

the other hand, the European region, where the crisis hit harder, subsequently performed very poorly.

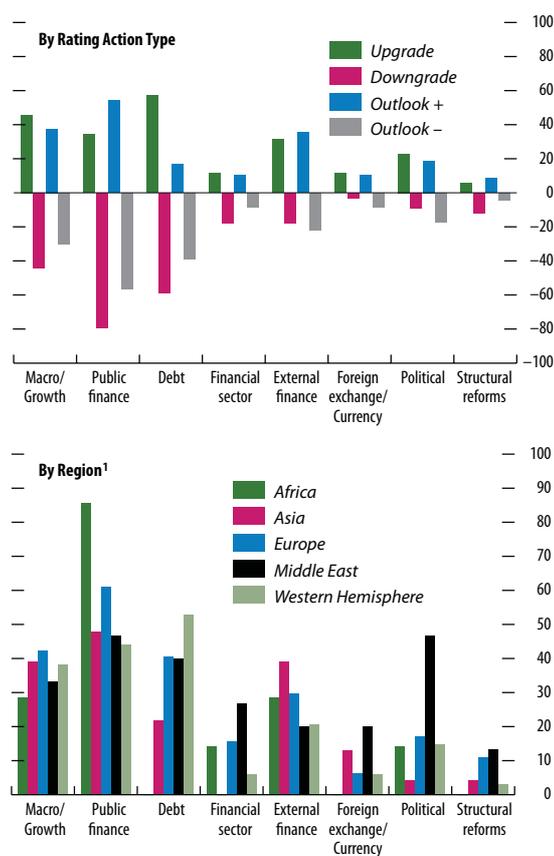
Reflecting this general deterioration in sovereign credit ratings, sovereign spreads widened significantly. However, some of these negative rating changes appear to have surprised markets, particularly the scale of the change. Specifically, the four-notch downgrade of Greece by Moody's in June 2010—a very significant move—seemed to have caught the market off guard, with spreads widening significantly following the event (see Box 3.6). Yet, when Moody's placed Greece on review for further possible downgrades in April, the potential for a multi-notch downgrade was clearly flagged. This suggests that insufficient attention was paid to the detailed analysis and information underlying the change in outlook. The importance of review and outlook changes for spreads is highlighted in the next section.

An examination of the analysis accompanying the announcement of each rating action by the “big three” CRAs shows that the drivers were not uniform across types of rating actions or geographic regions (Figure 3.4).²² While traditional debt sustainability rating drivers such as the fiscal balance and debt level were the most commonly cited variables across rating action types and geographic distribution, they played a proportionally greater role in driving negative rating actions than positive ones. Conversely, external financing conditions and political factors seem to matter more in an upgrade/positive outlook decision.

The Accuracy and Informational Value of Sovereign Ratings

In the wake of the recent crisis and European sovereign downgrades, questions are being asked about the usefulness of CRAs and the accuracy of their credit risk assessments. Also, going back to the 1990s, CRAs have been accused of not only being too slow to change ratings, but also of being procyclical. For example, Larrain, Reisen, and von Maltzan (1997) argued that the Mexican crisis of 1994–95 “produced the sentiment that rating agencies react to events rather than anticipate them.” During the 1997

Figure 3.4. Rating Drivers, May 2007–June 2010
(In percent of total rating actions)



Sources: IMF staff calculations using data from Fitch, Moody's, and Standard & Poor's.

Note: See Box 3.4 for the definitions of the rating drivers.

¹Both upgrades and downgrades.

²²Figure 3.4 is based on a “count” of main ratings drivers mentioned in the rating action reports.

Box 3.5. Empirical Studies of Rating Determinants

This box reviews some of the recent empirical work that has tried to reverse-engineer sovereign ratings from fundamental inputs. The results of these studies have implied that sovereign debt composition and contingent liabilities are not significant credit rating drivers, despite their key roles in recent crises.

An empirical study by Cantor and Packer (1996) indicated that a small number of well-defined criteria explained the sovereign ratings of both Moody's and S&P, with apparently similar weights across both agencies. Of the eight indicators considered, six were statistically significant in explaining the rating; surprisingly, the fiscal and external balances were not. It should be noted that this study effectively assessed what determined a sovereign rating at just one point in time—September 1995. Reflecting the fact that relative weights are likely to change over time, later studies (e.g., Jüttner and McCarthy, 2000) showed that the predictive power of a model declines in future years, suggesting that models designed to infer a “shadow rating” should ideally allow for structural breaks. This study was followed by a series of additional studies, some of which looked at the determinants of ratings across a longer time horizon.¹ These studies tended to focus on the experience of emerging market economies, reflecting the fact that ratings for advanced economies have not varied very much in the past. Given that focus, and reflecting the importance of accessing international capital markets for the emerging market countries, these studies often also explored the link between credit ratings and spreads (that is, the price of credit risk).

One surprising feature of many of these studies is the limited focus on the composition of debt, which is explicitly mentioned as a key indicator by both S&P and Fitch. Specifically, while many studies investigate the importance of the level of external debt (and find it significant), only Jaramillo (2010) explicitly considers the importance of domestic debt, also finding it significant, although less important. This suggests that many studies might have missed an important factor. In the same vein, none of these studies have explicitly

Note: This box was prepared by Allison Holland.

¹Mulder and Perrelli (2001), Rowland and Torres (2004), and Afonso, Gomes, and Rother (2007) all looked at determinants of ratings over a multi-period sample.

considered information on the interest rate structure or the average maturity of debt, both of which are likely to affect a sovereign's medium-term prospects.

