Auditor Expertise: Evidence from the Public Sector

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Abstract

Public Audit Offices are fundamental institutions to supervise government agents. Without accurate information principals would find it hard to make adequate decisions. Since agents face strong incentives to misreport, competent audits of financial information are crucial. This paper is the first attempt to study the relationship between auditor expertise and fiscal performance. More competent auditors are more effective supervisors; they reduce the leeway of agents to misreport and improve fiscal outcomes. The empirical results support this hypothesis. I find that States requiring the auditor to hold a professional degree feature significantly higher credit ratings and lower debt and expenditures. (99 words)

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1. Introduction

Auditors are one of the fundamental supervising institutions in the public as well as the corporate sector. They are supposed to ensure that reported information is accurate. Without accurate information principals, i.e. citizens as well as investors, would find it difficult to make adequate – electoral respectively investment – decisions. Since agents face strong incentives to misreport, independent audits seem crucial.[1] There is a large body of literature on the influence of corporate auditors, including auditor independence and tenure, and audit quality and procedures, but only very limited evidence on the impact of public auditors. The few economic studies focusing on public sector auditing find that audits per se, auditor independence, term length and term limits as well as the audit mandate have a significant influence on outcomes.[2] But what about auditor competence and expertise? Does the audit competence of the chief auditor, who is responsible for the audit policy and the management of the public audit office, matter? This paper is the first attempt to study this important question in the field of public sector auditing.

Section 2 briefly reviews the literature and available evidence and establishes the basis for formulating testable hypotheses. Section 3 presents the unique dataset at the US State level and reports and discusses the empirical results. Section 4 gives a summary and conclusion.

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[1] There is ample evidence for 'creative accounting' and misreporting in the public sector (e.g. Milesi-Ferretti 2004, von Hagen and Wolff 2004 or Wallack 2007). Evidence on earnings management in the corporate sector supports this view (recent contributions are e.g. Beatty, Ke, Petroni (2002), Johnson, Khurana and Reynolds (2002), Leuz, Nanda and Wysocki (2003), Cornett, Marcus Tehranian (2007), Fang (2008), Li, Pincus and Olhoft Rego (2008).

[2] See Olken (2007) and Ferraz and Finan (2008) for the influence of random audits on corruption in the public sector; Schelker (2008) and Schelker and Eichenberger (2003, 2007) for the influence of auditor selection and audit mandate and Schelker (2009) for the influence of auditor term length and term limits on public sector performance. From the large body of literature on corporate sector auditing see e.g. Myers, Myers and Omer (2003), Mayhew and Pike (2004), Mansi, Maxwell and Miller (2004), Gosh and Moon (2005), Davidson III, Jiraporn and DaDalt (2006), and Caramanis and Lennox (2008).

2.   Auditor Expertise

The fundamental agency problem between citizens and their agents in government positions is well established. In order to control the agent, the principal requires information. Such information is typically revealed during some procedural mechanism by the agent himself or by some third party. In many cases the information is reviewed by an external body in order to insure the accuracy of the information provided. In the political process the quality and quantity of the available information is, to a great extent, determined by transparency and supervision requirements.[3]

The few economic contributions on public auditing so far emphasize the important functions of auditors in controlling the government and the bureaucracy by providing information to policymakers and citizens, and in exposing waste and corruption (e.g. Frey 1994, Olken 2007, Ferraz and Finan 2008). The studies by Olken (2007) and Ferraz and Finan (2008) do not primarily focus on the effect of independent audits but, nevertheless, they provide interesting insights for our purposes. Olken (2007) analyzes different methods of reducing corruption using a randomized field experiment in Indonesia. He finds that an increasing audit probability significantly reduces wasteful expenditures. In a randomized field experiment in Brazil, Ferraz and Finan (2008) show that independent audits actually improve the level and quality of information available to the principal, which finally influences voting behavior. The two studies only focus on financial audits. However, some auditing institutions also conduct various performance audits. In a study analyzing US State auditors Schelker (2008) finds evidence that performance audits improve policy outcomes. According to Schelker and Eichenberger (2003,

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[3] On the influence of budgetary procedures fostering transparency see e.g. von Hagen and Harden 1995, Alesina and Perotti 1996 and Alt and Lassen 2006.

