

## Budget Transparency and Financial Markets

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**Abstract:** The link between transparency and financial markets has received considerable attention in the recent years. This paper sheds some light on this issue using an indicator of budget transparency based on a comprehensive global survey conducted by the International Budget Partnership in 2008. Our findings suggest that budget transparency matters for financial markets. In particular, more transparent countries, after controlling for various economic variables, have higher credit ratings and lower spreads. Further, for countries with similar credit ratings, higher transparency is associated with lower spreads. We find limited evidence that more transparent countries are less likely to be downgraded given excessively high spreads. Finally, the change in spreads is smaller for more transparent countries compared to less transparent countries.

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# 1 Introduction

Transparency has received considerable attention from both policy makers and researchers over the last few years. Despite this attention, the empirical evidence on the link between transparency and markets has been hotly debated. Market participants are interested in determining the default risk associated with various sovereign borrowers which is largely dependent on a country's long term fiscal position. Often it is difficult for the market participants to determine the true nature of a country's fiscal position because governments for various reasons engage in fiscal misreporting or off-budget activity. Budget transparency can improve the ability of the market to assess a government's fiscal position thus its ability and willingness to service its debt obligations. We argue that given similar economic conditions, a country with more transparent budget processes is likely to be assigned a better sovereign credit rating and lower risk premiums for a number of reasons. We will use an index of budget transparency based on the International Budget Partnership (IBP) Open Budget annual survey to examine the relationship between budget transparency and financial markets.

This paper will start with a brief overview of the earlier literature on the link between transparency and financial markets. This will be followed by a discussion of the budget transparency indices and a description of the financial and economic data used in the paper. The empirical section will start by discussing the cross-section analysis of the link between budget transparency and sovereign rating as well as sovereign spreads followed by a consideration of the same link in a panel data setting. The next section will ask if less transparent countries are more likely to be downgraded in response to excessive spreads. The following section will consider if a change in spreads (risk premium) due to a change is higher for less transparent countries (and vice versa). The paper will conclude with a summary of finding and a discussion of the future research directions.

## 2 Transparency and Financial Markets

Financial markets have played an increasingly important role in the ability of the advanced as well as developing economies to finance their budget deficits. The emerging markets in particular have been able to tap the international sovereign bond markets to support their expenditures. Before investing in a country's bonds, the lenders need to assess the creditworthiness of the particular borrowers. Two broadly used indicators of a sovereign borrower's risk level are the credit rating and the sovereign spread. The credit rating refers to the a rating assigned by a credit rating agency (e.g. Standard & Poor's, Fitch and Moody's) and generally ranges from AAA (triple A) to D for default. Higher rated sovereign can borrow at lower cost since they are deemed to be less risky. The other major indicator of risk level is the sovereign bond spread, i.e., the difference between the yield of a risk free (or nearly risk free) bond, such as the U.S. Treasury bill and the yield of the sovereign bond in question. In other words, it is the expected return required to compensate the investors for holding riskier bonds. Yields (based on the price of the bond and its coupon) are available at a high frequency and respond immediately to market conditions. The higher the spread the higher is the market assessment of the country risk and higher will be the borrowing cost. As an example, for a US\$ 1 billion sovereign bond

issue, a spread of 3.5% would mean that the borrower will pay an additional US\$ 35 million on an annual basis to service the bond compared to a borrower with minimal risk.

While this paper will focus on the direct information impact of budget transparency on financial markets there are several other channels which link transparency and financial markets. The most direct channel through which budget transparency impacts the financial markets is through provision of more fiscal information and reduced uncertainty around that information. The reduced uncertainty is likely to result in lower risk premiums thus lower cost of borrowing. But this is assuming that more information is necessarily favorable information, which may not always be true. For example, in an attempt to become more transparent, a country may do a stock taking of all of its debt and if the result of the analysis reveals that the consolidated debt of the government is much higher than previously reported, the higher transparency could very well increase the risk premium and thus the cost of borrowing. It is plausible that the governments are aware of this trade-off and are likely to make rational decisions regarding their level of transparency. Essentially, this suggests a non-linear relationship of transparency and gains from transparency i.e. for those countries which have a reason to remain non-transparent as well those countries which are already highly transparent the gains from additional transparency may be limited (at least in the short-run). On the other hand, countries in the middle may have the most of gain from increased transparency.

Another way to look at the impact of transparency on financial markets is to consider two countries with similar economic fundamentals but different budget transparency levels. We argue that markets are likely to rate the more transparent country higher than the one with low transparency. This is not because markets attach an intrinsic value to transparency but because given that governments are rational, engaging in non-transparent practices implies that government perceives a gain from those practices. This in turn suggests that the information provided by the government needs to be discounted and the economic fundamentals are likely to be worst than reported. That being said, it is also possible that government may have a preference for opaqueness (particularly in non-democratic regimes) in which case the government may be reporting actual numbers without providing any assurances of accuracy. Similarly, financial market impact of the low or high level of transparency may be mitigated by other factors such as the appeal of the market size, contagion from neighboring countries, global economic conditions etc.

Transparency may also shelter a country from the effects of sudden changes in market sentiments and mitigate contagion. Lack of transparency has often been cited as a partial contributor to financial crises. For example, IMF (2001) notes that “a lack of transparency was a feature of the buildup to the Mexican crisis of 1994-95 and of the emerging market crises of 1997-98 and that inadequate economic data, hidden weaknesses 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.” The idea being that more transparency may assure the financial markets of the ability of the government to weather economic shocks. So for example, instead of a knee-jerk

reaction to a crisis in a neighboring country, the markets may assess the merits of a more transparent country and make decision based on economic fundamentals rather than market sentiments.

A number of earlier studies have shown that both credit ratings (See Cantor and Packer (1996) as well as spreads (e.g. Alesina et al. (1992) and Hallerberg and Wolff (2008)) depend on the level of debt and deficit as well as other economic variables. But at the same time a number of papers have shown that governments may undertake steps which may hide the true level of both deficits and debt.<sup>2</sup> The question is whether or not markets discount the economic information from less transparent countries while rewarding the more transparent ones.

Another channel is through the signaling effect of transparency. In a principal- agent framework, the government has private information regarding its financial management competencies and preferences while the public (voters) and financial markets can only ascertain the ability based on reported data. A particularly outcome could be a result of the government's ability or it could very well be due to luck. Transparency allows the principals (voter or lenders) to attribute the outcomes to action of the government while distinguishing effort from opportunistic behavior and stochastic factors. For example, without transparency a low deficit may be a result of prudent fiscal management or use of non-transparent practices such as overly optimistic forecasts or incomplete and complicated reporting. By adopting transparent practices, the government can signal its level of competence and confidence in its financial management. Alt and Lassen (2006) uses a career concerns political economy model to show that fiscal transparency reduces public debt and deficits, even after controlling for political variables like common law history, political competition, and presidential system.

Regardless of the particular channel of the impact, it is plausible that budget transparency matters for financial market outcomes, particularly for emerging markets. At the same time, transparency reforms are likely to be much more cost effective than other measures such as increasing productivity, private sector growth, increasing revenues or decreasing expenditures.

