Fool the markets? Creative accounting, fiscal transparency and sovereign risk premia

Kerstin Bernoth
(De Nederlandsche Bank)

Guntram B. Wolff
(Deutsche Bundesbank)

Abstract:

We investigate the effects of official fiscal data and creative accounting signals on interest rate spreads between bond yields in the European Union. Our model predicts that risk premia contained in government bond spreads should increase in both, the official fiscal position and the expected "creative" part of fiscal policy. The relative importance of these two signals depends on the transparency of the country. Greater transparency reduces risk premia. The empirical results confirm the hypotheses. Creative accounting increases the spread. The increase of the risk premium is stronger if financial markets are unsure about the true extent of creative accounting. Fiscal transparency reduces risk premia. Instrumental variable regressions confirm these results by addressing potential reverse causality problems and measurement bias.

Non-technical summary

A number of empirical and theoretical papers show that EU Member States in various cases have used questionable accounting practices and data interpretations as well as temporary measures to beautify fiscal data in the context of the requirements of the Maastricht Treaty and the Stability and Growth Pact. For the European Union, recent research by Dafflon and Rossi (1999), Milesi-Ferretti and Moriyama (2004), Koen and van den Noord (2005), and von Hagen and Wolff (2006) confirms that fiscal policy figures of EU countries are purposely beautified to circumvent the constraints on deficits and debt in order to officially comply with the Stability and Growth Pact (SGP).

The reaction of financial markets to this creative accounting is an important policy topic. If financial markets do not price in the de facto deterioration of the fiscal position due to creative accounting, while punishing official deficit data, risk premia could be lowered by shifting deficits to creative accounting. The lower interest rate would provide an incentive to governments to beautify their fiscal data. To our knowledge, no study so far analyzes whether financial markets take note of fiscal window-dressing when pricing government bonds. This is the purpose of our study. In particular, we study whether spreads react, besides official fiscal data, to stock-flow adjustments or to an alternative measure of creative accounting by Koen and van den Noord (2005).

Furthermore, we investigate, in how far fiscal transparency affects risk spreads. Kopits and Craig (1998) argue that international financial markets are likely to demand lower premiums from governments that are forthcoming about their fiscal position and risk. The argument is that markets can be more certain about a fiscally transparent government's ability and willingness to service its obligation. A more transparent budget process in addition helps financial markets to detect creative accounting more easily and to assess the true fiscal position of a country. This might increase the spread since more creative accounting becomes known to the markets.

We develop a portfolio model of interest differentials based on Bernoth, von Hagen, and Schuknecht (2004). In this model, interest rate differentials increase with a relative worsening of the fiscal position due to an increase in the government's default probability. The model is augmented to account for fiscal creative accounting and fiscal transparency. Creative accounting appearing in the media constitutes a news signal. The more reliable this signal, the greater

will be the effect of creative accounting on the expected fiscal position of a country. Creative accounting news should therefore increase the default risk premium. Fiscal transparency should reduce spreads by lowering the uncertainty of fiscal policy. In addition, it influences the relative information content of the official and the news signal as more transparent countries probably provide more reliable official data but also the quality of the news signal increases.

The empirical results confirm the hypotheses derived from the model. Creative accounting increases risk premia. The gimmickry events, that make it in the financial news, have significant punishing effects on risk premia. This is especially true, if a country is intransparent, as financial markets then take gimmickry as a "tip of the iceberg" signal. Creative accounting thus increases the cost of borrowing significantly, if it becomes known. This holds especially if financial markets are unsure about the true extent of creative accounting. Fiscal transparency is connected with lower risk premia. Deficits and creative accounting are penalized less in EMU. Instrumental variable regressions, addressing potential simultaneity and attenuation biases, confirm the results.

Nicht technische Zusammenfassung

Aus einer Reihe von empirischen und theoretischen Untersuchungen geht hervor, dass EU-Mitgliedsländer in verschiedenen Fällen fragwürdige Buchungspraktiken und Dateninterpretationen sowie Einmalmaßnahmen nutzten, um ihre fiskalischen Daten im Zusammenhang mit den Anforderungen des Maastrichtvertrages und des Stabilitts- und Wachstumspakts zu schönen. Aktuelle Studien über die Europäische Union (Dafflon und Rossi (1999), Milesi-Ferretti und Moriyama (2004), Koen und van den Noord (2005) und von Hagen und Wolff (2006)) bestätigen, dass öffentliche Finanzdaten in EU-Mitgliedstaaten absichtlich gestaltet werden, um die hinsichtlich des Defizits und der Verschuldung geltenden Beschränkungen zu unterlaufen und so offiziell die Vorgaben des Stabilitäts- und Wachstumspakts (SWP) einzuhalten.

Die Reaktion der Finanzmärkte auf diese kreative Buchführung stellt ein wichtiges wirtschaftspolitisches Thema dar. Falls die Finanzmärkte eine de facto vorliegende Verschlechterung der Haushaltslage aufgrund der kreativen Buchführung nicht einpreisen, die offiziellen Defizitdaten aber negativ sanktionieren, ließen sich die Risikoprämien verringern, indem man Defizite durch kreative Buchführung versteckt. Der daraus resultierende niedrigere Zinssatz böte den Regierungen einen Anreiz zum Manipulieren ihrer Fiskaldaten. Nach unseren Erkenntnissen wurde bislang nicht untersucht, ob Finanzmärkte bei der Preisbildung von Staatsanleihen Maßnahmen zum Schönen der offiziellen Fiskaldaten berücksichtigen. Dies ist der Zweck unserer Studie. Wir untersuchen insbesondere, ob Zinsgefälle zwischen EU Ländern nicht nur auf die offiziellen Haushaltsdaten, sondern auch auf stock-flow Anpassungen oder auf die von Koen und van den Noord (2005) ermittelte alternative Messgröße für die kreative Buchhaltung reagieren.

Darüber hinaus gehen wir der Frage nach, inwieweit fiskalische Transparenz den Risikospread beeinflusst. Kopits und Craig (1998) führen an, dass die internationalen Finanzmärkte von Staaten, die ihre Haushaltspositionen und -risiken offen darlegen, eher niedrigere Prämien verlangen. Sie argumentieren, dass die Märkte bei einer Regierung, die fiskalische Transparenz walten lässt, verstärkt davon ausgehen können, dass diese ihre Verbindlichkeiten bedienen kann und will. Ein transparenterer Haushaltsprozess hilft darüber hinaus den Finanzmärkten, Anzeichen einer kreativen Buchführung leichter aufzuspüren und die wahre Haushaltsposition eines Landes zu bewerten. Dadurch

könnte sich der Zinsabstand vergrößern, da die Märkte zunehmend von Fällen kreativer Buchführung erfahren.

Wir entwickeln ein Portfolio-Modell für Zinsdifferenzen auf der Basis von Bernoth, von Hagen und Schuknecht (2004). In diesem Modell steigen Zinsdifferenzen bei einer relativen Verschlechterung der Haushaltslage an, da sich die Wahrscheinlichkeit einer Zahlungsunfähigkeit des Staates erhöht. Unser Modell wurde erweitert, um kreative Buchführung und Transparenz im Bereich der öffentlichen Finanzen zu berücksichtigen. Wird die kreative Buchführung in den Medien diskutiert, ist dies ein wichtiges Signal. Je verlässlicher dieses Signal ist, desto größer wird der Effekt der kreativen Buchführung auf die erwartete Haushaltsposition eines Landes sein. Meldungen in Bezug auf kreative Buchführung dürften daher die Ausfallrisikoprämien erhöhen. Fiskalische Transparenz dürfte die Spreads verringern, weil die Unsicherheit hinsichtlich der Haushaltspolitik sinkt. Ferner beeinflusst sie den relativen Informationsgehalt der Meldungen von offiziellen Stellen und Medien, da transparenter vorgehende Länder wahrscheinlich verlässlichere amtliche Angaben liefern, sich aber auch die Qualität der von den Medien ausgehenden Signale erhöht.

Die empirischen Ergebnisse bestätigen die aus dem Modell abgeleiteten Hypothesen. Durch kreative Buchführung steigen die Risikoprämien. Die Haushaltstricks, über die in den Finanznachrichten auch tatsächlich berichtet wird, haben auf die Risikoprämien eine klare "bestrafende" Wirkung. Dies gilt insbesondere dann, wenn ein Land nicht transparent vorgeht, da geschönte Haushaltsdaten für die Finanzmärkte dann nur die Spitze des Eisbergs darstellen. Die kreative Buchführung erhöht also die Kreditfinanzierungskosten signifikant, wenn sie bekannt wird. Dies gilt besonders dann, wenn am Finanzmarkt bezüglich des wahren Ausmaßes kreativer Buchführung Unsicherheit herrscht. Finanzpolitische Transparenz geht dagegen mit niedrigeren Risikoprämien einher. In der WWU werden Defizite und kreative Buchführung in geringerem Maße negativ sanktioniert. Regressionen mit Instrumentenschätzern, die einen möglichen Simultanitäts- und "Attenuation-" Bias berücksichtigen, bestätigen die Ergebnisse.

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"In fact, irrespective of any formal fiscal rules, governments may wish to put the best possible gloss on the accounts presented to the outside world, including the so-called 'bond market vigilantes'." (Koen and van den Noord 2005)

1 Introduction

The effect of fiscal variables on bond markets is hotly debated. A topic of particular importance concerns the question, whether and to what extent bond markets price in the possibility of (partial) sovereign default by demanding higher interest rates. If a worsening in the fiscal position of an issuer country increases the default probability, it should also be reflected in an increase of the default risk premium contained in bond yields, measurable by an increase in the interest rate spread towards a low risk benchmark country.

