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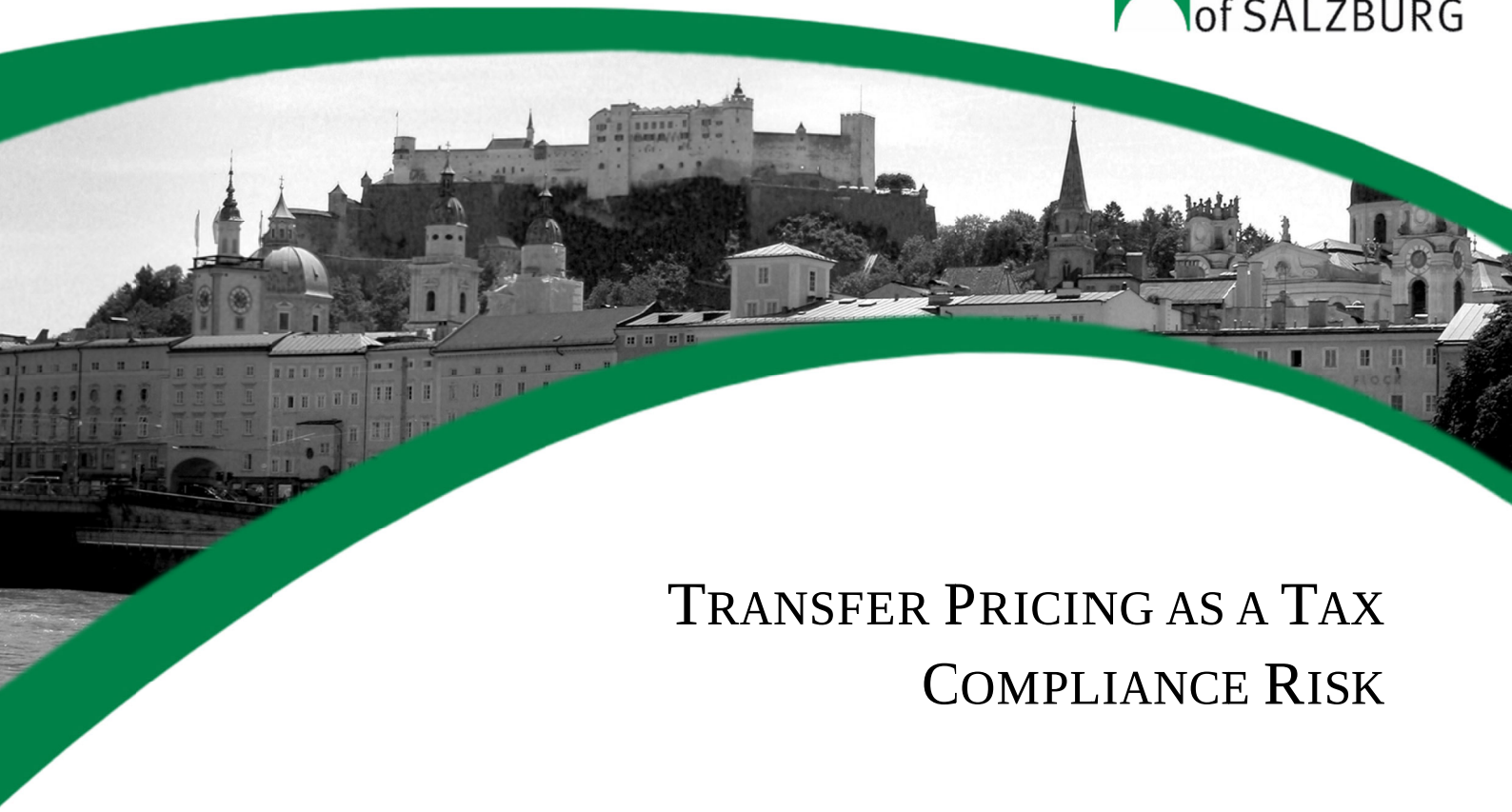

TRANSFER PRICING AS A TAX COMPLIANCE RISK

SVEN P. JOST, MICHAEL PFAFFERMAYR AND HANNES WINNER

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WORKING PAPERS IN ECONOMICS AND FINANCE

Transfer Pricing as a Tax Compliance Risk

Sven P. Jost*, Michael Pfaffermayr† and Hannes Winner‡

February 2010

Abstract

This paper contributes to the empirical literature on the transfer pricing behavior of multinational firms. Previous research mainly focuses on transfer pricing as a means of tax optimization. Our approach concentrates on transfer pricing as a critical compliance issue. Specifically, we investigate whether and to what extent the awareness of transfer pricing as a tax compliance issue responds to country and industry characteristics as well as firm-specifics. Empirically, the transfer pricing risk awareness is measured as a professional assessment reported by the person with ultimate responsibility for transfer pricing in their company. Based on a unique global survey conducted by a Big 4 accounting firm in 2007 and 2008, we estimate the number of firms reporting transfer pricing being the largest risk issue with regard to subsequent tax payments. We find that transfer pricing risk awareness depends on variables accounting for general tax and transfer pricing specific strategies, the types and characteristics of intercompany transactions the multinational firms are involved in, their individual transfer pricing compliance efforts and resources dedicated to transfer pricing matters.

Keywords: Transfer pricing; International taxation; Multinational firms; Tax risk management

JEL codes: F23; H25

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1 Introduction

This paper analyzes the role of country-, industry- and firm-specific determinants on the transfer pricing risk awareness of multinational enterprises (MNEs) around the world. The existing literature mainly focuses on the effects of tax differentials and tax competition on the transfer pricing behavior of MNEs (i.e., MNEs shift income from high tax countries to affiliates located in low tax countries). By way of contrast, we ask whether and to what extent common tax considerations (e.g., experience from previous tax audits) and transfer pricing specific determinants are associated with a higher number of MNEs reporting a high transfer pricing risk perception. Hence, our approach predominantly focuses on transfer pricing as a critical compliance issue rather than a means of tax optimization.

We implement a unique set of explanatory variables, in particular (i) variables accounting for general tax and transfer pricing specific strategies, (ii) the types and characteristics of intercompany transactions the MNEs are involved in, and (iii) the individual transfer pricing compliance efforts and resources dedicated to transfer pricing matters within the MNEs. Our dependent variable – the number of MNEs in a given country and industry that report transfer pricing to be the largest risk issue – is derived from a categorical survey variable varying from the "largest risk issue" over "a risk issue but not the largest" to "not a risk issue at all". Empirically, we rely on a unique cross-sectional survey of more than 350 MNEs around the world performed by a Big 4 accounting firm, in which the person with ultimate responsibility for transfer pricing matters was interviewed (i.e., in most cases, the Chief Financial Officer or tax director). The reported transfer pricing risk awareness is a subjective, professional assessment of a key person in each firm. Together with information on the transfer pricing behavior of each MNE, we are able to provide new insights to the transfer pricing compliance practice of MNEs.