Several papers have studied the effect of fiscal institutions on financial market variables. Poterba and Rueben (1999, 2001) consider the impact of fiscal institutions on U.S. municipal bond interest rates. Their findings suggest that institutions matter i.e. fiscal institutions affect interest rates beyond their indirect effect through fiscal outcomes. Similarly, Lowry and Alt (2001), observed that fiscal institutions in American states have an impact on bond rates. Johnson and Kriz (2005) find that expenditure limits and stricter balanced budget rules lower interest costs by lowering the credit risk. Hallerberg and Wolff (2008) observed that in the Eurozone government bond markets, "better budget

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<sup>2</sup> See Alt, James E. and David Dreyer Lassen, "Fiscal Transparency, Political Parties, and Debt in OECD Countries," *European Economic Review*, Elsevier, vol. 50, no. 6, (August 2006), pp. 1403-1439; von Hagen, Jürgen and Guntram B. Wolff, "What do deficits tell us about debt? Empirical evidence on creative accounting with fiscal rules in the EU," *Journal of Banking and Finance*, vol. 30, no. 12 (December 2006), pp. 3259-3279; and Milesi-Ferretti, Gian Maria, "Good, Bad or Ugly? On the Effects of Fiscal Rules with Creative Accounting," *Journal of Public Economics*, vol. 88, no. 1-2 (January 2004), pp. 377-394.

institutions are connected with lower risk premia. Furthermore, the effect of fiscal policy variables on risk premia is lower in countries with better fiscal institutions.”

It is often difficult for the markets to determine the true nature of a country's fiscal position because the government for various reasons may engage in fiscal misreporting or creative accounting. For example, during an election year, government may try to increase spending but while trying to hide the deficit if voters dislike deficit.<sup>3</sup> In other cases, the government may engage in off-budget activity to circumvent numerical rules such as deficit or debt limits.<sup>4</sup> This suggests that the level of fiscal gimmickry may influence the impact of fiscal variables on ratings and spreads. Bernoth and Wolff (2008) using three different measures of transparency<sup>5</sup> finds that fiscal transparency reduces risk premia while creative accounting increases the spread. The increase in risk premium is stronger if financial markets are unsure of the true extent of creative accounting.

In addition, several paper have studied the impact of various forms of transparency on financial markets. Hameed (2005) finds that after controlling for other socio-economic variables, more transparent countries have better credit ratings. Glennerster and Shin (2003) find that sovereign spreads decline following the adoption of transparency-related reforms such as publication of IMF country surveillance reports as well as release of various reports on compliance to standards. Gelos and Wei (2002), using various indices of government and corporate transparency, show that emerging market equity funds hold fewer assets in less transparent countries, and herding among funds is somewhat less prevalent in more transparent countries.

### 3 Budget Transparency Indices

Considerable amount of resources have been dedicated to collecting information on level of transparency of the budget process across the globe as well as developing measures of transparency. This section will first describe the IBP survey and give a description of the basic data available. Then following a strategy similar to Hameed (2005), we will develop various indices of budget reporting. We propose to calculate an index for each stage of the budget process: pre-budget statements, budget formulation, budget execution and auditing. The indices vary between 0 and 1 where 1 indicates higher transparency. The next part of section will discuss the actual indices and some salient features of the data.

One of the primary products of the IBP is the Open Budget Survey <sup>6</sup> which is designed to allow benchmarking of best practices in transparency and accountability practices around the World. The survey responses are submitted to a rigorous peer review process and the survey sample includes a

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<sup>3</sup> See Alt and Lassen (2006)

<sup>4</sup> See Milesi-Ferretti (2004)

<sup>5</sup> One based on the stock and flow adjustment (between change in debt and deficit) and two based on survey responses.

<sup>6</sup> See <http://www.openbudgetindex.org/> for more details.

variety of countries from the richest to the poorest. The survey questionnaire is divided into three sections and this paper uses the 123 questions in sections two and three to develop the indices.

Each question in the survey has four answers (a,b,c,d). We first assign a number to each of the four choices as follows: a=1, b=0.66, c=0.33 and d=0. The overall IBP index is calculated as the average of the answers for the 123 answers<sup>7</sup>. The “Budget Information” index is the average of answers for Questions 1-65, the “Budget Formulation” index is based on Question 66-73, the “Budget Execution” index is based on Questions 82-100 and the “Budget Audit” index is based on Question 101-123.

Figure 1 shows the average IBP index by income per capita quartiles. Similar to earlier institutional research where the development of institutions is often linked to income, the budget transparency index also varies systematically with income. This may also be partly explained by the fact that many of questions are based on best practices of transparency initially adopted in more advanced (richer) countries.

Figure 1. Average Budget Transparency Index (by Income per Capita Quartiles)

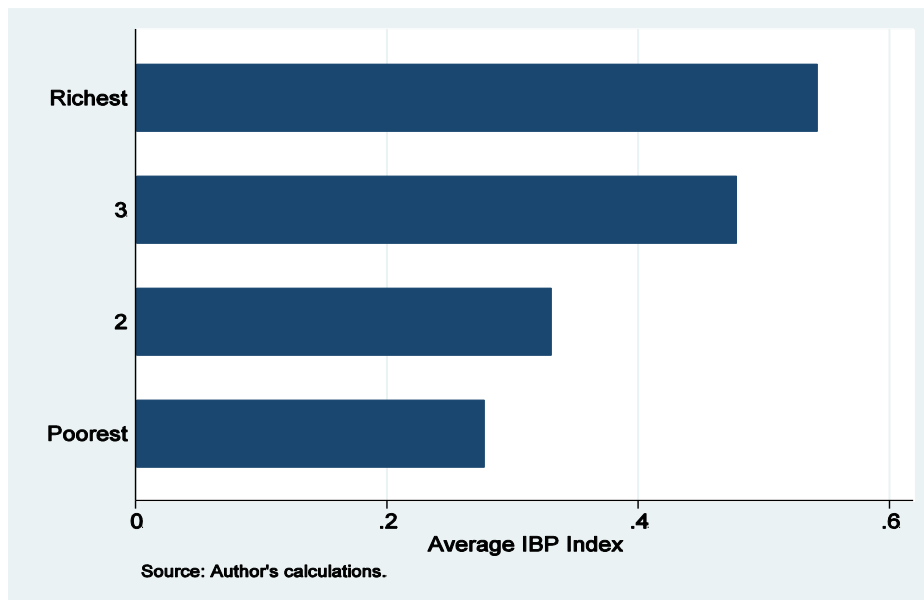
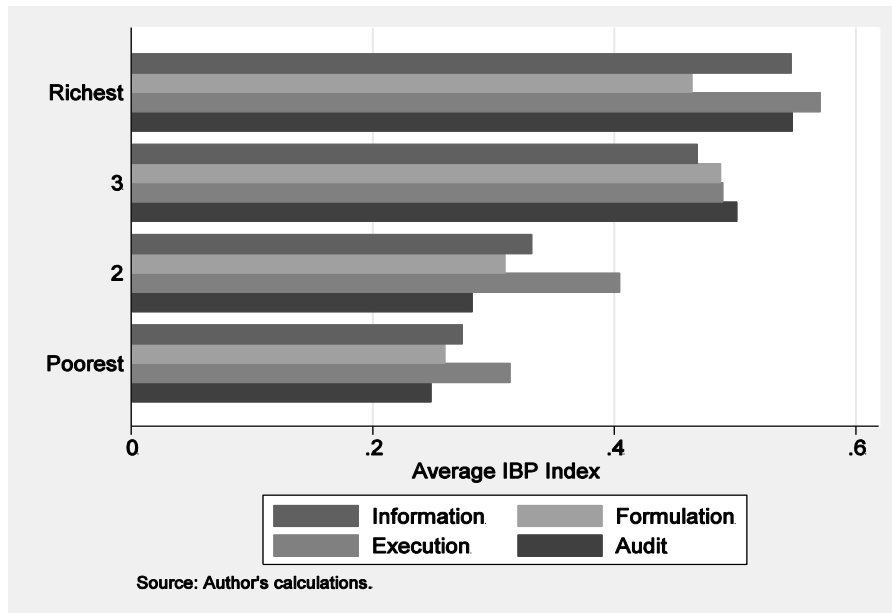