In the previous literature, fiscal determinants of sovereign default risk are quantified by the official fiscal position of a country, usually the official debt and deficit figures. The general empirical finding is that bond yields depend positively on the debt and deficit level (Capeci (1991, 1994), Alesina, De Broeck, Prati, and Tabellini (1992), Bernoth, von Hagen, and Schuknecht (2004)). No empirical study so far investigates, whether financial markets are "fooled" by governments if these misreport on their true state of fiscal policy. This is the main purpose of our paper.

Official reported fiscal variables might not give an accurate picture of the true fiscal position of a country for many reasons. Politicians might want to hide deficits if voters dislike them.[2] Governments might also want to engage

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[2]Alt and Lassen (2006) provide evidence that electoral cycles depend on fiscal transparency. They are less pronounced, the more fiscally transparent a country is. von Hagen and Wolff (2006) show that creative accounting moves with the business cycle.

in additional spending without having parliamentary approval. Parliamentary control can be reduced by fiscal misreporting.[3] Moreover, fiscal rules such as constitutional deficit limits and international rules such as the Stability and Growth Pact (SGP) constitute limits on official fiscal data and therefore on fiscal behavior. This might increase the incentive of governments to hide away deficits by reverting to window-dressing or shifting fiscal expenditures off the budget (Milesi-Ferretti 2003). We label these activities 'creative accounting'. Especially the use of creative accounting to 'comply' with the European fiscal rules, namely the excessive deficit procedure (EDP) and the SGP, has recently become an important policy concern in Europe (see e.g. European Commission, 2003).

Numerous studies investigate the effect of fiscal rules on budget outcomes for US states and cities (Bunch (1991), von Hagen (1991), Kiewiet and Szakaly (1996), Bohn and Inman (1996)). The general conclusion from this literature is that binding restraints induce fiscal actors to use other instruments such as creative accounting to dampen the effect of the rule. Relatively few studies investigate the use of "creative" accounting in the EU.[4] von Hagen and Wolff (2006) are the first to analyze accounting tricks in order to comply with the rules of the SGP. They focus on stock-flow adjustments (SFA), which are defined as the difference between the reported annual change in debt levels and the reported deficits. Positive SFA imply that the debt level increases faster than the deficit data suggest. In particular, they find evidence that SFA was systematically used to reduce the official deficit figures. Koen and van den Noord (2005) collect information on single one-off measures (fiscal gimmickry) and show that the probability to observe such measures increases with the budget deficit. The empirical evidence thus confirms the view that fiscal policy figures are sometimes purposely changed to officially comply with fiscal rules. Significant use of one-off measures can be detected in Europe.

The reaction of financial markets to this creative accounting is an important policy topic. If financial markets do not price in the de facto deterioration of

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[3]This is the idea behind the sub-index on fiscal transparency developed in von Hagen (1992).

[4]Dafflon and Rossi (1999) surveys the accounting tricks used in the run-up to the Euro. They find that numerous countries have used tricks to qualify for EMU membership. Similarly, Milesi-Ferretti and Moriyama (2004) find that during the period leading up to 1997 governments reduced the public debt ratio by decumulating government assets in order to qualify for EU membership.

the fiscal position due to creative accounting, while punishing official deficit data, risk premia could be lowered by shifting deficits to creative accounting. The lower interest rate in turn would provide an incentive to governments to beautify their fiscal data. To our knowledge, no study so far analyzes whether financial markets take note of fiscal window-dressing when pricing government bonds. This is the purpose of our study. In particular, we study whether spreads react, besides official fiscal data, to stock-flow adjustments or to an alternative measure of creative accounting by Koen and van den Noord (2005).

Furthermore, we investigate, in how far fiscal transparency affects risk spreads. Kopits and Craig (1998) argue that international financial markets are likely to demand lower premia from governments that are forthcoming about their fiscal position and risk. The argument is that markets can be more certain about a fiscally transparent government's ability and willingness to service its obligation. A more transparent budget process in addition helps financial markets to detect creative accounting more easily and to assess the true fiscal position of a country. This might increase the spread since more creative accounting becomes known to the markets. Glennerster and Shin (2006) find that the release of macroeconomic information in the form of publication of the IMF article IV consultation reduces spreads. Their measure does not cover fiscal transparency, however. Gelos and Wei (2005) lend further support to the hypothesis of a risk-reducing role of fiscal transparency by showing that international funds prefer to hold more assets in more transparent countries.

These questions are addressed in the framework of Bernoth et al. (2004). In this paper, the authors derive a simple portfolio model, which shows that the yield spread between a risky and a risk-free country is explained by a default risk premium, a liquidity risk premium, and an uncertainty premium. In their empirical part, they make use of an innovative data set, which consists of spreads between Deutsche Mark (Euro after 1999) and US$ denominated bond issues of 14 EU governments and Germany or the US government respectively. They show that the interest differentials between sovereign bonds increase with the official figures of the debt and deficit to GDP ratios. In this paper, we modify the basic portfolio model by differentiating between the true fiscal position and the official fiscal position. The default probability assessed by financial markets might differ from the true default probability to the extent that creative accounting exists and is unknown. Transparency by itself reduces uncertainty about the degree of cheating and therefore reduces risk premia.

The next section outlines the model and derives the principle hypotheses. We then present the empirical approach and discuss the data. Section 3 develops the measures of creative accounting and transparency. Section 4 presents and discusses the econometric results while the last section concludes.

2 Risk premia in government bond markets

2.1 A portfolio model of interest rate differentials

The theoretical model to analyze the impact of creative accounting on bond yield spreads between two countries is an extension of the portfolio model of interest differentials described in Bernoth, von Hagen, and Schuknecht (2004). We modify this model by assuming that governments might use creative accounting, which makes the actual fiscal position of a country difficult to observe.

Consider a representative international investor maximizing a utility function that depends positively on expected real wealth, $E_t[w_{t+1}]$ and negatively on its variance, $Var_t[w_{t+1}]$:

$$Max\ U\left\{E_t\left[w_{t+1}\right], Var_t\left[w_{t+1}\right]\right\},\ U_1 > 0, U_2 < 0. \tag{1}$$

The investor allocates a fraction θ_t of his real wealth w_t to a risky security of country A and a fraction of $1 - \theta_t$ to a safe security of country B. Both securities and real wealth are priced in the same currency.

For simplicity, we assume that the invested money in A's bonds is lost in case of government default.[5] Investors incur transaction costs proportional to their investment in bonds which decrease with the liquidity of the bond market. We assume that the bond of country B has benchmark status, i.e., its market is considered to be more liquid than the bond market of country A. Expected wealth then is:

$$E_t(w_{t+1}) = w_t(1 - \theta_t)(1 + r_t^B) - \theta_t w_t l^A + \theta_t w_t(1 + r_t^A)(1 - P_t^e) \tag{2}$$

where l_t^A is the expected transaction/liquidity cost on trading a bond of country A and r_t^i denotes the interest rate on the bond of country i, with $i \in A, B$.[6] P_t^e

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[5]As shown in Bernoth et al. (2004), this model can easily be extended to the more general case of partial default, i.e. that investors receive a fraction of their gross payment in case of default.

[6]Note that we normalize the transaction cost of the risk free bond market to zero.

denotes the investor's expected default probability, which depends positively on the expected fiscal position of the risky country. Its determinants will be discussed later in this section.

Due to the uncertain investment return of securities of country A, the variance of next period's real wealth of the investor is non-zero and given by:

$$Var(w_{t+1}) = \theta_t^2 w_t^2 (1 + r_t^A)^2 \left((1 - P_t^e) P_t^e \right), \tag{3}$$

Note, that there is no uncertainty regarding the transaction costs in the B market, nor regarding the interest rate on the two different bonds.

Following Dumas (1994), we substitute equation (2) and (3) into the utility function and derive the optimal share invested in the securities of country A, and get $\widehat{\theta}_t$, the optimal share of investment in country A, by utility maximization with respect to θ_t:

$$\widehat{\theta}_t = \frac{(1 - P_t^e)(1 + r_t^A) - l_t^A - (1 + r_t^B)}{\Phi(1 + r_t^A)^2(1 - P_t^e)P_t^e}, \tag{4}$$

where $\Phi = -2w_t U_2 / U_1$ denotes the coefficients of relative risk aversion for the representative investor.

Let S^A be the total supply of bonds issued by the government of country A. Equilibrium in the bond market requires that supply is equal to demand and therefore:

$$S_t^A = \widehat{\theta}_t w_t = \frac{w_t[(1 - P_t^e)(1 + r_t^A) - l_t^A - (1 + r_t^B)]}{\Phi(1 + r_t^A)^2(1 - P_t^e)P_t^e}. \tag{5}$$

which can be solved for the interest rate differential:

$$\frac{r_t^A - r_t^B}{1 + r_t^A} = P_t^e + \frac{l_t^A}{1 + r_t^A} + \frac{S^A(1 + r_t^A)^2(1 - P_t^e)P_t^e}{(w_t/\Phi)(1 + r_t^A)}. \tag{6}$$

In what follows, by the interest rate spread or differential, we mean the term on the left hand side of the equation.

