AUDITOR ROTATION BEHAVIOR IN GERMANY

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Abstract

The German legislator implements, among other auditor regulations, mandatory auditor rotation in order to contribute to the European objectives of higher auditor independence and audit market deconcentration. However, it is questionable how German firms will implement the mandatory auditor rotation within the statutory transition periods. Here, reputation and transaction cost theory are contrary in describing how firms will handle the mandatory auditor rotation. This paper examines the firms' behavior in dealing with mandatory auditor rotation for the 120 largest German firms which are listed in the German index HDAX. On the one hand, a transaction cost-based rotation behavior suggests a late auditor rotation within the transition periods. On the other hand, the reputation hypothesis argues for an early auditor rotation within the transition periods caused by reputational considerations of the audit committee. In order to obtain evidence on auditor rotation behavior during the transition periods this paper contributes to the existing body of literature by analyzing auditor rotation behavior of the HDAX firms for the period 2005 to 2022 and gives evidence for transaction cost theory. This result is contrary to the existing body of literature in favor of the reputation hypothesis.

Keywords: Auditing, Mandatory Auditor Rotation, Audit Market Concentration, Transaction Cost Theory, European Regulatory Actions

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1. INTRODUCTION

With the Financial Market Integrity Strengthening Act (*Finanzmarktintegritätsstärkungsgesetz*, *FISG*), the German legislator repeals the previously used options to extend the periods for mandatory auditor rotation, which are designed as a member state option. The legislator aims to improve audit quality by increasing auditor independence (Yakubu & Williams, 2020). Therefore, the regulations of the European Union (EU) Directive (European Union, 2014) are directly applicable. Now, Germany has an auditor rotation requirement after an engagement period of ten years, which previously only applied to banks and insurance companies. This general rotation period can no longer be extended by a public tender for ten years or, in case of a joint audit, by further four years. The companies affected by mandatory auditor rotation were granted a transition period until 2023 if the previous auditor was engaged for between 11 and 20 years, and a transition period until 2020 if the engagement time lasted for more than 20 years (European Union, 2014, Art. 41, section 1 and 2).

However, it is questionable how the German HDAX companies, as the largest 120 German public interest entities, implement the auditor rotation requirement within the statutory transition periods. Therefore, a descriptive analysis of the rotation behavior seems appropriate, which examines the influence of the rotation requirement on the rotation behavior. In particular, the question arises whether and — if so — how a change in auditor rotation behavior has occurred with the announcement of mandatory auditor rotation. The rotation requirement has now been known

informally since the end of 2013 (Naumann & Herkendell, 2013) (the agreement between the trilogue parties was announced on December 17, 2013) and formally since the beginning of 2014 (Institut der Wirtschaftsprüfer [IDW], 2014; Naumann & Herkendell, 2014), meaning that companies had the opportunity to anticipate the European amendments in their auditor choice since the financial year 2014.

The research question of this paper is to find whether — and how — auditor rotation behavior has changed since the rotation requirement became known. There are two competing theories for predicting auditor rotation behavior. On the one hand, the companies could initiate an early auditor rotation within the transition periods, especially for reputational reasons of the audit committee, in order to signal a correspondingly early anticipation of the rotation requirement (Köhler & Herbers, 2014). On the other hand, increasing initial audit costs could suggest an auditor rotation as late as possible within the transition periods in order to lower transaction costs in line with the transaction cost theory (DeAngelo, 1981; Meuthen, 2017a).

However, first, a literature review will be carried out in Section 2. Next, the effects for the HDAX companies as well as for the engaged audit firms will be shown. Afterwards, in Section 3 a descriptive examination will be executed in order to find evidence for reputation or transaction cost theory. In Section 4, the development of auditor rotation behavior from 2004 to 2022 is critically discussed against the background of the European legislator's objectives. Finally, the paper ends with a brief conclusion in Section 5.

2. LITERATURE REVIEW

2.1. Clarification of the term auditor rotation

In the absence of a generally accepted definition of the term *auditor rotation* literature mostly defines auditor rotation as the fact of not re-electing the previous year's auditor (Marten, 1994; Koecke, 2006; Strickmann, 2000; Fischkin & Gassen, 2011). The term is not intended to cover internal rotations, as it is often already mandatory by national law, in the sense of rotating the auditor as a person. A differentiation of auditor rotation according to the aforementioned understanding can be made both, according to causality and direction of a rotation (Fischkin & Gassen, 2011).

