

Online Appendix for

“The adverse effects of systematic leakage ahead of official sovereign debt rating announcements”

This appendix presents results not reported in the paper for brevity and is organized into nine sections, most of which are accompanied by tables and figures. The last section provides an extended timeline of international regulatory changes relevant to the process CRAs use to announce revisions in sovereign ratings and outlooks. An outline of this appendix is as follows:

Section	Title	Table	Figure
1	Ratings and outlooks robustness	A1	in paper
2	OLS and institutional quality variable robustness	A2	
3	Standard error robustness: panel regressions	A3	A1
4	Volatility robustness: panel regressions	A4	A2
5	Rating level and volatility robustness: panel regressions	A5	A3
6	Beta estimation robustness	A6	A4
7	Beta estimation, TSLS and institutional quality variable robustness	A7	
8	Replication using non-MSCI stock indices	-	A5
9	Timeline of regulatory changes	-	-

1. Event studies using changes in ratings and outlooks

Changes in ratings and watchlist inclusions (or exclusions) typically serve as early indications of upcoming changes in ratings. In this section we present cumulative average abnormal returns (CAARs) from event studies of changes in sovereign ratings and outlooks on local stock market indices. In Table A1, Panel A we present results for the “First Mover using Ratings and Outlooks” (FMRO) sample separately for upgrades and downgrades. Recall that the FMRO sample contains all observations not preceded by another change in ratings or outlooks by a CRA (Fitch, Moody's and Standard & Poor's) in the previous twenty trading days. In Panel B, we present results for ratings-only FMRO, which is constructed by applying the FMRO filter on the union of all changes in ratings. The results are consistent with those in Table 1, Panel B in the paper.

2. Ordinary least squares (OLS) of cumulative abnormal returns (CAR) on institutional quality proxies

Even though the corruption perception index of Transparency International (TI) captures several elements of alternative institutional quality measures that can be used instead of TI in Table 2 of the paper, we also provide OLS estimates of CAR [-5, -3], on other proxies of institutional quality. These are:

- World Bank development classification which takes the value of 1 if a country is emerging or frontier and 0 if it is developed (shown in Table A2 column 2)
- law & order index from Political Risk Services Group (PRS), (shown in Table A2 column 3)
- legal origin (common vs. civil law) from La Porta et al. (1998), (shown in Table A2 column 4).

Results for TI are also shown for completeness in Table A2 column 1. All results are statistically significant and in the expected direction.

3. Standard error robustness: abnormal stock return panel regressions

When estimating standard errors using the methodology of Kolari and Pynnonen (2010), it might be the case that the event (i.e., announcement) changes the stock returns residuals' correlation in the estimation period, thus violating the Kolari and Pynnonen (2010) assumption. To address this concern, we conduct panel regressions of daily raw returns around the announcements of sovereign downgrades, as described below.

Using daily data starting 270 days before each announcement and ending 10 days after each announcement, we run panel regressions where the dependent variable is the daily stock market return of the country being downgraded and the independent variables are the corresponding daily world index return and 21 dummy variables, one for each day in the period [-10, +10]. Panel regressions using robust (White) standard errors clustered by date are conducted (a) without fixed effects, (b) with country fixed effects, and (c) with country and relative day fixed effects.

In Table A3 we report the estimated coefficients from the three panel regression specifications for high TI (Transparency Index) and low TI downgrades. In Figure A1, we provide graphs from the three panel regression models of the cumulative abnormal returns (that is, the cumulative coefficient estimates) for high and low TI downgrades over the 10 days before to 10 days after the announcement. We discuss the three sets of panel regressions in turn:

(a) Panel regression using robust (White) standard errors clustered by date without fixed effects

Table A3 (first and fourth columns) report coefficients on the dummy variables along with their statistical significance, while and Figure A1, Panel A plots the corresponding CAARs. As can be seen, the results remain unchanged. Specifically, for low TI downgrades, we observe negative statistically significant coefficients before and on the day of the announcement, and positive and statistically significant coefficients after the announcement. For high TI events the results are either much weaker or absent, consistent with our paper's results.

(b) Panel regression using robust (White) standard errors clustered by date with country fixed effects

We re-run the analysis in (a) above but include country fixed effects. Regression results are reported in Table A3 (second and fifth columns) and CAARs are plotted in Figure A1, Panel B. The results are similar to those in part (a) above and thus again remain unchanged.

(c) Panel regression using robust (White) standard errors clustered by date with country and relative day fixed effects

We re-run the analysis in (a) above but now include country and relative day fixed effects. This means that fixed effects are applied for each relative day (with respect to the event) for each country. Regression results are reported in Table A3 (third and sixth columns) and graphs of CAARs are plotted in Figure A1, Panel C. The negative pre-announcement abnormal returns of low TI announcements and the partial reversal after the announcement remain robust. On the event day, the market reaction goes away using the country and relative day fixed effects combination since the announcement day is controlled for.

4. Volatility robustness: information (Sharpe) ratio panel regressions

Since lower institutional quality markets may experience higher volatility than higher institutional quality markets, our results could be driven by increased volatility in low institutional quality markets. If information leakage is to explain the results, the effects of leakage should still be present after controlling for variation in volatility across markets. While Kolari and Pynnonen (2010) partially address the issue of potentially higher volatility in lower institutional quality countries by estimating standardized returns (as an intermediate step) using each event's volatility of returns, we conduct a series of additional robustness tests.

First, we estimate information (Sharpe) ratios by dividing stock index returns over the [-270, +20] window by the standard deviation of index returns over the same period. We then run panel regressions

following the methodology in Section 1 above, that is, we run variations of the model (a) without fixed effects, (b) with country fixed effects, and (c) with country and relative day fixed effects.

In Table A4 we report the estimated coefficients from the three panel regressions for high TI and low TI downgrades. In Figure A2, we plot the cumulative coefficients on the information ratios over the 20 days around the announcement for high and low TI downgrades. The results for each model are as follows:

(a) Information ratio panel regressions using robust (White) standard errors clustered by date without fixed effects

Using daily data starting 270 days before and ending 20 days after each announcement, we run a panel regression where the dependent variable is the daily stock market information ratio of the country being downgraded and the independent variables are the corresponding daily world index and 21 dummy variables for each day in the [-10, +10] period. We use robust (White) standard errors clustering by date. Table A4 (first and fourth columns) report the coefficients on the dummy variables along with their statistical significance, and Figure A2, Panel A plots the cumulative coefficient estimates for high and low TI downgrades over the 10 days before to 10 days after the announcement. Consistent with previous robustness tests, the results remain unchanged.

(b) Information ratio panel regressions using robust (White) standard errors clustered by date with country fixed effects

We re-run the analysis in (a) above but now include country fixed effects. Regression results are shown in Table A4 (second and fifth columns) and cumulative coefficient estimates are plotted in Figure A2, Panel B. The results remain unchanged.

(c) Information ratio panel regressions using robust (White) standard errors clustered by date with country and relative day fixed effects

We re-run the analysis in (a) above but now include country and relative day fixed effects. Regression results are shown in Table A4 (third and sixth columns) and cumulative coefficient estimates are plotted in Figure A2, Panel C. As before, the results are consistent with those in the previous robustness section where country and relative day fixed effects were applied.

In additional robustness checks (not reported here or in the paper), we use standardized abnormal returns calculated by 1) dividing abnormal returns in the testing period by the standard deviation of residuals in the estimation period, and 2) dividing abnormal returns in the testing period by the standard deviation of residuals in the testing period. In both cases, the results remain unchanged.

5. Rating level and volatility robustness: information ratio panel regressions

Market reactions may vary depending on the level of a country's debt rating. To account for this possibility, we split the sample into broad rating categories and re-run our analysis, also controlling for volatility using the approach in Section 3 above.

Specifically, we first split our sample of sovereign debt downgrades into "investment grade" and "non-investment grade" downgrades, where for S&P and Fitch (Moody's) we classify as investment grade a BBB- (Baa3) or better rating. This classification is equivalent to the investment grade versus junk classification for corporate bonds. The dummy variable IG takes the value of 1 if the rating level is investment grade and 0 otherwise. Focusing on low TI downgrades, the IG=0 sample has 102 observations and the IG=1 sample has 47.

We run panel regressions similar to those in Section 3 separately for the two subsamples (IG=0 and IG=1). The dependent variable is the daily information (Sharpe) ratio for each event in the period [-270, +20]. Independent variables are the corresponding daily world index and 21 dummy variables for each day in the period [-10, +10]. We repeat the three versions of panel regressions conducted above here.

In Table A5 we report the estimated coefficients from the panel regressions for IG=0 and IG=1 low TI downgrades. In Figure A3, we plot the cumulative coefficients on information ratios for the [-10, 10] period for IG=0 and IG=1 low TI downgrades. Results are as follows:

(a) Information ratio panel regressions using robust (White) standard errors clustered by date without fixed effects

(b) Information ratio panel regressions using robust (White) standard errors clustered by date with country fixed effects

For (a) and (b) above, examining the two broad ratings categories separately does not change the results: we observe negative abnormal returns before and the day of the announcement, and a partial reversal after the announcement.

