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Corporate Tax Avoidance and the Real Effects of Taxation: A Review

Alissa I. Brühne and Martin Jacob*

Abstract

The tax literature of the past two decades has been dominated by empirical studies on corporate tax avoidance and a growing literature on the real effects of taxation. However, this literature lacks a quantitative synthesis of these studies and an in-depth discussion of potential convergences and divergences in empirical findings. To thoroughly evaluate empirical results, we provide a comprehensive theoretical framework that allows us not only to organize the literature, but also to identify underexplored yet fruitful areas for future research. We link our theoretical predictions to a quantitative synthesis of all empirical tax studies published in the top accounting, finance, and economics journals over the last two decades. Combining theoretical predictions with a quantitative synthesis allows us to identify potential empirical inconsistencies and areas for future tax research.

Keywords: Tax avoidance, literature review, real effects, quantitative synthesis

JEL Classification: M48, M41, H25, H26

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1 Introduction

Taxes represent a major cost factor for firms and play a pervasive role in corporate investment and financing decisions (e.g., Scholes & Wolfson, 1992). To reduce their effective tax burden, many firms engage in various tax avoidance activities. Recently, these activities have led to a growing interest in corporate tax practice—not only among policy makers and the general public, but also among tax researchers. Over the last two decades, a large number of studies examining the determinants and consequences of corporate tax avoidance as well as on the real effects[1] of taxation have been published. Despite this large and still growing literature, many studies provide conflicting results or lack a clear theoretical underpinning.[2] This review provides a theoretically grounded summary of the empirical tax avoidance literature as well as the real effects literature. Furthermore, we are the first to systematically compare theory and aggregated empirical evidence in these fields to identify fruitful paths for future research.

Specifically, we synthesize and review the literature on the determinants and consequences of corporate tax avoidance as well as on the real effects of taxation. Our analysis is guided by three questions: (1) What drives the profit-maximizing level of tax avoidance? (2) How do taxes affect the profit-maximizing level of labor and capital input (real effects)? (3) How does tax avoidance interact with this tax effect on capital and labor? To guide these three questions, we organize our literature review around the theoretical framework provided by Dyreng, Jacob, Jiang, & Müller (2020) (in the following referred to as DJJM framework). Based on this framework, we hypothesize that a profit-maximizing firm will engage in tax avoidance if the marginal benefits associated with such activities exceed the additional costs (see also Scholes & Wolfson, 1992). The key advantage of the DJJM framework is that it also allows us to assess the real effects of taxation and how corporate tax avoidance interacts with these real effects.

To compare our theoretical predictions to the large body of empirical studies, we conduct an extensive quantitative synthesis of the empirical tax avoidance literature of the last two decades.

[1] We consider a firm's response to corporate taxes a *real effect* if tax rules (e.g., tax rates or the tax base via deprecation or tax credits) affect the level and/or the mix of labor and capital input in firms. We call them real effects because changes in firms' labor and capital input are key drivers of overall economic growth (e.g., Solow, 1957)). Labor input choices, for example, comprise the number of employees, the mix of high versus low skill employees, or the location of employees. Capital input refers to the amount of fixed assets or intangible assets.

[2] Several tax avoidance studies rely on framework by Scholes & Wolfson (1992). While we do acknowledge that their framework provides a thorough basis for evaluating how taxes affect business decisions, we stress the need for a more detailed analytical model for investment decisions.

Our innovative approach allows us to conduct a systematic review of a specific (rather mature) literature field by quantitatively synthesizing the empirical evidence (Glass, 1976; Buckley, Devinney, & Tang, 2014). A classical meta-analysis does not seem feasible in our case. Due to the substantial variation, for example, in tax avoidance definitions or operationalizations of real effects across studies, one cannot reliably aggregate the empirical results into an actual statistical meta-regression (Pomeroy & Thornton, 2008; Khlif & Chalmers, 2015).[3] However, we believe that some form of quantitative synthesis is still needed to move the tax literature forward. In this review, we therefore strive to quantitatively synthesize the empirical findings obtained by prior studies to create a better understanding of potential consistencies and inconsistencies between theory and empirical evidence. Instead of identifying the true effect in the population, our approach focuses on a depiction of the dispersion of the coefficient signs and the variation in statistical power across empirical tax studies. Our approach proceeds as follows: first, we employ a structured keyword search and identify the relevant empirical studies in one of the top accounting, finance, or economics journals over the last two decades. These papers examine either corporate tax avoidance determinants or consequences or examine the effect of corporate tax rules on firms' investment or other operational decisions (i.e., real effects). We identify 188 studies in these journals. Second, we extract the coefficient signs and significance levels of all the relevant explanatory variables from the main regressions of these studies. Third, we aggregate the empirical evidence and evaluate it under consideration of the DJJM framework. As a general trend, we find that the majority of the papers address determinants, whereas the consequences and real effects of tax avoidance receive less (although recently growing) attention.

We identify 32 tax avoidance determinants from the empirical studies considered in our analysis. Based on theory, an unambiguous directional prediction can be derived for 16 of these 32 determinants (e.g., leverage, growth opportunities, or financial reporting incentives). For the other 16 determinants, the theoretical framework predicts that the benefits and costs of tax avoidance are affected such that the predicted effect is ambiguous (e.g., intangible assets or market power). For ten determinants, theory and empirical results are aligned (growth opportunities, financial constraints, foreign operations, statutory tax rates, corporate political

[3]Moreover, given that the empirical tax literature is dominated by U.S.-centered research, the samples of the different studies could, in fact, not be fully independent. Thus, a meta-analysis might not properly identify the true effect in the population.

activity, intermediaries, book-tax conformity, anti-tax avoidance rules, tax enforcement, and labor organization). Also for ten other determinants, theory as well as empirical results are mixed (size, market power, institutional ownership, worldwide taxation, country characteristics, corporate complexity, customer base, CSR, board characteristics, and life-cycle stage). For six determinants, for which we have mixed theoretical predictions, empirical results lean towards a positive association with tax avoidance (profitability, tangibility, intangible assets, and executive incentives) or towards a negative association (family ownership and executive characteristics). Next, for two determinants (internal information environment and peer tax practice), we have a clear theoretical prediction, but mixed empirical evidence across the studies in our sample. Finally, there are three determinants for which theory and empirical evidence contradict each other (losses, leverage, and financial reporting incentives). Taken together, the results of our determinants analysis highlights some inconsistencies between theory and empirics.

Second, we focus on the consequences of corporate tax avoidance. We organize the literature on tax avoidance consequences around four key constructs examined in prior empirical literature: transparency, cost of capital, cost of debt, and firm value. For instance, a common notion in the literature is that corporate tax avoidance should reduce the transparency of a firm's operations. Under the caveat that transparency can only be measured indirectly, the surveyed empirical studies report results consistent with this notion. Of the 31 regressions considered in our quantitative synthesis, 81% find a statistically significant and negative association between transparency and corporate tax avoidance. While theory is ambiguous for the other consequences, clear empirical results seem to exist with respect to corporate tax avoidance and cost of capital. Of the regressions considered in our analysis, 83% outline a significant positive association between these two constructs. With regard to tax avoidance and cost of debt, 91% of the regressions considered emphasize a significant negative association.

In the final step, we turn to the real effects of taxation on corporate investment decisions. Based on prior literature and the DJJM framework, we identify two tax policy tools, which primarily affect corporate investment decisions: statutory corporate tax rates and the deductibility of investment costs (e.g., through depreciation, DPAD, or deductibility limits). In total, we examine 51 real effects studies. There seems to be a consensus between theory and empirical evidence that statutory corporate tax rates reduce firms' capital investment (e.g., Giroud

& Rauh, 2019). Similarly, studies using a combination of tax rates and tax base elements, e.g., through effective average tax rates (e.g., Djankov, Ganser, McLiesh, Ramalho, & Shleifer, 2010) or through user cost of capital (e.g., Chirinko & Wilson, 2008) find a negative effect of tax rates on investment and overall business activity. With respect to the tax deductibility of investment costs, empirical work has isolated specific tax elements such as depreciation that affect investment consistent with theory. However, there is a lack of studies on the investment impact of recently implemented policy tools such as anti-tax avoidance regulation. Our review also shows that a large fraction of papers focuses on capital investment and its financing (capital structure decisions), leaving room for more studies on employment and investments in R&D. We further document that there is a growing empirical literature providing evidence that taxes paid by shareholders and other stakeholders (e.g., dividends or consumer taxes) affect corporate investment (e.g., Becker, Jacob, & Jacob, 2013; Alstadsæter, Jacob, & Michaely, 2017; Jacob, Michaely, & Müller, 2019).

However, there is still substantial room for more work on the real effects of taxation and, in particular, on the question how corporate tax avoidance can affect investment. A key gap in the empirical literature relates to the role of corporate tax avoidance in shaping investment decisions. One notable exception is the macroeconomic view in Shevlin, Shivakumar, & Urcan (2019). While theory yields the unambiguous prediction that corporate tax avoidance can increase firms' investments (by muting the adverse effect of corporate taxes on investment), there is little empirical research supporting this prediction. Understanding this link is, however, important for several reasons. First, given the recent policy changes triggered by the OECD BEPS action plan, the increased public scrutiny, and the recent cases of leaked tax documents, understanding the role of tax avoidance in shaping real investment decisions is a crucial prerequisite for informed policy debates. Another so-far underexplored area of research relates to the effect of corporate taxes and tax avoidance on income and wealth inequality (see, in general, e.g., Piketty & Saez, 2003). Since business profits and corporate income comprise a substantial fraction of top income individuals (Alstadsæter, Jacob, Kopczuk, & Telle, 2017; Smith, Yagan, Zidar, & Zwick, 2019), corporate tax avoidance might contribute to income inequality. This also helps to understand who benefits from tax avoidance (and who is worse off). By better understanding the consequences and real effects of taxation and, in particular, of corporate

tax avoidance, future research can add important insights to (1) the ongoing policy and public debate on tax policy changes, which strive to combat aggressive tax avoidance and (2) to the academic and public debate on inequality.

Taken together, our study makes several contributions to the literature. First, we provide a structured and quantitative review of the empirical tax literature of the last two decades. Prior reviews are either confined to early and selected evidence (Shackelford & Shevlin, 2001; Hanlon & Heitzman, 2010) or focus on the determinants of tax avoidance (Wilde & Wilson, 2018). Since the reviews by Shackelford & Shevlin (2001) and Hanlon & Heitzman (2010), the tax avoidance literature has advanced substantially and the scope of the literature has widened (Wilde & Wilson, 2018). We summarize these trends and contrast empirical evidence and theory in a structured way. We contribute, in particular to Wilde & Wilson (2018), by also summarizing the real effects literature and by bridging the gap between the (mostly accounting-based) tax avoidance literature and the (mostly economics- or finance-based) real effects literature. Moreover, while Shackelford & Shevlin (2001) and Hanlon & Heitzman (2010) primarily focus on U.S.-centered accounting research, our review also accounts for international evidence and integrates studies from related research fields (e.g., economics and finance). Second, our study contributes to the literature by embedding both, the tax avoidance and the real effects literature, into a single comprehensive theoretical framework. The DJJM framework allows us to not only identify interdependencies between different constructs, but also to highlight empirically underexplored yet theoretically relevant research areas. The third contribution of our paper is that we provide and discuss various gaps in the tax avoidance literature, as well as in the literature on the real effects of taxation. In doing so, our paper not only stresses the need to better combine these two literature streams in the future, but also outlines the demand for more research contributing to big picture (societal) questions, e.g., on inequality and policy debates.

2 Theoretical Framework to Structure the Literature

The review is structured around the following three related questions: (1) What drives the profit-maximizing level of corporate tax avoidance? (2) How do taxes affect labor and capital input (i.e., real effects)? (3) How does tax avoidance interact with the real effect of taxation? To organize our literature review around these three questions, we use the theoretical framework

proposed by Dyreng, Jacob, Jiang, & Müller (2020). While other frameworks, e.g., the Scholes-Wolfson framework might be perfectly suited to answer the first question, the DJJM framework allows us to answer all three questions based on one single analytical framework.[4] Dyreng, Jacob, Jiang, & Müller (2020) develop their framework to examine how tax incidence and tax avoidance interact. Thus, applying the DJJM framework accounts more formally for the general notion of including all taxes, all costs, and all parties (e.g., Scholes & Wolfson, 1992). We believe that, beyond this original objective, the DJJM framework also allows for understanding the choice of factor inputs (level and mix of labor and capital, that is, real effects) and the role of taxes in this decision, and the interaction of tax avoidance and the tax effects on factor input choices. After discussion the general setup of the framework, we subsequently discuss the implications for the three questions.

2.1 General Framework

Dyreng, Jacob, Jiang, & Müller (2020) define the after-tax profit function of a representative firm as follows:

$$\Pi(K, L, A) = [1 - (\tau - A)] \left(\rho F(K, L) - wL - \eta rK\right) - (1 - \eta)rK - C(A) \tag{1}$$

It is assumed that the representative firm strives to maximize after-tax profits $\Pi(K, L, A)$, instead of just minimizing taxes paid. The representative firm invests in capital K, labor L, and tax avoidance A. All three investments are costly for the firm. The cost of capital investment per unit amounts to r. The cost of labor per unit equals the wage cost w. It is assumed that wages are fully tax deductible, whereas the tax deductibility of capital investment is restricted by the parameter $\eta \in [0, 1]$. The restriction parameter η accounts for the fact that tax deductibility is often lower than the actual cost of capital investment, which comprises the costs of both financing and economic depreciation. Hence, η also captures any tax-induced investment distortions (e.g., limited loss offset rules, limited accounting depreciation, or the non-deductibility of the cost of financing), which we discuss later. The statutory corporate tax rate on pre-tax income is captured by the parameter τ.

[4] We, of course, acknowledge that there are clear limitations of the DJJM framework when it comes to more complex tax avoidance determinants such as ownership structure that would require principal-agent models (see, e.g., Jacob, Rohlfing-Bastian, & Sandner, 2019, for such a model).

2.2 The Tax Avoidance Decision

Dyreng, Jacob, Jiang, & Müller (2020) assume that firms engaging in corporate tax avoidance can reduce the statutory tax rate by A percentage points, leading to an effective tax rate (ETR) of $\tau - A$. Thus, tax avoidance is modeled as a reduction in the effective tax rate on profits. The authors also account for the fact that tax avoidance can be assumed to be a (financially) risky and thus costly activity (Rego & Wilson, 2012). Indeed, the costs associated with corporate tax avoidance $C(A)$ can be manifold and increase with a firm's engagement level in tax avoidance activities ($C'(A) > 0$). Wilde & Wilson (2018) distinguish three types of tax avoidance costs: agency, implementation, and outcome costs. Outcome costs, for example, comprise potential reputation damages stemming from corporate tax avoidance engagement (e.g., Dyreng, Hoopes, & Wilde, 2016).[5] Equation 1 implies that the optimal level of corporate tax avoidance must satisfy the following equation:

$$\rho F(K^*, L^*) - wL^* - \eta r K^* = C'(A^*) \tag{2}$$

The asterisks in Equation 2 denote the equilibrium values of the input factors K and L, and corporate tax avoidance A. The expression on the left side of Equation 2 captures a firm's revenues minus all deductible costs, i.e., the corporate tax base. Intuitively, the higher the tax base, the higher a profit-maximizing firm's incentives are to engage in corporate tax avoidance. The left-hand side of Equation 2 therefore captures the marginal benefit resulting from each percentage point of tax avoided. The right-hand side of Equation 2 accounts for the marginal cost of tax avoidance. While intuitively simple, Equation 2 encapsulates a wide range of trade-off dynamics that determine the optimal level of corporate tax avoidance. For example, it illustrates that, under limited tax deductibility of investment costs ($\eta < 1$), a firm with a higher proportion of capital input will have greater incentives to engage in corporate tax avoidance than a firm with a higher proportion of labor input.

2.3 The Effect of Tax Rules on Capital and Labor Input

One advantage of the DJJM framework is that it also serves as a theoretical basis for a review of the literature on real effects. According to Equation 1, corporate tax rules, that is, the level

[5] Reputational concerns can affect not only the firm itself but also its top executives, due to for instance, managerial career concerns, as highlighted, for example, by Chyz & Gaertner (2018).

of the tax rate (τ) and the definition of the tax base (η) can affect both capital investment K and labor input L. This becomes apparent through the two first-order conditions of Equation 1:

$$pF_K(K^*, L^*)\frac{1-(\tau - A^*)}{1-\eta(\tau - A^*)} = r \tag{3}$$

$$pF_L(K^*, L^*) = w \tag{4}$$

Equation 3 shows that the optimal level of capital K^* depends on the statutory tax rate, τ, if the tax deductibility of capital is restricted ($\eta < 1$). Equation 4 contains the first-order condition for the optimal level of fully tax-deductible labor input. Specifically, we are interested in how specific tax policy tools can affect corporate investment decisions. Equation 3 outlines how tax policy can influence the optimal level of capital investment K^*. Policy makers can change either the statutory tax rate τ or any tax base item that determines the deductibility η of the costs associated with capital investment (e.g., depreciation rules, loss offset restrictions, or the deductibility of interest expenses). Likewise, they could affect the deductibility of labor costs, which we omit for the sake of simplicity. Still, labor decisions are affected through the optimal level of capital K^* in the model. If a firm's demand for capital decreases, demand for labor also decreases. This way, corporate taxes can reduce employment.

In general, taxes will have no impact on investment decision if the tax system allows the cost of capital investment to be fully deducted ($\eta = 1$), that is, if the tax system is neutral (Diamond & Mirrlees, 1971; Sandmo, 1974). However, in reality, the deductibility of the cost of capital investment r will always be limited ($\eta < 1$) (e.g., Sandmo, 1974). To see this, a corporate tax system would have to allow firms to deduct not only the economic depreciation but also the cost of equity and debt financing from the tax base. In this case, a higher corporate tax rate reduces capital investment ($\partial K^*/\partial \tau < 0$). Further, if policy makers increase the deductibility of investment expenses (i.e., move η closer to a value of one), corporate investment increases ($\partial K^*/\partial \eta > 0$). In Section 6, we discuss the empirical evidence on the real effects of taxation. Specifically, we focus on the real effects of tax policy changes of either the statutory corporate tax rate (τ) or the tax base definition (η).

2.4 The Interaction of Tax Avoidance and the Real Effects of Corporate Taxation

Equation 3 allows us to tackle our third overarching question, as it is informative about the interaction of tax avoidance (A^*) and capital anf labor input choices. Tax avoidance activities can have real consequences for corporate investment decisions because tax avoidance affects the firm-specific corporate tax rate. Equations 3 and 4 indicate that, as long as investment costs are not fully tax deductible (which holds for most existing corporate tax systems), capital represents a less attractive input factor. Tax avoidance reduces this tax impact. For example, consider that costs of tax avoidance $C(A)$ decline. This way, the firm's optimal level of tax avoidance increases. Thereby, the adverse effect of the statutory tax rate is mitigated and firms invest more because they pay a lower effective tax rate ($\tau - A^*$). Put differently, corporate tax avoidance is expected to mitigate the adverse effect of corporate taxation in the sense that for a given statutory tax rate, firms with more tax avoidance would also invest more and employ more employees. Tax avoidance thus affects the optimal level of labor and capital input by reducing the effective tax burden on profits.[6]

3 Sampling Approach of the Quantitative Synthesis

There is substantial variation in definitions and operationalization across tax avoidance or real effects studies. Hence, a classical meta-analysis that aggregates the results of all empirical studies into one statistical meta-regression is not feasible for our research objectives (Pomeroy & Thornton, 2008; Khlif & Chalmers, 2015). The general idea of quantitatively assessing the literature is, however, still appropriate, since we are primarily interested in exploring empirical regularities across tax avoidance studies or real effects studies. We therefore adopt an quantitative synthesis approach focusing on the documentation of the dispersion of the coefficient sign and significance levels across empirical tax avoidance studies on the one hand and real effects studies on the other hand.

We conduct a systematic search process and first define all relevant publication outlets considered in our structured literature search. We set the scope of our synthesis to studies published in top accounting, finance, and economics journals. To identify top accounting and finance jour-

[6]Note that this explanation is independent from financing frictions. For financially constrained firms, tax avoidance would not only affect investment decisions by reducing the effective tax rate on an investment, tax avoidance would also increase the internally generated cash to fund the investment. Thereby, the cost of financing is also reduced.

nals, we refer to the Erasmus Research Institute of Management Journal List (EJL).[7] From this list, we include all journals with an EJL STAR or P classification in our search process. We also include the *Journal of the American Tax Association* and the *National Tax Journal* in our journal list, given that this journal represents an important outlet for (U.S. centered) tax research. To identify top economics journals, we follow the Scientific Journal Rankings.[8]

Table 1 lists all 42 accounting, finance, and economics journals considered in our structured literature search. We limit our literature search to studies published or forthcoming in these journals between 1998 and March 2019. We then conduct a systematic Web of Science (WoS) keyword search in the selected journals to identify relevant empirical studies.[9] In total, our systematic keyword search yields 384 unique studies. From these 384 studies, we remove misclassifications (e.g., studies covering personal tax avoidance or covering only shareholder-level taxes), any theory studies or surveys, and papers identifying the drivers of cross-border profit shifting.[10] In a subsequent step, from the pool of remaining studies, we identify all studies dealing with tax avoidance determinants, tax avoidance consequences, or with real effects of taxation. In sum, we identify 114 studies on tax avoidance determinants, 23 studies on tax avoidance consequences, and 51 studies on real effects of taxation. Table 1 reports their distribution across the 42 journals.

In Figure 1, we provide an overview of recent trends in the tax avoidance literature, based on studies published in the top accounting, finance, or economics journals over the last two decades. As becomes apparent, there are many determinant studies. In addition, a growing number of studies on consequences and real effects have emerged during recent years. Table A.1 in the Online Appendix presents a list of the 114 studies on tax avoidance determinants, 23 studies on tax avoidance consequences, and 51 studies on real effects of corporate taxes.

[7] See https://www.erim.eur.nl/about-erim/erim-journals-list-ejl/ (accessed: 2019-07-03).