Our empirical findings suggest that the number of MNEs in a country and industry considering transfer pricing the largest risk issue is positively related to a lion's share of transfer pricing specific determinants, such as the materiality of intangible goods transactions and the compliance approach. Further, we observe that the set of variables used to account for common tax considerations, and in particular previous tax audit experience, do also significantly affect the perception of transfer pricing as a corporate risk issue. This, in turn, suggests that compliance considerations – apart from tax optimization strategies – should be accounted for not only in empirical work but also in theoretical transfer pricing models.

The paper is organized in the following way. In Section 2, we briefly review the related literature. Section 3 explains the technique for estimating the expected number of MNEs reporting a high transfer pricing risk awareness in an industry in a given country. It further summarizes the data and discusses the variables used in the empirical model. In Section 4, we present and discuss the empirical findings. Section 5 concludes.

2 Literature review

Previous research on transfer pricing can be broadly divided into two strands of literature: The first one is primarily concerned with optimal firm strategies given different tax rates, whereas the second one focuses on government response on transfer pricing and the corresponding welfare effects. Compared to optimal government policies that are usually analyzed theoretically, optimal firm strategies are frequently corroborated by empirical evidence. Kant (1990), for example, derived a framework in which a model MNE underinvoices (overinvoices) its intrafirm exports (imports) responding to tax rate differentials. More recently, Haufler and Schjelderup (2000) analyzed optimal taxation of corporate profits and found that it would be optimal for each government to distort investment decisions of MNEs to reduce tax rates and limit the incentive for profit shifting. Likewise, Raimondos-Møller and Scharf (2002) showed that a non-cooperative equilibrium is characterized by above-optimal levels of effective tax rates if governments use transfer pricing rules strategically. However, the lion's share of publications has been devoted to optimal firm strategies and the question whether evidence could be found that support income shifting behavior from high tax to low tax countries as suggested by game theory (see Hines 1997 and Devereux 2007 for comprehensive surveys). Horst (1971) provided a simple model which has since been frequently used as a theoretical background in empirical studies. The response variables used in the existing literature are generally proxies of actual transfer prices, such as reported profits of an MNE in high and low tax countries (see, for example, Grubert and Mutti 1991), tax liability as a fraction of sales or assets in a high tax country (see, for example, Harris, Morck and Slemrod 1993), or foreign direct investments (FDI) of MNEs in high and low tax countries (see, for example, Hines and Rice 1994). All these authors found evidence that MNEs use transfer prices as a means of profit maximization. Likewise, studies on the location of FDI come to the conclusion that companies from high tax countries locate a sizable fraction of their foreign activity in tax havens. Clausing (2009) provides a comprehensive survey on different types of international tax

avoidance of U.S. MNEs. Besides analyzing the relationship between U.S. affiliate profit rates and foreign country tax rates – a common approach – she also investigates the effects of taxes on U.S. MNEs' real operations across countries.

One common characteristic of previous research is the use of publicly available data that allows for testing indirectly the importance of transfer pricing.[1] However, using aggregate data and disregarding micro-level control variables raises unavoidable problems. Most obviously, it is generally not possible to estimate the firm-specific factors that determine the transfer pricing behavior of individual MNEs (e.g., income underreporting, transfer pricing method selection, transfer pricing risk management). Given the fundamentally non-transparent nature of transfer pricing, more disaggregated data seems to be indispensable. Moreover, it is also ignored that, according to the OECD Transfer Pricing Guidelines (see OECD 1999), transfer prices cannot be set equal to the marginal cost of production, but must be set according to the functions performed, risks borne and assets employed by the transaction parties.[2] To the best of our knowledge, however, there are no reliable sources of information about transfer prices on a firm level and, most obviously, taxpayers are generally very reluctant to publish sensitive data about their transfer pricing behavior as tax authorities have become more aggressive and public skepticism about transfer pricing as a means of income tax manipulation is prevalent.[3]

This paper contributes to the existing research on the transfer pricing behavior of MNEs in two ways: First and foremost, it provides new insights to the drivers of transfer pricing as a tax compliance issue looking at the risk sensitivity of different industries across a large number of developed countries. Thereby, the paper relies upon unique survey which contains in-depth data

[1] There are only very few exceptions, such as Clausing (2003) and Bernard, Jensen and Schott (2006) that draw conclusions from actual intercompany prices. The latter state that "*... existing empirical studies generally rely upon indirect evidence or responses in a narrowly defined industry*" or geographic area. Due to data availability, a large share of the existing research geographically restricts the analysis of transfer pricing matters to North America. There are a few exceptions, such as Oyelere and Emmanuel (1998), Huizinga and Laeven (2008), and Egger, Eggert and Winner (2010) who focus on European data.

[2] The OECD (1999) encourages all member countries to follow its transfer pricing guidelines in their domestic tax practices and taxpayers are encouraged to follow these guidelines in evaluating for tax purposes whether their transfer pricing complies with the arm's length principle. Since the first published version of 1995, a vast majority of all member states has incorporated into law the fundamental aspects of the OECD Transfer Pricing Guidelines.

[3] The far-reaching international tax proposals unveiled by the Obama administration May 4, 2009 carry broad implications for MNEs, not only in the significant limits they would place on income deferral but in major changes to the foreign tax credit and new restrictions on the use of disregarded entities, practitioners told the Bureau of National Affairs. More specifically, the May 4 document reads that they will "eliminate loopholes for disappearing offshore subsidiaries and crack down on foreign tax havens".

on numerous transfer pricing aspects obtained from MNEs around the world. Second, given that our results are based on a professional judgment by a key tax person in each MNE, we address both tax authorities and MNEs. Tax professionals as well as tax authorities have observed that the complexity of new regulations is increasing steadily and, likewise, are the intercompany transactions taking place within an MNE. This being said, there needs to be a mutual understanding what the key drivers are behind transfer pricing (risk) management to efficiently manage the transfer pricing compliance burden.

3 Empirical framework and data

3.1 Econometric specification

Our aim is to estimate the main factors behind the perceived risk of transfer pricing as a compliance issue of MNEs. For this purpose, let us discuss the nature of our response variable in a first step, which is derived from a categorical variable restricted to three levels. The person with ultimate responsibility for transfer pricing in an MNE was asked to evaluate the following question:

> *To what extent do you consider transfer pricing a risk issue with regard to severe subsequent tax payments and penalties?*

Respondents could choose from (i) the largest risk issue, (ii) a risk issue but not the largest, and (iii) not a risk issue. To preserve confidentiality, firm-level data was aggregated; i.e., records were summed for each country and industry combination in which MNEs operate; overall, twelve industry classifications were incorporated. Hence, the observational unit of our study is the country and industry dimension. For the purpose of this analysis and to limit the loss of valuable information, the dependent variable is defined as the number of MNEs in a specific country and industry that reported transfer pricing to be the largest risk issue in the aforementioned survey question.