(c) Information ratio panel regressions using robust (White) standard errors clustered by date with country and relative day fixed effects.

Separately examining the two categories (IG=0 and IG=1) does not change the results relative to previous robustness checks with country and relative day fixed effects, that is, we continue to find statistically significant negative pre-announcement abnormal returns but insignificant reactions the day of and after the announcement.

As a final test we include IG as an independent variable in the TSLS regressions reported in the paper's Table 3B. We find that the level of transparency remains economically and statistically significant at the 5% level. IG is also statistically significant at the 10% level. Hence, our results appear to be robust to the rating level a country is downgraded to and the volatility of abnormal returns.

6. Beta estimation robustness

Beta estimates may be noisy and thus affect the results. To address this concern we conduct several robustness checks on the beta estimation.

First, we examine the descriptive statistics and t-values of the beta estimates.

Statistic	Beta Coefficient	T-Value
Average	0.59	6.26
Median	0.54	5.40
N	688	688

The beta estimates are reasonable and are not expected to add much noise to the results as they are well below the value of 1. Thus, any changes in the world index are not likely to be magnified by the estimated betas. Similarly, the t-values of the coefficients are high. Overall, 82% of the beta coefficients are statistically significant at the 10% level.

Next, we show that our results are robust to the following alternative specifications of beta:

(a) $\beta = 1$,

(b) Full-sample monthly betas: we use full-sample monthly data, where the entire time series of each country's stock returns is used to estimate beta, without excluding the testing period around each announcement. This means that changes in ratings within each country have the same beta estimate.

(c) Pre-event monthly beta: we use the approach for "full-sample monthly betas" but the sample is up to one month prior to the announcement.

(d) Ex-U.S.: we estimate correlations among all countries' stock indices in our sample for the period January 1, 2008 to the end of our data, when we expect to see the highest correlations among countries. All countries that have a correlation with the U.S. of more than 0.8 are regressed on the ex-U.S. world portfolio, obtained from Datastream. These countries are: Denmark, Estonia, Germany, Hong Kong, Korea, Malaysia, Mexico, Norway, Singapore, South Africa, Thailand and United Kingdom. For the remaining sample (which excludes the events in the countries listed above), the benchmark return used in the estimation of the market model is the world return that includes the U.S. (as in our paper).

For each robustness check we present the daily abnormal returns for the period $[-10, 10]$ in Table A6 and we plot the cumulative adjusted market returns over the same period in Figure A4. Standard errors are based on Kolari and Pynnonen (2010). In the interest of space, we use TI as the representative institutional quality variable in Table A6 and Figure A4. The results are reported separately for high and low TI downgrades.

In summary, in all robustness checks we observe for low TI events a consistent, pre-announcement stock market decline, an additional negative reaction the day of the announcement and a partial reversal after the announcement; this pattern is both statistically and economically significant. For high TI events these effects are much weaker or absent, consistent with the paper's results.

7. Beta estimation, TSLS and institutional quality variable robustness

A focal part of our analysis is the two-stage least squares (TSLS) regressions using CAR $[-5, -3]$. In this section we show that the TSLS results using TI are robust to other institutional quality variables, and that the dependent variable in the TSLS regression is robust to its estimation method. To do so, we repeat the estimation of the TSLS regressions using other proxies for institutional quality and then we show that the TSLS regressions are robust to using CARs from alternative beta estimation methods (see Section 6 above).

We summarize the results of the second stage of the TSLS regressions in Table A7, Panels A-F for all proxies of institutional quality (TI, developed vs. non-developed and PRS law & order). In Panel A we replicate Table 3B in the paper (CAR $[-5, -3]$) but now include all institutional quality measures. In Table A7, Panels B-E we re-run the analysis in Table A6 Panel A, but now use all the beta robustness checks, that is, the dependent variable (CAR) is estimated using the beta variations above. We find that the causal link between institutional quality and abnormal returns is robust to all beta specifications. Furthermore, the coefficient on TI is almost identical to that reported in Table 3, Panel B in the paper, and hence of

similar economic significance. Finally, we find that the TSLS results hold using cumulative raw returns as the dependent variable (Table A7, Panel F).

8. Replication using non-MSCI stock indices

Figure 7 in our paper uses a liquidity measure that is based on daily volume data from each country. Since MSCI indices (which are used throughout the paper) are not associated with volume data, we had to collect volume data from other “general Datastream (DS)” indices that had respective volume data. Accordingly, here we replicate the main results of our paper using DS (non-MSCI) stock indices.

Panel A of Figure A5 plots CAARs for upgrades and downgrades in a similar fashion to the Figure 4 of the paper; results look similar. Panel B of Figure A5 replicates the paper’s Figure 6. Again, similar results obtain. Finally, Panel C of Figure A5 replicates the paper’s Figure 8, again with similar results.

9. Regulation timeline

Below we detail the chronological order of recent rules, regulations and/or guidelines related to the process through which CRAs communicate their decision to revise a sovereign debt rating.

In 2004, the European Commission (Directorate General for Internal Markets and Services) requested technical advice from the Committee of European Securities Regulators (CESR) on potential action against CRAs. Specifically, the request focused on four issues (CESR, 2004)¹:

“(i) potential conflicts of interests within rating agencies;

(ii) transparency of rating agencies’ methodologies;

(iii) legal treatment of rating agencies’ access to inside information; and

¹ CESR was the predecessor of ESMA (European Securities and Exchange Commission).

(iv) concerns about possible lack of competition in the market for provision of credit ratings.”

While these four concerns appear to capture most aspects of CRAs’ rating practices, they were largely motivated by issues related to corporate bond ratings and structured finance ratings, rather than sovereign debt ratings. It seems that at the time, the sovereign debt rating market was not of major interest to the European Commission.

Also in 2004, IOSCO published the “Code of Conduct Fundamentals” for CRAs (IOSCO, 2004). This document outlines recommended practices for CRAs, but at the same time recognizes (page 2, “Preamble”) that CRAs require some degree of flexibility to respond to the environment in which they operate. Section 3.6 of the Code states:

“Where feasible and appropriate, prior to issuing or revising a rating, the CRA should advise the issuer of the critical information and principal considerations upon which a rating will be based and afford the issuer an opportunity to clarify any likely factual misperceptions or other matters that the CRA would wish to be made aware of in order to produce an accurate rating. The CRA will duly evaluate the response.”

Prior to this Code being published, there was no common set of standards on how CRAs should publicly announce changes in sovereign debt ratings.

In December 2005, the Commission on Credit Ratings Agencies stated (among other things) in their report to the European Parliament that there is no proof that more strict regulation of CRAs is required (EU, 2005):

“...Following the request by the European Parliament, the Commission has considered very carefully whether or not fresh legislative proposals are required to regulate the activities of credit rating agencies. Its conclusion is that at present no new legislative initiatives are needed.

One of the central principles of ‘Better Regulation’ is that legislative solutions should be

applied only where they are strictly necessary for the achievement of public policy objectives. The Commission believes that the case for new legislation in this area remains unproven....”

In a 2006 revision to its Code of Conduct (IOSCO, 2006), IOSCO clarifies the process through which a rating should be released, but continues to make no reference to the timeframe over which such announcements should take place:

“In addition to conflicts of interest, the IOSCO Code describes how credit rating agencies can improve the transparency of the rating process and the timeliness of ratings disclosure. Credit rating agencies have to publish sufficient information about their procedures, methodologies and assumptions, so that outside parties can understand how a rating was arrived at by a given credit rating agency. Credit rating agencies are required to disclose within each rating

- i) whether the rating was initiated by the issuer or by the credit rating agency itself, and*
- ii) whether the issuer participated in the rating assessment process (i.e. provided non-public confidential information).”*

In **January 2007**, the European Commission (EC, 2007) reiterated the view that there is no proof that more strict regulation of CRAs is required:

“However, the case for new legislation in this area remains unproven. Nevertheless, the Commission will continue to monitor developments in this area and, in particular, the impact of the new US Act on CRAs which will be operational by next summer.”

In **May 2008**, IOSCO issued another revision to its Code of Conduct for CRAs. This revision includes an entire section on “The Treatment of Confidential Information” (Section 3b). The most relevant points for our purposes are as follows:

“3.11 A CRA should adopt procedures and mechanisms to protect the confidential nature of information shared with them by issuers under the terms of a confidentiality agreement or otherwise under a mutual understanding that the information is shared confidentially. Unless otherwise permitted by the confidentiality agreement and consistent with applicable laws or regulations, the CRA and its employees should not disclose confidential information in press releases, through research conferences, to future employers, or in conversations with investors, other issuers, other persons, or otherwise.

3.16 CRA employees should not selectively disclose any non-public information about rating opinions or possible future rating actions of the CRA, except to the issuer or its designated agents.

3.18 CRA employees should not use or share confidential information for the purpose of trading securities, or for any other purpose except the conduct of the CRA’s business.”

