Fiscal Transparency and Capital Markets

Risk Premiums in the Government Bond Market

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Abstract
Following several corporate accounting scandals, politicians and participants in the financial markets have opted for greater corporate transparency whereas people almost blindly trusted state authorities and their released information especially on fiscal data. This attitude changed in the aftermath of several crises in emerging market economies during the second half of the 1990s, which led the IMF to push for greater transparency of countries’ fiscal positions. This initiative has steadily been gaining support and Greece’s misreporting of fiscal data to Eurostat has revealed that a lack of fiscal transparency is not only a problem of low-income countries. Fiscal transparency can be defined as the openness about policy intentions, formulation, and implementation and is regarded as a key element of good governance. Despite strong empirical evidence, there are only few theoretical approaches to model the effects of fiscal transparency. Thus, after a short review of the relevant literature this paper tries to shed light on the underlying transmission mechanism of fiscal transparency with respect to financial markets. First, the bond spreads between countries are decomposed in three different components. In a second step, the default probability of a country is specified in more detail to allow for a deeper analysis of the effects of fiscal transparency on bond spreads. It will be shown that the variance of revisions to fiscal data following the reported first notifications to Eurostat can explain to a large extent past differences in bond spreads. This is due to the fact that more transparent countries are more prudent in their fiscal reporting and do not need to resort to the use of creative accounting. Thus, the more transparent the budget of a country, the lower is the likelihood of large revisions in the fiscal balances and the expected default probability decreases.
1 INTRODUCTION

After the sobering experience with 1st generation models of economic development, it is now generally acknowledged that, among other factors, institutional quality holds the key to prevailing patterns of prosperity around the world. The role of institutions is emphasized by North (1990, 1993), Rodrik (2000), Campos (2000), Lin and Nugent (1995), Havrylyshyn and van Rooden (2001), and Acemoglu et al. (2005). Rodrik (2004, p.10) addresses the problem of causality of institutions and economic development by stating that “high-quality institutions are perhaps as much a result of economic prosperity as they are their cause. But however important the reverse arrow of causality may be, a growing body of empirical research has shown that institutions exert a very strong determining effect on aggregate incomes.”

One main result from the so-called 2nd generation models of economic development was that “institutions matter” and that market liberalization alone can only produce the desired outcomes if strong institutions support these changes. These models argue that, in addition to the factors of the Washington Consensus, governance and “good” institutions are generally accepted fundamentals to promote investment and growth.

Fiscal transparency promotion is thereby a newer element of 2nd generation policies of economic development. Especially in the aftermath of financial crises in several emerging market countries at the end of the 1990s, international institutions eventually shifted their interest increasingly towards the relationship between good governance and increased transparency and better economic and social outcomes.

By the same token, the importance of transparency in successful economies is becoming increasingly recognized in the operational work of international organizations. In this regard, the IMF paved the way by initiating the Code of Good Practices on Fiscal Transparency - Declaration on Principles at its 50th meeting in Washington, D.C. on April 16, 1998. According to IMF (2001a) the lack of transparency was a feature responsible for the build-up of the Mexican crisis of 1994-95 and of the emerging market crises of 1997-98 in Asia and Russia. In their view, inadequate economic data, hidden weakness in financial systems, and a lack of clarity about government policies and policy formulation contributed to a loss of confidence that ultimately threatened to undermine global stability. This view is shared by Rahman (1998, p.3): “It is difficult, if not impossible, to say to what extent disclosure deficiencies and non-transparency of financial statements were responsible for triggering the East Asian financial crisis, but there is general agreement that they played a crucial role.”

Meanwhile, other international institutions started promoting more transparent policies among their member countries, as well. Examples are the Organization of Economic Development and Co-operation (OECD) with its “Best Practices for Budget Transparency” (OECD, 2001) and “Best Practice Guidelines - Off-Budget and Tax Expenditures” (OECD, 2004a) or the Washington-based NGO “International Budget Project” that promotes civil society’s capacity to

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1 Following North (1990, p.3) “Institutions are the rules of the game in society or, more formally, are the humanly devised constraints that shape human interaction.”

2 This result is shared by Feige (1997, p.22): “The historical laboratory of the transition economies has revealed that liberalization, stabilization, and privatization may be necessary but are by no means sufficient conditions for creating ‘market economies’.”

3 Williamson introduced the term ‘Washington Consensus’ in 1990 to “refer to the lowest common denominator of policy advice being addressed by the Washington-based institutions to Latin American countries as of 1989” (see Williamson (1990) and Williamson (2000)). The common factors of the Washington Consensus include fiscal discipline, tax reform, financial liberalization, a unified and competitive exchange rate, openness, trade liberalization, privatization, deregulation, and secure property rights. Rodrik (2005) includes corporate governance and anticorruption in an augmented Washington Consensus.

