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A Survey Study on MNCs**

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# Measuring Tax Complexity Across Countries: A Survey Study on MNCs

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**Abstract:** This paper introduces an index that captures the complexity of countries' corporate income tax systems faced by multinational corporations. It is based on surveys of highly experienced tax consultants of the largest international tax services networks. The index, called the Tax Complexity Index (TCI), is composed of a tax code subindex covering tax regulations and a tax framework subindex covering tax processes and features. For a sample of 100 countries for the year 2016, we find that the level of tax complexity varies considerably across countries, while tax code and framework complexity also vary within countries. From a global perspective, tax complexity is strongly driven by the complexity of both transfer pricing regulations in the tax code and tax audits in the tax framework. When analyzing the associations with other country characteristics, we identify different correlation patterns. For example, tax framework complexity is negatively associated with countries' governance, suggesting that strongly governed countries tend to have less complex tax frameworks, while tax code complexity is positively associated with the statutory tax rate, indicating that high-tax countries tend to have more complex tax codes. However, none of the observed associations are very strong. We conclude that tax complexity represents a distinct country characteristic and propose the use of our TCI and its subindices in future research.

**Keywords:** tax complexity, tax index, tax system, multinational corporations, tax consultants

**JEL Classification:** H20, H25, C83, O57

## 1. Introduction

Recent evidence indicates that tax complexity has increased significantly in the past years (Devereux 2016; Hoppe et al. 2017). This increase can be attributed to at least two factors. The first is the introduction and adaption of tax measures to ensure a level playing field for firms and to close tax loopholes, leading to extraordinary costs and uncertainty. The second is the implementation of tax incentives and mechanisms to attract investments and to resolve uncertainties, thereby lowering costs and providing opportunities for tax planning. As indicated by the latter, tax complexity is not bad per se. Nonetheless, concerns have emerged that tax systems have become too complex (Ingraham and Karlinsky 2005, United States; Tran-Nam and Karlinsky 2008, Australia; Spengel et al. 2012, Germany; Deloitte 2014, China; Whiting et al. 2014, UK) and that the negative consequences of tax complexity may dominate the positive consequences (Müller and Voget 2012).<sup>1</sup> In particular, tax complexity is expected to jeopardize economic prosperity (Collier et al. 2018) and to encourage undesired tax planning or tax avoidance (Budak and James 2018). The negative impact of tax complexity is also addressed by the tax certainty reports of the IMF and the OECD (IMF and OECD 2017, 2018, 2019), which conclude that more clarity and less complexity are needed to support economic growth.

Given that a uniform definition of tax complexity is missing, a variety of studies have addressed it differently. While past studies have often focused on one facet of tax complexity (e.g., Clotfelter 1983; Slemrod and Blumenthal 1996), such as the level of detail in tax regulations, more recent studies have started to account for the multidimensional nature of the topic by evaluating different facets simultaneously (e.g., Slemrod 2005; Tran-Nam and Evans 2014; OTS 2015). However, as

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<sup>1</sup> As indicated by theoretical and experimental studies, tax complexity can discourage investments (Boylan and Frischmann 2006; Niemann 2011) and trigger noncompliance (Milliron 1985; Beck et al. 1991).

more facets are addressed in the extant literature fewer countries are considered. Given that tax complexity is a worldwide phenomenon, several calls have been issued for more international comparative approaches (McKerchar 2005; OTS 2015). In this paper, we respond to these calls and create a Tax Complexity Index (TCI), a country-level measure of the corporate income tax complexity faced by multinational corporations (MNCs). With the TCI and its underlying data, we aim to answer the following questions:

- (1) How does tax complexity vary across countries?
- (2) What are the main drivers of tax complexity?
- (3) Is tax complexity associated with other country characteristics?

In answering these questions, the aim of this paper is to provide a better and more detailed understanding of tax complexity.<sup>2</sup> In the development of the index, we follow a two-step formative measurement approach based on the theoretical consideration that the latent construct, tax complexity, is a composite of different dimensions. In the first step, the construct and its dimensions were identified via a thorough literature review, conversations with tax experts and a global online survey of highly experienced tax consultants (first survey; Hoppe et al. 2018). We found that tax complexity consists of two subconstructs: tax code complexity (the complexity that arises from the regulations of the tax code<sup>3</sup>) and tax framework complexity (the complexity that arises from the legislative and administrative processes and features within a tax system), each of which is made up of several dimensions. Based on this result, we operationalized our TCI with two subindices that cover these two subconstructs. In the second step, another online survey was distributed

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<sup>2</sup> We do not address any questions on the optimal level of tax complexity or on the distinction between necessary and unnecessary complexity.

<sup>3</sup> We use the term “regulation” to cover rules or standards in the tax code. Other (legal) meanings (e.g., guidelines) are not covered by this definition.

via 19 international tax services firms and networks to their highly experienced tax consultants to gather country-level tax complexity data for the year 2016 (second survey). In total, we obtained 933 responses that enabled us to measure and assess tax complexity for 100 countries worldwide. Based on these responses, we find that the overall level of tax complexity varies considerably across countries. There are countries that present both highly or less complex tax codes and frameworks. However, we also observe several countries in which tax code and tax framework complexity differ to a large extent. In particular, countries, such as the United States, the United Kingdom and Germany, whose tax systems are often considered the most complex, have a medium overall level of complexity that comprises a high level of tax code complexity and a low level of tax framework complexity. From a global perspective, tax complexity is strongly affected by the complexity of transfer pricing regulations in the tax code and by the complexity of tax audits in the tax framework. The main drivers of the complexity of transfer pricing regulations are documentation requirements (record keeping) and the ambiguity (ambiguity and interpretation) of these regulations. In contrast, tax audit complexity is strongly driven by long statutes of limitations and inconsistent decisions by tax officers. An analysis of the associations between our tax complexity measures and economic, political/legal and tax country characteristics shows different correlation patterns. For example, triggered by the negative association between tax framework complexity and governance, a negative association occurs between tax complexity and the governance of a country. Hence, strongly governed countries tend to have less complex tax frameworks. In contrast, triggered by tax code complexity, a positive association occurs between tax complexity and the statutory tax rate: this indicates that high tax countries tend to have more complex tax codes. However, none of the associations are very strong. This finding supports the view that tax complexity represents a distinct country characteristic.

This paper makes several contributions to extant literature. We examine corporate income tax complexity worldwide and thereby provide a deeper understanding of this important tax system characteristic. We extend prior research on the measurement of tax complexity by introducing the first comprehensive cross-country tax complexity measures for MNCs that are based on a uniform and well-grounded approach. With these measures, we pave the way for future archival research to investigate the effects of tax complexity on corporate decisions, such as investment or profit shifting.<sup>4</sup> Hence, we provide new opportunities for research on the impact of tax system characteristics (Atwood et al. 2012; Markle 2016; Blouin et al. 2018). In terms of practical implications, the indices can help policy makers and governments to benchmark their country's tax complexity against that of other countries. By further decomposing the subindices into their components, areas that are problematic can be identified. Finally, tax practitioners can use the indices for advisory or decision-making purposes.

This paper proceeds as follows. Section 2 provides an overview of prior measurement approaches and briefly discusses their meaning and limitations. Section 3 introduces the methodology for the index construction. Section 4 provides descriptive statistics on the TCI and its components. Subsequently, Section 5 compares the TCI and its subindices with other country characteristics. Section 6 assesses the robustness of our results. The last section presents a summary and the conclusions.

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<sup>4</sup> The data can be downloaded on our project homepage ([www.taxcomplexity.org](http://www.taxcomplexity.org)).

## 2. Review of existing measurement approaches

In the literature, the term tax complexity is defined in different ways.<sup>5</sup> Because of these different definitions, a variety of methods for measuring tax complexity have emerged. They build on measuring the costs, characteristics, or perceptions of tax complexity. To provide a systematic overview of the approaches that have been used or proposed in the literature, we categorize them based on two criteria: (1) the number of facets of tax complexity and (2) the number of countries considered.

The most common approach is to focus on one facet of tax complexity and to measure it for one country. We place studies using this approach into a category we call one facet–one country. Among the well-known studies in this category are those that analyze the costs of taxation, such as Sandford (1989), Pope and Fayle (1991) and Blumenthal and Slemrod (1992) and Slemrod and Blumenthal (1996).<sup>6</sup> The most common types of costs are tax compliance costs, followed by tax administrative and tax planning costs. Because such costs are usually not disclosed, cost studies often gather information through surveys. However, survey-based cost measurement is characterized by several issues, including framing effects.<sup>7</sup> These issues are not present when tax complexity is measured by the characteristics of a tax system. Common characteristics that are examined include the level of detail and the understandability of the tax code or related documents. While details are usually measured by counting the number of regulations, paragraphs or words (Karlin-sky 1981; Clotfelter 1983; Weinstein 2014; Weber 2015), understandability is regularly determined through readability indices (Tan and Tower 1992; Richardson and Sawyer 1998; Pau et al. 2007; Saw and Sawyer 2010). A serious drawback of these purely fact-based methods is that they often rely on strong assumptions and do not consider how certain facts are actually perceived by

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<sup>5</sup> See Slemrod (1989), McCaffery (1990), Cooper (1993), Evans and Tran-Nam (2010), Tran-Nam and Evans (2014), Diller et al. (2013) or Hoppe et al. (2018).

<sup>6</sup> A literature review on the measurement of tax (bureaucracy) costs is provided by Eichfelder (2011).

<sup>7</sup> See Eichfelder and Vaillancourt (2014) or Eichfelder and Hechtner (2018).



taxpayers.<sup>8</sup> This issue is addressed by survey studies that measure tax complexity based on the perceptions of individuals, companies or tax professionals (Tran-Nam and Karlinsky 2010; Gupta 2011). However, most studies focus on the overall complexity level of the tax code or single tax regulations and do not provide deeper insights.

Rather than focusing on one specific facet of tax complexity, another approach is to look at two or more selected facets in one country. We name this category few facets–one country.<sup>9</sup> The studies that are assigned to this category either extend or combine the methods described above. For example, Koch and Karlinsky (1984) and Martindale et al. (1992) develop an extended readability measure, while Moody et al. (2005) examine not only compliance costs but also the number of words and sections of the U.S. tax code. Slemrod (2005) and Bacher and Brühlhart (2013) extend prior count-based studies by using two measures instead of one. With regard to the perception-based studies, Long and Swingen (1987), Carnes and Cuccia (1996) and Lassila and Smith (1997) take into account the perception of tax complexity sources or costs in addition to the perception of regulations.

More recently, tax complexity has been considered a multidimensional concept and has been measured based on a variety of facets in one country. Accordingly, studies using this approach are assigned to a category we call many facets–one country. This category is strongly influenced by initiatives that governments and other organizations take in their efforts to simplify the tax system. One of the first studies in this category was conducted by the Office of Tax Simplification (OTS), which developed a complexity index for the United Kingdom (OTS 2012, 2015, 2017). The index

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<sup>8</sup> When using the number of words in the tax code, a higher number usually indicates a more complex code. However, in practice, it could also mean that the tax code provides more information with which to understand a tax treatment, thus indicating a less complex tax code.

<sup>9</sup> In terms of facets, few is defined as more than one but fewer than ten, while many is defined as ten or more.

covers the underlying complexity and the impact of complexity. A similar index has been proposed but not applied in Australia by Tran-Nam and Evans (2014). Using a survey, Borrego et al. (2016) construct three indices based on several facets of complexity.

All the studies above focus on a specific country, which makes it difficult to generalize and compare their results. Another approach is therefore to measure tax complexity across countries. Existing studies that examine tax complexity across countries show that in a cross-country setting, several problems arise, e.g., issues due to the lack of comparable data. However, some studies have employed this approach. We place these studies in one of the two categories we call one facet–few countries or few facets–few countries.<sup>10</sup> Examples of the first category are the studies of McKerrchar et al. (2005), Richardson (2006a, b), Ehrlich (2011) and Freudenberg et al. (2012), which either use a count- or perception-based approach to compare one facet of complexity across a few countries. Studies by the OECD (2001), Edmiston et al. (2003) and Budak and James (2016), which can be assigned to the second category, extend this stream of literature by considering more than one facet of complexity for a few countries. For example, Budak and James (2016) use a rather comprehensive tax complexity measure in their study by applying a modified version of the OTS index to four countries. However, they conclude that the index is not suitable for an international comparison.

To date, studies that consider many countries are rare. Only three studies can be categorized as few facets–many countries, namely, Peter et al. (2010), the annual Paying Taxes study of PwC et al. and the study by the TMF Group (2017, 2018). While Peter et al. (2010) focus on tax complexity based on six count-based facets and faced by personal taxpayers in 189 countries, based on seven

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<sup>10</sup> In terms of countries, few is defined as more than one but fewer than 50, while many is defined as 50 or more.

facets, PwC et al. (2017) examine the overall costs and administrative tax burden of a standardized domestic company without any foreign operations in 190 countries. Data for the Paying Taxes measure are gathered through an in-house survey. The study by the TMF Group (2017, 2018) aims to establish a country ranking with regard to financial complexity, including taxation. Again, an in-house survey of accounting and tax experts is used to obtain the data to determine the ranking. The few empirical studies that examine the effects of tax complexity across countries, such as Müller and Voget (2012), Lawless (2013) and Liu and Feng (2015), usually rely on the Paying Taxes measure. Although this represents one of the most comprehensive measures to date, both its quality and usefulness as an indicator of total tax complexity are questioned in the literature.<sup>11</sup> Thus, a more sophisticated measure of tax complexity that broadly captures the tax environment faced by MNCs is required. The lack of such a measure might also explain why empirical studies on the effects of tax complexity are rare.

We contribute to the literature on the measurement of tax complexity by developing a measurement approach that captures the multidimensional nature of tax complexity for a large number of countries. Thus, we provide the first study in the category called many facets–many countries. To overcome the limitations of prior literature, we build on a conceptual framework and gather information on tax complexity by surveying experienced tax consultants on both the facts and on their perceptions of various facets of tax complexity. We also adopt an input-oriented (i.e., formative) perspective, which enables us to examine the underlying drivers of tax complexity. With our new approach, we support future research in conducting cross-country analyses and thus in shedding light on the effects of tax complexity on certain factors, such as firm behavior.

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<sup>11</sup> See Tran-Nam and Evans (2014).

### **3. Development of the Tax Complexity Index**

#### ***General approach***

We focus on the corporate income tax system complexity faced by MNCs. To capture the various facets of corporate income tax complexity, based on a formative approach according to Diamantopoulos and Winklhofer (2001), we construct a tax complexity index using a four-step process. First, the domain of the content the index is intended to capture has to be specified (content specification). Second, the indicators (complexity drivers) that cover the entire scope of the latent variable (tax complexity) must be gathered (indicator specification). Third, the issue of multicollinearity among the variables must be addressed (collinearity). Fourth, the association between the index and other related variables has to be assessed (external validity).

#### ***Content and indicator specification***

Because the literature does not provide a uniform definition of tax complexity, we first had to develop our own definition and identify the drivers of tax complexity based on intensive literature reviews and conversations with tax experts. Afterwards, we created a first online survey that was distributed via two tax services networks to their tax consultants.<sup>12</sup> In this survey, we asked respondents to indicate important complexity drivers and corporate income tax regulations for MNCs. We received 221 surveys completed by highly experienced tax consultants from 108 countries.<sup>13</sup> The results, which are described in detail in Hoppe et al. (2018), show that tax complexity is a much broader construct than was initially captured by our definition. Accordingly, tax complexity is a feature of the tax system that arises from the difficulty of reading, understanding and

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<sup>12</sup> To avoid responses that are highly firm-specific, we did not survey MNCs directly. Tax consultants are involved in various tax matters and therefore possess the capability to answer the questions from a broader perspective. See Hoppe et al. (2018), p. 657.

<sup>13</sup> The majority of the respondents consisted of partners, directors or principals (62.9 percent), had tax experience of more than 15 years (55.2 percent) and spent, on average, 68.0 percent of their total working time on MNC tax issues. See Hoppe et al. (2018), p. 660.

complying with the tax code as well as from issues of various kinds within the tax framework. Hence, we understand tax complexity as being characterized through two subconstructs, namely, tax code and tax framework complexity, each of which covers various dimensions.

Tax code complexity describes the complexity that is inherent in the different regulations of the tax code. Based on the first survey, we identified 15 regulations that cover a major part of the tax code and that are suitable for an international comparison: (A1) additional local and industry-specific income taxes, (A2) (alternative) minimum tax, (A3) capital gains and losses, (A4) controlled foreign corporations, (A5) corporate reorganization, (A6) depreciation and amortization, (A7) dividends including withholding taxes, (A8) general anti-avoidance, (A9) group treatment, (A10) interest including withholding taxes and thin capitalization, (A11) investment incentives, (A12) loss offset, (A13) royalties including withholding taxes, (A14) statutory corporate income tax rate, and (A15) transfer pricing. In our terminology, each regulation represents a dimension of the tax code. To determine the degree of complexity of these dimensions, we identified five complexity drivers on which each dimension had to be evaluated (ambiguity & interpretation, change, computation, detail and record keeping).<sup>14</sup>

Tax framework complexity describes the complexity that arises from the legislative and administrative processes and features within a tax system. Based on our first survey, we identified five dimensions of the tax framework: (B1) tax guidance (i.e., guidance provided by the tax authority or by any law to clarify uncertain tax treatments or procedures), (B2) tax law enactment (i.e., the process of how a tax regulation is enacted, starting with the discussion of a change in the tax law and ending with the regulation becoming effective), (B3) tax filing and payments (i.e., the process

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<sup>14</sup> See Appendix 1, panel A for a description of the tax code complexity drivers.

of preparing and filing tax returns as well as the payment and refund of taxes), (B4) tax audits (i.e., examination of the tax returns by the tax authority and extent to which they can be anticipated and prepared), and (B5) tax appeals (i.e., the process from filing an appeal with the responsible institution to its resolution at the administrative or judicial appeal level).<sup>15</sup> Compared with the dimensions of the tax code, these dimensions had to be evaluated based on several different complexity drivers that are specific to each dimension. We derived these drivers from a qualitative analysis of the first survey and a comprehensive literature review.<sup>16</sup> To summarize, Figure 1 provides an overview of our concept of tax complexity.