[8] The list of journals included in the Scientific Journal Rankings ranking is available at https://www.scimagojr.com/journalrank.php?area=2000 (accessed: 2019-07-03).

[9] Specifically, we run separate WoS search queries with the search words *tax avoidance*, *tax planning*, *tax shelter*, *tax aggressiveness*, *income shifting*, *profit shifting*, and *effective tax rate* to identify determinants and consequences of tax avoidance studies. To identify real effects studies, we use search string combinations of the search words *tax*, *corporate*, *firm*, *effect*, *consequence* and the real effects search words *capital*, *investment*, *labor*, *wage*, *employment*, *dividend*, *financing*, *intangible*, *research*, *R&D*, *innovation*, *patent*, *location*, *resource allocation*, *bonus depreciation*, *productivity*, *input*, *operations*, *repatriation*, *welfare*, *incidence*, *inequality*, *offshore*, *mergers*, or *acquisitions*.

[10] These steps explain why our coverage of studies, e.g., in *The Accounting Review*, differs from Wilde & Wilson (2018).

We synthesize the empirical evidence on the determinants of corporate tax avoidance as follows: first, we identify the main regression tables in the respective studies and select all full specification tests with a tax avoidance construct as the dependent variable. Then, we collect the coefficient signs and significance levels for all the relevant control variables, which capture tax avoidance determinants, from these full specification tests to determine the frequency of the four possible coefficient sign–significance combinations (+/Y, +/N, -/Y, and -/N) for all the tax avoidance determinants. Whenever necessary, we reverse the coefficient signs to ensure directional comparability across all tax avoidance proxies. For example, if a study originally reports a negative determinant coefficient and the dependent variable of the regression is a firm's GAAP ETR, we reverse the coefficient sign (from negative to positive) to accurately record the positive association between the respective determinant and tax avoidance. In our analysis, we use a very broad definition of tax avoidance following following Dyreng, Hanlon, & Maydew (2008) and Hanlon & Heitzman (2010). Tax avoidance comprise all actions that a firm takes to reduce cash taxes paid, including non-aggressive means (e.g., via loss utilization or tax credits) or aggressive means (e.g., via tax shelters). While our data would in general allow for a deeper analysis according to the level of aggressiveness, we view this as beyond the scope of our paper because of the three questions we want to answer in this paper.[11] Hence, our results on the determinants of tax avoidance need to be interpreted in a way that we explain the determinants of all means to reduce cash taxes paid.

The results of our quantitative synthesis of the determinants literature are displayed in Figure 2 and Table 3. Table A.2 of the Online Appendix is a long version of Table 3 and contains a detailed breakdown by measure (e.g., total assets or total sales as a proxy for firm size). Figure 2 plots the distribution of the aggregated empirical evidence (+/Y, +/N, -/Y, and -/N) for each determinant and compares it to theoretical predictions. The information displayed in Figure 2 and Table 3, as well as our predictions, are explained in more detail in Section 4. We employ a comparable approach to assess the 23 studies on tax avoidance consequences. If necessary, the coefficient signs are again reversed to ensure directional comparability across tax avoidance measures. The results of our quantitative synthesis of the tax consequence studies are presented

[11] Future research could tackle this point, for example, using our data.

in Figure 4 and Table 4. We discuss these results in more detail in Section 5. The results of the real effects analysis are discussed in detail in Section 6.

4 Determinants of Corporate Tax Avoidance

We identify 32 tax avoidance determinants from the empirical studies included in our quantitative synthesis. In the following, we present an overview over these 32 determinants, a brief discussion of the theoretical predictions, and an overview over the empirical results. We keep the discussion of the theoretical predictions very brief in the paper and refer to the Online Appendix for a longer and more elaborate discussion of the predictions of each determinant.

4.1 Theoretical Predictions

To derive a theoretical prediction for the directional link between each determinant and corporate tax avoidance, we rely on a pure cost-benefit comparison of tax avoidance. We base our discussion on the Scholes-Wolfson framework as well as the DJJM framework, introduced in Section 2. Table 2 summarizes the theoretical predictions for the 32 determinants discussed in our review. Specifically, we summarize how each of the 32 determinants affects the cost–benefit trade-off of engaging in tax avoidance.

Let us illustrate the application of the cost-benefit trade-off using the example of the most frequently examined determinant of corporate tax avoidance, namely firm size. Predictions on the directional association between firm size and corporate tax avoidance can be motivated by political power theory and political cost arguments. Political power theory suggests that larger firms are more powerful and could thus succeed in negotiating more favorable environmental conditions (e.g., more beneficial tax treatments) (Siegfried, 1972). Larger firms could, for instance, engage more successfully in corporate political activity (i.e., lobbying), thereby reducing the costs of tax avoidance. Hence, firms' incentives to engage in corporate tax avoidance should increase with firm size (Kim & Zhang, 2016).

However, a contrary prediction can be derived from the political cost argument (Watts & Zimmerman, 1978). Political costs comprise any wealth transfers that are imposed upon firms due to their political sensitivity (e.g., taxes, tariffs, or the loss of specific subsidies or government contracts). Larger firms can face more severe public and government scrutiny, due to higher external visibility (Wong, 1988). Hence, we predict that public or government scrutiny

could force larger firms to reduce tax avoidance activities due to their higher political costs of tax avoidance.[12] Altogether, the theory seems ambiguous for size.

In sum, the theoretical link between tax avoidance and the respective determinants is ambiguous in 16 of 32 cases (size, profitability, tangibility, intangible assets, market power, executive incentives, executive characteristics, institutional ownership, worldwide tax system, country characteristic, corporate complexity, family ownership, customer base, corporate social responsibility (CSR), board characteristics, and the life-cycle stage). For eight of the 32 determinants, we expect a positive association between tax avoidance and the respective determinant (growth opportunities, financial constraints, foreign operations, statutory tax rates, corporate political activity, use of intermediaries, internal information environment, and peer tax practice). For the remaining eight determinants (losses, leverage, financial reporting incentives, external information environment, book-tax conformity, anti-tax avoidance rules, tax enforcement, and labor organizations), we expect a negative relation between tax avoidance and the respective determinant based on the cost-benefit trade-off of engaging in tax avoidance.

4.2 Linking Theory to Empirical Results

As introduced above, Figure 2 and Table 3 summarize the empirical results of our literature review. Again, let us illustrate the outcome of the determinant analysis using the coefficient on firm size. Our search identifies 81 studies controlling for firm size in their main regressions. Among the 213 regressions considered from these 81 studies, 71% obtain statistically significant results, with one-half of the regressions exhibiting a positive estimate and the other half exhibiting a negative estimate. Hence, not only are the theoretical predictions mixed, also the empirical results are mixed suggesting.

To summarize our results and to compare theoretical predictions and empirical outcomes, Figure 3 presents a matrix of both, theory and empirics. The top left (bottom right) box summarizes the determinants along with the number of coefficient estimates for which we predict a positive (negative) association with tax avoidance and for which we find a positive (negative) association empirically. Put differently, for these 10 determinants (six in the top right box and

[12] In addition, labor economics theory suggests that larger firms could attract more productive employees, have earlier access to advanced technologies, are better organized and informed, offer better training on the job, and provide higher working standards for their employees (Oi, 1983; Idson & Oi, 1999). A size-induced increase in productivity and thus profits should favor a positive association between tax avoidance and firm size.

four in the bottom right box), theory and empirical results are aligned. These determinants are growth opportunities, financial constraints, foreign operations, statutory tax rates, corporate political activity, and intermediaries in the top left box, and book-tax conformity, anti-tax avoidance rules, tax enforcement, and labor organization in the bottom right box.

The middle box represents the ten determinants for which theory as well as empirical results are ambiguous. Specifically, for size, market power, institutional ownership, worldwide taxation, country characteristics, corporate complexity, customer base, CSR, board characteristics, and life-cycle stage, empirics and theory are ambiguous. For six determinants, for which we have mixed theoretical predictions, empirical results lean towards a positive association of the determinant and tax avoidance (profitability, tangibility, intangible assets, and executive incentives) or towards a negative association (family ownership and executive characteristics).

Finally, we note that there are two additional boxes with discrepancies between theory and empirical. The top box in the middle summarizes two determinants (internal information environment and peer tax practice) for which we have a clear theoretical prediction, but mixed empirical evidence across the studies in our sample. Further, the bottom left corner summarizes three determinants for which theory and empirical evidence contradict each other (losses, leverage, and financial reporting incentives). One potential explanation in the case of losses is that there is a mechanical relation between losses and the cash effective tax rate, which is a commonly used proxy of tax avoidance.

For scholars interested in the determinants of tax avoidance, the results in this section outline areas where theory is not supported by empirical evidence or where theory is ambiguous but the empirical results seem to point towards one direction. One implications of this finding is that the literature has made progress in understanding the determinants of tax avoidance. However, we also outline ambiguous theoretical and empirical findings, where it might be helpful to disentangle competing explanations. Ideally, researchers can strive for more compelling research designs to isolate the effects and the respective channels.

4.3 Risk and Uncertainty of Corporate Tax Avoidance

Finally, we discuss the role of uncertainty in tax avoidance. In general, managers weigh benefits and costs to decide on the optimal level of corporate tax avoidance as discussed so far. However,

the costs and benefits of tax avoidance can be uncertain: Due to ambiguities and complexities inherent in the tax code, managers' and tax authorities' evaluations of a firm's tax liability can diverge. In addition, the assessment of the sustainability of specific tax positions upon audit can differ. Hence, firms can face the uncertainty of additional cash demands by tax authorities (Hanlon, Maydew, & Saavedra, 2017; Dyreng, Hanlon, & Maydew, 2019).

There is a growing literature on whether and how tax uncertainty affects tax avoidance. The survey by Graham, Hanlon, Shevlin, & Shroff (2014) provides evidence suggesting that managers incorporate tax uncertainty into their decision making. Guenther, Wilson, & Wu (2019) show that the percentage of uncertain tax avoidance is not higher for firms engaging in relatively more tax avoidance. In contrast, Dyreng, Hanlon, & Maydew (2019) document a positive relation between cash ETRs and the level of firms' uncertain tax avoidance. The varying results can be attributable to differences in measuring tax uncertainty. Many studies use measures related to unrecognized tax benefits (UTBs), disclosed under Financial Interpretation No. 48 (FIN 48), to proxy for tax uncertainty. UTB reserves represent the corporate estimate of potential additional tax expenses that a firm expects to owe the tax authorities after audit (Blouin, Gleason, Mills, & Sikes, 2007; Towery, 2017). Studies employing UTB-related measures define tax uncertainty as the difficulties in applying ambiguous tax law to corporate facts and the resulting uncertainty about future tax payments (Mills, Robinson, & Sansing, 2010; Lisowsky, Robinson, & Schmidt, 2013). Consistent with this definition, Ciconte, Donohoe, Lisowsky, & Mayberry (2016) provide evidence that UTBs are indeed predictive of firms' future tax cash outflows.

However, we note that several studies emphasize that managers can exercise substantial financial reporting discretion in their FIN 48 disclosures, potentially decreasing the informativeness of UTBs regarding firms' actual level of tax uncertainty (Lisowsky, Robinson, & Schmidt, 2013; De Simone, Robinson, & Stomberg, 2014). Yet, so far, the literature still lacks a clear understanding of the definition, scope, and differentiation of tax uncertainty and tax risk (Wilde & Wilson, 2018; Guenther, Wilson, & Wu, 2019). Indeed, two recent studies advocate a broader tax risk notion. Neuman, Omer, & Schmidt (2019) construct a six-item tax risk score based on the tax risk management framework of a Big Four audit firm. They use this innovative measure to validate UTB-related tax uncertainty measures. Specifically, they document that their tax risk score explains a substantial part of the variation in UTBs. Brühne & Schanz (2019) add

to this by arguing the need to examine practitioners' tax risk understanding more directly. By conducting interviews with 40 experts involved in corporate tax risk management (e.g., CFOs, tax directors, tax consultants), they find that tax risk seems to be a highly context-dependent construct and that tax risk definitions differ between firm insiders and outsiders.

The previous discussion shows that the literature has not settled on a commonly accepted tax uncertainty proxy, particularly one that is also applicable to firms not reporting under U.S. GAAP. Thus, there is still room for future research on defining and measuring tax uncertainty in a way that allows for a better understanding and categorization of firms' tax avoidance decisions.

5 Consequences of Corporate Tax Avoidance

Why do researchers care so much about the determinants of tax avoidance? As we discuss in this section, corporate tax avoidance can have substantial consequences on firm decisions. Hence, it is important to understand not only the determinants (Section 4), but also the potential consequences of corporate tax avoidance. As described in Section 3, we also conduct a quantitative synthesis of the empirical evidence on tax avoidance consequences. We identify four constructs in our analysis: transparency, cost of capital, cost of debt, and firm value. We view these consequences as distinct from the real effects discussion in Section 6 because none of the consequences papers examines the link of tax avoidance to firms' investment or employment decisions (with the recent exception of Shevlin, Shivakumar, & Urcan, 2019).

5.1 Transparency

The literature argues that tax avoidance can decrease the transparency of a firm's operations for at least three reasons. First, tax avoidance renders a firm's actual operations less transparent (Desai, 2005). Second, the ability to increase after-tax profits can obscure a firm's actual operating performance. Third, the use of tax havens can enable a firm's management to conceal insider trading activities, for example, due to beneficial bank secrecy policies in tax havens. These arguments suggest a negative association between tax avoidance and transparency.

Figure 2 and Table 4 show that the empirical evidence seems to support this prediction. Of the 31 regressions, 81% report a statistically significant and negative association between tax avoidance and transparency. The corporate transparency proxies in these studies correspond to the proxy choices employed by financial reporting and disclosure studies (e.g., Healy & Palepu,

2001). Despite their popularity, most of these proxies capture rather the result of transparency than the transparency construct itself, and thus measure transparency only indirectly. For instance, Kim, Li, & Zhang (2011) suggest that corporate tax avoidance is positively related to a firm's stock price crash risk, which indirectly proxies for a decline in corporate transparency. Chung, Goh, Lee, & Shevlin (2019) use insider purchase probability, while Balakrishnan, Blouin, & Guay (2019) use analyst pre-tax forecast errors as a proxy for transparency. A few studies strive to examine directly how corporate tax avoidance affects specific information channels. Ayers, Jiang, & Laplante (2009) analyze the relation between aggressive tax avoidance and tax income's ability to truthfully depict economic income. Donohoe & Knechel (2014) find that tax-aggressive firms pay higher audit fees. Thus, aggressive tax avoidance could aggravate auditors' proper assessment and understanding of clients' tax positions. In addition, Chen, Hepfer, Quinn, & Wilson (2018) report that cross-border income shifting can curb investors' ability to identify the actual geographic location of income generation.

5.2 Cost of Capital and Cost of Debt

The link between tax avoidance and cost of capital is not trivial. Basic predictions on the link between tax avoidance and the cost of equity capital can be derived from the model of information quality and cost of equity capital by Lambert, Leuz, & Verrecchia (2007) (see, e.g., Goh, Lee, Lim, & Shevlin, 2016). According to Lambert, Leuz, & Verrecchia (2007), tax avoidance can affect cost of equity capital via two channels: first, via its effect on a firm's expected future cash flows and, second, via its effect on the covariance between a firm's cash flows and other firms' cash flows. If tax avoidance increases after-tax cash flows without a simultaneous offsetting increase in the covariance, cost of equity capital will decrease (Lambert, Leuz, & Verrecchia, 2007). Corporate tax avoidance strategies also affect firm fundamentals, for example, the intensity of foreign operations or R&D. This, in turn, can affect the covariance of a firm's cash flows with the market and alter the level of business risk. However, it is difficult to predict whether tax avoidance should increase or decrease the covariance of a firm's cash flows with the market. Sikes & Verrecchia (2016) propose that the covariance can increase when more firms in an industry adopt similar tax avoidance activities. In this case, the cost of capital is raised for all firms in that industry.

Tax avoidance can also affect the cost of debt. DeAngelo & Masulis (1980) predict that firms with large non-debt tax shields (e.g., tax shelters) have lower incentives to use debt for financing. Thus, there is a potential substitution between tax avoidance and debt financing. However, since tax avoidance decreases the benefits of debt financing and affects the cost of equity capital, it is difficult to predict whether these effects will lead to a lower or higher weighted cost of capital. Thus, theory on the link between tax avoidance and cost of capital is ambiguous.

Our analysis reveals clear tendencies for both the association between tax avoidance and the cost of capital and the association between tax avoidance and the cost of debt. With regard to the cost of capital, 83% of the 23 regressions in the analysis suggest a statistically significant and positive association between tax avoidance and the cost of capital. With regard to the cost of debt, 91% of the 11 regressions considered in our analysis depict a statistically significant and negative association. For example, Hasan, Hoi, Wu, & Zhang (2014) find that tax-aggressive firms incur higher loan spreads. Similar evidence is provided by Platikanova (2017), who finds that tax avoidance is linked to shorter debt maturities. Both studies thus suggest that lenders perceive tax avoidance as inherently risky.

If tax avoidance is indeed risky, it can also affect the cost of equity capital. Goh, Lee, Lim, & Shevlin (2016) examine the relation between tax avoidance and the implied cost of equity capital and find a significant negative relation. To some extent, this result is inconsistent with the interpretations proposed by Hasan, Hoi, Wu, & Zhang (2014) and Platikanova (2017). Goh, Lee, Lim, & Shevlin (2016) suggest that investors could, in fact, demand lower returns, since cash tax savings already generate higher expected cash flows. Consistent with Hasan, Hoi, Wu, & Zhang (2014), Brooks, Godfrey, Hillenbrand, & Money (2016) report a positive association between tax avoidance and capital asset pricing model betas in the U.K. setting. Heitzman & Ogneva (2019) propose that there is an industry-based risk premium to corporate tax avoidance. Consistent with the model of Sikes & Verrecchia (2016), Heitzman & Ogneva (2019) provide empirical evidence suggesting that this risk premium applies to all firms in an industry, independent of their actual tax avoidance engagement.

5.3 Firm Value

Whether tax avoidance influences cost of capital is closely related to the effect of tax avoidance on firm value. Tax avoidance can affect firm value directly via higher future after-tax cash flows, agency conflicts (Desai & Dharmapala, 2009), or reputational effects (Hanlon & Slemrod, 2009). Hanlon & Slemrod (2009), for example, find a negative stock market reaction to news on firms' tax shelter involvement, consistent with reputational tax concerns adversely affecting firm value. Desai & Dharmapala (2009) suggest that aggressive tax avoidance can lead to agency costs. In poorly governed firms, management's opportunities to extract rents from investors increase with reduced transparency. For such firms, tax avoidance can thus be negatively associated with firm value. Consistent with their theory, Desai & Dharmapala (2009) find a positive relation between tax avoidance and Tobin's Q. However, the results only hold for firms with a high percentage of institutional ownership.

When examining the empirical evidence on firm value and tax avoidance, we find mixed results (Figure 2 and Table 4). This is consistent with the difficulties in deriving a clear theoretical prediction for the overall relation between tax avoidance and firm value. A valuation model recently developed by Jacob & Schütt (2019) based on the framework of Feltham & Ohlson (1995) stresses the necessity of considering not only the level, but also the uncertainty of tax avoidance in a composite measure to fully assess the firm value consequences of corporate tax avoidance.[13] Obtaining a better understanding of the relation between tax avoidance and firm value is important, since firms would not engage in large-scale tax avoidance activities if these did not create value. This notion is consistent with shareholder value theory. Future tax research can add to this by explicitly investigating different tax avoidance strategies and their potential interdependencies. Moreover, future research should aim to theoretically and empirically link the results on firm value and cost of capital.

[13]Related to the notion of tax uncertainty driving firm value, Mescall & Klassen (2018) show that transfer pricing risk is negatively associated with takeover premiums in merger and acquisition deals.

6 Real Effects of Taxation

In this section, we discuss the literature on the real effects of taxation, particularly focusing on corporate investment. We examine 51 papers in this section.[14] As outlined in Section 2, tax policy tools (e.g., τ and η) affect corporate investment decisions in theory. The statutory tax rate τ can affect corporate investment if the costs of capital investment are not fully deductible for tax purposes ($\eta < 1$). Moreover, explicit rules dealing with the tax deductibility of financing costs or specific depreciation schemes can affect corporate investment. In the following, we discuss these two policy tools (tax rates and tax deductibility via the tax base) in more detail.

6.1 Investment and Statutory Corporate Tax Rates

Since private sector investment is highly relevant for overall economic growth (Solow, 1957), understanding the effect of tax rates on corporate investment is crucial. Panel A, Table 5 summarizes the different constructs in prior literature, sorted by the number of studies. The two most frequently examined constructs are investment and the funding of investment (i.e., capital structure). For both dependent variables, there appears to be consensus that higher corporate tax rates reduce investment and increase use of debt financing. For example, Giroud & Rauh (2019) estimate elasticities between -0.4 to -0.5, while Patel, Seegert, & Smith (2017) report an elasticity of -0.21. Related to financing, for example, Heider & Ljungqvist (2015) show that higher corporate tax rates increase leverage ratios. We note that studies use different approaches, either by using statutory tax rates or effective average tax rates which combine tax rate and tax base elements (e.g., Djankov, Ganser, McLiesh, Ramalho, & Shleifer, 2010). Such measures that also account for tax credits, e.g., for R&D investment are often used when examining the effect of corporate taxes on innovation and R&D activity. Our quantitative synthesis shows that there seems to be consensus of a negative impact of corporate taxes on innovation. Higher corporate taxes appear to discourage R&D investment. Moreover, consistent with theory, corporate taxes also seems to negatively affect location decisions.

