

Do independence and strong mandates matter for the impact of supreme audit institutions?

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Abstract

This paper analyzes the effects of the independence of supreme audit institutions (SAIs) on perceived corruption, budget balances, government expenditures and revenues, debt and sovereign debt ratings. In our cross-sectional analysis, we exploit a new dataset on supreme audit institutions covering the OECD countries (except Spain and Mexico) plus India and Brazil. We find strong evidence that more independent SAIs are connected to lower levels of perceived corruption. There is also support (albeit less robust) for the hypothesis that independent SAIs have a positive effect on the structural balance. In contrast, sovereign debt ratings are negatively affected by SAI independence.

Keywords: Supreme Audit Institutions, Independence, Corruption, Ratings, Budget deficits, Budget balances, Debt, Government expenditures, Government revenues

JEL: D73, E02, H60, H61, H62, H63, H83

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1 Introduction

Today, most countries in the world operate a supreme audit institution (SAI). Even though the relevance of such institutions is widely recognized and their theoretical grounds have been well established by the literature, comparably few studies have provided an empirical analysis of their actual impact.

This paper contributes to the empirical economic literature on supreme audit institutions. Exploiting a unique dataset from a survey of supreme audit institutions and experts from academia and politics, we analyze the effects of independence and strong mandates of SAIs on a broad set of fiscal and non-fiscal target variables. In our cross-sectional analysis, we find that independent SAIs are connected to lower levels of (perceived) corruption. There is also some support, although not fully robust, for the hypothesis that SAI independence has a positive effect on the structural budget balance. In contrast to these intuitive results, we estimate a negative effect of SAI independence on sovereign debt ratings.

In deriving these conclusions, we proceed as follows: Section 2 discusses the role and functions of supreme audit institutions in democratic systems of government and provides an overview of the empirical economic literature on the effectiveness of supreme audit institutions. Section 3 presents our SAI dataset and the remaining data used in this study. In section 4, we discuss the conceptual and empirical problems with measuring independence and propose some indicators of SAI independence. Section 5 outlines the estimation approach and presents the empirical results. Section 6 summarizes our conclusions and discusses opportunities for further research.

2 The impact of supreme audit institutions

2.1 The role and function of supreme audit institutions in democracies

Representative democracies suffer from a threefold principal-agent problem. The first is between voters and their elected representatives, the second is between the representatives and the government, and the third is between the government and the administration.¹

In the first stage of this principal-agent problem, it is not rational for the electorate to monitor its representatives very closely given that collecting and processing information on their attitudes and behavior is costly. If one considers delegation as a mechanism to avoid dealing with all of the details of every topic on the political agenda, then the net utility and the attractiveness of delegation decreases the higher the voter's cost for monitoring their delegates. In reality, however, the availability of low-cost monitoring mechanisms is limited. Therefore, a situation with ex-post moral hazard can arise in which politicians use the information asymmetry to improve their utility position vis-à-vis the electorate by granting benefits to individuals or organized groups, by engaging in consumption on the job, by reducing their work effort or by following their own political viewpoints, which may deviate from those of their voters.

Streim (1994) notes that in addition to ex-post moral hazard, an adverse selection problem may arise ex-ante when voters learn that politicians gain advantage by making promises that they are not going to keep. Politicians who behave honestly either fail to be elected or retreat if they are not willing to engage in that type of competition. Less honest politicians remain. Some voters realize this and turn away. The remaining voters are easier to deceive and the remaining politicians are more willing to be deceptive. The outcome is lower voter turnout and less willingness to run for public office. A destabilizing effect on the political system as a whole can result from the lack of input legitimacy, a possible rise of extreme parties aiming at system change and a reduced willingness to follow rules and laws made by government, with, for example, a negative impact on tax morale.

¹In addition, INTOSAI (2004) suggests that in their role as lenders, international organizations such as the World Bank and the IMF also need to be considered principals in a principal-agent relationship with national governments.

In the second stage of the principal-agent problem, elected representatives experience difficulty in monitoring the executive. Even if the government is supported by a parliamentary majority, a moral hazard can arise that closely resembles the moral hazard in the relationship between the electorate and its representatives.

In the third stage of the principal-agent problem, a moral hazard situation may arise between the government and its administration since the administration may pursue objectives different from those of the government, e.g., it may want to enlarge its budget to increase utility from more power, higher status and greater on-the-job consumption. This moral hazard is enabled by the fact that bureaucrats' behavior is not fully observable and the fact that administration officials possess more and deeper knowledge of the 'political production function' than their political principals do (Streim (1994)).

An auditor can contribute to solving these principal-agent problems by monitoring the agents' behavior. Since audit results are non-rivalrous and (within appropriate institutional settings) non-excludable, monitoring may suddenly be worth the effort, even though it is not individually rational for any of the involved principals. This effect is particularly appealing in the case of voters whose small utility of casting their vote only allows for very low information and monitoring costs.

This auditor role is usually assumed by supreme audit institutions (SAIs), which are a standard feature of today's democracies. However, introducing an SAI into the institutional framework creates two additional principal-agent problems (the second of which has not yet, to our knowledge, been discussed in the literature). *First*, there is a principal-agent problem between the principal and the SAI as a monitoring agent. Of course, this relationship also suffers from an information asymmetry that can be exploited by the SAI for collusion with the auditee either for consumption on the job or for an individually rational but socially insufficient audit effort. *Second*, a principal-agent problem may arise between the head or leadership team of the SAI (who is often appointed with involvement of political institutions) and the comparably constant administrative body of the SAI (which is often recruited through competitive procedures). As Blume and Voigt (2011) note, SAIs are often considerable bureaucracies themselves. Nine of the 34 SAIs included in this study

have more than 1,000 employees.²

The first principal-agent problem can be solved by appointing a monitoring agent for the SAI itself, such as a private audit firm, one or more other SAIs or a parliamentary committee.³ However, none of these solutions is fully satisfying. The effectiveness of the first approach likely depends to a large extent on the selection mechanism for the private audit firm. The second one is prone to collusion among 'colleagues'. The third one may turn out to be dangerous for the interests of the electorate as a principal.

To serve the interests of all principals equally and effectively, the SAI must be independent from the monitored agents who could otherwise exert pressure on the SAI. At the same time, independence mitigates the problem of voluntary collusion since collusion is more likely where personal relationships exist. These relationships are less likely the more independent the SAI is from the monitored agents. SAIs serve different principals, parliament and the voters. However, parliament itself may well be subject to the SAI's monitoring, and not only in parliamentary forms of government. Independence from both government and parliament therefore increases SAIs' credibility vis-à-vis all principals.

SAI independence does not cause a problem of legitimacy that is as severe as in the case of central banks because SAIs usually do not dispose of significant decision rights.⁴

However, the effectiveness of an SAI is based on more than its independence. It is plausible to assume that it also depends on the design of the SAI mandate. The mandate is defined by the types of audits that the SAI performs, the entities that are subject to these audits, and the timing of audits.

²An extraordinary case is India, where the Indian Audit and Accounting Service employs 600 people who constitute the upper and middle management of the SAI and are supported by approximately 43,000 colleagues throughout India.

³Usually, the main focus of SAI activity is to monitor the government on behalf of parliament and the voters. Therefore, a parliamentary committee as a monitoring institution might make sense, depending on the form of government, the election system, and the institutional set-up of parliamentary work; however, the more the government depends on parliament and the more each representative depends on his party to get reelected, the greater the danger that a parliamentary committee will collude with the government. Of course, this risk can be mitigated by adequate minority rights for the opposition.

⁴There are important exceptions to this rule, however: in Greece and Ireland, for example, the SAIs ex-ante authorize payments made by the government; in some countries, the SAI exercises judicial powers and thus suffers from a legitimacy problem similar to that of the judiciary.

The literature usually distinguishes three *types of audit* (Stapenhurst and Titsworth (n.d.)): Financial audits, compliance audits and value-for-money or performance audits. In *financial audits*, the SAI examines the correctness of the financial statements (and in particular, whether the corresponding accounting standards have been observed). *Compliance audits* examine (based on verified financial statements) whether public money has been spent as designated. Therefore, financial and compliance audits support the parliament as a principal in determining whether the government executes the budget correctly and thus complies with parliament's most fundamental right. *Performance audits* are very different from these two audit types. As Barzelay (1997, p. 240) notes, "the simple idea is that organizations should (and can) be held accountable for the results of what they do, rather than how they do it". Performance audits usually occur in at least two different forms: As *efficiency audits* (have resources been spent efficiently, i.e., would it be possible to produce at least the same output with fewer resources or to produce more output with no more than the actually used resources?) and as *effectiveness audits* (have programs not only produced the planned output but also achieved the planned social result (outcome) based on this output?).

Unlike financial and compliance audits, performance audits lack a clear yardstick against which the government's activities can be judged. Streim (1994) argues accordingly that a major problem with effectiveness audits is that the targets of programs and activities are often not clearly defined.⁵ However, this is not an inherent problem of this audit type per se. Principally, both a program's targeted immediate output (e.g., the number of administered inoculations) and its targeted outcome (e.g., the decrease in the prevalence of an illness) could be defined ex-ante. Since explicitly defining targets, especially measurable ones, is typically not in the interest of the agent, it could be made an obligatory feature in the budget and lawmaking process. Nevertheless, the problem remains that the outcome of a program is not only a function of the output but also result of a set of other factors outside the government's control.

These two problems – establishing the necessary policy targets and the problem of outcome controllability – are also relevant to the *audit of election programs* proposed by Streim

⁵Indeed, efficiency audits suffer from the same problem.

(1994). This audit can relate to both output and outcome. Even though such an audit is principally desirable since it increases the controllability of politics by voters and ties policy closer to the electorate's preferences, it nevertheless creates two significant problems. *First*, if the SAI audits campaign promises, it will assume a more central role in the political system and its independence will be endangered, with possible adverse effects on its other audits. This problem could be solved by delegating the election audit to a newly created institution that is also independent and has no ties to the actual SAI. *Second*, such an audit makes it more difficult for politicians to react to unforeseen events if that would require to deviate from their election program. This problem is closely related to the rules versus discretion debate.

Although financial and compliance audits are SAIs' core tasks, most modern SAIs also conduct performance audits.⁶

Apart from the type of audit, the *time of audit* is also an important characteristic of the mandate. Audits usually occur ex-post. Their effect is based on both agents knowing that their behavior may be sanctioned by the SAI and on learning from suboptimal results (particularly in the case of performance audits). In some cases, however, the SAI also audits ex-ante, e.g., in Greece and Ireland, where Treasury expenses must be approved by the SAI⁷, or in Italy, where the SAI audits certain contracts and government decisions before they enter into force, thus ensuring that inappropriate contracts and government decisions do not lead to damages that cannot be cured (UK National Audit Office (2005), Corte dei Conti (2010)). A special case is Switzerland, where the local SAIs in the municipalities of some states (Kantone) can ex-ante develop alternative policy proposals opposed to those of the local government. These proposals are then put to the vote in local town hall meetings (Eichenberger and Schelker (2006)). The SAIs function as an institutional competitor to the government without the same incentives as the parliamentary opposition.

In addition to audits, many SAIs play an advisory role for the government or lawmakers

⁶According to our survey, all OECD SAIs conduct performance audits, with the exceptions of Korea and Greece, where according to the Greek Court of Audit, the political will for mandate extension is lacking (Hellenic Court of Audit (2002)).

⁷In Greece, for example, the SAI audits more than 1 million transactions per year, each within two days.

as part of their mandate. In Austria, for example, the SAI sees itself as "a pioneer of innovation and reform"⁸ and considers one of its tasks to include giving lawmaking advice based on its audit results and experiences. In some countries, the SAI must be consulted in the legislative process for certain topics, e.g., in Greece in the case of pension laws (Hellenic Court of Audit (2002)). Unusually broad is the SAI's advisory mandate in Estonia. The Estonian SAI not only plays a consultative role for lawmaking projects regarding financial management, financial accounting and reporting but can also make proposals to parliament, the government and the ministers to develop or enhance laws and regulations.⁹

SAIs exercise their mandate in various organizational settings. Stapenhurst and Titsworth (n.d.) distinguish three organizational models: The *Napoleonic system*, in which the SAI is organized as an institution of the judiciary, independent from both government and parliament, and in which the SAI not only exercises administrative but also judicial powers¹⁰; the *Westminster system*, in which the SAI has a close working relationship with parliament and usually follows a monocratic organizational scheme; and the *board system*, which in contrast to the Westminster model follows a collegiate organizational scheme and in which the SAI usually shows a greater distance from parliament.

2.2 Economic analysis of the impact of supreme audit institutions

2.2.1 Theoretical considerations

Although there is theoretically sound reasoning for the existence and function of SAIs, the question remains of how well SAIs perform this function in reality. What are the possible outcomes of SAI activity and what are the transmission mechanisms through which SAIs influence these outcome variables?

First, there are *fiscal measures*. SAIs audit government expenditures. They contribute to

⁸See the website of the Austrian Rechnungshof (www.rechnungshof.at, article "About the RH"; visited April 8, 2014).

⁹See art. 12 [Participation in legislative drafting] of the Estonian National Audit Office Act.

¹⁰In Belgium, for example, the Cour de Comptes can sentence officials to pay compensation for damages they have caused.

avoiding unlawful or unnecessary expenditures by revealing ineffective (i.e., with no effect on the targeted outcome) and uneconomic programs (i.e., which have too much input for the achieved effect on output or outcome) and by reducing on-the-job consumption. This could, *ceteris paribus*, lead to lower expenditures, lower taxes (because of lower financing needs), lower deficits and ultimately, lower debt. However, this is not a necessary relationship. When ineffective programs are replaced by effective ones, higher government expenditures can result, even if the new programs are operated efficiently. However, even if SAI work leads to less expenditures, it may well be that the newly gained latitude is used to finance new expenditures. If expenditures decrease instead, either the deficit decreases or taxes are lowered with potentially no net effect on deficit and debt. Therefore, even if SAI activity has welfare effects, they are not necessarily reflected in the development of fiscal measures. That aside, the strength of the effects on fiscal variables is questionable: fiscal aggregates will be much more sensitive to far-reaching discretionary policy decisions (e.g., issuing a new social security benefit) than to SAI activities, which are often related to single (albeit large) cases.

Second, policy is aligned to voters' preferences. The SAI provides information that helps voters to better judge their government's policies. This should lead to policies that are more tightly aligned with voters' preferences. This effect, however, requires that voters become aware of the audit results published by the SAI, which may be seriously doubted. Streim (1994) attributes this unawareness both to the complexity of SAI reports and to the fact that only the opposition has a real interest in using the published results. Further reasons may be the previously mentioned single-case character of most audit results and the fact that many audit results are related to circumstances that will not influence the voter's decision. As a remedy, Streim (1994) proposes that the majority party publish a citizen-oriented report on the fulfillment of election promises, which will then be audited by the SAI.

Third, less corruption. The SAI's audit activities may lead to public officials' corrupt behavior being revealed and prosecuted, whether through the SAI itself or through judicial institutions. Less corruption may also lead to lower expenditures and consequently to lower taxes, deficits and debt. Even though only single cases are audited, a considerable effect may still be expected from deterrence and the application of risk-oriented audit approaches.

Fourth, higher confidence in public information. The SAI audits the state’s financial statements. Quality-assured information is relevant not only to voters but also to investors who are invested in government bonds. Therefore, SAI audit activities can lead to better ratings and consequently, to lower risk premia.

Fifth, the stability of the political system. Wasted public money, policies diverging from voters’ preferences and corruption can erode the long-term legitimacy of the political system. The political system’s stability is in part an indirect effect derived from the direct effects of SAIs’ work.

Clearly, many of the potential effects of SAIs are difficult to identify and measure. Blume and Voigt (2011, p. 4) note in this regard that SAIs ”might very well have no economic consequences”. The question that is suggested is whether the expected welfare gain through SAI activity is big enough to justify the costs.¹¹ Most modern states seem to answer this question in the affirmative.

To have real impact, the SAI must first generate relevant findings. Second, it must be ensured that the right conclusions are drawn from these findings.

It can be assumed that independence from the auditee, appropriate resources (sufficient budget, sufficient and well trained personnel, the option to use external support) and the existence of sufficient examination rights (e.g., the right to access the auditee’s documents and the right to hear witnesses) impact the SAI’s ability to generate relevant findings. In addition, the type of audits, the scope of the audited entities and the time of audit may influence the amount and quality of the findings. In the following, we will refer to all of these factors as *mandate strength* because they either describe the SAI’s mandate or determine how well the SAI can exercise that mandate. Since we assume independence to be a very important factor, we will separate it from mandate strength. Thus, our hypothesis is that mandate strength and independence are important determinants of an SAI’s ability to generate relevant findings.¹²

¹¹These costs are absolutely significant: the budget of the US Government Accountability Office (GAO), for example, amounts to more than half a billion US dollars a year.