[Insert Figure 1 here]

### ***Gathering data on tax complexity***

To collect the data to construct the complexity index for each country, we conducted a second online survey of tax consultants. We implemented the survey draft in Qualtrics and carried out comprehensive pretests.<sup>17</sup> The final survey consisted of four parts and 52 standardized questions. In the first part, we asked respondents to specify the country with whose tax system they are most familiar and whether corporate income taxes are levied on resident corporations in that country. Furthermore, to gain familiarity with the topic, the respondents were given a warm-up exercise in which they had to evaluate three statements on the impact of tax complexity in their country. In the second part of the survey, we explored the different dimensions of the tax code. In the third part, we focused on the tax framework. In the last part, we gathered demographic information on

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<sup>15</sup> See Hoppe et al. (2018) for the identification of the dimensions of the tax framework.

<sup>16</sup> See Appendix I, panel B for a description of the tax framework complexity drivers.

<sup>17</sup> We circulated the draft among 14 national and international tax experts (academics and practitioners) who were asked to complete the survey. After submitting their responses, they had to answer several questions on the content of the survey and its design. Based on their remarks, we made some minor revisions by rewriting several questions and response options to make them more precise.

the respondents.<sup>18</sup> Throughout the survey, we added definitions and hints to several questions to ensure a uniform understanding and to provide respondents with reference points for their judgments.<sup>19</sup>

Before the participants were asked to answer any questions, they had to read a short introduction. They also received some general and content-related instructions. Whenever reasonable, we randomized the order of the questions in the survey. Except for a few questions, e.g., on the country for which the responses were to be given, we refrained from using questions with forced responses. However, this approach led to some missing responses that we imputed by using median imputation at the country level.<sup>20</sup> To be included in the dataset, the surveys had to be completed.

We contacted major international tax services networks and asked them to distribute our survey to randomly selected tax consultants. To ensure the validity of the data for the analysis, the selection criteria for the consultants included an adequate degree of experience in the tax field as well as with MNCs. We sent out an email invitation with the survey link to our contacts in 19 networks on October 19, 2016. These contacts circulated the invitation to at least 5,800 consultants around

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<sup>18</sup> For several reasons, we placed the demographic questions at the end of survey. First, demographic questions are not very interesting for respondents. If respondents take the survey because of an interest in the topic and have to start with demographic questions, they are more likely to quit the survey (Porst 2014). Second, demographic questions do not require strong cognitive skills (Häder 2015). As our survey is relatively long, respondents could become tired by the end. Thus, rather than putting important topic-related questions at the end, we decided to round off the survey with the easy demographic questions. Third, by the end of the survey, respondents are aware of the survey content. As our survey does not contain any sensitive questions, respondents are expected to be more likely to provide answers to the demographic questions at the end. However, the placement at the end of the survey does not enable us to analyze the demographic characteristics of the participants who did not finish the survey.

<sup>19</sup> For instance, we defined each dimension of the tax code. We defined transfer pricing regulations as regulations to prevent prices from being charged to a subsidiary or other related party in order to excessively reduce taxable income. In addition, we provided hints in the form of questions to sharpen the respondent's view of this regulation: Does the tax code contain specific regulations on this? If not, do general concepts (e.g., arm's length principle) apply? Does the tax code prescribe specific transfer pricing methods? [...]. See Appendix 1 for further examples.

<sup>20</sup> An analysis of missing values showed that values are not systematically missing but rather missing completely at random. The missing ratio in the dataset of completed surveys was approximately 0.47 percent. Thus, only a very small number of values have been imputed.

the world.<sup>21</sup> Reminders were sent out after three and five weeks. We received a total of 1,016 useable responses from 147 countries by December 16, 2016, yielding a maximum response rate of 17.5 percent. For the purpose of the analysis, we only focus on responses from countries that levy corporate income taxes, which results in a total of 1,000 responses from 143 countries.

To check the quality of the responses, we perform two tests. First, we search for respondents who spent a very small amount of time on the survey (less than or equal to five minutes).<sup>22</sup> Based on this analysis, we drop all six responses from Jordan and thus exclude this country from the dataset.<sup>23</sup> Second, we check the dataset for inexperienced tax consultants and examine whether their answers are systematically different from the answers of the other respondents from the respective country.<sup>24</sup> One respondent from Madagascar is dropped based on this criterion, which leaves us with 993 responses from 142 countries.

To address the concern that single opinions dictate the level of tax complexity in a specific country, we exclude all countries from the analysis from which we only received one or two responses.<sup>25</sup> This approach results in a remaining sample of 933 responses from 100 countries.<sup>26</sup> Table 1 displays the distribution of the responses.

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<sup>21</sup> The participating networks informed us about their distribution method and the approximate number of people who received the invitation. However, as several networks used existing global distribution lists and asked the recipients to further circulate the survey link within their country, the number of 5,800 consultants represents a lower bound of the potential participants. As we assured anonymity to the respondents, we are not able to identify the network to which the respondents belong.

<sup>22</sup> We consider a duration of more than five minutes as realistic because survey participants could have printed out the survey to work on it offline and transferred them later to the online survey.

<sup>23</sup> Although only one out of six respondents from Jordan spent such a small amount of time on the survey, we also cross-checked the other respondents from this country. Most of them had a similar completion time of approximately 10 minutes. Furthermore, all respondents had very little experience with MNCs (around 5 percent of their total working time). In the spirit of a cautious approach, we decided not to rely on the answers from Jordan.

<sup>24</sup> For this purpose, we searched for respondents who are not specialized in income taxes, have less than five years of experience in the tax area, are under 30 years old and have classified themselves as junior assistants.

<sup>25</sup> However, even in the remaining countries, the opinions vary across consultants to some extent: this is not bad per se, as people might come from different regions or have had different experiences.

<sup>26</sup> Out of these 100 countries, 78 countries were also included in the sample of the first survey. This suggests that the first survey provides a reliable foundation for the second survey.



[Insert Table 1 here]

Table 2 provides the demographic information on the respondents, who are very similar in terms of position, specialization and education.<sup>27</sup> Partners, directors and principals are the largest group (64.4 percent), followed by managers (22.7 percent). The respondents generally have substantial experience in tax practice: 73.0 percent have been working in the tax field for more than 10 years, including 55.0 percent that report more than 15 years of tax experience. Almost 90 percent specialize in income taxes, which represent the targeted type of taxes in this study. Furthermore, over 50 percent are familiar with more than one tax system. The respondents also have major experience with MNCs. On average, on MNC tax issues, the respondents spend 54.1 percent of their total working time, of which 40.8 percent is devoted to purely international tax issues. Moreover, the respondents have advanced education (majority with a master's or doctoral degree). The extent of experience is also reflected by the age. More than half of the respondents (62.1 percent) are older than 40 years of age. In terms of gender, 71.1 percent are male, and 28.5 percent are female. In general, the characteristics of the respondents indicate that the sample consists of highly experienced tax consultants. The time they spent on the survey (approximately 39 minutes on average) corresponds to our prediction from the pretest. We therefore expect valid and reliable responses.

[Insert Table 2 here]

### ***Index construction***

To construct the subindices and the index, we had to aggregate the data.<sup>28</sup> With regard to tax code complexity, we asked the respondents to provide an importance rating for each dimension and

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<sup>27</sup> Demographic characteristics have not been imputed. Hence, missing values can occur.

<sup>28</sup> According to the formative measurement approach, the weights of the indicators and the dimensions are usually obtained through a multivariate statistical analysis. In the literature, this procedure is sometimes criticized because the weights strongly depend on the outcome variable used for the estimation (Howell et al. 2007). Because we lack a suitable outcome variable for tax complexity, we employ our own weights.

complexity driver. The ratings indicate that the 15 dimensions and five complexity drivers of the tax code are not of equal relevance for MNCs. Thus, we applied weights based on the global importance rating of each dimension and complexity driver obtained through a 5-point Likert scale.<sup>29</sup> The resulting weighting factors for the dimensions range from 0.025 (lowest weighting factor) to 0.085 (highest weighting factor), while those for the complexity drivers vary between 0.175 (lowest weighting factor) and 0.230 (highest weighting factor).<sup>30</sup> The approach for constructing the tax code complexity subindex is expressed in the following formula:

$$\text{Tax code complexity subindex} = \sum_{j=1}^{15} w_j \times d_j \quad \text{with} \quad d_j = \sum_{i=1}^5 w_i \times x_{i,j} \quad (1)$$

where

- $d$  = Complexity of dimension
- $x$  = Complexity rating
- $w$  = Weighting factor
- $j$  = Dimension (1 = additional local and industry-specific income taxes, ..., 15 = transfer pricing)
- $i$  = Complexity driver (1 = ambiguity & interpretation, ..., 5 = record keeping)

The tax framework complexity subindex is calculated in a similar manner. However, we assign equal weights to its dimensions and complexity drivers because it would not have been possible to determine reliable differentiated weights for the large number of tax framework complexity drivers. Hence, the tax framework complexity subindex is computed as follows:

$$\text{Tax framework complexity subindex} = \frac{1}{5} \sum_{j=1}^5 d_j \quad \text{with} \quad d_j = \frac{1}{n_j} \sum_{i=1}^{n_j} x_{i,j} \quad (2)$$

where

- $d$  = Complexity of dimension
- $x$  = Complexity rating
- $j$  = Dimension (1 = tax guidance, ..., 5 = tax appeals)
- $i$  = Complexity driver (specific to each dimension)
- $n$  = Number of complexity drivers

<sup>29</sup> This approach is also applied by Simmons (2003).

<sup>30</sup> All tax code weighting factors are provided in Appendix 2.

The final step is to calculate the total tax complexity index. We call this index the Tax Complexity Index (TCI). From prior literature and conversations with tax practitioners, we infer that the tax code and the tax framework are nearly equally important. Hence, we calculate the TCI as the arithmetic mean of both the tax code and the tax framework subindex. Theoretically, all indices can range between zero (not complex at all) and one (extremely complex).<sup>31</sup>

$$\begin{aligned} \textit{Tax Complexity Index (TCI)} \\ &= 1/2 \textit{Tax code complexity subindex} \\ &+ 1/2 \textit{Tax framework complexity subindex} \end{aligned} \tag{3}$$

In the following, we will present our results for both the TCI and its subindices. A closer look at each subindex provides valuable information and additional insight into tax complexity. It also enables us to compare the subindices and to analyze whether there are differences between tax code and tax framework complexity. Moreover, the implications of the weights of the tax code and the tax framework subindex are made transparent when calculating the TCI. In the first part of the analysis, we will also break down the subindices into their dimensions and complexity drivers. Therefore, we will eliminate claims associated with the weighting of indicators.<sup>32</sup>

### ***Collinearity and index validation***

Because each dimension should have a distinct influence on the latent variable, very high correlations between the dimensions would be critical. The correlation matrices in panel A and B of Table 3 show that nearly all dimensions of both subindices are significantly correlated. However, there

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<sup>31</sup> Compared with other tax measures, such as the statutory tax rate, a change in our measure is somewhat difficult to interpret since it is composed of several different elements. If we take a complexity driver of the tax framework such as inconsistent decisions of tax officers, as an example, we see that, if this aspect becomes a problem in a country (while it was not a problem before), the TCI of this country changes by approximately 0.01.

<sup>32</sup> In general, we understand the weights we use in this paper to calculate our TCI as baseline weights. To account for individual preferences, the weights could be adjusted. A tool that makes it possible to use a custom weighting scheme is available on our project homepage. See [www.taxcomplexity.org](http://www.taxcomplexity.org).

are no perfect correlations and even no multicollinearity issues.<sup>33</sup> With regard to the subindices, panel C of Table 3 shows that the correlation between the indices is not statistically significant. We conclude that the two subindices measure different areas of complexity.<sup>34</sup>

[Insert Table 3 here]

To test the external validity of the TCI, we relate it to the Paying Taxes measure of PwC et al. (2017) and the country ranking of the Financial Complexity Index<sup>35</sup> of the TMF Group (2017, 2018).<sup>36</sup> We also investigate the relationship with the components of the Paying Taxes measure (total tax rate, time to comply, tax payments, post-filing index). The correlations are displayed in Table 4. All variables are defined in panel A of Appendix 3. For the overall Paying Taxes measure, the post-filing index and the Financial Complexity Index, countries are ranked in descending order (i.e., value/ranking decreases with the level of complexity), and we expect the associations between our complexity measures and these measures to be negative. In contrast, we expect the correlations between our complexity measures and the other components of the Paying Taxes measures, whose values are ranked in ascending order, to be positive.

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<sup>33</sup> In untabulated analyses, we calculate the variance inflation factors (VIFs) for each dimension both within each subindex and among the subindices. All VIFs are clearly below the commonly applied threshold of 10 and even below the threshold of five. We therefore do not expect multicollinearity to be a problem (Bollen and Lennox 1991; Law and Wong 1999; Diamantopoulos and Siguaw 2006).

<sup>34</sup> We also examine the correlations between the dimensions of the tax code (tax framework) and the tax framework (tax code) subindex as well as the correlations between the dimensions of the tax code and the dimensions of the tax framework, and find some significant correlations that, however, are mostly weak. This finding suggests that there are certain links between tax code and tax framework complexity but that, overall, both subindices are relatively independent from each other.

<sup>35</sup> The rankings of the Financial Complexity Index of the TMF Group are available for 2017 and 2018 only; thus, they are not directly comparable to our 2016 complexity data. The correlation between the two rankings is approximately 0.76, and the mean rank difference is approximately -0.87, indicating little change over the two years. However, the results obtained should be interpreted carefully.

<sup>36</sup> In theory, there are different methods to test the external validity of an approach. The most common method is a multiple indicators-multiple causes (MIMIC) model, which assumes that the latent variable is caused by its dimensions and their indicators and is simultaneously reflected by a set of reflective measures (Joreskog and Goldberger 1975). Given the lack of different cross-country reflective tax complexity measures, based on this or any similar model, we are unable to evaluate the external validity.

[Insert Table 4 here]

We find that all significant correlations have the expected sign. Our TCI is significantly negatively correlated with the overall Paying Taxes measure and the post-filing index. Furthermore, we find a moderate positive correlation between the TCI and the Paying Taxes component time to comply. The strength of this relationship increases when we restrict the time to comply component to corporate income taxes, which are the focus of our TCI. Overall, the results indicate that a complex tax system is associated with a higher compliance burden. When we examine the correlations of our tax framework complexity subindex, we find the expected correlations for nearly all the Paying Taxes measures. Surprisingly, except for the correlation between the time to comply with corporate income taxes, the tax code complexity subindex is not correlated with any of the Paying Taxes measures. This might be attributed to the close relationship of these measures to our definition of the tax framework. Because Paying Taxes, in particular, captures the filing, payment and audit process, we also investigate the association with the respective dimensions of our tax framework subindex. For both the filing and payments and the audits dimension, we find significant correlations with the majority of the Paying Taxes measures. The correlations with the filing and payments dimension are among the highest that we observe. Regarding the Financial Complexity Index, we find a strong correlation between our TCI and the 2017 as well as the 2018 ranking of the Financial Complexity Index. Results similar to that obtained from investigating their association with the Paying Taxes measure are observed when we consider our two subindices.

Overall, we find strong correlations with the Paying Taxes measure and the Financial Complexity Index, which supports the validity of our construct. We are aware that both measures are not perfectly suited to test the external validity of our construct. However, they are the only country-level measures that are currently available for a large number of countries and capture highly related

constructs. To further validate our measures, we discussed our results with in-house tax experts of MNCs, tax consultants and tax authorities from several countries. They not only confirmed our results to a large extent but also provided anecdotal evidence that contributed to a more comprehensive understanding of our results.