Figure 2, shows the four components of budget transparency across income quartiles. In three out of four income groups, budget execution is the highest average component. This section primarily inquires on the extent of in-year reporting of the budget, changes in budget and regulations regarding procurement. For budget formulation, the richest countries appear to have a lower average performance than the third (second richest) quartile.

<sup>7</sup> Although we adopt an approach where each question has equal weight in the index for the purpose of this paper, a more sophisticated approach such as principal component analysis could be incorporated in the future to allow the weights to vary across questions.

Figure 2. Components of Budget Transparency Index (by Income per Capita Quartiles)



Although the Open Budget Survey covers large number of countries and encapsulates valuable information on fiscal reporting, there are certain limitations which must be stated at the outset. The first limitation is that transparency is defined in the narrow sense as public availability of budget and audit reports. There is limited emphasis on the quality of the information contained within the reports and ease of use of the information. For example, it is not sufficient to know that the government is producing a report on guarantees but that it is taking steps to reduce to the guarantees or allocate funds to service the expected costs of the guarantees.

Since the survey is still in early stages of implementation i.e. a limited number of annual rounds have been completed, there is limited scope for panel data analysis. This makes it difficult to do analysis on the direction of causality between transparency and other economic variables. Further, since the respondents completing the survey may change over the years, the ranking of the country may depend on the actual changes in budget reporting as well as change in respondents. Although, the quality assurance process at IBP involving IBP staff as well as third party independent reviewers goes some way in reducing the impact of change in respondents. Despite these limitations, the OBI data is a unique and important resource for analysis of budget transparency.

## 4 Financial and Economic Data

The last decade has seen an unprecedented increase in international financial flows with a large number of countries accessing international credit markets. The number of countries with foreign

currency sovereign credit ratings has risen from 30 in 1980 to over a hundred in 2009.<sup>8</sup> Sovereign credit ratings assess a government's ability and willingness to honor its debt. It is plausible that countries which are more transparent are likely to be more successful at convincing the market of their creditworthiness. This should be reflected in better credit rating, so a logical question to ask is: whether more transparent countries have better ratings after controlling for other economic fundamental?

The foreign currency sovereign credit ratings refer to the foreign currency long-term bond rating by Standard and Poor's (S&P), Fitch and Moody's. These alphanumeric ratings are converted to numeric ratings based on the chart available in Appendix I.<sup>9</sup> Of the 85 countries included in Open Budget survey (2008), 68 were rated by at least one of the three rating agencies. The rating data is available on Bloomberg as the date of change in rating and the new rating which was used to derive a dataset of rating at the end of each month.

The spread is the difference between the yield on a country's foreign currency bonds and the yield on bonds issued by a industrialized country such as U.S. The spread reflects the market's assessment of the default risk associated with a country by demanding a higher yield (risk premium) from riskier borrowers. The lower the spread the cheaper it is for the country to raise fund in the international financial markets. The sovereign spreads used in this paper are the end of month stripped spreads for the emerging market bond index (EMBI) available from J.P. Morgan. The EMBI is a benchmark index for measuring the total return performance of international government bonds issued by sovereign emerging market countries. The countries must also meet some liquidity and structural requirements.<sup>10</sup> Of the 85 countries covered by the Open Budget survey, 29 were included in the EMBI.

We also include a proxy for international investors' appetite for risk defined as the spread of US corporate bonds (with a Moody's rating of Baa and a maturity of 10 years) over the 10-year US treasuries, similar to Favero and Giavazzi (2004) and Hilscher and Nosbusch (2007). The source of this data was the Federal Reserve Economic Database (FRED). The economic data is from the World Development Indicators database of the World Bank and the International Financial Statistics (monthly) available from the IMF.

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<sup>8</sup> Primarily Moody's, Fitch, and Standard and Poor's.

<sup>9</sup> Based on Cantor, Richard and Frank Packer, "Sovereign Risk Assessment and Agency Credit Ratings," *European Financial Management*, vol.2, no. 2 (July 1996), pp.247-256; and Gaillard, Norbert, "Fitch, Moodys and S&P's Sovereign Ratings and EMBI Global Spreads: Lessons from 1993-2007," Chaire Finances Internationales, Working Paper (July 2007).

<sup>10</sup> In order to qualify for index membership, the debt must be more than one year to maturity, have more than \$500 million outstanding, and meet stringent trading guidelines to ensure that pricing inefficiencies do not affect the index.

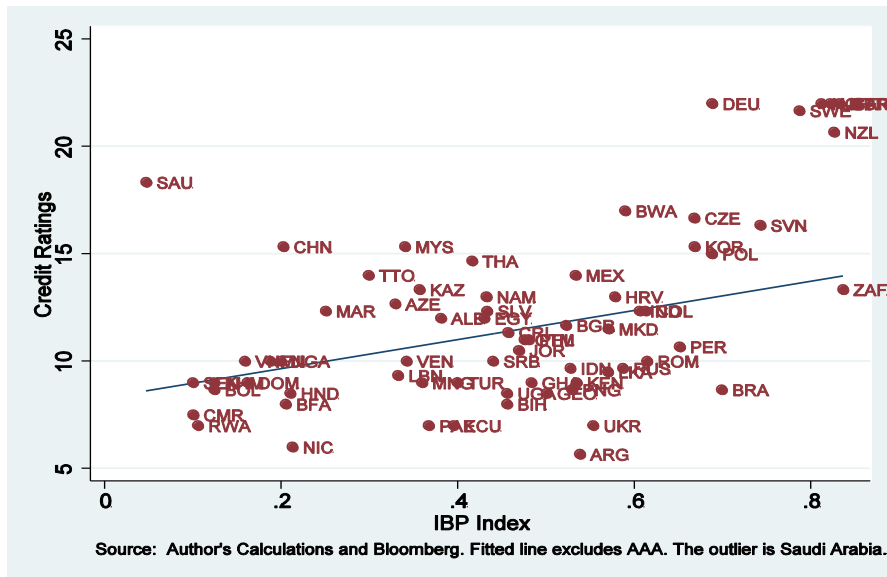


## 5 Cross-section Empirical Results

### 5.1 Credit Ratings and Transparency

A cursory look at the data suggests that credit ratings and transparency are related. Figure 3 shows a scatter plot of the IBP index and the numerical credit rating (average for the three rating agencies) at the end of June 2009. The countries which perform better on the transparency also have higher credit ratings. There are a number of advanced economies such as Canada and United Kingdom bunched in the top right hand of the plot, which have the highest credit ratings and have high transparency. On the opposite end of the spectrum are countries like Rwanda and Cameroon which are less transparent and have lower credit rating. There are also some notable outliers, e.g., Saudi Arabia performs poorly on transparency but has a high credit rating partly due to its immense natural resources. One the other hand, countries such as Argentina (0.59) and Brazil (0.70) fare better on transparency but have lower credit ratings, most likely due to the history of selective defaults. It is clear that, although the plot suggests a link between transparency and credit ratings, we need to control for other socio-economic variables which may explain credit ratings.