Given the nature and distribution of the dependent variable, we use a count data model to estimate the relationship between the response variable and the set of explanatory variables. For variables with low expected counts (in absolute terms) as in our case, this is regularly more suitable than using a standard regression model. As we do not find strong evidence for overdispersion (see summary statistics in Table 2 and the test statistics reported in Table 3) and the Vuong test rejects the existence of zero inflation, we fit a non-inflated Poisson count data model. Hence, let the number of tax directors considering transfer pricing the largest risk issue within their group be represented by μ_{ij} for each observed combination of country i and industry j which

is generated under a Poisson regression model. Thereby, each observation, i.e., the MNEs in each country and industry, is allowed to have a different value of μ. Our basic specification reads as

$$Pr\left(y_{ij} \mid \mu\right) = \frac{e^{-\mu_{ij}} \mu_{ij}^{y_{ij}}}{y_{ij}!} \qquad \text{for} \quad y = 0, 1, 2, ... \tag{1}$$
$$\text{with} \quad \mu_{ij} = E\left(y_{ij} \mid \mathbf{x}\right) = \exp\left(\mathbf{x}_i \beta_1 + \mathbf{x}_{ij} \beta_2\right).$$

y_{ij} defines the outcome variable; $\mathbf{x}_i$ is a column vector of country-specific explanatory variables; $\mathbf{x}_{ij}$ is a vector of country-industry-specific regressors such as transfer pricing specific determinants obtained from the survey. β_1 and β_2 represent vectors of structural parameters.

In our specification, we include country- and industry-specific control variables that are mainly motivated by the existing literature on transfer pricing (also see Table 2 below and Table A.2 in the Appendix for summary statistics and the definition of all variables, respectively). As mentioned above, it is often believed that MNEs manipulate transfer prices such that income is taxed in low tax countries.[4] Therefore, we include the statutory corporate tax rate of the parent country. Further, we include additional information on the existence of country-specific statutory transfer pricing regulations along with penalty regimes and the time of introduction of domestic transfer pricing regulations. We will take these two factors into consideration as we believe that an MNE will most likely align its transfer pricing practice to the nature of domestic regulations and the behavior of domestic tax authorities. The remaining set of explanatory variables is derived from the survey of MNEs around the world (also see Section 3.2 for more information) and can be broadly divided into three sets of regressors. The first set controls for drivers of general tax considerations of MNEs. These strategic components are likely to provide general insights into a company's tax focus areas given its previous experience and future expectations. The second set concerns decisive information about the materiality and nature of intercompany transactions. More specifically, intangible transactions are relatively complex in terms of transfer pricing. Therefore, traditional transfer pricing methods (i.e., the comparable uncon-

[4] There is no reliable source of firm-specific data on actual transfer prices and transfer pricing behavior such as the number of transfer pricing adjustments per year. The data and model specifications used in the existing literature on transfer pricing thus only allow for implicit conclusions on the link between income shifting behavior and transfer prices. Harris, Morck and Slemrod (1993), for example, find that U.S. tax liability is related to the location of foreign subsidiaries suggesting that income is shifted by means of manipulation of transfer prices. Similar implicit conclusions are drawn by Grubert and Mutti (1991) and Huizinga and Laeven (2008).

trolled price method, the resale price method and the cost plus method) can usually not be applied and tax authorities are particularly skeptical about whether and to what extent intangible transactions comply with the arm's length principle. The third set of independent variables controls for transfer pricing compliance practices and resource allocation.

3.2 Data and descriptive statistics

In total, more than 350 MNEs (parent companies) in 24 markets (countries) across twelve different industries have been surveyed in Ernst & Young's Global Transfer Pricing Survey 2007-2008 (henceforth "the Survey"). The design of the Survey has been developed by Ernst & Young's transfer pricing professionals. The Survey has been conducted by telephone interview. Interviews were carried out with the person with ultimate responsibility for tax policy and strategy in each MNE (Ernst & Young 2008).

Table 1: Descriptive statistics

Total no. of firms surveyed	368
Total no. of countries	24
Total no. of industries	12
Total no. of observations	137
Average no. of industries per country	6
Average no. of MNEs per industry	31
Most diverse country	United States (10)
Least diverse country	China (1), New Zealand (1)
Most represented industry	Consumer products (23)
Least represented industry	Asset management (3)

Note: Table 1 shows some basic descriptives of our data set. Reference is also made to Table A.1 in the Appendix which shows the twelve subordinate parent industries that were collapsed to five distinct industry classifications.

Table 1 provides the basic descriptives of the data set. Overall, our sample originally included 368 firms that reported their individual transfer pricing risk awareness. However, to preserve confidentiality, we had to aggregate firm-level information such that the final data set was based on a country and industry dimension. So, the data set could have potentially had 288 observations (i.e., 24 countries and 12 industries). Due to missing observations in the explanatory variables and the fact that respondents were not operating in all possible countries and industries, we use 137 observations in our basic model specification. With regard to the distribution of firms, almost all industries are represented once in the United States. By contrast, firms from only one industry are observed in China and New Zealand. Consumer products firms

are the most important group in our data set, asset management companies are only present in three countries. We will have to account for this pattern of unbalanced distribution in our empirical model (see below).