Other important dependent variables are less frequently studied. For example, there seems to be mixed evidence whether and how statutory corporate tax rates affect employment lev-

[14] Some of the constructs directly reflect investments, e.g., capital expenditures or R&D spending. Other dependent variables capture financing (e.g., capital structure), specific large investments (M&A). or aggregated consequences (GDP growth).

els. Early evidence on this is provided by Ljungqvist & Smolyansky (2018). Williams (2018) shows that corporate tax rates appear to drive the decision to offshore jobs but the overall level of employment is still unanswered. Future research is needed to establish this link empirically. Finally, there are studies (1) linking repatriation costs to cash holdings (Arena & Kutner, 2015) or to M&A activities (Edwards, Schwab, & Shevlin, 2016; Harris & O'Brien, 2018), (2) examining the effect of corporate taxes on the choice of organizational form (Goolsbee, 1998; Donohoe, Lisowsky, & Mayberry, 2019), (3) analyzing risk-taking (e.g., Ljungqvist, Zhang, & Zuo, 2017), or (4) assessing the impact on overall GDP growth (Lee & Gordon, 2005; Shevlin, Shivakumar, & Urcan, 2019). In all these studies, theory and empirical evidence seem to be aligned. However, we note that for some important constructs, the empirical evidence is based on very few studies (especially with regards to employment and innovation), leaving substantial room for future research.

6.2 Investment and the Corporate Tax Base

Tax policy can unfold real effects also via the definition of the tax base, as indicated by the parameter η in the DJJM framework. Equation 3 suggests that investment levels increase as η increases, that is, when more of the cost of capital investment is deductible. Panel B of Table 5 summarizes the studies using tax base elements such as depreciation, loss offset rules, or thin capitalization rules. We transform all constructs in a way so that they reflect higher deductibility, predicting more investment. Empirical work supports our theoretical prediction that a higher η increases investment: The introduction of a bonus depreciation scheme increases the level of corporate investment (e.g., House & Shapiro, 2008; Zwick & Mahon, 2017). Likewise, the domestic production activities deduction (DPAD) appears to increase corporate investment (e.g., Ohrn, 2018; Lester, 2019). Since a higher deductibility of investment costs (higher η) reduce the after-tax cost of financing, theory predicts lower leverage. This result is confirmed by the empirical studies in our literature review (e.g., Ohrn, 2018). Further, loss offset restrictions also determine the scope of the corporate tax base. One effect of limited loss offset opportunities is a reduction in corporate investment and risk taking (Ljungqvist, Zhang, & Zuo, 2017; Bethmann, Jacob, & Müller, 2018; Langenmayr & Lester, 2018).

With respect to capital structure decisions, a large stream of the literature (not included in Table 5) deals with internal debt shifting within multinationals to shift profits to low-tax countries (Desai, Foley, & Hines, 2004; Huizinga, Laeven, & Nicodeme, 2008). To curb such profit-shifting activities, countries have implemented thin-capitalization rules limiting the tax deductibility of internal debt (Buettner, Overesch, Schreiber, & Wamser, 2012). Some countries have even expanded these rules to external debt, thereby reducing the deductibility of the cost of debt financing (e.g., the 2017 U.S. Tax Reform). According to the DJJM framework, a lower deductibility of the cost of financing reduces corporate investment (see Equation 3). How such rules affect overall levels of debt and ultimately corporate investment is an open question for future research. Further, our quantitative synthesis shows that there is a scarcity of studies on employment effects of specific tax base items. We note that studies on innovation and R&D activity are already covered in Panel A of Table 5. Taken together, the results in this section reveal that understanding how tax rules, in particular tax base items other than depreciation, is to date incomplete, leaving room for more research.

6.3 Other Taxes

So far, we have exclusively discussed the role of corporate income taxation. However, other tax types can also affect corporate decision making. For the sake of completeness, we briefly touch upon two additional taxes (i.e., shareholder taxes and consumer taxes) and outline how they can affect corporate investment. Consistent with the framework of Chetty & Saez (2010)[15], Becker, Jacob, & Jacob (2013) and Alstadsæter, Jacob, & Michaely (2017) show that dividend taxes affect the allocation of capital across firms: higher dividend taxes increase (decrease) the investment of firms with internal funds (external equity needs). In addition, other studies suggest no overall effect of dividend taxation on investment (e.g., Yagan, 2015). However, whether these studies' findings are indeed transferable to other markets (e.g., emerging markets) remains an open empirical question.

Taxes paid by external stakeholders also determine corporate investment decisions. For example, consumption taxes, which represent the most important revenue source for many coun-

[15]If firms require external equity to invest, dividend taxation thus negatively affects corporate investment (Harberger, 1962, 1966; Feldstein, 1970). If firms have the ability to fund profitable investments internally, dividend taxes do not affect corporate investment behavior (King, 1977; Auerbach, 1979). Chetty & Saez (2010) show that higher dividend taxes can lead to additional—yet inefficient—corporate investment.

tries, can affect corporate profitability. Although consumption taxes are collected by firms on behalf of their consumers, prior literature shows that such taxes can drive a wedge between the price that is paid by consumers and that which is received by firms (e.g., Poterba, 1996; Kenkel, 2005; DeCicca, Kenkel, & Liu, 2013). Consequently, firm profitability and corporate investment can decline. Jacob, Michaely, & Müller (2019) show that consumption taxes, such as the value-added tax, adversely affect investment and that this effect is a function of consumer demand elasticity.

7 Directions for Future Research

This section provides a more structured overview of promising research avenues in the tax literature, that we could identify from comparing theory and empirical evidence. Specifically, we strive to develop a comprehensive and structured agenda for future tax research revolving around the big picture question of how the tax literature can contribute to important societal topics and better guide policy-making in the future.

7.1 Macro-View on Corporate Taxes and Corporate Tax Avoidance

Taxes have important implications for the whole economy. Future accounting research in the area of taxation should ideally speak to these important questions. For example, as overall economic growth is driven by productivity, capital investment, and labor investment (e.g., Solow, 1957), corporate taxes and, thus also corporate tax avoidance, can have important implications on overall economic growth through their potential effects on real investment decisions. In particular, understanding the role of tax avoidance in investment decisions is an important step for future research.

Furthermore, given the public interest in tax avoidance (and the public outcry on this regard), the consequences of policy actions (e.g., the elements of the OECD BEPS initiative), of public and regulatory scrutiny, or of leaked documents for the real economy seem to be of first-order importance. While recent studies started to look into this (see among others the recent examples of De Simone & Olbert, 2020; Joshi, 2020; Joshi, Outslay, & Persson, 2020), the overall consequences of these policy actions on firms' investment decisions and tax practices is to date not well understood. While one single paper can hardly address these big picture questions, future accounting research should ideally strive to add to the debate and evaluation of recent

policy actions and their consequences. For example, from our initial three research questions, one question—the link between tax avoidance and real effects of corporate taxation—is still unanswered. While theory is relatively clear (tax avoidance mitigating the adverse tax effect on investment), this prediction is not tested. Addressing this question, however, is important to contribute to the policy debate on recent regulatory changes. Scholes & Wolfson (1992) emphasize that taxes represent a first-order cost factor in almost all business decisions. Corporate tax avoidance can reduce this cost. However, beside its cost-saving potential, tax avoidance can have several other *real* effects that are not yet well understood. Without fully understanding these effects, one also cannot fully explain why firms avoid taxes or not.

Our literature review further reveals that in order to better understand real effects, the scope of the analysis should be expanded to labor investments and R&D. In addition, future literature could isolate the effect of tax base elements. As we discuss above, while depreciation allowances and tax credits have received considerable attention in the real effects literature, recent tax policy changes that affect the cost of capital investment, such as thin capitalization rules, CFC rules, or transfer pricing documentation, can also unfold real effects. Understanding the real effects of these rules is important given the recent policy changes and the combination of reforms that cut tax rates while broadening tax bases (Brühne, Jacob, & Schütt, 2019).

In general, we call for compelling research designs and settings with sufficient variation. Moving away from primarily U.S.-focused tax research can foster the stronger identification of empirical results. Moreover, international tax (accounting) researchers can benefit from in-depth understanding of the nature of the variation examined in specific settings. By adding empirical evidence on the causal effect of specific tax rule changes from different countries, future research can contribute to the policy debate.

7.2 Role of Corporate Taxes and Tax Avoidance in Inequality and Incidence

Since corporate taxes and corporate tax avoidance determine the amount of profits that can be distributed to shareholders, corporate taxes can have implications for the debate on inequality. Over the past few decades, there is an intense academic and political debate about income and wealth inequality (see, among many others, Piketty & Saez, 2003; Piketty, Zucman, & Saez, 2018; Smith, Yagan, Zidar, & Zwick, 2019). Pass through business income (Smith, Yagan,

Zidar, & Zwick, 2019) and income derived from corporations (Alstadsæter, Jacob, Kopczuk, & Telle, 2017) play an important role among top incomes. Put differently, a large fraction of the income earned by top income earners relates to business profits. These profits—in case of (C-) corporations—are subject to corporate taxes and firms may have incentives to avoid taxes. Hence, corporate taxes and corporate tax avoidance could naturally increase income inequality. While this link seems intuitive, to date there is little empirical evidence on this aspect. We thus call for more research on addressing the link between (corporate) tax avoidance and income as well as wealth inequality. Understanding this link is important to obtain a more complete picture of the consequences of business taxation and tax avoidance. This would also improve our understanding with regards to who ultimately benefits from tax avoidance and who is indeed worse off.

The discussion on inequality also relates to the question of tax incidence, that is, the question of who ultimately bears the economic burden of corporate taxation. Given that corporations are able to pass on part of the corporate tax burden to their employees (e.g., Suárez Serrato & Zidar, 2016; Fuest, Peichl, & Siegloch, 2018; Dyreng, Jacob, Jiang, & Müller, 2020) or consumers (e.g., Baker, Sun, & Yannelis, 2020; Jacob, Müller, & Wulff, 2020), corporate tax avoidance can have important implications on tax incidence. As shown by Dyreng, Jacob, Jiang, & Müller (2020), tax avoidance and tax incidence are inevitably linked. More broadly, this calls for a better understanding of the firm and its stakeholders in firms' business decisions.

Beyond the question of tax incidence, future research could consider other ways stakeholders react to firms' tax positions. If stakeholders respond to tax avoidance outcomes, a firm needs to integrate these (potentially costly) consequences into its decision making on real effects (e.g., because capital providers might not invest in tax-aggressive firms, as stressed by Hanlon & Slemrod (2009)). Hence, we look forward to future work, which, for instance, examines the different facets of the reputational costs associated with corporate tax avoidance. One potential question in this regard is whether employees and long-term suppliers disapprove overly aggressive tax avoidance activities and punish tax-avoiding firms with lower productivity levels or less access to capital. Another important question is whether different stakeholder groups have potentially conflicting preferences for tax avoidance. It could, for instance, seem plausible for investors to prefer more aggressive but value-enhancing tax avoidance activities,

while employees may exhibit a relatively lower preference for such activities due to the inherent tax risks. Exploring situations in which the preferences of different stakeholder groups diverge could yield valuable insights in the potential real effects of corporate tax avoidance actions.

7.3 Challenges in Construct Measurement

In addition to these big picture research questions, one direction for future research relates to the constructs used to define tax avoidance and tax aggressiveness. In this paper, we follow Dyreng, Hanlon, & Maydew (2008) and Hanlon & Heitzman (2010) and define tax avoidance as all actions that reduce corporate tax payments. However, this approach has the limitation that firms reducing taxes via less aggressive means, for example, via net operating losses or tax credits, are not distinguished from firms using more aggressive methods (Drake, Hamilton, & Lusch, 2020; van der Geest & Jacob, 2020). While we acknowledge prior works' calls for better construct operationalization beyond ETRs (Hanlon & Heitzman, 2010; Blouin, 2014) and the fact that several innovative measurement approaches have recently emerged (see, e.g., Balakrishnan, Blouin, & Guay, 2019), we believe that there is still considerable room for future advances in construct measurement (e.g., with respect to tax aggressiveness, tax risk, and tax uncertainty). Moreover, the tax literature's understanding of the term *tax avoidance* is still limited. No general consensus exists on where to draw the line between non-aggressive and aggressive tax avoidance activities. Recent evidence suggests that excessive tax loss utilization does not seem to be an aggressive form of tax avoidance (van der Geest & Jacob, 2020). Blouin (2014) argues that "tax aggressiveness can only be defined by considering the riskiness of the firm's tax planning activities" (p. 878). In other words, if a tax transaction does not bear additional risks stemming from the way the transaction is structured for tax purposes, then the transaction should not be considered tax aggressive. However, as Blouin (2014) remarks, this consideration only pushes the definition issue to the next level and brings up a further concern: up to now, we have a limited understanding of what constitutes tax risk and tax uncertainty. In addition, it is not clear whether these two constructs are indeed clearly distinguishable (Wilde & Wilson, 2018). Given these definition challenges, it is not surprising that the literature is struggling substantially with measuring tax risk, tax uncertainty, and tax aggressiveness, especially for non-U.S. firms, which do not report UTBs.

Several studies use firms' cash ETR volatility to proxy for tax risk (e.g., Gallemore & Labro, 2015; Guenther, Matsunaga, & Williams, 2017). However, as in the case with ETR-based tax avoidance measures, such measures can be noisy, and volatility shifts may be exogenously induced (e.g., through statutory tax rate reductions). Moreover, recent qualitative work suggests that different parties involved in corporate tax practice tend to define tax risk differently—not only in terms of construct composition, but also in terms of construct direction (Brühne & Schanz, 2019). These qualitative insights into tax risk definitions offer the promising prospect to foster better-informed operationalization choices in future empirical work. Nevertheless, the measurement and definition of core tax concepts (i.e., tax avoidance, tax aggressiveness, tax risk, and tax uncertainty) remain a primary challenge of future tax research.

8 Conclusion

In this study, we provide a theoretically grounded, quantitative review of the literature on corporate tax avoidance and the real effects of taxation. Building on the framework by Dyreng, Jacob, Jiang, & Müller (2020), we derive theoretical predictions on the dynamics of corporate tax avoidance engagement. We conduct a quantitative synthesis of 188 studies on tax avoidance determinants, consequences and the real effects of taxation. Comparing the results of this analysis with our theoretical predictions allows us to identify areas where theory is either not supported by empirical evidence or where theory is ambiguous but clear empirical results seem to exist. Based on these results, we develop a structured research agenda for the future. In particular, this review calls for more research on firms' responses to recent policy changes by also accounting for the real effects of tax avoidance and the measures that countries take against firms. Further, future research can ideally inform important policy debates on inequality and how corporate taxes and the evidenced corporate tax avoidance contributes to this phenomenon.

This study contributes to the tax literature in several ways. While prior reviews (Shackelford & Shevlin, 2001; Hanlon & Heitzman, 2010; Wilde & Wilson, 2018) are either confined to early or selected tax avoidance research, we link the tax avoidance literature to the growing literature on the real effects of taxation. Further, in contrast to prior reviews, which primarily focus on U.S.-centered work, our review also accounts for international evidence. Finally, the theoretical considerations of the dynamics of corporate tax avoidance engagement, which we derive from

the framework by Dyreng, Jacob, Jiang, & Müller (2020), will allow other researchers to not only better map existing tax avoidance studies but will also help them in identifying fruitful areas for future research in the tax context. We look forward to future studies addressing the challenges and open questions outlined in this review to advance our understanding of corporate tax practice.

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Figure 1: Development of the Tax Literature

This figure shows the amount of (empirical and non-empirical) studies published per year that fall into one of the following four categories: studies on the determinants of tax avoidance, studies on the consequences of tax avoidance, and studies on the real effects of taxation. For this figure, we consider papers that appeared in any of the journals listed in Table 1 over the period from 1998 to 2018.

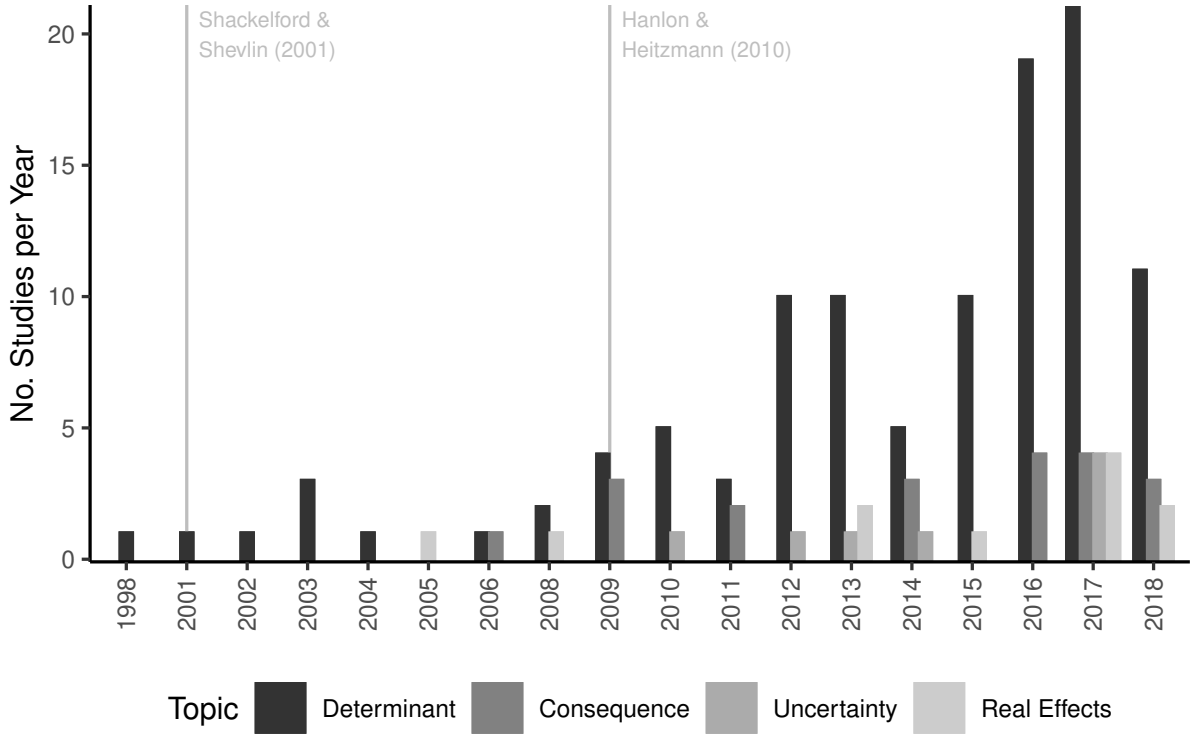

Figure 2: Graphical Summary Analysis—Determinants

Figure 2 summarizes the key results from Table 3 through histograms. Each subfigure presents the relative frequency of coefficient sign-significance combinations (significant negative ('-/Y'), non-significant negative ('-/N'), non-significant positive ('+/N'), and significant positive ('+/Y')) across all relevant main regressions in the considered 114 determinants studies. Each subfigure addresses one determinant of tax avoidance. Thus, in total, 32 determinants were identified from extant empirical work. The coefficient sign-significance combinations represent findings at the aggregate level. The black bars display coefficient sign-significance combinations that are consistent with the theoretical prediction derived from the Dyreng, Jacob, Jiang, & Müller (2020) framework.

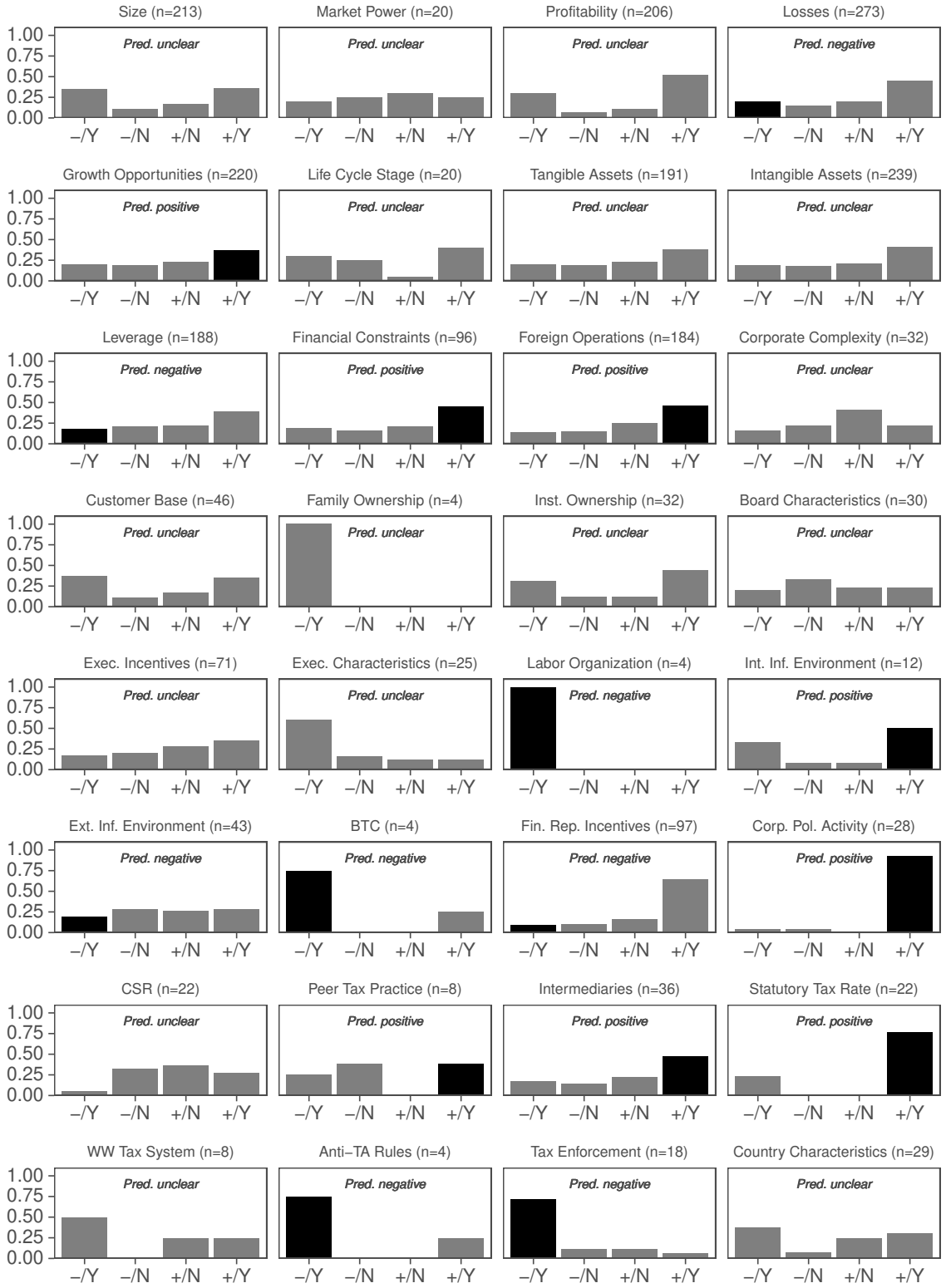

Figure 3: Comparing Theory and Empirical Evidence—Determinants

This figure summarizes the theoretical predictions and the empirical results on the determinants of tax avoidance in an aggregated manner. The empirical results can be assessed in Detail in Table 3. In this matrix, directional assignments of the empirical evidence were made based on the direction of the critical mass.