Equation (6) separates the yield spread between the two bonds into three terms. The first term on the right hand side reflects the *default risk premium*. The larger the expected default probability, the larger will be the spread. Second, the bond yield differential depends on the *liquidity risk premium*. The more liquid a bond market, which means low transaction costs l^A, the smaller will be the liquidity risk premium. The last uncertainty premium depends positively on the variance of the perceived default probability of country A, $(1 - P_t^e)P_t^e$. This variance increases with the expected default probability if

the expected default probability is smaller 0.5. The last term also increases with the gross nominal return $(1 + r_t^A)$, and the level of the relative risk aversion of the representative investor Φ. The more the investor cares about the variance of his future wealth w_{t+1} (the larger U_2), the larger will be the interest rate differential between the risky and the risk-free country. Furthermore, the country specific risk premium increases with the total supply of the risky bonds, S^A.

In the following, we discuss in more detail the determinants of the expected default probability, P_t^e. As pointed out, the spread unambiguously increases with the expected default probability. Transparency and creative accounting enters the model by influencing the expected default probability. We assume that one determinant of the expected default probability is the degree of fiscal transparency. A more transparent budget process helps financial markets to detect creative accounting and signals the willingness and ability of governments to serve its obligation. Therefore, we expect that fiscal transparency itself has a negative impact on the expected government's default probability and therefore also on risk premia. This argument finds support in e.g. Kopits and Craig (1998) and Glennerster and Shin (2006).

A further important determinant of the expected default probability, P_t^e, is the expected fiscal position of country A, $E_t(B_t)$.[7] The expected default probability increases strictly with the expected fiscal position $\frac{\partial P_t^e}{\partial E_t(B_t)} > 0$. For the formation of the expectation of the actual fiscal position, the investor makes use of two information sources. The first is the official publication of the fiscal position, which we call the 'official signal', and the second is a signal coming from news agencies observing the fiscal behavior of governments, which we call the 'news signal'. The official signal is given by:

$$B_t^O = B_t - c - \eta_t \tag{7}$$

where c is the average amount of creative accounting, η_t is normally and independently distributed with mean zero and variance $\sigma_{\eta_t}^2$. The official fiscal position B_t^O is thus equal to the actual position B_t, a systematic creative accounting bias c and an error term. We think of the difference between the actual fiscal position and the official one as creative accounting $(B_t - B_t^O = CA_t = c + \eta_t)$. From the point of view of the investor, creative accounting is thus an unknown

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[7]Due to the uncertainty concerning the government's use of creative accounting, the expected fiscal position can differ from the actual fiscal position, B_t.

random variable with mean c. The precision of the official signal is given by $\alpha_t = \frac{1}{\sigma_{\eta_t}^2}$.

The news signal the investor receives about the actual fiscal behavior is described by:

$$B_t^N = B_t + \varepsilon_t \tag{8}$$

where ε_t is again normally and independently distributed with mean zero and variance $\sigma_{\varepsilon_t}^2$. The precision of this signal is accordingly given by $\beta_t = \frac{1}{\sigma_{\varepsilon_t}^2}$.

Following Bayesian inference, the investor's expectation about the actual fiscal position is:

$$E(B_t) = \frac{\alpha_t \tilde{B}_t^O + \beta_t B_t^N}{\alpha_t + \beta_t}. \tag{9}$$

where $\tilde{B}_t^O = B_t^O + c$. Thus, the larger e.g. β_t relative to α_t, the more precise and less distorted is the information collected by news agencies about B_t, and the more weight does the investor put on the news signal for forming his believe over B_t. Rearranging equation (9) leads to:

$$E(B_t) = \tilde{B}_t^O + x_t(B_t^N - \tilde{B}_t^O), \tag{10}$$

with $x_t = \frac{\beta_t}{\alpha_t + \beta_t}$ denoting the informativeness of the news signal relative to the informativeness of the official signal. We see that the investor's expectation about the actual fiscal position of the government is equal to the officially reported one, $\tilde{B}_t^O$, plus a correction term due to the use of creative accounting, which is weighted by the relative informativeness of the news signal, x_t. Note that the difference in the two signals is given by creative accounting and a random term related to the noise in the news signal, i.e., $B_t^N - \tilde{B}_t^O = CA_t - c + \varepsilon_t$. If the informational content of the second signal converges towards zero ($x \to 0$), the expectation of the actual fiscal position will be equal to the official announced fiscal position plus average cheating c.

Fiscal transparency might have a significant influence on the relative informativeness of the news signal. Fiscal transparency has a disciplinary effect on governments by not only reducing government deficits (see e.g. Alt and Lassen (2006)), but also the use of creative accounting (compare e.g. Koen and van den Noord (2005)). In this case, the precision of the official signal, α_t, depends positively on fiscal transparency. However, the more transparent the budgetary process of a country is, the easier it is for news agencies to detect creative accounting, which increases also the precision of the news signal,

β_t. Therefore, depending on which effect is stronger, fiscal transparency can have a positive or a negative effect on the relative informativeness of the news signal, x_t, and therefore on the effect of creative accounting on the expected default probability.

2.2 An empirical model of the determinants of risk premia

To test the impact of (hidden) fiscal policy on interest rate spreads, we estimate equation (6) as:

$$\frac{r_{it} - r_{jt}^*}{1 + r_{it}} = \alpha_1 + fiscal_{it}\alpha_2 + \alpha_3 CA_{it} + \alpha_4 \cdot FT_{it} \cdot CA_{it} + \alpha_5 FT_{it} + \alpha_6 z_{it} + \mu_i + \epsilon_{it}$$

(11)

where μ_i denotes country dummies and ϵ_{it} is an error term with usual properties. The dependent variable is the yield spread between a bond issued in EU country i and a benchmark country j, both denominated in the same currency. Looking at spreads between bonds issued in the same currency has the advantage that one can neglect the issue of exchange rate risk so that data coming from the pre-EMU and post-EMU regimes can be analyzed in one data set.[8] We regard Germany and the USA as benchmark countries and the joint currency of issuance is the Deutsche Mark (Euro after 1999) or the US$, respectively.

The government bond data are taken from Capital Data Bondware, which provides a data set with information on the yield, maturity, and underlying currency of government bond issues.[9] If available, an equivalent benchmark bond is matched to the bond issues, between which the yield spread is then calculated.[10] We compare government bonds issued by the 15 EU countries, excluding Luxembourg, between 1991 and beginning 2005 that are denominated in Deutsche Mark (DM) before 1998 and subsequently in Euro or alternatively in US$. Accordingly, the interest differential is measured as the difference

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[8]Favero, Giavazzi, and Spaventa (1997) discuss the relative performance of this measure with using swap spreads to correct for exchange rate depreciations. They conclude, that both "proxies obviously tend to measure the same phenomenon".

[9]Thanks to Evi Koch for help with Capital Data Bondware.

[10]Capital Data Bondware defines a benchmark bond in the following way. First, it is issued in the same currency, second, it is issued by the government of the country, which owns the issuing currency, third, it has the same coupon payment structure, and, finally, the issuing date is close that of the comparable bond issue it has a comparable time to maturity.

in the yield to maturity at the time of issue between the national bond under consideration and an equivalent German government bond in the case of DM/Euro denominated bonds or an equivalent US government bond in the case of a US\$ bond. Figure 2 in the appendix plots the yield spreads of EU government bond issues over time. We see a strong co-movement between the interest differentials of EU countries relative to Germany or the USA and a cyclical pattern.

$fiscal$ includes official fiscal variables influencing the fiscal position of a country and thereby the default probability P^e. We use the lagged debt to GDP and deficit to GDP ratios as proxies for the fiscal position and its deterioration.[11] CA is a creative accounting measure aimed at capturing the news signal, which should affect the expected default probability as it deteriorates the expected state of public finance. The fiscal variables and the creative accounting term are measured as the difference relative to the benchmark country Germany and the USA respectively.[12] We expect both, $fiscal$ and CA to positively affect the spread ($\alpha_2, \alpha_3 > 0$). FT is a measure of fiscal transparency, which should lower the spread by reducing uncertainty ($\alpha_5 < 0$). The effect of CA on the spread might increase or decrease with an increase in transparency, the direction depends on how transparency effects x_t, that is the informativeness of the news signal relative to the informativeness of the public signal. Increased transparency improves the quality of the news signal, but at the same time reduces the uncertainty about the official signal as more transparent countries probably cheat less. Therefore we expect α_4 to be larger (smaller) zero, if transparency increases (decreases) x.

z_{it} is a vector containing several variables affecting the yield spread of the issuing country, i.e. a liquidity variable ($liquidity$), an indicator of the cyclical stance ($cycle$) of the economy, a variable measuring the general investors' risk attitude ($corspread$), and a maturity variable ($maturity$).

The $liquidity$ variable serves to estimate the liquidity premium. We cannot follow one of the conventional approaches to use bid-ask spreads, which reflect trading costs in trading securities (Flemming 2003) as a measure for liquidity, since this information is not reported for primary issues. Gravelle (1999) shows that the correlation between bid-ask spreads and the total sup-

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[11]While the debt level is a stock variable controlling for the fiscal position of a country, the deficit measures the deterioration of that position.

[12]More details on CA will be given in the next section. The fiscal data are taken from the AMECO database and are in the definition of the EDP.

ply of debt is significantly negative. This suggests that the total volume of supply of a security has a positive effect on its liquidity, an argument put forward also by Gómez-Puig (2006). Following this reasoning, we assume as Bernoth, von Hagen, and Schuknecht (2004) that liquidity depends on market size and, additionally, that all debt issued by a government in a given currency is homogeneous up to maturity. Thus, the liquidity premium is assumed to be proportional to the ratio of the debt issued by a government in DM/Euro or US\$ to the total debt of EU countries issued in DM/Euro or US\$.[13] Measuring liquidity by the market share of foreign denominated debt assures additionally a low correlation between our liquidity variable and the debt/GDP variable.