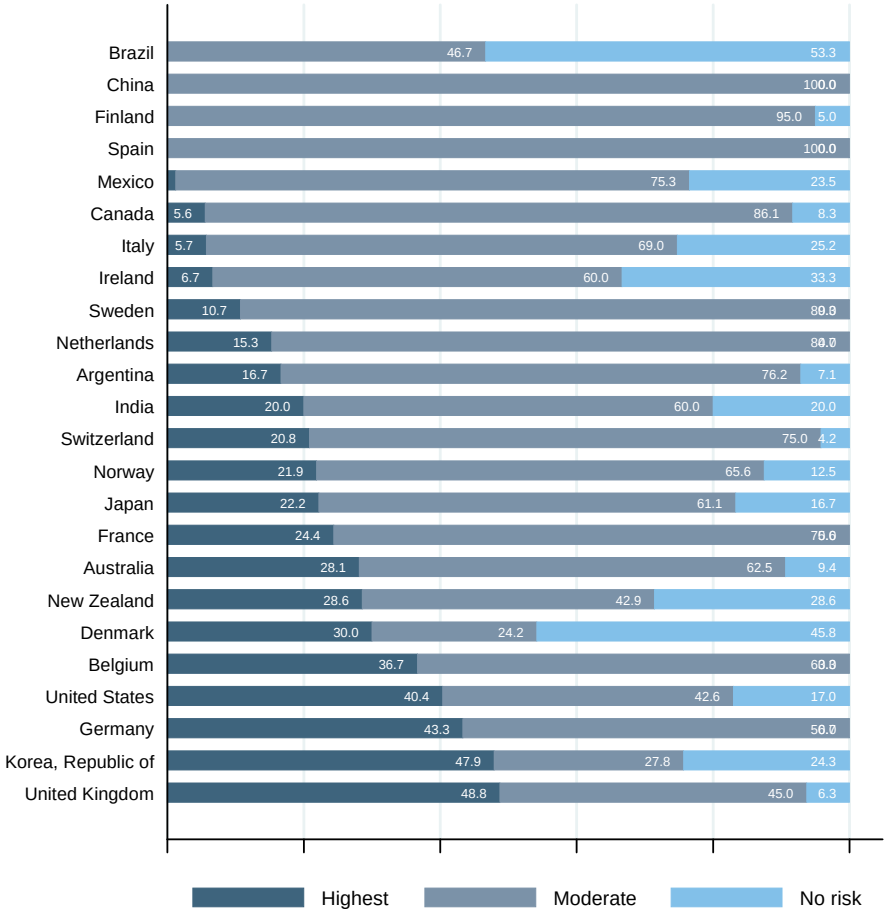

Figure 1: Perceived risk awareness by parent country

Figure 1 illustrates the transfer pricing risk awareness by parent country. As can be seen, the difference in reported risk perception could hardly be starker. Interestingly, it is the Anglo-Saxon countries, like Australia, New Zealand, the United Kingdom and the United States that are particularly aware of transfer pricing as a risky compliance issue; almost half of all parent companies located in the United Kingdom consider transfer pricing to be the largest risk issue within their group. From a macro-level perspective, a potential reason might be the relatively early incorporation of transfer pricing regulations into law in these countries; Australia and the United States were

the two first countries that issued detailed transfer pricing legislation. Consequently, one might expect that MNEs located in these countries as well as tax authorities are relatively experienced with transfer pricing issues (see Table A.1 in the Appendix). Tax aspects, albeit less dominant from a compliance perspective, might also play a role as it is particularly high tax countries that are seated in the top group (e.g., Germany and the United States). On the other end of the table, non-OECD countries like Brazil prevail, with no firms perceiving transfer pricing as the largest corporate risk issue. Similarly, albeit not very well represented, China is also located at the lower end of the table. One of the pioneer countries, China incorporated transfer pricing regulations into law in 1991. However, as a developing country, the transfer pricing system in China is still in an elementary stage and has many problems, such as the lack of well-trained transfer pricing expertise and the shortage of experience in handling sophisticated transfer pricing investigations. This particularly applies to Chinese tax authorities who audit only a small proportion of MNEs per year.

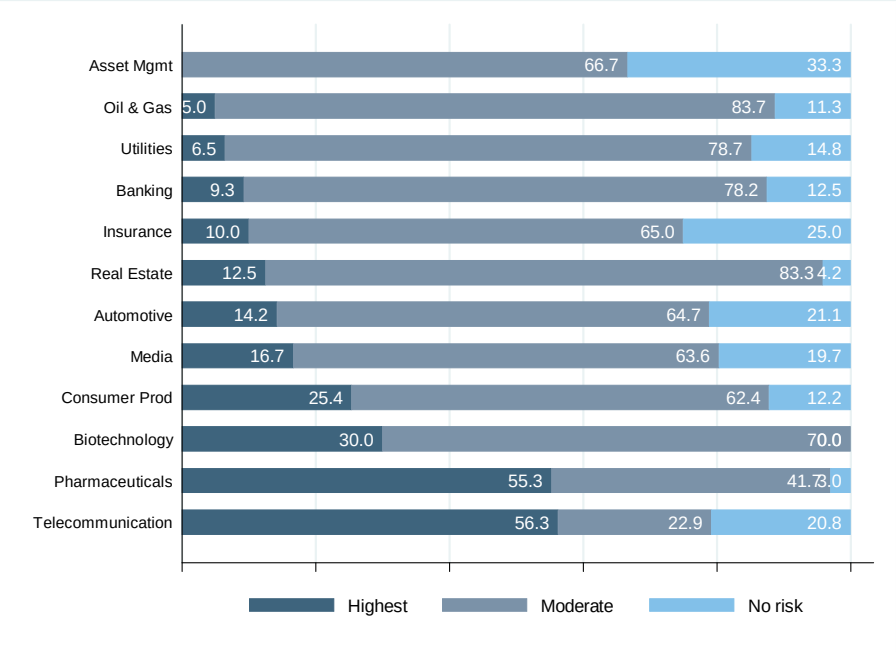

Figure 2: Perceived risk awareness by parent industry classification

Likewise, the transfer pricing risk awareness differs significantly among industries (see Figure 2). MNEs operating in the pharmaceutical and telecommunications industries seem particularly exposed to and aware of transfer pricing risks. One reason might lie in the unprecedented GlaxoSmithKline

case, in which the Internal Revenue Service (IRS) in the United States imposed a penalty of USD 3.2bn to the pharmaceutical giant due to allegedly willful manipulation of transfer prices. In complying with transfer pricing regulations, MNEs operating in the telecommunication business face the problem of documenting intercompany service transactions, which are often a nuisance and particularly difficult to document as the costs and benefits have to be adequately allocated between a service provider and a service receiver within the group. Further, the allocation of research and development expenses (also relevant to pharmaceutical companies) also poses a great challenge to these companies. At the other end of the table, you find financial services companies (although this classification does not cover banks). Having just become "popular" to tax authorities, financial services transfer pricing requires an in-depth knowledge of transfer pricing techniques, let alone the comprehensive understanding of the non-transparent cash flows within asset management companies. Although not negligible in total, there are issues other than transfer pricing that pose a more imminent thread to financial service companies.

Table 2: Summary statistics

Variable	**Mean**	**Std.Dev.**	**Min.**	**Max.**
Dependent variable(s)				
TP risk awareness (rel.)	0.212	0.340	0	1
TP risk awareness (abs.)	0.628	1.163	0	8
Country parameters				
Pioneer country [D]	0.372	0.485	0	1
Stat. tax rate	0.313	0.056	0.125	0.407
Survey parameters				
Tax audit performed	0.434	0.426	0	1
Mgmt. responsibility	0.458	0.436	0	1
T/N subject to customs	0.469	0.423	0	1
Reliance on audit firm	0.928	0.193	0	1
Resources increased	0.655	0.386	0	1
Intangible T/N	0.758	0.227	0	1
Documentation prepared	0.909	0.244	0	1
IC agreements in place	0.692	0.374	0	1
Observations	137			

Note: Table 2 provides the summary statistics of all relevant variables used in the final model. All survey parameters are expressed as shares. Variables are defined as in Table A.2. [D] indicates a dummy variable, "IC" means intercompany, "TP" stands for transfer pricing and "T/N" stands for transaction.