¹²For our empirical analysis we focus on a limited set of relevant factors. Certainly, many more deter-

SAIs' findings lead to conclusions, recommendations and decisions.¹³ Only a few SAIs have decision rights that allow them to mitigate the grievances they discover. Usually, these decision rights cover the right to veto the disbursement of public money ex-ante or the right to demand compensation for damages ex-post. In some cases (e.g., in Switzerland), certain government actions can be annulled or corrected by directive. In most cases, however, SAIs depend on other actors to transform their findings into tangible results: These actors may be the auditee itself or another institution (parliament or a parliamentary committee, the auditee's superior administrative authority, a public prosecutor, a court, or the electorate) that becomes involved either on request of the SAI or on its own initiative. Usually, the auditee is asked to correct the grievance and to reply in writing to the SAI's conclusion or recommendation. In some cases, the SAI can escalate the matter to another institution in the event that it finds the auditee's remedy insufficient.¹⁴

How well SAIs succeed in transforming their findings into tangible results depends not only on direct decision rights and other institutions to which the SAI can appeal but also on the SAI's environment: Blume and Voigt (2011) emphasize the role of freedom of the press to exert pressure through the publication of findings¹⁵, NGOs, and an independent judiciary. At the same time, NGOs, an independent judiciary, internal audit units, investigative journalists and citizens' action committees are not only complementary but also competing institutions whose effectiveness depends on an entire set of factors such as the existence of freedom of information acts and again, freedom of the press.

minants SAIs' ability to generate relevant findings exist as can be seen, for example, from Frey's (1994) critique of SAIs' work. He claims that many SAIs generally are too focused on payments, neglect opportunity cost and ignore grievances caused by political decisions.

¹³Although each conclusion implicitly contains a recommendation (usually to mitigate the identified grievance), seemingly neutral conclusions still are effective *sui generis*. This effectiveness comes from the fact that other actors (such as public prosecutors, opposition parties, media, NGOs, and voters) can ex-post take them up judgmentally, which again has an ex-ante incentive effect on auditees' behavior.

¹⁴A prototype of such an escalation is the Estonian case. In Estonia, the SAI can appeal to parliament if the auditee has not remedied a material grievance. After hearing the auditee, parliament chooses the measures to be taken by the auditee (art. 29 (5), (9) and (10) Estonian Court of Audit Law).

¹⁵The SAI's right to publish audit results, which according to our research all OCED SAIs enjoy, complements freedom of the press, albeit to a different extent.

2.2.2 Overview of the empirical literature

The economic literature on SAI effectiveness remains limited, but evolving. A non-negligible part of the current literature is attributable to Mark Schelker.

We first present an overview of the literature on fiscal effects of SAIs and then turn to the available evidence with regard to the effects on the rents of public servants, government performance, debt ratings, corruption, tax morale and complementary institutional control mechanisms.

Schelker and Eichenberger (2003), Eichenberger and Schelker (2006) and Schelker (2008*a*) analyze the effect of certain mandate characteristics (which we would call indicators of mandate strength) on the level of taxes and public expenditures in Swiss municipalities. As mandate characteristics, they consider the time of the audit (ex-ante versus ex-post), the extent of the audit (single projects versus whole budget) and the right of local SAIs (finance commissions) to address the citizens with decision recommendations or even alternatives to local government policies. They aggregate these features into a finance commission index. Independence is assumed as given if the members of the finance commissions are elected by the citizens (in contrast to being appointed by the local government) but is ultimately excluded from the analysis since all finance commissions are elected by public vote. Eichenberger/Schelker find a significant negative effect of the finance commission index on taxes and expenditures. The size of the effects is noteworthy. They interpret their finding as a result of institutional competition between SAIs and local governments. The core feature of institutional competition, the right to advance alternative policy proposals that makes the Swiss case so special, determines only one-third of the possible range of their finance commission index.

Blume and Voigt (2011) analyze the effect of SAIs' different institutional characteristics on the level of government expenditures and budget deficits in a cross-country study of 28 to 40 countries. Based on the OCED Survey on Budget Practices and Procedures and INTOSAI survey data, they examine the effects of the breadth of the SAI mandate (in terms of the number of audit types covered by the mandate), the existence of procedures

for tracking the implementation of recommendations¹⁶, the SAI's coverage in legal texts (constitution, laws, decrees), the independence in forming the SAI's audit program, the number of employees and the organization model (court on the one hand versus the Westminster or board model on the other hand). They find that none of these characteristics has a significant influence on government expenditures and only the breadth of the mandate has an effect on the budget deficit, which shows a counterintuitive direction, however, and is not robust to the inclusion of other control variables. To our knowledge, Blume and Voigt (2011) is the only cross-country study of SAI effectiveness covering both mandate strength and (rudimentarily) independence.¹⁷

Schelker (2012*a*) analyzes for the American states the influence of auditor expertise (which we would consider part of mandate strength) on fiscal variables. He measures auditor expertise by the requirement that the auditor-general hold a CPA degree and finds that such a requirement affects real per-capita debt and per-capita government expenses.¹⁸

Schelker (2008*b*) notes that the SAI's independence may influence the quality of official financial data. Therefore, analyses of the effect of SAI independence on fiscal measures may be biased.¹⁹ In his panel study of the American states, Schelker (2008*b*) therefore uses a government performance rating as an alternative target measure that reflects the quality of certain aspects of government activity. He finds that states with an auditor-general elected by popular vote show better government performance ratings than states in which auditor-generals are appointed by the executive or elected by the legislature. He also dis-

¹⁶The variable regarding the tracking of audit recommendations is taken from the OECD Survey on Budget Practices and Procedures and, unfortunately, their categories are not mutually exclusive.

¹⁷Blume and Voigt (2011) measure independence only by the coverage of the SAI's independence from the executive in legal texts and the right to determine its working program. The latter variable is seen as the more positive the more actors (executive, legislative, civil society actors, the SAI itself) can exert influence on the working program. However, given a certain endowment of resources the SAI can also be purposely overloaded and distracted from truly important audit topics. It will certainly not hurt the SAI to take hints from all directions, but these must not necessarily become part of the SAI's working program.

¹⁸Further down, we discuss the interpretation of these findings in connection with a similar analysis for credit ratings.

¹⁹However, this endogeneity problem is less severe than it seems at first: If a relationship between SAI independence and fiscal measures is found in the expected direction, this effect would be even more pronounced if the fiscal data were not biased. For example, let us assume that government would bias debt figures downwards by using creative accounting techniques. Further assume that independent SAIs indeed lead to lower debt levels since they have a fiscal effect (less waste etc.). If this effect remains measurable (though official data is biased), it would be even stronger with unbiased data. A problem only arises if no effect is found, even though there would have been one if unbiased data had been used.

covers a positive effect of the extent of performance audits on government performance ratings.

An analysis of the effect of SAI characteristics on rents that public employees receive from their work is provided by Luechinger, Schelker and Stutzer (2014). They quantify rents with subjective well-being differentials between public employees and employees in other industries, based on panel data from the National Survey of Families and Households for the American states. Luechinger et al. (2014) find that in states with tighter fiscal transparency rules, election of the auditor-general or balanced budget rules public employees show significantly lower relative well-being than their colleagues in other states.

Apart from fiscal measures, government performance ratings and public servants' rents, another kind of parameter on which SAI activity might have an effect is *credit ratings*. In the first place, it can be argued that more independent SAIs produce more and better audit results, which *ceteris paribus* lead to less waste. This is appreciated by investors because it strengthens the resources available to pay back public debt and generally indicates a responsible and rightful management of public finances. Also, independent SAIs may lead to more precise and more credible finance data. Therefore, rating agencies can abstain from factoring in risk premia for the quality of finance data.

Schelker (2008*b*), Schelker (2012*b*) and Schelker (2012*a*) analyze the effect of SAI characteristics on ratings. Schelker (2008*b*) finds no conclusive evidence that the appointment mode of the auditor-general or the right to conduct performance audits has a significant impact on the ratings of American states. Schelker (2012*b*) analyzes the effects of term length and term limits of the auditor-general and finds a positive effect of term limits but no effect of term length. This suggests that auditors without reelection constraints are more effective in their audit function because they need to be less considerate of the interests of their nominator. Schelker (2012*a*) analyzes auditor expertise (the legal requirement of holding a CPA) and finds that both the requirement to hold a CPA and the existence of a mandate for performance audits have a positive effect on the ratings of American states. He concludes that the knowledge and skills of the auditor-general positively affect audit results. However, even if one argues in line with Schelker (2012*a*) that the auditor-general has considerable leeway regarding "audit mandate, strategy and policy, which includes the

focus of the conducted audits, its timing, priorities and thoroughness”, it is not very plausible to assume that the education of the head of the institution exercises such a substantial influence. It is more likely that investors and rating agencies expect that employees’ education and skill levels are generally more esteemed in SAIs in which also the auditor-general has a good academic education. In addition, investors and rating agencies expect that the auditor-general and his leadership team are more likely to be selected according to their competence than along political criteria if they hold relevant academic degrees.

Some of the literature studies SAIs’ effect on *corruption*. One of these studies is Blume and Voigt (2011), who use a set-up similar to the one they apply in their analysis of fiscal variables and examine the effect of audit types, the availability of a procedure to track the implementation of recommendations, the coverage of the SAI’s independence in legal texts, the right to decide on its audit program, the number of employees and the SAI’s organizational model on perceived corruption for which data is provided by Transparency International (TI). They do not find any significant effect on TI’s Corruption Perception Index exerted by the variables covering independence and mandate strength. Only the organizational model impacts perceived corruption: countries whose SAIs are organized according to the Napoleonic model (court model) exhibit *higher* perceived corruption. Blume and Voigt (2011) interpret this finding as an effect of lower transparency and public awareness of judicial audit and decision procedures.

In their study of Brazilian municipalities, Ferraz and Finan (2008) show that the publication of audit results (and consequently the uncovering of corruption) influences the outcomes of local elections. They use the fact that the Brazilian federal government audited the use of federal money in 2003 in randomly selected municipalities. Corrupt incumbents had a significantly lower chance of reelection if their municipality was audited before the election. Ferraz and Finan (2008) also analyze the media’s effect on spreading audit results. They find that in cases of corruption and audits, probability of reelection was lower in municipalities with local radio stations than in those without.

Olken (2007) uses a field experiment in Indonesia to analyze the effect of audits on corrupt behavior connected to local construction work financed by the Indonesian government. Corruption is measured as the difference between the cost as reported by the recipients of

federal finance transfers and independent cost estimates.²⁰ He finds that the probability of audit has a significantly negative effect on the extent of corruption. In contrast, participation of the local population only has an effect if personal interests are involved and the political elites are unable to influence the audit process.

To our knowledge, studies of the *system-stabilizing effect* of SAIs do not exist. However, there are studies of the SAIs' impact on tax morale, which is an indicator of the extent to which citizens are willing to comply with the rules produced by the political system. In his analysis of tax morale in Switzerland, Torgler (2005) finds that independent and strong local SAIs have a significantly negative effect on the willingness to evade taxes. Torgler bases his analysis on survey data on tax morale and the index of SAIs' combined independence and mandate strength (finance commission index) calculated Schelker and Eichenberger (2003), Eichenberger and Schelker (2006) and Schelker (2008a). Local SAIs' characteristics lose their significance when Torgler (2005) controls for direct democratic participation rights because they are strongly correlated with the finance commission index.

Schelker (2008b) follows a completely different direction by analyzing whether SAIs' independence and mandate strength have an impact on the probability of divided government in the American states. Schelker interprets divided government as a control mechanism used by voters to prevent undesired policies. If voters have other, less costly control mechanisms available (such as independent, strong SAIs), then the probability of divided government should decrease. He finds that auditor-generals elected by the legislature reduce the probability of divided government by more than auditor-generals elected by popular vote, but only if they do not have a strong performance audit mandate. That aside, a strong performance audit mandate decreases the probability of divided government independent of the auditor-general's appointment mode.

²⁰Manifestations of corruption can involve, for example, collusion by the purchaser and recipient of construction materials or the billing of volunteer work that has been provided free by the local population.

3 The data

3.1 Data on supreme audit institutions

Our dataset covers 32 OECD countries (all OECD countries excluding Spain and Mexico), plus India and Brazil. Data on SAIs' institutional characteristics have been collected through a survey of the SAIs themselves, scientists and members of national parliaments. The survey data have been validated and completed with information from legal texts (primarily national audit laws and constitutions), SAIs' self-portrayals on the internet and information from other publicly available sources (e.g., INTOSAI's Mandate of SAIs project writeups, the OECD Survey on Budget Practices and Procedures and the State Audit Book published by the UK National Audit Office (2005)). In some cases, survey responses have been adjusted to a common standard of interpretation to achieve maximum consistency. The interpretation rules have been documented in a comprehensible manner. For 16 countries without survey responses, all information has been extracted from legal texts and other publicly available sources.

Even though data have been collected as carefully as possible, it seems appropriate to mention some problems that could have a negative impact on data quality and conclusions based on this data. *First*, the reference year for this dataset is 2007. However, in some cases it was not possible to determine the year to which the sources actually relate. *Second*, data are drawn from very different sources in which different circumstances may have been described similarly and similar circumstances may have been described differently. Furthermore, certain relevant aspects may have received different weights in different sources or even completely omitted in some cases. *Third*, particularly for countries for which no survey responses are available, it might well be that particularities of the national legal systems have not been sufficiently considered or relevant legal texts may have been missed.

All of the SAI characteristics used in this study are listed in table A5 of the appendix.

3.2 Other data

For the dependent and independent variables, we use fiscal and macroeconomic data from the IMF September 2011 World Economic Outlook, long-term government bonds ratings from Moody's for both bonds denominated in foreign currency and bonds denominated in domestic currency, and the Corruption Perception Index (CPI)²¹ provided by Transparency International (TI).

In addition, we use demographic data from OECD statistics, data on electoral systems and the composition of governments from the Database on Political Institutions provided by the World Bank (Beck, Clarke, Groff and Keefer (2001)), data on budget institutions and processes from the OECD Survey on Budget Practices and Procedures and data on the de jure and de facto independence of the judiciary from Feld and Voigt (2003). The data is, as far as possible, reported for 2007. All of the non-SAI variables used in this study are listed in table A6 of the appendix.

²¹We multiply the CPI by (-1) to obtain a variable that increases with perceived corruption. The CPI actually measures perceived *absence of* corruption.

4 Measuring independence

Independence cannot be measured directly. One convenient way to quantify this concept is to examine the institutional characteristics that promote independence.

Alternatives to analyzing institutional characteristics include direct expert surveys ("How independent do you think this SAI is?") and studies of events in which independence becomes manifest. The former approach allows for consideration of all country-specific circumstances that influence independence; however, it may be biased depending on the respondents' perspectives and does not provide much insight that would be helpful for institutional design. The latter method is problematic because a lack of independence can become manifest in *omitting* actions (e.g., audits) that may be difficult to identify for. A third approach is to analyze observable changes in senior SAI staff, specifically whether there is a relationship between changes of the incumbent in the office of auditor-general and parliamentary or presidential elections²²; however, this analysis focuses only on one aspect of independence, namely, appointment and dismissal of the auditor-general.

One significant advantage of measuring independence based on institutional characteristics is that the institutional setting is comparably invariant over time. However, non-institutional factors also influence independence (e.g., career ambitions, political preferences, personal relationships) and are necessarily neglected when focusing on institutional characteristics. Also, from a methodological point of view, invariant characteristics favor cross-sectional approaches over time-series analysis resulting in less observations and, consequently, in less degrees of freedom for including relevant controls.

When an entire set of institutional characteristics is analyzed, it makes sense to condense independence information into an index. This is the approach that is usually followed in analyses of central bank independence (e.g., in Cukierman (1992) or Grilli, Masciandaro and Tabellini (1991)), the area in which independence has been considered most often in empirical studies so far. The selection of institutional criteria is based on plausibility.

The criteria used in this study are clustered into factors influencing *institutional indepen-*

²²This approach is proposed and implemented, for example, by Cukierman and Webb (1995) for central banks.

dence and factors influencing *personal independence*. These characteristics are explained below.