Figure 3. IBP Index and Credit Ratings (June 2009)



Significant literature exists analyzing the determinants of credit ratings. Cantor and Packer (1996) find that rating assignments by Moody's and S&P are related to a limited set of economic fundamentals including per capita income, growth, fiscal balance, external balance, external debt, economic development indicator and default history.

Similar to Cantor and Packer (1996), our core model for credit ratings includes GDP per capita, growth, inflation, debt and an indicator for default history. Except for the default history indicator, a 5 year average (2004-2008) of each variable is used. Income and growth are included to capture the potential tax base and the ability of the government to repay its debt. High level of inflation can

indicate structural problems in government finances, inflationary money supply or general instability of the economy. The obvious reasons for including external debt is that a greater debt burden increases the probability of default. The actual variable used is the external debt in percentage of exports. The default history variable indicates if a country has defaulted in the last 10 years.<sup>11</sup>

Table 1 provides estimates for a more systematic analysis of the link between credit ratings and transparency. Similar to the graphic presentation (Figure 1), the result in column (1) indicates that transparency is positively related to credit ratings. As we showed earlier, richer countries tend to have better institutions so column (2) controls for development of a country by including GDP per capita as a control variable. Transparency continues to be positively linked to ratings even after inclusion of income per capita. In fact, IBP index and income per capita explains 58% (R<sup>2</sup>) of the variation in credit ratings.

Table 1. Regression for Average Rating and EMBI

	(1)	(2)	(3)	(4)	(5)
	Average Rating (June 2009)			Log EMBI (June 2009)	
IBP Index	11.73 (2.08)***	4.64 (1.96)**	3.23 (1.96)	-0.81 (0.59)	-0.75 (0.38)*
Income per capita		2.10 (0.32)***	1.26 (0.38)***		
Growth			12.62 (12.05)		
Inflation			-6.62 (7.14)		
Debt			-2.14 (0.74)***		
Default Indicator			-2.59 (1.06)**		-0.02 (0.17)
Average Rating					-0.15 (0.03)***
Constant	6.29 (1.05)***	-7.48 (2.28)***	0.54 (2.86)	1.53 (0.29)***	3.05 (0.36)***
Observations	68	68	55	29	29
Adjusted R <sup>2</sup>	0.32	0.58	0.37	0.03	0.59

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Column (3) shows the results for a regression which includes the variables included in the core model along with transparency. The estimate for transparency is of the expected sign (negative) but is statistically insignificant. The p-value for the transparency estimate is 10.6% which is near the significance threshold level of 10%. The impacts of income per capita, debt and default history are in line with theoretical expectations. Income per capital continues to have a positive impact on credit ratings while higher debt and default history tend to reduce credit ratings. The estimates for growth

<sup>11</sup> Cantor and Packer (1996) also included primary fiscal balance and external balance (in percent of GDP) but these were found to be statistically insignificant in explaining credit ratings.

and inflation are statistically insignificant although they are of the right sign. A look at the cross-section of the data shows that ratings are positively related to transparency after controlling for income differences across countries although this relationship becomes weaker once other control variables are added.

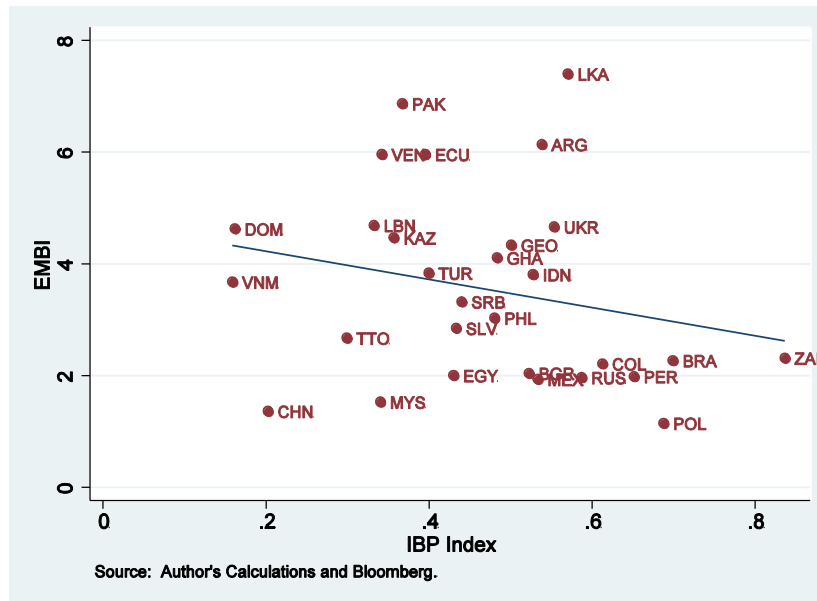
It is difficult to give a quantitative interpretation to the value of the transparency coefficient, so we consider the predicted change in rating if the countries in lowest transparency quartile achieve the average transparency level of the highest quartile (in the model where the coefficient was statistically significant i.e. Column (2)). If countries in the lowest quartile of transparency (average value of 0.18) rise to the average transparency values for the highest quartile in sample (0.73), the average rating changes from 9.8 to 11.6. This is an increase of nearly two notches with a change in transparency index from 0.18 to 0.73. Although it is not a dramatic increase, even a one notch improvement in credit rating results in lower borrowing costs. The small increase in predicted rating underscores the fact that credit rating is largely dependent on economic variables such as debt and income per capita. At the same time, improvements in economic variables such as income per capita are likely to be more costly than budget transparency reforms.

## 5.2 Sovereign Spreads and Transparency

Sovereign spreads reflect the market assessment of the risk premium (above the risk free US T-bill) associated with various countries. Higher uncertainty regarding a country's ability to pay should be reflected in a higher sovereign spread. On the other hand, higher transparency may allow the market to develop a better assessment of a country's ability to pay resulting in lower spreads. Figure 4 shows a scatter plot of the IBP Index and sovereign spread at the end of June 2009. Although, Figure 4 suggests a tentative negative relationship between sovereign spreads and transparency, the observations are quite dispersed. A number of high transparency countries such as Sri Lanka and Argentina, also have high spreads. The high spreads may partly be explained by the internal conflict in Sri Lanka and the recent selective default by Argentina. Similarly, the high spreads of Pakistan and Venezuela are likely explained by the default history. On the other hand, there are countries like China which have low transparency but have low spreads most likely due to the strength of the Chinese economy.