Let us briefly turn our attention to the summary statistics reported in Table 2. On average, we observe about one MNE per country and industry that considers transfer pricing the largest risk issue in our sample, corresponding to

slightly more than 21 percent.[5] This share increases to 22.1 percent considering the 51 observations that are located in pioneer countries (these values are not reported in Table 2). On the contrary, the average transfer pricing risk awareness decreases to 20.6 percent considering the firms located in countries that are not among the first ones incorporating transfer pricing regulations into law.[6] We can see that the average statutory corporate tax rate in our sample is 31.3 percent, with 18.3 percent of the respondents located in a low tax country and 21.9 percent located in a high tax country.[7] It is also worth mentioning that approximately 60 percent of all MNEs are located in high risk countries, which are characterized by statutory transfer pricing documentation requirements and stringent penalty regimes in case of non-compliance with domestic transfer pricing rules.

With respect to the set of explanatory variables derived from the Survey of MNEs, we find that, on average, 43.4 percent of MNEs have undergone a transfer pricing audit in the last years. The share of MNEs preparing a transfer pricing documentation is fairly high (i.e., above 90 percent); however, this number includes MNEs that prepared a documentation on an as-necessary basis with limited or no coordination between affiliated companies. At the same time, a relatively high share of MNEs supplements their transfer pricing documentation with legally binding intercompany agreements that rule the terms and conditions of intercompany transactions. It is also striking that almost half of all observations report that the Chief Financial Officer (CFO) or the audit committee is ultimately responsible for transfer pricing within their group which underlines the practical importance of this tax issue. It is rather not surprising that about two thirds of MNEs have increased resources devoted to transfer pricing over the last years. Reference is made to Table A.2 in the Appendix which provides the definition of all variables. Table A.3 in the Appendix reports the correlation matrix.

[5] The difference between the mean and the variance of our dependent variable is also relatively low; the variance, 1.35, is just twice as large as the mean. The overall distribution of our dependent variable is not displaying signs of over-dispersion, that is, we do not observe a significantly greater variance than might be expected from a Poisson distribution (also see Figure A.1 in the Appendix). Furthermore, we also observe very large standard errors on the coefficients in the inflation equation which further implies a definite lack of fit in a zero-inflated model.

[6] "Pioneer" countries are among the top ten countries worldwide introducing statutory transfer pricing regulations. Compared to all other countries, pioneer countries are believed to be relatively experienced in transfer pricing matters and their tax authorities are believed to follow a rather sophisticated approach in challenging a tax payer's transfer pricing system.

[7] We defined low tax countries as countries with a corporate tax rate lower than the first quartile of tax rates of the full sample. High tax countries are defined analogously.

4 Estimation results on the determinants of transfer pricing risk awareness

This section connects the empirical findings of the existing literature to common transfer pricing practices of MNEs around the world using the aforementioned characteristics and determinants obtained from the Survey. Table 3 presents the empirical results of our count data model. Our dependent variable is defined as the number of MNEs in a given country and industry cell reporting transfer pricing as the largest risk issue. All three models include eleven industry dummies based on the parent industry classification. The first column presents the basic model specification which contains two country-specific parameters as well as a set of transfer pricing specific determinants obtained from the Survey. It also includes the statutory corporate tax rate to account for larger tax compliance risks in high tax countries. In the second specification, we add two interaction effects between the share of MNEs with previous tax audit experience and (i) the statutory corporate tax rate and (ii) management responsibility for transfer pricing matters. This specification tests whether the impact of previous audit experiences depends on the tax levels and the management responsibilities in the respective country. The difference between columns two and three simply lies in the exclusion of all non-significant explanatory variables to obtain a parsimonious model (with a significance level of less than ten percent).

In all specifications, we report both the results of robust (see White 1980) and clustered standard errors. This allows us to investigate whether the level of aggregation gives rise to the presence of country-wise clustered errors, which are typically present in studies in which observations are randomly sampled but the explanatory variables are measured at a different aggregate level than the dependent variable. More specifically, our data may induce clustering of errors at the country level; that is, the aggregated firms in our industries are correlated in some unknown way within countries, but different countries do not have correlated errors. From Table 1 we know that the respondents/firms are not equally distributed across countries and industries. We accounted for this difference in representativeness such that we include the number of firms in a country and industry cell in our model. This ensures that our results and, hence, the coefficients of the explanatory variables are not driven solely by countries with a high number of observations (e.g., the United States).

In general, the model seems well specified. The control variables have the expected sign, the industry effects are significant, and the pseudo-R^2 is

Table 3: Poisson regression output

	(1)	(2)	(3)
Country parameters			
Pioneer country [D]	0.456	0.547	0.383
	(0.244)*	(0.270)**	(0.215)*
	[0.170]***	[0.221]**	[0.150]**
Stat. tax rate [1]	−1.294	2.041	
	(1.702)	(3.659)	
	[1.235]	[3.651]	
Survey parameters			
Tax audit performed [2]	0.930	3.125	1.320
	(0.316)***	(1.665)*	(0.484)***
	[0.353]***	[1.976]	[0.586]**
Mgmt. responsibility [3]	0.302	1.003	0.972
	(0.219)	(0.510)**	(0.501)*
	[0.207]	[0.572]*	[0.519]*
[1] × [2]		−5.216	
		(4.498)	
		[5.051]	
[2] × [3]		−1.031	−0.889
		(0.583)*	(0.580)
		[0.699]	[0.626]
T/N subject to customs	1.035	1.098	1.067
	(0.375)***	(0.381)***	(0.378)***
	[0.351]***	[0.340]***	[0.351]***
Reliance on audit firm	−0.996	−0.949	−1.116
	(0.414)**	(0.420)**	(0.439)**
	[0.368]***	[0.368]***	[0.379]***
Resources increased	1.038	1.005	0.919
	(0.403)***	(0.395)**	(0.392)**
	[0.378]***	[0.382]***	[0.387]**
Intangible T/N	1.252	1.562	1.244
	(0.746)*	(0.763)**	(0.684)*
	[0.804]	[0.805]*	[0.787]
Documentation prepared	−0.587	−0.539	
	(0.494)	(0.468)	
	[0.640]	[0.568]	
IC agreements in place	−0.794	−0.804	−0.740
	(0.380)**	(0.369)**	(0.325)**
	[0.341]**	[0.336]**	[0.311]**
Number of firms (Log)	1.104	1.072	1.040
	(0.157)***	(0.147)***	(0.148)***
	[0.137]***	[0.134]***	[0.135]***
Observations	137	137	137
Industry effects (F-statistic)	15.154***	30.283***	15.041***
Vuong test (Z-statistic)	0.82	0.39	0.74
McFadden's R^2	0.398	0.404	0.400
AIC	229.401	231.714	227.001
BIC	276.121	284.273	270.801