Institutional independence:

- *SAIs can make decisions about their expenditures.* Obviously, an institution is less independent if it needs the approval of another actor to expend its budget (which is the case in six countries in our sample).
- *Budget proposals cannot be changed by government.* SAIs are considered more independent if their budget proposals cannot be changed by the government.²³ In many cases, the budget proposal is developed by the SAI and directly forwarded to parliament for decision. In 22 countries from our sample, the government cannot change the SAI's budget proposal. In 8 of the remaining 12 cases, the original proposal comes from the SAI but the government can still change the draft before it is submitted to parliament.
- *SAIs can choose their own staff.* Independence can be undermined severely if a personally independent auditor is surrounded by staff that is not independent. The right to choose the SAI staff independently exists in 31 of 34 analyzed countries, but is limited in France, Ireland and Korea.
- *SAIs can freely choose the subjects of audits/its working program.* There can obviously be no independence if the SAI cannot determine the subjects of its audits. This criterion is fulfilled in all of the countries of our sample and therefore is not further considered here.²⁴

Personal independence:

- *Election/appointment of the auditor-general:* It is plausible to assume that the auditor-general will be tamer toward the person or institution to which he owes

²³On its website (as of November 10, 2013), the Estonian SAI openly criticizes the dependency that arises from the government's right to influence the SAI budget.

²⁴Even if the SAI can decide the subjects of its audit, there remain differences between countries: It is not unproblematic if the SAI is obliged to perform audits at the request of other institutions (as is usually the case in Westminster system countries) because the SAI's resources can then be tied up by those institutions. In Switzerland, the Director of the Eidgenössische Finanzkontrolle can reject audit requests by parliament and government if the execution of the SAI's audit program would otherwise be compromised. INTOSAI (2004) considers this problem one that threatens SAI independence.

his office because the appointer usually has an interest in selecting a compliant appointee. The underlying reasons for this tame behavior may be a general disposition toward gratefulness, the desire to be reappointed or a pre-existing bond of trust through personal relationships. Of course, the latter reason may also play a role in the auditor's behavior towards actors other than the ones that appointed him. In 14 out of 34 cases in our sample, the auditor-general is appointed by the executive.

- *Proposal for appointment of the auditor-general*: The actor making the proposal for appointment of the auditor-general plays a key role because he or she limits the set of decision options for the appointing person or body.²⁵
- *Removal of the auditor-general*: Significant pressure can be exerted upon the auditor-general by the credible threat of dismissal. An auditor-general has been dismissed within the last 20 years in only two (Hungary, Slovakia) of the 18 countries that responded to our survey. This, however, must not be understood as an indicator of the irrelevance of the dismissal criterion for independence precisely because the threat as such may be an effective instrument for forcing the auditor-general to see things one's way without actually dismissing him.²⁶
- *Proposal for dismissal of the auditor-general*: Here, a similar argument applies as in the case of the proposal for appointment. However, unlike the latter, here the decider can leave the status quo unchanged by refusing to dismiss the auditor-general. A derived variable again indicates whether the proposal maker and the decider are identical. This applies in 23 countries in our sample.
- *Reappointability of the auditor-general*: We assume that reappointability weakens the independence of the auditor-general. However, the effect of a ban on reappointment may be limited because the outgoing auditor-general may still need endorsement of

²⁵Taking the proposal maker into account obviously leads to a new independence problem: If the proposing person or institution is somehow dependent on the decision maker, then the decision maker has stronger control over the appointment process. To cover at least the most extreme case of that situation, we include a variable in our dataset that indicates whether the proposal maker and the decision maker are identical. This is the case in 22 countries in our sample.

²⁶The instrument of threatening with dismissal is obviously even more effective if the dismissing actor can also exert a strong influence on the appointment of a successor because it makes the threat more credible. This suggests that there might be an interaction effect between the right to dismiss and the right to appoint the auditor-general. For reasons of simplicity, we do not model this interaction effect in our independence indices.

the appointing person or body if he decides to continue his career in the public sector. In 13 countries in our sample, reappointment is completely prohibited, whereas in 14 countries it is allowed without any restrictions.

- *Term of office of the auditor-general*: The longer the auditor-general's term of office, the more time he has during which he does not need to worry about reappointment. In contrast, shorter terms leave the appointing body or person with the perspective to install a new auditor-general without bearing the political cost of dismissal, forcing the auditor-general to assess his performance from the viewpoint of the appointer (to the extent that the auditor-general pursues his reappointment). In five of the countries in our sample, the auditor-general's term is unlimited. The average term in the other countries is 7.4 years, with a range between 4 years (Greece, Korea, Norway, Portugal) and 15 years (United States).
- *Term of office of the auditor-general in relation to the term of office of government*: If the term of office of the auditor-general is longer than the government's term, it is more likely that a different government will make the reappointment decision.²⁷ Only four countries have an auditor-general's term that is shorter than or equal to the term of office of government (Greece, Korea, Norway, Portugal).
- *Ban on certain offices before assuming office as auditor-general*: If the auditor-general's last occupation was in the scope of the SAI's audit activity, he may be called upon to audit situations in which he was previously involved. In addition, the auditor-general is likely to have close relationships with the leading personnel of his old employer. The relevance of this criterion can be seen from the actual origin of auditor-generals: in 13 of 18 countries with survey responses, at least one-third of the incoming auditor-generals within the last 20 years previously worked in the public sector. In six of these countries and two in the rest of the sample, such a restriction on previous occupations is in place.
- *Ban on secondary employment*: Secondary employment may lead to dependence on the secondary employer. In most of the countries in our sample, secondary employment is prohibited.²⁸

²⁷This criterion is only relevant if reappointment is possible. For the sake of simplicity, this condition is not taken into account in constructing our independence indices.

²⁸Strictly speaking, only secondary employment within the scope of the SAI's audit is relevant. In our

- *Ban on certain offices after leaving office as auditor-general*: The career ambitions of auditor-generals in the public sector may prevent the SAI from conducting impartial audits. Therefore, we assume that a ban on certain future career options benefits independence. However, auditor-generals have gone into the public sector after leaving office in only four of the 18 countries that responded to the survey. In none of these countries were future career steps restricted; future career options were restricted in five of the other countries in our sample.
- *Ban on active membership in a political party*: Institutional provisions will not switch off party preferences. However, it can be assumed that the office of the auditor-general is generally less political if the incumbent must not be a member of a party. Of course, the auditor-general can be influenced politically despite a lack of active membership (e.g., through further career ambitions that need support of his party), but it should be easier for the auditor-general to resist pressure if he can refer to his inactive party membership. An active membership has been assumed if the auditor-general is a member of a body of a political party or if he publicly utters political opinions. A ban on active party membership exists in 18 of the 34 countries in our sample.

In measuring independence, we focus on these characteristics, knowing that there may be more institutional factors that favor independence.²⁹ The SAI independence index values and the ranking of countries according to SAI independence can be seen from table A1. Table A2 presents some descriptive statistics of our independence measures.

The difficulty of measuring such a multi-faceted concept is impressively illustrated by Mangano (1998). He analyzes four measures of central bank independence and finds rank correlation coefficients among them to range between 0.36 and 0.76. Breaking down the differences into a criteria spread (selection of different criteria), a weighting spread (different weighting schemes) and an interpretation spread (different assessment of the same

survey, we have followed a stricter definition and asked for all types of secondary employment.

²⁹In Belgium, Luxembourg and Brazil, for example, there are restrictions regarding the degree of family relationship the SAI's leading personnel may have with ministers or leading administration officials. Additional institutional characteristics that might be considered when measuring independence are the SAI's ultimate authority in organizational matters and the authority to decide on audit procedures; in Belgium, for example, the SAI cannot change its organization or working mode without approval of the chamber of deputies.

criteria) shows the surprisingly high relevance of the latter. Indeed, in many cases it is difficult to choose the right category when evaluating a criterion because the world is not black and white. To proceed as consistently as possible, we have validated all questionnaire answers and applied a unified interpretation scheme.

For better analysis of robustness, several indices of independence have been constructed from the available indicators. They differ in the set of indicators they use. All of an index's indicators are weighted equally since it is difficult *a priori* to identify more important and less important characteristics. Naturally, this leads to one indicator having different weights in different indices. The correlation matrix of our independence measures is shown in table A3. Bivariate correlations range from -0.68 (*IND2–IND5*) to 0.93 (*IND11–IND14*), and 91% (166 of 182) of them are positive.

To obtain a better understanding of the relevance of indicators for SAIs' independence experts have been asked to assess their relevance. This approach is inspired by Masciandaro and Spinelli (1994), who pursued a similar idea in their study of central bank independence. Our results are shown in table A4.³⁰ The right to decide on audit subjects without interference by another institution is considered the *most* important factor for independence by the group of SAI respondents and the group of scientists; only the small group of parliamentary respondents considers it important, but not the most important criterion. As seen from the low standard deviation of responses, there is substantial agreement among SAIs and scientists about the relevance of this factor. However, all of the SAIs in our sample enjoy this important privilege. According to the respondents, the least important indicators are restrictions on offices before and after being auditor-general.

For five countries, we received two survey responses. Using this fact, we analyzed the variation within the responses to the indicator-weighting question to control for a possible country effect. Surprisingly, the correlation between answers for one country only ranged between 0.14 and 0.5. The very different views of experts from one country emphasize how

³⁰In addition to the indicators in table A4, the following characteristics have been assessed by the experts: the fact that the auditor-general may only be dismissed for specific reasons, the fact that the SAI's mandate is explicitly defined by law, the fact that the SAI's mandate can only be changed by a special majority, and the procedure for establishing the remuneration for the auditor-general. These characteristics could not be considered in our index construction because of data quality problems.

difficult it is to consistently measure the concept of independence.

That notwithstanding, there is some evidence that experts have considered the characteristics that apply to the SAIs in their own countries particularly relevant to independence.

Table A7 of the appendix shows the composition of the indices for SAI independence.

5 Empirical results

5.1 Estimation approach

We estimate a simple cross-sectional model of the form

$$Y_i = \alpha + \beta x_i + \delta z_i + \epsilon_i \quad (1)$$

where Y_i represents the dependent variable, which is either the corruption perception index (CPI), a fiscal aggregate or a government bond rating. x_i comprises the SAI-related regressors such as the measures for SAI independence, and z_i is a vector of economic, demographic and non-SAI-related institutional control variables.

Since we are working with a very small sample, a thorough analysis of robustness is particularly important. Therefore, we (1) test all results relating to SAI independence not only with one independence measure but with all 14 different specifications of SAI independence; (2) we examine the robustness with regard to the omission of single observations from the sample; (3) we perform hypothesis testing not only based on White standard errors but also using MacKinnon/White's (1985) small-sample (HC3) standard errors; and (4) we perform a Sala-i-Martin-type extreme bounds analysis (EBA) with a comprehensive set of additional control variables (covering both features of the political system and additional SAI characteristics). The results of this extreme bounds analysis are discussed in section 5.6.

	Model A	Model B	Model C	Model D	Model E	Model F
(Intercept)	-8.209*** (1.039)	-3.859* (2.024)	-5.912** (2.312)	-3.200 (1.950)	-3.750** (1.732)	-5.626*** (1.228)
GDP/capita (10k)	-0.426*** (0.098)	-0.719** (0.261)	-0.627** (0.272)	-0.687*** (0.221)	-0.531* (0.246)	-0.507*** (0.101)
Openess	0.966*** (0.323)	0.033 (0.642)	0.100 (0.638)	0.129 (0.559)	0.846 (0.609)	1.162*** (0.351)
Share of protestants	-0.003 (0.006)	-0.008 (0.006)	-0.005 (0.005)	-0.002 (0.005)	-0.008 (0.005)	-0.003 (0.008)
Freedom of press	-0.103*** (0.034)	-0.064 (0.048)	-0.078 (0.052)	-0.055 (0.039)	-0.103* (0.052)	-0.107*** (0.026)
De facto prosecutor indep.		0.343 (0.736)		0.285 (0.578)	-0.149 (0.608)	
De facto judicial indep.		-2.402* (1.168)		-3.206*** (1.003)	-2.212** (0.919)	
Diff. de jure-de facto prosec. indep.			0.438 (0.776)			
Diff. de jure-de facto jud. indep.			2.174* (1.049)			
SAI can hear witnesses				-0.847** (0.338)		-0.331 (0.366)
SAI has judicial powers				1.052** (0.410)		0.042 (0.492)
SAI independence					-4.134* (2.328)	-4.754*** (1.463)
R ²	0.665	0.767	0.778	0.819	0.797	0.747
Adj. R ²	0.617	0.667	0.683	0.698	0.688	0.676
Num. obs.	33	21	21	21	21	33

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Heteroscedasticity-consistent White standard errors in brackets.

Table 1: Corruption Perception Index (CPI)

	Dom. curr.	For. curr.	Dom. curr.	For. curr.	Dom. curr.	For. curr.	Dom. curr.	For. curr.	Dom. curr.	For. curr.
(Intercept)	5.023** (1.922)	4.961** (1.809)	5.610*** (1.417)	5.438*** (1.443)	8.511*** (1.598)	8.332*** (1.696)	5.028** (1.937)	4.993** (1.838)	6.140*** (1.945)	6.114*** (1.912)
Gross debt/GDP	0.005 (0.010)	-0.014 (0.009)	0.000 (0.009)	-0.017* (0.009)	-0.002 (0.008)	-0.020** (0.009)	0.005 (0.010)	-0.014 (0.008)	0.005 (0.010)	-0.013 (0.008)
GDP/capita (10k)	-0.855*** (0.300)	-0.808*** (0.260)	-0.811*** (0.231)	-0.771*** (0.205)	-0.825*** (0.220)	-0.785*** (0.192)	-0.856*** (0.306)	-0.815*** (0.268)	-0.848*** (0.282)	-0.800*** (0.240)
Unemployment rate	0.181 (0.228)	0.302 (0.217)	0.204 (0.190)	0.320 (0.192)	0.181 (0.166)	0.298* (0.167)	0.181 (0.230)	0.296 (0.220)	0.206 (0.219)	0.328 (0.205)
Population	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Reappointment possible			-1.982** (0.747)	-1.639** (0.779)	-0.856 (0.775)	-0.510 (0.835)				
Term length			0.034 (1.252)	0.055 (1.331)						
Corrected term length					-0.437** (0.191)	-0.436** (0.207)				
Appointment for life							0.052 (1.118)	0.360 (1.090)		
SAI independence									-2.824 (2.585)	-2.916 (2.617)
R ²	0.532	0.555	0.618	0.613	0.689	0.682	0.532	0.556	0.546	0.569
Adj. R ²	0.465	0.491	0.530	0.523	0.617	0.609	0.445	0.474	0.462	0.490
Num. obs.	33	33	33	33	33	33	33	33	33	33

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Heteroscedasticity-consistent White standard errors in brackets.

Table 2: Ratings (for debt denominated in domestic and in foreign currency)

	Net lending	Primary balance	Structural balance	Expenditures	Revenues	Gen. gov. gr. debt	Cent. gov. gr. debt	Net debt
(Intercept)	-2.363 (4.864)	-12.953*** (4.454)	-2.750 (4.350)	8.899 (13.338)	0.854 (10.151)	-77.805* (45.182)	-111.979*** (37.357)	-78.992 (48.969)
GDP/capita (10k)(5y)	0.045 (0.045)	0.024 (0.037)	0.027 (0.038)	0.149** (0.072)	0.190** (0.090)			
GDP growth (5y)						-6.752*** (2.282)	-4.607** (2.085)	-4.961* (2.842)
Gross debt/GDP (5y)	-0.037** (0.018)	-0.017 (0.016)	-0.045*** (0.016)	0.083 (0.053)				
Unemployment rate (5y)	-0.274* (0.156)	0.079 (0.153)	-0.190 (0.143)	1.004** (0.408)	0.802** (0.356)	3.022** (1.276)	3.723*** (1.305)	4.465* (2.459)
Population	0.000** (0.000)	0.000* (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)
Population density	-0.006 (0.005)	-0.010* (0.006)	0.002 (0.003)	-0.006 (0.008)	-0.008 (0.007)	0.091** (0.044)	0.100** (0.037)	0.144*** (0.046)
Dependency ratio	0.110 (0.082)	0.313*** (0.080)	0.069 (0.083)	0.361 (0.256)	0.614*** (0.198)	2.298*** (0.819)	2.624*** (0.684)	1.335 (1.147)
R ²	0.495	0.386	0.360	0.372	0.463	0.459	0.457	0.352
Adj. R ²	0.379	0.219	0.199	0.226	0.363	0.359	0.353	0.211
Num. obs.	33	29	31	33	33	33	32	29

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Heteroscedasticity-consistent White standard errors in brackets.