4 See IMF (2001b) for more details.

5 A more critical stance on this issue comes from Hoff and Stiglitz (2001, p.426): “The focus on transparency in financial reporting as a key factor behind the East Asian crisis served strong political interests. […] It shifted blame from industrial countries that had pushed rapid capital account and financial liberalization - without a corresponding stress on the importance of strong institutions and regulatory oversight - to the governments of developing countries, which had failed to enforce information disclosure.”
analyze and influence the budget process and its outcome. The economic literature shows a growing number of empirical evidence that countries that are less fiscally transparent tend to experience lower levels of foreign direct investments (FDI), higher risk premiums in the government bonds markets, higher capture of corruption, slower growth rates, and consequently also lower levels of per capita GDP. However, despite the strong empirical evidence, there are only few theoretical approaches to model the effects of fiscal transparency.

This paper tries to disentangle the underlying transmission channel of fiscal transparency with respect to government bond markets. To begin with, the following Section 2 will define the term transparency both, in a wider context as well as in a more specific way, i.e. fiscal and budgetary transparency and reviews the economic literature on fiscal transparency. After this exercise, Section 3 introduces possible effects of transparency on the capital markets followed by Section 4 that decomposes the required return of a risky investment in three distinctive subcomponents. In Section 5, the expected default probability will be specified in more detail in order to model the effects of fiscal transparency on the expected default probability and eventually also on the risk premiums demanded by investors. This section also analyzes the quality of the model with fiscal data for selective EU countries. The effects of intransparent fiscal reporting will be illustrated by means of a short country case study on Greece in Section 6. Finally, Section 7 summarizes the main results.

2 Brief Literature Review on Fiscal Transparency

To start with, a comprehensive definition of transparency in general can be found at Drabek and Payne (2001, pp.4-5). They describe the term transparency as referring to the clarity and effectiveness of activities with impact on public policy. Fiscal Transparency will be defined in this paper as the openness about policy intentions, formulation, and implementation. Moreover, they regret that in the economic literature, the discussion about transparency has remained almost limited to two key topics, on corruption and bribery and on the protection of property rights. Besides these two items, Drabek and Payne (2001) count three more possible fields of non-transparent policies: the level of bureaucratic inefficiency within the government, poor enforcement of the rule of law, and economic policies per se. In the latter case, economic policy is regarded as non-transparent if it is subject to unpredictable changes and policy reversals.

A more specific definition of transparency can be derived if the concept is applied towards fiscal and budgetary policies. First, a comprehensive definition of fiscal transparency can be found in Kopits and Craig (1998, p.1): “Fiscal Transparency is defined [...] as openness toward the public at large about government structure and functions, fiscal policy intentions, public sector accounts, and projections. It involves ready access to reliable, comprehensive, timely, understandable, and internationally comparable information on government activities [...] so that the electorate and financial markets can accurately assess the government’s financial position and the true costs and benefits of government activities, including their present and future economic and social implications.” With regard to the budget one should first take into account that the budget is the single most important policy document of a government, where all policy objectives should be reconciled and implemented in concrete terms. In this context, the OECD (2001, p.3) defines budget transparency as “ [...] the full disclosure of all relevant fiscal information in a timely and systematic manner.” A further specific example of transparent budget reporting procedures can be found in 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.” As features of
non-transparent financial reporting. Alesina and Perotti (1996) identify optimistic predictions on key economic variables, optimistic forecasts of the effects of new policies, creative and strategic use of what is kept on or off budget, strategic use of budget projections, and strategic use of multi-year budgeting.

Erbaş (2004) is analyzing this link between transparency and the level of investments a country may attract. He shows with a model based on cumulative prospect theory that for a given probability and payoff structure the expected return on investment is higher in more transparent countries as the uncertainty of possible outcomes is being reduced. Therefore, those countries attract more capital investment and grow more than less transparent countries.

A similar result can be found in Gelos and Wei (2005). They analyze the role of both, government and corporate transparency, with respect to shifts in portfolio investments by international investment funds. Low government transparency tends to be associated with a lower level of international investment into that country. Moreover, they provide evidence of increased herding behavior by international investors in less transparent countries, therefore, contributing to a higher volatility and to a higher likelihood of financial crisis in emerging markets.

One further aspect to be found in the economic literature is that fiscal transparency has large and positive effects on the fiscal performance. According to Kopits and Craig (1998), “transparency in government operations is widely regarded as an important precondition for macroeconomic fiscal sustainability, good governance, and overall fiscal rectitude.” Alesina and Perotti (1996) and Poterba and von Hagen (1999) concur that more transparency leads to lower budget deficits and makes fiscal discipline and control of spending easier to achieve. Alt and Lassen (2003) present a career-concerns model with political parties to analyze the effects of fiscal transparency on public debt accumulation. They construct a replicable index of fiscal transparency to test the predictions of this model. Simultaneous estimates of the level of public debt and transparency for a sample of 19 OECD countries strongly confirm that a higher degree of fiscal transparency is robustly associated with lower public debt and deficits. In a similar manner the more public choice oriented approach by Hall and Taylor (1996) show that greater transparency eases the task of attributing outcomes to the acts of particular politicians. This helps voters distinguish effort from opportunistic behavior or stochastic factors primarily by providing actors with greater or lesser degrees of certainty about the present and future behavior of politicians.