2007) and Schelker (2008), extending the audit mandate even further to include not only standard ex post audits, but also ex ante audits of the budget draft and individual policy proposals lead to significantly lower taxes and expenditures. The study by Schelker (2008) also analyzes whether auditor selection and removal mechanisms influence outcomes. The available empirical evidence on auditor appointment and removal procedures is not conclusive. Finally, there is also empirical evidence on the influence of auditor terms and term limits on public sector performance. Schelker (2009) finds no clear evidence on the impact of the length of the audit term, however, term limits have a strong and significant positive influence on State credit ratings.

Hence, the available evidence suggests that auditor characteristics have a substantial influence on public sector performance. In the corporate auditing literature one of the main drivers is audit quality, which depends heavily on auditor expertise.[4] Competent auditors are more likely to find data manipulation and earnings management and make it easier for owners and investors to control the management and to receive a reliable assessment of a firm's financial situation respectively. However, so far there is no evidence how auditor expertise in the public sector affects political and economic results.

From the literature on public sector auditing published so far it can be inferred that auditor characteristics and incentives matter. Since decision makers face incentives to misreport due to electoral pressure or career concerns, the question arises if auditor expertise is a restricting factor. Similar to the arguments for private sector audits, audit expertise is likely to influence the incentives of agents to misreport in the public sector. If a more competent auditor detects inaccurate reporting with a higher probability, the informational content of fiscal data improves.

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[4] The literature on this topic is vast: see e.g. DeAngelo (1981), Dopuch, Holthausen and Leftwich (1987), Ferguson, Francis and Stokes (2003), Mansi, Maxwell and Miller (2004), and more recently, e.g. Caramanis and Lennox (2008) or van Tendeloo and Vanstraelen (2008).

Seen from this perspective, it seems reasonable to assume that more competent auditors reduce the incentives of decision makers to misreport. This is important for both citizens and financial market participants investing in public debt. Electoral decisions by voters and reactions by investors in financial markets require credible information on the state of public finance. More stringent audits by competent auditors enable principals to better control government agents or make more appropriate investment decisions, because they can observe a more reliable signal about the state of public finances.

The public auditing institution is typically a large bureaucracy and it would be very difficult to assess the expertise within such a complex structure. This study focuses on the influence of the expertise and competence of the chief auditor. Public auditing institutions are headed by the chief auditor, which is responsible for the overall activity and performance of the agency. Several departments with specialized auditing and administration staff conduct the various audits. The chief auditor could be compared to the lead partner of a big auditing firm, who is responsible for the audit mandate and audit policy, but is not necessarily directly a part of the actual auditing process. He defines the auditing policy and auditing strategy and he typically enjoys a high degree of autonomy within the legal and regulatory framework. He can usually influence the focus of the conducted audits, its timing, priorities and the thoroughness of it, which is essential for the understanding of his role as supervisor of bureaucratic agencies in a principal-agent framework. The auditing staff conducts the audits according to the auditing policy and a well defined regulatory framework. They have to follow a clear auditing mission that is tightly regulated by standardized procedures. In contrast, the chief auditor enjoys important degrees of freedom in determining timing and thoroughness of audits, which are crucial factors in the auditing process.

Hence, I test the following theoretical hypothesis:

> More competent auditors improve the quality and reliance of reported information, which results in improved government performance.

In the empirical section I estimate the following basic equation:

$$y = \alpha + \beta * AUDITOR\ EXPERTISE + \zeta * A + \lambda * X + \varepsilon$$

where y is the dependent variable, *AUDITOR EXPERTISE* is the variable accounting for auditor competence and expertise. ζ and λ are parameter vectors, A is a matrix capturing additional features of the various auditing offices, X is a matrix including additional cross-section characteristics, and ε is, of course, the error term.