Table 3: Budget balances, government expenditures and revenues, debt measures - Base models

	Net lending	Primary balance	Structural balance	Expenditures	Revenues	Gen. gov. gr. debt	Cent. gov. gr. debt	Net debt
(Intercept)	-2.575 (5.096)	-14.692*** (5.104)	-3.182 (4.474)	6.665 (12.076)	-0.916 (9.019)	-79.578* (44.187)	-107.625** (38.637)	-77.450 (61.208)
GDP/capita (10k)(5y)	0.044 (0.045)	0.027 (0.035)	0.024 (0.039)	0.142* (0.071)	0.183** (0.084)			
GDP growth (5y)						-6.643*** (2.233)	-4.878** (2.202)	-6.545** (2.981)
Gross debt/GDP (5y)	-0.037** (0.017)	-0.015 (0.015)	-0.045*** (0.015)	0.077 (0.053)				
Unemployment rate (5y)	-0.290* (0.166)	0.069 (0.151)	-0.234 (0.159)	0.840* (0.429)	0.608 (0.382)	2.917* (1.518)	3.994** (1.533)	5.384** (2.293)
Population	0.000** (0.000)	0.000* (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)
Population density	-0.006 (0.005)	-0.011* (0.006)	0.003 (0.003)	-0.005 (0.007)	-0.008 (0.007)	0.091** (0.044)	0.099** (0.037)	0.141*** (0.045)
Dependency ratio	0.105 (0.083)	0.312*** (0.081)	0.054 (0.081)	0.303 (0.261)	0.528*** (0.188)	2.263** (0.834)	2.714*** (0.749)	2.027 (1.339)
SAI independence	1.333 (3.414)	3.869 (3.198)	3.330 (2.978)	14.067** (6.349)	15.965** (5.861)	8.220 (39.523)	-20.662 (40.090)	-80.811 (47.749)
R ²	0.497	0.411	0.381	0.421	0.524	0.460	0.464	0.407
Adj. R ²	0.356	0.214	0.192	0.258	0.415	0.335	0.335	0.245
Num. obs.	33	29	31	33	33	33	32	29

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Heteroscedasticity-consistent White standard errors in brackets.

Table 4: Budget balances, government expenditures and revenues, debt measures - Models with independence

	Net lending	Primary balance	Structural balance	Expenditures	Revenues	Gen. gov. gr. debt	Cent. gov. gr. debt	Net debt
(Intercept)	-12.176* (5.905)	-12.859** (5.366)	-8.639* (4.993)	20.862 (17.486)	-5.116 (12.063)	0.816 (43.890)	-56.176 (42.347)	55.410 (88.667)
GDP/capita (10k)(5y)	0.060 (0.044)	0.030 (0.039)	0.016 (0.040)	0.087 (0.075)	0.161** (0.076)			
GDP growth (5y)						-7.576*** (2.374)	-5.324** (2.485)	-8.107* (3.915)
Gross debt/GDP (5y)	-0.027 (0.019)	-0.015 (0.015)	-0.041** (0.015)	0.068 (0.061)				
Unemployment rate (5y)	-0.128 (0.160)	0.099 (0.141)	-0.114 (0.169)	0.610 (0.491)	0.695* (0.369)	3.386** (1.604)	3.753** (1.564)	4.259* (2.069)
Population	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)
Population density	-0.014* (0.007)	-0.008 (0.007)	0.001 (0.004)	-0.002 (0.007)	-0.011 (0.009)	0.129** (0.056)	0.129** (0.055)	0.204*** (0.068)
Dependency ratio	0.231** (0.091)	0.303*** (0.089)	0.186* (0.091)	0.105 (0.359)	0.611** (0.222)	1.105 (0.771)	1.915** (0.728)	-0.204 (1.826)
Fiscal rule: Bal. budget	0.144 (1.382)	-2.184 (1.458)	-3.139*** (1.073)					
Fiscal rule: Expenditure				3.753 (2.471)				
Fiscal rule: Revenue					3.834 (3.101)			
Fiscal rule: Debt						-21.236 (12.592)	-5.413 (10.855)	0.349 (17.327)
SAI independence	5.534 (3.866)	3.724 (3.164)	6.680** (2.528)	10.629 (6.677)	17.175** (6.811)	-17.676 (40.763)	-39.247 (42.195)	-120.788** (51.125)
R ²	0.583	0.438	0.495	0.340	0.483	0.531	0.482	0.482
Adj. R ²	0.432	0.202	0.293	0.100	0.326	0.388	0.317	0.291
Num. obs.	31	28	29	31	31	31	30	27

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Heteroscedasticity-consistent White standard errors in brackets.

Table 5: Budget balances, government expenditures and revenues, debt measures - Models with independence and fiscal rules (all)

5.2 Corruption

Our base model for perceived corruption (Corruption Perception Index, CPI) consists of (1) GDP per capita, (2) openness of the economy (measured by the ratio of the sum of exports and imports to total GDP), (3) the percentage share of Protestants in the population and (4) an indicator for freedom of the press (calculated by Freedom House). Interestingly, the effect of openness is negative, contrary to intuition. The four variables alone explain 67 percent of the total variation in the CPI. The results are presented in table 1 as model A.

In the next step, we start including institutional variables in the models and begin with the independence of the main actors of the judiciary, judges and prosecutors. An independent judicial system should pose a more credible threat to potential wrongdoers of being prosecuted and convicted. Feld and Voigt (2003) and van Aaken, Feld and Voigt (2010) provide indices of de facto and de jure independence of judges and prosecutors, respectively.

We first add de facto independence to the models (resulting in model B in table 1) and find a negative effect of judicial independence on perceived corruption but a positive effect of prosecutor independence (i.e., higher de facto prosecutor independence increases the level of perceived corruption). Both coefficients are robust to omissions of observations, and the effect of judicial independence is significant at conventional levels, at least when tested with White standard errors. To analyze these effects further, we calculate the difference between the indices for de jure and de facto judicial and prosecutor independence and replace the absolute values with these differences. Positive values of our difference variables mean that the institutions are de facto not as independent as it might seem based on the underlying legal texts.³¹ A large difference might indicate that politicians and administration officials generally tend to override rules and exploit personal relationships; these are typical patterns supporting corruption. The estimation results of model C confirm our hypothesis: differences between de jure and de facto independence for both judges and prosecutors increase the perceived level of corruption. The effects are robust to country omissions, but again, only the judicial effect is significant at conventional levels when tested with White standard errors. Moreover, this coefficient is much larger than the prosecutor coefficient.

³¹Of course, this is a rather strong interpretation, since the two indices are not of a cardinal nature. However, it is still valid to claim that larger differences indicate judges/prosecutors who enjoy a higher excess judicial independence.

Next, in model D we include two variables related to the mandate strength of the SAIs: the exercise of judicial powers and the right to hear witnesses. It is plausible to assume that another important component of mandate strength is the right to demand access to the auditees' documents. However, the Italian Corte dei Conti is the only SAI in our sample that seemingly does not enjoy this privilege. Therefore, we abstain from including this variable (which would have been a country dummy for Italy) in our estimations.

The exercise of judicial powers³² affects the negative CPI variable positively, indicating that countries whose SAIs enjoy judicial powers suffer from stronger corruption than other countries. This effect is highly robust with regard to changes in the model specification (inclusion of prosecutor/judicial de facto/de jure independence, inclusion of the de facto–de jure difference variables) and does not change qualitatively if belonging to the judicial branch of government is considered instead of the exercise of judicial powers.³³ This finding is surprising because it would be plausible to assume that judicial powers are a particularly sharp sword in the fight against corruption. Blume and Voigt (2011) arrive at the same result and explain it with the comparatively low transparency of judicial processes. They argue that because of the lack of transparency, there is no public outcry in case of corruption and that this increases the net utility from corrupt behavior. However, the reason for this counterintuitive effect could simply be that given a specific level of actual corruption in a situation with comparably low transparency, public awareness of corruption cases is just lower, and this is what the CPI measures (because it is a *perception* index). However, when subjecting our results to an extreme bounds analysis (EBA) in section 5.6, we find this effect not to be robust. What is robust instead is the corruption-increasing effect of an SAI belonging to the judicial branch of government.

As expected, the right to hear witnesses has a negative effect on perceived corruption. This result is highly robust with regard to changes in the model specification (inclusion

³²According to our definition, SAIs need to dispose of judicial powers in their core activity, i.e., in *producing audit results and drawing conclusions from them*. The SAI's ability to impose fines for delays in the provision of documents and information is not considered judicial, even if these decisions are made in the last instance.

³³In seven countries the SAI exercises judicial powers even though it is not part of the judicial branch of government. Of course, there are no countries in which the SAI belongs to the judicial sphere but does not exercise judicial powers.

of prosecutor and judicial independence) and to omissions of single observations from the sample. Moreover, in most specifications the effects are significant at conventional levels when tested with White standard errors.

Finally, we include SAI independence in our model. Table 1 presents as model E the results when index *IND14* is used as the measure of SAI independence. As expected, countries with more independent SAIs perform generally better in terms of the CPI than countries with less independent SAIs. Depending on the exact specification, between 10 and 12 of our 14 independence measures yield positive coefficients. This effect is quite stable to omissions of single observations from the sample. However, coefficients are frequently insignificant, except for the estimations with de facto judicial and de facto prosecutor independence, for which five and three coefficients, respectively, reach significance at conventional levels when tested with White standard errors.

Given the actual range of *IND14* (0.41) the independence of the supreme audit institutions explains between 1.69 and 2.57 points in the CPI (which is measured on a 0 to 10 point scale), depending on the specification. However, DFBETA analysis for the model with *IND14* as the independence measure shows that the coefficient magnitude reacts sensitively to omissions of certain observations with up to 68% of change in coefficient value. Greece and Korea have a particularly strong influence on coefficient magnitudes across specifications. However, even if both countries are excluded, the effects of independence continue along their directions in all model specifications. Substituting *IND14* by one of the other 13 independence measures shows that coefficient magnitudes are generally not stable across independence indices although effect directions are comparably robust: when the independence measures are exchanged simultaneously and one observation per estimation is dropped, between 71% and 86% of coefficients of all the resulting model combinations maintain their intuitive directions, depending on the specification.

In summary, we find some evidence that more independent SAIs lead to lower levels of perceived corruption. In addition, positive effects of mandate strength (as measured by the right to hear witnesses) on perceived freedom from corruption are supported by the data. In contrast, SAIs belonging to the judicial branch of government exert a cumulative influence on perceived corruption.

5.3 Ratings

In this section, we analyze the effect of SAIs on government debt ratings. As relevant SAI characteristics, we consider the auditor-general's term length, the prohibition of reappointment of the auditor-general and overall SAI independence.

The left columns of table 2 present the base specification with Moody's long-term sovereign debt ratings as the dependent variable, both for debt denominated in domestic currency and for debt denominated in foreign currency.³⁴ These base models alone explain slightly more than half of the total variation of the ratings. It is noteworthy that contrary to intuition, per capita GDP exerts a significantly negative influence on ratings. The effect remains significant when tested with small-sample (HC3) standard errors (see MacKinnon and White (1985)).

We now add SAI characteristics to the base models and start with term length and prohibition of reappointment. Term length is tested in three different versions: *term* is a categorical variable with equidistant classes on the unit interval (see table A4 in the appendix for coding). The variable *corr_term* is an adjusted term length: it is the actual term length in years (not categorized as in *term*), but for countries with lifelong appointments (five cases in our sample) the term length is adjusted to the average of the actual (de facto) term lengths in all those countries from which we got survey responses. Finally, *forlife* is a dummy set to one if the appointment of the auditor-general is for life. As seen from the results presented in table 2, the effect of absolute term length is positive (but never significant at conventional levels) in the case of absolute term length and the indicator for lifelong appointments, but negative for adjusted term length. The effect of the prohibition of reappointment is always negative and significant at conventional levels. This means that given a certain auditor term length, countries without restrictions on reappointment perform better in terms of ratings. The reason may be that the investment effect of accumulating specific knowledge (Schelker (2012b)), which is more worthwhile when the auditor-general's appointment can be renewed, outweighs the effect of increased independence.

³⁴The ratings for domestic and foreign debt only differ in the cases of Chile, India and Japan.

In the next model, we include our measures of overall SAI independence (and remove the reappointment and term variables since these are part of the independence indices). Independence turns out to have a negative effect on ratings with 10 and 12 (out of 14) independence measures for domestic and foreign ratings, respectively. The negative coefficients are significant at conventional levels in at least half of the cases when tested with White standard errors. The effects are robust to omissions of single observations from the sample.

In summary, we do not find any conclusive evidence for an effect of auditor-general terms length on rating performance. Restrictions on reappointment seem to exert a negative influence on ratings, suggesting that knowledge and experience accumulation are valued by investors. Contrary to our intuition, the effects of independence are usually negative.

5.4 Budget deficits, expenditures, revenues and debt

We analyze the effect of SAI characteristics on eight fiscal variables: three deficit measures (net lending, primary balance and structural balance), three debt measures (general government gross debt, central government gross debt and general government net debt), government expenditures and government revenues. To account for business cycle effects, we use five-year averages of these variables over the period 2003 to 2007.

Our base models for these fiscal aggregates include (1) the GDP (average absolute value or growth rate) (2) the average unemployment rate, (3) the population number, (4) the dependency ratio, (5) the population density and (6) the average gross debt in percent of GDP (for budget balances and expenditures only). Table 3 shows that between 37% (government expenditures) and 50% (net lending) of the total variation of the dependent variables can be explained by these macroeconomic and demographic regressors alone.

In the next step, we add SAI independence to the models. As seen from table 4, where we use *IND14* as independence measure, independence affects budget balances positively, indicating that more independent auditors are related to higher budget surpluses / lower budget deficits. The debt level (at least when measured by general government gross debt) appears lower the less independent the SAI is. When testing with the other independence

measures, however, we find that the results for the debt level are in line with our intuition in between 10 (general government gross debt) and 12 (general government net debt) of the 14 independence specifications and that the counterintuitive effects of *IND14* are the exception rather than the rule. It must be noted, however, that these seemingly positive results react highly sensitively to the omission of Greece. In summary, there is at least some support for the hypothesis that more independent SAIs lead to lower levels of government debt. However, the case for independence is somewhat stronger with the budget balances as dependent variables. Here, between 11 and 13 of the 14 independence measures yield the expected effect directions. These results, which are significant at conventional levels in some cases (at least when tested with White standard errors), again are sensitive to the dropping of Greece from the sample but are generally more robust than the debt results. This is particularly true for the case of the structural balance, with 13 of 14 independence coefficients yielding the intuitive signs.

To further test our results for robustness, we include the existence of fiscal rules in our models. For this purpose, we use data from the OCED Budget Practices and Procedures Survey (from 2007) and from the IMF Fiscal Rules Dataset (covering the period 1985-2012).³⁵ As noted correctly by Nerlich and Reuter (2012), these two datasets differ in their assessment of the existence of fiscal rules for a given type of rule, country and year. We do not further investigate the causes of these differences (which cannot be explained by different definitions of fiscal rules), but simply perform our analysis with both datasets separately.

When looking at the results presented in table 5 based on the IMF fiscal rules dataset, it is noteworthy that for the primary balance, the structural balance, government expenditures and general government net debt, the fiscal rules dummy variables do not show the intuitive effect directions. This picture changes when only national fiscal rules are considered. Then, only the sign of the expenditure fiscal rule coefficient deviates from what would have been expected. These effects are quite robust to country omissions, to changes in the independence measure included and to the complete omission of independence from the models.

³⁵For reasons of simplicity, we determine the existence of fiscal rules for 2007 even though our dependent variables (except for the debt measures) are averages from 2003-2007.

In contrast, the results regarding the effects of independence do not differ much between the models with all fiscal rules and with national fiscal rules only. The number of independence measures yielding positive coefficients is 9, 10 and 12 out of 14 for the primary balance, net lending and the structural balance, respectively (with national fiscal rules; with all fiscal rules the yield of positive effects is 8, 10, and 13). Thus, the previously found positive effect of independence on the structural balance can be confirmed. In the models with all fiscal rules, this effect is comparably robust to country omissions and is significant at conventional levels with 5 independence measures when tested with White standard errors (and only one when tested with small-sample (HC3) standard errors). In the models with national fiscal rules only, the effect of independence is somewhat less stable with regard to country omissions and is significant at conventional levels in the case of only three independence measures when tested with White standard errors (there is no significance at all when tested with HC3 standard errors).

Interestingly, the effect of independence on expenditures, which has been mixed in the models without fiscal rules, is now mostly negative, as expected (both with all fiscal rules and with national fiscal rules only), quite robust to country omissions and significant in two cases when tested with White standard errors. The effects of independence on the three debt variables, in contrast, which have been mostly negative in the previous models, are now relatively mixed.

The results regarding independence do not change much if instead of the IMF dataset on fiscal rules, the data from the OECD Budget Practices and Procedures Survey is used. The effects of independence on the structural balance and government expenditures show the expected directions for 13 of 14 independence measures and are comparably robust to country omissions (particularly in the case of government expenditures). Eight of the 14 independence coefficients in the expenditure model are significant at conventional levels when tested with White standard errors, three are significant in the structural balance model.