With respect to bond markets, Kopits and Craig (1998) state that international financial markets demand lower risk premiums for countries that are forthcoming about their fiscal position and risk. Similar, Glennerster and Shin (2006) analyze empirically the effect of increased transparency (measured with the dissemination of macroeconomic data) on returns in the bond market. The release of more reliable macro-data is associated with a substantial drop in a government’s borrowing costs in the bond market.

However, one should bear in mind that the problem of how to exactly define the term transparency and how to correctly measure the level of fiscal transparency remains one central weakness in all empirical findings. Alesina and Perotti (1996) note that the “results on transparency probably say more about the difficulty of measuring it, than about its effect on fiscal discipline“, a view shared by Tanzi and Schuknecht (2000). Drabek and Payne (2001, p.3) even speak of an ‘overuse’ of the term transparency that “is often put forward out of context or without a specific meaning. This makes discussions about transparency too general and limits the scope of policy recommendations.” Likewise, Stiglitz (2002, p.354) denunciates that transparency “has become the subject of intense political discussion, though [...] analytical work remains scare.”

The aim of this paper is to shed light on the underlying link between fiscal transparency and capital markets. Especially the empirical results of Glennerster and Shin (2006) about the relationship between fiscal transparency and bond spreads will be analyzed in an analytical setting. Following this brief literature review I will decompose the interest rate spreads in the next section which will enable a closer look at the effects of fiscal transparency.
3 Fiscal Transparency and Capital Markets

“Why do we study volatility in the first place? And the primary answer probably is that it’s a tool for measuring risk. [...] But it’s easy to fall into the believe that lower volatility is always better. In fact that’s not the case. A zero volatility would be terrible for financial markets. It means that prices are not adjusting to fundamental values. It means that [...] countries that are following sensible policies don’t advance past countries that follow unsensible policies. So we need to be a little bit more careful about that.”

Speech of Robert Engle on Global Financial Volatility during the 2\textsuperscript{nd} Meeting of Nobel Prizewinners in Economic Sciences on August 18\textsuperscript{th}, 2006, in Lindau, Germany.

Robert Engle’s quote addresses the central problem to be analyzed in this paper: Do sensible policies (here more precisely the level of fiscal transparency) influence the economic outcomes of a country (here more precisely the level of FDI-inflows into a country)? Before deriving the analytical foundations, it is important to mention that there are at least two thinkable capital market transmission channels of fiscal transparency. First, the link between fiscal transparency and the level of FDI-inflows into a country. For a given probability and payoff structure the expected return on investment is higher in more transparent countries as the uncertainty of possible outcomes is being reduced. Those countries attract more capital investment compared to less transparent countries.\textsuperscript{6} Second, the link between fiscal transparency and the perception of capital markets with respect to the risk of a country’s debt (interest rate on sovereign bonds, default probability). This section will focus on disentangling this second link between fiscal transparency and financial markets.

Back to Engle’s quote: Volatility is measured in this paper with the standard deviations of monthly bond returns for selective EU countries over the period 1993 to 2003.\textsuperscript{7} Bond spreads are defined in this paper as the average bond spreads for the same time period with German government bonds as risk-free benchmark. The following figure 1 displays that there exists a strong relationship between the volatility and the average bond spreads.

In the following I will focus solely on explaining bond spreads. However, if the level of fiscal transparency explains at least to some extent the size of bond spreads it helps to explain at the same time differences in volatility between countries.

4 Decomposing Government Bond Market Spreads

To begin with, I will first of all decompose the bond spread between a risky and a risk-free bond according to Bernoth et al. (2004) into three risk-components as depicted in figure 2.\textsuperscript{8} To perform this task, it will be assumed that international investors maximize the following utility function:

\[ \text{Max}\{U_t(w_{t+1}), \text{Var}(w_{t+1})\}, U_1 > 0, U_2 < 0. \]  

The utility is a function of the expected real wealth \(E_t(w_{t+1})\) and of the variance of real wealth \(\text{Var}(w_{t+1})\).

\textsuperscript{6}However, what remains to be clarified is if higher FDI-inflows necessarily cause higher growth.

\textsuperscript{7}The approach to measure volatility with the standard deviations of monthly returns is quite common in the literature, e.g. Du and Wei (2004) measure market volatility as the standard deviation of the monthly returns in US Dollar over 1984.12-1998.12.

\textsuperscript{8}According to Dumas (1994), it is possible to use a simple mean-variance analysis to derive a solution of the investment decision between a risky and a risk-free investment of a representative financial market agent.
Figure 1: Relationship between Volatility and Bond Spreads

\[ y = 96.466x - 89.802 \]
\[ R^2 = 0.9888 \]

Source: Author’s Illustration based on data from Eurostat.

The asset allocation problem of investors is depicted in figure 3. To keep the calculation simple it will be assumed that investors can invest in only two securities: in risky bonds of country A and in risk-free bonds of country B.