The inclusion of an indicator of the cyclical stance (*cycle*) is motivated by the idea that default risk depends on the overall economic situation of a country. In an economic slow-down, government revenues decrease, while expenditures increase, and the probability of default may rise. Our indicator takes the value 1, when the nominal GDP of a country is more than half a standard deviation above its trend (boom), (-1) when it is more than half a standard deviation below its trend (recession), and 0 otherwise. The *cycle* variable included in the regression is calculated as the difference of this indicator between the issuer and the benchmark country.[14]

As suggested by our model as well by several empirical studies,[15] one important determinant of yield spread between countries is the general investors' risk aversion towards credit risk. Since investors' risk aversion is not directly observable, we use, similar to Codogno, Favero, and Missale (2003) Favero and Giavazzi (2004), and Bernoth, von Hagen, and Schuknecht (2004)), the yield spread between low grade US corporate bonds (BBB) and benchmark US government bonds as an empirical proxy. A rise in this spread indicates an increase in the investors' risk aversion, and vice versa.

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[13]We also used the issue size as an alternative proxy for liquidity, but since this variable shows insignificant coefficients, we exclude it from reported regression analysis. The other regression coefficients remained unaffected.

[14]Thus, *cycle* is zero, if both countries are in the same cyclical position; it is (-2) and (2), if one is in a strong boom and the other in a strong recession, and (-1) and 1 in the case of less severe differences in the cyclical stance.

[15]E.g. Dungey, Martin, and Pagan (2000) provide strong evidence of a common international factor in many yield differentials. Codogno, Favero, and Missale (2003) and Pagano and Thadden (2004) also note considerable co-movement of yield spreads, probably driven by international risk factors. Bernoth, von Hagen, and Schuknecht (2004)) confirm as well that interest differentials between EU countries are significantly affected by international risk factors and that the USA enjoy a 'safe haven' status.

We expect, that an investor demands a compensation for investing in long-term bonds instead of buying short-term bonds as the default risk increases with time to maturity. Given that our data set contains bond issues with different times to maturity, this motivates the inclusion of a *maturity* variable to our regression equation, which measures the time to maturity of the bonds at the time of issue.

Since we have data before and after the introduction of the Euro, we have to augment the above equation. More precisely, we estimate the following equation:

$$
\begin{aligned}
\frac{r_{it} - r_{jt}}{1 + r_{it}} \quad = \quad & fiscal_{it}(\mu_1 + \mu_2 EMU) + CA_{it}(\xi_1 + \xi_2 FT_{it} + \xi_3 EMU) + \beta_1 FT_{it} + \\
& + \quad z_{it}(\alpha_1 + \alpha_2 EMU) + \alpha_3 EMU + \mu_i + \epsilon_{it} \qquad (12)
\end{aligned}
$$

where μ_i denotes country dummies and ϵ_{it} is an error term with usual properties. To estimate the effects of EMU on yield spreads, we use the EMU dummy which takes the value of one for all EMU member countries as of 1998 and for Greece as of 2000 and zero otherwise.[16] A significant coefficient on this dummy points to a general effect of EMU on yield spreads of all member countries. Furthermore, we interact the EMU dummy with the fiscal variables, and the liquidity variable to see whether EMU has changed the effect of the fiscal variables, creative accounting, and market liquidity on interest rates.

Before estimating equation (12) we tested, whether we can pool DM/Euro and US\$ bonds into one data set. That means that we test, whether the effects of the independent variables on the spreads are the same for both currency groups. We find that, except for the effects of corporate-government spreads, pooling is permissable. Thus, we estimate for the variable *corspread* for both currency groups separate slope coefficients. To do that, we add a variable to our regression that interacts the variable *corspread* with a dummy that takes the value one, if a bond is issued in US\$.

Finally, we include country dummies to control for unobserved country characteristics. This is especially relevant in the current context, as some countries have a reputation of frequent fiscal misreporting. The coefficients of creative accounting including countries dummies thus really captures the change of the country's risk premium due to the new signal. It does not capture the bad reputation of that country.

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[16]We included the year 1998 in the EMU dummy since the decision, which countries would participate was made public in May of 1998 and was ex hypothesi correctly expected.

Detailed summary statistics of all mentioned variables are given in Table 3 in the appendix.

3 Creative accounting and fiscal transparency

3.1 Creative accounting

Measuring creative accounting is - by definition - difficult as it is an unpublished and hidden fiscal activity. Therefore, in our empirical exercise, we have to resort to approximate measures for the true extent of creative accounting. We employ two different measures, both measures only approximate the true extent of creative accounting. Both measures come from generally available information sources and therefore represent "news" signals to the financial markets. The first one is a noisy measure of creative accounting, namely stock-flow adjustments in percent of GDP. Following von Hagen and Wolff (2006), they are calculated from equation (13) as the difference between the change in the debt level B and the deficit D.

$$B_t - B_{t-1} - D_t = SFA_t \tag{13}$$

The advantage of this measure is that it captures all events that have an effect on the debt level without being recorded in the budget. This advantage is also the measure's main weakness, as some operations might not reflect the attempt to improve the books but result from purely technical problems that do not necessarily have an effect on the default probability of a country.[17] Overall, these "noisy" parts of the measure are probably random and should tend to cancel out over time (European Comission, DG for Economic and Financial Affairs 2003, p.79). von Hagen and Wolff (2006), however, show that stock-flow adjustments observed in Europe are on average positive over long periods of time. They also show that SFA is actively used by governments as a creative accounting tool. Buti, Martins, and Turrini (2006) extend and confirm these results. This creative accounting part contained in SFA should have a significant effect on interest rates, if it is recognized by financial markets as increasing the risk of default.

As a second measure of creative accounting, we employ the data presented in Koen and van den Noord (2005), who collect individual one-off measures

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[17]For example, positive SFA resulting from exchange rate re-valuation of foreign denominated debt are connected with a change in the ability of governments to service the debt, while positive SFA resulting from building up assets leaves the default probability unaffected.

to window dress the budget. The measure, called 'fiscal gimmickry', is a non-exhaustive inventory of events that have become public knowledge through media coverage. It is a more "fine tuned" measure of creative government activities than SFA. However, it is very likely, that many of such operations are unnoticed by news agencies and are therefore not collected in this database. Thus, while SFA probably captures a broader range of creative accounting but is measured with noise because of "non-creative" parts of SFA, 'fiscal gimmickry' is a 'pure' measure of creative accounting but captures only the window-dressing activities that became public knowledge and have been collected in the data base.

Figure 1 shows the relationship between stock-flow adjustments and one-off measures as collected by Koen and van den Noord (2005). We can clearly see a positive relationship, suggesting that the two measures probably both give similar and valuable information of creative accounting.

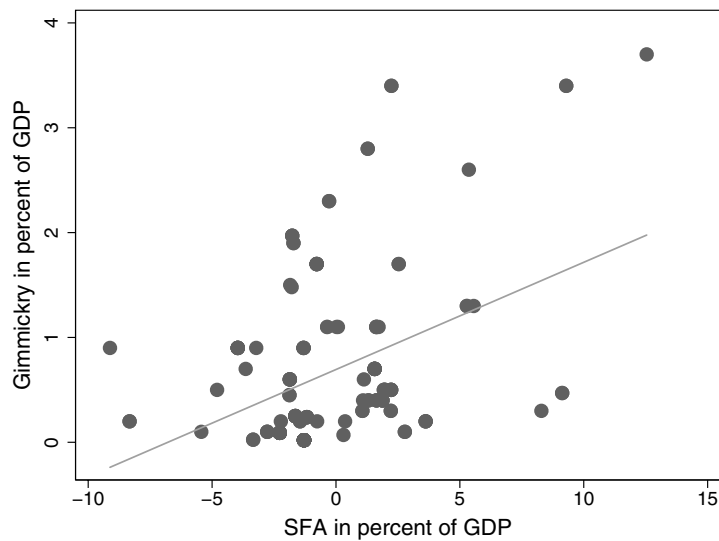Figure 1: The relation between stock-flow adjustments and fiscal gimmickry taken from Koen and Noord (2005) in percent of GDP, when gimmickry is observed.

Summary statistic of our two creative accounting variables are shown in Table 3 in the appendix.

3.2 Fiscal transparency

Fiscal transparency is an important concept, which is, however, difficult to measure. The IMF's concept of fiscal transparency is defined in their manual

on fiscal transparency.[18] This definition, which emphasizes being open to the public about the structure and functions of government, fiscal policy intentions, public sector accounts, and fiscal projections is based on Kopits and Craig (1998).[19]

In our paper, we think of transparency in a more narrow sense as influencing the relative information content of the official deficit signal and further creative accounting news. This narrower concept is also used to define transparency by Poterba and von Hagen (1999, pp. 3-4): "A transparent budget process is one that provides clear information on all aspects of government fiscal policy. Budgets that include numerous special accounts and that fail to consolidate all fiscal activity into a single 'bottom line' measure are not transparent. Budgets that are easily available to the public and to participants in the policymaking process, and that do present consolidated information, are transparent."

We capture the concept of informational transparency with two measures. One is a newly developed index of auditing, called *Audit*. This index is calculated on the basis of the answers collected by an OECD and World bank survey conducted in 2003. A detailed description of the derivation of this index is given in the Appendix. *Audit* measures whether governments are financially audited externally, how independent the auditing can be performed and how well the obtained information is disseminated.