In terms of causality, a separation can be made between client-induced and auditor-induced auditor rotations (Whisenant et al., 2003). A further distinction can be made between influencing factors that lead to auditor rotations on either the client or auditor side (Fischkin & Gassen, 2011). It can be distinguished between auditor rotations due to a change in the product characteristics (Kaplan, 1990; Knechel et al., 2008; Williamson, 1998), a change in the level of information regarding the product characteristics (Lenz, 1993; Doll, 2000; Watkins et al., 2004), a change in the company-specific contractual relationships (DeFond, 1992; El Ghoul et al., 2007) and a change in the institutional framework (DeFond, 1992; Gassen & Skaife, 2009; Fischkin & Gassen, 2011). The product in this context is the executed audit.

Table 1. Systematization of reasons for auditor rotations

Reasons for client-induced auditor rotations			*Reasons for auditor-induced auditor rotations*	
Contractual relationship	***Information stand***	***Auditor specialization***	***Audit risk***	***Liability risk***
• Company mergers • Ownership structure • Management change • Capital market activities • Financial situation of the company • Changes in regulation	• Auditor reputation • Differences of opinion • Certificate restrictions • Bad company news • Supervisory board quality • Sanctions against auditors • Audit fee increase	• Group-wide audit • Industry knowledge • Services offered by the auditor • Corporate complexity	• Financial situation of the company • Internal control system deficiencies	• Certificate restriction • Differences of opinion • Management fraud

Source: Modified taken from Fischkin and Gassen (2011).

In accordance with the aforementioned systematization, Table 1 shows a list of verifiable reasons that can induce an auditor rotation on the client or auditor side. The systematization shown in Table 1 is based on Fischkin and Gassen (2011), which built up on Farhadi (2009) and Williamson (1998).

A critical aspect of the differentiation of causes is that there is no obligation to report on the reasons for an auditor rotation, which means that a distinction is hardly possible or only possible if key assumptions are made. However, with the introduction of mandatory auditor rotation, regulatory reasons for an auditor rotation are becoming significantly more relevant, although — in contrast to the illustration in Table 1 — these are not clearly attributable to either the client- or auditor-side.

With regard to the direction of auditor rotations, a distinction can be made between horizontal and vertical auditor rotations. While the term *vertical rotation* describes auditor rotations where the new audit firm is in a different size segment compared to the former audit firm, the term *horizontal rotation* is to be used for auditor rotations within an identical size segment (Fischkin & Gassen, 2011). The most common differentiation in literature is between Big 4 and non-Big 4 firms, whereas a further differentiation, for example, into first, second and third tier, tends to be less but also common (Chaney et al., 2004; Cassel et al., 2013).

For this paper a differentiation according to the causes of an auditor rotation is largely obsolete. Since the auditor rotation caused by the implementation of mandatory auditor rotation will be analyzed in terms of evidence for reputation or transaction cost theory, it is merely relevant if

an auditor rotation took place because of a mathematical rotation requirement or not. In addition to the established causality, the observable vertical rotations are of particular interest for analyzing audit market (de)concentration. This research interest can be traced back to the objective of the European Commission's regulatory approach, as it intends to achieve audit market deconcentration through mandatory auditor rotation (European Union, 2014, para. 18, 20, 21, 25, 34, 30). The European legislator is thus aiming for a rotation from Big 4 to non-Big 4 auditors.

2.2. Theoretical framework for auditor rotations

The theoretical framework for the majority of studies in this field is the agency theory (Ross, 1973; Jensen & Meckling, 1976; Jensen, 1983), against the background of which the auditor is able to reduce agency costs by reducing the information asymmetries between stakeholders and management (Ballwieser, 1987; Ewert, 1990; Hachmeister, 2001). However, even if the validity of agency theory for the explanation of the necessity for audits is strong, it remains questionable which factors determine auditor rotation behavior. Here, the transaction cost theory seems more suitable, which provides strong explanatory power by using the cost disadvantage of initial audit procedures after an auditor rotation. This initial cost disadvantage sets up a transaction cost-related incentive to continue the previous contractual relationship with the auditor and does not trigger an auditor rotation (DeAngelo, 1981; Freidank, 2012).