Some further assumptions are necessary to compute the expected wealth and to derive the optimal share \( \theta^*_t \) of the total wealth invested in the risky security. First, both bonds are denominated in the same currency allowing to neglect changes in exchange rates. Second, in case of default of bonds from country A all money is lost.\(^9\) Third, investors face transaction costs that decrease with the liquidity of the bond market. It is assumed that the bond market of country B is more liquid than the bond market of country A.\(^10\)

Based on the simple asset allocation problem, the expected wealth \( E_t(w_{t+1}) \) can be written as:

\[
E_t(w_{t+1}) = w_t(1 - \theta_t)(1 + r^B_t) - \theta_t w_t A + \theta_t w_t (1 + r^A_t)(1 - P_t^e),
\]

(2)

where the variables are defined as follows:

\(^9\)This assumption is made solely to simplify the further calculation. It would be possible, however, with only minimal changes to model only partial loss of the wealth invested in case of default of the risky bond. See for example Bernoth et al. (2004, pp.9).

\(^10\)It is reasonable to assume that the risk-free bond market is larger than the bond market for the risky security as most risk-averse investors are likely to invest the biggest portion of their wealth in the risk-free security. Bernoth et al. (2006, p.19) state that “ [...] yield spreads are affected by liquidity premiums [...] [and] countries with larger market shares in the DM (Euro) or US Dollar markets pay significantly lower interest rates than EU countries with smaller market shares.”
Figure 2: *Three Items of Bond-Spreads*

![Diagram of bond-spreads](Figure2.png)

Source: Author’s Illustration.

Let $l_t^A$ be the transaction/liquidity cost, $r_t^A$ the interest rate on bond of country A, $r_t^B$ the interest rate on bond of country B, $P_t^e$ the expected default probability of a country A bond.

Due to the uncertainty of an investment in bonds of country A, the variance of real wealth in the next period can be written as:

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

Substituting equations (2) and (3) into the utility maximization problem illustrated in equation (1), one can derive the optimal share $\theta_t^*$ of total wealth invested in risky bonds of country A:

$$\theta_t^* = \frac{(1 - P_t^e)(1 + r_t^A) - l_t^A - (1 + r_t^B)}{\Phi(1 + r_t^A)^2(1 - P_t^e) P_t^e},$$

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

Based on this optimal investor decision and assuming an equilibrium in the bond market of country A one can compute the interest rate spread. With $S_t^A$ being the total amount of bonds issued by country A, the equilibrium in the bond market of country A can be derived with:

$$S_t^A = \theta_t^* w_t = \frac{w_t [(1 - P_t^e)(1 + r_t^A) - l_t^A - (1 + r_t^B)]}{\Phi(1 + r_t^A)^2(1 - P_t^e) P_t^e},$$

which can be rearranged to get the interest rate differential:

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

The term on the left hand side of equation (6) measures the interest rate spread between the risky asset $r_t^A$ and the risk-free return $r_t^B$. On the right hand side one can find the three following components:
components explaining interest rate differentials:

- First, the default risk premium $P_e^r$. The larger the expected default probability $P_e^r$, the larger will be ceteris paribus the interest rate spread.

- Second, the liquidity risk premium $l_A^r$. It displays the relative transaction/liquidity costs involved when trading a bond of country A. The more liquid the bond market (low transaction costs $l_A^r$), the smaller the liquidity risk premium and consequently also the interest rate spread.

- Finally, the third summand reflects the uncertainty premium $S_A^r(1+r_A^r)^2(1-P_e^r)P_e^r/\Phi$. As long as the expected default probability $P_e^r$, is smaller than 0.5, the uncertainty premium increases with $P_e^r$.11 Moreover, the uncertainty premium increases with the level of relative risk aversion of the representative investor $\Phi$. Finally, the last summand also increases with the total supply of risky bonds $S_A^r$.

Like mentioned above, the spread increases with the expected default probability $P_e^r$, where fiscal transparency can be modeled as influencing the expected default probability $P_e^r$.

5 Fiscal Transparency and Bond Spreads

Intuitively higher fiscal transparency should decrease the expected default probability of the respective government. Budgetary transparency helps potential investors to detect creative accounting and provides a signal to financial markets of solid public financial management.12 Consequently, the required risk premiums should decrease as well.

To model the effect of fiscal transparency in more detail, it is necessary to specify the factors influencing the expected default probability $P_e^r$ in more detail. I assume that the default probability $P_e^r$

11 More precisely, in this case the variance of perceived default probability of country A, $(1 - P_e^r)P_e^r$, increases.