5.5 SAI implementation success

Unfortunately, a well-founded quantitative analysis of the implementation success of SAI recommendations is not possible based on our dataset because of the low case number. From our survey, we only received 9 responses regarding implementation success. The OECD's Survey on Budget Practices and Procedures of 2003³⁶ provides data on implementation success for 17 countries (question 4.5.q), five of which have also answered the related questions in our survey. By comparing the responses for these five countries, we find that the implementation success has almost consistently been assessed worse in the OECD survey. One reason for this finding may be that the OECD survey explicitly asks for implementation success during a specific period ("on a timely basis (as defined in statute or regulation)"). Since some recommendations are only implemented after that deadline, implementation success measured by the OECD survey may be lower. Another reason could be that supreme audit institutions have indeed become more effective between 2003 and today. Unfortunately, the OECD did not include the question for implementation success in its 2007 version of the survey.

Explorative analysis shows that SAIs without judicial powers seem to be more effective. The same applies to SAIs with stronger tracking of the implementation of recommendations. SAI independence seems to decrease implementation success (according to the OECD definition). The reason for that could also be that higher independence is generally accompanied by a less close working relationship between auditor and auditee. No robust correlation can be found between a monocratic SAI organization and its implementation success. All of these effects are neither significant in linear models nor in logit models and usually exhibit negative adjusted R^2 in linear models. The only variable showing significance in the logit models (and almost full robustness) is the tracking of the audit recommendations' implementation.

5.6 Extreme bounds analysis

In this analysis, we are working with a very small sample. Therefore, we have tested the robustness of our results in the course of sections 5.2 to 5.4 with regard to the omission of single observations and to the variation of the measure for SAI independence. That aside, we have tested all coefficients not only with White standard errors but also with special

³⁶We thank H el ene Leconte-Lucas from the OCED for providing these data.

small-sample standard errors (see MacKinnon and White (1985)).

To provide an even broader picture of robustness, we perform an extreme bounds analysis (EBA) and include a set of control variables. These controls include SAI characteristics, structural and variable features of the political system³⁷, characteristics of the budget framework³⁸ and fiscal decentralization. For the corruption perception index, the features of the political system and of the budget framework are replaced by judicial and prosecutor independence.

We apply Sala-i-Martin's (1997) version of EBA with three doubtful variables in each regression and adjusted R^2 as weights for the calculation of the cumulative density functions. The R implementation of Hlavac (2016) is used to perform the analysis. The summarized results of the up to 21,000 EBA regressions per dependent variable are presented in tables A8 to A14 of the appendix.

The negative effect of SAI independence on perceived corruption is strongly confirmed by the EBA. The same applies to the right to hear witnesses. The increasing effect of the exercise of judicial powers on perceived corruption, in contrast, is not supported by our EBA. Indeed, in almost half of the regressions, judicial powers exert a negative influence on the perceived level of corruption. The original result is confirmed, however, when instead of the exercise of judicial powers, the SAI's belonging to the judicial sphere of government is considered. SAIs that cannot be assigned to any sphere of government are usually associated with lower perceived corruption, whereas the results are mixed for SAIs in the parliamentary sphere. The corruption-alleviating effects of de facto judicial and prosecutor independence are confirmed by the EBA, whereas the de jure independence of these institutions has (surprisingly) an increasing effect on perceived corruption. The high share of negative coefficients for the effect of ex-ante audits on perceived freedom from corruption (i.e., on the CPI) is because Greece and Italy, which have very low CPI scores, are among the four countries in our sample in which SAIs have this right. Interestingly, monocratically organized SAIs seem to be more effective in establishing a perception of

³⁷We consider as features of the political environment the electoral system, two measures for the political left-right orientation of government and the Herfindahl index of government fragmentation.

³⁸Included in the regressions are the existence of fiscal rules (both, according to IMF and OECD data) and two index measures for the strength of budget institutions.

low corruption, whereas the contrary is true for SAIs with larger staff sizes.

The results regarding the effect of independence on the budget balances are not very robust. Notable exceptions are the independence measures *IND1* and *IND2*, which focus on resource independence and yield the expected coefficient directions for all three budget balance variables in the vast majority of EBA models. If anything, independence effects are the most robust for the structural balance. However, even there, only 8 of the 14 independence measures turn out to have both shares of positive coefficients of at least 70% in all EBA regressions and at least 70% CDF probability mass on the positive side.

For both the debt measures and government expenditures and revenues, the results for independence from the EBA are also quite mixed.

The counterintuitively negative effect of independence on debt ratings is slightly more robust than its effect on the budget balances: in the case of ratings for debt denominated in foreign currency, 10 out of 14 independence measures yield more than 80% negative coefficients in the more than 6,000 EBA models. The results from section 5.3 regarding auditor term length and the prohibition of reappointment can be confirmed (the effect of term length as measured by unadjusted term length is now clearly negative). These two results do not enable a clear conclusion about whether investors value knowledge accumulation by the auditor-general more highly than his independence.

Regarding the other SAI characteristics, it is notable that the EBA reveals a positive effect of the exercise of judicial powers on budget balances and debt ratings, whereas the effect is negative not only for government expenditures (as expected) but also for revenues and all debt measures. The effects of tracking the implementation of recommendations, staff size, the right to hear witnesses and the monocratic organization of the SAI are usually mixed or inconsistent across dependent variables of the same type (e.g., all budget balance measures, all debt measures). However, there is some evidence for both the tracking and the staff numbers having a positive effect on the ratings while monocratically organized SAIs usually exhibit lower ratings. It is also interesting to note that investors seem to prefer SAIs neither belonging to the judicial nor to the parliamentary sphere, whereas SAIs in the parliamentary sphere have a positive effect on budget balances.

6 Conclusions and outlook

This cross-country study analyzes the effects of independence and strong mandates of supreme audit institutions (SAIs) on perceived corruption, government bond ratings and a range of fiscal measures (budget balances, debt, expenditures and revenues). Based on primary data generated through a survey among national supreme audit institutions, scientists and members of parliament, and secondary data from various sources, we calculate 14 index-based measures of SAI independence and indicators of mandate strength.

We find that more independent SAIs lead to lower levels of *perceived corruption*. Positive effects of the right to hear witnesses are also supported by the data. Unlike previous studies, we do not find an increasing effect of the exercise of judicial powers by the SAI on perceived corruption, at least when a reasonable set of SAI and non-SAI controls is included. We do, however, find a negative effect of belonging to the judicial sphere of government. In addition, our extreme bounds analysis reveals that SAIs that are not clearly assigned to any sphere of government are the most effective in fighting perceived corruption, as are smaller SAIs (in terms of staff size) and SAIs that are monocratically organized.

We find some evidence for the auditor-general's term length negatively influencing *sovereign debt ratings*. At the same time, reappointment restrictions also affect ratings negatively, so there is no clear answer to the trade-off between independence and knowledge accumulation in the office of the auditor-general. Interestingly, however, there is some quite robust evidence that overall SAI independence as measured by our SAI independence indices negatively affects ratings.

Finally, we provide empirical support for the hypothesis that more independent SAIs are related to higher *structural balances*. This evidence is, however, significantly less robust than the results for perceived corruption and slightly less robust than the results for ratings.

In summary, we find indications of a measurable economic impact of supreme audit institutions.

The field of quantitative research on the effects of the institutional design, mandate and

audit procedures of supreme audit institutions remains in a relatively early development stage. For future research, it would be desirable to use larger samples and more closely examine not only the SAIs' mandates but also *procedural aspects* such as following up on recommendations and enforcement mechanisms to better understand the reception and impact of SAI audit results and the reactions that they trigger. This is important because these reactions are the transmission mechanism between audit results and fiscal aggregates. Furthermore, it would be interesting to shed more light on the interaction between SAIs and their principals and auditees to improve our understanding of the de facto aspects of SAI independence. Together with the existing empirical results from the literature, this would help support discussions about improving SAI independence and effectiveness.

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Appendix

Table A1: SAI independence values and countries' ranking positions

	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND10	IND11	IND12	IND13	IND14
	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value
Australia	26 0.500	19 0.667	12 0.500	6 0.667	12 0.500	12 0.500	20 0.571	22 0.500	16 0.444	20 0.500	28 0.364	26 0.417	22 0.458	26 0.417
Austria	1 1.000	1 1.000	26 0.100	21 0.400	32 0.092	24 0.300	16 0.600	29 0.421	14 0.467	9 0.600	10 0.585	6 0.644	18 0.486	6 0.614
Belgium	1 1.000	1 1.000	26 0.100	30 0.067	32 0.092	28 0.238	22 0.564	29 0.421	30 0.217	29 0.413	25 0.422	25 0.436	32 0.346	25 0.426
Brazil	19 0.750	19 0.667	23 0.200	18 0.467	29 0.225	4 0.600	14 0.629	26 0.488	4 0.600	8 0.617	7 0.622	4 0.650	10 0.556	1 0.658
Canada	1 1.000	1 1.000	1 0.700	1 0.800	7 0.600	4 0.600	1 0.771	1 0.800	4 0.600	2 0.700	8 0.600	4 0.650	3 0.608	5 0.617
Chile	19 0.750	19 0.667	1 0.700	1 0.800	21 0.433	8 0.538	17 0.593	18 0.592	7 0.572	10 0.596	12 0.557	22 0.497	17 0.489	15 0.540
Czech Republic	1 1.000	1 1.000	12 0.500	17 0.556	12 0.500	12 0.500	5 0.714	3 0.750	12 0.519	7 0.639	13 0.552	20 0.528	7 0.568	13 0.556
Denmark	1 1.000	1 1.000	7 0.600	14 0.622	8 0.592	17 0.488	9 0.707	11 0.671	24 0.402	17 0.551	23 0.450	14 0.547	16 0.513	21 0.482
Estonia	19 0.750	19 0.667	7 0.600	21 0.400	4 0.675	17 0.488	22 0.564	9 0.713	19 0.439	23 0.496	22 0.456	30 0.325	20 0.466	23 0.454
Finland	1 1.000	1 1.000	23 0.200	28 0.133	30 0.183	26 0.288	17 0.593	27 0.467	29 0.239	26 0.429	21 0.465	22 0.497	28 0.395	22 0.457
France	26 0.500	31 0.333	32 0.000	24 0.333	12 0.500	12 0.500	29 0.429	22 0.500	8 0.556	20 0.500	18 0.515	21 0.500	8 0.563	9 0.583
Germany	1 1.000	1 1.000	12 0.500	6 0.667	23 0.375	12 0.500	5 0.714	20 0.563	16 0.444	12 0.583	19 0.503	2 0.667	15 0.531	14 0.542
Greece	19 0.750	19 0.667	32 0.000	33 0.000	27 0.250	34 0.000	33 0.286	22 0.500	34 0.111	33 0.250	34 0.226	33 0.167	34 0.281	34 0.250
Hungary	26 0.500	19 0.667	23 0.200	28 0.133	30 0.183	23 0.350	27 0.486	27 0.467	13 0.489	19 0.533	4 0.639	17 0.539	24 0.447	12 0.561
Iceland	34 0.000	31 0.333	26 0.100	30 0.067	25 0.342	28 0.238	34 0.279	29 0.421	30 0.217	34 0.246	32 0.315	31 0.269	33 0.283	33 0.260
India	1 1.000	1 1.000	32 0.000	33 0.000	27 0.250	32 0.188	26 0.536	22 0.500	32 0.194	31 0.396	29 0.349	27 0.375	30 0.380	27 0.396
Ireland	33 0.250	34 0.000	12 0.500	6 0.667	12 0.500	1 0.750	29 0.429	34 0.250	8 0.556	27 0.417	33 0.292	29 0.333	26 0.411	31 0.333
Israel	1 1.000	1 1.000	26 0.100	21 0.400	32 0.092	28 0.238	22 0.564	29 0.421	19 0.439	13 0.579	9 0.591	10 0.603	19 0.471	8 0.593
Italy	19 0.750	19 0.667	12 0.500	6 0.667	1 0.750	1 0.750	5 0.714	14 0.625	16 0.444	20 0.500	24 0.423	2 0.667	8 0.563	20 0.500
Japan	1 1.000	1 1.000	1 0.700	4 0.689	2 0.683	8 0.538	3 0.736	6 0.717	23 0.424	15 0.568	16 0.529	8 0.608	12 0.551	16 0.513
Korea	19 0.750	31 0.333	7 0.600	14 0.622	5 0.633	24 0.300	32 0.314	19 0.567	22 0.430	30 0.406	30 0.337	32 0.200	27 0.398	30 0.350
Luxembourg	1 1.000	1 1.000	12 0.500	24 0.333	12 0.500	21 0.438	12 0.679	14 0.625	28 0.306	24 0.479	27 0.380	27 0.375	23 0.448	27 0.396
Netherlands	26 0.500	19 0.667	12 0.500	6 0.667	6 0.625	1 0.750	5 0.714	20 0.563	1 0.667	4 0.667	14 0.534	12 0.583	2 0.630	4 0.625
New Zealand	1 1.000	1 1.000	12 0.500	6 0.667	12 0.500	21 0.438	12 0.679	3 0.750	11 0.528	6 0.646	11 0.585	16 0.542	6 0.573	11 0.563
Norway	1 1.000	1 1.000	26 0.100	30 0.067	11 0.550	33 0.050	28 0.457	13 0.650	33 0.133	32 0.350	20 0.473	19 0.533	20 0.466	24 0.433
Poland	26 0.500	19 0.667	1 0.700	4 0.689	2 0.683	8 0.538	17 0.593	6 0.717	10 0.535	15 0.568	6 0.637	8 0.608	13 0.535	16 0.513

	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND10	IND11	IND12	IND13	IND14
	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value	Rank Value
Portugal	19 0.750	19 0.667	12 0.500	24 0.333	12 0.500	27 0.250	29 0.429	14 0.625	27 0.333	27 0.417	31 0.330	33 0.167	31 0.375	31 0.333
Slovak Republic	1 1.000	1 1.000	7 0.600	14 0.622	8 0.592	17 0.488	9 0.707	2 0.796	3 0.624	1 0.718	1 0.661	14 0.547	1 0.638	2 0.649
Slovenia	1 1.000	1 1.000	1 0.700	18 0.467	21 0.433	4 0.600	1 0.771	6 0.717	4 0.600	2 0.700	4 0.639	17 0.539	10 0.556	3 0.644
Sweden	1 1.000	1 1.000	7 0.600	3 0.733	8 0.592	17 0.488	9 0.707	11 0.671	19 0.439	13 0.579	17 0.519	10 0.603	14 0.533	19 0.510
Switzerland	1 1.000	1 1.000	1 0.700	18 0.467	24 0.350	8 0.538	3 0.736	10 0.675	15 0.461	10 0.596	15 0.534	24 0.442	24 0.447	16 0.513
Turkey	1 1.000	1 1.000	26 0.100	27 0.289	20 0.467	28 0.238	22 0.564	5 0.733	24 0.402	17 0.551	3 0.653	7 0.631	5 0.575	7 0.607
United Kingdom	26 0.500	19 0.667	12 0.500	6 0.667	12 0.500	12 0.500	20 0.571	14 0.625	1 0.667	4 0.667	2 0.657	12 0.583	4 0.583	9 0.583
United States	26 0.500	19 0.667	12 0.500	6 0.667	26 0.333	7 0.563	15 0.607	33 0.417	26 0.361	25 0.438	26 0.412	1 0.681	29 0.391	29 0.382

Table A2: Descriptive statistics of the independence measures

	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND10	IND11	IND12	IND13	IND14
Minimum	0,000	0,000	0,000	0,000	0,092	0,000	0,279	0,250	0,111	0,246	0,226	0,167	0,281	0,250
Maximum	1,000	1,000	0,700	0,800	0,750	0,750	0,771	0,800	0,667	0,718	0,661	0,681	0,638	0,658
Range	1,000	1,000	0,700	0,800	0,658	0,750	0,493	0,550	0,556	0,472	0,435	0,514	0,356	0,408
Mean	0,794	0,794	0,409	0,465	0,443	0,434	0,588	0,586	0,437	0,526	0,494	0,499	0,486	0,496
Median	1,000	1,000	0,500	0,511	0,500	0,488	0,593	0,608	0,444	0,551	0,517	0,539	0,488	0,513
Std. dev.	0,265	0,260	0,245	0,248	0,185	0,185	0,136	0,133	0,148	0,120	0,120	0,147	0,093	0,112

