



## Auditor expertise: Evidence from the public sector

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### ABSTRACT

This paper is the first attempt to study the relationship between public auditor expertise and fiscal performance. I find that states requiring the auditor to hold a professional degree feature significantly higher credit ratings and lower expenditures and debt. (39 words)

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### 1. Auditor expertise

In the political process the quality, quantity and timing of information is, to a great extent, determined by transparency and supervision requirements (e.g., Alt and Lassen, 2006). Auditors are a fundamental supervising institutions in the public as well as the corporate sector to ensure that reported information is accurate. Without accurate information citizens as well as investors would find it difficult to make adequate decisions. Since agents face strong incentives to misreport, independent audits are crucial.<sup>1</sup>

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, Schelker, 2008). In field experiments Olken (2007) and Ferraz and Finan (2008) provide evidence that financial audits reduce wasteful spending and improve the quality of information. In addition to financial audits some auditing institutions also

conduct performance audits, which tend to improve policy outcomes (Schelker, 2008). Schelker and Eichenberger (2010) analyze the influence of extending the audit mandate to include *ex ante* audits of the budget draft and individual policy proposals and find significantly lower taxes and expenditures. Research on auditor independence shows that limiting auditor tenure by binding term limits improves credit ratings, while there seems to be no clear effect of auditor appointment and removal procedures (Schelker, 2008, 2012).

In the corporate auditing literature, one of the main drivers of audit quality is auditor expertise. So far however, there is no evidence on the influence of auditor expertise in the public sector. Due to electoral pressure or career concerns, public decision makers face incentives to misreport. Audit expertise is likely to influence these incentives. If more competent auditors detect inaccurate reporting and fiscal data management with a higher probability, the informational content of fiscal information improves, which enables citizens and investors to make more appropriate electoral and investment decisions.

The public auditing institution is typically a large bureaucracy and it would be very difficult to assess the overall expertise within such a complex structure. This study focuses on the influence of professional expertise of the chief auditor. He enjoys a high degree of autonomy within the legal and regulatory framework and defines the audit mandate, strategy and policy, which includes the focus of the conducted audits, its timing, priorities and thoroughness.

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<sup>1</sup> Recent experiences (e.g., EURO Area) as well as academic research shows that there is ample evidence for 'creative accounting' in the public sector (e.g., von Hagen and Wolff, 2006).

**Table 1**  
The influence of auditor expertise on state GOB rating.

US states: 1992–1999						
Dependent variable	Normalized state general obligation bond ratings (GOB rating)					
	Random effects tobit				Linear fixed effects	
	(1)	(2)	(3)	(4)	(5)	(6)
Auditor expertise	0.040*** (0.014)	0.040*** (0.014)	0.045*** (0.014)	0.040*** (0.014)	0.059*** (0.005)	0.065*** (0.006)
Auditor election	–	0.015 (0.024)	0.028 (0.024)	0.025 (0.021)	–	–
Performance audit	–	0.001 (0.002)	0.004* (0.002)	0.004* (0.002)	0.002 (0.003)	0.005 (0.003)
Auditor removal	–	–0.006 (0.012)	–0.014 (0.012)	–0.016 (0.011)	–	–
State population	–3.22e–09** (1.50e–09)	–3.14e–09** (1.53e–09)	–3.13e–09** (1.53e–09)	–2.80e–09** (1.36e–09)	–2.06e–08* (1.03e–08)	–1.66e–08 (1.03e–08)
State r.p.c. income	3.01e–06 (2.22e–06)	3.34e–06 (2.27e–06)	1.10e–05*** (3.33e–06)	1.28e–05*** (3.30e–06)	3.28e–06 (4.93e–06)	1.33e–05 (1.08e–05)
Unemployment	–0.005*** (0.002)	–0.005*** (0.002)	–0.012*** (0.002)	–0.012*** (0.002)	–0.005 (0.003)	–0.011** (0.005)
Aged	–0.761* (0.400)	–0.733* (0.403)	–0.637 (0.398)	–1.018*** (0.395)	–0.078 (0.719)	0.060 (0.643)
Kids	–0.263 (0.188)	–0.258 (0.191)	–0.207 (0.184)	–0.237 (0.184)	–0.161 (0.199)	–0.188 (0.144)
State r.p.c. debt	–2.87e–06 (3.76e–06)	–2.91e–06 (3.76e–06)	–5.52e–06 (3.71e–06)	–4.51e–06 (3.65e–06)	8.60e–07 (7.85e–06)	–5.95e–07 (6.98e–06)
State r.p.c. expenditures	3.01e–06 (1.46e–05)	9.22e–07 (1.48e–05)	2.87e–05* (1.52e–05)	2.80e–05* (1.51e–05)	2.10e–05 (2.78e–05)	4.41e–05 (2.69e–05)
Balanced budget law	–	–	–	0.055*** (0.017)	–	–
Initiative	–	–	–	0.001 (0.017)	–	–
Year effects	–	–	Included	Included	–	Included
Observations	309	309	309	309	309	309
(pseudo) R-squared	0.179	0.185	0.202	0.372	0.220	0.287