3. Empirical Evidence from US State Auditing Institutions

3.1. US State auditors and Data

In order to analyze the influence of auditor expertise I take advantage of the decentralized US federal structure. The US States enjoy a high degree of autonomy and every State has its own constitution and legal framework that define the primary governance structures and processes. The main advantage in this setting is that the States feature different regulations concerning the institutional details of their auditing institutions. Variation can be observed on many different levels, notably in the minimum educational requirements the State auditor has to meet in different States. Some States require the State auditor to hold at least a diploma as a Certified Public Accountant (CPA), other States do not.

In order to conduct the empirical analysis I adopt a unique dataset containing information on a variety of institutional details of US State auditing institutions (see Schelker 2008 which is

based on NASACT 1992, 1996 and 2000). The information on State auditing institutions is merged into a standard dataset at the US State level (see Alt, Lassen and Rose 2006, and Besley and Case 2003) including a variety of state-specific fiscal information such as public expenditures, revenues, and debt; fiscal institutions such as balanced budget requirements and voter initiatives; and a series of economic and socio-demographic variables such as the State population, real per capita income, unemployment rate, the fraction of the aged population (65+), and the fraction of school aged kids. Moreover, information on state obligation bond ratings have been collected from Moody's Investor Service. The panel dataset contains State-specific information between 1992 and 1999. More details and summary statistics can be found in the Appendix.

A brief discussion of the choice of the dependent variable in the context of transparency and the role of auditors is important, since the standard fiscal variables are likely to be biased and hence, not valid for statistical inference. Officially reported fiscal information is likely to be unreliable, because the quality of fiscal information itself depends on audit quality and transparency (see Schelker 2008). In other words, data quality is might be endogenous to auditor characteristics, which would produce biased estimates and thus, undermine statistical inference. There could be differences with respect to the severity of this problem depending on the type of fiscal information. One could argue that debt figures are more difficult to manipulate than expenditure measures. Nevertheless, one should be very careful when using fiscal information in such an empirical setup. Therefore, I resort to an alternative identification strategy and adopt State long-term credit ratings. State credit ratings reflect a market evaluation of State fiscal performance and are a forward-looking evaluation of the credit-worthiness of the borrower taking into account the credit history, accumulated debts, and the state of public finance. A further

advantage is that data quality effects can be controlled for by including fiscal measures such as debt or expenditure levels into the regression framework. The State general obligation bond ratings are available for 39 US States for the entire period 1992 to 1999, but do not include States that have no general obligation debts.[5] Observing States without general obligation debt ratings one possible concern could be selection bias. When approaching this potential selection problem, I do not find a significant correlation between auditor characteristics and the excluded States. Furthermore, I cannot explain this selection with any auditor or institutional variables in a multivariate regression framework either. Hence, it seems that selection bias is not a major concern the study has to account for.

As a robustness check I also present the estimates exploiting standard fiscal measures such as public debt and expenditures. A further, though minor, adjustment is the exclusion of Alaska and Hawaii from the analysis, which is the general practice for studies analyzing fiscal institutions in US States (for details see e.g. Alt, Lassen and Skilling 2002). Alaska and Hawaii are outliers in many respects, but most importantly with respect to the fiscal circumstances, since these States disproportionally depend on federal transfers.