		Empirical Outcomes		
		Positive relation between construct and tax avoidance	Mixed relation between construct and tax avoidance	Negative relation between construct and tax avoidance
Theoretical Prediction	Positive relation between construct and tax avoidance	Growth Opportunities (n=220) Financial Constraints (n=96) Foreign operations (n=184) Statutory tax rate (n=22) Corporate political activity (n=28) Intermediaries (n=36)	Internal information environment (n=12) Peer tax practice (n=8)	
	Mixed relation between construct and tax avoidance	Profitability (n=206) Tangibility (n=191) Intangible Assets (n=239) Exec. Incentives (n=71)	Size (n=213) Market Power(n=20) Institutional Ownership (n=32) WW Tax System (n=8) Country characteristics (n=29) Corporate complexity (n=32) Customer base (n=46) CSR (n=22) Board Characteristics (n=30) Life-cycle stage (n=20)	Family ownership (n=4) Executive characteristics (n=25)
	Negative relation between construct and tax avoidance	Losses (n=273) Leverage (n=188) Fin. Rep. Incentives (n=97)	Ext. Inf. Environment (n=43)	BTC (n=4) Anti TA Rules (n=4) Tax Enforcement (n=18) Labor organization (n=4)

Figure 4: Graphical Summary Analysis—Consequences

This figure depicts the most important consequences of corporate tax avoidance identified in our quantitative literature synthesis. This panel summarizes the key results from Table 4 through histograms. Each histogram presents the relative frequency of the coefficient sign–significance combinations across all relevant main regressions in the 23 consequence studies considered. The relevant coefficients are collected from all the main regressions that regress a relevant consequence proxy on a measure of tax avoidance. Note that the coefficient sign–significance combinations represent findings at the aggregate level. The black bars in Panels A and B display those combinations that are consistent with the theoretical prediction derived from the framework of Dyreng, Jacob, Jiang, & Müller (2020).

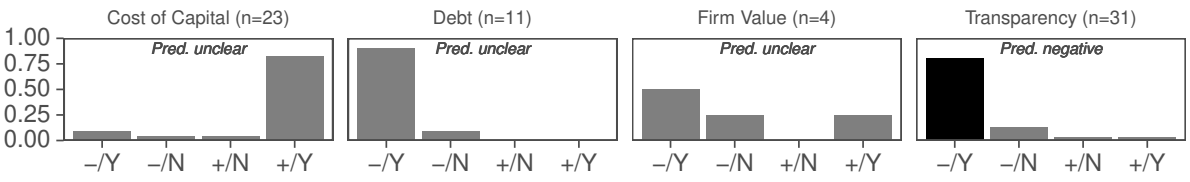

Figure 5: Comparing Theory and Empirical Evidence—Consequences

This figure summarizes the theoretical predictions and the empirical results on the consequences of tax avoidance in an aggregated manner. The empirical results can be assessed in Detail in Table 4. In this matrix, directional assignments of the empirical evidence were made based on the direction of the critical mass.

		Empirical Outcomes		
		Positive relation between construct and tax avoidance	Mixed relation between construct and tax avoidance	Negative relation between construct and tax avoidance
Theoretical Prediction	Positive relation between construct and tax avoidance			
	Mixed relation between construct and tax avoidance	Cost of Capital (n=23)		Debt (n=11) Firm value (n=4)
	Negative relation between construct and tax avoidance			Transparency (n=31)

Figure 6: Comparing Theory and Empirical Evidence—Real Effects

This figure summarizes the theoretical predictions and the empirical results on the real effects of taxation. The empirical results can be assessed in Detail in Table 5. In this matrix, directional assignments of the empirical evidence were made based on the direction of the critical mass.

		Empirical Outcomes	
		Positive relation between ...	Negative relation between ...
Theoretical Prediction	Positive relation between ...	Tax rate and capital structure (n=8) Tax rate and cash holdings (n=3) Tax rate and organizational form choice (n=4) Tax base and investment (n=8) Tax base and employment (n=1) Tax base and M&A (n=2) Tax base and risk-taking (n=2)	
	Negative relation between ...		Tax rate and investment (n=14) Tax rate and innovation (n=8) Tax rate and location choice (n=9) Tax rate and employment (n=20) Tax rate and M&A (n=9) Tax rate and business activity (n=8) Tax rate and GDP growth (n=2) Tax rate and corporate risk-taking (n=9) Tax base and capital structure (n=8) Tax base and organizational form choice (n=2)

Table 1: List of Journals

Journal	Total No. Studies	No. TA Det. Studies	No. TA Con. Studies	No. RE Studies
Accounting Journals				
Accounting Review	44	32	3	3
Contemporary Accounting Research	18	11	4	3
Journal of Accounting & Economics	14	11	0	3
Journal of The American Taxation Association	14	10	3	1
Journal of Accounting Research	13	8	0	2
Review of Accounting Studies	9	6	1	0
Journal of Business Finance & Accounting	7	5	2	0
National Tax Journal	3	0	0	2
European Accounting Review	2	1	1	0
Auditing-A Journal of Practice & Theory	1	1	0	0
Abacus A Journal of Accounting Finance and Business Studies	0	0	0	0
Accounting Organizations and Society	0	0	0	0
Management Accounting Research	0	0	0	0
Economics Journals				
Journal of Public Economics	23	8	1	14
American Economic Review	4	0	0	4
Review of Economics And Statistics	3	2	1	0
Economic Journal	2	1	0	1
American Economic Journal – Economic Policy	1	0	0	1
American Economic Journal – Macroeconomics	1	0	0	1
Applied Economics	1	1	0	0
Economic Policy	1	0	0	1
Journal of Labor Economics	1	0	0	1
Journal of Political Economy	1	0	0	1
Econometrica	0	0	0	0
Journal of Econometrics	0	0	0	0
Journal of Economic Growth	0	0	0	0
Quarterly Journal of Economics	0	0	0	0
Rand Journal of Economics	0	0	0	0
Review of Economic Studies	0	0	0	0
Finance Journals				
Journal of Financial Economics	13	6	3	4
Journal of Banking & Finance	10	5	1	4
Journal of Corporate Finance	8	4	3	1
Journal of Finance	2	0	0	2
Review of Financial Studies	2	0	0	2
Financial Management	1	1	0	0
Journal of Financial and Quantitative Analysis	1	1	0	0
Journal of Empirical Finance	0	0	0	0
Journal of Financial Intermediation	0	0	0	0
Journal of Financial Markets	0	0	0	0
Journal of International Money and Finance	0	0	0	0
Journal Of Money Credit and Banking	0	0	0	0
Review of Finance	0	0	0	0

This table lists the journals considered in the quantitative literature synthesis, and the number of studies in each. For tax avoidance studies, we searched WoS for all studies published between 1998 and March 2019 that are captured by the search queries *tax avoidance*, *tax planning*, *tax shelter*, *tax aggressiveness*, *income shifting*, *profit shifting*, and *effective tax rate*. The studies retrieved were then filtered and sorted into the categories of either tax avoidance determinant or tax avoidance consequence studies. To identify real effects studies, we used search string combinations of the search words *tax*, *corporate*, *firm*, *effect*, *consequence* and the real effects search words *capital*, *investment*, *labor*, *wage*, *employment*, *dividend*, *financing*, *intangible*, *research*, *R&D*, *innovation*, *patent*, *location*, *resource allocation*, *bonus depreciation*, *productivity*, *input*, *operations*, *repatriation*, *welfare*, *incidence*, *inequality*, *offshore*, *mergers*, or *acquisitions*. Based on the WoS search results, we then manually identified any misqualifications.

Table 2: Summary of Theoretical Predictions

Determinant	Benefits	Costs	Prediction
Size	↑	↑ / ↓	?
	Larger firms may attract more productive employees → Productivity increases	Political cost hypothesis vs. political power hypothesis	
Market Power	↑ / ↓		?
	Higher market power → Higher profitability; But potential contradicting effect depending on substitutability/complementarity of labor and capital		
Profitability	↑	↑	?
	Higher profitability → Higher tax base	Higher profitability → Higher IRS/investor scrutiny → Higher costs of tax avoidance	
Losses	↓		–
	NOLs → Lower tax base; Loss carryforward potential reduces tax avoidance incentives		
Growth Opportunities	↑	↓	+
	Expansion to new products or markets → Increasing output (yet, also increasing demand for input factors)	Greater flexibility in setting up international structures → Lower implementation costs of tax avoidance	
Life Cycle Stage	↑ / ↓	↑ / ↓	?
	Varying profitability depending on life cycle stage, varying labor cost, tax incentives for start-ups, which decrease tax base	Varying risk appetite, varying reputational and political costs depending on life cycle stage	
Tangible Assets	↑	↑	?
	Higher capital to labor ratio → Less deductible input (η<1)	Lower capital mobility → Higher costs to implement tax avoidance structures	
Intangible Assets	↑ / ↓	↓	?
	Higher skilled labor; less capital-intensive → More deductible input. Intangible capital more productive → output increases. Yet, in some countries tax benefits (e.g., tax credits for R&D) → Varying tax base effects	Higher capital mobility → Lower cost to implement tax avoidance structures	
Leverage	↓		–
	Higher leverage increases η and r → Lower tax base (debt and tax avoidance as substitutes)		
Financial Constraints	↑	(↑)	+ (?)
	Financially constrained firms substitute costly external financing with internal financing → r decreases → larger tax base. At the same time, more internal financing leads to lower debt tax shield (η goes down) → tax avoidance incentives increase	By avoiding taxes through cross-border tax avoidance, profits are allocated to foreign subsidiaries, hence, internal capital is locked in, high repatriation costs (if financial constraints are domestic)	
Foreign Operations		↓	+
		Lower implementation costs if corporate presence in low-tax countries	

(continued on next page)

Table 2: Summary of Theoretical Predictions (continued)

Determinant	Benefits	Costs	Prediction
Corporate Complexity		↓/↑	?
		Decrease in transparency → Decrease in detection probability → Lower costs of tax avoidance; but: also increase in coordination costs → Higher implementation costs of tax avoidance	
B2C Customer Base		↑	–
		Higher visibility → Higher public scrutiny → Higher reputational costs of tax avoidance	
Family Ownership	↑	↑	?
	Greater concentration of ownership and control → Higher productivity	Higher reputational costs; Larger majority-minority shareholder conflict → Higher agency costs	
Inst. Ownership	↑	↑	?
	More efficient monitoring → Higher productivity	Higher reputational costs/CSR concerns	
Board Size		↑	–
		Larger board size → Higher coordination costs	
Exec. Incentives	↑	(↑)	?
	After-tax compensation incentives → Increase in productivity → Higher tax base	Executive compensation reduces rent extraction → Higher costs of tax avoidance (if there are complementaries between rent extraction and tax avoidance)	
Exec. Characteristics	↑/↓	↑/↓	?
	Varying executive characteristics can affect productivity	Varying executive characteristics can affect costs of tax avoidance	
Labor Organization	↓	↑	–
	Unionization increases labor input costs → Lower tax base	Higher monitoring → Higher costs of tax avoidance	
Int. Inf. Environment		↓	+
		Identification/increase of tax avoidance opportunities; Reduction of environmental uncertainties	
Ext. Inf. Environment		↑	–
		Higher external information quality → Increase in transparency → Increase in detection probability → Higher costs of tax avoidance	
Fin. Rep. Incentives / BTC		↑	–
		High book-tax conformity → Higher costs of tax avoidance; under low book-tax conformity, large BTDs raise regulatory scrutiny → Higher costs of tax avoidance	
Corp. Pol. Activity		↓	+
		Lower political costs (less scrutiny)	
CSR	↑	↑	?
	Consumer goodwill → Higher profitability; CSR firms may attract better skilled/qualified employees → Higher productivity	Firms with high CSR activities face higher tax avoidance costs (e.g., reputational or political costs)	

(continued on next page)

Table 2: Summary of Theoretical Predictions (continued)

Determinant	Benefits	Costs	Prediction
Peer Tax Practice		↓	+
		Learning from peers, mimicking, legitimization → Lower costs of tax avoidance	
Intermediaries		↓	+
		Access to additional (external) expertise → Lower costs to implement tax avoidance	
Statutory Tax Rate		↓	+
		Lower foreign statutory tax rate → Larger statutory tax rate differential → Lower implementation costs of tax avoidance structures	
WW Tax System		↑	–
		Additional tax when shifted profits are repatriated → Higher costs of tax avoidance	
Anti-TA Rules		↑	–
		Stricter anti TA rules → Higher implementation costs	
Tax Enforcement		↑	–
		Stricter enforcement increases costs (e.g., more regulatory scrutiny under stricter enforcement)	
Country Characteristics	↑ / ↓	↑ / ↓	?
	Output and input factor costs depend on country specifics → Varying tax base effects	Varying costs of tax avoidance (e.g., due to varying enforcement/scrutiny levels)	

This table summarizes theoretical predictions on the association between different determinants and corporate tax avoidance, derived from the framework of Dyreng, Jacob, Jiang, & Müller (2020). The symbol ↑ denotes a theoretically predicted positive effect of a determinant on either the benefits or costs of tax avoidance, ↓ denotes a theoretically predicted negative effect, and ↑ / ↓ denotes a theoretically unclear directional effect. The last column shows the overall prediction on the association between a determinant and corporate tax avoidance. This overall prediction is derived by weighing the predicted benefit and the cost effects. Note that, for two determinant constructs, our theoretical prediction focuses on the dominant subconstruct (i.e., board size for board characteristics and a B2C customer base for the customer base).

Table 3: Quantitative Synthesis of Determinants

	Pred.	No. Studies	No. Regs.	Empirical Evidence -/N	-/Y	+/N	+/Y
Size	?	81	213	0.11	0.35	0.17	0.36
Profitability	?	77	206	0.07	0.30	0.11	0.52
Losses	-	58	273	0.15	0.20	0.20	0.45
Market Power	?	5	20	0.25	0.20	0.30	0.25
Growth Opportunities	+	68	220	0.19	0.20	0.23	0.37
Life Cycle Stage	?	5	20	0.25	0.30	0.05	0.40
Tangible Assets	?	62	191	0.19	0.20	0.23	0.38
Intangible Assets	?	71	239	0.18	0.19	0.21	0.41
Leverage	-	73	188	0.21	0.18	0.22	0.39
Financial Constraints	+	33	96	0.16	0.19	0.21	0.45
Foreign Operations	+	71	184	0.15	0.14	0.25	0.46
Corporate Complexity	?	7	32	0.22	0.16	0.41	0.22
Customer Base	?	12	46	0.11	0.37	0.17	0.35
Family Ownership	?	1	4		1.00		
Institutional Ownership	?	9	32	0.12	0.31	0.12	0.44
Board Characteristics	?	5	30	0.33	0.20	0.23	0.23
Executive Incentives	?	21	71	0.20	0.17	0.28	0.35
Executive Characteristics	?	6	25	0.16	0.60	0.12	0.12
Labor Organization	-	1	4		1.00		
Internal Inf. Environment	+	5	12	0.08	0.33	0.08	0.50
External Inf. Environment	-	20	43	0.28	0.19	0.26	0.28
BTC	-	4	4		0.75		0.25
Financial Rep. Incentives	-	34	97	0.10	0.09	0.16	0.64
Corporate Political Activity	+	4	28	0.04	0.04		0.93
CSR	?	5	22	0.32	0.05	0.36	0.27
Peer Tax Practice	+	4	8	0.38	0.25		0.38
Intermediaries	+	11	36	0.14	0.17	0.22	0.47
Statutory Tax Rate	+	18	22		0.23		0.77
WW Tax System	?	7	8		0.50	0.25	0.25
Anti-TA Rules	-	4	4		0.75		0.25
Tax Enforcement	-	10	18	0.11	0.72	0.11	0.06
Country Characteristics	?	8	29	0.07	0.38	0.24	0.31

This table presents the detailed results of our quantitative synthesis of the 114 tax avoidance determinant studies. The information depicted is more detailed than in our determinant discussion in Figure 2 and Table 2. The measure column denotes the different independent variables included in the main regressions of the 114 studies considered, grouped by underlying constructs. The next column repeats the predictions from Table 2 on the direction of the association between a determinant and corporate tax avoidance. The next column shows the number of studies with a proxy for the determinant of interest in their main test(s), with a tax avoidance proxy as the dependent variable. Some studies have multiple main regressions and use different tax avoidance proxies. In these cases, we consider all of these regressions in our analysis in the next column and count the number of regressions of all 114 studies that include the respective proxy. In rare cases, a regression includes two or more proxies for the same determinant. Those cases are also counted in this column. Whenever necessary, we reverse the coefficient signs to ensure directional comparability across all tax avoidance proxies. For example, if a study originally reports a negative determinant coefficient and the dependent variable of the regression is a firm's GAAP ETR, we reverse the coefficient sign (from negative to positive) to accurately record the positive association between the respective determinant and tax avoidance. Consequently, -/N denotes an insignificant negative association with tax avoidance, -/Y a significant negative association with tax avoidance, +/N an insignificant positive association with tax avoidance, and +/Y a significant positive association with tax avoidance. The numbers reported in the respective columns represent the numbers of the respective coefficient sign–significance combinations relative to the number of regressions.

Table 4: Quantitative Synthesis of Consequences

	Pred.	No. Studies	No. Regs.	Empirical Evidence -/N	-/Y	+/N	+/Y
Transparency	-	9	31	0.13	0.81	0.03	0.03
Cost of Capital	?	7	23	0.04	0.09	0.04	0.83
Cost of Debt	?	3	11	0.09	0.91		
Firm Value	?	4	4	0.25	0.50		0.25

This table presents the detailed results of our quantitative synthesis of the 23 tax avoidance consequence studies. The measure column denotes different dependent variables included in the main regressions of these studies, grouped by underlying constructs. The next column denotes the expected sign of the relation between tax avoidance and the constructs of interest. The next column denotes the number of studies including a consequence proxy as the dependent variable in their main test(s) and using a tax avoidance proxy as a key explanatory variable. The next column counts the number of relevant regressions of all 23 studies. When we count the number of positive and negative coefficients, we adjust the reported sign (if necessary, depending on the dependent and independent variable) to reflect a construct's association with tax avoidance. where -/N denotes an insignificant negative association with tax avoidance, -/Y a significant negative association with tax avoidance, +/N an insignificant positive association with tax avoidance, and +/Y a significant positive association with tax avoidance. The numbers reported in the respective columns represent the numbers of the respective coefficient sign–significance combinations relative to the number of regressions.

Table 5: Quantitative Synthesis of Real Effects

	Pred.	No. Studies	No. Regs.	Empirical Evidence -/N	-/Y	+/N	+/Y
Panel A: Tax Rates and Real Effects							
Investment	-	8	14	0.07	0.93		
Capital Structure	+	7	8			0.13	0.88
Innovation	-	6	8	0.25	0.75		
Location Choice	-	6	9		1.00		
Employment	-	5	20	0.40	0.55	0.05	
M&A	-	3	9		1.00		
Cash Holdings	+	3	3				1.00
Business Activity	-	2	8		1.00		
Organizational Form	+	2	4			0.25	0.75
GDP Growth	-	2	2		1.00		
Risk Taking	-	2	9	0.44	0.44		0.11
Panel B: Tax Base Elements and Real Effects							
Investment	+	7	8			0.13	0.87
Capital Structure	-	4	8	0.13	0.75		0.13
Employment	+	1	1				1.00
M&A	+	1	5			0.60	0.40
Organizational Form Choice	-	1	2	0.50	0.50		
Risk Taking	+	1	2				1.00

This table presents the detailed results of our quantitative synthesis of the 51 real effects studies. The measure column denotes different dependent variables included in the main regressions of these studies, grouped by underlying constructs. The next column denotes the expected sign. The next columns denotes the number of studies and the number of relevant regressions, respectively. When we count the number of positive and negative coefficients, we adjust the reported sign (if necessary, depending on the dependent and independent variable). -/N (-/Y) denotes an insignificant (significant) negative association with real effects. +/N (+/Y) an insignificant (significant) positive association real effects. The numbers reported in the respective columns represent the numbers of the respective coefficient sign–significance combinations relative to the number of regressions.

Online Appendix:

Corporate Tax Avoidance and the Real Effects of Taxation: A Review

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This appendix complements the discussion in the paper in two ways. First, in Section A of this appendix, we discuss the predictions for each tax avoidance determinant, The argumentation is based on equation (2) of the paper, which we reproduce here:

$$\rho F(K^*, L^*) - wL^* - \eta r K^* = C'(A^*) \tag{1}$$

The order of determinants is in principle based on the frequency of occurrence. Second, in Section B, we present extended versions of the tables from the paper as well as a complete list of papers used in the literature review.

A Long Discussion of Determinants of Tax Avoidance

A.1 Size

The first and most frequently examined determinant of corporate tax avoidance is firm size. Predictions on the directional association between firm size and corporate tax avoidance can be motivated by political power theory and political cost arguments. Political power theory suggests that larger firms are more powerful and could thus succeed in negotiating more favorable environmental conditions (e.g., more beneficial tax treatments) (Siegfried, 1972). Larger firms could, for instance, engage more successfully in corporate political activity (i.e., lobbying), thereby reducing the costs of tax avoidance (see the right-hand side of Equation 1). Hence, the trade-off in Equation 1 suggests that firms' incentives to engage in corporate tax avoidance should increase with firm size (Hill, Kubick, Lockhart, & Wan, 2013; Kim & Zhang, 2016).