Table A3: Correlation matrix of SAI independence measures

	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND10	IND11	IND12	IND13	IND14
IND1	1.000	0.871	0.076	-0.020	-0.088	-0.212	0.550	0.491	-0.128	0.352	0.295	0.271	0.273	0.365
IND2	0.871	1.000	0.045	-0.067	-0.168	-0.217	0.651	0.510	-0.146	0.405	0.425	0.437	0.294	0.419
IND3	0.076	0.045	1.000	0.808	0.661	0.673	0.560	0.554	0.540	0.523	0.201	0.138	0.418	0.174
IND4	-0.020	-0.067	0.808	1.000	0.583	0.782	0.553	0.355	0.744	0.652	0.330	0.441	0.631	0.391
IND5	-0.088	-0.168	0.661	0.583	1.000	0.487	0.241	0.630	0.338	0.222	0.021	0.031	0.488	0.036
IND6	-0.212	-0.217	0.673	0.782	0.487	1.000	0.599	0.161	0.773	0.597	0.289	0.436	0.597	0.418
IND7	0.550	0.651	0.560	0.553	0.241	0.599	1.000	0.543	0.481	0.796	0.573	0.698	0.705	0.669
IND8	0.491	0.510	0.554	0.355	0.630	0.161	0.543	1.000	0.284	0.538	0.471	0.227	0.614	0.411
IND9	-0.128	-0.146	0.540	0.744	0.338	0.773	0.481	0.284	1.000	0.846	0.660	0.462	0.781	0.731
IND10	0.352	0.405	0.523	0.652	0.222	0.597	0.796	0.538	0.846	1.000	0.839	0.663	0.880	0.902
IND11	0.295	0.425	0.201	0.330	0.021	0.289	0.573	0.471	0.660	0.839	1.000	0.743	0.774	0.926
IND12	0.271	0.437	0.138	0.441	0.031	0.436	0.698	0.227	0.462	0.663	0.743	1.000	0.710	0.768
IND13	0.273	0.294	0.418	0.631	0.488	0.597	0.705	0.614	0.781	0.880	0.774	0.710	1.000	0.866
IND14	0.365	0.419	0.174	0.391	0.036	0.418	0.669	0.411	0.731	0.902	0.926	0.768	0.866	1.000

Table A4: Experts' assessment of the relevance of institutional indicators for SAI independence

Criterion	Average of assessment (1 – 10)	Standard deviation	Relative weight	Number of observations
Right to decide on audit program	8.727	2.492	¹⁾	22
Right to decide on own staff	7.864	2.513	0.119	22
Appointment procedure for auditor-general	7.682	2.662	0.116	22
Appointment procedure for auditor-general	7.667	3.261	0.116	21
Determine budget without governmental interference	7.455	3.320	0.112	22
Ban on political-party membership	7.158	3.304	0.108	19
Ban on secondary employment	6.850	3.183	0.103	20
Ban on reappointment	6.421	2.912	0.097	19
Term length in relation to government	6.095	3.419	0.092	21
Ban on certain offices after leaving auditor-general position	4.778	3.116	0.072	18
Ban on certain offices before assuming position of auditor-general	4.389	3.183	0.066	18

¹⁾ Not included in independence indices because of a lack of variation among countries.

Table A5: SAI characteristics used in this study (from survey questionnaire)

Variable	Description	Coding
<i>Characteristics of the office of Auditor-General</i>		
PROP_AG	Who proposes the Auditor-General?	
	The board of the Supreme Audit Institution	1.00
	An independent council / body	0.75
	The legislative (with special majority)	0.50
	The legislative (with normal majority)	0.25
	The executive	0.00
APP_AG	Who appoints/elects the Auditor-General?	
	The people / voters	1.00
	The board of the Supreme Audit Institution	0.80
	An independent council / body	0.60
	The legislative (with special majority)	0.40
	The legislative (with normal majority)	0.20
	The executive	0.00
AG_APP_PROP_EQU_DEC	Appointment of AG: Proposal maker equals decider.	
	Yes	0.00
	No	1.00
DISMISS_PROP_AG	Who can propose to dismiss the Auditor-General?	
	No dismissal possible	1.00
	The people / voters	0.83
	The Supreme Audit Institution itself	0.67
	An independent council / body	0.50
	The legislative (with special majority)	0.33
	The legislative (with normal majority)	0.17
	The executive	0.00
DISMISS_DEC_AG	Who dismisses the Auditor-General?	
	No dismissal possible	1.00
	The people / voters	0.83
	The Supreme Audit Institution itself	0.67
	An independent council / body	0.50
	The legislative (with special majority)	0.33
	The legislative (with normal majority)	0.17
	The executive	0.00
AG_DISM_PROP_EQU_DEC	Dismissal of AG: Proposal maker equals decider.	
	Yes	0.00
	No	1.00
DF_DISM_AG	How often has an Auditor-General been dismissed during the last 20 years?	Number
DF_DISM_AG_REAS	In how many of these cases was the actual reason for dismissal related to the exercise of the office of the Auditor-General?	Number
REAPP_AG	Re-appointment / re-election of the Auditor-General	
	Re-election not permitted	1.00
	Re-election permitted for one term	0.67
	Re-election permitted for more than one term. Number of re-elections limited	0.33
	Re-election not restricted	0.00
DF_REAPPS_AG	How many times in the last 20 years have Auditor-Generals been reappointed?	Number
TERM_LEN	Term of office of the Auditor-General and the members of the board	
	Unlimited / for life	1.00
	> 12 years, but limited	0.75
	8 < term length ≤ 12	0.50
	4 < term length ≤ 8	0.25
	≤ 4 years	0.00
DF_AVG_TERM_AG	What has been the average actual term length of the Auditor-General during the last 20 years?	Number

Variable	Description	Coding
TERM_LEN_REL_GOV_AG	Term of office of the Auditor-General in relation to government	
	Unlimited / for life	1.00
	Limited, but longer than the term of office of the government	0.50
	Shorter than or equal to the term of office of the government	0.00
OFFICES_BEFORE	Holding certain offices is prohibited for a specified time before assuming office as Auditor-General or member of the board.	
	True	1.00
	False	0.00
DF_SHARE_AG_BEFORE	During the last 20 years, how many Auditor-Generals have worked in government or administration immediately before assuming office as Auditor-General?	Number
SEC_EMPLOY	Auditor-General and members of the board may not have secondary employment during their term of office.	
	True	1.00
	False	0.00
OFFICES_AFTER	Holding certain offices is prohibited for a specified time after leaving office as Auditor-General or member of the board.	
	True	1.00
	False	0.00
DF_SHARE_AG_AFTER	Which share of Auditor-Generals during the last 20 years assumed an office in government or administration immediately after leaving the Supreme Audit Institution?	Number
POL_PARTY	Auditor-General and members of the board may not have an active membership in any political party.	
	True	1.00
	False	0.00
DF_SHARE_AG_PARTY	Which share of Auditor-Generals during the last 20 years has been member of a political party?	Number
<i>Characteristics of the institution</i>		
MONOCRATIC	Leadership structure of the Supreme Audit institution	
	Monocratic	1.00
	Collegiate	0.00
BUDGET_PROPOSAL	Proposal for SAI budget	
	Proposal cannot be changed by the government	1.00
	Proposal can be changed by the government	0.00
EXPEND_BUDGET	SAI has the right to expend budget autonomously.	
	True	1.00
	False	0.00
INIT_AUDITS	The Supreme Audit Institution can decide on its own to initiate and perform audits without the approval of any other institution.	
	True	1.00
	False	0.00
EXANTE	Supreme Audit Institution may perform ex-ante audits (approval of payments, contracts, administrative orders, etc.).	
	Yes	1.00
	No	0.00
DECIDE_STAFF	The Supreme Audit Institution may choose its own staff.	
	True	1.00
	False	0.00
DF_MAND_FTE_ANALYTICAL	Personnel of the Supreme Audit Institution: FTEs in analytical / audit functions	Number
DF_MAND_FTE_ADMIN	Personnel of the Supreme Audit Institution: FTE in administrative / other functions	Number
DF_SPHERE	To which sphere does the Supreme Audit Institution most likely belong?	
	Neither judicial nor parliamentary nor government sphere	1.00
	To the judicial sphere	0.67
	To the sphere of parliament	0.33
	To the sphere of government	0.00

Variable	Description	Coding
DF_MAND_JUD_POWERES	Does the Supreme Audit Institution exercise (quasi) judicial powers?	
	Yes	1.00
	No	0.00
MAND_INFO_ACCESS	The Supreme Audit Institution may require access to records and documents of the audited institutions.	
	True	1.00
	False	0.00
MAND_FORCE_WITNESS	The Supreme Audit Institution may require officials of the audited institutions to serve as witness / participate in hearings.	
	True	1.00
	False	0.00
MAND_AUDIT_TYPES_ACC	Types of audit the Supreme Audit Institution performs:	
	Accounting audit	
	Law compliance audit	
	Program audit	
	General efficiency audit	
MAND_COMMENT_REQ	Audited institution is required to comment on audit results.	
	True	1.00
	False	0.00
MAND_REMEDY	Which influence does the law give to the Supreme Audit Institution with regard to the remedy of problems / implementation of proposals?	
	Supreme Audit Institution can order remedy measures directly	1.00
	Supreme Audit Institution can demand remedy and appeal another institution in the event of the inactivity of the audited institution	0.67
	Supreme Audit Institution can demand remedy, but cannot appeal other institution in the event of the inactivity of the audited institution	0.33
	Supreme Audit Institution cannot demand a remedy	0.00

Table A6: Dependent and independent variables from other sources than our survey

Variable	Description	Data source
<i>Dependent variables</i>		
RATING_LT_DOM	Long-term issuer rating for bonds denominated in domestic currency; scale: Aaa (coded 1) to C (coded 21)	Moody's Investors Service
RATING_LT_FOR	Long-term issuer rating for bonds denominated in domestic currency; scale: Aaa (coded 1) to C (coded 21)	Moody's Investors Service
CPI_SCORE	Corruption Perception Index 2011; scale: 0 to 10 (with 10 indicating the lowest level of perceived corruption)	Transparency International
GOV_EXP_GDP	General government total expenditure in % of GDP	IMF World Economic Outlook Database Sep 2011
NET_LEND_GDP	General government net lending/borrowing in % of GDP	IMF World Economic Outlook Database Sep 2011
BAL_PRIM_GDP	General government primary net lending/borrowing in % of GDP	IMF World Economic Outlook Database Sep 2011
BAL_STRUC_GDP	General government structural balance in % of GDP	IMF World Economic Outlook Database Sep 2011
NET_DEBT_GDP	General government net debt in % of GDP	IMF World Economic Outlook Database Sep 2011
GROSS_DEBT_GDP	General government gross debt in % of GDP	IMF World Economic Outlook Database Sep 2011
CENTR_GROSS_DEBT_GDP	Central government debt in % of GDP	IMF World Economic Outlook Database Sep 2011

Variable	Description	Data source
IMPL	Implementation success "on a timely basis (as defined in statute or regulation)", in % of recommendations made: "Close to 100%" (coded 1); "75 to 100%" (coded 2); "50 to 75%" (coded 3); "25 to 50%" (coded 4); "0 to 25%" (coded 5)	OECD Survey on Budget Institutions and Procedures (2003)
<i>Independent variables</i>		
POP_TOTAL	Total population (in 10 m)	OECD StatExtracts
POP_0_14_SHARE	Share of children (age 0 to 14) in % of total population	OECD StatExtracts
POP_65PLUS_SHARE	Share of seniors (age 65+) in % of total population	OECD StatExtracts
POP_DENSITY	Population density (inhabitants per square km)	Calculated from OECD population data and area data from United Nations Statistics Division Demographical Yearbook
URBAN	Urbanization (share of population living in urban areas according to national definitions)	CIA World Factbook
PROT_LAPORTA	Share of Protestants among the population	LaPorta et al. (1999)
GDP_CAP	GDP (in current prices; USD) per capita (in 10k)	IMF World Economic Outlook Database Sep 2011
UNEMPLOY	Unemployment rate	IMF World Economic Outlook Database Sep 2011
OPEN	Openness of the economy (imports plus exports divided by GDP)	Calculated based on IMF World Economic Outlook Database Sep 2011 data
ELEC_SYS	Election system: Coded 1 if the majority of seats in the first chamber of Parliament is elected according to plurality rules, otherwise 0	World Bank Database on Political Institutions
HERF_GOV	Herfindahl index for government	World Bank Database on Political Institutions
FREE_PRESS	Freedom of the press rating	Freedom House (2007)
FRI_RULES_EXP	Dummy for expenditure rule in place	OECD Survey on Budget Institutions and Procedures (2007)
FRI_RULES_REV	Dummy for revenue rule in place	OECD Survey on Budget Institutions and Procedures (2007)
FRI_RULES_BAL	Dummy for budget balance rule in place	OECD Survey on Budget Institutions and Procedures (2007)
FRI_RULES_DEBT	Dummy for debt rule in place	OECD Survey on Budget Institutions and Procedures (2007)
IMF_RULES_EXP	Dummy for expenditure rule in place	IMF Fiscal Rules Dataset, 2012 (Schaechter et. al. (2012))
IMF_RULES_BAL	Dummy for budget balance rule in place	IMF Fiscal Rules Dataset, 2012 (Schaechter et. al. (2012))
IMF_RULES_DEBT	Dummy for debt rule in place	IMF Fiscal Rules Dataset, 2012 (Schaechter et. al. (2012))
JUD_INDEP_JUR	Index of de jure judicial independence	Feld/Voigt (2003)
JUD_INDEP_FACT	Index of de facto judicial independence	Feld/Voigt (2003)
PR_INDEP_JUR	Index of de jure prosecutor independence	van Aaken et. al. (2010)
PR_INDEP_FACT	Index of de facto prosecutor independence	van Aaken et. al. (2010)
FRI_SPEND_LIMITS	Dummy for limits (ceilings) imposed by the central budget authority/finance ministry for each ministry's initial spending request	OECD Survey on Budget Institutions and Procedures (2007)

Variable	Description	Data source
FRI_VOTE_AGGR	Dummy for vote of the legislature on the total amount of expenditure before specific appropriation votes	OECD Survey on Budget Institutions and Procedures (2007)
FRI_AMEND	Dummy for any restrictions for the legislature to amend the budget proposed by the executive (either amendments permissible only while keeping the budget balance unchanged or amendments permissible only if they decrease expenditures or increase revenue or if amendments are not permissible at all)	OECD Survey on Budget Institutions and Procedures (2007)
FRI_EXEC_VETO	Dummy for any type of veto power of the executive on the budget decided by the legislature (either line item veto or package veto or both)	OECD Survey on Budget Institutions and Procedures (2007)
TRACKING	Tracking of audit recommendations: "Yes, keeps track of implementation of recommendations" (coded 1); "Yes, an annual report is issued of recommendations" (coded 2); "Yes, but the reports are kept internally" (coded 3); "No" (coded 4)	OECD Survey on Budget Institutions and Procedures (2003)

Table A7: Composition of the indices of SAI independence

Criterion	Variable	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND10	IND11	IND12	IND13	IND14
Right to expend budget autonomously	EXPEND_BUDGET	x	x					x	x		x			x	x
Budget proposal cannot be changed by the government	BUDGET_PROPOSAL	x	x						x		x	x	x	x	x
Right to decide on own staff	DECIDE_STAFF		x					x	x		x	x	x	x	x
Appointment of the auditor-general	APP_AG			x	x	x	x	x	x	x	x	x	x	x	x
Proposal for appointment of the auditor-general	PROP_AG			x	x	x	x	x						x	
Appointment: Proposal-maker equals decider	AG_APP_PROP_EQU_DEC			x	x	x	x	x	x	x	x			x	
Dismissal of the auditor-general	DISMISS_DEC_AG					x			x			x	x	x	x
Proposal for dismissal of the auditor-general	DISMISS_PROP_AG													x	
Dismissal: Proposal maker equals decider	AG_DISM_PROP_EQU_DEC					x			x					x	
Reappointment of the auditor-general	REAPP_AG				x					x	x	x	x	x	x
Term length of the auditor-general relative to term length of government	TERM_LEN_REL_GOV_AG						x	x		x	x	x		x	x
Absolute term length of the auditor-general	TERM_LEN						x	x		x	x		x	x	x
Ban on certain offices before assuming the office of auditor-general	OFFICES_BEFORE									x	x	x		x	x
Ban on secondary employment	SEC_EMPLOY									x	x	x		x	x
Ban on certain offices after leaving the position of auditor-general	OFFICES_AFTER									x	x	x		x	x
Ban on active membership in a political party	POL_PARTY								x	x	x	x		x	x

Table A8: Results of EBA analysis (1/7): Corruption Perception Index (CPI)

Variable	Corruption Perception Index (CPI)						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	-2.77	1.30	-0.60	0.83	0.17	0.77	0.23
IND2	-3.32	1.56	-0.65	0.82	0.18	0.81	0.19
IND3	-2.35	0.54	-1.30	0.98	0.02	0.94	0.06
IND4	-3.50	-0.06	-1.83	1.00	0.00	0.97	0.03
IND5	-2.43	1.85	-0.66	0.80	0.20	0.71	0.29
IND6	-3.21	1.39	-1.17	0.91	0.09	0.77	0.23
IND7	-4.66	1.80	-2.11	0.97	0.03	0.90	0.10
IND8	-3.03	2.27	-1.26	0.91	0.09	0.79	0.21
IND9	-5.50	-0.62	-2.97	1.00	0.00	0.97	0.03
IND10	-6.85	-0.06	-4.31	1.00	0.00	0.99	0.01
IND11	-6.29	1.04	-3.40	0.99	0.01	0.97	0.03
IND12	-4.70	1.25	-1.34	0.88	0.12	0.82	0.18
IND13	-5.92	1.20	-3.50	1.00	0.00	0.93	0.07
IND14	-6.47	1.26	-4.04	1.00	0.00	0.98	0.02
EXANTE	0.21	3.93	2.17	0.00	1.00	0.00	1.00
DF_MAND_JUD_POWER	-1.72	1.12	-0.05	0.57	0.43	0.54	0.46
MAND_FORCE_WITNESS	-1.14	0.58	-0.43	0.95	0.05	0.85	0.15
MONOCRATIC	-2.05	0.75	-0.49	0.93	0.07	0.88	0.12
fte_total	0.00	0.00	0.00	0.00	1.00	0.00	1.00
fte_pop	-10.2 k	37.5 k	11.4 k	0.05	0.95	0.09	0.91
fte_gdp	-0.04	0.11	0.02	0.08	0.92	0.13	0.87
JUD_INDEP_JUR	-4.06	6.54	0.72	0.33	0.67	0.38	0.62
JUD_INDEP_FACT	-3.58	-0.25	-2.21	1.00	0.00	0.99	0.01
PI_DE_JURE	-2.08	3.82	1.15	0.20	0.80	0.24	0.76
PI_DE_FACTO	-2.91	0.58	-0.94	0.94	0.06	0.92	0.08
jud_sphereTRUE	0.08	2.70	1.84	0.00	1.00	0.00	1.00
parl_sphereTRUE	-0.79	1.52	-0.04	0.62	0.38	0.54	0.46
ind_sphereTRUE	-2.02	0.39	-0.40	0.87	0.13	0.83	0.17

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation. Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation. CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation. The independent variables of the base specifications are included as free variables.