The other index used is based on a part of the indicator developed in the seminal paper by von Hagen (1992), extended in Hallerberg, Strauch, and von Hagen (2001) and updated in Hallerberg, Strauch, and von Hagen (2005). We call this indicator *Transparency*, it is a measure of informativeness and transparency of the budget draft and includes an assessment of transparency given by government officials, the degree to which special funds are included in the budget draft, the information whether the budget consists of one document, whether it is linked to national accounts and finally whether government loans

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[18]http://www.imf.org/external/np/fad/trans/manual/intro.htm

[19]The IMF code includes four general principles of fiscal transparency. The first general principle, Clarity of Roles and Responsibilities, is concerned with specifying the structure and functions of government, responsibilities within government, and relations between government and the rest of the economy. The second general principle, Public Availability of Information, emphasizes the importance of publishing comprehensive fiscal information at clearly specified times. The third general principle, Open Budget Preparation, Execution, and Reporting, covers the type of information that is made available about the budget process. The fourth general principle, Assurances of Integrity, deals with the quality of fiscal data and the need for independent scrutiny of fiscal information.

are included.

In comparison to *Audit, Transparency* is up-dated twice over the investigated time period, and therefore also takes the development of 'budgetary transparency' over time into account. Hallerberg, Strauch, and von Hagen (2005) show that there has been a general increase in the level of transparency in Europe over the covered time period. Figure 3 in the Appendix compares the two measures of fiscal transparency for the year 2003. As can be seen, both are positively correlated. Table 3 in the appendix describes the descriptive statistics of these two transparency variables.

For both measures of fiscal transparency, we expect a negative impact on default risk premia asked by financial markets. Thus, the better governments are audited and the better the public information on the budget, the lower the spread. The hypothesis underlying this prediction is that financial markets know about transparency and will penalize in-transparent institutions, as they have less information on the true state of public finance. Furthermore, more transparency might increase the bargaining power of lenders in case of debt restructuring and thereby lower the risk of losing out completely on a credit.

Figures 4 and 5 in the appendix suggest that there exists a negative relationship between fiscal transparency and creative accounting. Thus, a country with a highly transparent budgetary process uses less fiscal window-dressing activities than a less transparent country. A logit regression between a binary variable, that takes the value of 1 if a country used fiscal gimmickry and zero otherwise, and the *Transparency* index confirms this result. However, the causality between these two variables is unclear. It might be that lower scores on fiscal transparency raise the odds of gimmickry, because the probability of detection is small. Alternatively, countries that have less incentive/need to hide parts of their fiscal position might introduce a highly transparent budgetary process to signal their trustworthiness to financial markets.

Figures 6 and 7 in the appendix plot the relation between the variance of publicly known creative accounting and the level of fiscal transparency. These graphs confirm the prediction, that transparency and the uncertainty of (measured) creative accounting are negatively correlated.

A simple correlation analysis between spreads and the two measures of creative accounting provides first evidence, that there exist a significant positive relationship between interest rates and hidden fiscal policy. For stock-flow adjustments this positive correlation is significant at a 5 percent level, while for

gimmickry it is significant at a 1 percent level. The next section provides more econometric evidence on these effects.

4   Results

4.1   Baseline results

Table 1 presents our estimation results. All regressions are estimated with country fixed effects to control for unobserved country characteristics.[20] Our results confirm the previous results of Bernoth, von Hagen, and Schuknecht (2004). Deficits significantly increase risk premia.[21] According to column A, a deficit differential of five percent relative to the benchmark country explains a yield differential of around 20 basis points. However, the significant negative coefficient on $deficit * EMU$ indicates that with EMU the effect of deficits on risk premia is significantly reduced. In fact, an F-test on the sum of the coefficients for $deficit$ and $deficit * EMU$ does not allow to reject the null hypothesis of no influence of the deficit on the spread with an EMU membership.

Before 1999 and for non-EMU countries thereafter, we find a significant and positive effect of fiscal gimmickry on government bond yields. The coefficient for stock-flow adjustments shows as well the expected positive sign, but is significant at the 10 percent significance level in only 3 out of 5 regressions. A reasonable explanation for the weak significance of stock-flow adjustments is that this measure of creative accounting is, as described earlier, a noisy measure for creative accounting. All in all, we can summarize that financial markets recognize window-dressing of governments and are not completely fooled. Financial markets thus demand higher interest rates if a government uses creative accounting.

Interestingly, the effects of the two different CA measures and the effects of the deficit, are quantitatively substantially different. While an increase in stock-flow adjustments by one percent of GDP increases the spreads by less than one basis point (and is not always significant), the effect of an equivalent increase in gimmickry amounts to up to 20 basis points. Increasing the deficit

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[20]We also estimated regression (12) without country fixed effects to exploit as well the cross-country dimension of our data. The estimation results are qualitatively similar and are available from the authors on request.

[21]Only in two regressions deficits become insignificant since their effect can not be separated from the effect of fiscal transparency.

by one percentage point will lead to an increase of the spread by roughly three basis points. The difference in coefficient size needs to be explained. In fact, if all three variables were perfect measures of the factual deterioration of the fiscal stance of the economy, they should all equally affect the probability of default. The estimated coefficients should be the same as they measure the increase in the spread due to the equally increased default probability.

The difference in coefficient sizes can result from two sources. First, sfa is a very rough measure of creative accounting. It is well known, that if a variable is measured with error, the coefficient is biased towards zero (the so called attenuation bias). If sfa measures the actual deterioration of the fiscal position with more noise than the deficit, and if the noise is well-behaved, the difference in size of the coefficient vis-a-vis the deficit coefficient might actually result from this attenuation bias. The estimated coefficient for sfa is thus a lower bound for the true impact of creative accounting on spreads.

However, the argument that the attenuation bias also explains the discrepancy between the coefficients of sfa and gimmickry, does not seem to be plausible. sfa must be extremely noisy to actually explain the huge difference in these two coefficients. Therefore, we believe that the large size of the fiscal gimmickry coefficient must result from something else. The data on which "gimmickry" is based come from creative accounting events that become public knowledge in the media. Apparently, financial markets react more strongly to these events than to more hidden creative accounting, which we capture with sfa. Figure 1 indicates why the reaction to sfa should be smaller than to gimmickry. As can be seen, gimmickry increases less than one-to-one compared to sfa. This implies that the coefficient of sfa should be lower than the one of gimmickry. Probably, financial markets assume that the gimmickry becoming public knowledge is just the tip of the iceberg. In this interpretation, gimmickry data represent a huge signal of additional hidden fiscal profligacy, which is penalized accordingly by financial markets.

After acceptance to EMU, the effect of cheating on the risk premium is significantly reduced, as indicated by the negative and significant coefficients on $sfa * EMU$ and $gimmickry * EMU$. Comparable to the weakening of the deficit effect, an F-test cannot reject the null hypothesis of no significant relationship between stock-flow adjustments and interest rate spreads after the start of EMU. Once inside the Euro, financial markets thus basically become

indifferent to the cheating of individual EMU members.[22]

We do not find a significant relationship between the lagged debt level and the yield spread. This suggests that financial markets mostly react to the deterioration of the fiscal position and not to its overall level. A reasonable explanation is that the influence of the relatively time-invariant debt level on interest spreads is almost entirely absorbed in the estimated country-fixed effects.

Before EMU and for non-EMU countries after 1999, we find a significant liquidity effect on interest rate spreads in most regressions. According to column A, an increase of the relative debt market size by five percent causes a reduction of the yield spread by around four basis points. As indicated by the significant coefficients on $Liquidity * EMU$, EMU-membership reduces the liquidity premium contained in government bond yields. A F-test does not reject the hypothesis that liquidity premia even vanish with EMU. An explanation is that this results from the improved integration of markets, which lowers transaction costs. This result is in line with Pagano and Thadden (2004), who also conclude that liquidity premia play a smaller role in explaining yield differentials after EMU membership.

As indicated by the significant coefficient of $corspread * US$, we find for yield differentials relative to the USA a significant effect of the general investors' risk aversion. The more risk averse investors are towards credit risk, which is indicated by a large spread between low-graded US corporate bonds and US government bonds, the wider is the interest differential between an EU country and the USA. For bond yield spreads relative to Germany, we do not find this effect. This shows that, contrarily to Germany, the USA enjoy a 'safe haven' status and that international factors have a significant effect on government bond yield spreads, which is in line with the results of e.g. Codogno et al. (2003), Gomez-Puig (2005) and Bernoth et al (2004). The other control variables have the expected signs and will not be discussed further at this place.

Columns B and D extend the regression by two alternative measures for fiscal transparency. In all regression with gimmickry, we find a significant reduction of the spread, the more transparent the budgetary process of a government is. An increase of the *audit* as well the transparency measure taken

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[22]Anecdotal evidence from significant deficit and debt data revisions in some countries in recent years confirms this finding as risk premia moved very little in these cases.

from Hallerberg, Strauch, and von Hagen (2005) by one standard deviation causes an decrease of the yield differential by roughly 6 basis points.[23] For both transparency measures, we find the statistical significance of the coefficients on creative accounting to remain unaffected. This shows, that the significant results of creative accounting do not result from an omitted variable bias because of missing transparency proxies. Overall, our evidence suggest that fiscally more transparent countries have to pay lower risk premia. This evidence confirms the prediction by Kopits and Craig (1998) that financial markets can be more certain about a fiscally transparent government's ability and willingness to service its obligation and therefore demand lower risk premia.