#### **4. Results**

##### ***Tax Complexity Index and subindices***

Table 5 provides descriptive statistics for the TCI and its subindices. The sample-wide mean and median of the TCI, which may serve as benchmarks, are both 0.37. Overall, a country that is either not complex at all (0) or extremely complex (1) has not been observed. Instead, the index values range between 0.19 and 0.53. The country with the most complex tax system is Brazil (0.53). This result is similar to that of the TMF Group (2017) and PwC et al. (2017).<sup>37</sup> Even the press often considers Brazil as having “one of the most complex tax systems in the world”<sup>38</sup>. In our ranking, it is closely followed by Colombia (0.52), Egypt (0.51), Albania (0.50), and Zimbabwe (0.49). In contrast, the top five countries with the lowest levels of total tax complexity are Jersey (0.19), Nicaragua (0.20), Mauritius (0.22), Estonia (0.22), and Yemen (0.23). Because we restrict our analysis to countries that impose taxes on corporate income, typical tax havens, such as the Cayman Islands, are not included in our sample. Nonetheless, we still find that our TCI varies substantially across the sample countries, with a variation coefficient of 0.19.<sup>39</sup>

[Insert Table 5 here]

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<sup>37</sup> Brazil is the second most complex country out of 94 countries in the TMF Group (2017) and the sixth most complex country out of 189 countries in PwC et al. (2017).

<sup>38</sup> See Machado and Utimati (2017).

<sup>39</sup> As a measure of dispersion, to allow for comparisons between different variables, we use the variation coefficient instead of the standard deviation. See Bedeian and Mossholder (2000) for some further details on this measure.

The mean and median values for tax code complexity are 0.43 and 0.45, respectively, while those for tax framework complexity are both 0.30. Moreover, we find substantial variation in both sub-indices, with variation coefficients of 0.24 (tax code) and 0.27 (tax framework). With regard to the tax code, Colombia (0.64), the Philippines (0.63), Brazil (0.61), Ghana (0.58) and Chile (0.58) are the most complex countries. The least complex countries are Nicaragua (0.12), Estonia (0.18), Jersey (0.20), Bulgaria (0.23), and Yemen (0.25). For tax code complexity, the list of the five most complex countries is quite different from that of the top-five countries whose complexity is based on the TCI, while the list of the five least complex countries is very similar to the five least complex TCI countries.<sup>40</sup> Ranked by the tax framework, we observe the reverse pattern: the five most complex countries are almost the same as those for the TCI, with Zimbabwe (0.54) having the highest level of tax framework complexity, followed by Albania (0.50), Ethiopia (0.47), Brazil (0.46) and Egypt (0.45). The five countries with the lowest tax framework complexity are largely different, with only Mauritius (0.14) included in both the top-five TCI and the top-five tax framework complexity list. The remaining countries with the least complex tax frameworks are Liechtenstein (0.12), the Netherlands (0.16), Singapore (0.17) and Japan (0.18).

To obtain an impression of the similarities and differences between tax code and tax framework complexity, we classify countries and assign complexity values to five levels, ranging from very low to very high, based on the quintiles of each complexity measure. The results are displayed in Appendix 4. We find that only one fifth of our sample (20 countries) receives the same classification for both subindices. In 38 countries, the tax framework has a higher classification, i.e., is more

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<sup>40</sup> Only two countries, Brazil and Colombia, belong to both the list of the five most complex tax systems and the list of the five most complex tax codes. In contrast, four countries belong to the lists of the five least complex tax systems and tax codes.

complex than the tax code, while in 42 countries, the tax code is more complex than the tax framework. Figure 2 plots the values of the tax code complexity subindex against the values of the tax framework complexity subindex, providing additional evidence for this mixed picture. Although this finding seems to be surprising, because a high level of tax code complexity may be expected to encourage a high level of tax framework complexity, the finding is consistent with some of the respondents' comments. For example, one respondent highlighted in the free text field that in his country, "regulations are of a good quality, but implementation is complicated" because of the "lack of professional skills at the administrative and judicial level". Furthermore, some respondents also mentioned specific instruments within the areas of the tax framework intended to suppress complexities that may arise from the complexity of the tax regulations, such as rulings or special audit procedures.

[Insert Figure 2 here]

In the last step, we address our results from a broader perspective and specifically examine the member and nonmember countries of the OECD.<sup>41</sup> The descriptive statistics are provided in Table 6. With regard to the TCI, we do not find a significant difference between the mean complexity values of the OECD (0.36) and the non-OECD (0.37) countries. Hence, OECD countries, on average, have the same level of total tax complexity as non-OECD countries. When we analyze the complexity levels of the OECD countries provided in Appendix 4, we obtain a very balanced picture. There are 12 countries with a low or very low level of complexity, 12 countries with a medium level of complexity and 9 countries with a high to very high level of complexity. The classifications also reveal that OECD countries that often claim to have the most complex tax system in the world,

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<sup>41</sup> We refer to the OECD classification of the year in which our survey was carried out (2016). Therefore, Lithuania, which joined the OECD in 2018, is not considered an OECD member country. Furthermore, Iceland and Latvia are not included in our sample. This results in 33 OECD countries in our sample.



such as Germany, the United Kingdom and the United States, only have a medium level of total tax complexity.

[Insert Table 6 here]

Unlike the difference in the TCI between OECD and non-OECD countries, significant differences are observed between OECD and non-OECD countries for the tax code as well as the tax framework subindex. While the mean tax code subindex for the OECD countries (0.46) is significantly greater than the mean tax code subindex for the non-OECD countries (0.41), we find the opposite for the mean tax framework subindex. The latter is significantly lower in OECD countries (0.26) than in non-OECD countries (0.33). Hence, OECD countries, on average, have a more complex tax code and a less complex tax framework than do non-OECD countries. Reconsidering the countries that often claim to have the most complex tax systems in the world, these countries are characterized by a high or very high level of tax code complexity but a low level of tax framework complexity. Hence, their claims seem to relate to the tax code and not necessarily to the tax framework.

### ***Insights into the dimensions of tax code and framework complexity***

To provide more insight into the complexity of the tax code and the tax framework, we turn to their dimensions and the underlying complexity drivers. Panel A of Table 7 shows the descriptive statistics of the tax code dimensions. We find that transfer pricing regulations have the highest average level of complexity (0.60) and thus contribute most to the countries' tax code complexity.<sup>42</sup> These regulations are considered to be the most complex in Russia (0.86), Australia (0.84) and Brazil (0.82). The main complexity drivers of transfer pricing regulations are record keeping

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<sup>42</sup> This is consistent with the notion that transfer pricing is often considered as one of the most burdensome tax areas (e.g., Klassen et al. 2017; Mescall and Klassen 2018).

as well as ambiguity and interpretation (see Appendix 5). General anti-avoidance (0.48) and investment incentives (0.47) regulations are ranked second and third in complexity. However, they are closely followed by other regulations, such as those on corporate reorganization (0.46). Similar to transfer pricing regulations, the complexity of regulations on general anti-avoidance is strongly characterized by ambiguity and interpretation as well as record keeping.<sup>43</sup> The complexity of regulations on investment incentives is more strongly determined by record keeping, change and detail.

[Insert Table 7 here]

In contrast, certain dimensions of the tax code are considered less complex and thus contribute only a small extent to the complexity of the tax code. The lowest average complexity level of 0.17 belongs to (alternative) minimum tax regulations. This result seems surprising given that (alternative) minimum tax rules are sometimes considered highly complex in countries such as the United States, at least prior to 2018. However, there are only a few countries that have such complex rules. Regarding the complexity drivers, the complexity of (alternative) minimum tax regulations is almost equally determined by all complexity drivers. The countries in which (alternative) minimum tax regulations are perceived as the most complex are India (0.59), the Philippines (0.57) and Ecuador (0.55).<sup>44</sup> For this regulation, we further observe a variation coefficient of 0.90, the highest level of relative variation. Additional local and industry-specific taxes represent the dimension with the second lowest level of complexity overall (0.29). As for (alternative) minimum tax regulations, certain countries do not levy additional local and industry-specific taxes at all. If such rules

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<sup>43</sup> In line with this finding, studies, such as that of Laplante et al. (2019), focus the ambiguity in the tax law.

<sup>44</sup> In the United States, (alternative) minimum tax regulations obtain a value of 0.42. Therefore, the United States is one of the top-10 countries with the most complex regulations on (alternative) minimum taxation.

exist, they are often complex, with change being the most important complexity driver. The highest country complexity levels are found in Colombia (0.67), the United States (0.66) and Kenya (0.63).

With respect to the remaining dimensions, the mean complexity levels range between 0.35 for group treatment and 0.46 for corporate reorganization and interest. By considering the complexity drivers across all dimensions, we find that record keeping contributes the most to tax code complexity, followed by detail, ambiguity and interpretation, changes and computation. Finally, we conclude that tax codes are not characterized by the different dimensions and complexity drivers in the same way, as there is much variation within both aspects across countries.

Turning to the tax framework, panel B of Table 7 displays the descriptive statistics for its dimensions. On average, tax audits (0.43) contribute most to the tax framework complexity across countries.<sup>45</sup> We obtain the highest levels of tax audits complexity for Zimbabwe (0.85), Ethiopia (0.79) and Afghanistan (0.70). In contrast, tax filing and payments (0.23) have the lowest impact. Nonetheless, certain countries are characterized by rather high levels of filing and payments complexity, such as Zimbabwe (0.52), Brazil (0.49) and Colombia (0.45). This dimension is closely followed by tax appeals (0.25). Tax guidance and tax law enactment exhibit similar levels of complexity (0.31 and 0.30).

As illustrated in Appendix 5, we find that the high average level of tax audits complexity is induced by several different complexity drivers. One of these drivers is the length of the statute of limitations and the associated uncertainty. Only a few countries have a short statute of limitations. In most countries, between three or five years or even more than five years after a tax return has been filed, tax authorities have the right to perform a tax audit and to adjust the tax payable amount.

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<sup>45</sup> Tax audits appear to be very relevant not only in terms of tax complexity. There are several studies that provide evidence for a link between tax audits and firm behavior (e.g., Beuselinck et al. 2015; Lin et al. 2018).

Another driver is the decision-making of tax officers during the audit process. The tax officers' decisions are often perceived as inconsistent and vary from one officer to another or even for the same officer. As a result, predicting the audit outcome or preparing tax returns based on prior experience can become difficult. Moreover, tax audit complexity is also driven to a large extent by the tax officers' lack of experience or skills, which results in misunderstandings and mistakes. A substantial level of complexity also comes from the inability to anticipate a tax audit. In particular, the selection criteria for tax audit targets are frequently not disclosed. Thus, due to a lack of information, MNCs often do not know in advance whether they are subject to an audit.

Two main drivers affect tax guidance: international soft law<sup>46</sup> and accounting standards. Regarding international soft law, complexity is triggered by the fact that in dealing with national law, these rules do not offer support by providing additional information but rather contradict national practice. These contradictions often make it even more difficult to apply national law. Turning to accounting standards, complexity is shaped by the differences between Generally Accepted Accounting Principles (GAAP) and tax rules. As the two sets of rules have different objectives, they often deviate from each other. Therefore, adjustments to the accounting treatment are necessary to comply with the tax rules, and these adjustments require additional effort and time.

Three drivers have a strong influence on tax law enactment complexity across countries. The strongest influence is exerted by the (lack of) quality of tax legislation drafting. Due to poorly conceived drafts, overcomplicated texts or inaccurate translations, problems arise after or sometimes even before the enactment of a draft. Another strong driver of tax law enactment complexity is the time between the announcement of tax changes and their enactment. Proposed tax law

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<sup>46</sup> We define international soft law as rules that are neither strictly binding in nature nor completely lacking legal significance. The term refers to guidelines, policy declarations or codes of conduct that are not legally enforceable. OECD guidelines are an example of soft law.

changes are often enacted without prior announcements. This practice is usually intended to prevent taxpayers from using the proposed changes to plan their transactions ahead in a manner that will avoid the expected outcome of the changes. In this vein, a proposal is discussed and adopted without any public involvement. Accordingly, there are no calls for comments. From the perspective of MNCs, this practice is often critical because it does not allow them to anticipate and react to unintended consequences that the changes may have. Moreover, it creates permanent uncertainty for planning purposes. Similarly, tax law enactment complexity is generally strongly driven by the time at which the legislation becomes effective. Often, changes become effective on the date of enactment or even before (retrospective application), thus creating significant uncertainty and, hence, potential costs for MNCs.

Although tax filing and payments as well as tax appeals contribute, on average, less to tax framework complexity, they also require some attention. Similar to tax guidance complexity, there are two main complexity drivers for tax filing and payment complexity. The most frequently chosen driver is the lack of permission to file a consolidated tax return. Instead, each entity must file a separate return, thus ensuring high compliance costs for large groups. The second most frequent driver is the process of refunding overpaid taxes, which regularly causes problems. These problems may result from complicated application requirements, tight deadlines and long processing times of the tax authority for refunds of overpaid taxes. The resulting tax refund uncertainty can distort MNCs' decisions. Timing also plays an important role in tax appeals. The most frequent driver of tax appeals complexity is the time period between the filing of an appeal at the judicial level and its resolution. Appeals to courts often take 1 to 3 years to be resolved.<sup>47</sup> These long time periods

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<sup>47</sup> For example, in Germany, the average duration of appeal proceedings at the level of the Federal Fiscal Court in 2018 was 20 months. See Bundesfinanzhof (2019).

impose substantial costs. For instance, if an MNC loses an appeal, it usually has to pay high rates of interest.

Similar to the tax code, in the tax framework, there is also considerable variation across countries in the level of complexity of the different dimensions and in the complexity drivers. For example, both tax appeals and tax filing and payments have relatively high variation coefficients. When considering the complexity drivers, the variation is even higher.

## **5. Comparison with other country characteristics**

In this section, we compare our TCI and its subindices with important other country measures that are commonly used in cross-country studies. We follow an explorative approach and use bivariate correlation analysis to identify the extent to which our indices and the other characteristics coincide. To structure the analysis, we categorize the country characteristics into three groups: economic, political/legal and tax characteristics. The descriptive statistics on the country characteristics are provided in Appendix 6.

### ***Economic country characteristics***

Economic characteristics describe the state of a country's economy and include the size of a country measured by the population, the aggregate output as measured by the gross domestic product (GDP), the development level measured by the Human Development Index, the internationalization of capital flows measured as the net in-flow of investments, the infrastructure measured by the telephone lines and the income inequality measured by the GINI index (Fauver et al. 2017; Shevlin et al. 2019). Ex ante, the direction of the relationships with tax complexity is not clear. On the one hand, the tax system could be a mirror of the economy reflecting its complexities. Hence, more complex tax systems would be associated with more economically sophisticated countries. On the other hand, due to high compliance costs and a high level of uncertainty, tax complexity

could also affect a country by suppressing economic activity. As a result, more complex tax systems would be associated with less economically sophisticated economies. Table 8, panel A reports the results of the analysis. Among the variables, we find both positive and negative associations. With respect to the population, the association with our TCI is positive. However, at the level of the subindices, the association is only significant for the tax code subindex. Hence, larger countries tend to have more complex tax codes. We obtain a similar result for the GDP. However, for the GDP, we also find a negative association with the tax framework subindex, although it has a much stronger association with the tax code subindex, resulting in a positive association between total tax complexity and the GDP. In contrast, for foreign investments, the positive association with the tax code subindex seems to be offset by the negative association with the tax framework subindex. As a result, we do not find a significant association with the TCI. The results are different for the development level and the infrastructure. For both characteristics, we find a negative association with the tax framework complexity subindex. Therefore, more developed countries tend to have less complex tax frameworks. This negative association also remains at the level of the TCI. We do not find any significant association between the tax complexity indices and income inequality. When we consider the strengths of the associations, we do not find (very) strong associations among the selected country characteristics. The Pearson coefficients for the TCI vary between -0.33 (infrastructure) and 0.47 (population), indicating weak to moderate relationships. At the level of the subindices, the Pearson coefficients are slightly larger and vary between -0.45 (development) and 0.52 (GDP). Overall, we conclude that economically sophisticated countries tend to have a more complex tax code and a less complex tax framework. Regarding the TCI, a clear tendency is not observed.

[Insert Table 8 here]

### *Political and legal country characteristics*

Political and legal characteristics capture the strength of a country's government. We focus on general governance as measured by the six governance proxies from the World Bank's Worldwide Governance Indicators project (Beck et al. 2014; Akins et al. 2017; Andries et al. 2017; Langenmayr and Lester 2018; Williams 2018).<sup>48</sup> These proxies cover the following: voice and accountability (i.e., the ability of citizens to participate in choosing the government), political stability and absence of violence/terrorism (i.e., the likelihood that the government will lose its power by unconstitutional means), government effectiveness (i.e., the quality of public services), regulatory quality (i.e., the ability of the government to introduce sound regulations), rule of law (i.e., the trust in the rules of society) and control of corruption (i.e., the ability to influence public power). Strong governance in a country could spill over to the tax system, thus strengthening the quality of the law and making it less complex. In contrast, a complex tax system might also be susceptible to low governance or loose rights and induce corruption and other types of misconduct. As illustrated in panel B of Table 8, we find a negative association between our TCI and all governance indicators. Therefore, countries with a higher level of total tax complexity tend to be associated with less participation ability for its citizens, a lower level of political stability, a lower level of government effectiveness, lower regulatory quality, lower trust in rules and lower control of corruption. However, similar to the correlation coefficients for the economic characteristics, the Pearson correlation coefficients for the governance indicators are relatively small and range from -0.22 (voice and accountability) to -0.38 (regulatory quality). When we examine the tax complexity subindices, we observe negative relationships with the tax framework complexity subindex.

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<sup>48</sup> See Kaufmann and Kraay (2008) for a review of the indicators.