Regression for EMBI spreads and transparency are shown in Column (4) and (5) of Table 1. Since the number of observations is limited (29), we use a parsimonious model for EMBI which includes a 10 year default indicator, average rating (over rating agencies) and the IBP index. Sovereign ratings were included because they are key determinants in pricing of sovereign bonds. In the first regression (column (4)), although the transparency variable is of the right sign (negative) it is not significant. In the second regression (column (5)) the transparency estimate is negative i.e. higher transparency is related to lower spreads and is statistically significant.

Figure 4. IBP Index and EMBI Sovereign Spreads (June 2009)



Similar to the results for ratings, in order to give some interpretation to the value of the transparency coefficient we consider the change in predicted EMBI spread associated with a change in transparency to the average index value for more transparent countries. Since there are a limited number of observations of EMBI spread, the sample is divided in two groups instead of quartiles. If countries in the lower transparency group (average value of 0.34) rise to the average transparency values for the higher transparency group in sample (0.59), the average EMBI spread decreases from 3.4% to 2.8%. The spread difference of 0.6% on a US\$ 500 million bond issue can result in a decrease of debt servicing cost by US\$ 3.1 million.

## 6 Panel Results

### 6.1 Relationship between Sovereign Spreads, Ratings and Transparency

It is clear that ratings are correlated with spreads since they reflect the same phenomenon, i.e. the creditworthiness of the sovereign borrower. Higher the rating i.e. more creditworthy a borrower, lower should be the risk premium (sovereign spread) demanded by the market. However, the spreads are also dependent on other variables such as the liquidity and the investor's risk appetite. Kamin and von Kleist (1999) found that for new bond issues, the spreads were linked to the domestic macroeconomic conditions (as reflected by sovereign credit rating). Eichengreen and Mody (2000) showed that a rise in US interest rates put upward pressure on spreads through changes in investors' demands for emerging market bonds. Kamin (2002) also found that US corporate spread, a proxy for risk appetite of investors, had a statistically significant impact on sovereign spreads. Based on these

studies as well as Sy (2001), we will examine the link between spreads and rating on a monthly basis over the period July 2004 to June 2009 (past five years).<sup>12</sup>

We estimate both a univariate and multivariate model for sovereign spreads. The general model is as follows:

$$\text{Log}(\text{Spread}_{it}) = \alpha_i + \beta_1 \text{RAT}_{it} + \sum \beta_j Z_j + \varepsilon_{it} \quad (1)$$

The index  $i$  refers to the countries while  $t$  refers to months. The models are estimated individually for each of the rating agencies. “ $Z$ ” refers to the various economic variables which have been used in the literature to explain spreads and are available on a monthly frequency. These include the federal funds rate, corporate spread and default indicator.<sup>13</sup> In addition to the rating variable, we also report results for model estimate with an interacted term (rating X transparency). The reason we include this term is to take into account the possibility that the relationship between spread and credit rating is likely to be moderated by transparency. Since credit ratings reflect the market’s assessment of a country’s creditworthiness based on available information, investors may have more confidence in credit ratings for more transparent countries. On the other hand, the information available in the market on a less transparent country is less certain and since the rating reflects the market’s assessment of the country’s creditworthiness based on uncertain information, the investors may demand a premium to compensate for the uncertainty. The inclusion of an interaction term makes the interpretation of the coefficient somewhat more complex. We report conditional coefficients (marginal effects) for variables which are included in the interaction terms.<sup>14</sup>

Table 2 presents the estimation results for both the univariate and multivariate models for each rating agency. Column (1)-(3) provide estimates for the univariate model which is estimated with fixed effects. Similar to earlier findings (e.g. Sy (2002) and Gaillard (2007)) for each rating agency the coefficient is negative and statistically significant. The S&P based model explains 47% of the variation in spreads. We will use this univariate model later in the paper to estimate excessive spreads.

The multivariate model was estimated using fixed effects and results are shown in Column (4) – (6). The conditional coefficients of the rating variables are negative and significant for all rating agencies implying that countries with higher credit ratings have lower spreads. The marginal effect of

<sup>12</sup> The analysis could be extended further back to 1993 but the reason we limited the analysis to the past five years to allow us to include transparency data. Since institutional change is slow we propose that the observation of transparency in 2008 is a good estimate for transparency 5 years back. This limit is arbitrary but plausible.

<sup>13</sup> Equals 1 if a country was in selective default during the month.

<sup>14</sup> See Hallerberg, Mark and Guntram B. Wolff, “Fiscal Institutions, Fiscal Policy and Sovereign Risk Premia in EMU,” *Public Choice*, vol. 136, no. 3 (September 2008), pp. 379-396; and Bernoth, Kerstin and Guntram B. Wolff, “Fool the Markets? Creative Accounting, Fiscal Transparency and Sovereign Risk Premia,” *Scottish Journal of Political Economy*, vol. 55, no. 4 (September 2008), pp. 465-487 for use of interaction term with transparency. See Greene, William H., *Econometric Analysis*, 5<sup>th</sup> ed. (Upper Saddle River, New Jersey: Prentice Hall, 2003) for a review of interpretation of coefficient with interaction terms. The conditional coefficient is estimated as a linear combination of the coefficient of the variable of interest and the coefficient of the interaction term multiplied by the sample mean of the other variables. For example, if the equation is  $G = b_1 * X + b_2 * Y + b_3 * XY$  then  $dG/dX$  is calculated as  $b_1 + b_3 * \text{Mean}(Y)$ .

transparency<sup>15</sup> from the interaction term is negative and significant suggesting that higher transparency is related to lower spreads (and vice versa).

Table 2. Regression Results for EMBI and Credit Ratings

Log of EMBI Spread	(1)	(2)	(3)	(4)	(5)	(6)
	(Fixed Effects Model)					
Standard & Poor	-0.19 (0.01)***			-0.01 (0.02)		
Fitch		-0.10 (0.01)***			0.06 (0.04)	
Moody's			-0.03 (0.03)			0.15 (0.05)***
S&P X IBP Index				-0.37 (0.04)***		
Fitch X IBP Index					-0.31 (0.08)***	
Moody's X IBP Index						-0.57 (0.09)***
Federa Fund Rate				-0.06 (0.01)***	-0.08 (0.01)***	-0.09 (0.01)***
Corporate Spread				0.30 (0.01)***	0.29 (0.01)***	0.28 (0.01)***
Default Indicator				0.59 (0.09)***	1.05 (0.08)***	1.28 (0.07)***
Constant	3.02 (0.15)***	2.07 (0.18)***	1.12 (0.26)***	2.37 (0.10)***	1.45 (0.11)***	1.58 (0.14)***
Obs.	1492	1405	1457	1492	1405	1457
No. of Countries	30	28	27	30	28	27
R <sup>2</sup> (Overall)	0.47	0.43	0.36	0.39	0.34	0.24
<i>Marginal Effects</i>						
Credit Ratings				-0.18 (0.01)***	-0.08 (0.01)***	-0.12 (0.02)***
Budget Transparency				-4.21 (0.44)***	-3.48 (0.85)***	-6.42 (1.07)***

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

The finding for other economic variables are as follows: an increase in the federal funds rate reduces the spread while an increase in the corporate spread or default increases the sovereign spreads.