In Columns C and E, we presents the estimation results for gimmickry and sfa interacted with our two measures for fiscal transparency. We find a strong and significant negative effect for gimmickry interacted with *Audit* and *Transparency*. This indicates that financial markets are less worried about gimmickry of a transparent country. This probably means that gimmickry is not perceived as a very bad signal of the tip of the iceberg if the budgetary process of a government is relatively transparent. In terms of the model interpretation, improved auditing respectively transparency has a stronger effect on the reliability of the official signal as compared to the precision of the news signal. Fiscal transparency thus probably reduces the odds of creative accounting strongly.

Our results provide evidence, that financial markets care about creative accounting. Creative accounting results in higher risk premia. Since creative accounting measured by gimmickry is significant in all specifications with included country dummies, financial markets appear to value the de facto deterioration of the inter-temporal budget situation. This indicates, that financial markets do not only take creative accounting exclusively as a signal of the country's general characteristics. They rather evaluate the actual deterioration of the fiscal position of the country resulting from creative accounting.

The different size of the coefficient for gimmickry and sfa provides some evidence, that public knowledge of this creative accounting plays a crucial role for financial markets. Recall that the gimmickry data are based on cases of fiscal cheating that made it in the news. These bad "cheating-news" strongly

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[23]Note, that we cannot control for country dummies in this regression, since *Audit* is time invariant.

degrade the perception of risk of a country. Financial markets' risk assessment is, however, less affected by gimmickry, the more transparent a country is.

Table 1: Creative accounting, fiscal transpareny and risk premia in government bond markets

Panel with sfa (t-values in parentheses below the coefficient)

	A	B	C	D	E
deficit	**3.98** (3.15)	**3.66** (2.04)	**3.69** (2.06)	**4.18** (3.41)	**4.14** (3.72)
sfa	**0.50** (1.74)	**0.48** (1.65)	**0.96** (0.84)	**0.47** (1.67)	**0.56** (1.43)
debt(-1)	**0.18** (1.14)	**0.12** (0.67)	**0.11** (0.58)	**0.07** (0.79)	**0.07** (0.9)
liquidity	**-0.88** (-2.32)	**-0.92** (-2.44)	**-0.99** (-2.26)	**-0.59** (-1.57)	**-0.60** (-1.61)
corspread	**0.05** (0.96)	**0.05** (0.92)	**0.04** (0.84)	**0.04** (1.15)	**0.05** (1.17)
US	**-40.40** (-3.68)	**-40.63** (-3.5)	**-41.70** (-3.42)	**-47.61** (-5.33)	**-47.15** (-5.28)
corspread*US	**0.40** (6.5)	**0.40** (6.29)	**0.41** (6.07)	**0.40** (8.26)	**0.40** (8.26)
cycle	**-3.30** (-2.67)	**-3.40** (-2.76)	**-3.54** (-2.84)	**-3.76** (-3.09)	**-3.85** (-3.28)
maturity	**0.83** (2.78)	**0.80** (2.61)	**0.80** (2.6)	**0.79** (2.71)	**0.80** (2.73)
EMU	**-13.28** (-2.18)	**-12.80** (-2.13)	**-13.02** (-2.14)	**-9.45** (-1.62)	**-9.17** (-1.68)
deficit*EMU	**-4.49** (-3.05)	**-4.09** (-2.09)	**-4.20** (-2.07)	**-3.81** (-2.82)	**-3.90** (-2.75)
sfa*EMU	**-1.35** (-2.43)	**-1.36** (-2.46)	**-1.34** (-2.43)	**-0.68** (-1.35)	**-0.80** (-1.29)
debt(-1)*EMU	**-0.13** (-0.86)	**-0.18** (-1.11)	**-0.17** (-1.1)	**-0.11** (-0.98)	**-0.13** (-1.08)
liquidity*EMU	**1.03** (2.29)	**1.14** (2.7)	**1.17** (2.65)	**0.66** (1.63)	**0.66** (1.67)
transparency		**-14.89** (-0.73)	**-17.38** (-0.91)		
transparency*SFA			**-0.72** (-0.46)		
audit				**-37.95** (-3.26)	**-35.53** (-2.9)
audit*SFA					**-1.13** (-0.45)
cons	**12.19** (1.37)	**25.78** (1.17)	**29.42** (1.42)	**18.45** (2.33)	**17.10** (2.21)
country dummies	yes	yes	yes	no	no
N	235	234	234	234	234
r2	0.65	0.66	0.66	0.60	0.60

Panel with gimmickry (t-values in parentheses below the coefficient)

	A	B	C	D	E
deficit	**2.58** (3.41)	**1.09** (1.11)	**0.64** (0.73)	**2.01** (2.59)	**2.08** (2.9)
gimmickry	**17.20** (3.96)	**20.50** (4.39)	**43.98** (6.05)	**22.53** (4.94)	**20.51** (5.08)
debt(-1)	**-0.06** (-0.46)	**0.02** (0.15)	**0.07** (0.52)	**-0.05** (-0.66)	**-0.04** (-0.55)
liquidity	**-0.49** (-1.85)	**-0.49** (-1.8)	**-0.35** (-1.42)	**-0.24** (-0.99)	**-0.19** (-0.86)
corspread	**0.00** (-0.02)	**0.05** (0.89)	**0.04** (0.79)	**0.02** (0.6)	**0.03** (0.74)
US	**-54.42** (-5.27)	**-45.75** (-4.31)	**-43.45** (-4.07)	**-56.08** (-6.32)	**-52.12** (-5.89)
corspread*US	**0.47** (8.16)	**0.42** (7.28)	**0.41** (7.11)	**0.44** (8.96)	**0.42** (8.65)
cycle	**-1.00** (-0.78)	**-0.75** (-0.57)	**-0.82** (-0.65)	**-1.13** (-0.77)	**-1.04** (-0.71)
maturity	**1.18** (3.65)	**1.18** (3.61)	**1.20** (3.74)	**1.07** (3.82)	**1.07** (3.88)
EMU	**2.34** (0.5)	**-0.07** (-0.02)	**-0.81** (-0.18)	**3.12** (0.71)	**2.40** (0.55)
deficit*EMU	**-1.89** (-2.07)	**-0.14** (-0.11)	**0.49** (0.45)	**-1.28** (-1.45)	**-1.28** (-1.5)
gimmickry*EMU	**-24.28** (-5.66)	**-27.61** (-5.98)	**-27.70** (-6.92)	**-26.69** (-5.91)	**-26.14** (-6.48)
debt(-1)*EMU	**0.16** (1.36)	**0.16** (1.41)	**0.26** (2.07)	**0.14** (1.43)	**0.09** (0.87)
liquidity*EMU	**0.35** (1.16)	**0.55** (1.76)	**0.50** (1.69)	**0.03** (0.09)	**0.12** (0.41)
transparency		**-41.08** (-2.52)	**-29.85** (-1.73)		
transparency*gimmickry			**-37.78** (-2.75)		
audit				**-41.36** (-3.61)	**-19.54** (-1.29)
audit*gimmickry					**-16.81** (-2.33)
cons	**-22.30** (-1.47)	**3.98** (0.2)	**-4.87** (-0.24)	**13.05** (1.73)	**8.64** (1.11)
	yes	yes	yes	no	no
N	208	208	208	207	207
r2	0.74	0.75	0.76	0.71	0.71

Notes: t-values below the coefficient.

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4.2 Robustness checks

Table 2 shows IV regressions to address the potential attenuation bias resulting from the imprecise measurement of creative accounting through stock-flow adjustments. If the coefficient is downward biased because of the attenuation bias, we expect the coefficients on sfa to be larger in the instrumental variables regressions. We instrument sfa with fiscal gimmickry and find the expected result. The coefficient for sfa is now larger and closer to the one on fiscal gimmickry.

Table 2: Instrumental variables regressions for stock-flow adjustments

sfa	11.97	7.91	1.40	1.83
	2.21	0.43	1.17	1.67
sfa*EMU	-10.54	-13.99	4.92	-0.31
	-1.91	-0.97	1.52	-0.07
deficit	5.48	5.83	4.41	4.50
	1.84	0.73	2.83	2.65
debt(-1)	0.61	1.59	0.08	0.21
	1.53	0.37	0.72	0.82
liquidity3	0.68	0.38	-0.53	-0.88
	0.42	0.17	-1.06	-1.73
corspread	0.02	0.04	0.08	0.01
	0.17	0.1	1.13	0.21
US	-27.88	-8.47	-23.94	-38.94
	-0.79	-0.04	-1.58	-2.85
corspread*US	0.34	0.34	0.27	0.40
	2	0.39	2.93	4.84
cycle	-21.06	-15.20	-0.62	-3.17
	-1.8	-0.56	-0.19	-1.4
maturity	1.30	2.33	0.84	1.21
	1.67	1.29	2.05	2.93
EMU	-4.12	12.88	-12.27	-8.10
	-0.23	0.36	-1.37	-1.06
deficit*EMU	-3.79	-16.36	3.86	-2.53
	-0.99	-1.61	1.13	-0.46
debt(-1) EMU	-0.60	-0.17	-0.05	-0.06
	-1.26	-0.31	-0.27	-0.26
liquidity3*EMU	-0.36	-0.07	0.21	0.62
	-0.23	-0.02	0.39	1.09
cons	1.23	-36.89	9.74	33.02
	0.04	-0.1	0.83	1.12
country dummies	no	yes	no	yes
instruments	gimmickry gimmickry*EMU		transparencyMH FisGovStructure elect2 vetoman	
N	208	208	225	225

Notes: t-values below the coefficient.