3.2. The Empirical Strategy

The empirical analysis starts with a series of regressions analyzing the influence of auditor expertise on State credit ratings. It then proceeds to estimate the same regressions using real per capita debt accumulation and expenditure levels. A simple OLS model assumes that the variance of the cross-section specific effects (a_i) is zero ($var(a_i)=0$). In the present setting such an assumption is likely to be violated. In order to relax this assumption I estimate random effects

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[5] The States without a rating during the analyzed period are Arizona, Colorado, Iowa, Idaho, Indiana, Kansas, Kentucky, North Dakota, Nebraska, South Dakota and Wyoming.

models that assume that the a_i's result from a random draw and follow a normal distribution. I conduct Lagrange multiplier tests (Breusch/Pagan) which indicate that $var(a_i)\neq0$ and, hence, the random effects estimates allowing for individual heterogeneity, are the preferred specification and will be presented in the following tables. In order to further relax the assumption on the cross-section specific effects a_i, I estimate fixed effects models. The reported fixed effects models allow for arbitrary correlation between a_i and the explanatory variables and control for unobserved time-invariant heterogeneity, e.g. State-specific effects. However, due to the high time persistence of institutional variables I prefer the random effect estimates that reflect a long-term perspective of the effects.[6]

Since the audit offices differ in various respects, I control for consequences stemming from the different auditor selection and removal mechanisms and for differences in the audit mandate.[7] Furthermore, all regressions include a range of standard covariates controlling for State-specific heterogeneity. This is important in order to take structural differences between the States into account. Note that all regressions on State credit ratings also include State real per capita debt in order to control for data quality and fiscal level effects. I always start by presenting a basic regression model only including the most standard control variables (real per capita income, population size, unemployment rate, fraction of young and aged population, and a dummy for southern States), and then present further specifications controlling for time effects and additional institutional covariates that have proven to be influential in previous research at the US State level (strict balanced budget rule, existence of voter initiatives). When estimating

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[6] I also conducted Hausman tests. However, the overall picture is not conclusive since the null hypothesis cannot be rejected in all specifications.

[7] Not all states require the auditor to conduct exactly the same types of audit. In addition to standard financial audits several state auditors also conduct performance audits. Financial audits follow standard accounting rules and are comparable across states. The differences in the extent to which performance audits are conducted are controlled for in the empirical model.

the fixed effects models some variables drop out since they do not vary at all over time (auditor selection, auditor removal, voter initiatives, strict balanced budget law). Since the additional (time persistent) institutional variables drop out when including State fixed effects, only the basic specification and the one including year fixed effects are reported in the fixed effects framework.

Note that the empirical results do not allow a causal interpretation of the influence of auditor expertise on credit ratings and fiscal variables. Unfortunately, I could not find valid instruments allowing to establish causal relationships. In order to reduce potential bias I introduce a whole battery of control variables and estimate fixed effects models to control for time-invariant unobserved heterogeneity. Table 1 presents the estimation results of all control variables. It can be seen that the estimation results are in line with previous research using the same or similar covariates. For this reason and for the sake of legibility and clarity the estimation results of control variables will be omitted in the subsequent robustness test in Table 2.

3.3. *Empirical Results*

Table 1 presents the regression results of auditor expertise on State obligation bond ratings provided by Moody's Investor Service. Tables 2 reports the regression results using real per capita State debt and expenditures as the dependent variable.

[Table 1 about here]

Since the quality of fiscal data itself could depend on audit quality, estimates relying on fiscal information are almost certainly biased. Therefore, I conduct regressions relying on State obligation bond ratings instead of fiscal data. In this setting I control for potential bias stemming from biased fiscal information by including fiscal data (real per capita State debt) as a control variable, as has been discussed above. Columns 1 to 3 of Table 1 present random effects

estimates of auditor expertise – parameterized by a minimum education requirement for the auditor to hold at least a CPA – on State credit ratings. The results show that States demanding the State auditor to hold at least a CPA have significantly higher credit ratings. On average these States feature approximately a one point higher credit rating than States without such a requirement. Including year fixed effects and further fiscal controls (columns 2 and 3) do not challenge the results. The coefficients estimated within a fixed effects framework in columns 4 and 5 are somewhat higher than the random effects estimates, thought the negative and significant effect remains.