Note: Table 3 provides the results from the Poisson regression model. All variables defined as in Table A.2. [D] indicates a dummy variable. "IC" stands for inter-company, "TP" stands for transfer pricing and "T/N" means transaction. White (1980) robust standard errors are in parentheses, country clustered standard errors in brackets. *, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

relatively high.[8] As mentioned earlier, the summary statistics of the left hand side does not show any signs of overdispersion or excess zeros. This is also confirmed by the insignificant Vuong (1989) test statistic as well as a graphical comparison between observed and predicted counts as illustrated in Figure A.1 in the Appendix. Within the realm of transfer pricing, there are almost exclusively structural reasons for firms to assess their transfer pricing practice as highly risky, and there is no reasonable indication that reporting transfer pricing as a high risk is a matter of chance. Hence, there is no basis for a zero-inflated model.

We find that the time of introduction of transfer pricing regulations matters, i.e., the pioneer country variable is significant at least at the ten percent level. As mentioned before, this result is quite intuitive and less surprising from a practitioner's point of view: Relatively speaking, both MNEs and tax authorities in pioneer countries tend to be relatively experienced in transfer pricing matters and statutory transfer pricing documentation requirements have developed into detailed guidelines for MNEs in these countries (the first country that established statutory transfer pricing regulations was the United States in 1994, also see Table A.1 in the Appendix for the time of introduction of transfer pricing regulation per country). Further, transfer pricing audits might have also become more sophisticated and MNEs have become relatively experienced in preparing their annual transfer pricing compliance work.

The significance of industry fixed effects tells us that the awareness of transfer pricing as the largest corporate risk issue differs across industries. For pharmaceutical companies this might be quite obvious as GlaxoSmithKline was involved in an unprecedented tax dispute with the IRS, which might have sustainably affected the tax authorities' attention toward intercompany transactions involving research and development activities and intangibles as such. Our results also indicate a non-significant coefficient for the statutory corporate tax rate. Against the background of the existing research on transfer pricing, this results may seem intriguing at first sight. However, there is a reasonable explanation of this finding: The left hand side is a subjective variable highly correlated with perceptions. As such, it primarily reflects the CFO's previous experiences as the ultimate person responsible for transfer pricing issues as well as their expectation in the future. Hence, resources and compliance efforts will most likely be allocated to countries with high risk exposure, irrelevant of the corporate tax rate (i.e., tax minimization aspects are less important from a compliance perspective).

[8] Several pseudo-R^2 for count models have been defined by analogy to the R^2 in the linear regression model. We only report McFadden's pseudo-R^2 (see, for example, Long 1997).

Regarding our variables of interest, we find evidence that most of the transfer pricing specific determinants derived from the Survey significantly affect the risk awareness of MNEs. First and foremost, we find that previous transfer pricing audit experience increases the number of MNEs perceiving transfer pricing as the largest risk issue. MNEs seem learn from their previous experience with competent authorities (and vice versa).[9] Relative to the other coefficients, this effect also proves to be among the strongest (also see Table 4 below for a discussion of marginal effects). We also observe that the share of MNEs with management responsibility for transfer pricing matters positively affects the transfer pricing risk awareness in a given country and industry. The two interaction terms between the tax audit experience and the statutory corporate tax rate and management responsibility show negative coefficients. That is, if the share of MNEs with previous tax audit experience increases, it has a strong positive effect on the number of firms in a country and industry perceiving transfer pricing as the largest risk issue, which is, however, reduced with an increasing number of firms with management responsibility for transfer pricing issues (or with an increasing statutory corporate tax rate).[10] With only one exception for the second interaction effect, however, the coefficients are insignificant.

Interestingly, the reliance on their auditor for transfer pricing advice negatively affects the transfer pricing risk sensitivity. This might have two explanations: First, a Channel 1 firm (i.e., an MNE that is both audited and provided tax advice by the same auditing company) will most likely not receive different opinions on the appropriateness of their internal pricing system from their audit team and their counterparts at the consulting arm of an auditor. Hence, if the same company audits a company's books that has provided advice in the management of transfer prices, the risk awareness is reported significantly lower.[11] Second, a Channel 2 firm (i.e., an MNE that is provided advice in other fields than transfer pricing by an auditing company, but not audited by

[9] This results may also be seen in line with the existing literature on audit selection; see, for example, Erard and Feinstein (1994).

[10] One potential explanation is that firms with previous tax audit experiences and management responsibility have already reacted to previous findings for the CFO has taken over responsibility, thereby reducing their risk exposure. From another perspective, in the case of an increasing share of firms with management responsibility, the positive effect of previous tax audit experience is almost canceled out by the interaction term. That is, if management has taken over the ultimate responsibility for transfer pricing, a previous tax audit experience does not seem to play a role in the awareness of transfer pricing as the largest risk issue.

[11] In general, independence clauses and national regulations do not allow for providing both auditing and audit related consulting services in most countries. However, general transfer pricing advice, as long as not binding and interfering, is permitted under certain circumstances.

this company) might be trusting in a long-term relationship with its auditor, who may have been providing audit related consulting services in the past. It is also less surprising to see the significant positive effect of an increase in resources devoted to transfer pricing matters affect the risk awareness. This might indicate that the compliance efforts dedicated to transfer pricing matters in the past proved to be insufficient. As could have been expected, we further find that the share of MNEs reporting material intangible goods transactions significantly increases the number of MNEs considering transfer pricing the largest risk issue in a given country and industry. Intercompany transactions involving intangible goods, such as royalties for the licensing of brands or service payments for the provision of cash pooling services, are particularly difficult to price (i.e., the application of standard transfer pricing methods is hardly possible) and regularly trigger a tax authority's scrutiny.

The last two variables of interest are the share of MNEs preparing a transfer pricing documentation and the share of MNEs that cover their intercompany transactions with intercompany agreements. Both variables concern a company's attempt to comply with local transfer pricing regulations and we expect at least one of them to significantly affect the number of MNEs considering transfer pricing a high risk. The former variable is insignificant throughout all specifications. The latter, however, enters our model significantly at a level of five percent. This might suggest that the implementation of intercompany agreements (i.e., a legally binding document) is more relevant than the mere preparation of a transfer pricing documentation. By nature, a transfer pricing documentation is prepared ex-post and, hence, does relatively little in explaining a company's effort to comply with the arm's length principle – compared to a binding group-wide transfer pricing guideline or the conclusion of intercompany agreements that both rule the terms and conditions applied to intercompany transactions ex-ante. Nevertheless, the significance of the variable capturing the share of MNEs that have implemented intercompany agreements suggests that such compliance efforts taken by an MNE significantly reduces the number of MNEs considering transfer pricing the largest risk issue.