Transaction costs related to auditor rotations are of particular interest since their effect creates an incentive to not change the auditor and thus causes regulation. Such transaction costs result to a particularly high degree from settlement costs (Coase, 1937; Picot, 1991) in the context of an initial audit (DeAngelo, 1981). In the case of a first-time audit, the incorporation of an auditor with a new client, i.e., the analysis and audit of the inter-company relationships, the capital structure and the market environment, results in considerably higher initial transaction costs (Meuthen, 2018). Once the fundamental and systemic audit procedures have initially been carried out, there is a positive transaction cost effect for the following years due to an approximate regressive reduction in transaction costs (DeAngelo, 1981). This positive effect on the settlement costs arises for both, the auditor and the client (DeAngelo, 1981). Therefore, a congruence of interests exists between auditor and client, which is caused by falling transaction costs in an ongoing audit relationship (Quick & Wiemann, 2011; Meuthen, 2017a). Based on transaction cost theory it is likely to happen that an auditor rotation will be initiated as late as possible within the transition period in order to save transaction costs. This would ensure that the maximum audit period is used and thus, minimize (initial audit) transaction costs. It would ensure that audit synergies are maintained as long as possible (Sattler, 2011). Overall, a late rotation within the transition periods would result in a transaction cost advantage for companies.

The aforementioned transaction cost-based argumentation is in contrast to the reputation hypothesis. This approach states that at the point of time when the auditor rotation requirements become known, the audit committee will change the auditor early for reputational reasons. An early auditor rotation is intended as a signal to the capital market that the amendments to European law have already been anticipated and that a *high-quality* auditor has been secured. In the case of mandatory auditor rotation, an early rotation has the advantage that a rotation does not have to be carried out at the same time as possibly many other companies when there tends to be a shortage of auditors (resources) and a poorer basis for negotiation. This behavior emphasizes the reputational compliance character of the audit committee, which signals early anticipation of legal changes and securing a comfortable negotiating position. Köhler and Herbers (2014) argue in line with the reputation hypothesis that an early auditor rotation is more likely to happen. This reputation hypothesis is contrary to the transaction cost hypothesis described above, according to which an auditor rotation will take place as late as possible in order to minimize transaction costs.

3. EFFECTS OF MANDATORY AUDITOR ROTATION

3.1. Data collection and methodology

The auditors of the 120 HDAX companies as of December 31, 2022, were surveyed for the years 2004 to 2022. On the basis of this data set it is possible to analyze auditor rotations for the years 2005 to 2022. Of a total of 120 companies listed in the HDAX as of December 31, 2022, 113 firms had their registered headquarters in Germany. For 74 of the aforementioned 113 firms complete data from 2004 to 2022 could be found and thus, these firms were fully included.

With regard to an auditor rotation requirement for the HDAX companies included, the first engagement of an auditor in or before 2004 is a criterion for a rotation requirement. If an auditor was engaged for the first time in 2004, this would result in an eleven-year audit period until the EU regulation came into force in 2014 and, therefore, an auditor rotation requirement occurs. Such a rotation obligation must be fulfilled by 2023 at the latest (European Union, 2014, Art. 41, section 2). If HDAX companies have their auditor for more than 20 years, an auditor rotation needs to be carried out by 2020 (European Union, 2014, Art. 41, section 1). However, the latter cannot be determined from the available data. Although, since the additional value of such recognition would be low, as there is only an influence on the transition period but not on the rotation requirement itself, the data set is sufficient for the research purpose of this paper. It is, therefore, always assumed that a mandatory rotation will be required by 2023 at the latest.

The information to feed the data set is hand-collected from the mainly publicly available annual reports of the HDAX companies. Data gaps were filled — if it was possible — with information from the investor relations services of the HDAX companies.

3.2. Descriptive analysis

The period from 2004 to 2022 shows which companies did not rotate their auditor from 2005 to 2022 and are, therefore, subject to a rotation requirement by 2023 at the latest. A differentiated analysis of the companies affected by auditor rotation according to the DAX40, MDAX and TecDAX indices, which are included in the HDAX shows that especially the DAX40 companies are disproportionately affected by an auditor rotation requirement.