Our estimates might suffer from endogeneity if governments use creative

accounting to "fool" the financial markets. In this case, the estimated coefficients will be biased, as they are driven by reverse causality. In this view, governments engage in creative accounting when the spreads are larger in order to reduce the risk premium and the connected interest payments. While it is very likely that other factors, especially fiscal rules and electoral motives, determine the incentives of governments more than the relatively small spreads in the EU, we want to make sure that our coefficients are not driven by a possible reverse causality problem. Therefore, we perform a second sets of instrumental variable regressions in Table 2.

In the second set of IV regressions, we instrument sfa with political economy variables. It is reasonable to assume, that variables measuring political and especially institutional features of an economy are exogenous to the interest rate spread. They are, however, very likely to be connected to the amount of creative accounting. In particular, we employ the transparency measure *Transparency*, a dummy variable taking the value 1 in election years, a variable measuring the quality of the budget process and a variable for the raw ideological distance (vetoman) within a government.[24] Following Hallerberg (2004), we expect better budgeting institutions to contribute to lower use of sfa, while governments might be particularly tempted to use sfa in election years. Finally, we expect that the larger the ideological distance in a government, the more difficult it will be to agree on hiding parts of the budget from the books. The first stage regressions confirm these predictions. As Table 2 shows, the instrumented sfa has the expected effect on the spread and is statistically significant when controlling for country dummies. We are therefore confident, that our measured coefficients on creative accounting are not driven by reverse causality.

5   Conclusions

We develop a portfolio model of interest differentials based on Bernoth, von Hagen, and Schuknecht (2004). In this model, interest rate differentials increase with a relative worsening of the fiscal position. The model is augmented to account for fiscal creative accounting and fiscal transparency. Creative accounting appearing in the media constitutes a news signal. The more reliable

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[24]Thanks to Mark Hallerberg for providing us with the data on raw ideological distance. Raw ideological distance is measured according to the Manifesto Project, which codes the distance among parties based on their election manifestos in multiple dimensions.

this signal, the greater will be the effect of creative accounting on the expected fiscal position of a country. Creative accounting news should therefore increase the default risk premium. Fiscal transparency should reduce spreads through lowering of uncertainty of fiscal policy. In addition, it influences the relative information content of the official and the news signal as more transparent countries probably provide more reliable official data.

The empirical results confirm the hypotheses derived from the model. Creative accounting increases risk premia. The gimmickry events, that make it in the financial news, have strong punishing effects on risk premia. This is especially true, if a country is in-transparent, as financial markets then take gimmickry as a "tip of the iceberg" signal. Creative accounting thus increases the cost of borrowing significantly, if it becomes known, especially if financial markets are unsure about the true extent of creative accounting. Deficits and creative accounting are penalized less in EMU. This suggests that central banks should increase their effort to monitor fiscal policy and to publicly stress the importance of sound fiscal policies. Fiscal transparency is connected with lower risk premia in our estimations. Instrumental variable regressions confirm the results by addressing potential simultaneity and attenuation biases.

The results highlight the importance of fiscal transparency for the credibility of governments. More transparent governments benefit from a significantly lower risk premium. Moreover, our results show that financial markets penalize fiscal misreporting heavily, which suggests that they are not fooled. In the monetary union, financial markets care less about hidden as well as official fiscal policy, however.

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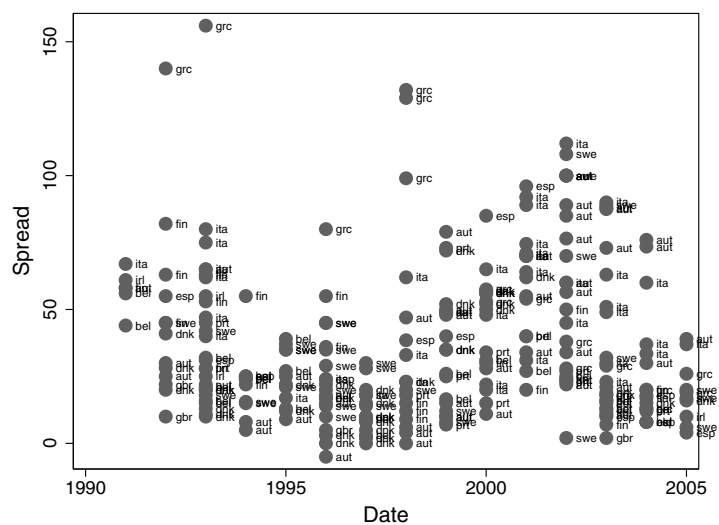
A Graphs

Figure 2: Interest rate spreads for central government primary debt issues vs benchmark countries Germany or USA in basis points.
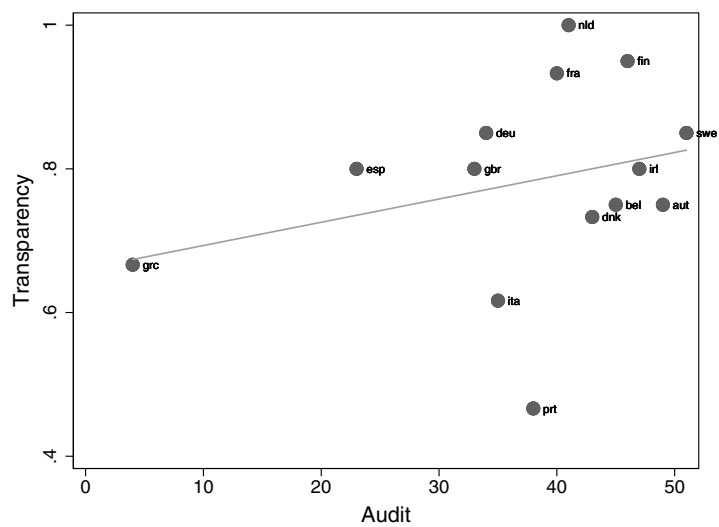

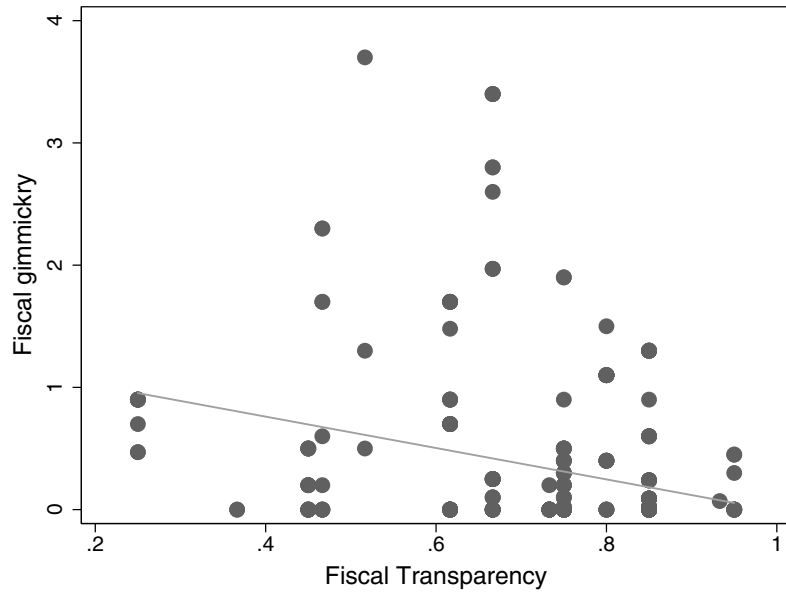Figure 3: A comparison of two indices of fiscal transparency.

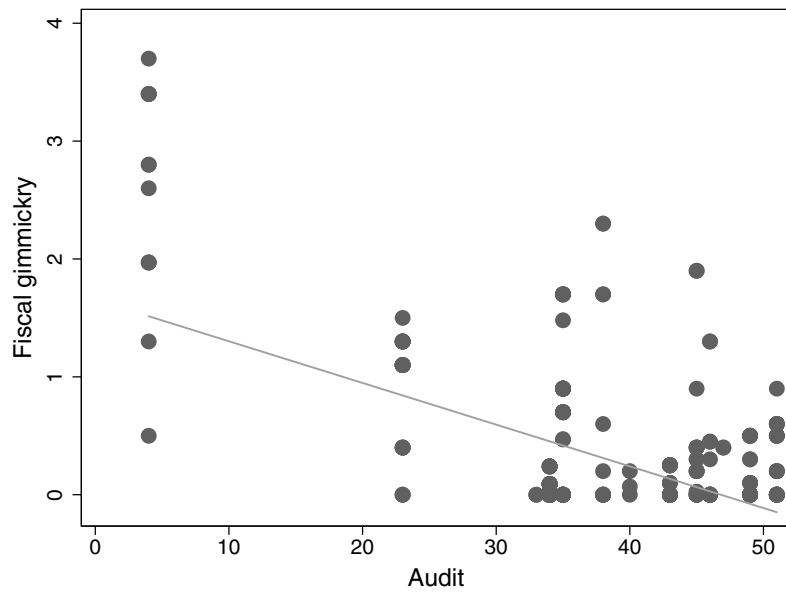Figure 4: Fiscal gimmickry as a function of transparency.
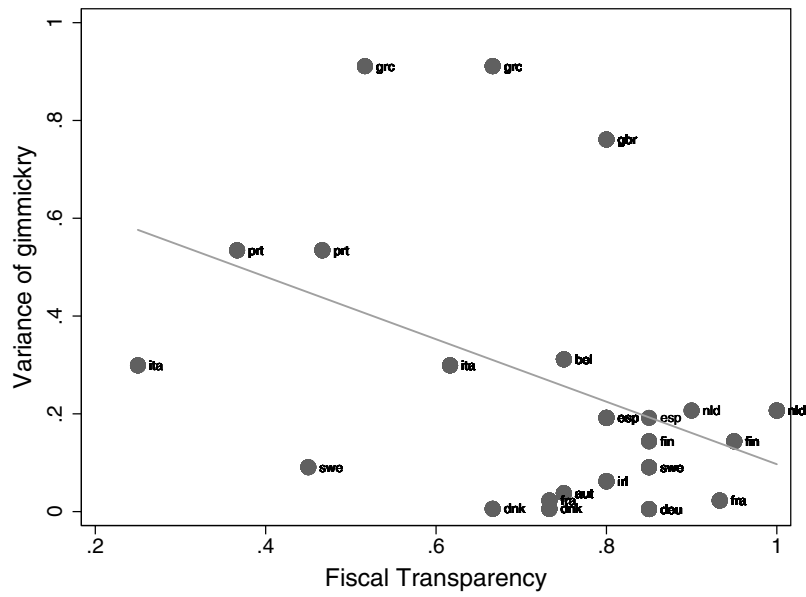

Figure 5: Fiscal gimmickry as a function of Audit.