Notes: Cluster-robust standard errors in brackets. Constant term and term for southern states omitted. Time-invariant variables (auditor election, auditor removal, balanced budget law, initiative) dropped in fixed effects regression.

\* Denotes significance level:  $0.05 < p < 0.1$ .

\*\* Denotes significance level:  $0.01 < p < 0.05$ .

\*\*\* Denotes significance level:  $p < 0.01$ .

Hence, the hypothesis is that more competent auditors improve the quality and reliance of reported information, which results in improved government performance.

## 2. Data on US state auditors

I take advantage of the decentralized US federal structure. Every state has its own constitution and legal framework defining the details of its auditing institution. Variation can be observed in many different dimensions, notably in the minimum educational requirements imposed on the state auditor. Some states require the state auditor to hold at least a diploma as a Certified Public Accountant (CPA). Based on NASACT (1992) I construct a unique dataset for the period 1992–1999 containing information on a variety of institutional details of US state auditing institutions. In addition to the information on various characteristics of the US state audit offices, the dataset contains a whole range of state-specific standard control variables (Alt et al., 2006), for which summary statistics can be found in Table A.1 in the Appendix.

The standard approach for studies on the influence of fiscal institutions on government performance adopts fiscal measures such as expenditure or debt as dependent variables. In research on transparency and auditing, this strategy features several drawbacks: (1) fiscal variables might be biased due to misreporting and (2) fiscal levels might not be informative about government

efficiency. First, officially reported fiscal information might be unreliable, because the quality of fiscal information itself depends on audit quality and transparency (Schelker, 2008, 2012). Hence, data quality might be endogenous to auditor characteristics. Second, high as well as low levels of expenditures and debts might be the outcomes of good as well as bad governance. E.g., especially efficient governments might face a higher demand for public goods relative to inefficient governments, which might result in higher expenditures or debts (e.g., Ferejohn, 1999).

Hence, I present evidence based on an alternative identification strategy: I adopt state General Obligation Bond (GOB) ratings that reflect a market evaluation of state fiscal performance. Similar approaches have been used by, e.g., Depken and Lafountain (2006) and Schelker (2012) to study the influence of fiscal institutions and corruption, and by, e.g., Mansi et al. (2004) in the context of corporate auditing quality. To obtain the market evaluation of anticipated audit quality I control for the influence of the reported state of public finance and I include real per capita debt and expenditures in the regression framework. In line with the general practice I focus on the 48 mainland states and exclude Alaska and Hawaii from the analysis.

The data on state credit ratings are collected from Moody's Investor Services, Fitch Ratings and Standard & Poor's. State GOB ratings are available for a maximum of 42 US states for some or the entire period 1992–1999, but do not include states that

**Table 2**  
The influence of auditor expertise on state real per capita debt and expenditure.

US states: 1992–1999							
Dependent variable	PANELA: log state real per capita debt						
	Linear random effects				Linear fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)	
Auditor expertise	−0.099** (0.044)	−0.099** (0.044)	−0.118*** (0.043)	−0.107** (0.050)	−0.114** (0.044)	−0.139*** (0.043)	
Auditor controls	–	Included	Included	Included	Included	Included	Included
Further controls	–	–	–	Included	–	–	–
Year fixed effects	–	–	Included	Included	–	–	Included
State fixed effects	–	–	–	–	Included	–	Included
Observations	384	384	384	384	384	384	384
R-squared	0.261	0.285	0.202	0.360	0.152	0.227	
LM (Breusch/Pagan)	1057	1011	1020	1006	–	–	
PANELB: log state real per capita expenditure							
Dependent variable	PANELB: log state real per capita expenditure						
	Linear random effects				Linear fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)	
Auditor expertise	−0.059** (0.023)	−0.051** (0.022)	−0.050* (0.027)	−0.044 (0.028)	−0.035 (0.026)	−0.035 (0.033)	
Auditor controls	–	Included	Included	Included	Included	Included	Included
Further controls	–	–	–	Included	–	–	–
Year fixed effects	–	–	Included	Included	–	–	Included
State fixed effects	–	–	–	–	Included	–	Included
Observations	384	384	384	384	384	384	384
R-squared	0.144	0.184	0.310	0.397	0.558	0.595	
LM (Breusch/Pagan)	857.3	842.3	967.7	922.9	–	–	

Notes: Cluster-robust standard errors in brackets. Information on 'Auditor controls' and 'Further controls' see Table 1.