Table 2. Number of companies affected by mandatory auditor rotation sorted by index

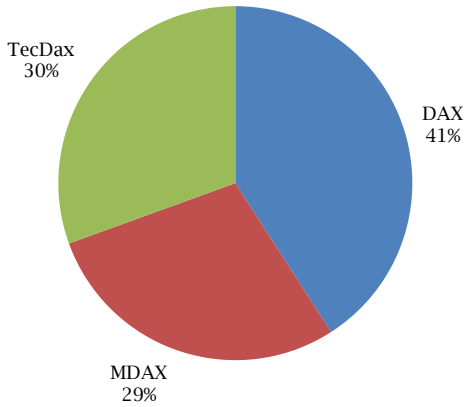
Index	*Companies affected*	*Companies in index*	*Companies in the index with headquarters in Germany and complete data*	*Affectedness in %*
DAX40	26	40	30	83.33%
MDAX	23	50	38	60.53%
TecDAX	3 (11)*	30	6 (17)*	64.71%
Sum	**52**	**120**	**74**	
HDAX companies affected	**52**			**70.27%**
HDAX companies not affected	22			29.73%

*Note: * Since a large number of companies included in TecDAX are also listed in DAX40 or MDAX (double listing), only those companies that have not already been included in the DAX40 or MDAX were included to the TecDAX number. However, the number in brackets indicates the absolute number of companies in the TecDAX so that the relative affectedness can be calculated appropriately.*

Table 2 shows that a total of 52 HDAX companies will have to carry out an auditor rotation by 2023 at the latest. Under the restrictive assumption that there are no twenty-year (or longer) audit relationships among the affected HDAX companies, this number results in an intensity of 5.2 auditor rotations per year until 2023. This rotation intensity is only found in the HDAX, which only includes 120 public interest entities, out of which only 74 companies show complete data and, thus, can be analyzed.

This is a far-reaching intervention into contractual freedom which is capable of permanently changing the current positions of the Big 4 audit firms. While around 70% of all analyzable listed companies in the HDAX, even slightly over 80% of the companies listed in the DAX40 segment, are affected by the mandatory auditor rotation. Against the backdrop of such far-reaching market regulation, the question of whether the mandatory auditor rotation will achieve its legislative objective must be exposed all the more, as only this can justify the strong legislative intervention into the audit market. This question will be taken up in the further course of the paper by critically assessing the direction of auditor rotations by HDAX companies.

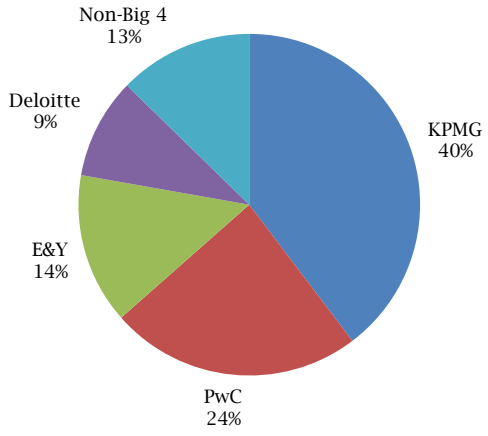
Figure 1. Index-weighted rotation requirement within DAX40, MDAX and TecDAX



The observation that the relative necessity for an auditor rotation increases with the size of a company seems hardly surprising, as the transaction costs of an initial audit following an auditor rotation also increase with the size of a company (DeAngelo, 1981). In addition, the publicity effect of an auditor rotation also increases with companies' size, which is subject to intensive interpretation with regard to its (economic) signaling effect by considering the signaling theory (Fischkin & Gassen, 2011). Breaking through existing (and often proven) control structures is always associated with (control) risks (Pittman & Fortin, 2004). In this respect, the increasing proportion of long engagement terms in dependence on a firm's size appears to be theoretically justified by transaction cost theory (for this section, Meuthen, 2022).