## 6.2 Change in Credit Rating and Excessive Spreads

Sovereign spreads may respond to credit rating changes particularly if the rating change leads to a change in classification of the bond, e.g. from investment grade to speculative grade.<sup>16</sup> At the same

<sup>15</sup> It is not possible to estimate the budget transparency coefficient in a fixed effects model since transparency does not vary over time for a given country. So the marginal effect of transparency is reported as the coefficient of the interaction term multiplied by sample average rating.

<sup>16</sup> Investment grade ratings are at or above BBB-, BBB- and Baa3 for Fitch, S&P and Moody's respectively. Similarly, speculative grade is at or below BB+, BB+ and Ba1 for Fitch, S&P and Moody's respectively.

time, an excessively high spread may influence the credit rating agency into downgrading the country since the yield is available on a daily basis while many of the inputs in a credit rating decision may be available on lower frequency (weekly, monthly or even annually).<sup>17</sup>

Although many papers have shown that credit ratings can be explained by a limited number of economic variables (Cantor and Packer (1996)), it is likely that ratings are also influenced by market sentiments. Sovereign spread is a summary measure of bond market sentiment which is available on a daily basis unlike other economic variables such as debt, growth, and inflation. A sudden rise in spreads could be a lead indicator of deteriorating economic conditions in a country or on the other hand may reflect a sudden change in market sentiments (contagion rather than based on economic fundamentals). The rating agencies need to differentiate between these possible causes of sudden rise in spreads. We contend that for a more transparent country, an excessively high level of spread is less likely to trigger a downgrade compared to a low transparency country; the reasons being that for more transparent countries it may be easier to distinguish between a rise in spread due a change in economic fundamentals compared to a change in market sentiment. The hypothesis we want to test is as follows: confronted by excessively high spreads a rating agency is more likely to downgrade the less transparent countries compared to more transparent countries.

We use the univariate fixed effects spreads model, with only a constant and the numerical rating, estimate earlier (See Table 2) to calculate a predicted spread for each rating agency.<sup>18</sup> The actual spread is said to be excessively high if it is greater than the predicted spread by one standard deviation (of predicted spread). Similarly, the spread is said to be excessively low if the actual spread is once standard deviation below the predicted spread. The statistic of interest is the number of cases where of excessively high (low) spreads resulted in a downgrade (upgrade) in the same month, next month or three months. If this statistic varies systematically with transparency then we would have found evidence for our proposition.

Table 3 shows the percentage of downgrades for cases of excessively high spreads by quartiles of transparency (1=lowest transparency, 4=highest transparency). The period of analysis is the five year period from July 2004 to June 2009. Although, the downgrade rates do not systematically vary with transparency quartiles, in many instances the high percentage of downgrades is associated with lower levels of transparency. For example, 10% (of 30) low (second quartile) transparency countries were downgraded by S&P in the next month while only 2.3% (of 44) highest countries were downgraded in the next month. Similarly, 6.8% (of 44) lows transparency (second quartile) countries were downgraded by Fitch while only 3% (of 33) high transparency countries were downgraded. For Moody's, 7.5% (of 53) low transparency (second quartile) countries were downgraded.

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<sup>17</sup> See Sy, Amadou N. R., "Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals," International Monetary Fund, IMF Working Paper 01/165 (October 2001); and Gaillard (2007).

<sup>18</sup> The models are estimate for the whole period available i.e. starting from December 1993.

Table 3. Rating adjustments with excessively high spreads

(July 2004 - June 2009)				
Transparency Quartiles	Cases of High Spreads	Downgrades (% of cases)		
		In same month	In next month	In three months
<b>Standard and Poor's</b>				
1	16	6.3%	6.3%	0.0%
2	30	3.3%	10.0%	0.0%
3	66	7.6%	7.6%	3.0%
4	44	2.3%	2.3%	2.3%
Total	156	5.1%	6.4%	1.9%
<b>Fitch</b>				
1	17	0.0%	0.0%	0.0%
2	44	6.8%	6.8%	4.5%
3	71	5.6%	5.6%	1.4%
4	33	3.0%	3.0%	3.0%
Total	165	4.8%	4.8%	2.4%
<b>Moody's</b>				
1	17	0.0%	0.0%	0.0%
2	53	7.5%	5.7%	1.9%
3	42	0.0%	0.0%	0.0%
4	29	0.0%	0.0%	0.0%
Total	141	2.8%	2.1%	0.7%

Source: Author's calculations.

Table 4 shows the percentage of upgrades for cases of excessively low spreads by quartiles of transparency (1=lowest transparency, 4=highest transparency). Gaillard (2007) showed that “rating changes are asymmetric. The three agencies are more reluctant to upgrade when spreads are excessively low than downgrade when spreads are excessively high”. Our findings are similar when we compare downgrade and upgrade rates across rating agencies. The downgrade rate for the same month is 5.1%, 4.8% and 2.8% for S&P, Fitch and Moody’s respectively. On the other hand, the upgrade rate for the same month is 0.7%, 0.6% and 1.1% for S&P, Fitch and Moody’s respectively.



Table 4. Rating adjustments with excessively low spreads

(July 2004 - June 2009)				
Transparency Quartiles	Cases of Low Spreads	Upgrades (% of cases)		
		In same month	In next month	In three months
<b>Standard and Poor's</b>				
1	84	1.2%	4.8%	4.8%
2	233	0.4%	2.1%	1.3%
3	90	1.1%	5.6%	4.4%
4	40	0.0%	10.0%	5.0%
Total	447	0.7%	4.0%	2.9%
<b>Fitch</b>				
1	79	1.3%	1.3%	1.3%
2	206	0.5%	0.5%	0.5%
3	148	0.0%	2.7%	1.4%
4	39	2.6%	7.7%	5.1%
Total	472	0.6%	1.9%	1.3%
<b>Moody's</b>				
1	87	1.1%	1.1%	1.1%
2	177	0.6%	1.7%	1.7%
3	267	1.5%	1.9%	1.5%
4	27	0.0%	11.1%	11.1%
Total	558	1.1%	2.2%	2.0%

Source: Author's calculations.

We observe a higher percentage of upgrades for more transparent countries given excessively low spreads. For all three rating agencies, the highest percentage of upgrade in the next month is observed for the most transparent (fourth quartile) countries. The percentages are 10%, 7.7% and 11.1% for S&P, Fitch and Moody's respectively.

Table 5 considers the downgrades by both transparency quartiles and rating range.<sup>19</sup> First, note that most of the downgrades occurred in the "B" rating range. Further, in the case of Fitch and S&P, there appears to be a correlation between transparency and the percentage of excess spreads which resulted in downgrades. For example, consider that 14.3% of countries in the lowest quartile of transparency and "B" rating range with excessively high spreads were downgraded by S&P in the next month. On the other hand only 2.8% of the countries in the highest transparency quartile (4) were downgraded. A caveat here is that during the period July 2004-June 2009, there were few downgrades

<sup>19</sup> This refers to the first letter of the rating for each agency (excluding defaults). For example a Baa rating would be assigned the rating range of "B".

prior to current economic downturn. Further, as we can see from Tables 3 and 4, the number of downgrades and upgrades under consideration is small.