Table A9: Results of EBA analysis (2/7): Net lending and primary balance

Variable	Net lending							Primary balance						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	2.23	7.87	4.53	0.00	1.00	0.01	0.99	0.27	5.97	3.17	0.00	1.00	0.04	0.96
IND2	1.08	9.30	3.25	0.00	1.00	0.03	0.97	-0.36	6.67	2.68	0.01	0.99	0.06	0.94
IND3	-4.46	6.34	1.34	0.28	0.72	0.32	0.68	-6.93	2.69	-1.96	0.86	0.14	0.78	0.22
IND4	-4.25	4.10	0.10	0.44	0.56	0.49	0.51	-6.57	1.97	-2.65	0.97	0.03	0.89	0.11
IND5	1.75	8.81	4.87	0.00	1.00	0.04	0.96	-3.47	5.52	1.12	0.21	0.79	0.32	0.68
IND6	-12.68	-1.17	-5.18	1.00	0.00	0.89	0.11	-13.66	1.08	-5.99	0.99	0.01	0.95	0.05
IND7	-6.72	15.37	0.86	0.40	0.60	0.42	0.58	-11.65	9.47	-0.40	0.60	0.40	0.54	0.46
IND8	3.33	16.43	8.28	0.00	1.00	0.03	0.97	-1.48	12.81	4.20	0.02	0.98	0.16	0.84
IND9	-21.41	-2.54	-8.32	1.00	0.00	0.96	0.04	-19.67	-0.99	-8.11	1.00	0.00	0.98	0.02
IND10	-12.39	7.98	-3.85	0.92	0.08	0.77	0.23	-19.64	5.74	-5.95	0.94	0.06	0.90	0.10
IND11	-9.26	12.68	-0.35	0.54	0.46	0.52	0.48	-9.20	11.20	1.57	0.31	0.69	0.40	0.60
IND12	-7.09	20.27	2.18	0.24	0.76	0.30	0.70	-10.37	18.52	4.14	0.05	0.95	0.18	0.82
IND13	-5.14	10.66	2.27	0.23	0.77	0.34	0.66	-11.05	12.61	-0.87	0.49	0.51	0.56	0.44
IND14	-12.87	9.16	-1.51	0.65	0.35	0.62	0.38	-13.36	10.97	0.00	0.43	0.57	0.50	0.50
HERF	-5.50	6.16	-0.96	0.81	0.19	0.69	0.31	-4.35	5.66	-0.24	0.79	0.21	0.55	0.45
GOV_LEFTRIGHT	-0.86	1.23	0.11	0.26	0.74	0.43	0.57	-1.21	0.99	-0.11	0.45	0.55	0.57	0.43
LEFT_GOV_SEATS_REL	-2.45	3.38	-0.42	0.80	0.20	0.61	0.39	-2.87	2.19	-0.41	0.71	0.29	0.62	0.38
ELEC_SYS	-1.00	4.27	1.35	0.02	0.98	0.13	0.87	-3.49	2.02	-0.95	0.93	0.07	0.77	0.23
bud_inst_small	-1.34	1.75	-0.36	0.88	0.12	0.76	0.24	-1.55	2.94	0.08	0.81	0.19	0.44	0.56
bud_inst_big	-1.70	0.38	-0.79	0.99	0.01	0.97	0.03	-1.51	0.93	-0.47	0.97	0.03	0.88	0.12
EXANTE	-5.66	2.91	-1.47	0.91	0.09	0.86	0.14	-4.57	4.46	-0.40	0.55	0.45	0.62	0.38
DF_MAND_JUD_POWERS	-3.34	8.11	1.50	0.08	0.92	0.18	0.82	-3.32	8.01	3.04	0.07	0.93	0.04	0.96
MAND_FORCE_WITNESS	-3.94	2.73	-0.39	0.75	0.25	0.61	0.39	-4.06	1.49	-0.88	0.95	0.05	0.81	0.19
MONOCRATIC	-7.37	1.52	-0.82	0.74	0.26	0.70	0.30	-7.67	1.37	-1.96	0.63	0.37	0.88	0.12
fte_total	0.00	0.01	0.00	0.12	0.88	0.20	0.80	0.00	0.01	0.00	0.00	1.00	0.01	0.99
fte_pop	-6.4 k	63.9 k	22.3 k	0.01	0.99	0.16	0.84	-11.7 k	52.4 k	26.1 k	0.01	0.99	0.09	0.91
fte_gdp	-0.07	0.19	0.03	0.13	0.87	0.33	0.67	-0.05	0.19	0.08	0.10	0.90	0.11	0.89
jud_sphereTRUE	-9.02	3.72	-2.23	0.99	0.01	0.96	0.04	-10.72	0.96	-2.97	0.99	0.01	0.98	0.02
parl_sphereTRUE	-3.09	6.26	1.30	0.11	0.89	0.17	0.83	-1.79	8.03	2.04	0.08	0.92	0.08	0.92
ind_sphereTRUE	-5.36	2.70	-1.64	0.96	0.04	0.91	0.09	-4.99	2.54	-1.44	0.92	0.08	0.87	0.13

Variable	Net lending							Primary balance						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)
TRACKING	-1.27	1.04	0.00	0.42	0.58	0.50	0.50	-1.15	0.72	-0.04	0.41	0.59	0.53	0.47
DECENTR	-0.05	0.15	0.05	0.02	0.98	0.13	0.87	-0.08	0.10	0.02	0.19	0.81	0.34	0.66
IMF_RULES_BAL	-4.33	7.72	-1.37	0.91	0.09	0.79	0.21	-5.25	2.47	-2.23	0.97	0.03	0.94	0.06
FRI_RULES_BAL	-5.14	5.07	1.34	0.04	0.96	0.16	0.84	-6.81	3.74	0.19	0.17	0.83	0.44	0.56

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.

Table A10: Results of EBA analysis (3/7): Structural balance

Variable	Structural balance						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	0.98	5.91	2.95	0.00	1.00	0.07	0.93
IND2	-0.85	6.91	3.55	0.00	1.00	0.03	0.97
IND3	-2.07	5.57	2.94	0.04	0.96	0.06	0.94
IND4	-1.58	5.14	2.43	0.01	0.99	0.14	0.86
IND5	-5.33	5.20	0.78	0.37	0.63	0.37	0.63
IND6	-5.91	5.03	0.77	0.37	0.63	0.39	0.61
IND7	0.39	14.19	7.16	0.00	1.00	0.02	0.98
IND8	-2.49	9.15	4.52	0.03	0.97	0.13	0.87
IND9	-12.53	2.99	-2.03	0.78	0.22	0.71	0.29
IND10	-5.97	10.82	3.26	0.20	0.80	0.22	0.78
IND11	-17.71	9.85	-2.47	0.54	0.46	0.71	0.29
IND12	-9.81	9.09	1.84	0.28	0.72	0.28	0.72
IND13	-13.50	8.98	0.96	0.41	0.59	0.42	0.58
IND14	-18.82	10.60	0.61	0.37	0.63	0.44	0.56
HERF	-10.32	0.22	-3.99	1.00	0.00	0.99	0.01
GOV_LEFTRIGHT	-1.58	0.44	-0.44	0.96	0.04	0.80	0.20
LEFT_GOV_SEATS_REL	-3.52	0.70	-1.31	0.99	0.01	0.87	0.13
ELEC_SYS	-0.05	5.45	1.92	0.00	1.00	0.02	0.98
bud_inst_small	-2.08	0.50	-0.46	0.95	0.05	0.89	0.11
bud_inst_big	-1.83	0.03	-0.58	1.00	0.00	0.95	0.05
EXANTE	-9.82	1.00	-3.70	1.00	0.00	1.00	0.00
DF_MAND_JUD POWERS	-4.48	4.88	1.00	0.18	0.82	0.25	0.75
MAND_FORCE_WITNESS	-1.21	3.68	1.67	0.00	1.00	0.07	0.93
MONOCRATIC	-1.67	3.51	0.71	0.13	0.87	0.24	0.76
fte_total	-0.01	0.00	0.00	0.80	0.20	0.64	0.36
fte_pop	-35.4 k	27.1 k	-2.1 k	0.58	0.42	0.55	0.45
fte_gdp	-0.15	0.02	-0.07	1.00	0.00	0.89	0.11
jud_sphereTRUE	-5.83	4.18	-1.13	0.84	0.16	0.84	0.16
parl_sphereTRUE	-3.53	2.08	0.32	0.27	0.73	0.37	0.63
ind_sphereTRUE	-3.33	3.32	-0.53	0.74	0.26	0.72	0.28
TRACKING	-1.30	0.26	-0.46	1.00	0.00	0.91	0.09
DECENTR	0.04	0.20	0.12	0.00	1.00	0.00	1.00

Variable	Structural balance						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IMF_RULES_BAL	-6.25	-1.32	-3.14	1.00	0.00	1.00	0.00
FRI_RULES_BAL	-2.11	2.99	0.45	0.37	0.63	0.35	0.65

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.

Table A11: Results of EBA analysis (4/7): Government expenditures and revenues

Variable	Government Expenditures							Government Revenues						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	-6.66	6.42	-3.16	0.91	0.09	0.78	0.22	-1.63	10.20	2.98	0.08	0.92	0.23	0.77
IND2	-8.93	15.87	0.54	0.37	0.63	0.46	0.54	-2.25	17.02	5.57	0.02	0.98	0.09	0.91
IND3	-25.30	3.00	-10.86	0.98	0.02	0.97	0.03	-22.42	3.26	-8.29	0.98	0.02	0.95	0.05
IND4	-21.76	5.12	-7.84	0.96	0.04	0.94	0.06	-16.83	3.70	-7.29	0.97	0.03	0.93	0.07
IND5	-26.62	-0.61	-11.95	1.00	0.00	0.98	0.02	-21.87	6.47	-7.30	0.93	0.07	0.91	0.09
IND6	-41.21	15.63	-0.45	0.45	0.55	0.53	0.47	-28.82	8.69	-4.96	0.80	0.20	0.76	0.24
IND7	-24.53	29.18	0.91	0.38	0.62	0.46	0.54	-11.36	24.74	5.52	0.19	0.81	0.24	0.76
IND8	-31.40	5.35	-12.42	0.99	0.01	0.89	0.11	-19.41	14.34	-1.71	0.69	0.31	0.57	0.43
IND9	-28.39	21.25	0.49	0.45	0.55	0.48	0.52	-34.94	9.24	-8.30	0.88	0.12	0.84	0.16
IND10	-39.35	27.00	0.71	0.39	0.61	0.47	0.53	-25.37	24.35	0.41	0.48	0.52	0.48	0.52
IND11	-36.07	36.97	6.76	0.17	0.83	0.24	0.76	-16.24	40.54	10.14	0.10	0.90	0.17	0.83
IND12	-16.46	39.48	13.78	0.03	0.97	0.05	0.95	5.49	38.91	17.78	0.00	1.00	0.01	0.99
IND13	-40.89	25.42	-2.38	0.59	0.41	0.59	0.41	-25.34	26.11	2.03	0.43	0.57	0.43	0.57
IND14	-20.42	48.35	11.30	0.08	0.92	0.12	0.88	-7.42	38.42	13.21	0.02	0.98	0.08	0.92
HERF	-22.77	16.49	-6.60	0.95	0.05	0.92	0.08	-22.80	13.12	-9.30	0.99	0.01	0.99	0.01
GOV_LEFTRIGHT	-3.71	2.96	0.63	0.11	0.89	0.33	0.67	-2.68	2.75	0.56	0.11	0.89	0.34	0.66
LEFT_GOV_SEATS_REL	-8.93	8.94	2.84	0.03	0.97	0.18	0.82	-5.59	8.06	2.18	0.03	0.97	0.22	0.78
ELEC_SYS	-15.41	-2.81	-7.23	1.00	0.00	0.99	0.01	-15.59	-0.87	-6.65	1.00	0.00	0.99	0.01
bud_inst_small	-0.33	8.18	2.40	0.00	1.00	0.01	0.99	-1.37	6.72	1.56	0.05	0.95	0.09	0.91
bud_inst_big	0.48	5.69	2.14	0.00	1.00	0.01	0.99	-0.61	4.88	0.99	0.03	0.97	0.14	0.86
EXANTE	-21.36	7.19	-3.61	0.83	0.17	0.86	0.14	-20.96	6.15	-5.34	0.92	0.08	0.95	0.05
DF_MAND_JUD_POWERS	-22.03	5.49	-9.70	1.00	0.00	1.00	0.00	-16.21	1.66	-5.84	1.00	0.00	0.97	0.03
MAND_FORCE_WITNESS	-10.77	2.78	-5.14	0.99	0.01	0.98	0.02	-9.62	2.06	-5.15	0.99	0.01	0.98	0.02
MONOCRATIC	-15.46	11.11	-0.95	0.60	0.40	0.63	0.37	-11.70	3.69	-2.76	0.92	0.08	0.87	0.13
fte_total	-0.02	0.02	0.00	0.31	0.69	0.44	0.56	-0.01	0.02	0.00	0.14	0.86	0.30	0.70
fte_pop	-100.4 k	41.9 k	-13.1 k	0.72	0.28	0.65	0.35	-65.2 k	62.6 k	5.8 k	0.38	0.62	0.44	0.56
fte_gdp	-0.34	0.14	-0.10	0.86	0.14	0.80	0.20	-0.28	0.18	-0.09	0.82	0.18	0.77	0.23
jud_sphereTRUE	-8.21	27.85	7.38	0.04	0.96	0.01	0.99	-14.73	22.74	4.08	0.21	0.79	0.10	0.90
parl_sphereTRUE	-5.80	18.48	1.72	0.16	0.84	0.25	0.75	-5.08	10.73	2.21	0.10	0.90	0.19	0.81
ind_sphereTRUE	-11.58	9.27	-1.41	0.74	0.26	0.69	0.31	-9.32	6.39	-1.79	0.85	0.15	0.74	0.26

Variable	Government Expenditures							Government Revenues						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
TRACKING	-2.50	3.15	-0.46	0.65	0.35	0.62	0.38	-1.99	4.28	-0.17	0.63	0.37	0.55	0.45
DECENTR	-0.19	0.35	0.02	0.39	0.61	0.42	0.58	-0.05	0.31	0.08	0.03	0.97	0.18	0.82
IMF_RULES_EXP / REV	-1.02	13.19	3.80	0.00	1.00	0.06	0.94	-2.35	10.00	4.46	0.01	0.99	0.10	0.90
FRI_RULES_EXP / REV	0.82	14.89	6.59	0.00	1.00	0.00	1.00	3.55	14.17	8.91	0.00	1.00	0.00	1.00

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.