However, a contrary prediction can be derived from the political cost argument (Watts & Zimmerman, 1978). Political costs comprise any wealth transfers that are imposed upon firms due to their political sensitivity (e.g., taxes, tariffs, or the loss of specific subsidies or government contracts). Larger firms can face more severe public and government scrutiny, due to higher external visibility (Aichian & Kessel, 1962; Wong, 1988). Based on Equation 1, we predict that public or government scrutiny could force larger firms to reduce tax avoidance activities due to their higher political costs of tax avoidance.

In addition, labor economics theory suggests that larger firms could attract more productive employees, have earlier access to advanced technologies, are better organized and informed, offer better training on the job, and provide higher working standards for their employees (Oi, 1983; Idson & Oi, 1999). Incorporating this into the DJJM framework reveals that larger firms exhibit a higher tax base (see the left-hand side of Equation 1). The higher the tax base, the higher the marginal benefit of tax avoidance. Thus, a size-induced increase in productivity should favor a positive association between tax avoidance and firm size.[1] Altogether, the theory seems ambiguous.

A.2 Industry Affiliation and Market Power

Corporate tax avoidance engagement can also be determined by a firm's industry affiliation and the intensity of competition in the respective industry. Most empirical tax avoidance studies account for a potential link between industry affiliation and corporate tax avoidance engagement by including industry

1. One argument underlying the assumption that higher labor productivity leads to a higher tax base is that wage costs w are exogenous. However, in a competitive labor market, this assumption might not hold necessarily. Instead, more productive workers could demand higher wages in a competitive labor market (e.g., Idson & Oi, 1999). Thus, larger firms can face substantially higher wage costs w (Brown & Medoff, 1989; Evans & Leighton, 1989). Higher wage costs can adversely affect the cost–benefit trade-off depicted in Equation 1 and could thus decrease firms' incentives to engage in tax avoidance.

fixed effects.[2] Firms of different industries can therefore exhibit varying productivity levels, wages, or economic growth rates (Krueger & Summers, 1988; Acemoglu & Zilibotti, 2001). Moreover, firms in different industries can also differ substantially in terms of their access to new technologies, innovation potential, organizational structure, size, or required input factor mixes (Idson & Oi, 1999). Further, some industries have access to beneficial depreciation schemes or tax credits.

Closely related to industry affiliation is the level of within-industry competition (and, thus, a firm's relative market power). As Dyreng, Jacob, Jiang, & Müller (2020) show, the relation between market power and tax avoidance is ambiguous and depends on the substitutability or complementarity of labor and capital input at the margin. Hence, no clear theoretical prediction can be derived.

A.3 Performance: Profitability and the Role of Losses

The effect of profitability on the cost–benefit trade-off in Equation 1 is twofold. The straightforward interpretation is that higher profitability increases the corporate tax base and thus increases the benefits of tax avoidance. However, at the same time, higher profitability can expose firms to greater tax authority and investor scrutiny (Bozanic, Hoopes, Thornock, & Williams, 2017), making tax avoidance more costly. Given this impact on the cost side of Equation 1, the overall direction of the relation between profitability and tax avoidance is theoretically unclear.

Related to profitability is the consideration of losses. The DJJM framework suggests that losses decrease firms' incentives to engage in (future) tax avoidance. Many tax systems allow firms to offset losses with profits from other periods (e.g., Bethmann, Jacob, & Müller, 2018). The potential to offset losses with future profits decreases corporate tax liabilities and reduces firms' incentives to engage in tax avoidance.

A.4 Growth

Firms' growth opportunities can also influence the cost–benefit trade-off depicted in Equation 1. We expect future growth opportunities to be positively associated with future profitability (Alchian, 1950). Firms with economic growth opportunities can expand their operations to new products and markets, thereby potentially increasing corporate output $F(K, L)$ and thus profit. If growth opportunities are indeed positively associated with profitability, the corporate tax base and thus firms' incentives to engage in tax avoidance should increase. Further, growth firms could have the necessary flexibility to set up corporate structure in a tax-efficient manner from the start. Due to this higher flexibility in setting up group structures, we expect growth firms to face lower implementation costs in certain cross-border tax avoidance strategies. Thus, we expect the incentives to engage in tax avoidance to increase with growth opportunities.

Another argumentation supporting this theoretical prediction is that growth firms require cash to finance their investments. Corporate tax avoidance can represent a way to allocate cash internally. In sum, theory predicts that growth firms can have higher incentives to engage in tax avoidance, since it allows them to raise necessary investment funds internally.

2. Of all the regressions that we consider for our quantitative synthesis, 85% include industry fixed effects. Studies without industry fixed effects usually employ firm fixed effects instead.

A.5 Asset Structure: Tangible and Intangible Assets

A firm's asset structure represents an integral part of its production function and determines the respective input factor costs. The firm's production function dictates whether capital is invested in tangible or intangible assets (e.g., Hall & Mairesse, 1995). While tangible assets represent assets with physical substance (i.e., fixed assets, such as factories, machines, or buildings), intangible assets result from investments in research and development (R&D), software development, marketing, human capital, or organizational capital (Danthine & Jin, 2007). Both tangible capital and intangible capital are restricted in their tax deductibility, since many tax systems restrict the deductibility of financing costs (Boadway & Bruce, 1984). In addition, the deductibility of tangible capital is further limited if tax depreciation does not fully capture economic depreciation. Both frictions are incorporated in the DJJM framework via $\eta < 1$. It follows from the limited deductibility of capital that, all else being equal, the firm with the higher capital-to-labor ratio will have the higher tax base, resulting in greater incentives to engage in tax avoidance (see the left-hand side of Equation 1). At the same time, tangible capital is less mobile, resulting in higher costs of tax avoidance. This decreases the net benefits of tax avoidance (see the right-hand side of Equation 1).

The previous discussion outlines that one cannot derive a clear prediction of the overall direction of the link between tangibility and corporate tax avoidance. Our synthesis reveals that tangibility represents an often considered determinant in our sample studies. At the aggregate level, 58% of the considered regressions obtain statistically significant results, with 38% of all regressions yielding positive significant results and 20% yielding negative significant results.

It is important to note that the cost argument (i.e., the capital immobility argument) holds primarily for multinational firms. Thus, the sign of the tangibility coefficient depends substantially on the proportion of multinationals included in each study's sample. When calculating the development of the proportion of firm–years with foreign pre-tax income in the Compustat North America database, we find that the proportion doubled from 20% in 1998 to 42% in 2018, using all firms with non-missing data on earnings before interest and taxes and sales above 1 million USD. This suggests that an increase in firms' opportunities to shift income.

Further, intangible-intensive firms have more income-shifting opportunities due to the higher mobility of intangible capital relative to tangible capital (e.g., Klassen & Laplante, 2012b; De Simone, Mills, & Stomberg, 2019). The DJJM framework supports this: assuming that the costs of shifting intangible capital to tax-favorable jurisdictions are lower, the right-hand side of Equation 1 suggests increasing tax avoidance incentives (see, e.g., Dischinger & Riedel, 2011). Moreover, returns to investment could be higher for intangible capital than for traditional tangible capital (Hall, Mairesse, & Mohnen, 2010). This increases the corporate tax base, and thus firms' incentives to engage in tax avoidance. In contrast, investments in intangible assets can be positively correlated with workforce qualification and wage costs w (Nelson & Phelps, 1966; Redding, 1996; Hall, Mairesse, & Mohnen, 2010). The direct expensing of intangible investments and the higher wage costs decrease the corporate tax base and thus a firm's tax avoidance incentives. Finally, several countries grant R&D tax credits to firms in an attempt to stimulate intangible investment. Such tax credits can mechanically reduce firms' Cash ETRs (Hall & van Reenen, 2000; Bloom, Griffith, & van Reenen, 2002). Hence, empirical studies using Cash ETRs to proxy for tax avoidance potentially interpret such tax credit–induced ETR reductions as tax avoidance.

A.6 Capital Structure

Many tax avoidance studies control for leverage without providing a detailed theoretical justification for its inclusion. The DJJM framework suggests that an increase in debt financing can increase the parameter η, since cost of debt is tax deductible (Miller, 1977). In addition, the use of debt financing could also increase the cost of capital r due to higher credit risk. In sum, debt financing reduces the a firm's taxable income (i.e., the left-hand side of Equation 1) and, thereby, incentives to avoid taxes. Prior work has stressed this potential substitution effect between debt financing and corporate tax avoidance (DeAngelo & Masulis, 1980; Graham, Lemmon, & Schallheim, 1998; Graham & Tucker, 2006).

A.7 Financial Constraints

A firm's decision to engage in tax avoidance can also depend on financial constraints (Law & Mills, 2015; Edwards, Schwab, & Shevlin, 2016). Financial constraints represent frictions that prevent a firm from funding its desired investments (Fazzari, Hubbard, & Petersen, 1988; Kaplan & Zingales, 1997). Put differently, financially constrained firms face higher costs of external financing to fund investments. In a broader sense, tax avoidance can serve as an alternative internal financing tool. One can incorporate these considerations into the DJJM framework through a reduction in r for tax-avoiding firms. The framework predicts that the reduction in r increases the tax base and thus produces additional incentives for tax avoidance engagement, as shown empirically (Law & Mills, 2015; Edwards, Schwab, & Shevlin, 2016).

While Law & Mills (2015) and Edwards, Schwab, & Shevlin (2016) broadly examine financial constraints, Dyreng & Markle (2016) provide indirect evidence that the location of the financial constraints seems to matter. One of their key takeaways is that some tax avoidance strategies (i.e., income shifting to foreign countries) will become less attractive for firms if they face domestic financial constraints. If such firms need to repatriate foreign income to cover domestic financing needs internally, the repatriation will expose them to additional tax costs (e.g., Foley, Hartzell, Titman, & Twite, 2007; Hanlon, Lester, & Verdi, 2015). Applying the logic of Equation 1, the repatriation of foreign income likely increases the marginal costs of corporate tax avoidance $C'(A)$. Thus, tax planning strategies that involve cross-border income shifting are less desirable for firms that face domestic financial constraints than for firms with foreign financial constraints (which would benefit from income shifting).

A.8 Foreign Operations

Another determinant of corporate tax avoidance is the amount of a firm's foreign operations. Foreign operations are, of course, to some extent correlated with other firm characteristics such as firm size. However, since foreign operations can determine the general availability of cross-border tax avoidance opportunities, we discuss them separately. Firms with foreign operations in low-tax jurisdictions are able to set up beneficial tax structures in these countries at lower cost. Equation 1 therefore predicts that firms with foreign operations can engage in more tax avoidance than purely domestic firms due to the lower implementation costs of cross-border tax avoidance activities.

A.9 Corporate Governance and Management Practices

Over the last decade, the tax literature has moved from a purely firm-centered perspective toward a more manager-oriented perspective on tax avoidance (Wilde & Wilson, 2018). Dyreng, Hanlon, & Maydew

(2010) were the first to explicitly account for the role of top executives, suggesting that they influence corporate tax avoidance activities by setting the strategic tone at the top. Similarly, ownership characteristics appear to matter because of monitoring incentives (Desai & Dharmapala, 2006). The DJJM framework does not explicitly account for principal–agent problems or manager characteristics. However, despite the lack of explicit consideration of principal–agent mechanisms, governance and management effects can still indirectly enter Equation 1 via productivity effects or by affecting the costs of corporate tax avoidance: properly aligned incentive plans, a good fit between management and firm characteristics, as well as well-designed governance and ownership structures can increase productivity. Higher productivity increases the tax base and thus the benefits of tax avoidance. At the same time, external stakeholders might be able to better monitor the managers of firms with good governance. Hence, potential engagement in tax avoidance activities can be easier detected from the outside, which increases the costs of corporate tax avoidance.

A.10 External Environment of the Firm

The quality of a firm's external information environment can also determine corporate tax avoidance engagement. External information quality depends on the amount, precision, and availability of externally generated firm information. If external information quality is high, corporate decision making should be more transparent and accessible for external stakeholders. The higher transparency is likely accompanied by a higher probability of the detection of corporate tax avoidance engagement. We therefore predict that the costs of corporate tax avoidance increase with higher external information quality. Following Equation 1, this increase in costs should decrease incentives to engage in tax avoidance.

A.11 Book–Tax Conformity and Financial Reporting Incentives

Under book-tax conformity (BTC), income reported for tax purposes and income reported for financial reporting purposes should not differ. If the level of BTC is high, firms must determine the trade-off between whether they manage earnings upward for financial reporting reasons and accept higher tax payments and whether they engage in tax avoidance, report lower earnings, and potentially face higher capital market pressure. Hence, BTC increases the costs of corporate tax avoidance and decreases firms' incentives to engage in such activities. The case is more difficult for jurisdictions with low BTC (e.g., the United States). Mills (1998) provides evidence that large book-tax differences of U.S. firms increase Internal Revenue Service (IRS) attention. She argues that large differences between financial reporting income and tax income have a signaling effect to investors and tax authorities, since these differences reveal that the firm's actual income is either understated by tax reporting or overstated by financial reporting. Thus, financial reporting incentives can increase tax avoidance costs. Based on the framework of Dyreng, Jacob, Jiang, & Müller (2020), we predict that lower BTC should result in less tax avoidance.

A.12 Tax System Characteristics

We next discuss how various characteristics of a country's tax system shape tax avoidance. First, we focus on the most salient tax policy tool: the statutory corporate tax rate. Intuitively, a higher tax rate results in higher tax payments and thus increases the benefits of tax avoidance. Most regressions considered in our quantitative synthesis (i.e., 77%) report a statistically significant and positive association between statutory tax rates and corporate tax avoidance engagement (see Figure **??** and Table A.2). Most studies

controlling for tax rates focus on U.S. multinationals (e.g., Klassen & Laplante, 2012b; De Simone, Mills, & Stomberg, 2019). However, multinationals from other jurisdictions (e.g., European countries) operate under different tax regimes, which may have changed substantially over time (Alexander, De Vito, & Jacob, 2019; Brühne, Jacob, & Schütt, 2019). Future research accounting for these changes is needed.

Other tax system characteristics can also affect the cost–benefit trade-off depicted in Equation 1. Countries differ in the treatment of foreign profits: some countries employ a worldwide tax system that taxes resident corporations based on their world income (e.g., the United States until 2017). Other countries follow a territorial system, implying that income sourced in a specific country will also induce a tax liability there (e.g., France). The respective tax system choice, worldwide versus territorial, affects tax avoidance incentives. Generally, the after-tax income derived from foreign investment is expected to be higher if the parent firm resides in a country with a territorial system, relative to a parent in a worldwide tax system country. The cost–benefit trade-off of Equation 1 suggests that multinationals located in a country with a territorial tax system should have higher incentives to engage in cross-border profit shifting to low-tax countries, since their profits are not subject to additional taxation upon repatriation.

Further, several countries have introduced a wide range of anti-tax avoidance rules to prevent firms' attempts to shift profits to low-tax countries (Alexander, De Vito, & Jacob, 2019; Brühne, Jacob, & Schütt, 2019). From a firm's perspective, the introduction or tightening of anti-tax avoidance rules can affect the cost–benefit trade-off in Equation 1 in an unfavorable way: stricter anti-tax avoidance rules increase the implementation costs of corporate tax avoidance activities and thus decrease a firm's incentives to engage in them. Based on the search criteria employed in our quantitative synthesis, only a small set of studies examining the role of specific anti-tax avoidance rules (e.g., controlled foreign corporation (CFC) rules or thin-capitalization regimes) on corporate tax avoidance engagement can be identified. All these studies are published in economics journals. Voget (2011), for instance, provides empirical evidence suggesting that CFC rules in a country encourage the relocation of corporate headquarters to other countries. Buettner, Overesch, Schreiber, & Wamser (2012) find that thin-capitalization regimes lead to substantial decreases in inter-company debt, which curbs corporate profit shifting.

Another important characteristic of a country's tax system is tax enforcement (e.g., Hoopes, Mescall, & Pittman, 2012). Stricter tax enforcement can increase the detection probability of tax avoidance activities and thus expose tax-avoiding firms to higher costs (e.g., penalties or interest payments). Consistent with Equation 1, we thus expect firms' tax avoidance incentives to decrease with stricter tax enforcement.

A.13 Other (Institutional) Country Characteristics

Besides a country's tax system, several other institutional country characteristics can affect the cost–benefit trade-off depicted in Equation 1. For example, national labor regulation can determine labor costs w and, thus, indirectly, also the tax avoidance engagement trade-off (De Vito, Jacob, & Müller, 2019). Further, public and regulatory scrutiny can, to some extent, be driven by the economic situation and the cultural norms of a country.

A.14 Life Cycle Stage

Closely related to economic growth opportunities, is the respective life cycle stage of a firm. The life cycle theory of a firm hypothesizes that a firm 'ages' by using up its growth opportunities (Mueller, 1972). Thus, the theoretical reasoning is (at least partially) consistent to the argumentation line in the previous

subsection on corporate growth. In early life cycle stages, when growth opportunities are high, firms refrain from paying dividends to shareholders. Instead, they invest to exploit existing growth opportunities. Theory argues that new growth opportunities become fewer when markets mature (Mueller, 1972). Transferring these considerations to the Dyreng, Jacob, Jiang, & Müller (2020) framework reveals that the theoretical prediction depends on the respective life cycle stage. For example, for earlier life cycle stages, the arguments from above hold and such firms should engage in relative more tax avoidance.

A.15 Business Model

A firm's business model strongly determines the form of its overall strategy (e.g., cost leadership versus premium manufacturing) and thereby also the optimal input factor levels K^*, L^*, and A^*. Moreover, the business model itself may affect other firm-level determinants, such as a firm's asset structure, its foreign operations, or its capital structure. Additionally, the business model of a firm can influence firm outsiders' accessibility and visibility of corporate tax avoidance strategies. In the following, we focus on two core dimensions of the business model and how they may affect corporate tax avoidance engagement: The degree of corporate complexity and a firm's customer base.

A.15.1 Corporate Complexity

Corporate complexity represents a central component of a firm's business model. We acknowledge that the term 'corporate complexity' can encompass various organizational design features. For simplification purposes, we follow Bushman, Piotroski, & Smith (2004) and adopt a two-dimensional complexity definition in this study. Specifically, we assume that firms, which operate in multiple industries and/or geographic regions, face higher corporate complexity than firms with higher industry or geographic market concentration.

From a theoretical point of view, the association between corporate complexity and corporate tax avoidance is not straightforward. On the one hand, more complex firms are less transparent (Balakrishnan, Blouin, & Guay, 2019). Thus, corporate complexity may reduce the probability that tax avoidance structures are overruled by tax auditors. This can result in lower tax avoidance costs (i.e., a reduction of the right-hand side of Equation 2 in the paper. Firms with high geographic complexity and/or presence in various industries may further have access to a wider range of tax avoidance opportunities. On the other hand, more complex firms may face higher implementation costs of certain tax avoidance activities (e.g., stemming from lower flexibility and higher coordination costs). Hence, the cost side of Equation 2 in the paper should increase, potentially diminishing the desirability of corporate tax avoidance engagement again. In sum, no unambiguous theoretical prediction on the link between corporate complexity and firms' tax avoidance engagement can be derived from the Dyreng, Jacob, Jiang, & Müller (2020) framework.

A.15.2 Customer Base

The customer base of a firm represents the second business model dimension we discuss in this review. The customer base of a firm likely determines the costs associated with corporate tax avoidance engagement. Consumer-oriented (B2C) business models can, for example, be expected to trigger higher public scrutiny than business-oriented (B2B) business models. Thus, the Dyreng, Jacob, Jiang, & Müller (2020) framework predicts that firms with more consumer-oriented business models tend to engage in less tax

avoidance due to higher implementation costs (e.g., reputational costs). A similar prediction may hold for firms primarily engaging in government contracts (Mills, Nutter, & Schwab, 2013).[3]

A.16 Family Ownership

Chen, Chen, Cheng, & Shevlin (2010) focus on the difference between family firms and non-family firms. From a theoretical perspective, family ownership should, on the one hand, increase the incentives to engage in corporate tax avoidance due to the outlined productivity effect. Greater concentration of ownership and control allows family owners to better lead and supervise managers, potentially resulting in lower agency costs between family owners and managers (Jensen & Meckling, 1976; Jensen, 1986; Francis & Smith, 1995; Shleifer & Vishny, 1997). Family firms further can be expected to have larger rent extracting opportunities and should thus benefit more from corporate tax avoidance. However, family firms are subject to larger majority-minority shareholder conflicts, potentially increasing the costs of corporate tax avoidance. Minority shareholders may anticipate majority shareholders' rent-extracting behavior and may penalize firm owners with a more costly share price discount (Myers & Majluf, 1984; Burkart, Panunzi, & Shleifer, 2003). Thus, the agency costs between family owners and external stakeholders may increase. Further, the reputational costs associated with corporate tax avoidance may be higher in the case of family ownership (Jacob, Rohlfing-Bastian, & Sandner, 2019). In sum, it is not possible to derive a clear theoretical prediction on how family ownership affects corporate tax avoidance.

A.17 Board Characteristics

Board characteristics also represent an important governance component, potentially related to tax avoidance. Various board structures can reduce agency costs, as they strengthen monitoring mechanisms and can enhance firm performance (see, e.g, Yermack, 1996; Core, Holthausen, & Larcker, 1999; Ghosh, 2006). Consistent with both sides of Equation 2 in the paper and the arguments raised by Desai & Dharmapala (2006), we acknowledge that specific board structures may positively affect corporate tax avoidance incentives. However, due to the variety of board characteristics, no clear theoretical prediction can be made.

We identify five empirical studies controlling for board characteristics in our quantitative synthesis. One board characteristic considered by several studies is board size. The theoretical argument is that smaller boards may be able to implement tax avoidance structures at lower cost (e.g., due to lower coordination needs). Thus, tax avoidance should decrease with board size. Besides board size, board composition is considered by several empirical studies in our sample (e.g., Armstrong, Blouin, Jagolinzer, & Larcker, 2015; Olsen & Stekelberg, 2016; McClure, Lanis, Wells, & Govendir, 2018). These studies, for instance, control for the number of financial experts or the percentage of indirect directors or auditors on the board.