We find correlation coefficients that are considerably larger in magnitude, ranging from -0.39 (political stability) to -0.62 (rule of law). In contrast, there is no systematic correlation between the governance indicators and the tax code complexity subindex.

In summary, the results provide support for the view that tax complexity is negatively associated with political/legal characteristics. This association seems to be driven by the tax framework.

### ***Tax characteristics***

Finally, we focus on the association between our tax complexity indices and common tax country variables. We investigate the association with the statutory tax rate, the effective average tax rate and the effective marginal tax rate as well as the tax attractiveness measured by the Tax Attractiveness Index (Overesch and Wamser 2010; Beuselinck et al. 2015; Cristea and Nguyen 2016; Schanz et al. 2017a, b). We further shed light on the association between tax complexity and the size of the shadow economy, which is assumed to be closely linked to tax evasion (Kirchgässner 2011; Neck et al. 2012; Medina and Schneider 2018). For the OECD countries, we also analyze their tax competitiveness. Tax systems with high tax rates could be more complex because they might be affected by base erosion and profit shifting, for which comprehensive anti-avoidance regulations have been enacted to prevent it. In addition to specific measures in the tax code, countries could also employ specific measures within the tax framework, such as aggressive tax audits, to strengthen enforcement and keep companies from shifting their profits to low-tax countries. The results of the analysis on the tax characteristics are provided in panel C of Table 8. Regarding the association between our TCI and the tax rate measures, we only find a weak significant positive association for the statutory tax rate, indicated by the Pearson correlation coefficient of 0.24. As shown by the coefficient of 0.35, the association is somewhat stronger for the tax code complexity

subindex. Furthermore, we find a weak positive association between the tax code complexity subindex and the effective average tax rate. Hence, countries with a higher level of tax code complexity tend to have a higher statutory tax rate and a higher effective average tax rate. In contrast, there is no association between the tax rate measures and the tax framework complexity subindex. With regard to a country's tax attractiveness, we find a negative association between our TCI and the Tax Attractiveness index, with a Pearson correlation coefficient of -0.48. Thus, countries with a higher level of tax complexity tend to be less attractive. The association remains negative for both the tax code (-0.31) and the tax framework subindex (-0.45). For tax competitiveness, we also observe significant negative associations with the TCI (-0.30) and the tax code complexity subindex (-0.45). Furthermore, we observe a positive association between the shadow economy and the TCI (0.24), which is driven by the tax framework complexity subindex (0.54), indicating that tax evasion seems to be a more serious problem in countries with more complex tax frameworks. Overall, we find some evidence for a positive association between tax complexity and different tax rate measures and the size of the shadow economy as well as negative associations between tax complexity and the tax attractiveness/tax competitiveness of a country.

In conclusion, our findings highlight that tax complexity is associated with several common country characteristics. However, the associations are often not strong, which supports the view of tax complexity as a distinct country feature that should be accounted for in future cross-country tax research studies. Nonetheless, all findings should be interpreted with caution because we only focus on associations and do not take interdependencies of these relationships into account. Because these investigations are not the focus of this paper, we leave them to future research.<sup>49</sup>

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<sup>49</sup> Because the survey will be repeated every two years and more data will become available, it will also become easier to focus on causal relationships.

## 6. Robustness tests

To test for the robustness of our results, we conduct two sets of robustness checks. The first set focuses on the survey instrument that has been used for data collection. One common concern in survey research is that the results may depend on the individual characteristics of the respondents. To account for this potential problem, we gathered a comprehensive list of demographic information as displayed in Table 2. We use this demographic information to test for significantly different responses across demographic groups of respondents within countries with at least 20 observations by using Wilcoxon rank-sum tests.<sup>50</sup> For this purpose, we divide the country samples into two subsamples for each demographic variable.<sup>51</sup> We focus on the TCI, the tax code complexity subindex and the tax framework complexity subindex. In untabulated results, we carry out 262 tests in total. For only 25 tests and, hence, a share of less than ten percent of all tests, statistically significant differences are observed at conventional significance levels. Three remarks on this analysis need to be made. First, a clustering of significant differences is not observed in specific countries. The number of differences ranges from zero (Germany) to four (Australia and United Kingdom). Second, clustering with regard to the complexity variable under consideration is not observed. We find eight significant differences for the TCI, ten significant differences for the tax code complexity subindex and seven significant differences for the tax framework complexity subindex. Third, and most importantly, there is no specific trend in the responses regarding a specific complexity variable. For example, in Australia, partners, directors or principals consider the tax code more complex than do other respondents, while in Ukraine, they consider it less complex

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<sup>50</sup> Because we need at least a couple of observations for the different demographic groups, we expect a total number of 20 observations per country to be sufficient for this kind of test. The 11 resulting countries under investigation are Australia, Austria, Belgium, Germany, Italy, Mexico, Netherlands, Spain, Ukraine, the United Kingdom, and the United States.

<sup>51</sup> We do not make use of the variable specialization, as more than 85% of the sample specializes in income taxes. Hence, in most countries, there is only a very small number of respondents (and sometimes no respondents) that do not specialize in income taxes.

than do other respondents. Overall, the findings from this analysis indicate that the demographic background does not seem to have a crucial impact on the responses.

Another concern with regard to the survey instrument might be the different weights of the complexity drivers and the regulations in the tax code we use to account for their varying degrees of importance. As a robustness check, we recalculate the tax code complexity subindex and the TCI by using equal weights. To evaluate the results, we rank the 100 sample countries according to their level of complexity from one (lowest level of complexity) to 100 (highest level of complexity) by using both the importance-weighting and the equal-weighting approach and compare the rankings. In untabulated results, we observe a maximum absolute difference of three ranks for the TCI (tax code complexity subindex) for 81 (72) out of 100 countries. None of the countries show an absolute difference of more than ten ranks for the TCI. For the tax code complexity subindex, only three countries with such a difference are observed (Afghanistan, Bangladesh, and Czech Republic). Overall, the results are not fundamentally affected by the importance weighting.

The second set of robustness checks investigates the sensitivity of the associations between tax complexity and other country characteristics. First, the results of the correlation analysis may be driven by the degree of variation in our complexity data. While many country characteristics, such as a country's statutory tax rate, are directly and easily observable, it could be somewhat difficult to precisely determine the level of tax complexity. To address this concern, we use the complexity levels of Appendix 4 and rerun the bivariate correlation analysis based on these quintiles. The results are displayed in Appendix 7.<sup>52</sup> The tables show that the results are very similar to those

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<sup>52</sup> Because the complexity variables are now ordinal data, we only report the Spearman correlation coefficients.

based on the index values, and nearly the same associations are observed. Moreover, the magnitudes of the associations are also quite similar.

Second, because our sample consists of heterogeneous countries, it could also be argued that some results are driven by extreme values. We analyze this potential problem by eliminating extreme values and rerunning the correlation analysis based on the new samples. We eliminate three different types of extreme values. First, we exclude the lower percentile of each country characteristic. Second, we exclude the upper percentile. Third, we exclude both the lower and the upper percentile of each country characteristic. The results are displayed in Appendix 8. For most country characteristics, we obtain very robust results. None of our main findings for the economic and political/legal characteristics change. For the tax characteristics, we obtain very robust results for the correlation between the statutory tax rate and the tax code complexity subindex as well as between the tax attractiveness of a country and the TCI/tax framework complexity subindex. Overall, we find considerable evidence that the main results of the correlation analysis in Section 5 are not systematically affected by extreme values.

Finally, we address concerns that might arise from the choice of country characteristics. To exclude the possibility that there are country characteristics that exhibit a completely different correlation pattern, such as very strong correlations, with the TCI and its subindices, we rerun the correlation analysis with a variety of other economic characteristics (e.g., GDP growth and trade intensity), political/legal characteristics (e.g., investor protection rights and legal origin; Djankov et al. 2008, La Porta et al. 2008) and tax characteristics (e.g., worldwide versus territorial tax system; Markle 2016). In untabulated analyses, we do not find correlation patterns that differ from the prior patterns to a large extent and, thus, would affect our conclusions. Because recent cross-country studies (Ahern et al. 2015; Kim et al. 2017) have increasingly focused on the effects of

social norms and cultural values, we also examine the correlations between our tax complexity measures and these country characteristics (e.g., cultural attributes; Hofstede 1980). However, in untabulated analyses, we do not find uniform correlation patterns. Often, the associations are insignificant.

## **7. Conclusion**

In this paper, we introduce the TCI, which is composed of two subindices, the tax code and the tax framework subindex, and represents a new and innovative way to assess the corporate income tax complexity faced by MNCs using survey data.

For a sample of 100 countries for the year 2016, we find considerable variation in the overall level of tax complexity across countries. There are certain countries that have a quite similar high or low level of both tax code and tax framework complexity, while others present large differences in their tax code and tax framework complexity. From a global perspective, tax code complexity is strongly affected by the complexity of transfer pricing regulations. In contrast, tax framework complexity is strongly influenced by the complexity of tax audits. In our correlation analysis, we observe that countries with a very complex tax code tend to have a larger population, a higher GDP, and higher tax rates. Countries with a very complex tax framework tend to have a lower GDP, a poorer infrastructure, a lower development level, and a lower quality of governance in place. In accordance with these correlation patterns, many highly industrialized countries, such as Germany, the United Kingdom or the United States, are characterized by high tax code complexity but low tax framework complexity. These countries are also among those that strongly promote fair and equitable tax policies. Hence, the high level of tax code complexity in these countries may be interpreted as a reflection of those policies, which could have positive implications for their economies.

Our study is subject to some limitations. First, respondents might not have adopted the perspective they were asked to take. For our project, it was crucial that the participants answer the questions on their country's corporate income tax system from the perspective of an MNC. At the beginning of the survey, we asked them to take this view and frequently repeated important terms, such as "your country" or "for MNCs", throughout the survey. Second, we received a relatively low number of responses from several countries. We address this point by excluding all countries in which only one or two people participated and performed several tests on the quality of the responses collected. Furthermore, we obtained a sample of highly experienced and skilled tax consultants; therefore, we do not expect this issue to be a concern. Finally, our analyses are basic and illustrative. For brevity and to highlight general patterns, we focused on selected interesting results without exploiting the whole richness of the underlying data. Because the new data are limited to 2016, our analyses are not able to show causal effects of tax complexity. With new data on tax complexity becoming available, future research will be able to approach research questions on the causal effects of tax complexity.

Our study is the first to establish a comprehensive tax complexity measure for a large number of countries. We provide future research with proxies that can be used to study the implications of tax complexity, e.g., the impact of tax complexity on foreign direct investments or profit shifting. Future research might further investigate the predictive power of country characteristics for tax complexity, distinguish between necessary and unnecessary complexity and identify the "right" level of tax complexity by taking the consequences of tax complexity into account. In addition to using the index for research, it might also be used to derive policy implications, e.g., by benchmarking a specific country against the worldwide average or against peer countries. Finally, the index might be considered for corporate decision making or tax advisory purposes.

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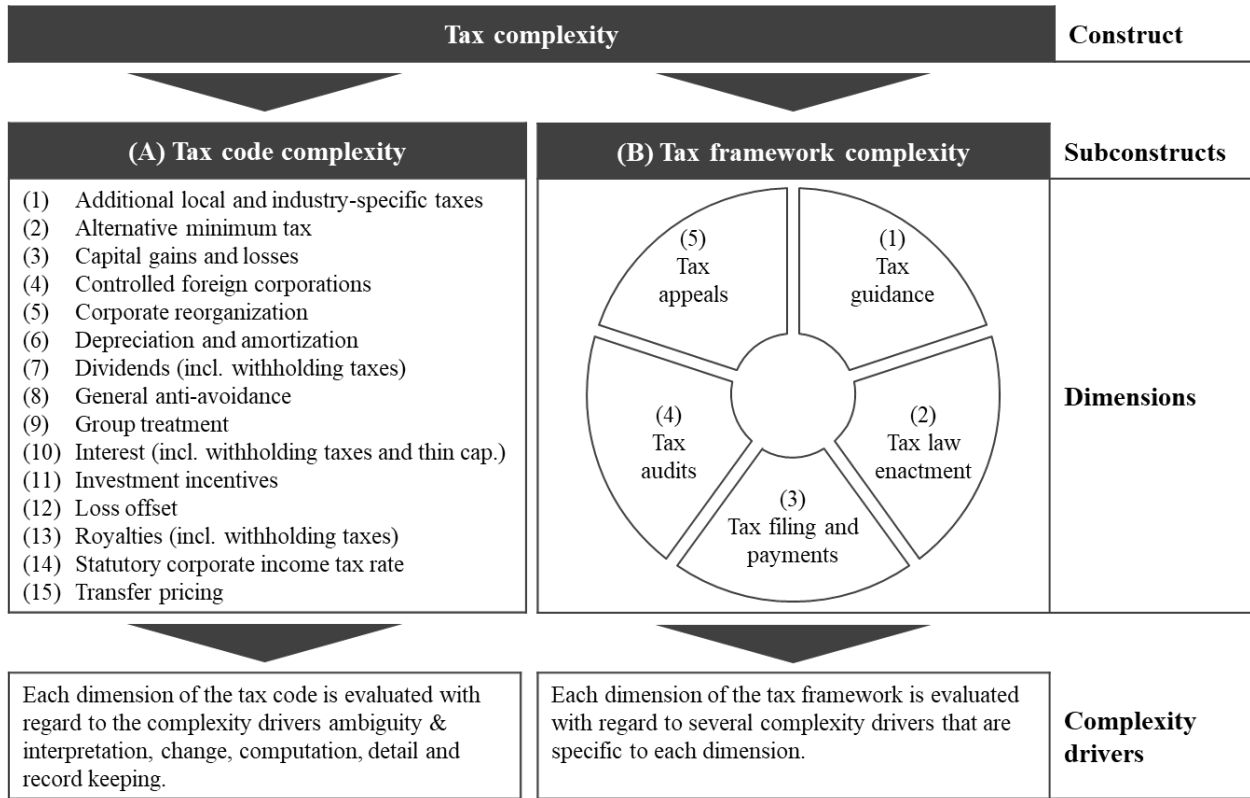
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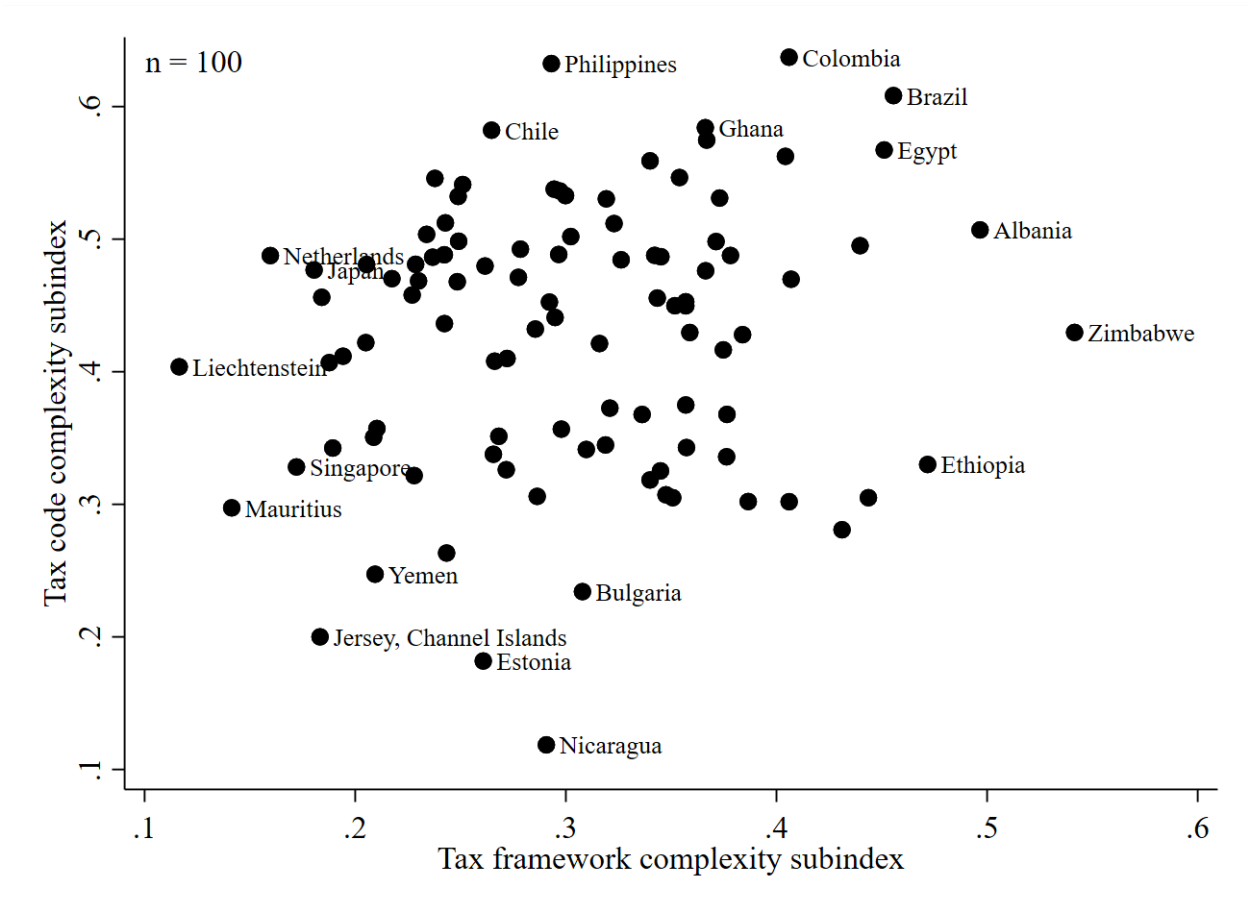
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**Figures**

**Figure 1** Concept of tax complexity



**Figure 2** Scatter plot of tax code subindex against tax framework subindex



Notes: All countries are listed with their tax code and tax framework complexity subindices in Appendix 4.