[Table 2 about here]

As a robustness test Table 2 presents the estimates using fiscal information as the dependent variable. The random effects estimates in columns 1 to 3 of Panel A and B in Table 2 present the results of auditor expertise on the fiscal variables real per capita State debt and expenditure. All random effects estimates in columns 1 to 3 of both Panels indicate a negative and in most cases a statistically significant effect of auditor expertise on government debt and expenditure. The coefficients seem to be quite robust to changes in the model specifications. An exception is the coefficient of the expenditure regressions in column 3 of Panel B, which does not reach statistical significance, though the magnitude of the effect is not heavily affected. States demanding that the State auditor must hold at least a CPA feature lower public expenditure and debt. In terms of magnitude the results amount to approximately 90 USD lower per capita expenditures and 440 USD lower per capita debt. The fixed effects regressions shown in columns 4 and 5 in both Panels point to the same conclusion. The coefficients of the debt regressions in Panel A confirm the negative and statistically significant results found in the previous random

effects specifications, while the expenditure regressions of Panel B are slightly lower and do not reach statistical significance.

The overall picture of the empirical analyses shows that auditor expertise is essentially correlated with government performance. The interpretation according to the theoretical considerations above is that more competent auditing are associated with more reliable fiscal information, which reduces the control problems in the principal agent relationship between citizens as well as investors and government agents.

4.   Conclusion

The theoretical discussion has established a relationship between auditor expertise and performance of audited organizations. More competent auditors are more effective supervisors, which reduces the leeway of agents to misreport. Since citizens and investors depend on fiscal information to make decisions, the quality of reported information is crucial. If competent auditors improve the quality of fiscal information, they can observe a more reliable signal about the state of public finances, which enables them to make more appropriate decisions. The empirical results support this hypothesis. I find that minimum professional education requirements for the State auditor are positively correlated with credit ratings and negatively with public debt and expenditures. The straightforward interpretation is that improved auditor expertise is associated with higher long term credit ratings and lower government debt and expenditures.

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Appendix

Table A1: Summary statistics

Variable	Min. – Max.	Sample mean (Std. Dev.)	Description
Moody's State credit rating	(-1) – (-8)	-2.932 (-1.547)	Moody's State long term obligation rating (highest rating Aaa = -1, Aa1 = -2, Aa2 = -3, etc.)
Government expenditures	1298.31 – 2968.72	1843.54 (293.76)	Real per capita government expenditures
Government debt	2088.36 – 9376.47	4539.76 (1456.23)	Real per capita government debt
Auditor expertise	0/1	0.219 (0.414)	Minimum Education requirement: Auditor has to hold a CPA (1), no minimum requirement (0). Details see Schelker (2008)
Auditor election	0/1	0.354 (0.479)	Auditor is elected by the citizens (1), auditor is appointed by the legislature (0). Details see Schelker (2008)
Performance audits	0 – 3	1.815 (1.119)	Index of conducted performance audits: Index adding 3 types of performance audits: Economy & Efficiency, Program, and Compliance audits. Details see Schelker (2008)
Removal procedures	0 – 3	1.146 (0.914)	Index capturing various removal procedures for the State auditor. Removal by single committee or public official (0), simple majority vote in both legislative chambers required (1), supermajority required in both chambers or if special procedures (2), agency head cannot be removed during official term (3). Details see Schelker (2008)
State Population	466251 – 3.31e+07	5491734 (5794756)	Total State population
State income	10397.11 – 22913.70	14702.42 (2213.26)	Real per capita State income in USD
Unemployment	2.5 – 11.3	5.211 (1.494)	Unemployment rate
Aged	0.087 – 0.186	0.129 (0.017)	Fraction of the aged population (65+)
Kids	0.071 – 0.264	0.189 (0.017)	Fraction of school-aged population (5-17)
Balanced budget rule	0/1	0.542 (0.499)	Balanced budget requirement (no carry-over rule)
Voter initiative	0/1	0.458 (0.499)	Voter initiative available (1), otherwise (0)