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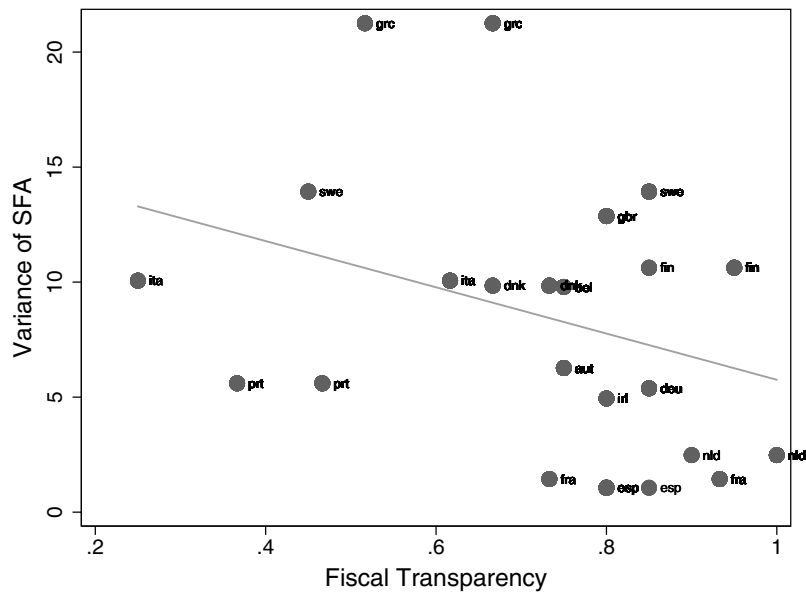Figure 6: The variance of gimmickry as a function of transparency.

Figure 7: The variance of stock-flow adjustments as a function of transparency.

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Variable	Desciption	Average	Std. Dev.	Min.	Max.
Spread S_{it}	The spread between the yield of a government bond issue of an EU country and a comparable government bond issued in the same currency related to the gross nominal return of the government bond issue. Expressed in basis points. Compare equation (11). Source: Capital DATA Bondware	37.29	28.56	-5.00	156.00
Deficit	Difference of deficit to GDP (including debt service payments) at the end of the fiscal year between the issuer country and the benchmark country. *Source:* European Commission (Ameco database)	-0.15	3.14	-8.10	10.30
Stock-Flow-Adjustment	Difference of stock-flow adjustment to GDP at the end of the fiscal year between the issuer country and the benchmark country (expressed in percent). *Source:* European Commission (Ameco database)	0.51	6.44	-14.67	14.24
Gimmickry	One-offs, creative accounting operations affecting fiscal balances collected by Koen and van der Noord (2005). Expressed in percent of GDP	0.47	0.77	0.00	3.70
Debt (lagged)	Difference of lagged debt to GDP outstanding at the end of the fiscal year between the issuer country and the benchmark country (expressed in percent). *Source:* European Commission (Ameco database)	13.86	26.63	-44.05	87.88
Audit	Measures the degree to which fiscal book keeping is being audited and the extent to which which this information is disseminated. Difference of audit relative to benchmark country, described in more detail in section 7 of the paper.	0.04	0.19	-0.56	0.27
Transparency	Measures the informativeness of the budget draft. It includes an assessment of transparency given by government officials, the degree to which special funds are included in the budget draft, the information whether the budget consists of one document, whether it is linked to national accounts and finally whether government loans are included. Taken from Hallerberg, Strauch, von Hagen (2005).	0.69	0.16	0.25	1.00
Corp. Spread	Spread between 7 to 10 years low grade corporate bonds (BBB) and 7 to 10 government bonds in the US to the time of issuance (expressed in basis points). *Source:* Datastream	170.95	43.98	113.00	289.00
Maturity	Time to maturity of the government bond issue measured in years. *Source:* Capital DATA Bondware.	7.32	4.94	1.60	32.50
Liquidity	The ratio of the total debt of the issuer country over the total debt of the EU issued in DM/Euro or US$. *Source:* DBSonline, BIS and own calculations.	13.64	12.89	0.11	53.82
Business Cycle	The difference of the business cycle variable between the issuer country and the benchmark county, which collates the value 1 when the detrended and standardized nominal GDP is bigger than 0.5, the value -1, when it is smaller then -0.5 and 0 otherwise.	-0.05	1.05	-2.00	2.00

Table 3: Descriptive statistics and sources of the variables.

B A new index of fiscal transparency

Fiscal transparency is an important concept, which is difficult to measure. In this paper, we focus on the narrow concept of "information" transparency. Our index "Audit" captures the degree to which fiscal book keeping is being audited and the extent to which the information of this auditing becomes public knowledge. A further aspect of *Audit* relates to potential political pressure that results from the auditing results.

Audit is based on a OECD/World Bank survey of budget practice, which was launched in February 2003, in more than 60 countries.[25] In the survey, question are asked regarding (1) general information on government budget organization, (2) budget formulation, (3) budget execution, (4) accounting, control and monitoring systems, (5) budget documentation and performance management, (6) fiscal relations among levels of government, and (7) special relationships and issues.

We took the responses on question in the area (4), more specifically 4.5a-4.5t. The questions and our coding are listed below. To each question, we assigned a value between zero and four, where four indicates the response most conducive to fiscal "transparency". The index is computed as the simple sum of the responses to all individual questions. We also computed the average response for every country. This alternative index, however, appears to capture the true extent of auditing less adequately, as non-response is not counted. Especially Greece leaves a significant amount of questions unanswered. We believe, that it is reasonable to assume that partial non-response is a sign of very bad auditing quality.

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[25]The results are available at http://ocde.dyndns.org/

Table 4: The external audit index

Country	External audit, index value
AUSTRIA	49
BELGIUM	45
DENMARK	43
FINLAND	46
FRANCE	40
GERMANY	34
GREECE	4
IRELAND	47
ITALY	35
NETHERLANDS	41
NORWAY	41
PORTUGAL	38
SPAIN	23
SWEDEN	51
UNITED KINGDOM	33
UNITED STATES	40

Notes: Authors' calculation based on World Bank/OECD survey.

Question:	**Coding of the answers developed by the authors.**
Are government entities subject to financial audits by an external auditor?	yes=4, no=0
Is there a central Supreme or National Audit Office	Yes, reports to legislative branch=4, Yes, reports to the executive branch=2, Yes, reports to judiciary branch=1; Other, please specify=0
Can the external auditor contract out to other entities?	Yes to private firms=4; Yes to other independent government bodies=2.5; Yes, other please specify=1, No=0
Is the National Audit Office peer reviewed by other countrys audit offices?	Yes, it is a routine practice=4, Yes, on an ad hoc basis=2, No=0

How would external audit arrangements be described?	There is no formal external audit of government accounts=0; The audit authority reports only within the executive (e.g., to the President)=1; A National Audit Body, independent of the executive, audits government accounts and reports to the executive=2; The National Audit Body is a legislative body=3; A National Audit Body, independent of the executive, audits government accounts and reports to the legislature=4
How is the independence of the National Audit Body from the executive established?	It is established in the constitution=4; It is established in law=3; It is set out in administrative regulation=1; It is not clearly set out in law=0
What mandate does the National Audit Body have?	0 to 4(most functions)
Are the findings of the National Audit Body available to the public?	Always=4; Generally, but with some exceptions (e.g., audits of the military)=2; Never or rarely=0
Does the external auditor conduct performance audits?	Yes=4, No=0
Is there a materiality level or other risk management procedure that limits the number of governmental organisations or entities subject to audit?	yes=0, no=4

Are audit results circulated and discussed in Parliament?	no=0, No, the reports are too late=1; Yes, by Budget committee=2; Yes, by oversight committee(s)=3; Yes, by General Assembly=4
How are the subjects of audits determined?	By legislative branch request=4; By request from the public or other civil society actor=3; Internally determined=2; By executive branch request=1; Other, please specify=0
Is there a system to track audit recommendations once issued?	Yes, keeps track of implementation of recommendations=4; Yes, an annual report is issued of recommendations=3; Yes, but the reports are kept internally=1;No=0
Is the executive branch required by constitution or legislation to follow up and respond to national audit body recommendations?	yes=4; Yes, but there is a procedure by which the executive may reject the recommendation=3; No, but it generally does=1; No=0
Does the Supreme Audit body coordinate with or use the reports of internal auditors?	all yes=4. No=0
Does the legislature have an audit body that is not affiliated with the National Audit Body?	yes=4, no=0

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