\* Denotes significance level:  $0.05 < p < 0.1$ .

\*\* Denotes significance level:  $0.01 < p < 0.05$ .

\*\*\* Denotes significance level:  $p < 0.01$ .

have no GOB.<sup>2</sup> The construction of the variable follows Depken and Lafountain (2006). The three principal agencies use very similar though not identical rating scales. Therefore, I construct a normalized overall rating  $R_{st}$  for each state  $s$  in year  $t$ . The rating of state  $s$  in year  $t$  by agency  $j = 1, \dots, n$  is  $R_{stj} \in \{-1, \dots, -N_j\}$ , where  $-1$  corresponds to the highest and  $-N_j$  to the lowest GOB rating.<sup>3</sup> The normalized state-year rating then is  $R_{st} = \frac{1}{n} \sum_{j=1}^n \frac{R_{stj}}{n_j}$  and it varies between  $-1$  and  $0$ .

### 3. Empirical strategy

In the empirical exercise I estimate the following basic regression equation:

$$y_{it} = \alpha + \beta \text{AuditorExpertise}_{it} + \zeta' \mathbf{A}_{it} + \lambda' \mathbf{X}_{it} + \varepsilon_{it}$$

where  $y_{it}$  is either the state GOB rating ( $R_{st}$ ), public debt or expenditures,  $\text{AuditorExpertise}_{it}$  is a dummy variable taking 1 if a CPA is required and 0 otherwise,  $\mathbf{A}_{it}$  are additional characteristics of public auditing institutions,  $\mathbf{X}_{it}$  is a vector of state characteristics,  $\beta$  is the parameter of interest,  $\zeta$  and  $\lambda$  are parameter vectors and  $\varepsilon$  is the error term.

When estimating the effect of auditor expertise on the normalized credit rating I estimate tobit models that take into account that  $R_{st}$  is censored at  $-1$  and  $0$ . For the debt and

expenditure regressions I rely on linear models. I estimate random effects (RE) as well as fixed effects (FE) models. However, fixed effects tobit is hard to implement due to the incidental parameter problem (e.g., Greene, 2003). Therefore, I present linear fixed effects estimates, which are typically good approximations, and allow a straightforward interpretation of the effects. However, due to the high time persistence of institutional variables I prefer the random effect estimates, which reflect a long-term perspective of the effects.

Since audit offices differ in various respects, I control for the different auditor selection and removal mechanisms and for differences in the audit mandate. All regressions include a set of standard state-specific covariates. Note that all regressions on state credit ratings also include real per capita expenditures and debt in order to control for data quality and fiscal level effects.

### 4. Empirical results

Table 1 presents the regression results of auditor expertise on GOB ratings. Columns 1–4 report the random effects estimates. The results show that states demanding the state auditor to hold at least a CPA feature significantly higher credit ratings. Including year fixed effects (columns 3 and 4) and further fiscal controls (column 4) do not challenge the results. The linear fixed effects regressions in columns 5 and 6 show that the coefficients remain statistically significant, while the impact is somewhat higher in magnitude. On average, the states demanding the auditor to hold at least a CPA feature approximately a one notch higher credit rating compared to states without such a requirement. The estimated coefficients of the control variables are widely in line with previous research using the same or similar covariates (e.g., Depken and Lafountain, 2006).

Table 2, Panels A and B present the results on the log of real per capita debt and expenditures respectively. All random effects

<sup>2</sup> The states without GOB rating are Arizona, Colorado, Iowa, Idaho, Nebraska and South Dakota. When observing states without GOB ratings selection bias might be a concern. When approaching this potential selection problem, I do not find a significant correlation between auditor characteristics and the excluded states. Furthermore, I cannot explain any of this selection with the auditing or institutional variables in a regression framework.

<sup>3</sup> The ratings are categorized as follows: AAA =  $-1$  to C =  $-21$  (lowest rating for Moody's) and D =  $-22$  (S&P and Fitch). The negative sign is chosen to make it more intuitive for the reader to interpret the regression results.