Table 5. Downgrades with excessively high spreads (by rating range)

Transparency Quartiles	Rating Range		
	A	B	C
Downgrades (% of cases with excessive spreads)			
Standard and Poor's			
1	0.0%	14.3%	0.0%
2	0.0%	10.5%	33.3%
3	0.0%	7.8%	0.0%
4	0.0%	2.8%	0.0%
Fitch			
1	0.0%	0.0%	0.0%
2	0.0%	6.7%	14.3%
3	0.0%	5.6%	0.0%
4	0.0%	3.8%	0.0%
Moody's			
1	0.0%	0.0%	0.0%
2	3.2%	4.8%	100.0%
3	0.0%	0.0%	0.0%
4	0.0%	0.0%	0.0%

Source: Author's calculations.

Although the analysis described above suggests that rating adjustments as a result of excessively high are related to transparency a more systematic approach using a probit models (results not shown) does not find that IBP transparency index is correlated with probability of downgrade.

### 6.3 Change in Spreads

Since sovereign spreads can react instantaneously, it is plausible that they may react to changes in credit ratings particularly if the rating change reflects new information (Cantor and Packer (1996)). As discussed earlier, the relationship between spread and credit rating is likely to be moderated by transparency. Market participants are likely to place more confidence in a credit rating for a transparent country compared to a less transparent country since there is more certainty regarding the underlying information. On the other hand, a change in rating for a less transparent country is more likely to reflect new information and be unanticipated compared to a transparent country for which credible information is available. Since surprise changes are likely to result in more drastic changes to spreads, it follows that a rating change for a less transparent country is likely to result in a larger change in spreads compared to a more transparent country. On the other hand, rating change

for a transparent country is more likely to be anticipated and associated with a gradual change in spreads compared to less transparent countries.

Before discussing the empirical results we consider a plot of the spread before and after a downgrade. Figure 5 and 6 show the mean and median, respectively, of the spread 12 months before and after a downgrade by transparency quartiles. Figure 5 shows that prior to downgrades, the mean spread is very similar for all transparency level but becomes dispersed after the downgrades. Countries in the highest quartile have the lowest mean spread after downgrade while the 3<sup>rd</sup> highest quartile has the highest. Considering the medians, the lowest and the 3<sup>rd</sup> quartile countries have the highest spreads after a downgrade while the most transparent countries as well as 2<sup>nd</sup> quartile countries have moderately higher spreads. Note that the increase in spreads for the highest quartile is gradual over nearly six months, while for all other quartiles there is a distinct increase near the time of downgrade. This suggests that for more transparent countries, markets are less surprised and adjust the spreads prior to the downgrade based on the available information.

Figure 5. Sovereign Spread (Mean) (One year before and after a downgrade)

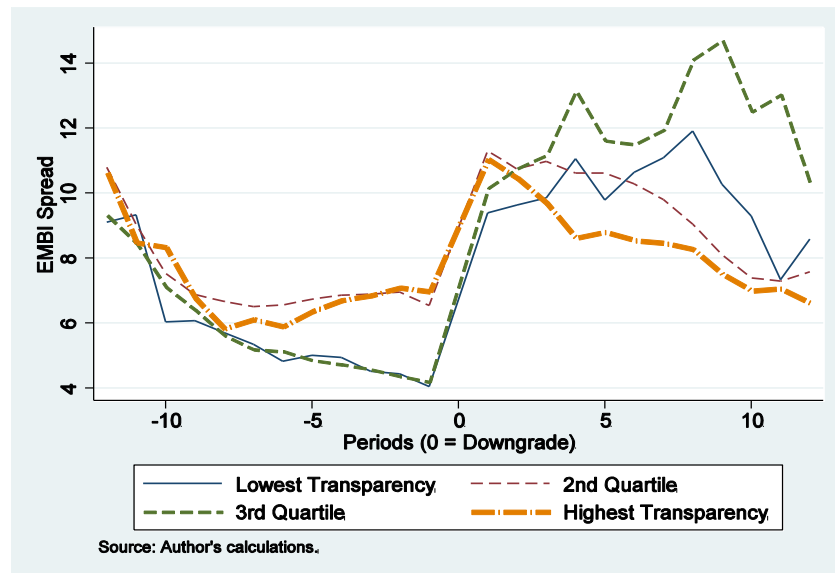
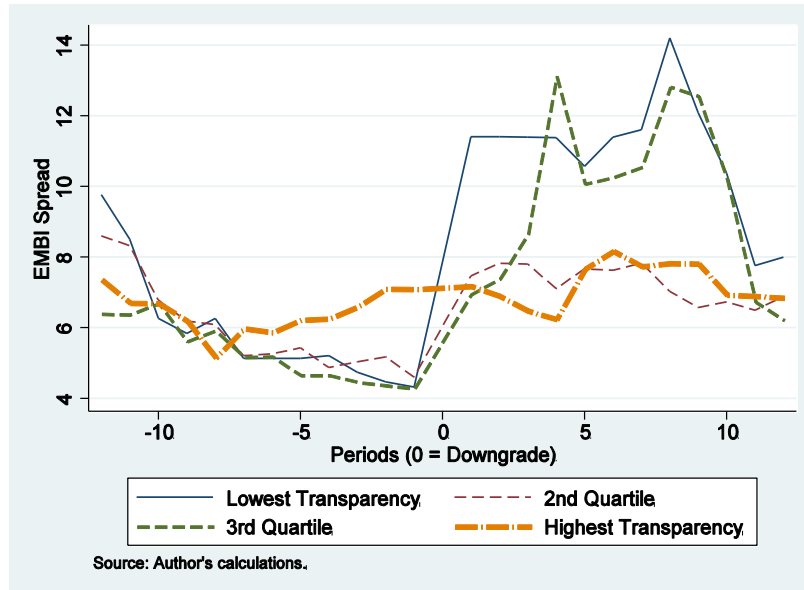


Figure 6. Sovereign Spread (Median) (One year before and after a downgrade)



Our model for change in spread includes the average rating, transparency (only for OLS) and an interacted term. We also added other explanatory variables based on the literature. For example, following Cantor and Packer (1996) we include a dummy variable for whether or not the country is classified as speculative. Other explanatory variables include rating change in number of notches change (-), federal funds rate, corporate spread and a dummy for default (+). We extend the analysis from July 1999 to June 2009 (10 years) in order to include a higher number of rating changes.

The first three columns of Table 6 show the OLS estimates of the model with three different dependent variables: change in spread in the same month, next month and three months ahead. Note that instead of including a constant term we include three dummies, namely, downgrades, upgrades and no change in rating. The conditional coefficients of credit ratings are positive and significant for all models implying that countries with higher credit ratings experience more changes in their spreads. This is a surprising result and need to be further explored.

On the other hand, the conditional coefficient of transparency variable is negative and significant suggesting that changes in sovereign spreads are smaller for more transparent countries. A possible explanation for this finding may be that because a significant amount of reliable fiscal information is available for more transparent countries, the markets are less likely to be surprised and therefore less likely to respond drastically.