12 Evidence of this conjecture can be found in the literature, e.g. Alt and Lassen (2006) proof a reduction in fiscal deficits in case of more transparent fiscal governments. Koen and van den Noord (2005) find that more transparent governments tend to use creative accounting to a lesser extent.
is among others a function of the expected fiscal balance $F_{B_t}^e$. The expected default probability is assumed to be a decreasing function of the fiscal balance, with $\frac{\partial P_e}{\partial F_{B_t}^e} < 0$, i.e. in case of a larger expected deficit ($\Delta F_{B_t}^e < 0$) the expected default probability rises. Figure 4 seems to support the finding that the yield spread is influenced by the expected fiscal balance. The expectations of the markets are proxied in figure 4 by the countries’ first notifications of fiscal data to Eurostat. The observations are based on data for 14 EU-countries over eleven years (1993 to 2003), thus figure 4 includes 143 observations. By the same token, the (expected) debt level of a country $D_{t}^e$ influences also the default probability $P_{t}^e$. The expected default probability is assumed to be an increasing function of the debt level, with $\frac{\partial P_e}{\partial D_{t}^e} > 0$, i.e. in case of a larger (expected) debt the expected default probability should rise. Besides these two macro variables, there are more thinkable factors influencing the default probability, like the inflation rate, GDP growth rate, per capita income, external balance or external debt to exports. However, as I want to focus in my further analysis on the quality of public finances and on the level of fiscal transparency, it makes sense to solely focus on the two macroeconomic variables fiscal balance and debt level. From these two variables the fiscal balance is the more important one. This has mainly two reasons: First, when the Stability and Growth pact has been introduced in 1997, not all countries fulfilled the Maastricht criteria of a general government debt level below 60 percent of GDP. Consequently, the fiscal balance criteria is considered the more important Maastricht criteria regarding measuring

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13 The fiscal balance $F_{B_t}^e$ is defined here as positive in case of surplus and as negative in case of deficit.
14 Eurostat provides bond return data for 14 of the 15 old EU countries (excluding Luxembourg). As Germany is assumed to be the risk-free benchmark to calculate the yield spreads only 13 countries can be included in this analysis for eleven years equal to 143 observations.
the fiscal stance of a country.\footnote{Second, while the debt level is a stock variable, the fiscal balance is a flow variable. Any change in capital markets’ perception of a country’s fiscal position relies therefore not on the overall level of debt, but on the change of the debt level which should be close to the fiscal balance. Therefore, it seems reasonable to focus on the development of financial markets perceptions. Financial markets can not observe the actual fiscal balance of a country in advance. Therefore, it will be assumed that financial market agents use the first notification of fiscal data released by each EU-country to Eurostat as a signal to build their expectations about the fiscal balance.\footnotetext[7]{Countries have to submit their fiscal data to Eurostat based on Article 4, Council Regulation (EC) No. 3605/93 of November, 22\textsuperscript{nd} 1993 on the application of the protocol on the Excessive Deficit Procedure of the Stability and Growth Pact. These regulations have been modified by the Council Regulation (EC) No. 475/2000 of February, 28\textsuperscript{th} 2000.} Table 1 displays these first notifications of fiscal balances for selective EU-countries from 1993 to 2003. Based on this signal financial markets calculate their expected fiscal balance $FB^e_t$ as follows:

Table 1: \textit{First Notifications of Fiscal Balances (in percent of GDP)}

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<td>0.0</td>
<td>-0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>-13.4</td>
<td>-10.4</td>
<td>-7.8</td>
<td>-3.6</td>
<td>-0.5</td>
<td>2.0</td>
<td>1.9</td>
<td>4.0</td>
<td>4.7</td>
<td>1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>UK</td>
<td>-7.7</td>
<td>-6.9</td>
<td>-6.0</td>
<td>-4.4</td>
<td>-1.9</td>
<td>0.6</td>
<td>1.2</td>
<td>4.4</td>
<td>0.9</td>
<td>-1.4</td>
<td>-3.2</td>
</tr>
</tbody>
</table>

Source: European Commission and Eurostat.

$$FB^e_{t+1} = FB^{FirstNotification}_{t+1} + \mu^e_{t+1},$$

(7)

where $\mu^e_{t+1}$ is financial market’s expected error of the first notification. The actual fiscal balance realized $FB_{t+1}$ is equal to the expected fiscal balance $FB^e_{t+1}$ plus an serially uncorrelated forecast error $\varphi_{t+1}$, with zero mean, $E(\varphi) = 0$, and variance $\sigma^2_{\varphi}$:

$$FB_{t+1} = FB^e_{t+1} + \varphi_{t+1}.$$  

(8)

One can substitute equation (7) into equation (8) to come up with the difference of the actual fiscal balance and the first notification:

$$FB_{t+1} - FB^{FirstNotification}_{t+1} = \mu^e_{t+1} + \varphi_{t+1}.$$  

(9)

\footnote{Unlike the debt to GDP criteria, in 1997 all countries besides Greece did fulfill the Maastricht reference value of a deficit of maximal three percent of GDP.}
5 Fiscal Transparency and Bond Spreads

In equation (9), $\mu_{t+1}^e + \varphi_{t+1}$ equals the total revision of a country’s fiscal balance following its first notification to the European Commission.

Table 2 contains these revisions to the first notifications for the same 15 EU countries already displayed in Table 1.