Analyzing the audit firms affected by the mandatory auditor rotation shows that KPMG is heavily affected. Figure 2 shows that 40% of all HDAX companies that are affected by mandatory auditor rotation have KPMG as their auditor. A rotation-related risk for PwC is also evident, as 24% of the companies affected by rotation appoint PwC as their auditor. For the two remaining Big 4 and the non-Big 4 audit firms, clear opportunities can be seen, as considerable market potential will be freed up, for which only three of the Big 4 firms can propose so that also non-Big 4 audit firms, in particular, could gain market access.

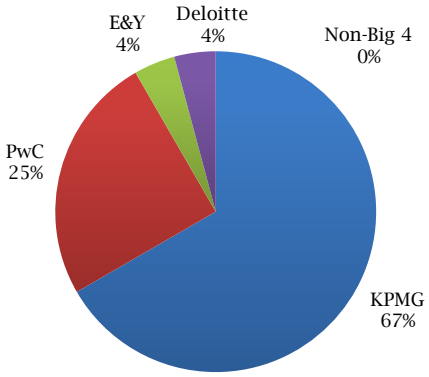
Figure 2. Audit firms of HDAX companies affected by mandatory auditor rotation



However, under the assumption that the HDAX companies are subject to mandatory rotation, 87% of companies that previously engaged a Big 4 auditor, intend to engage a Big 4 auditor again, and the number of eligible auditors is reduced to a total of three Big 4 firms. If, in a further step, the industry-specific experience of auditors is included, such as, e.g., in Germany the experience of KPMG and PwC in auditing large financial institutions, there is a possible further reduction of available auditors for certain industries. Contrary to the legislator's intention, there is a risk of further audit market concentration, at least if the HDAX companies do not abandon their previous engagement behavior and continue to predominantly engage Big 4 audit firms. However, the legislative concept does not indicate that a change in engagement behavior will take place which would ultimately contribute to achieving the objective of audit market deconcentration (contrary to the considerations in the EU Green Paper (European Commission, 2009), incentives to mandate medium-sized audit firms have not been implemented). This reduction of available auditors, which can be described as insufficient, could be solved by a transfer of employees with industry experience between the audit firms, which would counteract further market concentration. However, the existing internal rotation obligations of national law must be observed here (for this section, Meuthen, 2022).

Figure 3 shows the distribution of audit firms affected by the mandatory rotation for the DAX40. This also shows a highly heterogeneous distribution of opportunities and risks for the Big 4 audit firms.

Figure 3. Audit firms of DAX40 companies affected by mandatory auditor rotation



In contrast to HDAX, there is an even clearer concentration on KPMG with 67% of the companies subject to rotation. This means that KPMG is the only audit firm where the certain loss of clients exceeds the potential arising from the clients that become vacant. In this context, however, it should be noted that especially KPMG, but also other audit firms that lose a large number of audit clients, have the opportunity to use their existing auditor relationship with companies to propose consulting and other non-audit services and, thus, compensate for the loss of audit fees (Köhler & Herbers, 2014).

Table 3. Representation of HDAX auditors rotations from 2005 to 2022 (Part 1)

From \ *To*		*KPMG*	*PwC*	*E&Y*	*Deloitte*	*Non-Big 4*
KPMG	2005					
	2006					
	2007					
	2008					
	2009		1*	1**		
	2010					
	2011		1			
	2012			1*		
				1*		
	2013		1*	1*		
			1*			
	2014			1*		
	2015					
	2016		1*	1		
	2017		1*	1**		
	2018		1**			
			1**			
			1**			
			1*			
			1*			
	2019		1**	1*		
	2020		1**	1**		
			1**	1**		
			1**			
			1*			
	2021		1**			
			1**			
	2022		1			1*

Table 3. Representation of HDAX auditors rotations from 2005 to 2022 (Part 2)