In a press release in **July 2008**, the European Commission stated that it changed its view on the regulation of CRAs, leading a **worldwide initiative for stricter regulation** of CRAs (EC, 2008):

“Commissioner McCreevy declared: "I have been listening to many advisory bodies to the Commission and watching developments in the industry and in other jurisdictions for the last year. I am convinced, like others in Europe of the need to legislate in this area at EU level. CRAs will have to comply with exacting regulatory requirements to make sure ratings are not tainted by the conflicts of interest inherent to the ratings business.”

“Commission President José Manuel Barroso said: "Today's approvals of the Commission's proposals on credit rating agencies are the latest example of the EU leading the world in responding to the economic and financial crisis, restoring confidence and preventing a repeat. Our G20 partners agreed in London to move in the same direction the EU has taken today.”

The EU passed stricter regulation on **November 17, 2009** (EU, 2009). Section D of the regulation, (“Rules on the presentation of credit ratings”) includes the first specific reference to the consultation timeframe in the so-called “12-hour rule”:

“3. The credit rating agency shall inform the rated entity at least 12 hours before publication of the credit rating and of the principal grounds on which the rating is based in order to give the entity an opportunity to draw attention of the credit rating agency to any factual errors.”

While this regulation requires that CRAs inform rated entities at least 12 hours before the announcement, there is no explicit limit to how many days (or hours) before the public announcement CRAs should initiate contact with the rated entity. This **unbounded window of communication between CRAs and rated entities** creates the potential for information leakage.

In **June 2013**, the 2009 EU regulation was amended (EU, 2013). Among other changes, the “12-hour rule” was converted to a “24-hour rule” (Annex I, Section D, Part I):

“The credit rating agency shall inform the rated entity during working hours of the rated entity and at least a full working day before publication of the credit rating or the rating outlook. That information shall include the principal grounds on which the credit rating or rating outlook is based in order to give the rated entity an opportunity to draw attention of the credit rating agency to any factual errors.”

Furthermore, the new regulation refers to the destabilizing effects of CRAs, and requires certain procedural changes that aim to mitigate such effects (EC, 2013):

“ - To avoid market disruption, rating agencies will set up a calendar indicating when they will rate Member States.

- Such ratings will be limited to three per year for unsolicited sovereign ratings. Derogations remain possible in exceptional circumstances and subject to appropriate explanations.

- *The ratings will only be published on Fridays after close of business and at least one hour before the opening of trading venues in the EU. “*

The June 2013 regulation still does not specify a maximum number of days over which communication between CRAs and rated entities should be completed.

Finally, on **December 2, 2013**, ESMA published the results of a sovereign ratings investigation assessing CRAs’ governance, conflicts of interest, resourcing adequacy, confidentiality controls and timing of publication (ESMA, 2013). ESMA’s concerns are evident in Section 2.2 in their report:

“The Regulation specifically requires that the CRAs do not disclose any information about credit ratings, possible future credit ratings or rating outlooks, except to the rated entity or a related third party. To this end, CRAs need to ensure that their employees respect the confidentiality of the rating information and that sufficient internal controls are in place to limit the access to confidential rating information on a need-to-know basis.

In one or more CRAs, ESMA observed several instances of disclosure of upcoming rating actions to an unauthorised third party, before publication and, in some cases, before the rating committee had taken place. This occurred primarily before the date of registration [with ESMA] of the CRA(s), although the practice continued in some cases after registration.

ESMA is concerned that confidential information has been passed on to third parties who should not be privy to it. Moreover, the internal control functions did not identify these practices. While ESMA was informed that this practice has since stopped, it has requested a number of remedial actions to ensure full confidentiality.

One or more CRAs had, until recently, inadequate controls in place for the circulation of rating committee material and information on upcoming rating actions to functions outside the sovereign group. On some occasions, confidential information was provided before a rating

committee, or before a rating action was publicly announced, to other CRA staff beyond a need-to-know basis.

ESMA also observed cases of external communication consultants supporting one or more CRAs in the disclosure of rating actions, with an outsourcing agreement which allows confidential rating information to be shared with the consultants before a rating action is published. ESMA is concerned that these practices may impair the CRAs' ability to directly control confidential information on credit ratings from being: i) disclosed; and ii) used or shared for the purpose of trading in financial instruments, or for any other purpose other than the credit rating activity. CRAs must ensure that any confidentiality agreements adequately protect the confidentiality of ratings information, and that they set up appropriate controls to actively monitor and verify that there is no inappropriate use of the information."

With regards to the timely publication of rating decisions, ESMA notes in Section 2.3 of their report:

"In one or more CRAs, ESMA observed significant and frequent delays between the decision taken by the rating committee and the publication of sovereign ratings. In particular, there were instances of publication of ratings more than five days after the rating decision had been approved by the rating committee and, in at least one case even two weeks after the date of the committee.

The CRA(s) explained that the need to prevent incorrect information being presented to the public may require some extra time, after the rating decision, before the rating action can be published.

Notwithstanding the need to ensure correct information is published, ESMA considers that prolonging the time between the rating decisions and the disclosure of the rating actions to the public creates a serious risk that users of ratings do not receive information about changes in the creditworthiness of a rated entity on a timely basis. Moreover the delay may pose a risk to maintaining the confidentiality of ratings information."

References

(in addition to references in the paper)

- EC, 2005. Communication from the Commission on Credit Rating Agencies. In: 2005/11990 Commission E (Ed.), http://ec.europa.eu/internal_market/securities/docs/agencies/communication_en.pdf
- EC, 2007. Internal Market: Commission welcomes EU regulators' report on credit rating agencies. In: IP/07/28 Commission E (Ed.), http://europa.eu/rapid/press-release_IP-07-28_en.htm?locale=en
- EC, 2008. Consultation by the Commission services on Credit Rating Agencies (CRAs). In: IP/08/1224 EC (Ed.), http://europa.eu/rapid/press-release_IP-08-1224_en.htm?locale=en
- EC, 2013. New rules on credit rating agencies (CRAs) enter into force – frequently asked questions. In: MEMO/13/571 Commission E (Ed.), http://europa.eu/rapid/press-release_MEMO-13-571_en.htm
- IOSCO, 2006. Code of Conduct Fundamentals for Credit Rating Agencies.

Figures and Tables

Figure A1: Standard Error Robustness: Stock Returns Panel Regressions (Sovereign Downgrades).

Panel regression results of sovereign daily, returns (270 days before and 20 days after the event) around the time of sovereign debt downgrades. Dependent variable is the index return in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and the 10 days after each event. Robust (White) standard errors clustered by downgrade date are reported. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). Three versions of panel regressions are reported in panels A to C: (A) no fixed effects are used, (B) fixed effects by country are used, and (C) fixed effects by country and (relative) day are used.