While $\varphi_{t+1}$ is a random expectations error, $\mu_{t+1}^e$ reflects financial markets’ expected error of first notifications. The mean of $\mu^e + \varphi_{t+1}$ is $\mu_{t+1}^e + E(\varphi)$ and because $E(\varphi)$ is zero, the mean of $\mu_{t+1}^e + \varphi_{t+1}$ differs for each country only with respect to $\mu^e$. In a similar way, the variance of $\mu^e + \varphi_{t+1}$ can be calculated as:

$$\text{var}(\mu^e + \varphi) = \text{var}(\mu^e) + \text{var}(\varphi) + 2\text{cov}(\mu^e, \varphi).$$

(10)

Assuming that $\mu^e$ and $\varphi$ are pairwise uncorrelated, the covariance of the two variables is zero ($\text{cov}(\mu^e, \varphi) = 0$). Further, $\text{var}(\varphi)$ is per definitionem a serially uncorrelated error term which does not differ between countries. Therefore, all differences in each country’s variance of fiscal balance revisions with regard to the respective first notifications can be explained by differing expected forecast errors $\mu^e$.

Like explained above, in this model, both, the mean and the variance of the revisions differ between countries only due to different financial market expectations with respect to the expected error in the first notifications of fiscal data. The other way round, when building their expectations financial markets take the mean of historical variance of revisions, financial markets add to their expectation a certain premium due to the history of incorrect (i.e. intransparent) fiscal data reporting of the respective country. In this regard, $\mu^e$ is a function of the mean and variance of past revisions,

$$\mu_{t+1}^e = f((\overline{\mu_{t+1}^e} + E(\varphi)), \text{var}(\mu^e + \varphi)).$$

(11)

Both variables influence the expected error of first notification fiscal data in a positive way, i.e. a higher historical variance $\text{var}(\mu^e + \varphi)$ increases the expected error $\mu^e$ which eventually increases also the expected default probability $P^r$.

Fiscal transparency is modeled here as the quality of the macroeconomic framework especially with respect to the quality of fiscal data. More transparent countries are more prudent in their fiscal reporting and do not need to resort to the use of creative accounting. Thus, the more transparent the budget of a country, the lower is the likelihood of large revisions to fiscal balances.18

18 As can be seen in the last column of Table 2, the differences in the variances between countries can be quite substantial.

19 Instead of the wider concept of fiscal transparency, the already mentioned narrower definitions of budget transparency of the OECD (2001, p.3) and Poterba and von Hagen (1999, pp.3-4) apply here.
The quality of this model can be scrutinized when the variances \( \text{var}(\mu + \varphi) \) on the one side and the average bond spreads on the other side are put together in a plotter diagram. This is done in figure 5, which highlights the strong determining effect of variances of revisions to fiscal balances following first notifications on the average government bond yield spreads. This good fit of the simple regression line of a \( R^2 \) of almost 83 percent is surprisingly good. This strong relationship and the positive slope of the regression line seem to confirm the hypothesis that higher variance in revisions (i.e. lower fiscal transparency) makes investors more aware and are willing to buy the respective riskier bonds if they get compensated with an adequate extra return (i.e. higher yield).

These findings are shared by Bernoth and Wolff (2006, p.15). They expect a "[. . .] negative impact [of fiscal transparency] 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."

Last but not least, the relationship between the level of fiscal transparency and the sovereign credit ratings of a country seems to confirm the theoretical findings derived above. In figure 6 this relationship has been analyzed for a country sample size of 101 countries. For each broad government bond rating category the average percentage rank of a country’s transparency level

\[ y = 94.044x + 43.766 \]
\[ R^2 = 0.8287 \]

Source: Author’s Illustration based on data from Eurostat and European Commission.

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20 Like before, the yield spreads are based on Eurostat data for government bonds with ten year maturity. In order to calculate the yield spread data, the German bonds have been chosen as the risk-free benchmark as Germany shows the lowest bond returns and the lowest variance in revisions to fiscal balances over 1993 to 2003.

21 However, one has to admit that without Greece in the sample the quality of the regression will decrease to a large extent and \( R^2 \) drops to below 10 percent.
has been calculated based on the sub-index on institutional and economic transparency of Bellver and Kaufmann (2005). Figure 6 shows that the better a country is rated, the higher is also the average percentage rank of transparency.

This interrelation between transparency and sovereign credit ratings is by no means not only important for a government’s borrowing conditions on international capital markets, but also affects private sector companies. These spillover effects of sovereign credit ratings on corporate bond ratings within a country’s jurisdiction are often referred to as “sovereign ceiling” phenomenon. There are several reasons to justify this circumstance: The government of a country often has the control over foreign currency exchange and in case of currency crises the private sector will be affected, as well. Moreover, in case of a government credit crisis the prosperity of private companies within this country will be threatened and often a government acts as lender of last resort for major banks and companies. Besides the fact that credit rating companies have gradually moved away from a policy of never rating a private borrower above the sovereign, Borensztein et al. (2007) find that the sovereign ratings exert a significant and robust effect on private sector ratings. Consequently, it seems that public debt management and the level of fiscal transparency affects indirectly the financing conditions of the private sector on the international debt markets.