From \ To		KPMG	PwC	E&Y	Deloitte	Non-Big 4
PwC	2005					
	2006				1*	
	2007					
	2008	1*				
	2009				1	
	2010					
	2011					
	2012					1*
	2013				1*	
	2014					
	2015					
	2016					
	2017	1*			1**	
		1*				
	2018	1**		1*	1*	
	2019					
	2020	1		1**	1*	
		1*		1*		
	2021	1**			1*	
		1*			1*	
	2022				1**	
E&Y	2005	1**				
		1				
	2006	1*				
	2007	1**				
	2008		1			
	2009	1*			1*	
	2010					
	2011					
	2012					
	2013					
	2014					
	2015					
	2016					
	2017		1*			
	2018					
	2019	1*				
	2020	1*	1**			
			1**			
	2021					1*
	2022	1*	1*		1*	
					1*	
					1*	
Deloitte	2005			1*		
	2006	1**				
	2007					
	2008					
	2009					
	2010					
	2011	1*				
	2012					
	2013					
	2014			1**		
	2015	1**				
		1*				
	2016					
	2017	1*				
	2018					
	2019					
	2020					
	2021		1*			
	2022	1*				1
		1*				
Non-Big 4	2005	1*	1*			
	2006			1**		1*
	2007					
	2008		1*			
	2009					
	2010					
	2011		1*			
	2012	1*				
	2013					
	2014		1*			
	2015					
	2016					
	2017					
	2018					
	2019	1				
	2020					
	2021					
	2022				1*	
Clients in 2004 respective in first year with data		**35**	**22**	**20**	**10**	**9**
from		30	21	18	11	10
to		26	29	16	14	5
Balance		**-4**	**8**	**-2**	**3**	**-5**
Clients in 2022		**31**	**30**	**18**	**13**	**4**

*Note: 1** stands for auditor rotation within DAX40, 1* stands for auditor rotation within MDAX, 1 stands for auditor rotation within TecDAX.*

Overall, the rotation behavior for the period from 2005 to 2022 is characterized by a shift from non-Big 4 firms to Big 4 firms. While for KPMG and E&Y there have been negative net changes, Deloitte has slight and PwC has significant increases in HDAX clients. These increases are the result of a very significant loss of clients for non-Big 4 audit firms.

The descriptive analysis in Table 4 underlines the increase in market concentration on the Big 4 audit firms, which has been criticized by the European Commission. In view of the European market deconcentration efforts, vertical auditor rotations from Big 4 to non-Big 4 auditors appear not likely to happen. Against the backdrop of the ongoing vertical auditor rotation of the HDAX companies from non-Big 4 to Big 4 auditors, as shown in Table 4, an interest in deconcentration seems at least justified if the ongoing market concentration trend is associated with negative consequences for audit quality or systemic risks for the European economic system.

Table 4. Presentation of HDAX auditor changes from 2005 to 2022 between Big 4 and non-Big 4 audit firms

From \ *To*		*Big4*	*Non-Big4*	*From* \ *To*		*Big4*	*Non-Big4*
Big4	2005	3		*Non-Big 4*	2005	2	
	2006	3			2006	1	1
	2007	1			2007		
	2008	2			2008	1	
	2009	5			2009		
	2010				2010		
	2011	2			2011	1	
	2012	2	1		2012	1	
	2013	4			2013		
	2014	2			2014	1	
	2015	2			2015		
	2016	2			2016		
	2017	7			2017		
	2018	8			2018		
	2019	3			2019	1	
	2020	14			2020		
	2021	7	1		2021		
	2022	9	2		2022	1	
				Clients in 2004 respective in first year with data		87	9
					from	80	10
					to	85	5
				Balance		**5**	**-5**
				Clients in 2022		92	4

However, analyzing the previous (voluntary) auditor rotation behavior, it seems questionable why the mandatory auditor rotation at regular intervals should change the trend of auditor rotation direction. Without further measures that provide an incentive — which may be questionable under state aid law[1] — to switch to non-Big 4 auditors, it does not seem conceivable that the previous auditor rotation behavior within the payer initiated eligibility (PIE) segment should be reversed simply by a pure rotation requirement.

Following the descriptive analysis, the data set collected is now used to shed light on the auditor rotation behavior of HDAX companies in the field of tension between reputation and transaction cost theory. Irrespective of auditor rotation direction, the question to be answered is whether and how the auditor rotation behavior has changed with the announcement of the rotation requirements.