Table A12: Results of EBA analysis (5/7): General government gross debt and central government gross debt

Variable	General government gross debt							Central government gross debt						
	Min coeff.	Max coeff.	Mean (weighted)	Prop.< 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	6.56	56.66	26.39	0.00	1.00	0.05	0.95	-1.72	44.47	15.07	0.00	1.00	0.16	0.84
IND2	2.43	77.77	31.25	0.00	1.00	0.03	0.97	-3.98	57.44	20.59	0.02	0.98	0.10	0.90
IND3	-40.37	48.62	-8.15	0.77	0.23	0.62	0.38	-32.63	38.85	-12.38	0.88	0.12	0.68	0.32
IND4	-56.07	16.86	-24.19	0.98	0.02	0.91	0.09	-53.30	17.12	-23.42	0.97	0.03	0.90	0.10
IND5	-37.57	26.91	-6.06	0.75	0.25	0.58	0.42	-51.02	8.71	-20.02	0.98	0.02	0.76	0.24
IND6	-114.68	21.95	-28.32	0.97	0.03	0.87	0.13	-97.15	27.77	-27.21	0.94	0.06	0.85	0.15
IND7	-22.56	141.49	30.30	0.07	0.93	0.22	0.78	-48.36	107.29	11.93	0.39	0.61	0.37	0.63
IND8	-24.69	117.24	44.61	0.03	0.97	0.14	0.86	-42.30	68.48	12.56	0.24	0.76	0.37	0.63
IND9	-121.95	42.01	-37.78	0.92	0.08	0.90	0.10	-110.65	44.19	-34.29	0.93	0.07	0.87	0.13
IND10	-66.29	137.07	5.06	0.43	0.57	0.45	0.55	-70.21	104.81	-5.73	0.59	0.41	0.56	0.44
IND11	-28.42	191.86	47.75	0.07	0.93	0.16	0.84	-50.63	128.69	29.11	0.34	0.66	0.27	0.73
IND12	-21.44	204.35	44.06	0.07	0.93	0.12	0.88	-45.81	141.82	20.17	0.37	0.63	0.29	0.71
IND13	-50.91	121.88	7.53	0.45	0.55	0.44	0.56	-85.02	72.78	-23.83	0.81	0.19	0.69	0.31
IND14	-33.97	174.10	31.26	0.15	0.85	0.24	0.76	-64.97	122.44	9.35	0.45	0.55	0.42	0.58
HERF	-46.87	57.68	6.97	0.34	0.66	0.35	0.65	-41.39	73.94	16.74	0.19	0.81	0.19	0.81
GOV_LEFTRIGHT	-19.38	1.58	-9.15	1.00	0.00	0.93	0.07	-17.42	2.68	-6.49	0.99	0.01	0.87	0.13
LEFT_GOV_SEATS_REL	-49.58	10.57	-13.92	0.94	0.06	0.83	0.17	-37.86	14.54	-9.88	0.88	0.12	0.77	0.23
ELEC_SYS	-42.46	11.53	-9.61	0.95	0.05	0.77	0.23	-29.38	19.33	-7.01	0.82	0.18	0.71	0.29
bud_inst_small	-16.53	10.53	-2.35	0.83	0.17	0.66	0.34	-12.97	10.50	-0.15	0.42	0.58	0.51	0.49
bud_inst_big	-13.72	8.22	-3.00	0.89	0.11	0.75	0.25	-8.84	8.17	-0.58	0.49	0.51	0.55	0.45
EXANTE	-22.09	55.41	20.58	0.07	0.93	0.07	0.93	-11.71	59.75	28.06	0.03	0.97	0.02	0.98
DF_MAND_JUD_POWERS	-7.63	70.77	22.89	0.00	1.00	0.06	0.94	2.47	91.43	31.04	0.00	1.00	0.02	0.98
MAND_FORCE_WITNESS	-38.41	3.89	-14.96	1.00	0.00	0.92	0.08	-32.45	4.01	-11.71	1.00	0.00	0.84	0.16
MONOCRATIC	-31.18	19.41	-7.14	0.93	0.07	0.77	0.23	-24.05	27.45	-0.53	0.53	0.47	0.52	0.48
fte_total	-0.10	0.02	0.00	0.15	0.85	0.39	0.61	-0.08	0.03	0.00	0.14	0.86	0.38	0.62
fte_pop	-390.1k	484.5 k	132.9 k	0.05	0.95	0.16	0.84	-366.3 k	420.6 k	166.0 k	0.02	0.98	0.08	0.92
fte_gdp	-0.93	2.00	0.62	0.04	0.96	0.10	0.90	-0.35	2.32	0.98	0.01	0.99	0.01	0.99
jud_sphereTRUE	-48.67	48.18	13.81	0.17	0.83	0.18	0.82	-46.07	48.23	17.82	0.16	0.84	0.14	0.86
parl_sphereTRUE	-24.18	30.96	0.74	0.50	0.50	0.47	0.53	-21.90	29.77	2.86	0.48	0.52	0.38	0.62
ind_sphereTRUE	-28.91	36.28	5.24	0.22	0.78	0.37	0.63	-37.85	26.19	-2.23	0.63	0.37	0.56	0.44

Variable	General government gross debt							Central government gross debt						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
TRACKING	-12.71	8.66	-1.68	0.68	0.32	0.65	0.35	-12.96	4.07	-3.36	0.95	0.05	0.82	0.18
DECENTR	-0.04	1.42	0.86	0.00	1.00	0.01	0.99	-0.05	1.05	0.50	0.00	1.00	0.09	0.91
IMF_RULES_DEBT	-65.72	-11.00	-30.45	1.00	0.00	0.99	0.01	-39.23	15.65	-7.56	0.86	0.14	0.74	0.26
FRI_RULES_DEBT	-3.20	41.04	12.19	0.00	1.00	0.15	0.85	-4.01	36.14	14.03	0.00	1.00	0.09	0.91

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.

Table A13: Results of EBA analysis (6/7): General government net debt

Variable	General government net debt						
	Min coeff.	Max coeff.	Mean (weighted)	Prop.< 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	-73.55	30.65	-19.84	0.97	0.03	0.77	0.23
IND2	-66.47	34.05	-12.98	0.80	0.20	0.70	0.30
IND3	-66.15	40.82	-8.56	0.68	0.32	0.60	0.40
IND4	-73.42	52.82	-4.42	0.54	0.46	0.55	0.45
IND5	-162.74	-6.01	-68.84	1.00	0.00	0.96	0.04
IND6	-63.63	118.20	28.40	0.15	0.85	0.30	0.70
IND7	-165.64	124.75	1.06	0.55	0.45	0.49	0.51
IND8	-141.05	44.70	-41.82	0.94	0.06	0.80	0.20
IND9	-103.36	201.92	52.33	0.12	0.88	0.23	0.77
IND10	-187.71	195.72	38.50	0.32	0.68	0.31	0.69
IND11	-226.83	153.75	-7.83	0.59	0.41	0.55	0.45
IND12	-186.23	51.54	-53.72	0.87	0.13	0.84	0.16
IND13	-221.19	55.70	-82.16	0.97	0.03	0.87	0.13
IND14	-225.56	161.61	-0.92	0.55	0.45	0.51	0.49
HERF	-49.53	98.48	33.66	0.01	0.99	0.10	0.90
GOV_LEFTRIGHT	-38.54	-5.07	-17.39	1.00	0.00	0.97	0.03
LEFT_GOV_SEATS_REL	-72.23	16.01	-20.66	0.98	0.02	0.89	0.11
ELEC_SYS	-56.25	35.68	-4.58	0.67	0.33	0.63	0.37
bud_inst_small	-16.75	25.87	6.71	0.11	0.89	0.19	0.81
bud_inst_big	-7.16	32.63	10.53	0.01	0.99	0.08	0.92
EXANTE	-7.61	93.84	47.81	0.00	1.00	0.01	0.99
DF_MAND_JUD_POWERS	-22.79	86.79	34.50	0.00	1.00	0.01	0.99
MAND_FORCE_WITNESS	-17.02	37.94	9.72	0.08	0.92	0.26	0.74
MONOCRATIC	-1.93	93.70	38.16	0.00	1.00	0.09	0.91
fte_total	-0.09	0.10	0.01	0.28	0.72	0.42	0.58
fte_pop	-254.5 k	710.4 k	111.1 k	0.26	0.74	0.35	0.65
fte_gdp	-0.37	2.59	1.04	0.00	1.00	0.04	0.96
jud_sphereTRUE	-81.17	108.07	54.94	0.04	0.96	0.01	0.99
parl_sphereTRUE	-78.13	46.98	-12.79	0.78	0.22	0.79	0.21
ind_sphereTRUE	-56.23	66.07	-1.48	0.52	0.48	0.53	0.47
TRACKING	-19.22	8.26	-8.11	0.98	0.02	0.83	0.17
DECENTR	-1.16	2.50	0.55	0.17	0.83	0.21	0.79

Variable	General government net debt						
	Min coeff.	Max coeff.	Mean (weighted)	Prop.< 0	Prop. >0	CDF < 0 (EBA)	CDF > 0 (EBA)
IMF_RULES_EBTDEBT	-62.75	72.56	8.52	0.27	0.73	0.36	0.64
FRI_RULES_DEBT	-29.84	36.99	4.78	0.23	0.77	0.38	0.62

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.

Table A14: Results of EBA analysis (7/7): Ratings

Variable	Ratings (domestic currency)							Ratings (foreign currency)						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
IND1	-1.03	2.33	0.63	0.09	0.91	0.28	0.72	-2.19	1.50	-0.13	0.57	0.43	0.55	0.45
IND2	-1.69	2.71	0.03	0.50	0.50	0.49	0.51	-2.43	1.73	-0.79	0.88	0.12	0.73	0.27
IND3	-5.76	2.13	-2.00	0.95	0.05	0.87	0.13	-5.77	1.54	-2.37	0.97	0.03	0.91	0.09
IND4	-5.60	0.19	-2.93	1.00	0.00	0.98	0.02	-5.55	0.54	-2.78	1.00	0.00	0.97	0.03
IND5	-2.51	5.82	0.79	0.35	0.65	0.31	0.69	-3.28	4.45	-0.07	0.56	0.44	0.52	0.48
IND6	-11.32	1.60	-3.81	0.97	0.03	0.97	0.03	-10.03	1.57	-3.49	0.96	0.04	0.95	0.05
IND7	-10.28	3.01	-3.48	0.94	0.06	0.93	0.07	-11.57	1.78	-4.63	0.98	0.02	0.97	0.03
IND8	-2.08	7.22	1.54	0.18	0.82	0.27	0.73	-3.32	4.75	0.06	0.54	0.46	0.49	0.51
IND9	-10.60	2.19	-4.03	0.98	0.02	0.93	0.07	-9.43	3.49	-3.21	0.91	0.09	0.89	0.11
IND10	-12.17	3.53	-4.38	0.94	0.06	0.95	0.05	-11.31	2.80	-4.85	0.97	0.03	0.96	0.04
IND11	-5.37	8.08	0.35	0.49	0.51	0.46	0.54	-6.80	7.84	-0.78	0.67	0.33	0.59	0.41
IND12	-8.07	2.64	-2.45	0.92	0.08	0.84	0.16	-9.43	1.73	-3.02	0.97	0.03	0.87	0.13
IND13	-9.75	5.78	-1.38	0.74	0.26	0.65	0.35	-9.87	4.42	-2.64	0.85	0.15	0.77	0.23
IND14	-9.53	4.81	-1.87	0.81	0.19	0.72	0.28	-9.48	4.63	-2.41	0.85	0.15	0.76	0.24
term	-5.28	1.82	-1.60	0.89	0.11	0.90	0.10	-4.21	2.28	-0.98	0.81	0.19	0.78	0.22
forlife	-2.65	2.70	0.20	0.42	0.58	0.42	0.58	-2.23	2.63	0.45	0.30	0.70	0.33	0.67
corr_term	-0.72	0.05	-0.48	1.00	0.00	1.00	0.00	-0.64	0.17	-0.40	0.98	0.02	0.99	0.01
reappTRUE	-3.37	-0.15	-1.88	1.00	0.00	1.00	0.00	-2.87	0.64	-1.30	0.97	0.03	0.97	0.03
HERF	-3.28	6.35	-0.10	0.62	0.38	0.52	0.48	-3.55	7.30	0.01	0.63	0.37	0.50	0.50
GOV_LEFTRIGHT	-1.34	0.08	-0.63	1.00	0.00	0.91	0.09	-1.12	0.45	-0.41	0.93	0.07	0.80	0.20
LEFT_GOV_SEATS_REL	-3.33	0.24	-1.78	1.00	0.00	0.98	0.02	-2.90	0.92	-1.34	0.98	0.02	0.94	0.06
ELEC_SYS	-4.31	0.54	-1.66	1.00	0.00	0.98	0.02	-4.56	0.05	-1.90	1.00	0.00	0.99	0.01
bud_inst_small	-0.84	0.91	0.29	0.13	0.87	0.26	0.74	-0.32	1.25	0.62	0.05	0.95	0.08	0.92
bud_inst_big	-1.08	0.66	0.07	0.22	0.78	0.43	0.57	-0.56	0.94	0.34	0.11	0.89	0.18	0.82
EXANTE	-4.09	5.68	-0.14	0.59	0.41	0.55	0.45	-4.10	4.92	-0.21	0.63	0.37	0.58	0.42
DF_MAND_JUD_POWERS	-0.31	4.98	2.08	0.00	1.00	0.02	0.98	-1.14	4.03	1.40	0.03	0.97	0.08	0.92
MAND_FORCE_WITNESS	-2.14	1.75	-0.01	0.53	0.47	0.51	0.49	-1.75	1.95	0.00	0.52	0.48	0.50	0.50
MONOCRATIC	-2.91	1.66	-0.82	0.94	0.06	0.87	0.13	-2.12	1.68	-0.35	0.74	0.26	0.68	0.32
fte_total	0.00	0.01	0.00	0.05	0.95	0.15	0.85	0.00	0.01	0.00	0.01	0.99	0.05	0.95
fte_pop	-17.1 k	29.8 k	10.5 k	0.09	0.91	0.15	0.85	-130.0 k	33.8 k	13.1 k	0.06	0.94	0.10	0.90

Variable	Ratings (domestic currency)							Ratings (foreign currency)						
	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)	Min coeff.	Max coeff.	Mean (weighted)	Prop. < 0	Prop. > 0	CDF < 0 (EBA)	CDF > 0 (EBA)
fte_gdp	-0.06	0.12	0.05	0.05	0.95	0.11	0.89	-0.05	0.13	0.06	0.02	0.98	0.06	0.94
jud_sphereTRUE	-5.95	1.96	-1.94	0.98	0.02	0.95	0.05	-5.45	1.96	-1.84	0.98	0.02	0.93	0.07
parl_sphereTRUE	-2.27	2.57	-0.73	0.93	0.07	0.80	0.20	-1.66	1.99	-0.43	0.79	0.21	0.70	0.30
ind_sphereTRUE	-1.05	3.91	1.48	0.01	0.99	0.09	0.91	-2.13	3.05	0.75	0.09	0.91	0.25	0.75
TRACKING	-0.40	0.75	0.14	0.20	0.80	0.32	0.68	-0.37	0.69	0.23	0.08	0.92	0.20	0.80
DECENTR	-0.09	0.04	-0.03	0.94	0.06	0.88	0.12	-0.09	0.02	-0.04	0.99	0.01	0.95	0.05
IMF_RULES_DEBT	-2.47	0.96	-0.77	0.95	0.05	0.86	0.14	-1.59	1.15	-0.42	0.76	0.24	0.73	0.27
FRI_RULES_DEBT	-2.60	0.94	-1.53	1.00	0.00	0.95	0.05	-3.31	0.01	-2.34	1.00	0.00	1.00	0.00

Mean (weighted) is the average of the coefficients of the respective variable weighted with adj. R^2 in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

Prop < 0 (> 0) is the percentage of the coefficients of the respective variable that is negative (positive) in extreme bounds analysis with $k = 3$ doubtful variables in each estimation.

CDF < 0 and CDF > 0 is $CDF(0)$ and $(1 - CDF(0))$ in Sala-i-Martin's version of extreme bounds analysis (based on normal distribution) with $k = 3$ doubtful variables in each estimation.

The independent variables of the base specifications are included as free variables.