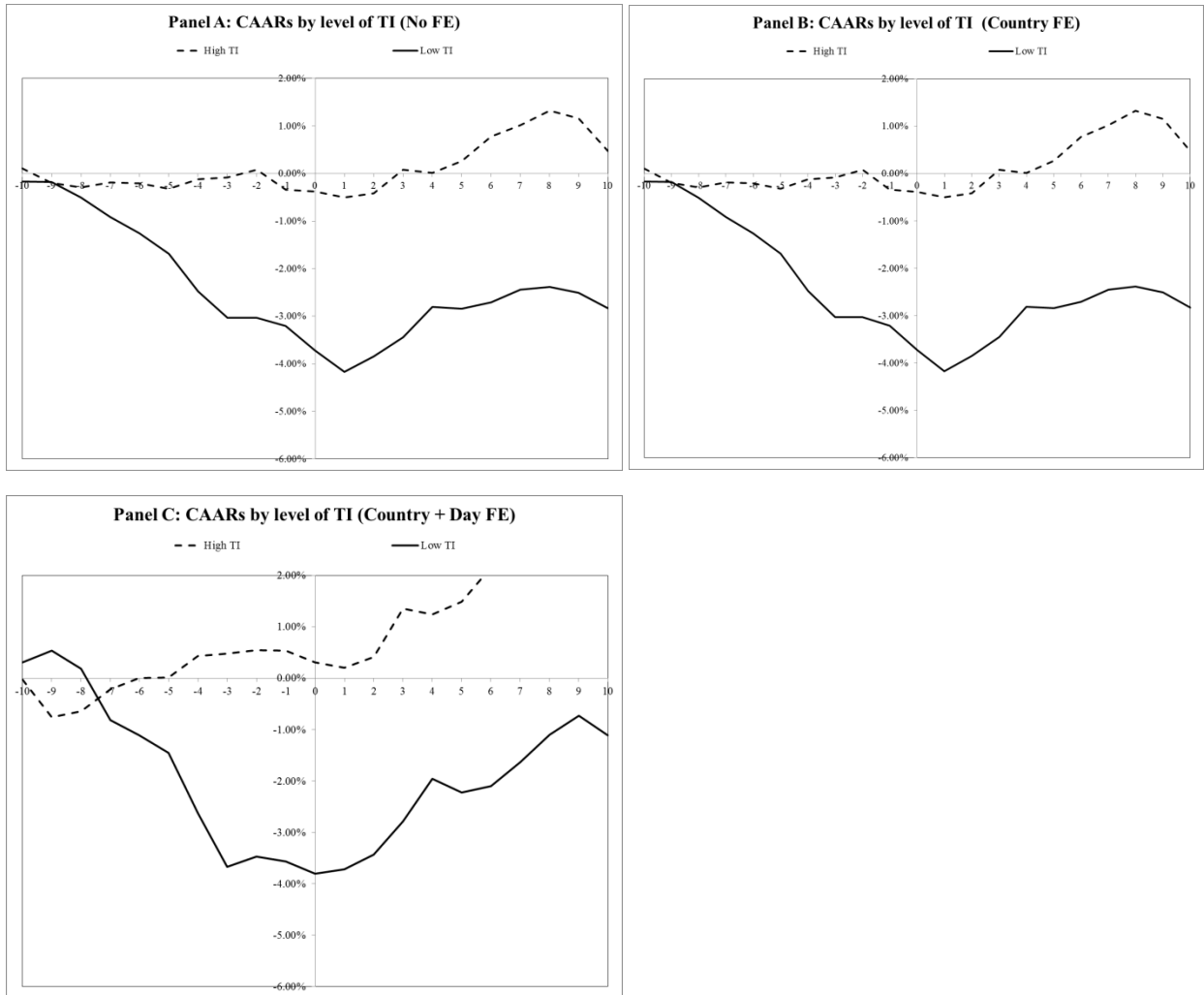


Figure A2: Volatility Robustness: Information Ratios (Sharpe) Panel Regressions (Sovereign Downgrades).

Panel regression results of sovereign daily, information (Sharpe) ratios (stock market returns divided by their volatility in the estimation period) around the time of sovereign debt downgrades. Dependent variable is the index return in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and the 10 days after each event. Robust (White) standard errors clustered by downgrade date are reported. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). Three versions of panel regressions are reported in panels A to C: (A) no fixed effects are used, (B) fixed effects by country are used, and (C) fixed effects by country and (relative) day are used.

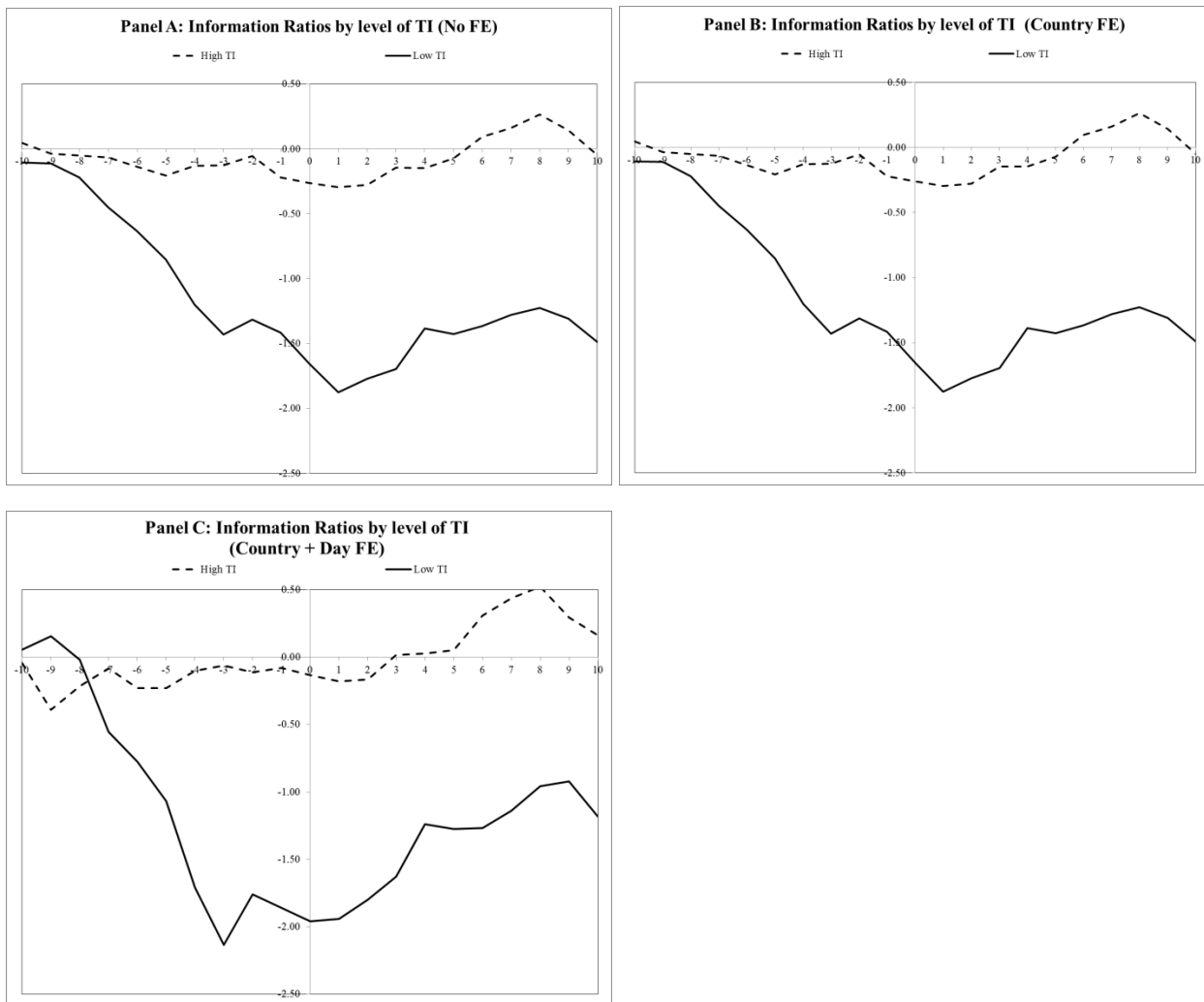


Figure A3: Rating Level & Volatility Robustness: Information Ratios Panel Regressions (Sovereign Downgrades – Low TI).

Panel regression results of sovereign daily, information (Sharpe) ratios (stock market returns divided by their volatility) around the time of sovereign debt downgrades (low TI). Dependent variable is the daily information ratio in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and the 10 days after each event. Robust (White) standard errors clustered by downgrade date are reported. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported for low Transparency Index (TI) downgrades separately for above Investment Grade (IG = 1; n=47) and Non-Investment Grade (IG=0; n=102). Relative Day is the trading day relative to the event day (day 0). Three versions of panel regressions are reported in panels A to C: (A) no fixed effects are used, (B) fixed effects by country are used, and (C) fixed effects by country and (relative) day are used.