Finally, Table 4 reports the corresponding marginal effects of the tax considerations and the other survey parameters for the three models presented in Table 3. Except for the two variables controlling for previous tax audit experience and management responsibility the size of the marginal effects are relatively stable throughout the different model specifications.[12] For instance,

[12]The increase in the effect size of these two variables is predominantly driven by the inclusion of interaction effects in the second model specification.

Table 4: Marginal effects

	(1)	(2)	(3)
Selected parameters			
Pioneer country [D]	0.124*	0.146*	0.104*
	0.110*	0.176*	0.116
Tax audit performed	0.237***	0.768**	0.339***
	0.177***	0.754*	0.330**
Mgmt. responsibility	0.077	0.246**	0.250**
	0.058	0.242*	0.243*
T/N subject to customs	0.263***	0.270***	0.274***
	0.197***	0.265***	0.266***
Reliance on audit firm	−0.253**	−0.233**	−0.287***
	−0.190**	−0.229**	−0.279**
Resources increased	0.264**	0.247**	0.236**
	0.198**	0.242**	0.230*
Intangible T/N	0.319	0.384**	0.320*
	0.239	0.377*	0.311
IC agreements in place	−0.202**	−0.198**	−0.190**
	−0.151**	−0.194***	−0.185**

Note: Table 4 reports the marginal effect of a selection of relevant variables. Marginal effects presented in the first (second) row are evaluated at the mean (median) of all other explanatory variables. A discrete change from 0 to 1 is assumed for dummy variables, which are indicated by a [D]. All variables are defined as in Table A.2. "IC" stands for intercompany, and "T/N" is the abbreviation for transaction. *, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

taking the specification in column three, the marginal effect of previous tax audit experience evaluated at the mean of all other variables is around 0.339, and about 0.330 for a firm in a given country and industry with median transfer pricing characteristics – besides the existence of intangible property transactions the strongest effect. Accordingly, a change in the share of MNEs with previous tax audit experience of ten percentage points in a given country and industry is associated with an increase in the number of MNEs considering transfer pricing the largest risk issue by about 3.4 percent. Given the seemingly ever-increasing role of transfer pricing as a tax (compliance) issue, we believe that the share of MNEs that will have experienced a tax audit with focus on transfer pricing will also increase significantly over the next years. Assuming that this share will increase to 75 (90) percent in the years ahead, while holding all other variables at their mean, the likelihood of at least one firm considering transfer pricing to be the largest risk issue in a given country and industry) increases by 9.6 (15.2) percentage points to 32.3 (37.8) percent. In other words, we will then observe 0.133 (0.218) additional firms considering transfer pricing the largest risk issue.

5 Conclusions

The practitioners' world observes that the pace of yet another transfer pricing regulation has rapidly increased around the world and, likewise, has the nature of intercompany transactions and the transfer pricing systems become increasingly complex. It is well known from previous research that tax differentials offer an incentive for MNEs to underreport profits in high tax countries and overreport profits in low tax countries. However, there are also inevitable tax compliance issues associated with transfer pricing activities of MNEs. In addition, transfer pricing is too complex and variable that there can be a definite blueprint for successful compliance affair. From a firm's perspective, the implementation of transfer pricing mechanisms inherently involves compliance risks, and, therefore, the risk of additional tax liabilities along with severe penalties.

Motivated by the existing literature on transfer pricing and utilizing several years of a practitioner's experience, we ask whether and to what extent the risk sensitivity of MNEs for transfer pricing issues is influenced by firm-specific determinants and the corresponding tax environment. For this purpose, we use unique data obtained from a global survey on the transfer pricing risk perception of large MNEs compiled by a Big 4 accounting firm. More specifically, we use a professional judgment by the key person with ultimate responsibility for transfer pricing in an MNE as our dependent variable to analyze the awareness of transfer pricing as a corporate risk issue. The estimation results provide strong evidence that the number of MNEs considering transfer pricing their largest risk issue is systematically affected by their previous tax audit experiences and typical transfer pricing related determinants, such as the nature of intercompany transactions or the use of intercompany agreements to appropriate cover intercompany transactions. Our estimation results also suggest that corporate statutory tax rates are not the prime candidates to explain the risk perception of transfer pricing. Apparently, the procedural risk of tax compliance as perceived by the responding MNEs seems to play a more crucial role than the level of statutory corporate tax rates.

The implications of these findings might be interesting not only from a tax policy perspective (e.g., harsher and more frequent transfer pricing audits would increase tax compliance), but also for theory building. To the best of our knowledge, there is no theoretical contribution on transfer pricing that explicitly accounts for the compliance risks of such activities. Linking the existing theory on transfer pricing closer to the (traditional) tax compli-

ance literature might improve our understanding of profit shifting activities of MNEs substantially.

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Appendix

The Appendix includes the following additional information:

- Table A.1 lists the final set of MNEs in a country and industry dimension, which also indicates the countries defined as pioneer and / or high risk countries as well as the year of introduction of statutory transfer pricing regulations.
- Table A.2 provides the definition of all relevant explanatory variables.
- Table A.3 shows the correlation matrix of the final model.
- Figure A.1 graphs the observed and predicted counts obtained from the Poisson regression.

Table A.1: Location and industry classification of MNEs

		Commodities				**Finance**			**Resource**	**Pharma**		**Telco/Media**		
	Year of TP reg. intro.	Automotive	Consumer Products	Real Estate	Utilities	Asset Management	Banking & Capital Markets	Insurance	Oil & Gas	Biotechnology	Pharmaceuticals	Media & Entertainment	Telecommunication	Total
Argentina [H]	1999	0	7	0	0	1	2	0	2	1	2	0	0	15
Australia [H] [P]	1995	0	4	4	1	0	3	0	5	0	1	2	1	21
Belgium	1999	0	2	0	1	0	3	0	0	0	1	0	2	9
Brazil [P]	1997	3	3	0	0	0	1	1	3	0	0	0	0	11
Canada [H]	1999	2	3	0	0	0	0	1	4	1	0	1	0	12
China [H] [P]	1998	0	0	0	0	0	0	0	1	0	0	0	0	1
Denmark [H]	2003	1	5	0	0	0	3	0	1	2	2	1	1	16
Finland	2007	0	8	0	1	0	1	0	0	1	0	1	0	12
France [P]	1996	3	7	0	4	0	2	1	0	0	0	1	0	18
Germany [H]	2003	5	10	0	0	0	0	0	0	0	1	0	0	16
India [H]	2001	2	1	0	0	0	0	1	1	0	0	0	1	6
Ireland		0	5	1	0	0	0	0	0	0	0	0	1	7
Italy [P]	2000	2	7	0	0	0	2	1	0	0	3	0	0	15
Japan	2001	6	2	0	0	0	0	1	3	0	2	0	1	15
Korea, Rep. of [H] [P]	1996	6	8	0	0	0	3	0	2	0	0	1	1	21
Mexico [H] [P]	1996	0	9	1	1	1	3	1	0	1	0	1	1	19
Netherlands	2001	1	7	2	1	0	2	1	1	0	0	0	0	15
New Zealand [P]	1996	0	7	0	0	0	0	0	0	0	0	0	0	7