## Tables

TABLE 1

Distribution of responses

Responses per country	Number of countries	Countries (sorted by country name)	Total responses
3	13	Afghanistan, Barbados, Bulgaria, Costa Rica, Ethiopia, Jamaica, Jersey, Kosovo, Lao People's Democratic Republic, Lebanon, Liechtenstein, Tunisia, Yemen	39
4	13	Albania, Armenia, Azerbaijan, Egypt, Estonia, Ghana, Israel, Kazakhstan, Nigeria, Oman, Puerto Rico, Uganda, Zimbabwe	52
5	12	Bangladesh, Belarus, Dominican Republic, El Salvador, Macedonia, Madagascar, Malta, Mauritius, Nicaragua, Norway, Slovenia, Sri Lanka	60
6	9	Botswana, Colombia, Ecuador, Lithuania, Peru, Qatar, Saudi Arabia, Venezuela	48
7	9	Chile, Indonesia, Pakistan, Philippines, Slovakia, Taiwan, Turkey, Uruguay, Vietnam	63
8	2	Malaysia, Republic of Korea	16
9	10	Argentina, Czech Republic, Denmark, Guatemala, Kenya, Mongolia, New Zealand, Portugal, Russian Federation, Thailand	90
10	3	Finland, Serbia, Sweden	30
11	2	Greece, Luxembourg	22
12	5	Croatia, Hong Kong, Ireland, Singapore, Tanzania	60
13	2	Cyprus, Japan	26
14	3	Brazil, Hungary, Switzerland	42
15	1	South Africa	15
16	1	Romania	16
17	1	Canada	17
18	3	France, India, Poland	54
19	1	China	19
21	1	Mexico	21
22	3	Austria, Netherland, Spain	66
23	2	Italy, Ukraine	46
24	2	Australia, Belgium	48
25	1	Germany	25
27	1	United Kingdom	27
31	1	United States of America	31
9.33	100	Total/average	933

TABLE 2  
Sample description

<b>Job position</b>	Number	Percentage
Partner/Director/Principal	601	64.4%
Manager	212	22.7%
Senior assistant	75	8.1%
Junior assistant	27	2.9%
Other	18	1.9%
<b>Tax experience</b>	Number	Percentage
>15 years	513	55.0%
>10 but ≤15 years	168	18.0%
>5 but ≤10 years	147	15.7%
≤5 years	105	11.3%
<b>Specialization</b>	Number	Percentage
Income taxes	799	85.6%
Consumption taxes	64	6.9%
Payroll taxes	19	2.0%
Property taxes	10	1.1%
Social security contributions	1	0.1%
None of the above	40	4.3%
<b>Familiar with ... other tax system(s)</b>	Number	Percentage
>three	112	12.0%
three	64	6.8%
two	143	15.3%
one	178	19.1%
no	436	46.7%
Missing	1	0.1%
<b>Working time</b>	% on MNCs	% on int. tax
Mean	54.11%	40.75%
Var. coeff.	0.51	0.63
Missing	9	44
<b>Education</b>	Number	Percentage
Doctoral or equivalent	79	8.5%
Master or equivalent	573	61.4%
Bachelor or equivalent	253	27.1%
Secondary education	6	0.6%
Other	22	2.4%
<b>Age</b>	Number	Percentage
Over 59 years	82	8.8%
50 – 59 years	223	23.9%
40 – 49 years	274	29.4%
30 – 39 years	268	28.7%
Under 30 years	86	9.2%
<b>Gender</b>	Number	Percentage
Male	663	71.1%
Female	265	28.4%
Missing	5	0.5%

TABLE 3

Pearson/spearman correlations of the index components

**Panel A:** Correlations between the dimensions of tax code complexity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Additional local and industry-specific taxes		<b>0.59</b>	<b>0.42</b>	<b>0.48</b>	<b>0.38</b>	<b>0.47</b>	<b>0.49</b>	<b>0.34</b>	<b>0.24</b>	<b>0.40</b>	<b>0.42</b>	<b>0.41</b>	<b>0.34</b>	<b>0.49</b>	<b>0.43</b>
(2) (Alternative) minimum tax	<b>0.56</b>		<b>0.36</b>	<b>0.29</b>	<b>0.27</b>	<b>0.39</b>	<b>0.28</b>	<b>0.17</b>	<b>0.35</b>	<b>0.18</b>	<b>0.33</b>	<b>0.30</b>	<b>0.26</b>	<b>0.36</b>	<b>0.28</b>
(3) Capital gains and losses	<b>0.41</b>	<b>0.35</b>		<b>0.56</b>	<b>0.71</b>	<b>0.62</b>	<b>0.68</b>	<b>0.68</b>	<b>0.49</b>	<b>0.71</b>	<b>0.49</b>	<b>0.65</b>	<b>0.62</b>	<b>0.45</b>	<b>0.60</b>
(4) Controlled foreign corporations	<b>0.45</b>	<b>0.24</b>	<b>0.61</b>		<b>0.62</b>	<b>0.39</b>	<b>0.45</b>	<b>0.62</b>	<b>0.58</b>	<b>0.51</b>	<b>0.30</b>	<b>0.47</b>	<b>0.28</b>	<b>0.22</b>	<b>0.53</b>
(5) Corporate reorganization	<b>0.35</b>	<b>0.29</b>	<b>0.73</b>	<b>0.64</b>		<b>0.58</b>	<b>0.59</b>	<b>0.66</b>	<b>0.42</b>	<b>0.56</b>	<b>0.53</b>	<b>0.66</b>	<b>0.50</b>	<b>0.24</b>	<b>0.66</b>
(6) Depreciation and amortization	<b>0.52</b>	<b>0.35</b>	<b>0.55</b>	<b>0.36</b>	<b>0.56</b>		<b>0.64</b>	<b>0.48</b>	<b>0.34</b>	<b>0.68</b>	<b>0.63</b>	<b>0.78</b>	<b>0.68</b>	<b>0.60</b>	<b>0.55</b>
(7) Dividends (incl. withholding taxes)	<b>0.53</b>	<b>0.31</b>	<b>0.64</b>	<b>0.47</b>	<b>0.56</b>	<b>0.64</b>		<b>0.56</b>	<b>0.32</b>	<b>0.81</b>	<b>0.52</b>	<b>0.67</b>	<b>0.77</b>	<b>0.54</b>	<b>0.59</b>
(8) General anti-avoidance	<b>0.34</b>	0.16	<b>0.65</b>	<b>0.63</b>	<b>0.67</b>	<b>0.45</b>	<b>0.51</b>		<b>0.51</b>	<b>0.62</b>	<b>0.40</b>	<b>0.64</b>	<b>0.41</b>	<b>0.30</b>	<b>0.64</b>
(9) Group treatment	<b>0.27</b>	<b>0.27</b>	<b>0.49</b>	<b>0.58</b>	<b>0.47</b>	<b>0.35</b>	<b>0.35</b>	<b>0.52</b>		<b>0.36</b>	<b>0.33</b>	<b>0.49</b>	<b>0.21</b>	<b>0.28</b>	<b>0.37</b>
(10) Interest (incl. withholding taxes and thin cap.)	<b>0.40</b>	<b>0.17</b>	<b>0.64</b>	<b>0.49</b>	<b>0.54</b>	<b>0.69</b>	<b>0.80</b>	<b>0.55</b>	<b>0.41</b>		<b>0.49</b>	<b>0.68</b>	<b>0.73</b>	<b>0.47</b>	<b>0.63</b>
(11) Investment incentives	<b>0.42</b>	<b>0.34</b>	<b>0.49</b>	<b>0.30</b>	<b>0.57</b>	<b>0.66</b>	<b>0.53</b>	<b>0.31</b>	<b>0.38</b>	<b>0.54</b>		<b>0.60</b>	<b>0.50</b>	<b>0.51</b>	<b>0.42</b>
(12) Loss offset	<b>0.43</b>	<b>0.25</b>	<b>0.54</b>	<b>0.42</b>	<b>0.59</b>	<b>0.79</b>	<b>0.66</b>	<b>0.56</b>	<b>0.46</b>	<b>0.71</b>	<b>0.60</b>		<b>0.62</b>	<b>0.53</b>	<b>0.50</b>
(13) Royalties (incl. withholding taxes)	<b>0.33</b>	<b>0.27</b>	<b>0.61</b>	<b>0.32</b>	<b>0.51</b>	<b>0.70</b>	<b>0.74</b>	<b>0.41</b>	<b>0.23</b>	<b>0.75</b>	<b>0.53</b>	<b>0.63</b>		<b>0.54</b>	<b>0.53</b>
(14) Statutory corporate income tax rate	<b>0.51</b>	<b>0.34</b>	<b>0.41</b>	<b>0.24</b>	<b>0.22</b>	<b>0.63</b>	<b>0.61</b>	<b>0.31</b>	<b>0.31</b>	<b>0.54</b>	<b>0.47</b>	<b>0.58</b>	<b>0.57</b>		<b>0.31</b>
(15) Transfer pricing	<b>0.40</b>	<b>0.28</b>	<b>0.59</b>	<b>0.56</b>	<b>0.59</b>	<b>0.44</b>	<b>0.45</b>	<b>0.67</b>	<b>0.34</b>	<b>0.54</b>	<b>0.34</b>	<b>0.32</b>	<b>0.46</b>	<b>0.22</b>	

**Panel B:** Correlations between the dimensions of tax framework complexity

	(1)	(2)	(3)	(4)	(5)
(1) Tax guidance		<b>0.23</b>	<b>0.34</b>	<b>0.35</b>	<b>0.39</b>
(2) Tax law enactment	<b>0.24</b>		<b>0.46</b>	<b>0.55</b>	<b>0.53</b>
(3) Tax filing and payments	<b>0.25</b>	<b>0.51</b>		<b>0.67</b>	<b>0.52</b>
(4) Tax audits	<b>0.32</b>	<b>0.56</b>	<b>0.67</b>		<b>0.61</b>
(5) Tax appeals	<b>0.45</b>	<b>0.51</b>	<b>0.47</b>	<b>0.57</b>	

**Panel C: Correlations between the subindices**

	(1)	(2)
(1) Tax code complexity subindex		0.12
(2) Tax framework complexity subindex	0.14	

Notes: Pearson's correlation coefficients are shown in the lower triangle, while Spearman's rank correlations are shown above the diagonal. Bold numbers denote statistically significant correlations ( $p < 0.1$ ).

TABLE 4  
Pearson/spearman correlations external validation

	Number of obs.	Tax Complexity Index	Tax code complexity subindex	Tax framework complexity subindex	Filing and payments dimension	Audits dimension
Paying Taxes	98	<b>-0.46</b>	0.02	<b>-0.71</b>	<b>-0.77</b>	<b>-0.64</b>
		<b>-0.43</b>	-0.07	<b>-0.77</b>	<b>-0.82</b>	<b>-0.71</b>
Post-filing index	98	<b>-0.37</b>	0.07	<b>-0.62</b>	<b>-0.77</b>	<b>-0.56</b>
		<b>-0.33</b>	0.05	<b>-0.61</b>	<b>-0.73</b>	<b>-0.59</b>
Time to comply	97	<b>0.49</b>	0.22	<b>0.53</b>	<b>0.68</b>	<b>0.49</b>
		<b>0.47</b>	0.09	<b>0.80</b>	<b>0.79</b>	<b>0.73</b>
Number tax payments	97	0.22	-0.16	<b>0.49</b>	0.28	<b>0.44</b>
		0.14	-0.07	<b>0.36</b>	0.21	<b>0.35</b>
Time to comply CIT	98	<b>0.60</b>	<b>0.42</b>	<b>0.51</b>	<b>0.66</b>	<b>0.46</b>
		<b>0.74</b>	<b>0.48</b>	<b>0.70</b>	<b>0.68</b>	<b>0.54</b>
Number CIT payments	98	-0.04	-0.29	0.20	0.18	0.12
		-0.16	-0.18	-0.04	-0.02	-0.03
Time to comply CIT audit	97	0.28	0.06	<b>0.37</b>	<b>0.36</b>	<b>0.42</b>
		0.26	0.07	<b>0.42</b>	<b>0.37</b>	<b>0.51</b>
Time to complete CIT audit	41	0.26	0.13	0.27	<b>0.48</b>	<b>0.35</b>
		<b>0.33</b>	0.15	0.25	<b>0.39</b>	<b>0.34</b>
Financial Complexity Index 2017	75	<b>-0.54</b>	-0.18	<b>-0.63</b>	<b>-0.60</b>	<b>-0.56</b>
		<b>-0.41</b>	-0.27	<b>-0.62</b>	<b>-0.62</b>	<b>-0.51</b>
Financial Complexity Index 2018	75	<b>-0.60</b>	-0.19	<b>-0.72</b>	<b>-0.76</b>	<b>-0.54</b>
		<b>-0.58</b>	<b>-0.33</b>	<b>-0.71</b>	<b>-0.80</b>	<b>-0.45</b>

Notes: Pearson's correlation coefficients are shown in the upper part of each cell, while Spearman's rank correlations are shown in the lower part of each cell. Bold numbers denote statistically significant correlations ( $p < 0.1$ ). Variables are defined in Appendix 3, panel A.

TABLE 5

Descriptive statistics on the Tax Complexity Index and subindices

(Sub)index	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Tax Complexity Index	0.37	0.07	0.19	0.19	0.33	0.37	0.41	0.53
Tax code complexity subindex	0.43	0.10	0.24	0.12	0.34	0.45	0.50	0.64
Tax framework complexity subindex	0.30	0.08	0.27	0.12	0.24	0.30	0.36	0.54

TABLE 6  
 Tax Complexity Index and subindices – OECD vs. non-OECD countries

(Sub)index	All countries (n = 100)		OECD countries (n = 33)		Non-OECD countries (n = 67)		Difference test (p-value)	
	Mean	Var. coeff.	Mean	Var. coeff.	Mean	Var. coeff.	t-test	Rank-sum
Tax Complexity Index	0.37	0.19	0.36	0.15	0.37	0.21	0.40	0.45
Tax code complexity subindex	0.43	0.24	0.46	0.17	0.41	0.27	<b>0.03</b>	<b>0.02</b>
Tax framework complexity subindex	0.30	0.27	0.26	0.22	0.33	0.25	<b>0.00</b>	<b>0.00</b>

TABLE 7

Descriptive statistics on the dimensions of tax code and tax framework complexity

**Panel A: Tax code complexity**

Dimension	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Additional local and industry-specific taxes	0.29	0.15	0.53	0.00	0.18	0.31	0.40	0.67
(Alternative) minimum tax	0.17	0.15	0.90	0.00	0.05	0.13	0.24	0.59
Capital gains and losses	0.40	0.15	0.37	0.00	0.33	0.41	0.50	0.67
Controlled foreign corporations	0.36	0.20	0.55	0.00	0.20	0.36	0.52	0.80
Corporate reorganization	0.46	0.16	0.36	0.00	0.39	0.50	0.59	0.75
Depreciation and amortization	0.41	0.11	0.26	0.09	0.35	0.42	0.49	0.67
Dividends (incl. withholding taxes)	0.42	0.11	0.27	0.12	0.35	0.43	0.50	0.69
General anti-avoidance	0.48	0.15	0.30	0.00	0.38	0.50	0.59	0.77
Group treatment	0.35	0.17	0.48	0.00	0.22	0.37	0.49	0.66
Interest (incl. withholding taxes and thin cap.)	0.46	0.12	0.27	0.07	0.38	0.47	0.54	0.70
Investment incentives	0.47	0.16	0.34	0.00	0.40	0.47	0.58	0.79
Loss offset	0.42	0.12	0.27	0.00	0.36	0.43	0.50	0.67
Royalties (incl. withholding taxes)	0.45	0.11	0.25	0.11	0.36	0.45	0.53	0.67
Statutory corporate income tax rate	0.38	0.12	0.32	0.01	0.31	0.37	0.44	0.68
Transfer pricing	0.60	0.17	0.29	0.00	0.55	0.65	0.71	0.86

**Panel B: Tax framework complexity**

Dimension	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Tax guidance	0.31	0.09	0.28	0.16	0.25	0.30	0.35	0.57
Tax law enactment	0.30	0.11	0.37	0.05	0.22	0.30	0.38	0.58
Tax filing and payments	0.23	0.09	0.42	0.02	0.16	0.21	0.29	0.52
Tax audits	0.43	0.13	0.31	0.15	0.32	0.43	0.52	0.85
Tax appeals	0.25	0.11	0.44	0.07	0.17	0.24	0.32	0.65



TABLE 8

Correlations between the tax complexity indices and other country characteristics