In a last step, each of the 101 sovereign country ratings between AAA and B used in figure 6 can be expressed as numerical default probability based on the 10-year cumulative default probabilities reported in Standard&Poor’s (2006b). Figure 7 illustrates for each country’s percentage rank of

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22 An example of this circumstance is the government balance of payments crisis in 1994 in Mexico. This crisis transformed into a general economic crisis that eventually also dried-up private sector’s financing options.
the level of institutional and economic transparency based on Bellver and Kaufmann (2005) these corresponding 10-year cumulative default probabilities. Besides the fluctuations of the actual values one can clearly see by means of the bold exponential trend line that the default probability of a country rises exponentially with the level of economic/institutional transparency (i.e. lower percentage rank). These findings exactly confirm the theoretically results derived above.

Figure 7: Economic/Institutional Transparency and 10-Year cumulative Default Probability

Source: Author’s Illustration with data from Standard & Poor’s (2006a), Standard & Poor’s (2006b) and Bellver and Kaufmann (2005).

6 Country Case Study Greece

In the following, the case of Greece and its mis-reporting of fiscal data to Eurostat will be analyzed in more detail in order to show the consequences of intransparent fiscal policies. While the socialist government announced budget deficits below three percent of GDP for the period from 2000 to 2003, the actual budget deficits have been much higher. Moreover, Eurostat’s investigations in the aftermath of this mis-reporting revealed that Greece also announced false budget data for the period between 1997 and 1999, which was the critical period for the belatedly accession of Greece to the Eurosystem. The main reasons for this understatement of fiscal deficits have been unmentioned military expenditures\textsuperscript{23}, too high estimated surpluses in the social insurance system, as well as incorrect booking of EU Structural Funds receipts. The extent of Greece’s misreporting can be seen in Table 3, which displays Greece’s reported deficit data of March 2004 and the subsequent data revision of November 2004 and March 2005. The extent of the overall corrections of Greece’s budget data is considerably high exceeding two percentage points during the years 2000 to 2003.

It is not the aim of this case study to go into detail regarding the causes and dimensions of these corrections. Instead this country case study will shed light on the implications of these corrections especially regarding reactions of the financial markets. Table 4 shows Standard & Poor’s sovereign

\textsuperscript{23}The Greek government referred to the obligation to maintain their military expenditures confidentiality.
Table 3: Greece’s Reported Budget Balances and their Revisions from 1997 to 2003

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<tr>
<td>Budget Balance after 1st Revision in November 2004</td>
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<td></td>
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<tr>
<td></td>
<td>6.6</td>
<td>4.3</td>
<td>3.4</td>
<td>4.1</td>
<td>3.7</td>
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<tr>
<td></td>
<td>6.6</td>
<td>4.3</td>
<td>3.4</td>
<td>4.1</td>
<td>3.6</td>
<td>4.1</td>
<td>5.2</td>
</tr>
<tr>
<td>Difference between the reported Budget Balance of March 2004 and the revised Budget Deficit in March 2005</td>
<td>2.6</td>
<td>1.8</td>
<td>1.6</td>
<td>2.1</td>
<td>2.2</td>
<td>2.7</td>
<td>3.5</td>
</tr>
</tbody>
</table>


credit ratings of countries of the Euro area and their respective development between May 2004 and August 2005. While most ratings remained unchanged during this period, three countries had been downgraded (Italy, Portugal, and Greece).

The downgrade of Greece’s sovereign credit rating from A+ to A has been—at least partly—caused by the increased uncertainty due to the revealed fiscal mis-reporting. Thus, Standard&Poor’s (2005, p.72) complains about the “lack of budgetary transparency” in Greece and states that among “EMU members Greece has the weakest public finances, whether measured in terms of debt ratio, budget deficits, or data reliability.” This fiscal data uncertainty and budget intransparency scares away potential investors of Greece’s government bonds. Furthermore, any downgrade of the sovereign

Table 4: Standard&Poor’s Sovereign Credit Ratings for selective Euro Area Countries

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<tr>
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<tbody>
<tr>
<td>Austria</td>
<td>AAA</td>
<td>△</td>
<td>AAA</td>
</tr>
<tr>
<td>Belgium</td>
<td>AA+</td>
<td>◯</td>
<td>AA+</td>
</tr>
<tr>
<td>Finland</td>
<td>AAA</td>
<td>△</td>
<td>AAA</td>
</tr>
<tr>
<td>France</td>
<td>AAA</td>
<td>◯</td>
<td>AAA</td>
</tr>
<tr>
<td>Germany</td>
<td>AAA</td>
<td>△</td>
<td>AAA</td>
</tr>
<tr>
<td>Greece</td>
<td>A+ (Nov.2004)*</td>
<td>◯</td>
<td>AAA</td>
</tr>
<tr>
<td>Ireland</td>
<td>AAA</td>
<td>△</td>
<td>AAA</td>
</tr>
<tr>
<td>Italy</td>
<td>A (July2004)*</td>
<td>◯</td>
<td>AAA</td>
</tr>
<tr>
<td>Netherlands</td>
<td>AAA</td>
<td>△</td>
<td>AAA</td>
</tr>
<tr>
<td>Portugal</td>
<td>AA (June2005)*</td>
<td>◯</td>
<td>AAA</td>
</tr>
<tr>
<td>Spain</td>
<td>AA+ (Dec.2004)*</td>
<td>◯</td>
<td>AAA</td>
</tr>
</tbody>
</table>

*Date of Last Change in the Ratings before August 2005.

credit rating has also consequences for the risk assessment of financial market participants. Figure
8 depicts the cumulative changes in selected government bond spreads against Germany since May 2004. As can be seen, the bond spread of Greece’s government bonds became more volatile after the false fiscal data reporting got revealed in September 2004. Furthermore, one can observe an increase of the return on Greece’s government bonds, particularly after the second data revision in March 2005. In comparison, France’s return rates on government bonds have been subject to much smaller fluctuations.