The coefficient on the change in rating (notches) is negative and significant for changes in spread in the same month indicating that a downgrade (upgrade) results in higher (lower) spreads. The coefficient on the downgrade dummy is positive and significant for 1 month and 3 months ahead as well implying confirming that downgrades are related to increases in spreads.

Table 6. Regressions for Change in Spread

% Change in Spread	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			Fixed Effects		
	Same month	Next month	Three months	Same month	Next month	Three months
Average Rating	-0.001 (0.004)	-0.002 (0.004)	-0.015 (0.008)*	0.039 (0.013)***	0.041 (0.013)***	0.105 (0.027)***
IBP Index	-0.178 (0.099)*	-0.212 (0.102)**	-0.790 (0.218)***			
Rating X Transparency	0.012 (0.008)	0.015 (0.008)*	0.055 (0.017)***	-0.040 (0.023)*	-0.042 (0.023)*	-0.087 (0.049)*
Rating Ch (Notches)	-0.064 (0.033)**	0.030 (0.033)	0.016 (0.073)	-0.040 (0.012)***	-0.023 (0.012)*	-0.003 (0.026)
Downgrade	-0.027 (0.070)	0.123 (0.072)*	0.314 (0.153)**	0.054 (0.029)*	-0.019 (0.030)	-0.022 (0.063)
Upgrade	0.008 (0.063)	-0.001 (0.064)	0.280 (0.139)**			
No Change in Rating	-0.045 (0.050)	0.059 (0.052)	0.281 (0.111)**			
Federal Funds Rate	0.010 (0.003)***	0.003 (0.003)	0.009 (0.006)	0.010 (0.003)***	0.003 (0.003)	0.011 (0.006)*
Corporate Spread	0.019 (0.005)***	-0.008 (0.005)	-0.019 (0.011)*	0.018 (0.005)***	-0.008 (0.005)	-0.016 (0.011)
Speculative Grade	0.014 (0.014)	0.016 (0.014)	0.039 (0.031)	-0.010 (0.020)	-0.011 (0.021)	-0.036 (0.044)
Default Indicator				0.078 (0.034)**	0.043 (0.035)	0.116 (0.073)
Constant				-0.264 (0.052)***	-0.188 (0.054)***	-0.610 (0.114)***
Observations	2104	2046	1999	2213	2151	2105
Number of ifs				29	29	29
Adj. R <sup>2</sup>	0.02	0.01	0.02			
R <sup>2</sup>				0.04	0.02	0.05
<i>Marginal Effects</i>						
Credit Ratings	0.005 (0.002)*	0.005 (0.003)**	0.013 (0.005)**	0.019 (0.004)***	0.020 (0.004)***	0.062 (0.008)***
Transparency	-0.039 (0.024)	-0.045 (0.025)*	-0.158 (0.053)***	-0.446 (0.251)*	-0.464 (0.259)*	-0.960 (0.545)*

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

The last three columns for Table 6 show the estimates for a fixed effects model with the same three dependent variables: change in spread in the same month, next month and three months ahead. The transparency term is excluded since it does not vary over time for a given county and cannot be estimated under fixed effects. The conditional coefficient for average rating is positive and significant, similar to the OLS estimates. The marginal effect of transparency<sup>20</sup> from the interaction term is negative and significant suggesting that transparency influences the impact of ratings on sovereign spreads.

<sup>20</sup> It is not possible to estimate the budget transparency coefficient in a fixed effects model since transparency does not vary over time for a given country. So the marginal effect of transparency is reported as the coefficient of the interaction term multiplied by sample average rating.

Amongst other explanatory variables, the rating change continues to be negatively related to spreads i.e. a downgrade (negative change in notches) is likely to result in an increase in spreads for the same month and the next month. The downgrade dummy coefficient is positive and significant only in the case of the same month. A positive coefficient on the federal funds rate suggests that an increase in the federal fund rate results in an increase in spreads which is inline with the findings in Eichengreen and Mody (2000) which finds that a increase in the federal funds rate lowers demand for new issues of emerging market bonds which puts upward pressure on the their spreads.

## 7 Conclusion

We examined the relationship between budget transparency, sovereign credit ratings and sovereign spreads. The paper first describes a budget transparency index based on the IBP survey 2008. A look at the cross-section of the data shows that ratings are positively related to transparency after controlling for income differences across countries although this relationship becomes weaker once other control variables are added. Similarly, sovereign spreads are lower for more transparent countries after controlling for ratings and selective defaults. The results from panel data show that ratings are negatively related to spreads and that transparency influences (dampens) the impact of ratings on sovereign spreads. Although we find some evidence that a downgrade in response to excessively high sovereign spreads is more likely in less transparent countries, the systematic analysis of likelihood of downgrade does not support this conclusion. We show that a change in spread is smaller for more transparent countries and the effect of ratings on change in spreads is moderated by budget transparency.

A fruitful direction of future would be to consider the impact of transparency on market variables in a non-linear setting. It is plausible that there is a trade-off between cost and benefits to transparency and the governments are making rational decisions regarding their level of transparency. Essentially, this suggests a non-linear relationship of transparency and gains from transparency i.e. for those countries which have a reason to remain non-transparent as well those countries which are already highly transparent, the gains from additional transparency may be limited (at least in the short-run). On the other hand, countries in the middle may have the most of gain from increased transparency.

Another direction for future research would be to consider the determinants of budget transparency. At this time, we cannot make any conclusive statements about the direction of causality between transparency and financial markets. While it is likely that credit ratings and spreads are dependent on budget transparency (through the fiscal channel) it is also plausible that a more able government may adopt transparent practices in order to benefit from better ratings and lower spreads. In other cases, the more transparent practices may be driven by other considerations such as political competition.<sup>21</sup> Future direction of research could exploit these political economy determinants of transparency to pin down causality.

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<sup>21</sup> Alt and Lassen (2006) suggest political competition as an instrument for budget transparency based on the observation that political parties prefer more transparency if there is a high probability that they might lose office in the next term.

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## Appendix

Appendix Table 1. Linear transformation of ratings

Fitch		Moody's		S&P	
Ratings	Numerical	Ratings	Numerical	Ratings	Numerical
AAA	23	Aaa	20	AAA	22
AA+	22	Aa1	19	AA+	21
AA	21	Aa2	18	AA	20
AA-	20	Aa3	17	AA-	19
A+	19	A1	16	A+	18
A	18	A2	15	A	17
A-	17	A3	14	A-	16
BBB+	16	Baa1	13	BBB+	15
BBB	15	Baa2	12	BBB	14
BBB-	14	Baa3	11	BBB-	13
BB+	13	Ba1	10	BB+	12
BB	12	Ba2	9	BB	11
BB-	11	Ba3	8	BB-	10
B+	10	B1	7	B+	9
B	9	B2	6	B	8
B-	8	B3	5	B-	7
CCC+	7	Caa1	4	CCC+	6
CCC	6	Caa2	3	CCC	5
CCC-	5	Caa3	2	CCC-	4
CC	4	Ca	1	CC	3
C	3	C	0	C	2
DDD	2			SD	1
DD	1			D	0
D	0				

Source: Cantor and Packer (1996).