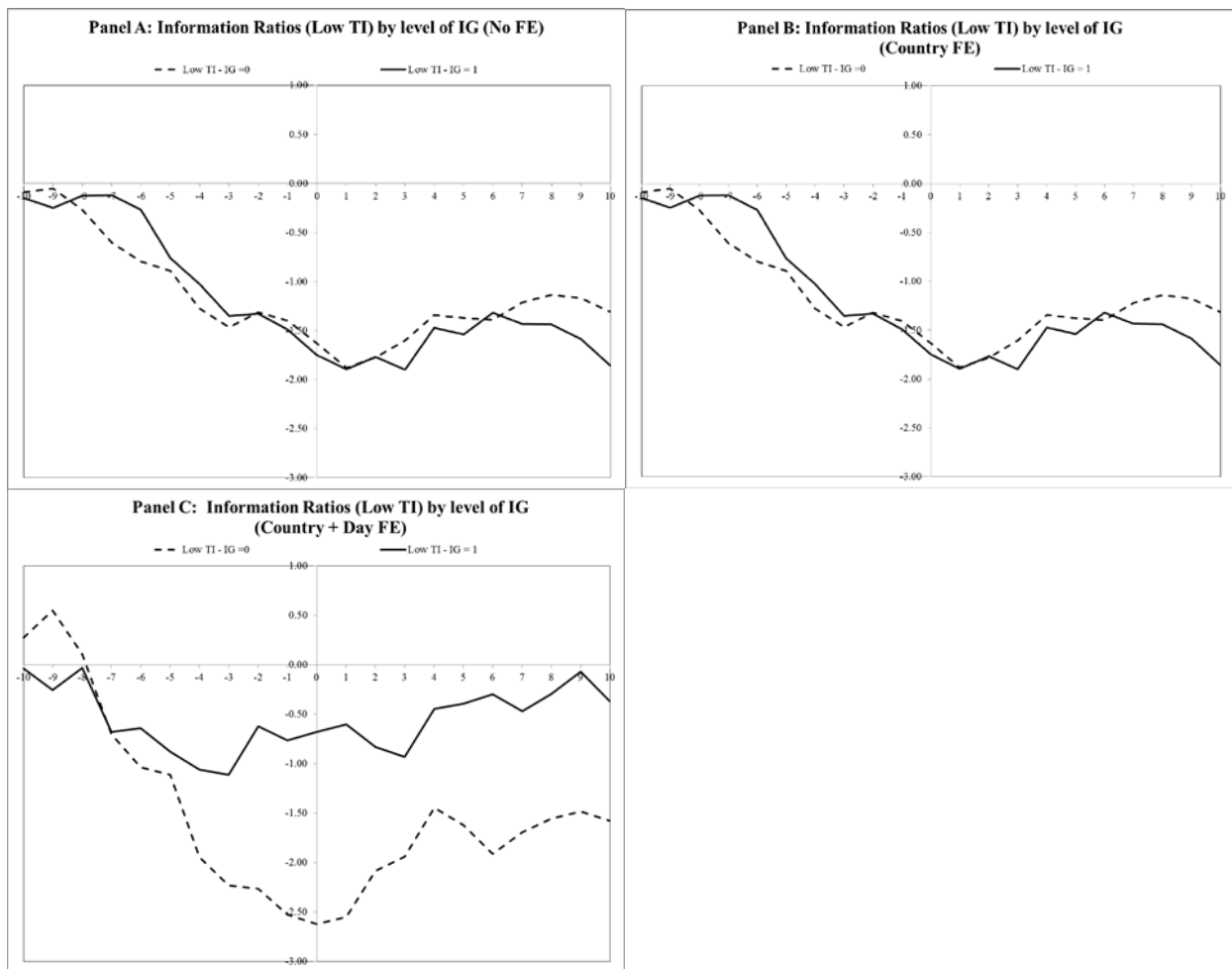


Figure A4: Beta Robustness: Abnormal Returns for Sovereign Downgrades.

Event study results of the sovereign debt downgrades on the respective sovereign daily, stock market return. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). Four robustness on beta estimates are reported in panels A to D: (A) beta =1, (B) beta is estimated using a full sample monthly estimate, (C) beta is estimated on a monthly basis using the sample up to one month prior to the event (pre-event monthly), and (D) beta is estimated using on an ex-US world index for countries highly correlated with the US index (the rest are estimated on the world index).

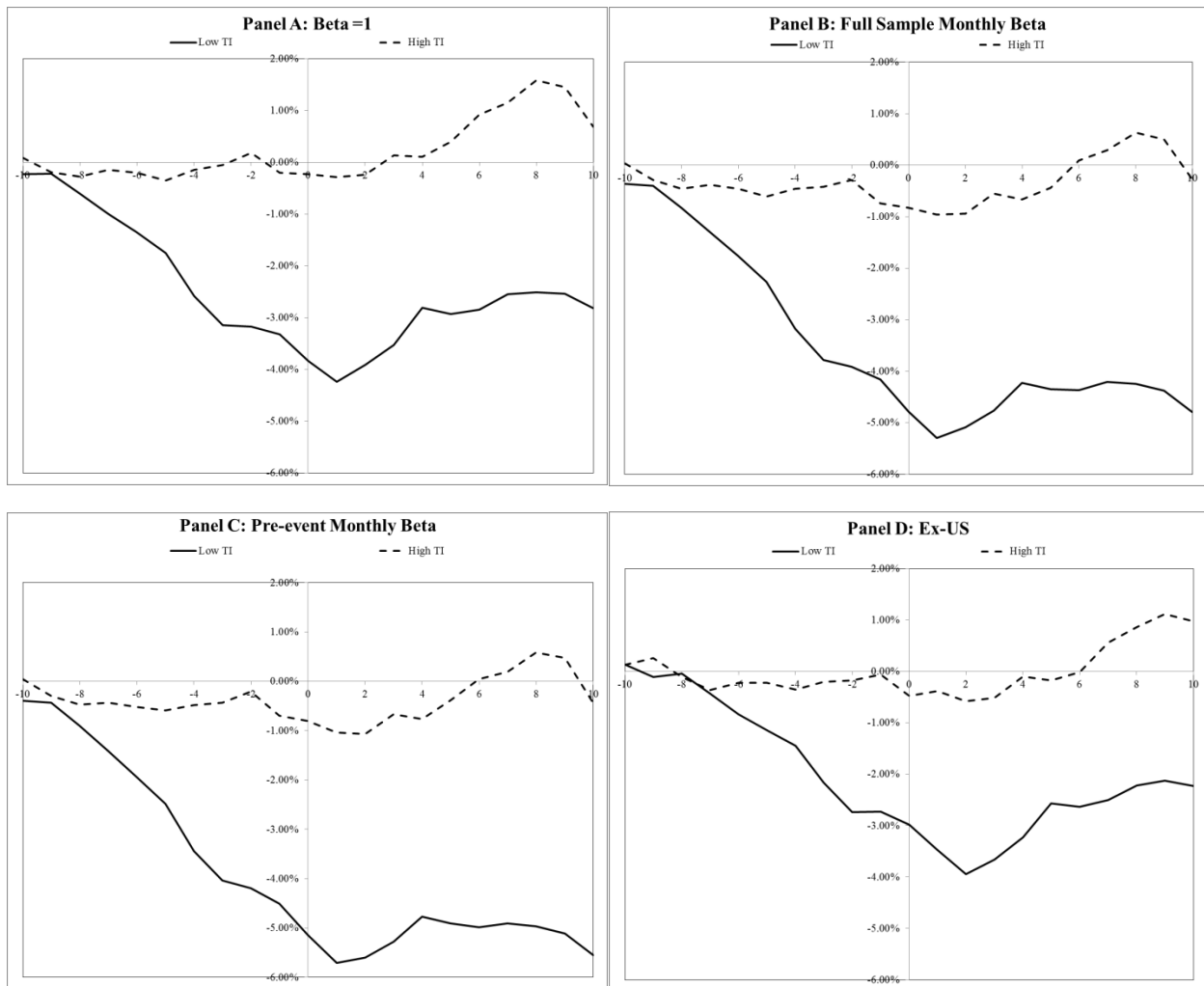
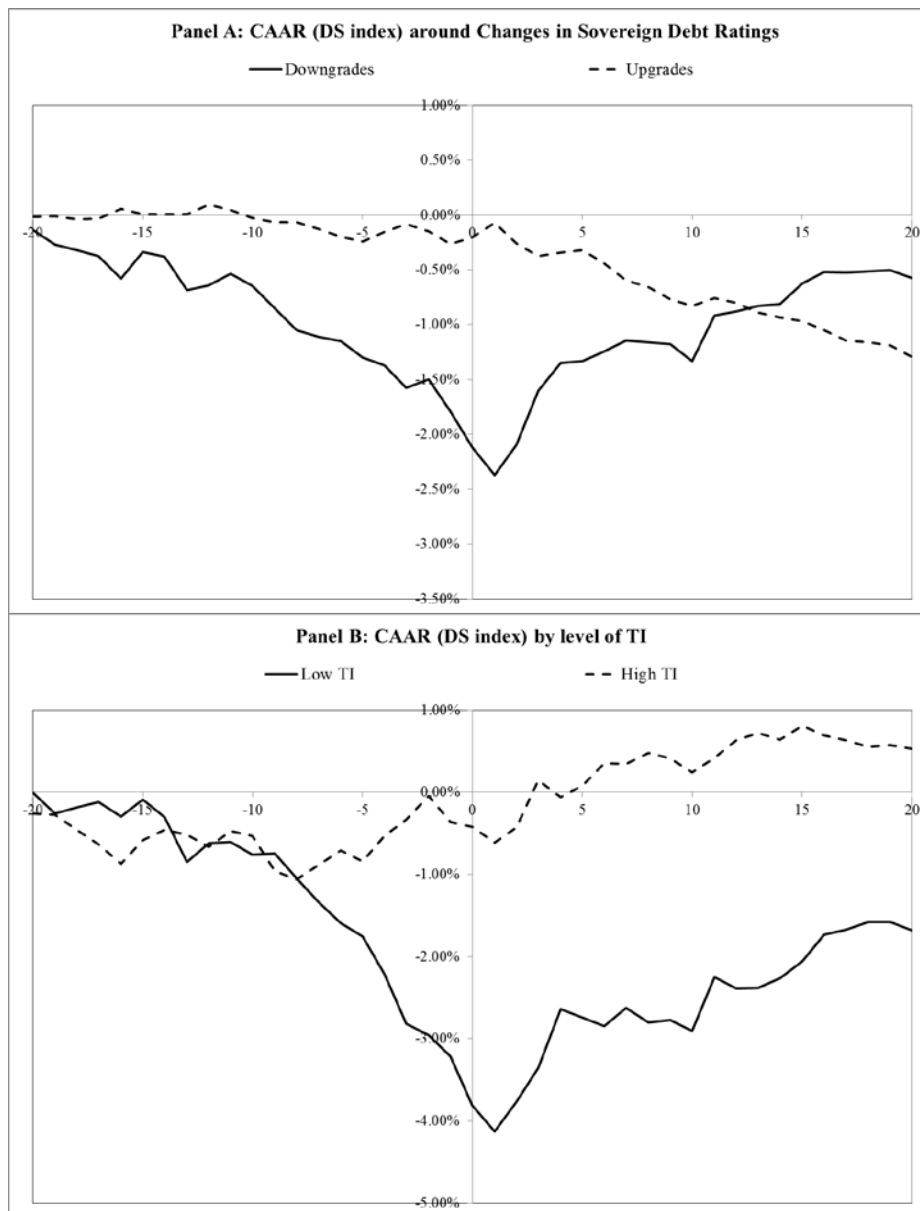


Figure A5: Replication of main results using other, general Datastream (DS) equity indices

In panel A we show cumulative average abnormal returns using broad Datastream equity indices (that also have available volume data), around changes in sovereign ratings (a replication of Figure 4 in the paper). The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. There are 244 downgrades and 361 upgrades with matching equity data. In Panel B, we show a replicate of Figure 6 in the paper but using general broad Datastream equity indices. There are 122 observation in both low and high TI sub-samples. In Panel C, we show a replicate of Figure 8 in the paper but using general broad Datastream equity indices. The "Ratings FMR" sample is used. Cumulative average abnormal returns are shown for low transparency Index (TI) downgrades, separately for those with SDN=0 (n=76) and SDN=1 (n=46). SDN (stands for Sovereign Downgrade News) takes the value of 1 if there are news specifically related to the forthcoming downgrade in the event window (-10,-1), and 0 otherwise.