A.18 Executive Characteristics

The necessity to control for executive characteristics can be motivated theoretically, since managers' personal attributes (e.g., their (intrinsic) motivation, skill set, or prior job expertise) may determine corporate productivity levels. The Dyreng, Jacob, Jiang, & Müller (2020) framework suggests that higher

3. Note that generally, the prediction on the association between customer base and tax avoidance is theoretically unclear. Different customer base types may affect corporate tax avoidance engagement differently.

productivity leads to higher tax avoidance incentives (see left-hand side of Equation 2 in the paper). Yet, at the same time, managerial characteristics could also affect the cost side of Equation 2 in the paper: Agency costs between managers and shareholders may decrease with managers' preference for honesty and their intrinsic motivation.[4] Additionally, better skilled or experienced managers may be able to set up tax avoidance structures at lower implementation cost. Hence, theory generally suggests a positive relation between managerial skills and corporate tax avoidance engagement.

With regards to managerial skills and experience (e.g., proxied by managerial ability, CEO age, or CEO MBA education), we find that only 20 percent of the regressions obtain a positive relation between managerial skills and corporate tax avoidance. Other specific management characteristics considered in recent empirical tax avoidance studies are personal tax aggressiveness (Chyz, 2013), gender (Francis, Hasan, Wu, & Yan, 2014), CEO narcissism (Olsen & Stekelberg, 2016), managerial overconfidence (Kubick & Lockhart, 2017), and executives' military experience (Law & Mills, 2017).[5] From a theoretical perspective, it is not clear whether the coefficients of all these managerial characteristics should point in the same direction. However, given that the literature on manager effects is just evolving, we call for future theoretical, archival, experimental, or qualitative work enhancing our understanding of executives' role in shaping corporate tax practice. First attempts in this direction exist (e.g., Feller & Schanz, 2017). Yet, more research is required to get inside the "black box" of corporate tax practice and understand it in all its depth.

A.19 Labor Organization

Distantly related to corporate governance, Chyz, Leung, Li, & Rui (2013) examine a potential effect of unionization on corporate tax avoidance. Unions may function as some form of internal monitoring device, raising the costs associated with tax avoidance for a firm's management. In addition, a direct economic effect may exist: If unionization increases labor input costs w, this will reduce the tax base, as higher wages can potentially induce a shift towards more capital input. The Dyreng, Jacob, Jiang, & Müller (2020) framework, in sum, suggests a negative effect of labor organization on corporate tax avoidance—at least in the short run. Consistent with this prediction, Chyz, Leung, Li, & Rui (2013) document a statistically significant negative association between union coverage and corporate tax avoidance. Future work could add to this by investigating, for example, whether employee satisfaction moderates the association between labor organization and corporate tax avoidance.

A.20 The Internal Information Environment of the Firm

Another governance-related determinant of corporate tax avoidance is the quality of a firm's internal information environment. Internal information quality refers to the availability, accessibility, accuracy, and amount of information that is created, collected, and consumed within a firm (Gallemore & Labro, 2015). Higher internal information quality is commonly assumed to foster better identification of tax avoidance opportunities within firms. Additionally, higher internal information quality reduces the risks

4. Supporting this theoretical argument, Evans, Hannan, Krishnan, & Moser (2001) provide experimental evidence that their participants often favored honest decision-making over additional wealth.
5. Some studies, which examine the relation between manager characteristics and corporate tax avoidance, have indeed been published in management journals. They are not included in our analysis due to the restrictiveness of our search criteria. Christensen, Dhaliwal, Boivie, & Graffin (2015), for example, look at managers' personal political orientation and analyze how it relates to corporate tax avoidance. Koester, Shevlin, & Wangerin (2017) examine the link between managerial ability and firms' tax avoidance engagement.

associated with tax avoidance, and thus lowers the overall cost of corporate tax avoidance engagement (right-hand side of Equation 2 in the paper).

Empirical work examining the role of internal information quality in the tax context originated from financial reporting studies' interest in corporate transparency and information quality (e.g., Bushman & Smith, 2003; Shroff, Verdi, & Yu, 2014). Further, management accounting studies claim that higher internal information quality should improve corporate decision-making (e.g., Gordon, Larcker, & Tuggle, 1978). An early study examining internal information quality in the tax setting is provided by Gallemore & Labro (2015). Specifically, Gallemore & Labro (2015) employ four different proxies to measure internal information quality (earnings announcement speed, management forecast accuracy, absence of material weaknesses, and the absence of error restatements). Their results support a significant positive association between internal information quality and corporate tax avoidance.

A later study by Bauer (2016) differentiates between tax-related and other internal control weaknesses disclosed under the Sarbanes-Oxley Act. This study documents statistically significant results for tax-related internal control weaknesses. On average, a tax-related internal control weakness seems to be associated with a substantial increase in the rate of taxes paid.

Weak internal controls can increase the likelihood that employees engage in non-desired activities, such as whistleblowing (Bowen, Call, & Rajgopal, 2010). Wilde (2017) examines the implications of employee whistleblowing on corporate tax avoidance engagement. Employee whistleblowing may cater inside information to firm outsiders. Hence, external monitoring may increase. Consequently, firms may face higher implementation costs of tax avoidance (right-hand side of Equation 2 in the paper). The empirical results provided by Wilde (2017) are consistent with theory. He reports that whistleblower firms engage in significantly less tax shelter activities and develop substantially lower book-tax differences.

A.21 Supplemental Firm Practices

A.21.1 Corporate Political Activity

Several studies examine the link between corporate tax avoidance engagement and supplemental firm practices, such as firms' engagement in corporate political activity (i.e., lobbying). Corporate political activity refers to firms' attempts to mitigate the negative consequences of corporate activities by gaining differential access to legislative information (Baysinger, 1984; Hillman, Keim, & Schuler, 2004). Effective corporate political activity may mitigate the political costs associated with tax avoidance. Thus, the Dyreng, Jacob, Jiang, & Müller (2020) framework suggests that firms with some form of corporate political activity may engage more in tax avoidance activities, as they can set up such tax avoidance activities at lower cost.

A.21.2 Corporate Social Responsibility

Over the last decade, a large literature examining the role of corporate social responsibility (CSR) for accounting practices emerged. CSR generally comprises the entirety of a firm's socially responsible activities and efforts, which are directed at its customers, employees, stakeholders, and the environment in general (Christensen, Hail, & Leuz, 2019). A firm's engagement in CSR activities may also influence its tax practice. From a theoretical perspective, CSR firms may be able to attract better skilled and motivated employees. Hence, the productivity level of such firms may increase (Turban & Greening, 1997; Bhattacharya, Sen, & Korschun, 2008; Balakrishnan, Sprinkle, & Williamson, 2011; Flammer

& Luo, 2017). In addition, several studies suggest that consumers might be more willing to support and buy from socially responsible firms (Maignan, 2001; Luo & Bhattacharya, 2006; Lev, Petrovits, & Radhakrishnan, 2010).

Both, the predicted increase in productivity and the positive shift in customer demand, positively affect the left-hand side of Equation 2 in the paper.[6] Thus, corporate tax avoidance incentives should increase with CSR initiatives. However, at the same time, CSR firms may face higher reputational and political costs and may thus refrain from engaging in overly aggressive tax avoidance strategies (consistent with the right-hand side of Equation 2 in the paper). Which of the two forces indeed dominates is an open empirical question.

Before assessing the empirical evidence on CSR and corporate tax avoidance engagement, it is important to remark that these studies may suffer from similar concerns as corporate political activity studies (e.g., potential self-selection issues). While extant CSR studies almost exclusively focus on potentially deterring effects of CSR on tax avoidance, it also seems plausible that some firms may indeed use high CSR involvement to disguise aggressive tax avoidance activities. The theoretical link between CSR and corporate tax avoidance is thus not unambiguous. The key concern is that both, CSR involvement and corporate tax avoidance engagement, represent simultaneous outcomes of a firm's general business strategy.

A.22 Peer Firms and Intermediaries

A.22.1 Learning from Peer Firms' Tax Avoidance Engagement

One firm's tax avoidance engagement should not be considered in isolation. Given that taxes represent a major cost factor for firms (Scholes et al. 1992), profit-maximizing firms likely stay attentive to peer firms' tax practices. Thereby, they ensure to not forego potential tax saving potentials, which could otherwise adversely affect their competitive position. There is a vast literature on peer effects, social learning, and institutional isomorphism in the management and economic literature (e.g., DiMaggio & Powell, 1983; Manski, 1993; Young, 2009; Cao, Liang, & Zhan, 2019). Recently, the role of peer effects also gained increasing relevance in the accounting (Arya & Mittendorf, 2005; Tse & Tucker, 2010), finance (Leary & Roberts, 2014; Kaustia & Rantala, 2015), and tax literature (Brown, 2011; Brown & Drake, 2014; Bayar, Huseynov, & Sardarli, 2018; Bird, Edwards, & Ruchti, 2018).

In the Dyreng, Jacob, Jiang, & Müller (2020) framework, learning from peers and mimicking their tax practices may reduce the tax avoidance costs of a firm (see right-hand side of Equation 2 in the paper). Peer firms' engagement in specific tax avoidance activities could, for instance, 'legitimize' such practices and reduce later adopting firms' exposure to public and tax authority scrutiny. However, even if public and tax authority scrutiny persist, firms being first movers on certain tax practices, will likely be the ones, who will get punished by the tax authorities. Hence, later adopting firms may face relatively lower tax avoidance costs than early adopters. Altogether, we thus predict that peer effects may be positively associated with corporate tax avoidance engagement.

All studies on peer effects (Brown, 2011; Brown & Drake, 2014; Bayar, Huseynov, & Sardarli, 2018; Bird, Edwards, & Ruchti, 2018) emphasize that firms can learn about their peers' tax practices via various channels. For instance, executives, which move from one firm to another, may increase corporate

6. Several accounting studies also suggest that CSR activities may reduce the cost of capital (Dhaliwal, Li, Tsang, & Yang, 2011; Goss & Roberts, 2011; Cheng, Ioannou, & Serafeim, 2014). According to the Dyreng, Jacob, Jiang, & Müller (2020) framework, lower cost of capital would also result in higher tax avoidance incentives for firms.

awareness for other firms' tax practices and may thus induce mimicking behavior (Bird, Edwards, & Ruchti, 2018). Alternatively, firms can learn about other firms' tax avoidance activities through network ties (e.g., board interlocks) (Brown, 2011; Brown & Drake, 2014) or via intermediaries. We discuss the role of intermediaries in the next subsection.

A.22.2 Intermediaries' Role in Shaping Corporate Tax Avoidance

Various intermediaries can shape the tax avoidance activities of a firm. One potentially relevant intermediary group are external tax service providers (e.g., tax consultants or auditors). Engaging external tax service providers with tax-specific industry expertise may enable firms to set up tax avoidance activities at lower cost. Stated differently, external tax service providers may possess better knowledge of the portfolio of tax avoidance opportunities, which may enable them to set up tax avoidance structures more efficiently. Hence, consistent with the right-hand side of Equation 2 in the paper, we expect that corporate tax avoidance incentives should increase for firms purchasing external tax services.

A recent study by Gallemore, Gipper, & Maydew (2019) considers the role of another intermediary group. Specifically, Gallemore, Gipper, & Maydew (2019) examine how a bank's portfolio of clients that engage in above-median tax avoidance may affect tax avoidance engagement of a new client firm. Their results suggest that new client firms tend to experience substantial Cash ETR reductions. We look forward to future studies that add to the presented work by examining how other intermediary groups shape corporate tax practice.

B Additional Tables and Figures

Table A.1: List of Analyzed Determinants and Consequences Studies

Study	Journal	Title
Panel A: Determinant Studies		
Abernathy, Kubick, & Masli (2016)	JATA	General counsel prominence and corporate tax policy
Allen, Francis, Wu, & Zhao (2016)	JBF	Analyst coverage and corporate tax aggressiveness
Amiram, Bauer, & Frank (2019)	TAR	Tax avoidance at public corporations driven by shareholder taxes: Evidence from changes in dividend tax policy
Armstrong, Blouin, & Larcker (2012)	JAE	The incentives for tax planning
Armstrong, Blouin, Jagolinzer, & Larcker (2015)	JAE	Corporate governance, incentives, and tax avoidance
Atwood, Drake, Myers, & Myers (2012)	TAR	Home country tax system characteristics and corporate tax avoidance: International evidence
Austin & Wilson (2017)	JATA	An examination of reputational costs and tax avoidance: Evidence from firms with valuable consumer brands
Ayers, Call, & Schwab (2018)	CAR	Do analysts' cash flow forecasts encourage managers to improve the firm's cash flows? Evidence from tax planning
Badertscher, Katz, & Rego (2013)	JAE	The separation of ownership and control and corporate tax avoidance
Badertscher, Katz, Rego, & Wilson (2019)	TAR	Conforming tax avoidance and capital market pressure
Bauer (2016)	CAR	Tax avoidance and the implications of weak internal controls
Bayar, Huseynov, & Sardarli (2018)	FM	Corporate governance, tax avoidance, and financial constraints
Beuselinck, Deloof, & Vanstraelen (2015)	RAST	Cross-jurisdictional income shifting and tax enforcement: Evidence from public versus private multinationals
Bird, Edwards, & Ruchti (2018)	TAR	Taxes and peer effects
Brown (2011)	TAR	The spread of aggressive corporate tax reporting: A detailed examination of the corporate-owned life insurance shelter
Brown & Drake (2014)	TAR	Network ties among low-tax firms
Brown, Drake, & Wellman (2015)	JATA	The benefits of a relational approach to corporate political activity: Evidence from political contributions to tax policymakers
Buettner, Overesch, Schreiber, & Wamser (2012)	JPubE	The impact of thin-capitalization rules on the capital structure of multinational firms
Cai & Liu (2009)	EJ	Competition and corporate tax avoidance: Evidence from Chinese industrial firms
Cen, Maydew, Zhang, & Zuo (2017)	JFE	Customer-supplier relationships and corporate tax avoidance
Chen & Lin (2017)	JFQA	Does information asymmetry affect corporate tax aggressiveness?
Chen, Chen, Cheng, & Shevlin (2010)	JFE	Are family firms more tax aggressive than non-family firms?
Chen, Chiu, & Shevlin (2018)	CAR	Do analysts matter for corporate tax planning? Evidence from a natural experiment
Chen, Schuchard, & Stomberg (2019)	TAR	Media coverage of corporate taxes
Cheng, Huang, Li, & Stanfield (2012)	TAR	The effect of hedge fund activism on corporate tax avoidance
Chi, Huang, & Sanchez (2017)	JAR	CEO inside debt incentives and corporate tax sheltering
Chyz (2013)	JAE	Personally tax aggressive executives and corporate tax sheltering
Chyz, Leung, Li, & Rui (2013)	JFE	Labor unions and tax aggressiveness
Clausing (2003)	JPubE	Tax-motivated transfer pricing and U.S. intra firm trade prices
Clifford (2019)	JPubE	Taxing multinationals beyond borders: Financial and locational responses to CFC rules
Collins, Kemsley Deen, & Lang (1998)	JAR	Cross-jurisdictional income shifting and earnings valuation
Davies, Martin, Parenti, & Toubal (2018)	REStat	Knocking on tax haven's door: Multinational firms and transfer pricing

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Table A.1: List of Analyzed Studies (Continued)

Study	Journal	Title
Davis, Guenther, Krull, & Williams (2016)	TAR	Do socially responsible firms pay more taxes?
De Simone (2016)	JAE	Does a common set of accounting standards affect tax-motivated income shifting for multinational firms?
De Simone, Klassen, & Seidman (2017)	TAR	Unprofitable affiliates and income shifting behavior
De Simone, Mills, & Stomberg (2019)	RAST	Using IRS data to identify income shifting to foreign affiliates
Desai & Dharmapala (2006)	JFE	Corporate tax avoidance and high-powered incentives
Dharmapala & Riedel (2013)	JPubE	Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals
Dischinger & Riedel (2011)	JPubE	Corporate taxes and the location of intangible assets within multinational firms
Donohoe (2015)	JAE	The economic effects of financial derivatives on corporate tax avoidance
Dowd, Landefeld, & Moore (2017)	JPubE	Profit shifting of U.S. multinationals
Dyreng & Markle (2016)	TAR	The effect of financial constraints on income shifting by U.S. multinationals
Dyreng, Hanlon, & Maydew (2008)	TAR	Long-run corporate tax avoidance
Dyreng, Hanlon, & Maydew (2010)	TAR	The effects of executives on corporate tax avoidance
Dyreng, Mayew, & Williams (2012)	JFBA	Religious social norms and corporate financial reporting
Dyreng, Lindsey, & Thornock (2013)	JFE	Exploring the role Delaware plays as a domestic tax haven
Dyreng, Hoopes, & Wilde (2016)	JAR	Public pressure and corporate tax behavior
Dyreng, Hanlon, Maydew, & Thornock (2017)	JFE	Changes in corporate effective tax rates over the past 25 years
Edwards, Schwab, & Shevlin (2016)	TAR	Financial constraints and cash tax savings
Francis, Hasan, Wu, & Yan (2014)	JATA	Are female CFOs less tax aggressive? Evidence from tax aggressiveness
Frank, Lynch, & Rego (2009)	TAR	Tax reporting aggressiveness and its relation to aggressive financial reporting
Gaertner (2014)	CAR	CEO after-tax compensation incentives and corporate tax avoidance
Gallemore & Labro (2015)	JAE	The importance of the internal information environment for tax avoidance
Gallemore, Gipper, & Maydew (2019)	JAR	Banks as tax planning intermediaries
Graham, Hanlon, Shevlin, & Shroff (2014)	TAR	Incentives for tax planning and avoidance: Evidence from the field
Gramlich, Limpaphayom, & Ghon Rhee (2004)	JAE	Taxes, Keiretsu affiliation, and income shifting
Gumpert, Hines, & Schnitzer (2016)	REStat	Multinational firms and tax havens
Gupta & Mills (2002)	JAE	Corporate multi-state tax planning: Benefits of multiple jurisdictions
Hasan, Hoi, Wu, & Zhang (2017)	JAR	Does social capital matter in corporate decisions? Evidence from corporate tax avoidance
Hasan, Al-Hadi, Taylor, & Richardson (2017)	EAR	Does a firm's life cycle explain its propensity to engage in corporate tax avoidance?
Higgins, Omer, & Phillips (2015)	CAR	The influence of a firm's business strategy on its tax aggressiveness
Hill, Kubick, Lockhart, & Wan (2013)	JBF	The effectiveness and valuation of political tax minimization
Hoi, Wu, & Zhang (2013)	TAR	Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities
Hoopes, Mescall, & Pittman (2012)	TAR	Do IRS audits deter corporate tax avoidance?
Hope, Ma, & Thomas (2013)	JAE	Tax avoidance and geographic earnings disclosure
Hopland, Lisowsky, Mardan, & Schindler (2018)	TAR	Flexibility in income shifting under losses
Hsu, Moore, & Neubaum (2018)	JFBA	Tax avoidance, financial experts on the audit committee, and business strategy
Huang, Lobo, Wang, & Xie (2016)	JBF	Customer concentration and corporate tax avoidance

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Table A.1: List of Analyzed Studies (Continued)

Study	Journal	Title
Huang, Sun, & Yu (2017)	JATA	Are socially responsible firms less likely to expatriate? An examination of corporate inversions
Huizinga & Laeven (2008)	JPubE	International profit shifting within multinationals: A multi-country perspective
Huseynov & Klamm (2012)	JCF	Tax avoidance, tax management and corporate social responsibility
Huseynov, Sardarli, & Zhang (2017)	JCF	Does index addition affect corporate tax avoidance?
Jung, Kim, & Kim (2009)	JFBA	Tax motivated income shifting and Korean business groups
Kanagaretnam, Lee, Lim, & Lobo (2016)	AJPT	Relation between auditor quality and tax aggressiveness: Implications of cross-country institutional differences
Kanagaretnam, Lee, Lim, & Lobo (2018)	RAST	Societal trust and corporate tax avoidance
Khan, Srinivasan, & Tan (2017)	TAR	Institutional ownership and corporate tax avoidance: new evidence
Khurana & Moser (2013)	JATA	Institutional shareholders' investment horizons and tax avoidance
Kim & Zhang (2016)	CAR	Corporate political connections and tax aggressiveness
Klassen & Laplante (2012b)	CAR	The effect of foreign reinvestment and financial reporting incentives on cross-jurisdictional income shifting
Klassen & Laplante (2012a)	JAR	Are us multinational corporations becoming more aggressive income shifters?
Klassen, Lisowsky, & Mescall (2016)	TAR	The role of auditors, non-auditors, and internal tax departments in corporate tax aggressiveness
Klassen, Lisowsky, & Mescall (2017)	CAR	Transfer pricing: Strategies, practices, and tax minimization
Kubick & Lockhart (2016)	JCF	Do external labor market incentives motivate CEOs to adopt more aggressive corporate tax reporting preferences?
Kubick & Lockhart (2017)	JFBA	Overconfidence, CEO awards, and corporate tax aggressiveness
Kubick, Lynch, Mayberry, & Omer (2015)	TAR	Product market power and tax avoidance: Market leaders, mimicking strategies, and stock returns
Kubick, Lynch, Mayberry, & Omer (2016)	TAR	The effects of regulatory scrutiny on tax avoidance: An examination of SEC comment letters
Kubick, Lockhart, Mills, & Robinson (2017)	JAE	IRS and corporate taxpayer effects of geographic proximity
Law & Mills (2015)	JAR	Taxes and financial constraints: Evidence from linguistic cues
Law & Mills (2017)	RAST	Military experience and corporate tax avoidance
Li, Liu, & Ni (2017)	JFBA	Controlling shareholders' incentive and corporate tax avoidance: A natural experiment in China
Lin, Mills, Zhang, & Li (2018)	CAR	Do political connections weaken tax enforcement effectiveness?
Lisowsky (2010)	TAR	Seeking shelter: Empirically modeling tax shelters using financial statement information
Markle (2016)	CAR	A comparison of the tax-motivated income shifting of multinationals in territorial and worldwide countries
McClure, Lanis, Wells, & Govendir (2018)	JCF	The impact of dividend imputation on corporate tax avoidance: The case of shareholder value
McGuire, Omer, & Wang (2012)	TAR	Tax avoidance: Does tax-specific industry expertise make a difference?
McGuire, Wang, & Wilson (2014)	TAR	Dual class ownership and tax avoidance
McGuire, Rane, & Weaver (2018)	JATA	Internal information quality and tax-motivated income shifting
Merz & Overesch (2016)	JBF	Profit shifting and tax response of multinational banks
Mills, Nutter, & Schwab (2013)	TAR	The effect of political sensitivity and bargaining power on taxes: Evidence from federal contractors
Newberry & Dhaliwal (2001)	JAR	Cross-jurisdictional income shifting by us multinationals: Evidence from international bond offerings
Olsen & Stekelberg (2016)	JATA	Ceo narcissism and corporate tax sheltering
Overesch & Wamser (2010)	APPEC	Corporate tax planning and thin-capitalization rules: Evidence from a quasi-experiment
Phillips (2003)	TAR	Corporate tax-planning effectiveness: The role of compensation-based incentives
Powers, Robinson, & Stomberg (2016)	RAST	How do CEO incentives affect corporate tax planning and financial reporting of income taxes?
Rego (2003)	CAR	Tax-avoidance activities of U.S. multinational corporations