**Panel A: Economic country characteristics**

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Ln Population	<b>0.47</b>	<b>0.49</b>	<b>0.51</b>	<b>0.57</b>	0.15	0.10
Ln GDP	<b>0.20</b>	<b>0.18</b>	<b>0.52</b>	<b>0.52</b>	<b>-0.31</b>	<b>-0.33</b>
Ln Foreign investments	0.09	0.12	<b>0.40</b>	<b>0.44</b>	<b>-0.36</b>	<b>-0.34</b>
Development	<b>-0.25</b>	<b>-0.33</b>	0.02	-0.02	<b>-0.45</b>	<b>-0.54</b>
Infrastructure	<b>-0.33</b>	<b>-0.35</b>	-0.08	-0.12	<b>-0.45</b>	<b>-0.42</b>
Inequality	0.08	0.04	-0.03	-0.03	0.17	0.16

**Panel B: Political/legal country characteristics**

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Voice and accountability	<b>-0.22</b>	<b>-0.28</b>	0.10	0.08	<b>-0.50</b>	<b>-0.55</b>
Political stability	<b>-0.34</b>	<b>-0.43</b>	-0.15	<b>-0.18</b>	<b>-0.39</b>	<b>-0.49</b>
Government effectiveness	<b>-0.34</b>	<b>-0.38</b>	0.01	-0.02	<b>-0.60</b>	<b>-0.62</b>
Regulatory quality	<b>-0.38</b>	<b>-0.43</b>	-0.03	-0.07	<b>-0.61</b>	<b>-0.62</b>
Rule of law	<b>-0.36</b>	<b>-0.39</b>	0.00	-0.03	<b>-0.62</b>	<b>-0.63</b>
Control of corruption	<b>-0.36</b>	<b>-0.39</b>	-0.03	-0.06	<b>-0.58</b>	<b>-0.59</b>

**Panel C: Other tax system characteristics**

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Statutory tax rate	<b>0.24</b>	<b>0.20</b>	<b>0.35</b>	<b>0.36</b>	-0.01	-0.02
Effective average tax rate	0.16	0.07	<b>0.35</b>	<b>0.39</b>	-0.13	-0.17
Effective marginal tax rate	-0.04	0.06	0.06	<b>0.30</b>	-0.12	-0.10
Tax attractiveness	<b>-0.48</b>	<b>-0.37</b>	<b>-0.31</b>	<b>-0.24</b>	<b>-0.45</b>	<b>-0.41</b>
Tax competitiveness	<b>-0.30</b>	-0.18	<b>-0.45</b>	<b>-0.35</b>	0.06	0.08
Shadow economy	<b>0.24</b>	<b>0.23</b>	-0.09	-0.09	<b>0.54</b>	<b>0.53</b>

Notes: Bold numbers denote statistically significant correlations ( $p < 0.1$ ). Variables are defined in Appendix 3, panel B.

## Appendix

### Appendix 1 – Overview of complexity drivers

#### Panel A: Tax code complexity drivers

#	Complexity driver	Survey question Definitions provided in the survey are in italics	Operationalization 0 = Least complex, 1 = Most complex
(1)	Ambiguity & interpretation	To what extent do you think ambiguity & interpretation contribute to the complexity of the regulations listed below for MNCs in your country? <i>Ambiguity &amp; interpretation: When a regulation is phrased in an unclear, imprecise and/or ambiguous manner so that different interpretations are possible.</i>	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent
(2)	Change	To what extent do you think change contributes to the complexity of the regulations listed below for MNCs in your country? <i>Change: When a regulation is frequently changed and the changes are extensive in terms of quantity and/or scope.</i>	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent
(3)	Computation	To what extent do you think computation contributes to the complexity of the regulations listed below for MNCs in your country? <i>Computation: When many and/or sophisticated calculations are necessary to prove the (non-)applicability of a regulation and/or to determine the specific tax treatment.</i>	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent
(4)	Detail	To what extent do you think detail contributes to the complexity of the regulations listed below for MNCs in your country? <i>Detail: When a regulation contains excessive details, such as numerous rules, exception to rules, and/or cross-references to other rules.</i>	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent
(5)	Record keeping	To what extent do you think record keeping contributes to the complexity of the regulations listed below for MNCs in your country? <i>Record keeping: When many records and documents must be kept to substantiate all claims under a regulation and/or to complete the tax return.</i>	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent

**Panel B: Tax framework complexity drivers**

#	Complexity driver	Survey question Definitions provided in the survey are in italics	Operationalization 0 = Least complex, 1 = Most complex
<b>Dimension 1: Tax guidance</b>			
(1)	Differences between GAAP and tax regulations	To what extent do national generally accepted accounting principles (GAAP) for domestic reporting and/or income determination differ from the national tax regulations?	0 = No extent 0.25 = Little extent 0.5 = Some extent 0.75 = Great extent 1 = Very great extent
(2)	Public binding rulings	Does the tax authority in your country issue private binding rulings (including advance pricing agreements)? <i>Public rulings are published statements describing how a tax authority will apply the tax code in particular situations. They include anonymized answers to specific requests as well as general and specific administrative guidance concerning, e.g., decrees and circulars. These public rulings are binding on the tax authority, meaning that taxpayers are protected from further assessment where they have acted in accordance with the advice given in the ruling.</i>	0 = Yes 1 = No
(3)	Private binding rulings	Does the tax authority in your country issue private binding rulings (including advance pricing agreements)? <i>Private rulings are unpublished statements by the tax authority in response to specific requests from taxpayers seeking clarification of how tax law would apply in relation to a proposed or completed transaction. They are binding on the tax authority when the transactions are carried out as described in the request.</i>	0 = Yes 1 = No
(4)	Non-binding oral or written advice	Does the tax authority in your country provide non-binding oral or written advice to resolve uncertainties when it comes to applying tax law to particular business issues or transactions? <i>Oral or written advice in this context is an informal opinion on tax matters that taxpayers can request by contacting the tax authority (e.g., by telephone or email). They are not binding on the tax authority.</i>	0 = Yes 0.5 = No, but there is a common practice 1 = No, and no common practice
(5)	Substantial business issues/transactions	Are there various substantial business issues and/or transactions whose tax treatment is not codified in your country's tax law?	0 = No 0.33 = Yes, but written guidance exists 0.66 = Yes, no guidance but there is a common practice 1 = Yes, and no written guidance or common practice

(6)	International soft law	To what extent does the existence of international soft law offer support by providing additional information in dealing with your country's tax law? <i>International soft law is defined as rules that are neither strictly binding in nature nor completely lacking legal significance. The term refers to guidelines, policy declarations or codes of conduct which are not legally enforceable. OECD guidelines are an example of soft law.</i>	0 = Very great extent 0.25 = Great extent 0.5 = Some extent 0.75 = Little extent 1 = No extent
<b>Dimension 2: Tax law enactment</b>			
(1)	Defined enactment process	Is the process by which tax legislation is enacted in your country defined by the constitution or any other law? <i>The tax legislation process is the process by which a new tax regulation or a tax change is codified in the law. It begins with a legislative proposal.</i>	0 = Yes 0.5 = No, but there is a common practice 1 = No, and no common practice
(2)	Access to enacted tax legislation	Regarding the tax legislative process in your country, which of the following aspects regularly cause problems? (a) Access to enacted tax legislation	0 = Not selected 1 = Selected
(3)	Influence of third parties	Regarding the tax legislative process in your country, which of the following aspects regularly cause problems? (b) Influence of third parties	0 = Not selected 1 = Selected
(4)	Quality of tax legislation drafting	Regarding the tax legislative process in your country, which of the following aspects regularly cause problems? (c) Quality of tax legislation drafting	0 = Not selected 1 = Selected
(5)	Time at which legislation becomes effective	Regarding the tax legislative process in your country, which of the following aspects regularly cause problems? (d) Time at which tax legislation becomes effective	0 = Not selected 1 = Selected
(6)	Time between the announcement and enactment of tax changes	Regarding the tax legislative process in your country, which of the following aspects regularly cause problems? (e) Time between the announcement of tax changes and their enactment	0 = Not selected 1 = Selected
<b>Dimension 3: Tax filing and payments</b>			
(1)	Computing tax payments	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (a) Computing tax payments	0 = Not selected 1 = Selected
(2)	Determining due dates for tax payments	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (b) Determining due dates for tax payments	0 = Not selected 1 = Selected
(3)	Identifying the recipient(s) of tax payments	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (c) Identifying the recipient(s) of tax payments	0 = Not selected 1 = Selected

(4)	Managing the number of tax payments during a year	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (d) Managing the number of tax payments during a year	0 = Not selected 1 = Selected
(5)	Refunding overpaid corporate income taxes	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (e) Refunding overpaid corporate income taxes	0 = Not selected 1 = Selected
(6)	(Electronic) remittance of tax payments	Regarding the payment of corporate income taxes in your country, which of the following aspects regularly cause problems? (f) (Electronic) remittance of tax payments	0 = Not selected 1 = Selected
(7)	Determining due dates for filing tax returns	Regarding the filing of corporate income taxes in your country, which of the following aspects regularly cause problems? (a) Determining due dates for filing tax returns	0 = Not selected 1 = Selected
(8)	Identifying the recipient(s) of tax returns	Regarding the filing of corporate income taxes in your country, which of the following aspects regularly cause problems? (b) Identifying the recipient(s) of tax returns	0 = Not selected 1 = Selected
(9)	Managing the number of tax returns during a year	Regarding the filing of corporate income taxes in your country, which of the following aspects regularly cause problems? (c) Managing the number of tax returns during a year	0 = Not selected 1 = Selected
(10)	Preparing tax returns	Regarding the filing of corporate income taxes in your country, which of the following aspects regularly cause problems? (d) Preparing tax returns	0 = Not selected 1 = Selected
(11)	(Electronic) transmission of tax returns	Regarding the filing of corporate income taxes in your country, which of the following aspects regularly cause problems? (e) (Electronic) transmission of tax returns	0 = Not selected 1 = Selected
(12)	Choice of tax year	Does your country allow corporations to choose their tax year in accordance with the financial year they have chosen for accounting purposes?	0 = Yes 1 = No
(13)	Consolidated tax returns	Does your country allow parent corporations to submit a single consolidated tax return for the entire group, instead of all associated companies filing separate corporate income tax returns?	0 = Yes 1 = No
(14)	Instructions for filing tax returns	Does the tax authority in your country provide written instructions on how to file tax returns?	0 = Yes 0.5 = Yes, but they are not helpful 1 = No
<b>Dimension 4: Tax audits</b>			
(1)	Defined tax audit process	Do rules or other written guidelines exist in your country that clearly outline the tax audit process?	0 = Yes 0.5 = No, but there is a common practice

			1 = No, and no common practice exists
(2)	Tax audit cycle	Regarding the anticipation of tax audits in your country, which of the following do you consider a serious problem in your country? (a) Absence of a regular audit cycle	0 = Not selected 1 = Selected
(3)	Notification of the upcoming tax audit	Regarding the anticipation of tax audits in your country, which of the following do you consider a serious problem in your country? (b) Late or no notification of the upcoming tax audit	0 = Not selected 1 = Selected
(4)	Disclosure of selection criteria for tax audit targets	Regarding the anticipation of tax audits in your country, which of the following do you consider a serious problem in your country? (c) Little or no disclosure of selection criteria for tax audit targets	0 = Not selected 1 = Selected
(5)	Communication of topics to be covered by the tax audit	Regarding the anticipation of tax audits in your country, which of the following do you consider a serious problem in your country? (d) Poor or no communication of topics to be covered by the tax audit	0 = Not selected 1 = Selected
(6)	Number of years covered by an audit	How many tax years are usually covered by an ordinary tax audit in your country?	0 = One year 0.5 = Between two and four years 1 = More than four years
(7)	Decisions by tax officers	Regarding the tax audit process, which of the following do you consider a serious problem in your country? (a) Inconsistent decisions by tax officers	0 = Not selected 1 = Selected
(8)	Sanctions imposed in case of violations	Regarding the tax audit process, which of the following do you consider a serious problem in your country? (b) Ineffectiveness of sanctions imposed in case of violations	0 = Not selected 1 = Selected
(9)	Experience or technical skill of tax officers	Regarding the tax audit process, which of the following do you consider a serious problem in your country? (c) Lack of experience or technical skill of tax officers	0 = Not selected 1 = Selected
(10)	Behavior by tax officers	Regarding the tax audit process, which of the following do you consider a serious problem in your country? (d) Offensive or unethical behavior by tax officers	0 = Not selected 1 = Selected
(11)	Statute of limitations	How many years after the corporate income tax return was filed does the tax authority lose the right to perform a tax audit and adjust the tax payable (statute of limitations)?	0 = Two years or less 0.5 = Between three and five years 1 = More than five years
<b>Dimension 5: Tax appeals</b>			
(1)	Defined appeal process	Do rules or other written guidelines exist in your country that clearly outline the process of appealing against a decision by the tax authority?	0 = Yes 1 = No

(2)	Decisions at administrative appeal level	Regarding the treatment of tax appeals at administrative level, which of the following do you consider a serious problem in your country? (a) Inconsistent decisions at administrative appeal level	0 = Not selected 1 = Selected
(3)	Influence of third parties at administrative appeal level	Regarding the treatment of tax appeals at administrative level, which of the following do you consider a serious problem in your country? (b) Influence of third parties at administrative appeal level	0 = Not selected 1 = Selected
(4)	Agents/staff	Regarding the treatment of tax appeals at administrative level, which of the following do you consider a serious problem in your country? (c) Lack of (specialized) agents/staff at administrative level	0 = Not selected 1 = Selected
(5)	Time period between the filing of an appeal at administrative level and its resolution	Regarding the treatment of tax appeals at administrative level, which of the following do you consider a serious problem in your country? (c) Unpredictable time period between the filing of an appeal at administrative level and its resolution at this level	0 = Not selected 1 = Selected
(6)	Decisions at judicial level	Regarding the treatment of tax appeals at judicial level, which of the following do you consider a serious problem in your country? (a) Inconsistent decisions at judicial level	0 = Not selected 1 = Selected
(7)	Influence of third parties at judicial level	Regarding the treatment of tax appeals at judicial level, which of the following do you consider a serious problem in your country? (b) Influence of third parties at judicial level	0 = Not selected 1 = Selected
(8)	Judges	Regarding the treatment of tax appeals at judicial level, which of the following do you consider a serious problem in your country? (c) Lack of (specialized) judges at judicial level	0 = Not selected 1 = Selected
(9)	Time period between the filing of an appeal at judicial level and its resolution	Regarding the treatment of tax appeals at judicial level, which of the following do you consider a serious problem in your country? (d) Unpredictable time period between the filing of an appeal at judicial level and its resolution at this level	0 = Not selected 1 = Selected
(10)	Public access to judicial decisions on tax appeals	Are judicial decisions on tax appeals publicly accessible in your country after they are made?	0 = Yes 1 = No

## Appendix 2 – Tax code weighting factors

### Panel A: Dimensions of tax code complexity

Dimension	Weighting factor
Additional local and industry-specific taxes	0.039
(Alternative) minimum tax	0.025
Capital gains and losses	0.064
Controlled foreign corporations	0.052
Corporate reorganization	0.068
Depreciation and amortization	0.071
Dividends (incl. withholding taxes)	0.081
General anti-avoidance	0.074
Group treatment	0.053
Interest (incl. withholding taxes and thin cap.)	0.081
Investment incentives	0.073
Loss offset	0.079
Royalties (incl. withholding taxes)	0.080
Statutory corporate income tax rate	0.075
Transfer pricing	0.085

### Panel B: Complexity drivers of tax code framework

Complexity driver	Weighting factor
Ambiguity & interpretation	0.230
Change	0.208
Computation	0.175
Detail	0.193
Record keeping	0.194



### Appendix 3 – Variable descriptions

#### Panel A: Other tax complexity variables

Variable	Description	Source
Paying Taxes	Overall tax burden of a country. Consists of the number of tax payments, the time to prepare, file and pay taxes, the total tax and contribution rate (each measure captures corporate income, labor and consumption taxes), as well as the post-filing index. A higher score indicates a less burdensome country.	PwC et al. (2017)
Post-filing index	Post-filing processes of a country's tax system. Consists of the components time to comply with a VAT refund (hours), time to obtain a VAT refund (weeks), time to comply with a CIT audit (hours) and time to complete a CIT audit (weeks). A higher score indicates a more efficient process.	PwC et al. (2017)
Time to comply	Time to comply with country's corporate income, labor and consumption taxes (hours).	PwC et al. (2017)
Number tax payments	Number of tax payments that have to be made in a country for corporate income, labor and consumption taxes.	PwC et al. (2017)
Time to comply CIT	Time to comply with country's corporate income taxes (hours).	PwC et al. (2017)
Number CIT payments	Number of tax payments that have to be made in a country for corporate income taxes.	PwC et al. (2017)
Time to comply CIT audit	Time to comply with a country's corporate income tax audit, including the correction of an error (hours).	PwC et al. (2017)
Time to complete CIT audit	Time to complete a country's corporate income tax audit (weeks).	PwC et al. (2017)
Financial Complexity Index	Complexity of maintaining accounting and tax compliance. Consists of the areas compliance, reporting, bookkeeping and tax. A higher rank indicates a less complex country.	TMF Group (2017, 2018)