4. RESULTS AND DISCUSSION

The validity of the two competing theoretical explanations for auditor rotation behavior is to be tested by examining the period before and after the announcement of the EU Directive which made auditor rotation mandatory. For this purpose, the data set collected is divided into two periods as shown in Table 5. While the period from 2005 to 2013 shows the auditor rotations before mandatory auditor rotation became known, the period from 2014 to 2022 includes the auditor rotations afterwards. The date on which the mandatory auditor rotation became known is the end of 2013, but no later than the publication of the EU Directive in April 2014 (Naumann & Herkendell, 2013)[2]. This means that companies had the opportunity to anticipate the rotation requirement from audit of the fiscal year 2014 in 2015 and onwards.

Table 5. Number of HDAX auditor rotations before and after the announcement of mandatory auditor rotation for the years 2005 to 2022

Year	*Number of auditor rotations*	*Average*	*Number of auditor rotations that cannot be attributed to a rotation requirement*	*Number of auditor rotations that can be mathematically attributed to a rotation requirement*
2005	5	3.3		
2006	5			
2007	1			
2008	3			
2009	5			
2010	0			
2011	3			
2012	4			
2013	4			
2014	3	6.7	2	1
2015	2		1	1
2016	2		1	1
2017	7		6	1
2018	8		2	6
2019	4		1	3
2020	14		3	11
2021	8		3	5
2022	12		4	8
Sum	**90**			

[1] Depending on the design of a potential incentive, there may be a risk of breaching state aid law with regard to Treaty on the Functioning of the European Union (European Union, 2016, Art. 107). Please also see Hey (2015) for the prohibition of state aid.

[2] The agreement between the trilogue parties was announced on December 17, 2013 (Naumann & Herkendell, 2014).

First of all, it is noticeable in Table 5 that the number of auditor rotations after the mandatory auditor rotation became known doubled compared to the auditor rotations before. It is also observable that the number of auditor rotations, which at least mathematically cannot be attributed to a rotation requirement, has fallen significantly. In the period before the mandatory auditor rotation became known, there were an average of about 3.3 voluntary auditor rotations per year, whereas after the mandatory auditor rotation became known, there was only an average of about 2.5 auditor rotation per year.

This shows that, on average, fewer voluntary auditor rotations are carried out each year after the implementation of mandatory auditor rotation than before. As a result, HDAX companies are inclined to rotate auditors at the end of the statutory transition periods in order to probably benefit from transaction cost advantages for as long as possible.

This argumentation is further strengthened by the fact that in the phase immediately after the mandatory auditor rotation became known, in the years 2014 to 2016, the number of auditor rotations fell to a below-average level. In contrast, the peaks in auditor rotation intensity were reached in 2020 and 2022, thus, right before the statutory transition periods end. A further peak will be observed in 2023, as of the 52 companies affected by mandatory auditor rotation, only 37 companies have rotated their auditors by 2022. This implies that there are still 15 auditor rotations pending that mathematically need to be made in 2023 in order to stay within the last transition period.

It can be seen that the HDAX companies do not carry out an early auditor rotation after the announcement of the rotation requirements, but rather maintain the positive transaction cost effects for as long as possible. Since an auditor rotation will take place anyway within the statutory transition periods negative signaling effects might be neglected. For those companies affected by the rotation requirement, a late auditor rotation within the statutory transition periods appears to represent transaction cost-optimal behavior.

When calculating the auditor rotation intensity within the statutory transition period and taking the otherwise voluntary auditor rotation intensity into account 8.5 auditor rotations are expected on average per year. However, such an inclusion of the voluntary auditor rotation intensity can be countered by the fact that the implementation of mandatory auditor rotation also has an influence on the voluntary auditor rotation behavior. As a result, companies could from now on initiate voluntary rotations less frequently in order to use the entire legally permissible rotation period to generate transaction cost advantages. However, such an incentive would not be in line with the objective of the European legislature to increase auditor rotations in order to enhance auditor independence and audit market deconcentration.

However, a real *turning point* does not occur within the statutory transition period from which the HDAX companies carry out the necessary mandatory rotations and, therefore, have an above-average rotation intensity in relation to the overall average of 6.7 auditor rotations. Actually, it was only at the end of the first transition period in 2020 and at the end of the second transition period in 2022 (and will be in 2023) that a far above-average intensity of auditor rotations can be observed. There were 11 auditor rotations in 2020 and 8 in 2022 (13 will be in 2023), which are mathematically due to a rotation requirement.