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Table A.1: List of Analyzed Studies (Continued)

Study	Journal	Title
Richardson, Lanis, & Taylor (2015)	JBF	Financial distress, outside directors and corporate tax aggressiveness spanning the global financial crisis: An empirical analysis
Robinson, Sikes, & Weaver (2010)	TAR	Performance measurement of corporate tax departments
Seidman & Stomberg (2017)	JATA	Equity compensation and tax avoidance: Disentangling managerial incentives from tax benefits and reexamining the effect of shareholder rights
Shevlin, Thornock, & Williams (2017)	RAST	An examination of firms' responses to tax forgiveness
Tang, Mo, & Chan (2017)	TAR	Tax collector or tax avoider? An investigation of intergovernmental agency conflicts
Voget (2011)	JPubE	Relocation of headquarters and international taxation
Watson (2015)	JATA	Corporate social responsibility, tax avoidance, and earnings performance
Wilde (2017)	TAR	The deterrent effect of employee whistleblowing on firms' financial misreporting and tax aggressiveness
Wilson (2009)	TAR	An examination of corporate tax shelter participants
Panel B: Consequences Studies		
Abernathy, Beyer, Gross, & Rapley (2017)	JATA	Income statement reporting discretion allowed by FIN 48: Interest and penalty expense classification
Ayers, Jiang, & Laplante (2009)	CAR	Taxable income as a performance measure: the effects of tax planning and earnings quality
Balakrishnan, Blouin, & Guay (2019)	TAR	Tax aggressiveness and corporate transparency
Brooks, Godfrey, Hillenbrand, & Money (2016)	JCF	Do investors care about corporate taxes?
Chen, Hepfer, Quinn, & Wilson (2018)	RAST	The effect of tax-motivated income shifting on information asymmetry
Chow, Klassen, & Liu (2016)	CAR	Targets' tax shelter participation and takeover premiums
Chung, Goh, Lee, & Shevlin (2019)	CAR	Corporate tax aggressiveness and insider trading
Cook, Moser, & Omer (2017)	JFBA	Tax avoidance and ex ante cost of capital
Desai & Dharmapala (2009a)	REStat	Corporate tax avoidance and firm value
Donohoe & Knechel (2014)	CAR	Does corporate tax aggressiveness influence audit pricing?
Durnev, Li, & Magnan (2017)	JBFA	Beyond tax avoidance: offshore firms' institutional environment and financial reporting quality
Goh, Lee, Lim, & Shevlin (2016)	TAR	The effect of corporate tax avoidance on the cost of equity
Graham & Tucker (2006)	JFE	Tax shelters and corporate debt policy
Hanlon & Slemrod (2009)	JPubE	What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement
Hasan, Hoi, Wu, & Zhang (2014)	JFE	Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans
Heitzman & Ogneva (2019)	TAR	Industry tax planning and stock returns
Inger, Meckfessel, Zhou, & Fan (2018)	JATA	An examination of the impact of tax avoidance on the readability of tax footnotes
Isin (2018)	JCF	Tax avoidance and cost of debt: The case for loan-specific risk mitigation and public debt financing
Kim, Li, & Zhang (2011)	JFE	Corporate tax avoidance and stock price crash risk: Firm-level analysis
Lim (2011)	JBF	Tax avoidance, cost of debt and shareholder activism: Evidence from Korea
McGuire, Neuman, Olson, & Omer (2016)	JATA	Do investors use prior tax avoidance when pricing tax loss carry forwards?
Platikanova (2017)	EAR	Debt maturity and tax avoidance
Richardson, Lanis, & Leung (2014)	JCF	Corporate tax aggressiveness, outside directors, and debt policy: An empirical analysis
Panel C: Real Effects Studies		
Alstadsæter, Barrios, Nicodeme, Skonieczna, & Vezzani (2018)	EcPol	Patent boxes design, patents location, and local R&D
Arena & Kutner (2015)	RFS	Territorial tax system reform and corporate financial policies
Barclay, Heitzman, & Smith (2013)	JCF	Debt and taxes: Evidence from the real estate industry

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Table A.1: List of Analyzed Studies (Continued)

Study	Journal	Title
Barrios, Huizinga, Laeven, & Nicodème (2012)	JPubE	International taxation and multinational firm location decisions
Bethmann, Jacob, & Müller (2018)	TAR	Tax loss carrybacks: investment stimulus versus misallocation
Bloom, Griffith, & van Reenen (2002)	JPubE	Do R&D tax credits work? Evidence from a panel of countries 1979–1997
Buettner & Wamser (2013)	NTJ	Internal debt and multinational profit shifting: Empirical evidence from firm-level panel data
Chirinko & Wilson (2008)	JPubE	State investment tax incentives: A zero-sum game?
Da Rin, Di Giacomo, & Sembenelli (2011)	JPubE	Entrepreneurship, firm entry, and the taxation of corporate income: Evidence from Europe
De Simone, Piotroski, & Tomy (2018)	RFS	Repatriation taxes and foreign cash holdings: The impact of anticipated tax reform
Desai & Dharmapala (2009b)	JPubE	Taxes, institutions and foreign diversification opportunities
Desai & Hines (2004)	JPubE	Foreign direct investment in a world of multiple taxes
Devereux, Maffini, & Xing (2018)	JBF	Corporate tax incentives and capital structure: New evidence from UK firm-level tax returns
Dharmapala, Foley, & Forbes (2011)	JF	Watch what i do, not what i say: The unintended consequences of the Homeland Investment Act
Djankov, Ganser, McLiesh, Ramalho, & Shleifer (2010)	AEJ Macro	The effect of corporate taxes on investment and entrepreneurship
Donohoe, Lisowsky, & Mayberry (2019)	CAR	The effects of competition from S corporations on the organizational form choice of rival C corporations
Edgerton (2010)	JPubE	Investment incentives and corporate tax asymmetries
Edwards, Kravet, & Wilson (2016)	CAR	Trapped cash and the profitability of foreign acquisitions
Egger & Wamser (2015)	JPubE	The impact of controlled foreign company legislation on real investments abroad. A multi-dimensional regression discontinuity design
Erickson & Wang (2000))	JAE	The effect of transaction structure on price: Evidence from subsidiary sales
Fallick & Hassett (1999)	JOLE	Investment and union certification
Feld, Heckemeyer, & Overesch (2013)	JBF	Capital structure choice and company taxation: A meta-study
Giroud & Rauh (2019)	JPE	State taxation and the reallocation of business activity: Evidence from establishment-level data
Goolsbee (1998)	JPubE	Taxes, organizational form, and the deadweight loss of the corporate income tax
Gordon & Lee (2001)	JPubE	Do taxes affect corporate debt policy? Evidence from U.S. corporate tax return data
Graham, Lang, & Shackelford (2004)	JF	Employee stock options, corporate taxes, and debt policy
Griffith, Miller, & O'Connell (2014)	JPubE	Ownership of intellectual property and corporate taxation
Gu (2017)	JFE	U.S. multinationals and cash holdings
Harris & O'Brien (2018)	JAE	U.S. worldwide taxation and domestic mergers and acquisitions
De Mooij & Hebous (2018)	JBF	Curbing corporate debt bias: Do limitations to interest deductibility work?
Hebous & Ruf (2017)	JPubE	Evaluating the effects of ACE systems on multinational debt financing and investment
Heckemeyer, de Mooij et al. (2017)	NTJ	Taxation and corporate debt: Are banks any different?
Heider & Ljungqvist (2015)	JFE	As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes
Hines Jr & Park (2019)	JPubE	Investment ramifications of distortionary tax subsidies
House & Shapiro (2008)	AER	Temporary investment tax incentives: Theory with evidence from bonus depreciation
Huizinga, Laeven, & Nicodeme (2008)	JFE	Capital structure and international debt shifting
Klassen, Pittman, Reed, & Fortin (2004)	CAR	A cross-national comparison ofR&D expenditure decisions: Tax incentives and financial constraints
Langenmayr & Lester (2018)	TAR	Taxation and corporate risk-taking
Lester (2019)	JAR	Made in the U.S.A.? A study of firm responses to domestic production incentives
Ljungqvist, Zhang, & Zuo (2017)	JAR	Sharing risk with the government: How taxes affect corporate risk taking
Merz, Overesch, & Wamser (2017)	JBF	The location of financial sector FDI: Tax and regulation policy

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Table A.1: List of Analyzed Studies (Continued)

Study	Journal	Title
Moretti & Wilson (2017)	AER	The effect of state taxes on the geographical location of top earners: Evidence from star scientists
Ohrn (2018)	AEJ EcPol	The effect of corporate taxation on investment and financial policy: Evidence from the DPAD
Rao (2016)	JPubE	Do tax credits stimulate R&D spending? The effect of the R&D tax credit in its first decade
Rathelot & Sillard (2008)	EJ	The importance of local corporate taxes in business location decisions: Evidence from french micro data
Suárez Serrato & Zidar (2016)	AER	Who benefits from state corporate tax cuts? A local labor markets approach with heterogeneous firms
Shevlin, Shivakumar, & Urcan (2019)	JAE	Macroeconomic effects of corporate tax policy
Swenson (2015)	JATA	The cash flow and behavioral effects of switching to a single sales factor on state taxation
Von Beschwitz (2018)	JFE	Cash windfalls and acquisitions
Williams (2018)	TAR	Multinational tax incentives and offshored U.S. jobs
Zwick & Mahon (2017)	AER	Tax policy and heterogeneous investment behavior

This table lists all tax avoidance determinants and consequences studies, as well as all real effects studies, which we consider in our quantitative synthesis.

Table A.2: Quantitative Synthesis of Determinants—Extended Version

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Size							
Aggregate	?	81	213	0.11	0.35	0.17	0.36
(Log) Total Assets		48	111	0.10	0.31	0.19	0.41
(Log) MV Equity		28	83	0.12	0.39	0.16	0.34
(Log) Sales		8	10	0.30	0.60		0.10
(Log) Number Employees		4	7		0.43	0.29	0.29
Decile-Ranks by Year-Industry of Total Assets		1	1			1.00	
Square of Log Sales		1	1				1.00
Market Power							
Aggregate	?	5	20	0.25	0.20	0.30	0.25
HHI		3	9	0.44	0.44	0.11	
MV Client Scaled by Industry Peer Clients' MVs		1	4	0.25		0.75	
Product Market Power		1	4				1.00
Ratio of Contracts not Subject to Competition		1	1			1.00	
Ratio of Defense Contract Dollars		1	1				1.00
Sum of Company Market Shares Squares		1	1			1.00	
Profitability							
Aggregate	?	77	206	0.07	0.30	0.11	0.52
RoA		64	167	0.07	0.31	0.10	0.53
Op. Cash Flow		4	5	0.20		0.40	0.40
RoE		2	8	0.12		0.12	0.75
RoA (Change)		2	6	0.17	0.17	0.33	0.33
EBIT		2	5		0.40		0.60
Pretax Income		2	3		0.33		0.67
Pretax Cashflows		1	4		0.75		0.25
RNoA		1	3	0.33		0.67	
RoI		1	2				1.00
EBITDA		1	1		1.00		
Gross Margin		1	1		1.00		
Pre-Shifting Profits		1	1				1.00
Losses							
Aggregate	-	58	273	0.15	0.20	0.20	0.45
NOL (Indicator)		55	151	0.09	0.07	0.27	0.57
NOL (Change)		36	112	0.25	0.34	0.10	0.31
NOL Amount		2	2			0.50	0.50
Loss (Indicator)		1	4	0.25	0.75		
4year Loss Intensity		1	2			0.50	0.50
Affiliate Loss (Indicator)		1	1		1.00		
Loss Percentage		1	1		1.00		
Growth Opportunities							
Aggregate	+	68	220	0.19	0.20	0.23	0.37
MB		36	116	0.17	0.17	0.26	0.40
Sales Growth		16	34	0.24	0.09	0.21	0.47
Capital Expenditures		10	18	0.06	0.39	0.22	0.33
BM		9	18	0.22	0.28	0.22	0.28
New Investment		3	15	0.33	0.33	0.13	0.20
Tobin's Q		3	7	0.29		0.43	0.29
BM (Change)		1	3		1.00		
Sales Growth (Change)		1	3				1.00
M&A Indicator		1	2		1.00		
Asset Growth		1	1	1.00			
EP		1	1			1.00	
M&A (Indicator)		1	1	1.00			
MV Equity (Change)		1	1				1.00

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Life Cycle Stage							
Aggregate	?	5	20	0.25	0.30	0.05	0.40
(Log) Firm Age		3	7	0.43	0.14	0.14	0.29
Firm Lifecycle Stage: Decline Stage (Indicator)		1	3	0.33			0.67
Firm Lifecycle Stage: Growth (Indicator)		1	3	0.33	0.67		
Firm Lifecycle Stage: Introduction (Indicator)		1	3				1.00
Firm Lifecycle Stage: Mature (Indicator)		1	3		1.00		
Assetage		1	1				1.00
Tangible Assets							
Aggregate	?	62	191	0.19	0.20	0.23	0.38
PPE		55	153	0.19	0.13	0.24	0.44
Inventory		9	17	0.18	0.76		0.06
Depreciation & Amortization		2	7		0.57	0.29	0.14
PPE (Change)		2	7	0.29	0.14	0.43	0.14
Noncurrent Operating Assets minus Liabilities (Change)		2	2				1.00
Inventory (Change)		1	3	1.00			
PPE Scaled by Sales		1	2			0.50	0.50
Intangible Assets							
Aggregate	?	71	239	0.18	0.19	0.21	0.41
R&D Expense		51	114	0.11	0.06	0.19	0.63
Intangible Assets		47	120	0.26	0.32	0.22	0.20
R&D Expense Scaled by Sales		2	3			0.33	0.67
R&D Expense (Indicator)		1	1			1.00	
R&D Relevance (Indicator)		1	1				1.00
Leverage							
Aggregate	-	73	188	0.21	0.18	0.22	0.39
Long Term Debt		55	148	0.20	0.20	0.21	0.39
Total Debt		15	30	0.17	0.10	0.27	0.47
Interest Expense		2	2			0.50	0.50
Mezzanine Financing		2	2	0.50		0.50	
Long Term Debt (Change)		1	3	0.33	0.67		
Total Debt (Change)		1	2	1.00			
Limited Capitalization (Indicator)		1	1	1.00			
Financial Constraints							
Aggregate	+ (?)	33	96	0.16	0.19	0.21	0.45
Cash Holdings		19	52	0.21	0.25	0.27	0.27
Free Cash Flow		5	12			0.33	0.67
SA Index		3	3		0.33		0.67
Altman's Z-Score		2	6			0.17	0.83
Financial Assets Minus Liabilities (Change)		2	2				1.00
Current Assets Scaled by Current Liabilities		1	4	1.00			
Ohlson Score		1	4				1.00
Zmijewski Variable		1	4				1.00
Investment Inefficiencies		1	2		0.50	0.50	
Altman's Z-Score (Change)		1	1				1.00
Credit Access		1	1		1.00		
Excess Cash		1	1		1.00		
Junk Rating		1	1		1.00		
KZ Index		1	1				1.00
Proportion Negative Words in 10-Ks		1	1				1.00
Tightened Standards Survey Response		1	1				1.00

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Foreign Operations							
Aggregate	+	71	184	0.15	0.14	0.25	0.46
Foreign Income		46	125	0.13	0.10	0.26	0.51
Multinational Operations (Indicator)		13	23	0.30	0.26	0.30	0.13
(Log) Foreign Assets		7	20	0.10	0.20	0.15	0.55
Tax Haven (Indicator)		5	7	0.14	0.14	0.14	0.57
Foreign Sales Percentage		2	2		0.50		0.50
Foreign Income (Change)		1	3	0.33	0.33		0.33
FDI		1	1		1.00		
Tax Haven Experience (Indicator)		1	1			1.00	
Tax Haven Operations Percentage		1	1			1.00	
Tax Shelter Score		1	1				1.00
Corporate Complexity							
Aggregate	?	7	32	0.22	0.16	0.41	0.22
Geographic Complexity		2	7	0.43	0.14	0.43	
Vertical Integration		1	6	0.17		0.50	0.33
Industry Complexity		1	5			0.80	0.20
Number of Business Segments		1	4		0.25	0.25	0.50
Number of Geographic Segments		1	4	0.50	0.25	0.25	
Number Foreign Segments		1	3	0.33	0.67		
Number of Countries		1	1				1.00
Number of State Returns Filed		1	1			1.00	
Number of States		1	1				1.00
Customer Base							
Aggregate	?	12	46	0.11	0.37	0.17	0.35
Advertising Expense		8	10	0.30	0.40	0.30	
Dependent Supplier (Indicator)		1	6				1.00
Government Contractor (Indicator)		1	6	0.33		0.67	
Principal Customer (Indicator)		1	6				1.00
Consumer-based Brand Equity		1	5		0.80	0.20	
Log of Dollar Amount of Government Contracts		1	4		1.00		
Corp. Major Customer Sales		1	3				1.00
Gov. Major Customer Sales		1	3		0.67		0.33
Political Sensitivity Indicator		1	3		1.00		
Business Model (Other)							
Aggregate	?	7	23	0.30	0.22	0.17	0.30
Business Strategy: Defender (Indicator)		2	7	0.57	0.29	0.14	
Business Strategy: Prospector (Indicator)		2	7			0.29	0.71
Survey Response Reputational Harm (Indicator)		1	4	0.50	0.50		
Litigation (Indicator)		1	1				1.00
Operating Cycle		1	1		1.00		
Profit Center (Indicator)		1	1				1.00
Tax Strategy Focus: Compliance Goal (Indicator)		1	1	1.00			
Tax Strategy Focus: Tax Goal (Indicator)		1	1			1.00	
Family Ownership							
Aggregate	?	1	4		1.00		
Family Firm (Indicator)		1	4		1.00		
Institutional Ownership							
Aggregate	?	9	32	0.12	0.31	0.12	0.44
Institutional Ownership		6	22	0.18	0.23	0.14	0.45
Hedge Fund Activism (Indicator)		1	4			0.25	0.75
Institutional Ownership Turnover (Indicator)		1	4		0.75		0.25
Institutional Ownership (Russell Reindexing)		1	2		1.00		

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Ownership (Other)							
Aggregate	?	7	21	0.14	0.38	0.29	0.19
Local Government Agency as Controlling Shareholder (Indicator)		2	4				1.00
Dual Class (Indicator)		1	4	0.50	0.25	0.25	
Management Owned (Indicator)		1	4		1.00		
Shares Owned by Government Percentage		1	4			1.00	
Dual Class Wedge		1	2		1.00		
Largest Shareholders' Stock Ownership		1	2	0.50		0.50	
Keiretsu Firm Indicator		1	1		1.00		
Board Characteristics							
Aggregate	?	5	30	0.33	0.20	0.23	0.23
Indep. Directors Percentage		3	7	0.29	0.14	0.29	0.29
(Log) Number of Directors		2	6	0.17	0.33	0.33	0.17
(Log) Number Audit Committee Member		1	4	0.25	0.75		
Indep. Auditors Percentage		1	4	0.25		0.50	0.25
Indep. Financial Experts on Audit Committee Percentage		1	4	1.00			
(Log) Number Financial Experts Board		1	2			0.50	0.50
Indicator for General Councel Ascension		1	2				1.00
Duality		1	1	1.00			
Executive Incentives							
Aggregate	?	21	71	0.20	0.17	0.28	0.35
(Log) Vega CEO		8	14	0.29	0.14	0.21	0.36
(Log) Delta CEO		7	13	0.23	0.15	0.46	0.15
CEO Stock-Based Compensation		6	9	0.22	0.33	0.11	0.33
CEO After-Tax Compensation		3	4			0.50	0.50
CEO Option Compensation Percentage		3	4			0.50	0.50
Tax Director Ratio Variable Pay		1	5	0.40	0.20	0.40	
CEO Total Compensation		1	4		0.50		0.50
(Log) Vega CFO		1	3			0.67	0.33
Industry Gap CEO Compensation		1	3				1.00
(Log) Delta NEO		1	2			0.50	0.50
(Log) Vega NEO		1	2	1.00			
CEO Cashflow Performance Incentive		1	2				1.00
BU Manager After-Tax Compensation		1	1			1.00	
BU Manager Stock-Based Compensation		1	1	1.00			
CEO Inside Debt Incentives		1	1		1.00		
CEO Tax Benefits Stock Options		1	1				1.00
Option Expense		1	1		1.00		
Variable Manager Compensation		1	1				1.00
Executive Characteristics							
Aggregate	?	6	25	0.16	0.60	0.12	0.12
CEO Gender		2	3	0.33	0.33	0.33	
CFO Gender Transition Year		1	3		1.00		
CEO Born Outside U.S.		1	2	1.00			
CEO Fixed Effect		1	2		1.00		
CEO Graduation in Recession		1	2			0.50	0.50
CEO Military Experience		1	2		1.00		
CEO Political Affiliation		1	2	0.50		0.50	
CFO Fixed Effect		1	2		1.00		
Executive Fixed Effect		1	2		1.00		
CEO Narcissism		1	1				1.00
CEO Overconfidence		1	1		1.00		