#### Panel B: Other country variables

Variable	Description	Source
Control of corruption	Control of corruption for 2016. Captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	Worldwide Governance Indicators
Development	Human development index for 2016. Presents a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living.	Human Development Report
Effective average tax rate	Effective average tax rate for 2016. Reflects the average tax contribution a firm makes on an investment project earning above-zero economic profits. It is defined as the difference in the NPV of pre-tax and post-tax economic profits relative to the NPV of pre-tax income net of real economic depreciation.	OECD

Effective marginal tax rate	Effective marginal tax rate for 2016. Measures the extent to which taxation increases the cost of capital; it corresponds to the case of a marginal project that delivers just enough profit to break even but no economic profit over and above this threshold.	OECD
Foreign investments	Foreign direct investments, net inflows (current US\$) for 2016. Consists of the sum of equity capital, reinvestment of earnings, and other capital.	World Bank Open Data
GDP (Gross Domestic Product)	Gross domestic product (constant 2010 US\$) for 2016. Consists of the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	World Bank Open Data
Government effectiveness	Government effectiveness for 2016. Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	Worldwide Governance Indicators
Inequality	GINI index (World Bank estimate) for 2016 or most recent year. Measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World Bank Open Data
Infrastructure	Fixed telephone subscriptions (per 100 people) for 2016. Refers to the sum of active number of analog fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones.	World Bank Open Data
Political stability	Political stability and absence of violence for 2016. Measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	Worldwide Governance Indicators
Population	Total population for 2016. Based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values are midyear estimates.	World Bank Open Data
Regulatory quality	Regulatory quality for 2016. Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	Worldwide Governance Indicators
Rule of law	Rule of law for 2016. Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood	Worldwide Governance Indicators

	of crime and violence. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	
Shadow economy	The shadow economy includes all economic activities which are hidden from official authorities for monetary, regulatory, and institutional reasons. Monetary reasons include avoiding paying taxes and all social security contributions, regulatory reasons include avoiding governmental bureaucracy or the burden of regulatory framework, while institutional reasons include corruption law, the quality of political institutions and weak rule of law. The size of the shadow economy is measured as a percentage of GDP.	Medina and Schneider (2018)
Statutory tax rate	Statutory corporate income tax rate for 2016.	KPMG Corporate Tax Rates Table
Tax attractiveness	Tax Attractiveness Index for 2016. Reflects the attractiveness of a country's tax environment based on 20 tax factors.	<a href="http://www.tax-index.org">www.tax-index.org</a>
Tax competitiveness	Corporate income tax competitiveness score for 2016. Measures the extent to which corporate income tax is neutral and competitiveness.	Tax Foundation (2017)
Voice and accountability	Voice and accountability for 2016. Captures perceptions on the extent to which a country's citizens are able to participate in selecting their government as well as freedom of expression, freedom of association, and a free media. Runs from approximately -2.5 to 2.5, with higher values corresponding to better governance.	Worldwide Governance Indicators

#### Appendix 4 – Country (sub)index values and complexity levels

Country	Tax Complexity Index	Complexity levels (quintiles)	Tax code complexity	Complexity levels (quintiles)	Tax framework complexity	Complexity levels (quintiles)
Afghanistan	0.40	High	0.45	Medium	0.36	High
Albania	0.50	Very high	0.51	High	0.50	Very high
Argentina	0.36	Medium	0.43	Medium	0.29	Medium
Armenia	0.33	Low	0.31	Very low	0.35	High
Australia*	0.39	High	0.53	Very high	0.25	Low
Austria*	0.34	Low	0.48	High	0.21	Very low
Azerbaijan	0.37	Medium	0.31	Very low	0.44	Very high
Bangladesh	0.35	Low	0.47	Medium	0.23	Very low
Barbados	0.36	Medium	0.28	Very low	0.43	Very high
Belarus	0.33	Low	0.34	Low	0.32	Medium
Belgium*	0.37	Medium	0.44	Medium	0.29	Medium
Botswana	0.34	Low	0.33	Very low	0.34	High
Brazil	0.53	Very high	0.61	Very high	0.46	Very high
Bulgaria	0.27	Very low	0.23	Very low	0.31	Medium
Canada*	0.37	Medium	0.50	High	0.25	Low
Chile*	0.42	Very high	0.58	Very high	0.26	Low
China, People's Republic of	0.41	High	0.48	High	0.33	High
Colombia	0.52	Very high	0.64	Very high	0.41	Very high
Costa Rica	0.36	Medium	0.34	Low	0.38	Very high
Croatia	0.47	Very high	0.50	High	0.44	Very high
Cyprus	0.35	Low	0.37	Low	0.32	Medium
Czech Republic*	0.43	Very high	0.49	High	0.38	Very high
Denmark*	0.36	Medium	0.47	Medium	0.25	Low
Dominican Republic	0.33	Low	0.36	Low	0.30	Medium
Ecuador	0.42	High	0.54	Very high	0.30	Medium
Egypt	0.51	Very high	0.57	Very high	0.45	Very high
El Salvador	0.33	Low	0.34	Low	0.31	Medium
Estonia*	0.22	Very low	0.18	Very low	0.26	Low
Ethiopia	0.40	High	0.33	Very low	0.47	Very high
Finland*	0.34	Low	0.46	Medium	0.23	Very low
France*	0.40	High	0.54	Very high	0.25	Low

Germany*	0.37	Medium	0.48	High	0.26	Low
Ghana	0.48	Very high	0.58	Very high	0.37	High
Greece*	0.43	Very high	0.50	High	0.37	Very high
Guatemala	0.35	Low	0.34	Low	0.36	High
Hong Kong	0.25	Very low	0.26	Very low	0.24	Low
Hungary*	0.35	Medium	0.37	Low	0.34	High
India	0.39	High	0.55	Very high	0.24	Low
Indonesia	0.48	Very high	0.56	Very high	0.40	Very high
Ireland*	0.30	Very low	0.41	Low	0.19	Very low
Israel*	0.28	Very low	0.36	Low	0.21	Very low
Italy*	0.45	Very high	0.56	Very high	0.34	High
Jamaica	0.33	Low	0.32	Very low	0.34	High
Japan*	0.33	Low	0.48	High	0.18	Very low
Jersey, Channel Islands	0.19	Very low	0.20	Very low	0.18	Very low
Kazakhstan	0.42	High	0.49	High	0.35	High
Kenya	0.40	High	0.50	High	0.30	Medium
Korea, Republic of*	0.30	Very low	0.41	Low	0.19	Very low
Kosovo	0.41	High	0.43	Medium	0.38	Very high
Lao, People's Democratic Republic	0.37	Medium	0.37	Low	0.38	Very high
Lebanon	0.42	Very high	0.48	High	0.37	High
Liechtenstein	0.26	Very low	0.40	Low	0.12	Very low
Lithuania	0.27	Very low	0.32	Very low	0.23	Very low
Luxembourg*	0.27	Very low	0.34	Low	0.19	Very low
Macedonia	0.34	Low	0.30	Very low	0.39	Very high
Madagascar	0.37	Medium	0.42	Medium	0.32	Medium
Malaysia	0.34	Low	0.47	Medium	0.22	Very low
Malta	0.32	Low	0.46	Medium	0.18	Very low
Mauritius	0.22	Very low	0.30	Very low	0.14	Very low
Mexico*	0.42	Very high	0.51	Very high	0.32	Medium
Mongolia	0.45	Very high	0.55	Very high	0.35	High
Netherlands*	0.32	Low	0.49	High	0.16	Very low
New Zealand*	0.28	Very low	0.35	Low	0.21	Very low
Nicaragua	0.20	Very low	0.12	Very low	0.29	Medium
Nigeria	0.42	Very high	0.53	Very high	0.32	Medium
Norway*	0.34	Low	0.44	Medium	0.24	Low

Oman	0.30	Very low	0.31	Very low	0.29	Medium
Pakistan	0.39	High	0.49	High	0.30	Medium
Peru	0.37	Medium	0.37	Low	0.36	High
Philippines	0.46	Very high	0.63	Very high	0.29	Medium
Poland*	0.41	High	0.49	High	0.34	High
Portugal*	0.37	Medium	0.49	High	0.24	Low
Puerto Rico	0.30	Very low	0.33	Very low	0.27	Low
Qatar	0.33	Low	0.30	Very low	0.35	High
Romania	0.39	High	0.43	Medium	0.36	High
Russian Federation	0.42	High	0.53	Very high	0.30	Medium
Saudi Arabia	0.44	Very high	0.47	Medium	0.41	Very high
Serbia	0.40	High	0.45	Medium	0.35	High
Singapore	0.25	Very low	0.33	Very low	0.17	Very low
Slovakia*	0.42	High	0.54	Very high	0.29	Medium
Slovenia*	0.37	Medium	0.47	Medium	0.28	Low
South Africa	0.39	High	0.49	High	0.28	Medium
Spain*	0.38	Medium	0.51	Very high	0.24	Low
Sri Lanka	0.40	High	0.45	Medium	0.36	High
Sweden*	0.36	Medium	0.49	High	0.24	Low
Switzerland*	0.31	Very low	0.42	Medium	0.21	Very low
Taiwan	0.34	Low	0.41	Low	0.27	Low
Tanzania	0.47	Very high	0.57	Very high	0.37	High
Thailand	0.40	High	0.46	Medium	0.34	High
Tunisia	0.30	Very low	0.34	Low	0.27	Low
Turkey*	0.37	Medium	0.45	Medium	0.29	Medium
Uganda	0.31	Very low	0.35	Low	0.27	Low
Ukraine	0.40	High	0.42	Low	0.37	Very high
United Kingdom*	0.35	Medium	0.48	High	0.23	Very low
United States of America*	0.37	Medium	0.50	High	0.23	Low
Uruguay	0.34	Low	0.41	Low	0.27	Low
Venezuela	0.35	Medium	0.30	Very low	0.41	Very high
Vietnam	0.45	Very high	0.53	Very high	0.37	Very high
Yemen	0.23	Very low	0.25	Very low	0.21	Very low
Zimbabwe	0.49	Very high	0.43	Medium	0.54	Very high

Notes: OECD countries are marked with an asterisk (\*).

## Appendix 5 – Descriptive statistics of the complexity drivers

**Panel A:** Drivers of tax code complexity

#	Dimension	#	Complexity driver	Mean	Var. coeff.	Min.	Max.
(1)	Additional local and industry-specific taxes	(1)	Ambiguity & interpretation	0.30	0.56	0.00	0.71
		(2)	Change	0.31	0.58	0.00	0.88
		(3)	Computation	0.27	0.55	0.00	0.64
		(4)	Detail	0.30	0.54	0.00	0.72
		(5)	Record keeping	0.28	0.57	0.00	0.69
(2)	(Alternative) minimum tax	(1)	Ambiguity & interpretation	0.17	0.92	0.00	0.57
		(2)	Change	0.17	0.96	0.00	0.69
		(3)	Computation	0.16	0.97	0.00	0.67
		(4)	Detail	0.17	0.90	0.00	0.65
		(5)	Record keeping	0.16	0.95	0.00	0.57
(3)	Capital gains and losses	(1)	Ambiguity & interpretation	0.39	0.40	0.00	0.72
		(2)	Change	0.38	0.42	0.00	0.75
		(3)	Computation	0.38	0.43	0.00	0.70
		(4)	Detail	0.40	0.43	0.00	0.71
		(5)	Record keeping	0.44	0.38	0.00	0.75
(4)	Controlled foreign corporations	(1)	Ambiguity & interpretation	0.38	0.54	0.00	0.75
		(2)	Change	0.35	0.56	0.00	0.86
		(3)	Computation	0.34	0.60	0.00	0.79
		(4)	Detail	0.37	0.61	0.00	0.86
		(5)	Record keeping	0.36	0.56	0.00	0.81
(5)	Corporate reorganization	(1)	Ambiguity & interpretation	0.49	0.37	0.00	0.79
		(2)	Change	0.42	0.42	0.00	0.75
		(3)	Computation	0.44	0.39	0.00	0.79
		(4)	Detail	0.48	0.41	0.00	0.84
		(5)	Record keeping	0.49	0.36	0.00	0.78
(6)	Depreciation and amortization	(1)	Ambiguity & interpretation	0.38	0.33	0.06	0.69
		(2)	Change	0.38	0.37	0.08	0.75
		(3)	Computation	0.43	0.29	0.10	0.75
		(4)	Detail	0.41	0.30	0.00	0.63
		(5)	Record keeping	0.47	0.30	0.10	0.75
(7)	Dividends (incl. withholding taxes)	(1)	Ambiguity & interpretation	0.40	0.34	0.00	0.75
		(2)	Change	0.43	0.32	0.08	0.71
		(3)	Computation	0.39	0.30	0.08	0.71
		(4)	Detail	0.44	0.31	0.13	0.71
		(5)	Record keeping	0.46	0.28	0.10	0.75
(8)	General anti-avoidance	(1)	Ambiguity & interpretation	0.54	0.33	0.00	0.85
		(2)	Change	0.47	0.37	0.00	0.86
		(3)	Computation	0.42	0.34	0.00	0.81
		(4)	Detail	0.47	0.37	0.00	0.78
		(5)	Record keeping	0.49	0.32	0.00	0.81
(9)	Group treatment	(1)	Ambiguity & interpretation	0.35	0.51	0.00	0.68
		(2)	Change	0.34	0.51	0.00	0.67
		(3)	Computation	0.34	0.49	0.00	0.69

	(4)	Detail	0.36	0.54	0.00	0.72
	(5)	Record keeping	0.35	0.48	0.00	0.70
(10)	(1)	Ambiguity & interpretation	0.45	0.34	0.06	0.88
	(2)	Change	0.44	0.34	0.06	0.75
	(3)	Computation	0.45	0.30	0.10	0.72
	(4)	Detail	0.47	0.30	0.06	0.81
	(5)	Record keeping	0.48	0.29	0.05	0.75
(11)	(1)	Ambiguity & interpretation	0.44	0.39	0.00	0.86
	(2)	Change	0.48	0.37	0.00	0.92
	(3)	Computation	0.45	0.38	0.00	0.81
	(4)	Detail	0.48	0.35	0.00	0.81
	(5)	Record keeping	0.50	0.35	0.00	0.81
(12)	(1)	Ambiguity & interpretation	0.40	0.32	0.00	0.69
	(2)	Change	0.42	0.35	0.00	0.75
	(3)	Computation	0.42	0.31	0.00	0.69
	(4)	Detail	0.43	0.32	0.00	0.64
	(5)	Record keeping	0.47	0.32	0.00	0.86
(13)	(1)	Ambiguity & interpretation	0.46	0.31	0.15	0.80
	(2)	Change	0.43	0.32	0.08	0.83
	(3)	Computation	0.41	0.29	0.08	0.69
	(4)	Detail	0.45	0.26	0.15	0.68
	(5)	Record keeping	0.48	0.29	0.05	0.81
(14)	(1)	Ambiguity & interpretation	0.34	0.42	0.00	0.64
	(2)	Change	0.41	0.36	0.00	0.92
	(3)	Computation	0.37	0.32	0.00	0.64
	(4)	Detail	0.38	0.36	0.00	0.75
	(5)	Record keeping	0.40	0.38	0.00	0.75
(15)	(1)	Ambiguity & interpretation	0.63	0.29	0.00	0.90
	(2)	Change	0.57	0.35	0.00	0.92
	(3)	Computation	0.59	0.31	0.00	0.94
	(4)	Detail	0.59	0.33	0.00	0.92
	(5)	Record keeping	0.63	0.30	0.00	0.88



**Panel B: Drivers of tax framework complexity**

#	Dimension	#	Complexity driver	Mean	Var. coeff.	Min.	Max.
(1)	Tax guidance	(1)	Differences between GAAP and tax regulations	0.49	0.27	0.13	0.75
		(2)	Public binding rulings	0.22	0.96	0.00	0.80
		(3)	Private binding rulings	0.21	0.97	0.00	1.00
		(4)	Non-binding oral or written advice	0.17	0.98	0.00	0.63
		(5)	Substantial business issues/transactions	0.25	0.72	0.00	1.00
		(6)	International soft law	0.51	0.24	0.25	0.85
(2)	Tax law enactment	(1)	Defined enactment process	0.03	2.15	0.00	0.33
		(2)	Access to enacted tax legislation	0.11	1.36	0.00	0.67
		(3)	Influence of third parties	0.27	0.82	0.00	1.00
		(4)	Quality of tax legislation drafting	0.60	0.39	0.00	1.00
		(5)	Time at which legislation becomes effective	0.38	0.62	0.00	1.00
		(6)	Time between the announcement and enactment of tax changes	0.42	0.58	0.00	1.00
(3)	Tax filing and payments	(1)	Computing tax payments	0.25	0.86	0.00	0.75
		(2)	Determining due dates for tax payments	0.04	1.91	0.00	0.40
		(3)	Identifying the recipient(s) of tax payments	0.02	2.57	0.00	0.25
		(4)	Managing the number of tax payments during a year	0.16	1.14	0.00	0.71
		(5)	Refunding overpaid corporate income taxes	0.53	0.66	0.00	1.00
		(6)	(Electronic) remittance of tax payments	0.15	1.36	0.00	0.80
		(7)	Determining due dates for filing tax returns	0.05	1.73	0.00	0.50
		(8)	Identifying the recipient(s) of tax returns	0.03	2.51	0.00	0.43
		(9)	Managing the number of tax returns during a year	0.15	1.12	0.00	0.67
		(10)	Preparing tax returns	0.35	0.73	0.00	1.00
		(11)	(Electronic) transmission of tax returns	0.23	1.03	0.00	0.83
		(12)	Choice of tax year	0.30	1.23	0.00	1.00
		(13)	Consolidated tax returns	0.79	0.36	0.00	1.00
		(14)	Instructions for filing tax returns	0.11	1.30	0.00	0.75
(4)	Tax audits	(1)	Defined tax audit process	0.30	0.86	0.00	1.00
		(2)	Tax audit cycle	0.40	0.69	0.00	1.00
		(3)	Notification of the upcoming tax audit	0.25	0.98	0.00	1.00
		(4)	Disclosure of selection criteria for tax audit targets	0.51	0.50	0.00	1.00
		(5)	Communication of topics to be covered by the tax audit	0.36	0.64	0.00	1.00