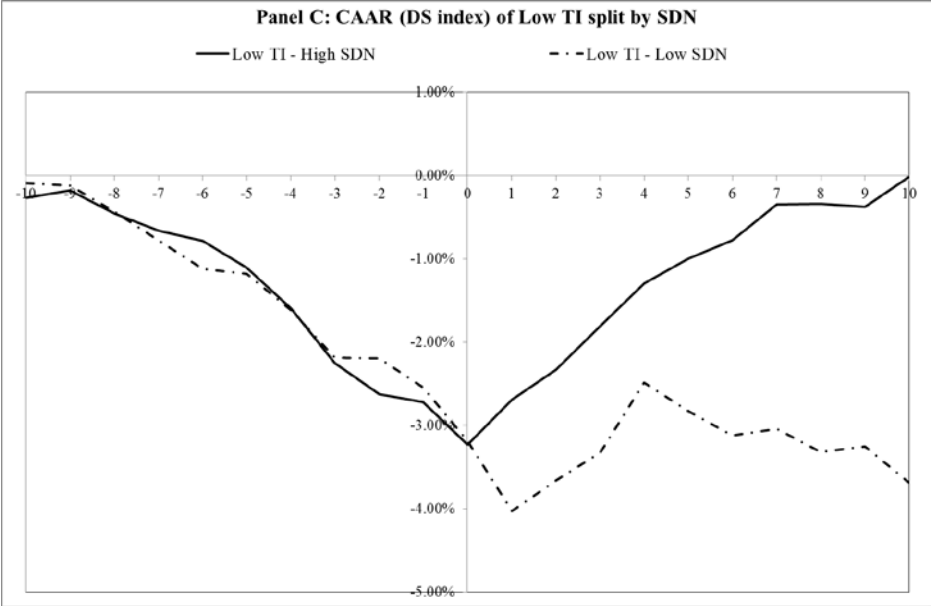


Table A1
Cumulative Average Abnormal Returns Around Changes in Sovereign Debt Ratings & Outlooks

This table presents cumulative average abnormal returns (CAARs) in the sovereign stock index, in the period before and after changes in sovereign debt ratings and outlooks. Results are reported separately for upgrades and downgrades. In all panels we apply a first mover (FM) filter: FMRO means that all observations preceded by changes in ratings and outlooks by the same or other rating agency (Fitch, Moody's and Standard & Poor's) in the previous twenty trading days are deleted. In panel A we show the "Ratings and Outlooks FMRO" sample: the union of changes in ratings and outlooks filtered by changes in ratings and outlooks. There are 667 upgrades (including positive outlooks) and 483 downgrades (including negative outlooks). In panel B we show the "Ratings FMRO" sample: the union of all changes in ratings, filtered using the FMRO filter as described above. There are 378 upgrades and 255 downgrades in panel B. P-values are based on the Kolari and Pynnonen (2010) approach (Equation 16). ***,**, and * denote statistical significance (SS) at the 1, 5, and 10 percent level.

Panel A: "Ratings & Outlooks FMRO"

Event Window	Upgrades			Downgrades		
	CAAR (%)	P-value	SS	CAAR (%)	P-value	SS
(-10,-3)	0.135	0.066	*	-1.311	0.000	***
(-5,-3)	0.245	0.002	***	-0.405	0.015	**
(0,+1)	0.185	0.037	**	-0.442	0.002	***
(+2,+5)	-0.420	0.001	***	0.842	0.009	***
(+2,+10)	-0.730	0.000	***	0.971	0.131	
(-5,+5)	-0.003	0.860		-0.401	0.016	**
(-10,+10)	-0.423	0.380		-1.178	0.002	***

Panel B: "Ratings FMRO"

Event Window	Upgrades			Downgrades		
	CAAR (%)	P-value	SS	CAAR (%)	P-value	SS
(-10,-3)	0.029	0.332		-1.556	0.000	***
(-5,-3)	0.330	0.009	***	-0.600	0.022	**
(0,+1)	0.211	0.021	**	-0.565	0.006	***
(+2,+5)	-0.361	0.048	**	1.007	0.076	*
(+2,+10)	-0.784	0.006	***	1.363	0.349	
(-5,+5)	0.006	0.696		-0.312	0.173	
(-10,+10)	-0.718	0.345		-0.913	0.071	*

Table A2

OLS Regressions of CAR [-5, -3] on Institutional Quality Variables

This table presents Ordinary Least Squares (OLS) regressions of the cumulative abnormal returns in the local stock market index, in the period before downgrades (using CAR [-5, -3] winsorized at 1%) on different measures of institutional quality. We show downgrades from the "Ratings FMR" sample. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. In addition to TI (repeated in column 1 for convenience), the other measures are: "Emerging & Frontier" (column 2); "PRS Law and Order" (column 3); "Common Law" indicator (column 4). Expected Sign denotes the expected sign on the institutional quality coefficient ("Coeff."). "T" and "P-val" are the robust t-value and p-value of the coefficient. The intercept is not shown. Statistical significance (SS) at the 1, 5, and 10 percent level is denoted by ***, **, and * respectively.

Column	1				2				3				4			
CAR [-5, -3]	Coeff.	T	P-val	SS	Coeff.	T	P-val	SS	Coeff.	T	P-val	SS	Coeff.	T	P-val	SS
TI	0.003	2.330	0.020	**												
Emerging/Frontier					-0.009	-2.200	0.028	**								
PRS Law & Order									0.003	1.980	0.049	**				
Common (vs. Civil) Law													0.011	2.390	0.017	**
Expected Sign			+				-					+				+
N			291				291					291				291
R squared			0.018				0.038					0.038				0.038

Table A3

Standard Error Robustness: Panel Regressions of Stock Index Returns for Sovereign Downgrades

Panel regression results of sovereign daily, stock market returns around the time of sovereign debt downgrades. Dependent variable is the index return in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and after each event. The "coefficient" of the indicator variables are reported. P-values from robust (White) standard errors clustered by downgrade date are also reported. ***, **, and * denote statistical significance (SS) at the 1, 5, and 10 percent level. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). Three versions of panel regressions are reported: (a) with no fixed effects, (b) with "country" specific fixed effects, and (c) with "country and relative-day" fixed effects.