**Table A.1**  
Summary statistics.

Variable	Min.–Max.	Sample mean (std. dev.)	Description
GOB rating	(−0.381)–(−0.046)	−0.133 (−0.069)	Normalized general obligation bond ratings by S&P, Moodys and Fitch (highest rating <i>Aaa</i> = −1, <i>Aa1</i> = −2, <i>Aa2</i> = −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)
Auditor election	0/1	0.354 (0.479)	Auditor is elected by the citizens (1), auditor is appointed by the legislature or the executive (0). Details see Schelker (2008)
Performance audits	0–3	1.815 (1.119)	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 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	466 251–3.31e+07	5 491 734 (5 794 756)	Total state population
State income	10 397.11–22 913.70	14 702.42 (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)

estimates in columns 1–4 of both panels indicate a negative and statistically significant effect of auditor expertise on debt and expenditures. States demanding the state auditor to hold at least a CPA feature roughly 10% lower debt and 5% lower expenditures. The fixed effects regressions shown in columns 5 and 6 in both panels point to the same conclusion. The coefficients of the debt regressions in Panel A confirm the random effects results, while the coefficients of the expenditure regressions in Panel B are slightly lower and do not reach statistical significance. Note that these results are difficult to interpret since fiscal information might be systematically biased and pure fiscal level effects might not be very informative on government performance.

To assess the robustness of the results I follow up on two main strands of arguments. First, expertise could primarily be a matter of experience. One might worry that states requiring minimum professional education standards could also be the states that feature longer auditor tenure. Therefore, I also include variables on auditor term length and term limits, since they co-determine auditor tenure (Schelker, 2012). Second, I follow up on two main concerns of endogeneity: (1) a CPA requirement might be the result of a more general preference for higher education. Therefore, I include the share of population holding at least a high school diploma. (2) The installation of a CPA requirement might reflect fiscal preferences of citizens, which determine the institutional design and actual policy outcomes simultaneously. To proxy for state fiscal preferences I include ADA scores, which rate state legislators' ideology on a conservative–liberal scale (Anderson and Habel, 2009). All results on the influence of auditor expertise remain robust.

Overall I find that minimum professional education requirements for the state auditor are positively correlated with credit ratings and negatively with public debt and expenditures. An interpretation is that more competent auditors improve the reliability of released information.

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## Appendix

See Table A.1.

## References

- Alt, J.E., Lassen, D., Dreyer, 2006. Fiscal transparency, political parties, and debt in OECD countries. *European Economic Review* 50, 1403–1439.
- Alt, J.E., Lassen, D., Dreyer, Rose, Shanna, 2006. The causes of fiscal transparency: evidence from the American States. IMF Staff Papers.
- Anderson, S., Habel, P., 2009. Revisiting adjusted ADA scores for the US congress, 1947–2007. *Political Analysis* 17, 83–88.
- Depken, C.A., Lafountain, C.L., 2006. Fiscal consequences of public corruption: empirical evidence from state bond ratings. *Public Choice* 126, 75–85.
- Ferejohn, J., 1999. Accountability and authority: toward a theory of political accountability. In: Przeworski, A., Stokes, S.C., Manin, B. (Eds.), *Democracy, Accountability, and Representation*. Cambridge University Press, Cambridge, pp. 131–153.
- Ferraz, C., Finan, F., 2008. Exposing corrupt politicians: the effect of Brazil's publicly released audits on electoral outcomes. *Quarterly Journal of Economics* 123 (2), 703–745.
- Frey, B.S., 1994. Supreme auditing institutions: a politico-economic analysis. *European Journal of Law and Economics* 1, 169–176.
- Greene, W., 2003. Fixed effects and bias due to the incidental parameters problem in the tobit model. Working Paper. New York University.
- Mansi, S.A., Maxwell, W.F., Miller, D.P., 2004. Does auditor quality and tenure matter to investors? evidence from the bond market. *Journal of Accounting Research* 42 (4), 755–793.
- NASACT, 1992, 1996, 2000. Auditing in the states: a summary. National Association of State Auditors, Comptrollers and Treasurers, NASACT. Lexington.
- Olken, B.A., 2007. Monitoring corruption: evidence from a field experiment in Indonesia. *Journal of Political Economy* 115 (2), 200–249.
- Schelker, M., 2008. Making Auditors Effective: Theory, Evidence, Perspectives. Nomos, Baden-Baden.
- Schelker, M., 2012. The influence of auditor term length and term limits on US state general obligation bond ratings. *Public Choice* 150 (1), 27–49.
- Schelker, M., Eichenberger, R., 2010. Auditors and fiscal policy: empirical evidence on a little big institution. *Journal of Comparative Economics* 38, 357–380.
- von Hagen, J., Wolff, G.B., 2006. What do deficits tell us about debt? empirical evidence on creative accounting with fiscal rules in the EU. *Journal of Banking and Finance* 30 (12), 3259–3279.