Thus, it became more expensive and less predictable for Greece to raise capital via the capital market. In the viewpoint of financial market participants, the uncertainty of an investment in Greek government bonds has increased significantly. Consequently, the risk-premium demanded by investors increased, as well. When summarizing the consequences of false budget data reporting one can come up with two results: First, potential investors became more careful to invest in the Greek government bonds market. Second, it became more expensive for the Greek government to service its debt. The latter consequence is particularly relevant against the background of Greece’s high debt level of above 100 percent of GDP.

However, the case of Greece also shows that it can be beneficial for a country to be fiscally not fully transparent. If the full extent of Greece’s budget deficits had been known to the Council of the European Union at its June 2000 meeting in Portuguese Santa Maria da Feira, it most probably had not voted in favor of the belatedly accession of Greece to the European Monetary Union (EMU). Greece benefited as a small economy to a particular extent from the accession to the EMU on January 1, 2001 as it could stabilize its currency and interest rate and integrate its high debt level into the Euro currency area.

Regarding the accuracy of Greece’s macro-data, the Greek Minister of Finance Giorgos Alogoskoufis announced in September 2006 that the Greek government plans to revise its GDP upwards by 25.7

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24 According to Standard&Poor’s (2005, p.73) Greece’s debt level in 2005 is 110.5 percent of GDP. This figure is substantially higher than the median debt-to-GDP-value of only 37.8 percent among other A-rated countries.

25 For example Scharrer (1999, p.65): states that “[f]or Greece the participation in the EMU implies from an economic viewpoint to profit from the static and dynamic gains of a single currency area [. . .]” (Author’s translation).
percent (see Ministry of Economy and Finance of Greece (2006) for more detail). A higher GDP would make it easier for Greece to meet the Maastricht criteria. Yet, the proposed step will have to be scrutinized by Eurostat, first.

7 Conclusions

Both empirical and theoretical studies indicate a link between the level of fiscal transparency and the social and economic outcomes of a country. In this context, financial economics can help to disentangle the link between fiscal transparency and economic outcomes. Main findings are, that the level of fiscal transparency seems to influence both, the level of FDI a country can attract and capital markets’ demanded rate of return of a country’s government bonds.

This paper focused on analysis of the latter relationship. In a first step, bond spreads between risk-free and risky bonds have been decomposed into three components: default risk premium, liquidity risk premium, and uncertainty premium. A more sophisticated modeling of the default probability allowed a more thorough analysis how increased transparency in the fiscal system affects the bond spreads.

In a second step, this paper used data on fiscal deficits and bond returns for selected EU countries to test the prediction power of the theoretical model specified before. Like predicted by the model, countries with larger variances in their fiscal balance revisions (i.e. less transparent countries) get penalized by financial markets. Intransparent governments face larger yield spreads of their government bonds demanded by financial markets. This result is important as financial markets seem to know the level of fiscal transparency and penalize “unsensible policies”, confirming Engle’s perception on volatility quoted earlier.

References

Acemoglu et al. 2005

Alesina and Perotti 1996

Alt and Lassen 2003

Alt and Lassen 2006

Bellver and Kaufmann 2005
REFERENCES

Bernoth et al. 2004

Bernoth et al. 2006

Bernoth and Wolff 2006

Borensztein et al. 2007

Campos 2000

Drabek and Payne 2001

Du and Wei 2004

Dumas 1994

ECB 2005

Erbaş 2004

Feige 1997

Gelos and Wei 2005
REFERENCES

Glennerster and Shin 2006
GLENNERSTER, Rachel ; SHIN, Yongseok: Does Transparency Pay? 2006. – minemo

von Hagen and Wolff 2006

Hall and Taylor 1996

Havrylyshyn and van Rooden 2001

Hoff and Stiglitz 2001

IMF 2001a

IMF 2001b

Koen and van den Noord 2005

Kopits and Craig 1998

Lin and Nugent 1995

Ministry of Economy and Finance of Greece 2006

North 1990

North 1993
REFERENCES

OECD 2001

OECD 2004a

OECD 2004b

OECD 2005

Poterba and von Hagen 1999

Rahman 1998

Rodrik 2000

Rodrik 2004

Rodrik 2005

Scharrer 1999

Standard&Poor’s 2005

Standard&Poor’s 2006a

Standard&Poor’s 2006b

Stiglitz 2002
REFERENCES

Tanzi and Schuknecht 2000

Williamson 1990

Williamson 2000