FE?	High TI									Low TI								
	No FE			Country FE			Country + Day FE			No FE			Country FE			Country + Day FE		
Relative Day	Coefficient (%)	P-value	SS	Coefficient (%)	P-value	SS	Coefficient (%)	P-value	SS	Coefficient (%)	P-value	SS	Coefficient (%)	P-value	SS	Coefficient (%)	P-value	SS
-10	0.11	0.50		0.11	0.50		-0.02	0.91		-0.17	0.47		-0.17	0.47		0.31	0.41	
-9	-0.31	0.04	**	-0.31	0.04	**	-0.74	0.00	***	-0.01	0.97		-0.01	0.97		0.23	0.61	
-8	-0.09	0.54		-0.09	0.54		0.12	0.63		-0.33	0.10		-0.33	0.10		-0.35	0.34	
-7	0.10	0.60		0.10	0.60		0.43	0.24		-0.41	0.04	**	-0.41	0.04	**	-1.00	0.00	***
-6	-0.02	0.95		-0.02	0.95		0.22	0.54		-0.35	0.08	*	-0.35	0.07	*	-0.30	0.35	
-5	-0.12	0.44		-0.12	0.44		0.00	0.99		-0.42	0.05	*	-0.42	0.05	*	-0.34	0.38	
-4	0.20	0.30		0.20	0.29		0.42	0.09	*	-0.79	0.00	***	-0.79	0.00	***	-1.17	0.00	***
-3	0.04	0.83		0.04	0.82		0.05	0.84		-0.56	0.02	**	-0.56	0.02	**	-1.04	0.00	***
-2	0.16	0.49		0.16	0.49		0.06	0.81		0.00	0.99		0.00	0.99		0.19	0.60	
-1	-0.42	0.05	**	-0.42	0.05	**	0.00	0.99		-0.17	0.44		-0.17	0.44		-0.09	0.80	
0	-0.04	0.81		-0.04	0.81		-0.23	0.42		-0.52	0.03	**	-0.52	0.03	**	-0.23	0.53	
1	-0.12	0.55		-0.12	0.55		-0.11	0.64		-0.45	0.12		-0.45	0.12		0.08	0.81	
2	0.09	0.69		0.09	0.69		0.21	0.63		0.32	0.23		0.32	0.23		0.29	0.51	
3	0.49	0.17		0.49	0.17		0.94	0.13		0.40	0.05	**	0.40	0.05	**	0.65	0.06	*
4	-0.07	0.71		-0.06	0.71		-0.12	0.65		0.63	0.01	***	0.63	0.01	***	0.83	0.07	*
5	0.25	0.19		0.25	0.19		0.25	0.51		-0.03	0.87		-0.03	0.87		-0.27	0.42	
6	0.51	0.04	**	0.51	0.04	**	0.66	0.07	*	0.14	0.49		0.14	0.49		0.12	0.71	
7	0.25	0.20		0.25	0.20		0.11	0.66		0.26	0.23		0.26	0.23		0.47	0.20	
8	0.30	0.10	*	0.30	0.10	*	0.27	0.26		0.06	0.79		0.06	0.79		0.53	0.11	
9	-0.17	0.33		-0.17	0.33		-0.38	0.09	*	-0.12	0.54		-0.12	0.54		0.37	0.31	
10	-0.69	0.31		-0.69	0.31		0.04	0.89		-0.32	0.13		-0.32	0.13		-0.39	0.21	

Table A4

Volatility Robustness: Information (Sharpe) Ratios for Sovereign Downgrades

Panel regression results of sovereign daily, information ratios around the time of sovereign debt downgrades. Dependent variable is the information (Sharpe) ratio (stock market returns divided by their volatility) in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and after each event. The "coefficient" of the indicator variables are reported. P-values from robust (White) standard errors clustered by downgrade date are also reported. ***, **, and * denote statistical significance (SS) at the 1, 5, and 10 percent level. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). Three versions of panel regressions are reported: (a) with no fixed effects, (b) with "country" specific fixed effects, and (c) with "country and relative-day" fixed effects.

Relative Day	High TI									Low TI								
	No FE			Country FE			Country + Day FE			No FE			Country FE			Country + Day FE		
	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS
-10	0.05	0.57		0.05	0.57		-0.04	0.71		-0.11	0.27		-0.11	0.27		0.06	0.75	
-9	-0.08	0.24		-0.08	0.24		-0.35	0.02	**	0.00	0.96		0.00	0.96		0.10	0.58	
-8	-0.01	0.87		-0.01	0.87		0.18	0.17		-0.11	0.22		-0.11	0.22		-0.17	0.29	
-7	-0.02	0.85		-0.02	0.85		0.13	0.47		-0.23	0.01	***	-0.23	0.01	***	-0.53	0.00	***
-6	-0.07	0.49		-0.07	0.49		-0.15	0.38		-0.18	0.03	**	-0.18	0.03	**	-0.22	0.16	
-5	-0.07	0.37		-0.07	0.37		0.00	1.00		-0.22	0.03	**	-0.22	0.03	**	-0.29	0.15	
-4	0.08	0.34		0.08	0.34		0.13	0.40		-0.35	0.00	***	-0.35	0.00	***	-0.64	0.00	***
-3	0.00	0.97		0.00	0.97		0.04	0.77		-0.23	0.02	**	-0.23	0.02	**	-0.42	0.02	**
-2	0.07	0.41		0.07	0.41		-0.05	0.73		0.12	0.35		0.12	0.35		0.37	0.07	*
-1	-0.17	0.06	*	-0.17	0.07	*	0.03	0.81		-0.10	0.23		-0.10	0.23		-0.10	0.47	
0	-0.04	0.64		-0.04	0.64		-0.05	0.73		-0.24	0.02	**	-0.24	0.02	**	-0.10	0.58	
1	-0.03	0.68		-0.03	0.68		-0.05	0.73		-0.22	0.04	**	-0.22	0.04	**	0.02	0.90	
2	0.02	0.81		0.02	0.81		0.01	0.93		0.10	0.33		0.10	0.34		0.14	0.42	
3	0.13	0.17		0.13	0.17		0.18	0.31		0.08	0.41		0.08	0.41		0.17	0.38	
4	0.00	0.99		0.00	0.99		0.01	0.95		0.31	0.00	***	0.31	0.00	***	0.39	0.05	**
5	0.07	0.39		0.07	0.39		0.02	0.89		-0.04	0.66		-0.04	0.66		-0.04	0.78	
6	0.17	0.03	**	0.17	0.03	**	0.26	0.12		0.06	0.52		0.06	0.52		0.01	0.96	
7	0.07	0.39		0.07	0.39		0.13	0.39		0.09	0.35		0.09	0.35		0.13	0.41	
8	0.10	0.27		0.10	0.27		0.09	0.59		0.05	0.56		0.05	0.56		0.18	0.18	
9	-0.12	0.20		-0.12	0.20		-0.23	0.11		-0.08	0.37		-0.08	0.37		0.03	0.85	
10	-0.19	0.15		-0.19	0.15		-0.13	0.45		-0.18	0.05	**	-0.18	0.05	**	-0.26	0.08	*

Table A5

Rating Level & Volatility Robustness: Information Ratios conditional on Investment Grade (IG) for Sovereign Downgrades (Low TI)

Panel regression results of sovereign daily, information (Sharpe) ratios (stock market returns divided by their volatility in the estimation period) around the time of sovereign debt downgrades (low TI). Dependent variable is the daily information ratio in each country 270 days before and 20 days after the event. Indicator variables are used for the 10 days before and the 10 days after each event. Robust (White) standard errors clustered by downgrade date are reported. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported for low Transparency Index (TI) downgrades separately for Investment Grade (IG = 1; n=47) and Non-Investment Grade (IG=0; n=102). Relative Day is the trading day relative to the event day (day 0). The "coefficient" of the indicator variables are reported. P-values from robust (White) standard errors clustered by downgrade date are reported. ***,**, and * denote statistical significance (SS) at the 1, 5, and 10 percent level. Three versions of panel regressions are reported: (a) with no fixed effects, (b) with "country" specific fixed effects, and (c) with "country and relative-day" fixed effects.

FE?	IG = 0									IG = 1								
	No FE			Country FE			Country + Day FE			No FE			Country FE			Country + Day FE		
Relative Day	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS	Coefficient	P-value	SS
-10	-0.09	0.47		-0.09	0.47		0.27	0.29		-0.15	0.34		-0.15	0.34		-0.04	0.90	
-9	0.04	0.68		0.04	0.68		0.28	0.29		-0.10	0.41		-0.10	0.42		-0.22	0.60	
-8	-0.22	0.03	**	-0.22	0.03	**	-0.44	0.08	*	0.12	0.50		0.12	0.50		0.22	0.45	
-7	-0.33	0.00	***	-0.34	0.00	***	-0.81	0.00	***	0.00	0.98		0.00	0.98		-0.65	0.04	**
-6	-0.19	0.06	*	-0.19	0.07	*	-0.33	0.15		-0.15	0.30		-0.15	0.30		0.04	0.88	
-5	-0.09	0.43		-0.09	0.43		-0.08	0.81		-0.50	0.00	***	-0.50	0.01	***	-0.24	0.37	
-4	-0.39	0.00	***	-0.39	0.00	***	-0.83	0.00	***	-0.26	0.06	*	-0.26	0.07	*	-0.18	0.47	
-3	-0.19	0.12		-0.19	0.12		-0.28	0.20		-0.33	0.07	*	-0.33	0.07	*	-0.05	0.83	
-2	0.15	0.38		0.15	0.39		-0.04	0.90		0.02	0.86		0.02	0.86		0.49	0.15	
-1	-0.09	0.42		-0.09	0.42		-0.26	0.26		-0.16	0.28		-0.16	0.28		-0.14	0.62	
0	-0.23	0.08	*	-0.23	0.08	*	-0.10	0.76		-0.26	0.06	*	-0.26	0.07	*	0.08	0.74	
1	-0.25	0.09	*	-0.25	0.09	*	0.07	0.77		-0.14	0.26		-0.14	0.27		0.08	0.75	
2	0.10	0.48		0.10	0.48		0.47	0.11		0.12	0.37		0.12	0.38		-0.23	0.43	
3	0.18	0.11		0.18	0.11		0.14	0.56		-0.13	0.44		-0.13	0.45		-0.10	0.73	
4	0.26	0.04	**	0.26	0.04	**	0.50	0.12		0.43	0.01	***	0.43	0.01	**	0.49	0.13	
5	-0.03	0.79		-0.03	0.78		-0.18	0.46		-0.07	0.64		-0.07	0.64		0.05	0.77	
6	-0.02	0.87		-0.02	0.87		-0.29	0.24		0.22	0.11		0.22	0.12		0.10	0.67	
7	0.18	0.09	*	0.18	0.09	*	0.22	0.39		-0.11	0.50		-0.11	0.50		-0.17	0.62	
8	0.08	0.50		0.08	0.50		0.13	0.54		0.00	0.97		0.00	0.97		0.17	0.23	
9	-0.04	0.74		-0.04	0.74		0.08	0.78		-0.15	0.34		-0.15	0.34		0.23	0.28	
10	-0.14	0.20		-0.14	0.20		-0.10	0.67		-0.27	0.10		-0.27	0.11		-0.31	0.09	*