	(6)	Number of years covered by an audit	0.44	0.47	0.00	1.00
	(7)	Decisions by tax officers	0.69	0.38	0.00	1.00
	(8)	Sanctions imposed in case of violations	0.15	1.10	0.00	0.67
	(9)	Experience or technical skill of tax officers	0.56	0.43	0.00	1.00
	(10)	Behavior by tax officers	0.32	0.83	0.00	1.00
	(11)	Statute of limitations	0.74	0.30	0.00	1.00
(5)	(1)	Defined appeal process	0.04	2.15	0.00	0.50
	(2)	Decisions at administrative appeal level	0.37	0.65	0.00	1.00
	(3)	Influence of third parties at administrative appeal level	0.09	1.62	0.00	0.75
	(4)	Agents/staff	0.25	0.83	0.00	1.00
	(5)	Time period between the filing of an appeal at administrative level and its resolution	0.33	0.76	0.00	1.00
	(6)	Decisions at judicial level	0.32	0.82	0.00	1.00
	(7)	Influence of third parties at judicial level	0.11	1.74	0.00	1.00
	(8)	Judges	0.36	0.69	0.00	1.00
	(9)	Time period between the filing of an appeal at judicial level and its resolution	0.53	0.45	0.00	1.00
	(10)	Public access to judicial decisions on tax appeals	0.14	1.29	0.00	0.67

## Appendix 6 – Descriptive statistics of country characteristics

### Panel A: Economic characteristics

Characteristic	n	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Ln Population	98	16.53	1.74	0.11	10.54	15.47	16.42	17.70	21.04
Ln GDP	95	25.78	1.80	0.07	22.26	24.57	25.87	26.88	30.46
Ln Foreign investments Development	90	22.26	1.94	0.09	16.16	20.88	21.98	23.56	26.90
Infrastructure	95	0.78	0.13	0.17	0.45	0.72	0.79	0.89	0.95
Inequality	97	22.89	16.64	0.73	0.08	8.55	18.74	37.53	60.27
	87	36.40	7.40	0.20	25.00	31.60	35.70	41.00	63.00

### Panel B: Political/legal characteristics

Characteristic	n	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Voice and accountability	98	0.25	0.96	3.82	-1.78	-0.47	0.42	1.08	1.58
Political stability	98	0.06	0.99	17.08	-2.79	-0.54	0.23	0.85	1.53
Government effectiveness	98	0.46	0.92	2.02	-1.82	-0.21	0.35	1.22	2.21
Regulatory quality	98	0.44	0.96	2.17	-2.00	-0.26	0.42	1.16	2.18
Rule of law	98	0.36	1.00	2.74	-2.18	-0.39	0.23	1.14	2.04
Control of corruption	98	0.28	1.06	3.75	-1.67	-0.53	0.04	1.14	2.30

### Panel C: Tax characteristics

Characteristic	n	Mean	Std. dev.	Var. coeff.	Min.	25%	50%	75%	Max.
Statutory tax rate	91	0.23	0.06	0.28	0.10	0.19	0.24	0.29	0.40
Effective average tax rate	45	0.22	0.06	0.27	0.08	0.18	0.22	0.26	0.35
Effective marginal tax rate	45	0.14	0.07	0.50	-0.09	0.09	0.14	0.19	0.48
Tax attractiveness	82	0.40	0.13	0.32	0.12	0.31	0.39	0.48	0.89
Tax competitiveness	33	60.76	13.72	0.23	31.90	51.00	60.30	68.80	100.00
Shadow economy	92	23.99	11.82	0.49	6.94	14.00	22.96	31.75	67.00

Notes: Variables are defined in Appendix 3, panel B

## Appendix 7 – Spearman correlations between tax complexity levels and other country characteristics

### Panel A: Economic country characteristics

Characteristic	Tax Complexity Index level	Tax code complexity level	Tax framework complexity level
Ln population	<b>0.49</b>	<b>0.58</b>	0.10
Ln GDP	<b>0.18</b>	<b>0.52</b>	<b>-0.28</b>
Ln foreign investments	0.13	<b>0.44</b>	<b>-0.30</b>
Development	<b>-0.33</b>	-0.02	<b>-0.50</b>
Infrastructure	<b>-0.33</b>	-0.10	<b>-0.39</b>
Inequality	0.05	-0.04	0.15

### Panel B: Political/legal country characteristics

Characteristic	Tax Complexity Index level	Tax code complexity level	Tax framework complexity level
Voice and accountability	<b>-0.26</b>	0.09	<b>-0.53</b>
Political stability	<b>-0.42</b>	-0.18	<b>-0.45</b>
Government effectiveness	<b>-0.37</b>	-0.03	<b>-0.58</b>
Regulatory quality	<b>-0.42</b>	-0.08	<b>-0.59</b>
Rule of law	<b>-0.38</b>	-0.04	<b>-0.59</b>
Control of corruption	<b>-0.39</b>	-0.07	<b>-0.55</b>

### Panel C: Other tax country characteristics

Characteristic	Tax Complexity Index level	Tax code complexity level	Tax framework complexity level
Statutory tax rate	<b>0.24</b>	<b>0.38</b>	0.00
Effective average tax rate	0.11	<b>0.43</b>	-0.13
Effective marginal tax rate	0.10	<b>0.32</b>	-0.10
Tax attractiveness	<b>-0.34</b>	<b>-0.21</b>	<b>-0.39</b>
Tax competitiveness	-0.20	<b>-0.39</b>	-0.01
Shadow economy	<b>0.21</b>	-0.11	<b>0.47</b>

Notes: Bold numbers denote statistically significant correlations ( $p < 0.1$ ). Variables are defined in Appendix 3, panel B.

## Appendix 8 – Correlations with extreme value exclusion

**Panel A:** Extreme value exclusion for economic characteristics

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Ln population	<b>0.47</b>	<b>0.49</b>	<b>0.51</b>	<b>0.57</b>	0.15	0.10
w/o lower 10%	<b>0.40</b>	<b>0.44</b>	<b>0.51</b>	<b>0.53</b>	0.03	0.05
w/o upper 10%	<b>0.44</b>	<b>0.45</b>	<b>0.44</b>	<b>0.49</b>	0.10	0.11
w/o lower and upper 10%	<b>0.36</b>	<b>0.40</b>	<b>0.45</b>	<b>0.45</b>	0.04	0.06
Ln GDP	<b>0.20</b>	<b>0.18</b>	<b>0.52</b>	<b>0.52</b>	<b>-0.31</b>	<b>-0.33</b>
w/o lower 10%	0.15	0.14	<b>0.49</b>	<b>0.48</b>	<b>-0.34</b>	<b>-0.34</b>
w/o upper 10%	0.17	0.15	<b>0.47</b>	<b>0.45</b>	<b>-0.30</b>	<b>-0.31</b>
w/o lower and upper 10%	0.11	0.11	<b>0.44</b>	<b>0.41</b>	<b>-0.34</b>	<b>-0.32</b>
Ln foreign investments	0.09	0.12	<b>0.40</b>	<b>0.44</b>	<b>-0.36</b>	<b>-0.34</b>
w/o lower 10%	0.07	0.13	<b>0.37</b>	<b>0.39</b>	<b>-0.36</b>	<b>-0.32</b>
w/o upper 10%	<b>0.20</b>	<b>0.24</b>	<b>0.49</b>	<b>0.54</b>	<b>-0.31</b>	<b>-0.29</b>
w/o lower and upper 10%	<b>0.22</b>	<b>0.26</b>	<b>0.50</b>	<b>0.50</b>	<b>-0.31</b>	<b>-0.26</b>
Development	<b>-0.25</b>	<b>-0.33</b>	0.02	-0.02	<b>-0.45</b>	<b>-0.54</b>
w/o lower 10%	<b>-0.30</b>	<b>-0.33</b>	-0.01	-0.04	<b>-0.50</b>	<b>-0.58</b>
w/o upper 10%	<b>-0.21</b>	<b>-0.28</b>	0.00	-0.03	<b>-0.38</b>	<b>-0.45</b>
w/o lower and upper 10%	<b>-0.26</b>	<b>-0.28</b>	-0.03	-0.05	<b>-0.43</b>	<b>-0.50</b>
Infrastructure	<b>-0.33</b>	<b>-0.35</b>	-0.08	-0.12	<b>-0.45</b>	<b>-0.42</b>
w/o lower 10%	<b>-0.30</b>	<b>-0.30</b>	-0.02	-0.06	<b>-0.47</b>	<b>-0.45</b>
w/o upper 10%	<b>-0.28</b>	<b>-0.30</b>	-0.06	-0.11	<b>-0.40</b>	<b>-0.35</b>
w/o lower and upper 10%	<b>-0.25</b>	<b>-0.25</b>	0.00	-0.04	<b>-0.43</b>	<b>-0.38</b>
Inequality	0.08	0.04	-0.03	-0.03	0.17	0.16
w/o lower 10%	0.13	0.12	-0.04	-0.05	<b>0.28</b>	<b>0.31</b>
w/o upper 10%	-0.05	-0.01	-0.12	-0.06	0.06	0.06
w/o lower and upper 10%	0.01	0.07	-0.15	-0.10	0.20	<b>0.22</b>

**Panel B:** Extreme value exclusion for political/legal characteristics

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Voice and accountability	<b>-0.22</b>	<b>-0.28</b>	0.10	0.08	<b>-0.50</b>	<b>-0.55</b>
w/o lower 10%	<b>-0.20</b>	<b>-0.24</b>	0.09	0.06	<b>-0.46</b>	<b>-0.52</b>
w/o upper 10%	-0.17	<b>-0.21</b>	0.10	0.10	<b>-0.44</b>	<b>-0.46</b>
w/o lower and upper 10%	-0.15	-0.17	0.08	0.08	<b>-0.38</b>	<b>-0.41</b>
Political stability	<b>-0.34</b>	<b>-0.43</b>	-0.15	<b>-0.18</b>	<b>-0.39</b>	<b>-0.49</b>
w/o lower 10%	<b>-0.41</b>	<b>-0.42</b>	<b>-0.20</b>	<b>-0.19</b>	<b>-0.46</b>	<b>-0.50</b>
w/o upper 10%	<b>-0.23</b>	<b>-0.32</b>	-0.08	-0.09	<b>-0.29</b>	<b>-0.38</b>
w/o lower and upper 10%	<b>-0.29</b>	<b>-0.29</b>	-0.12	-0.10	<b>-0.34</b>	<b>-0.39</b>
Government effectiveness	<b>-0.34</b>	<b>-0.38</b>	0.01	-0.02	<b>-0.60</b>	<b>-0.62</b>
w/o lower 10%	<b>-0.46</b>	<b>-0.44</b>	-0.10	-0.12	<b>-0.67</b>	<b>-0.68</b>
w/o upper 10%	<b>-0.26</b>	<b>-0.29</b>	0.04	0.01	<b>-0.52</b>	<b>-0.53</b>
w/o lower and upper 10%	<b>-0.39</b>	<b>-0.35</b>	-0.08	-0.09	<b>-0.60</b>	<b>-0.60</b>
Regulatory quality	<b>-0.38</b>	<b>-0.43</b>	-0.03	-0.07	<b>-0.61</b>	<b>-0.62</b>
w/o lower 10%	<b>-0.43</b>	<b>-0.45</b>	-0.10	-0.12	<b>-0.64</b>	<b>-0.67</b>
w/o upper 10%	<b>-0.33</b>	<b>-0.38</b>	-0.03	-0.07	<b>-0.54</b>	<b>-0.53</b>
w/o lower and upper 10%	<b>-0.39</b>	<b>-0.41</b>	-0.11	-0.12	<b>-0.57</b>	<b>-0.58</b>
Rule of law	<b>-0.36</b>	<b>-0.39</b>	0.00	-0.03	<b>-0.62</b>	<b>-0.63</b>
w/o lower 10%	<b>-0.42</b>	<b>-0.42</b>	-0.07	-0.07	<b>-0.66</b>	<b>-0.67</b>
w/o upper 10%	<b>-0.33</b>	<b>-0.34</b>	-0.03	-0.05	<b>-0.54</b>	<b>-0.54</b>
w/o lower and upper 10%	<b>-0.40</b>	<b>-0.38</b>	-0.11	-0.10	<b>-0.59</b>	<b>-0.59</b>
Control of corruption	<b>-0.36</b>	<b>-0.39</b>	-0.03	-0.06	<b>-0.58</b>	<b>-0.59</b>
w/o lower 10%	<b>-0.42</b>	<b>-0.43</b>	-0.09	-0.14	<b>-0.61</b>	<b>-0.63</b>
w/o upper 10%	<b>-0.29</b>	<b>-0.32</b>	-0.02	-0.03	<b>-0.49</b>	<b>-0.49</b>
w/o lower and upper 10%	<b>-0.35</b>	<b>-0.37</b>	-0.09	-0.13	<b>-0.52</b>	<b>-0.54</b>

**Panel C: Extreme value exclusion for tax characteristics**

Characteristic	Tax Complexity Index		Tax code complexity		Tax framework complexity	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Statutory tax rate	<b>0.24</b>	<b>0.20</b>	<b>0.35</b>	<b>0.36</b>	-0.01	-0.02
w/o lower 10%	0.16	0.13	<b>0.25</b>	<b>0.27</b>	-0.03	-0.02
w/o upper 10%	<b>0.22</b>	<b>0.19</b>	<b>0.32</b>	<b>0.32</b>	0.00	-0.01
w/o lower and upper 10%	0.14	0.10	<b>0.21</b>	<b>0.22</b>	-0.02	-0.01
Effective average tax rate	0.16	0.07	<b>0.35</b>	<b>0.39</b>	-0.13	-0.17
w/o lower 10%	0.03	-0.01	0.20	<b>0.28</b>	-0.16	-0.17
w/o upper 10%	0.05	-0.01	<b>0.27</b>	<b>0.28</b>	-0.22	-0.23
w/o lower and upper 10%	-0.14	-0.11	0.04	0.15	-0.27	-0.24
Effective marginal tax rate	-0.04	0.06	0.06	<b>0.30</b>	-0.12	-0.10
w/o lower 10%	-0.08	-0.01	-0.02	0.25	-0.10	-0.11
w/o upper 10%	0.10	0.12	<b>0.29</b>	<b>0.38</b>	-0.11	-0.08
w/o lower and upper 10%	0.13	0.05	<b>0.34</b>	<b>0.34</b>	-0.07	-0.10
Tax attractiveness	<b>-0.48</b>	<b>-0.37</b>	<b>-0.31</b>	<b>-0.24</b>	<b>-0.45</b>	<b>-0.41</b>
w/o lower 10%	<b>-0.46</b>	<b>-0.32</b>	<b>-0.32</b>	<b>-0.19</b>	<b>-0.41</b>	<b>-0.35</b>
w/o upper 10%	<b>-0.26</b>	<b>-0.20</b>	-0.12	-0.12	<b>-0.30</b>	<b>-0.28</b>
w/o lower and upper 10%	<b>-0.21</b>	-0.12	-0.10	-0.05	<b>-0.22</b>	-0.19
Tax competitiveness	<b>-0.30</b>	-0.18	<b>-0.45</b>	<b>-0.35</b>	0.06	0.07
w/o lower 10%	<b>-0.31</b>	-0.16	<b>-0.43</b>	-0.27	0.02	0.03
w/o upper 10%	-0.02	-0.08	-0.14	-0.24	0.12	0.08
w/o lower and upper 10%	0.04	-0.04	-0.01	-0.14	0.08	0.03
Shadow economy	<b>0.24</b>	<b>0.23</b>	-0.09	-0.09	<b>0.54</b>	<b>0.53</b>
w/o lower 10%	<b>0.23</b>	<b>0.21</b>	-0.07	-0.07	<b>0.51</b>	<b>0.49</b>
w/o upper 10%	<b>0.23</b>	<b>0.20</b>	-0.05	-0.04	<b>0.45</b>	<b>0.48</b>
w/o lower and upper 10%	<b>0.21</b>	0.18	-0.02	-0.02	<b>0.41</b>	<b>0.43</b>

Notes: Bold numbers denote statistically significant correlations ( $p < 0.1$ ). Variables are defined in Appendix 3, panel B.

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