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Executive Fixed Tax Effect Down		1	1		1.00		
Executive Fixed Tax Effect Up		1	1		1.00		
Personal Tax Aggressiveness of Top Executives (Indicator)		1	1				1.00
Executive Characteristics (Other: Skills)							
Aggregate	+	4	15	0.20	0.07	0.53	0.20
Managerial Ability		3	5	0.20	0.20	0.40	0.20
CEO Age		2	3	0.33		0.67	
CEO Tenure		2	3	0.33		0.67	
CEO Award		1	2				1.00
CEO MBA Education		1	2			1.00	
Labor Organization							
Aggregate	-	1	4		1.00		
Union Coverage		1	4		1.00		
Internal Inf. Environment							
Aggregate	+	5	12	0.08	0.33	0.08	0.50
Other Internal Control Weaknesses		2	2	0.50	0.50		
Financial Derivatives Usage		1	3			0.33	0.67
Whistleblowing (Indicator)		1	2		1.00		
Earnings Announcement Speed		1	1				1.00
Management Forecast Accuracy		1	1				1.00
No Error Restatement (Indicator)		1	1				1.00
No Material Weaknesses (Indicator)		1	1				1.00
Tax Internal Control Weaknesses		1	1		1.00		
Corp. Governance (Other)							
Aggregate	?	4	10	0.40	0.10	0.40	0.10
Number of CG Strengths minus CG Concerns		2	2	0.50	0.50		
Governance Index		1	4			1.00	
Sum of CG Concerns		1	2	1.00			
Sum of CG Strengths		1	2	0.50			0.50
External Inf. Environment							
Aggregate	-	20	43	0.28	0.19	0.26	0.28
Volatility RoA		10	17	0.24	0.18	0.24	0.35
Analyst Coverage		4	11	0.36	0.18	0.18	0.27
First Tax Article		1	2			1.00	
Media Coverage		1	2	0.50		0.50	
Most Media Tax Coverage		1	2	0.50		0.50	
Most Negative Media Tax Coverage		1	2	0.50		0.50	
Relative Volatility Earnings to OCF		1	2				1.00
Broker Mergers		1	1				1.00
Public Scrutiny Measure		1	1		1.00		
Trading Volume		1	1	1.00			
Volatility CF		1	1		1.00		
Volatility Sales		1	1		1.00		
BTC							
Aggregate	-	4	4		0.75		0.25
Booktax Conformity Level		4	4		0.75		0.25
Financial Rep. Incentives							
Aggregate	-	34	97	0.10	0.09	0.16	0.64
Discretionary Accruals		17	40	0.18	0.08	0.20	0.55
Abnormal Accruals		5	28	0.07	0.07	0.07	0.79
Total Accruals		3	5			0.20	0.80

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Working Capital		2	3	0.33	0.67		
BTDs		2	2			0.50	0.50
Working Capital (Change)		2	2				1.00
Discretionary Accruals (Change)		1	3				1.00
Absolute Accruals		1	2				1.00
Analyst Cash Flow Forecast (Indicator)		1	2			1.00	
Financial Misstatement (Indicator)		1	2		0.50	0.50	
Non-Disclosure of Geographic Earnings in the Post SFAS 131 Period (Indicator)		1	2				1.00
Rights Offering in the Next Year (Indicator)		1	2			0.50	0.50
Shares Outstanding $\geq$ 110% of Last Year (Indicator)		1	2		0.50		0.50
Affiliate IFRS Adoption (Indicator)		1	1				1.00
Financial Reporting Incentives		1	1				1.00
Corporate Political Activity							
Aggregate	+	4	28	0.04	0.04		0.93
Lobbying General (Indicator)		2	7	0.14	0.14		0.71
Lobbying for Tax Purposes (Indicator)		2	5				1.00
Strength of Political Connectedness		2	3				1.00
Campaign Contributions (Indicator)		1	4				1.00
Political Directors (Indicator)		1	4				1.00
(Log) Sum of Supported Candidates		1	2				1.00
(Log) Sum of Political Connectedness		1	1				1.00
Connected Board (Indicator)		1	1				1.00
Connected Chairman (Indicator)		1	1				1.00
Corporate Social Responsibility							
Aggregate	?	5	22	0.32	0.05	0.36	0.27
Sum Negative CSR Activities		2	5				1.00
Sum Positive CSR Activities		2	5	0.20		0.80	
Difference CSR Strengths and Weaknesses		2	4	0.25	0.25	0.50	
Sum of Community Concerns		1	2	0.50			0.50
Sum of Community Strengths		1	2	0.50		0.50	
Sum of Diversity Concerns		1	2	1.00			
Sum of Diversity Strengths		1	2	0.50		0.50	
Peer Tax Practice							
Aggregate	+	4	8	0.38	0.25		0.38
Auditor Interlock (Indicator)		1	1	1.00			
BEA Region Link (Indicator)		1	1				1.00
Board Interlock (Indicator)		1	1				1.00
Focal Firm Shock Down in TA (Indicator)		1	1		1.00		
Focal Firm Shock Up in TA (Indicator)		1	1	1.00			
Industry Link (Indicator)		1	1	1.00			
Industry Median CashETR		1	1		1.00		
Proportion of Board Ties to Low-Tax Firms		1	1				1.00
Intermediaries							
Aggregate	+	11	36	0.14	0.17	0.22	0.47
Big Four Auditor (Indicator)		7	12	0.17	0.33	0.33	0.17
SecondTier Auditor (Indicator)		2	7	0.43	0.14	0.29	0.14
Tax Fees		2	7			0.29	0.71
Audit Firm Tax Expertise (Indicator)		1	4				1.00
Audit Fees		1	1				1.00
External Tax Return Preparer (Indicator)		1	1				1.00
Intermediary Bank (Indicator)		1	1				1.00
Internal Tax Return Preparer (Indicator)		1	1				1.00
Payments for Outside Assistance Percentage		1	1				1.00

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Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Square of Payments for Outside Assistance Percentage		1	1		1.00		
Statutory Tax Rate							
Aggregate	+	18	22		0.23		0.77
Stat TR		5	6		0.33		0.67
Average Foreign Stat TR larger U.S. Stat TR (Indicator)		2	2				1.00
C Measure		2	2				1.00
Applicable Tax Rate (Change)		1	2				1.00
Average Foreign Nonhaven Tax Rate		1	2				1.00
Low Affiliate Tax Rate		1	2				1.00
Affiliate Tax Rate		1	1		1.00		
Applicable Tax Rate		1	1				1.00
CFC Stat TR		1	1		1.00		
Headquarter State Stat TR		1	1		1.00		
High Stat TR (Indicator)		1	1				1.00
U.S. Stat TR Minus Average Foreign Stat TR		1	1				1.00
WW Tax System							
Aggregate	?	7	8		0.50	0.25	0.25
Tax System (Indicator)		4	4		0.75	0.25	
Dividend Imputation		2	2		0.50		0.50
Business Friendliness Score in a State		1	1				1.00
Parent Territorial Tax System (Indicator)		1	1			1.00	
Anti-TA Rules							
Aggregate	-	4	4		0.75		0.25
Thin-Cap Regime (Indicator)		2	2		1.00		
CFC Rules (Indicator)		1	1		1.00		
Headquarter Relocation Indicator		1	1				1.00
Tax Enforcement							
Aggregate	-	10	18	0.11	0.72	0.11	0.06
IRS Audit Probability		2	2		1.00		
Perceived Tax Enforcement Simplicity		2	2		1.00		
Tax Enforcement Percentile Ranking		1	4		1.00		
SEC Scrutiny		1	3		1.00		
Amnesty State (Indicator)		1	1		1.00		
CiC Participation Knowledge		1	1			1.00	
Cost of Tax Compliance		1	1				1.00
Industry Specialist Nearby (Indicator)		1	1			1.00	
Log Distance to IRS Territory Manager		1	1	1.00			
Tax Enforcement (Indicator)		1	1	1.00			
Transfer Pricing Regulation (Indicator)		1	1		1.00		
Country Characteristics							
Aggregate	?	8	29	0.07	0.38	0.24	0.31
(Log) GDP Per Capita		3	4	0.50		0.25	0.25
LaPorta Legal Factor		2	2		1.00		
Governor Turnover		1	4			1.00	
NERI Institutional Characteristics Index		1	4				1.00
(Log) GDP		1	3		1.00		
Social Capital		1	3		0.33		0.67
Total Government Deficit		1	2			1.00	
(Log)GDP		1	1		1.00		
Annual Stock Market Capitalization		1	1				1.00
GDP Growth		1	1				1.00
Number of Religious Adherents Per Capita		1	1		1.00		
Population Growth		1	1		1.00		
Republican Voting Percentage		1	1		1.00		

(continued on next page)

Table A.2: Quantitative Synthesis of Determinants—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Social Trust		1	1		1.00		

Table A.2 presents the detailed results of our quantitative synthesis of the 114 tax avoidance determinants studies. The depicted information is more detailed than our determinant discussion in Table **??**. *Measure* denotes different independent variables included in the main regressions of the 114 studies considered, grouped by underlying constructs. *Pred.* repeats the predictions from Table **??** about the direction of the association between a determinant and corporate tax avoidance. *Nr. Studies* denotes the number of studies that include a proxy for the determinant of interest in their main test(s) with a tax avoidance proxy as the dependent variable. Some studies have multiple main regressions and use different tax avoidance proxies. In these cases, we consider all these regressions in our analysis. *Nr. Regs* thus counts the number of regressions of all 114 studies that include the respective proxy. In rare cases, a regression includes two or more proxies for the same determinant. Those cases are also counted in *Nr. Regs*. Whenever necessary, we reverse coefficient signs to ensure directional comparability across all tax avoidance proxies. For example, if a study originally reports a negative determinant coefficient and the dependent variable of the regression is a firm's GAAP ETR, we reverse the coefficient sign (from negative to positive) to accurately record the positive association between the respective determinant and tax avoidance. In consequence, '-/N' denotes a non-significant negative association with tax avoidance, '-/Y' denotes a significant negative association with tax avoidance, '+/N' denotes a non-significant positive association with tax avoidance, and '+/Y' denotes a significant positive association with tax avoidance. The numbers reported in columns *-/N*, *-/Y*, *+/N*, *+/Y* represent the number of the respective coefficient sign-significance combination relative to the number of regressions.

Table A.3: Quantitative Synthesis of Consequences—Extended Version

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Transparency							
Aggregate	-	9	31	0.13	0.81	0.03	0.03
Insider Purchase Profitability		1	3		0.67		0.33
Insider Sale Profitability		1	3	0.67		0.33	
Stock Price Crash Risk		1	3		1.00		
Abs. Analyst Forecast Error		1	2		1.00		
Abs. Analyst Net Income Forecast Error		1	2		1.00		
Abs. Analyst Pre-Tax Income Forecast Error		1	2		1.00		
Abs. Analyst Tax Expense Forecast Error		1	2	0.50	0.50		
Av. Dispersion of Analyst Earnings Forecasts		1	2		1.00		
(Log) Audit Fees		1	1		1.00		
Abs. Value Discretionary Accruals		1	1		1.00		
Av. Monthly Estimate of Adverse Selection Component of Bid-Ask Spread		1	1		1.00		
Dispersion of Analyst Earnings Forecast		1	1		1.00		
Fog Index 10K		1	1	1.00			
Fog Index Tax Footnote		1	1		1.00		
Idiosyncratic Return Volatility		1	1		1.00		
Insider Trading Profit		1	1		1.00		
Negative Abnormal Accruals		1	1		1.00		
Positive Abnormal Accruals		1	1		1.00		
Relative R-Square Tax Income vs. Book Income		1	1		1.00		
UTB Interest and Penalty Expense		1	1		1.00		
Cost of Capital							
Aggregate	?	7	23	0.04	0.09	0.04	0.83
CAPM Beta		1	6				1.00
(Log) Loan Interest Spread		1	3				1.00
Av. Premium (Ex-Ante Cost of Capital)		1	3			0.33	0.67
Cost of Equity Capital		1	3	0.33			0.67
FirmStock Return		1	3				1.00
Loan Spread		1	3				1.00
Cost of Debt		1	2		1.00		
Debt							
Aggregate	?	3	11	0.09	0.91		
Debt Maturity		1	4	0.25	0.75		
Total Debt		1	3		1.00		
Total Debt Scaled by Sum of MV Eq and Total Debt		1	3		1.00		
Debt-to-Assets Ratio		1	1		1.00		
Firm Value							
Aggregate	?	4	4	0.25	0.50		0.25
Cumulative Abnormal Returns		1	1		1.00		
Takeover Premium		1	1		1.00		
Tax Loss Carry Forward Valuation		1	1				1.00
Tobin's Q		1	1	1.00			

Table A.3 presents detailed results of our quantitative synthesis of the 23 tax avoidance consequences studies. *Measure* denotes different dependent variables included in the main regressions of these studies, grouped by underlying constructs. *Pred.* denotes expected signs of the relation between tax avoidance and constructs of interest. *Nr. Studies* denotes the number of studies including a consequence proxy as dependent variable in their main test(s) and using a tax avoidance proxy as key explanatory variable. *Nr. Regs* counts the number of relevant regressions of all 23 studies. When we count the number of positive and negative coefficients, we adjust the reported sign (if necessary, depending on the dependent and independent variable) to reflect a construct's association with tax avoidance. '-/N' denotes a non-significant negative association with tax avoidance, '-/Y' denotes a significant negative association with tax avoidance, '+/N' denotes a non-significant positive association with tax avoidance, and '+/Y' denotes a significant positive association with tax avoidance. The numbers reported in columns *-/N*, *-/Y*, *+/N*, *+/Y* represent the number of the respective coefficient sign-significance combination relative to the number of regressions.

Table A.4: Quantitative Synthesis of Real Effects—Extended Version

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
Business Activity							
Aggregate	?	2	5		0.80		0.20
Business density		1	3		1.00		
number of establishments		1	2		0.50		0.50
Capital Structure							
Aggregate	?	13	17	0.06	0.24	0.12	0.59
debt ratio		2	3		0.33	0.33	0.33
Change in Leverage		1	2				1.00
Change in long-term book leverage		1	1				1.00
change in the mean debt ratio between 1989-1990 and 1984-1985		1	1	1.00			
debt ratio (leverage-to-asset ratio)		1	1				1.00
debt ratios (Meta Study)		1	1				1.00
Dummy for whether firm i starts a new private loan		1	1		1.00		
Leverage		1	1				1.00
Leverage (different measures)		1	1				1.00
Size of new operating lease firm i starts at time t		1	1				1.00
Size of new private loan firm i starts at time t		1	1		1.00		
total debt divided by the market value of the firm		1	1				1.00
total debt ratio		1	1		1.00		
U.S. Capital Expenditures/Lagged Assets		1	1			1.00	
Cash Holdings							
Aggregate	?	3	3		0.33		0.67
cash holdings		1	1				1.00
Cash Holdings (Ln(Cash/net Assets))		1	1		1.00		
Cash/assets		1	1				1.00
Employment							
Aggregate	?	6	23	0.35	0.43		0.22
employment growth		1	3	0.33			0.67
(Log) Employees		1	2		0.50		0.50
(log) number of jobs offshored		1	1		1.00		
(log) number of outsourced offshored jobs		1	1	1.00			
(log) number of within-firm offshored jobs		1	1		1.00		
employment		1	1				1.00
Forced CEO Turnover		1	1				1.00
log other within-firm offshored jobs		1	1		1.00		
log unionized within-firm offshored jobs		1	1	1.00			
offshoring jobs indicator		1	1		1.00		
other withinfirm offshoring indicator		1	1		1.00		
outsourced offshoring indicator		1	1	1.00			
proportion of jobs offshored		1	1		1.00		
proportion of jobs offshored by outsourcing		1	1	1.00			
proportion of jobs offshored within the firm		1	1		1.00		
proportion of other jobs offshored within the firm		1	1		1.00		
proportion of unionized jobs offshored within the firm		1	1	1.00			
unionized within-firm offshoring indicator		1	1	1.00			
wage growth		1	1	1.00			
within-firm offshoring indicator		1	1		1.00		
Entrepeneurial Activity							
Aggregate	?	1	3		1.00		
Average entry rate 2000-2004		1	1		1.00		
Average entry rate 2000-2005		1	1		1.00		
Average entry rate 2000-2006		1	1		1.00		

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Table A.4: Quantitative Synthesis of Real Effects—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
GDP Growth							
Aggregate	?	2	4		0.50		0.50
Real GDP growth		1	3		0.33		0.67
growth rate of GDP per capita		1	1		1.00		
Innovation							
Aggregate	?	6	8	0.12	0.38	0.12	0.38
R&D expenditures		2	4	0.25	0.25		0.50
industry funded R&D		1	1				1.00
location of patent applications		1	1		1.00		
Patent Registrations		1	1		1.00		
R&D/Lagged Assets		1	1			1.00	
Internal Debt Shifting							
Aggregate	?	3	10		0.20		0.80
internal debt ratio of foreign affiliates related to loans from other, non-German affiliates		1	3				1.00
subsidiary leverage		1	3				1.00
log of passive assets defined as total financial assets net of equity in affiliated firms and lending to affiliated firms		1	1				1.00
net lending choice is equal to 1 if equity-financed net lending of an affiliate is larger than zero.		1	1				1.00
ratio of liabilities to non-German shareholders and other non-German affiliated parties linked with the subsidiary to the total balance sheet		1	1		1.00		
Ratio of loans from affiliated parties		1	1		1.00		
Investment							
Aggregate	?	13	20	0.10	0.60	0.05	0.25
(Log) Capital		1	2		0.50		0.50
învestment (capex)		1	2				1.00
(I/K)t		1	1		1.00		
(log) fixed assets		1	1			1.00	
capex		1	1		1.00		
Domestic capital expenditures		1	1	1.00			
establishment growth		1	1		1.00		
FDI 2003-2005		1	1		1.00		
FDI 2003-2006		1	1		1.00		
FDI 2003-2007		1	1		1.00		
fixed assets		1	1		1.00		
investment		1	1				1.00
Investment 2003-2005		1	1	1.00			
Investment 2003-2006		1	1		1.00		
Investment 2003-2007		1	1		1.00		
investment to capital stock ratio		1	1		1.00		
plant creations (establishments)		1	1		1.00		
Real Output		1	1				1.00
Labor Cost							
Aggregate	?	1	1			1.00	
U.S. Employment Compensation/Lagged Assets		1	1			1.00	
Location Choice							
Aggregate	?	7	11		0.55		0.45
Outmigration of Star Scientists		1	3				1.00
Country location choice, equal to 1 if a country hosts a new affiliate with positive equity-financed net lending		1	1				1.00
Employee compensation/assets		1	1				1.00
ENTRY-COUNTRY-INDUSTRY		1	1		1.00		

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Table A.4: Quantitative Synthesis of Real Effects—Extended Version (Continued)

	Pred.	Nr. Studies	Nr. Regs	Empirical Evidence -/N	-/Y	+/N	+/Y
FDI		1	1		1.00		
Log of assets		1	1		1.00		
Log of gross product		1	1		1.00		
Log of US equity FPI		1	1		1.00		
subsidiary location equaling 1 if a subsidiary is located in a country and 0 otherwise		1	1		1.00		
M&A							
Aggregate	?	5	15		0.60	0.20	0.20
number of domestic acquisitions (> $1mn and >1% of acquiring firm's market value)		1	2		1.00		
(Log) total transaction value for domestic acquisitions		1	1		1.00		
acquisition		1	1		1.00		
Acquisition announcement returns		1	1		1.00		
Change in return on assets surrounding acquisition		1	1		1.00		
number of domestic acquisitions (> $10mn)		1	1		1.00		
number of domestic acquisitions (> $50mn)		1	1		1.00		
Ohlson model		1	1			1.00	
Post-acquisition long-run returns		1	1		1.00		
Price to book value multiple		1	1				1.00
Price to EBITDA multiple		1	1				1.00
Price to net income multiple		1	1			1.00	
Price to operating cash flow multiple		1	1			1.00	
Takover premiums in mergers and aquisions		1	1				1.00
Organizational Form Choice							
Aggregate	?	2	7	0.14	0.29	0.14	0.43
C Corp. To S Corp. Conversion (Indicator)		1	6	0.17	0.33	0.17	0.33
share of non-corporate to total capital		1	1				1.00
Risk Taking							
Aggregate	?	2	11	0.36	0.36		0.27
ROA volatility		1	4	0.50	0.50		
ROIC volatility		1	4	0.50	0.50		
risk taking (3- or 5-years earnings volatility)		1	3				1.00

Table A.4 presents detailed results of our quantitative synthesis of the 23 tax avoidance consequences studies. *Measure* denotes different dependent variables included in the main regressions of these studies, grouped by underlying constructs. *Pred.* denotes expected signs of the relation between tax avoidance and constructs of interest. *Nr. Studies* denotes the number of studies including a consequence proxy as dependent variable in their main test(s) and using a tax avoidance proxy as key explanatory variable. *Nr. Regs* counts the number of relevant regressions of all 23 studies. When we count the number of positive and negative coefficients, we adjust the reported sign (if necessary, depending on the dependent and independent variable) to reflect a construct's association with tax avoidance. '-/N' denotes a non-significant negative association with tax avoidance, '-/Y' denotes a significant negative association with tax avoidance, '+/N' denotes a non-significant positive association with tax avoidance, and '+/Y' denotes a significant positive association with tax avoidance. The numbers reported in columns *-/N*, *-/Y*, *+/N*, *+/Y* represent the number of the respective coefficient sign-significance combination relative to the number of regressions.

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