Table 1: The influence of auditor expertise on State general obligation bond rating

	US State Data 1992 – 1999				
Dependent Variable	*State obligation bond ratings (Moody's)*				
Estimation Method	Random Effects			Fixed Effects	
	(1)	(2)	(3)	(4)	(5)
Auditor expertise	0.936***	0.968**	0.743	1.627***	1.763***
	(0.334)	(0.378)	(0.483)	(0.116)	(0.124)
Auditor election	0.426	0.811	0.676	-	-
	(0.712)	(0.706)	(0.616)	-	-
Performance audit	-0.023	0.043	0.043	0.011	0.100
	(0.075)	(0.075)	(0.076)	(0.076)	(0.075)
Auditor removal	-0.118	-0.316	-0.407	-	-
	(0.327)	(0.314)	(0.288)	-	-
State population	-6.17e-08**	-6.76e-08**	-6.16e-08**	-3.15e-07	-2.15e-07
	(2.57e-08)	(2.76e-08)	(2.57e-08)	(3.46e-07)	(3.44e-07)
State r.p.c. income	8.16e-05	2.76e-4	3.43e-4**	1.00e-4	4.20e-4
	(8.95e-05)	(1.68e-4)	(1.60e-4)	(1.10e-4)	(2.78e-4)
Unemployment	-0.030	-0.172	-0.190*	-0.004	-0.118
	(0.094)	(0.115)	(0.112)	(0.089)	(0.109)
Aged	-24.114**	-24.027**	-34.907***	-7.424	-7.126
	(11.918)	(11.679)	(11.314)	(21.584)	(20.677)
Kids	-4.350	-5.041	-6.407	-3.615	-7.210***
	(5.521)	(5.008)	(4.928)	(4.377)	(2.314)
State r.p.c. debt	-3.45e-05	-7.48e-05	-4.44e-05	1.65e-5	1.75e-4
	(1.67e-4)	(1.71e-4)	(1.61e-4)	(2.03e-4)	(1.91e-4)
Balanced budget law	-	-	1.325***	-	-
	-	-	(0.487)	-	-
Initiative	-	-	0.162	-	-
	-	-	(0.377)	-	-
Year effects	-	included	included	-	included
Observations	300	300	300	300	300
R-squared	0.166	0.228	0.404	0.113	0.169
LM (Breusch/ Pagan)	515.8	513.4	383.6	-	-

Notes: Clustering adjusted standard errors in brackets. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$.
Source: Own calculations

Table 2: The influence of auditor expertise on government expenditures and debt

	US State Data 1992 – 1999				
Dependent Variable	*Panel A: Real per capita State debt*				
Estimation Method	Random Effects			Fixed Effects	
	(1)	(2)	(3)	(4)	(5)
Auditor expertise	-406.541** (200.151)	-470.004** (185.966)	-440.163** (205.827)	-476.177** (206.553)	-565.316*** (193.736)
Basic controls	included	included	included	included	included
Additional controls	-	-	included	-	included
Year effects	-	included	included	-	included
Observations	384	384	384	384	384
R-squared	0.290	0.282	0.349	0.131	0.173
LM (Breusch/ Pagan)	955.7	970.9	963.1	-	-
Dependent Variable	*Panel B: Real per capita State expenditures*				
Estimation Method	Random Effects			Fixed Effects	
	(1)	(2)	(3)	(4)	(5)
Auditor expertise	-91.074** (41.311)	-91.459* (49.271)	-79.889 (50.534)	-66.276 (49.924)	-69.840 (60.627)
Basic controls	included	included	included	included	included
Additional controls	-	-	included	-	included
Year effects	-	included	included	-	included
Observations	384	384	384	384	384
R-squared	0.203	0.314	0.400	0.541	0.574
LM (Breusch/ Pagan)	858.6	967.9	926.2	-	-

Notes: Clustering adjusted standard errors in brackets. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$.
Source: Own calculations