With reference to the descriptive analysis in this paper, the impact of mandatory auditor rotation on audit firms in Germany is very heterogeneously distributed between the Big 4 audit firms. Furthermore, it remains unclear to what extent the blank implementation of a rotation requirement should lead to a deconcentration of the upper auditor segment. In any case, the descriptive analyses show no indication of a change in the direction of auditor rotation. This observation is in line with some literature, which describes a higher barrier to market entry for non-Big 4 audit firms due to the introduction of mandatory auditor rotation (Meuthen, 2018). In contrast, other authors (for an overview see Ewelt-Knauer et al., 2013) take the perspective that mandatory auditor rotation constantly opens up opportunities for smaller auditing firms to acquire new clients and prove their quality.

In view of the competing theoretical explanations for auditor rotation behavior within the statutory transition period, the transaction cost hypothesis arguing with the economic incentives of the classic quasi-rent model is superior. Transaction cost advantages seem more convincing for PIE than any reputational effects of the audit committee.

5. CONCLUSION

As a result, there is empirical evidence for transaction cost theory, which suggests that mandatory auditor rotations take place at the end of the transition periods. Nevertheless, due to the short period of time after the announcement of the external rotation obligation, the significance of the results presented for the first two years after the EU Directive must be critically assessed. However, the knowledge gained about the chronological sequence of auditor rotations is not of paramount importance. Rather, the contribution of this paper is the confirmation that transaction costs determine the auditor rotation behavior more strongly than the reputation effects of the audit committee.

In contrast to other studies that suggest an auditor rotation behavior in favor of the reputation hypothesis (Köhler & Herbers, 2014), this paper shows clear evidence for transaction cost theory. While other studies suggested auditor rotation behavior in favor of transactions cost theory (Meuthen, 2017a), this paper contributes empirical evidence. Of course, this evidence is limited to the German audit market. Whereas in other countries, like the Anglo-Saxon ones, reputational considerations might play a larger role. Therefore, a cross-country study could create additional value in order to gain a more precise picture of auditor rotation behavior depending on legal and economic conditions. This study is further limited to the top audit market segment in Germany. However, since it is the segment in which reputational considerations are likely to play the greatest role, it could be assumed that also for the smaller PIE transaction costs play a larger role than reputational considerations for an auditor rotation decision.

Although this study provides valuable insights into auditor rotation behavior for German HDAX

companies between 2005 and 2022, future research could apply qualitative methods to investigate the decision-making processes of audit committees regarding auditor rotations. Such a study would also allow for a classification of auditor rotations into client-induced and auditor-induced auditor rotations, as shown in Table 1 of this paper. Furthermore, a qualitative study could rule out the possibility that companies which would have been mathematically subject to auditor rotation did not, in the majority, change auditors for other reasons.

However, this result could be reconciled with reputation theory as the audit committee signals through a late auditor rotation that the statutory transition periods for a mandatory auditor rotation are used in a transaction cost-efficient manner. Thus, on the contrary, a late auditor rotation could also have a reputation-enhancing effect since it shows an economically efficient behavior (Meuthen, 2022).

Overall, an analysis of auditor rotations from 2005 to 2022 confirms an increase in market concentration in the upper audit market segment (HDAX) in Germany. According to the European Commission (2009), audit market concentration, which could potentially endanger the European economic system, should be counteracted by mandatory auditor rotation. However, even if the implementation of mandatory auditor rotation now triggers *a wave of auditor rotations*, this will not be able to influence the desired market-deconcentrating direction of auditor rotations. In view of the objective of achieving a deconcentration of the upper audit market segment, the decisive legislative influence on auditor rotation direction appears to be missing.

The paper shows that, in line with the transaction cost theory, HDAX companies rotate their auditors as late as possible within the transition periods. So far, there is no indication that the desired change in rotation direction from Big 4 to non-Big 4 audit firms and thus the European objective of audit market deconcentration will occur for HDAX companies.

As there is a greater focus on shareholders in Anglo-Saxon countries, whereas in continental European countries there is a greater focus on creditor protection (Meuthen, 2017b), this could be reflected in a higher weighting of reputational considerations in countries with an Anglo-Saxon legal system. This study is further limited to the top audit market segment in Germany.

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