Table A6

Beta Robustness: Abnormal Returns for Sovereign Downgrades

This table presents the event-study results of sovereign debt downgrades on the respective sovereign daily, stock market return. The sample comprises the union of changes in ratings, from Fitch, Moody's and S&P's, filtered using FMR. FMR means that all events preceded by changes in ratings by the same or other rating agency in the previous twenty trading days are deleted, thus giving the "Ratings FMR" sample. Results are reported separately for high and low Transparency Index (TI) downgrades (n = 142 and 149, respectively). Relative Day is the trading day relative to the event day (day 0). AAR(t) is the average abnormal return for all events on each day t. Four robustness on beta estimates are reported from left to right: (a) beta =1, (b) beta is estimated using a full sample monthly estimate, (c) beta is estimated on a monthly basis using the sample up to one month prior to the event (pre-event monthly), and (d) beta is estimated using an ex-US world index for countries highly correlated with the US index (the rest are estimated on the world index). P-values are based on the Kolari and Pymnonen (2010) approach. ***, **, and * denote statistical significance (SS) at the 1, 5, and 10 percent level.

Beta =	High TI								Low TI															
	One		Full Sample Monthly		Pre-event Monthly		Ex-U.S.		One		Full Sample Monthly		Pre-event Monthly		Ex-U.S.									
Relative Day	AAR (%)	P-value	SS	AAR (%)	P-value	SS	AAR (%)	P-value	SS	AAR (%)	P-value	SS	AAR (%)	P-value	SS	AAR (%)	P-value	SS						
-10	0.09	0.89		0.04	0.97		0.04	0.91		0.14	0.64		-0.22	0.43		-0.36	0.22		-0.40	0.17		-0.25	0.35	
-9	-0.28	0.29		-0.32	0.23		-0.34	0.17		-0.37	0.12		0.01	0.82		-0.04	0.67		-0.04	0.65		0.06	0.81	
-8	-0.08	0.92		-0.17	0.57		-0.17	0.30		-0.25	0.37		-0.38	0.21		-0.42	0.15		-0.46	0.12		-0.39	0.18	
-7	0.13	0.49		0.08	0.68		0.03	0.73		0.14	0.75		-0.39	0.01	**	-0.48	0.00	***	-0.52	0.00	***	-0.40	0.01	**
-6	-0.05	0.62		-0.07	0.49		-0.08	0.51		0.00	0.74		-0.36	0.04	**	-0.47	0.01	***	-0.53	0.00	***	-0.32	0.04	**
-5	-0.15	0.38		-0.16	0.42		-0.07	0.76		-0.13	0.56		-0.40	0.02	**	-0.50	0.01	***	-0.53	0.00	***	-0.30	0.05	*
-4	0.20	0.32		0.15	0.55		0.10	0.47		0.15	0.62		-0.83	0.00	***	-0.91	0.00	***	-0.96	0.00	***	-0.71	0.00	***
-3	0.09	0.98		0.04	0.79		0.05	0.76		0.03	0.98		-0.56	0.03	**	-0.61	0.01	**	-0.59	0.02	**	-0.58	0.02	**
-2	0.23	0.30		0.14	0.47		0.22	0.38		0.11	0.47		-0.03	0.51		-0.13	0.79		-0.17	0.92		0.01	0.36	
-1	-0.38	0.11		-0.46	0.03	**	-0.49	0.02	**	-0.42	0.02	**	-0.15	0.37		-0.25	0.18		-0.30	0.14		-0.25	0.15	
0	-0.03	0.72		-0.09	0.37	**	-0.11	0.39	**	0.10	0.55		-0.51	0.03	**	-0.63	0.01	***	-0.64	0.00	***	-0.50	0.02	**
1	-0.06	0.39		-0.13	0.29		-0.23	0.21		-0.20	0.14		-0.40	0.13		-0.51	0.04	**	-0.57	0.03	**	-0.47	0.05	*
2	0.05	0.99		0.02	0.93		-0.03	0.95		0.06	0.88		0.33	0.21		0.21	0.58		0.11	0.89		0.28	0.39	
3	0.38	0.62		0.38	0.61		0.40	0.50		0.41	0.62		0.38	0.30		0.32	0.44		0.32	0.50		0.44	0.22	
4	-0.03	0.85		-0.11	0.75		-0.10	0.81		-0.08	0.83		0.72	0.00	***	0.54	0.01	**	0.51	0.02	**	0.66	0.00	***
5	0.29	0.77		0.23	0.90		0.38	0.61		0.16	0.80		-0.12	0.26		-0.13	0.34		-0.14	0.28		-0.06	0.39	
6	0.52	0.02	**	0.52	0.01	**	0.43	0.04	**	0.58	0.01	***	0.09	0.46		-0.02	0.83		-0.07	0.99		0.13	0.36	
7	0.23	0.33		0.21	0.40		0.15	0.58		0.30	0.29		0.30	0.24		0.17	0.51		0.08	0.79		0.29	0.34	
8	0.43	0.07	*	0.33	0.12		0.39	0.11		0.25	0.30		0.04	0.77		-0.04	0.96		-0.06	0.84		0.09	0.56	
9	-0.13	0.33		-0.13	0.35		-0.11	0.43		-0.14	0.28		-0.03	0.83		-0.14	0.35		-0.15	0.28		-0.10	0.34	
10	-0.76	0.30		-0.78	0.27		-0.91	0.26		-0.67	0.28		-0.28	0.13		-0.41	0.01	**	-0.44	0.01	***	-0.22	0.13	

Table A7

Beta Robustness: Regressions of Cumulative Abnormal Returns on Institutional Quality

This table presents two-stage least squares (TSLS) regressions on the cumulative abnormal returns in the local stock market index, in the period before (using CAR [-5, -3] winsorized at 1%) downgrades in sovereign debt ratings. The constant in each regression is not shown. In Panel A we show TSLS regressions of Table 3B in the paper, but now using alternative measures of institutional quality (described below). In Panels B-E, we re-run the results of Panel A, but using four robustness checks in estimating beta: (B) “beta = 1”, (C) “Full-sample monthly betas”, (D) “Pre-event monthly beta” and (E) “Ex-US”, where countries highly correlated with the U.S. are regressed on a world index excluding the U.S.. Results for cumulative raw returns over the same pre-event window are reported in panel F. We show downgrades from the "Ratings FMR" sample. Instruments used for "TI" are Common/Civil Law, Ethnic fractionalization and Religion fractionalization. Instruments used for "Emerging & Frontier" are Common/Civil Law, Ethnic fractionalization and landlocked. Instruments used for "PRS Law and Order" are Common/Civil Law and Ethnic fractionalization. "Exp. Sign" is the expected sign of the regression coefficient ("Coeff."). "Z" and "P-val" are the robust z-value and p-value of the coefficient. Statistical significance (SS) at the 1, 5, and 10 percent level is denoted by ***,**, and * respectively.

Panel A: Institutional Quality Robustness (Replication of Paper's Table 3B)

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.006	3.540	0.000	***								
Emerging/Frontier	291	-					-0.026	-2.570	0.009	***				
PRS Law & Order	291	+									0.008	2.760	0.006	***

Panel B: Beta = 1

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.006	3.400	0.001	***								
Emerging/Frontier	291	-					-0.026	-2.570	0.010	**				
PRS Law & Order	291	+									0.007	2.330	0.020	**

Panel C: "Full Sample Monthly Beta"

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.007	3.810	0.000	***								
Emerging/Frontier	291	-					-0.029	-2.840	0.005	***				
PRS Law & Order	291	+									0.009	2.790	0.005	***

Panel D: "Pre-Event Monthly Beta"

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.008	4.410	0.000	***								
Emerging/Frontier	291	-					-0.033	-3.230	0.001	***				
PRS Law & Order	291	+									0.010	3.360	0.001	***

Panel E: "Ex-U.S."

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.006	3.320	0.001	***								
Emerging/Frontier	291	-					-0.024	-2.360	0.018	**				
PRS Law & Order	291	+									0.007	2.220	0.026	**

Panel F: Raw Returns

"Pre-Event Period"	N	Exp. Sign	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS	Coeff.	Z	P-val	SS
TI	291	+	0.006	3.300	0.001	***								
Emerging/Frontier	291	-					-0.023	-2.040	0.041	**				
PRS Law & Order	291	+									0.008	2.400	0.016	**