Table A.1: Location and industry classification of MNEs (continued)

		Commodities				**Finance**			**Resource**	**Pharma**		**Telco/Media**		
	Year of TP reg. intro.	Automotive	Consumer Products	Real Estate	Utilities	Asset Management	Banking & Capital Markets	Insurance	Oil & Gas	Biotechnology	Pharmaceuticals	Media & Entertainment	Telecommunication	Total
Norway [H]	2007	1	2	1	0	1	0	0	4	0	1	1	1	12
Spain [H]	2006	2	3	0	3	0	1	0	1	0	0	0	0	10
Sweden	2006	1	4	1	0	0	4	0	1	0	0	2	1	14
Switzerland		0	6	0	1	0	2	0	0	0	3	0	0	12
United Kingdom [H]	1999	1	12	0	0	0	5	2	2	0	1	6	2	31
United States [H] [P]	1994	5	17	0	3	0	5	2	5	5	4	3	4	53
Total		41	139	10	16	3	42	12	36	11	21	20	17	368

Note: Missing entries in the first column indicate that this country does not have incorporated statutory transfer pricing regulations into law. [H] indicates a high risk country, [P] indicates a pioneer country.

Table A.2: Definition of variables

Variable	Definition
Country parameters	
Stat. tax rate	Statutory corporate tax rate in the parent country of the MNE in 2007. *Source:* KPMG (2008)
High risk country [D]	Dummy variable indicating that a country has statutory transfer pricing regulations (e.g., legal documentation requirements, guidance on the application of transfer pricing methods, etc.) and penalty regimes in case of non-compliance [1=yes, 0=no]. *Source:* Ernst & Young's audit risk tool, interviews with Ernst & Young transfer pricing professionals
Pioneer country [D]	Dummy variable indicating that a country was among the top ten countries that introduced statutory transfer pricing regulations [1=yes, 0=no]
Survey variables	
Tax audit performed	Share of MNEs in a CIC that have undergone a transfer pricing audit since 2003
Mgmt. responsibility	Share of MNEs in a CIC reporting that CFO is ultimately responsible for transfer pricing
T/N subject to customs	Share of MNEs in a CIC reporting that IC transactions are subject to customs or other import duties
Reliance on audit firm	Share of MNEs in a CIC reporting increased reliance on audit firm with regard to transfer pricing advice
Resources increased	Share of MNEs in a CIC reporting that need for transfer pricing resourced has increased in the last three years
Intangible T/N	Share of MNEs in a CIC reporting that intangible transactions are "material" or "significant"
Documentation prepared	Share of MNEs in a CIC that have prepared a transfer pricing documentation in the past
IC agreements in place	Share of MNEs in a CIC reporting that IC transactions are adequately covered by IC agreements
Number of firms (Log)	Natural logarithm of the number of firms in a observed country and industry

Note: [D] indicates a dummy variable, "CIC" means country and industry classification, "IC" stands for intercompany, "IQR" stands for interquartile range, and "T/N" stands for transaction.

Table A.3: Correlation matrix

	TP risk awareness	**High risk country**	**Pioneer country**	**Stat. tax rate**	**Tax audit performed**	**Mgmt. responsibility**	**T/N subject to customs**	**Reliance on audit firm**	**Resources increased**	**Documentation prepared**	**Intangible T/N**	**IC agreements in place**	**Number of firms (Log)**
TP risk awareness	1.000												
High risk country [D]	0.050	1.000											
Pioneer country [D]	0.156	0.096	1.000										
Stat. tax rate	0.153	0.153	0.228	1.000									
Tax audit performed	0.305	−0.113	−0.020	0.057	1.000								
Mgmt. responsibility	−0.029	−0.059	−0.198	−0.205	−0.132	1.000							
T/N subject to customs	0.272	−0.004	−0.049	0.151	0.181	0.078	1.000						
Reliance on audit firm	−0.281	0.038	−0.040	−0.051	−0.234	0.154	−0.032	1.000					
Resources increased	0.166	0.115	−0.152	−0.056	0.261	0.042	0.029	−0.030	1.000				
Documentation prepared	0.065	0.231	−0.016	−0.123	0.236	−0.125	0.049	0.096	0.119	1.000			
Intangible T/N	0.004	0.019	−0.104	−0.076	0.074	−0.150	−0.324	0.104	0.037	0.122	1.000		
IC agreements in place	−0.044	0.010	−0.035	−0.150	0.219	0.041	0.145	0.072	0.107	0.173	0.088	1.000	
Number of firms (Log)	0.543	0.033	0.200	0.203	0.245	−0.086	0.220	−0.106	0.032	0.058	−0.045	−0.063	1.000

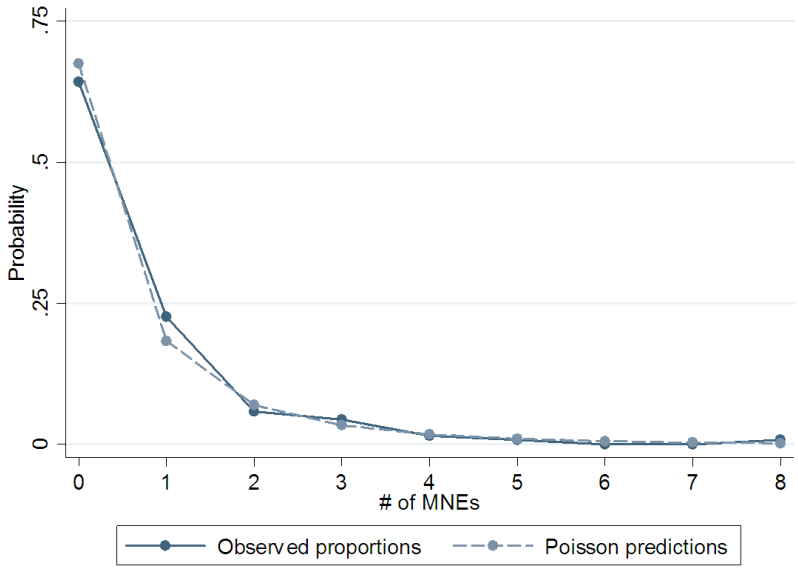

Figure A.1: Observed and predicted counts