In contrast, many studies do consider the relative importance of short-term (external) debt in explaining ratings. Overall, with the exception of Mulder and Perrelli (2001), this does not appear to be a significant factor in determining the level of credit rating. This is surprising given the emphasis placed on liquidity risk in alternative approaches to sovereign credit risk assessment, such as the balance sheet approach (Allen and others, 2002) and the assertion by the credit rating agencies (CRAs) that they adapted their approach in the wake of the Asian crisis to put more emphasis on this factor.² The importance of short-term debt has increased significantly across advanced economies in this crisis. Its role as a determinant of sovereign credit risk is evident if we consider that the level of short-term debt is highly significant and explains close to 30 percent of the recent movement in credit default swap (CDS) spreads across a sample of developed countries.³

Similarly, no studies have sought to explicitly address the role that contingent liabilities play in determining ratings. Again, this is one of the key indicators highlighted by the CRAs in their rating methodologies and one which plays an important role in determining the level of sovereign risk using alternative approaches (for example, the contingent claims approach of Gray, Merton, and Bodie, 2007). This is potentially an important omission given the role the extraordinary support to the banking sector played in the current crisis. However, in this case, while there is some evidence of a relationship between the level of outstanding government guaranteed debt and CDS spreads—with the stock of government guaranteed financial sector debt explaining close to 40 percent of recent movements in CDS spreads across a subsample of European countries where guarantees comprise more than 1 percent of GDP—the sign on the coefficient is negative and counterintuitive.

²In support of this, Mulder and Perrelli (2001) find a role for short-term debt in explaining ratings in the latter part of their sample. In contrast, Rowland (2004) explores the importance of a variety of liquidity factors in determining the level of ratings as of summer 2003; however, none are found to be significant.

³This was estimated using a pooled regression with fixed effects covering a sample of 17 countries that intervened heavily in the financial sector over the period 2006:Q1 to 2009:Q4.

Asian crisis, CRAs were accused both of being too slow initially to downgrade East Asian sovereigns, and subsequently of downgrading more than the worsening fundamentals justified.²³

All of these concerns are relevant from a financial stability point of view if ratings (1) actually influence markets, and (2) are inaccurate and/or ill-timed. The empirical tests in the following subsections will show that sovereign ratings do in fact influence markets, although more via credit warnings (“outlooks,” “reviews,” and “watches”) than through actual rating changes. However, actual rating changes do matter when they cross the investment-grade threshold, which supports reforms oriented toward reduced rating reliance, because these large “certification” effects do not necessarily fully reflect the impact of marginal new information.

Rating “accuracy” can be defined on an ordinal (rank ordered) or cardinal (absolute level) basis, with the CRAs professing that their ratings are supposed to reflect ordinal risk rankings. In fact, for sovereigns the CRAs make it clear that they do not aim for a mapping of default risk measures into rating grades.²⁴ In any case, the empirical analysis below shows that CRAs quite accurately rank sovereign default risk (that is, defaults tend to cluster in the lowest rating grades), particularly over short time horizons.

This suggests that in regulatory situations in which cardinal accuracy is important, such as the Basel II standardized approach, credit ratings should be subjected to the same rigorous calibration tests that are expected of the institutions that are allowed to use internal ratings.²⁵ At the very least, CRAs should be expected to be more transparent about how they calibrate ratings to default risk metrics (that is, the default probabilities, loss severities and stability assumptions).

²³See IMF (1999) and Ferri, Liu, and Stiglitz (1999). The latter authors came to their conclusion by comparing actual ratings with a rating model based on economic fundamentals.

²⁴However, the CRAs did indeed map credit metrics such as default probabilities and expected losses into ratings in their pre-crisis structured finance models (Fender and Kiff, 2005).

²⁵See Annex 2 of BCBS (2006) for an indication of the importance of cardinal accuracy in Basel II: “Supervisors will be responsible for assigning an eligible ECAI’s credit risk assessments to the risk weights available under the standardized risk approach.” An ECAI is an external credit assessment institution.

Empirical Tests of Rating Information Value: Do Ratings Matter and Why?

According to the theoretical literature, credit ratings potentially provide value to and influence markets in three ways. The “informational services” theory would be compatible with evidence pointing to a significant market reaction to rating actions (either changes in ratings or changes in outlook) regardless of the initial starting point on the scale. The “certification services” theory would point to a significant market reaction to upgrades and downgrades involving investment-grade threshold crossings versus other rating changes. If, instead, the “monitoring services” theory is a better explanation of the role played by CRAs, there should be a significant market reaction to downgrades that follow negative credit watches. This is because the downgrade is a signal that the CRA has come to the conclusion that, based on the private information it had access to during the credit watch period, any adjustments required by the CRA to maintain the pre-watch rating have not been met (Boot, Milbourn, and Schmeits, 2006).

These testable implications are analyzed using five-year credit default swap (CDS) spreads.²⁶ The CDS spreads measure the market price of creditworthiness and, as expected, higher spreads are associated with lower ratings. Figure 3.5 illustrates, for each year and each sovereign, the average CDS spread and average credit ratings. The figure also imposes an exponential trend line that shows that the rating/spread relationship is clearly nonlinear, and in line with the historical relationship between ratings and default probabilities (Table 3.1). It is notable that not only did spreads increase across the board during the recent crisis, but since 2007 the dispersion of spreads at the lowest rating grades has widened. This suggests that the market discriminates more among different risk profiles than the CRAs and that this additional discrimination takes place

²⁶A CDS is a financial contract under which an agent buys or sells risk protection against the credit risk associated with a specific reference entity (or specified range of entities). For a periodic fee, typically expressed as a spread, the protection seller agrees to make a contingent payment to the buyer on the occurrence of a default or other specified credit event. Hence, the spread is considered a reflection of the market’s perception of reference entity credit quality.

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Box 3.6. Greece: An Examination of the Evolution of Rating Actions

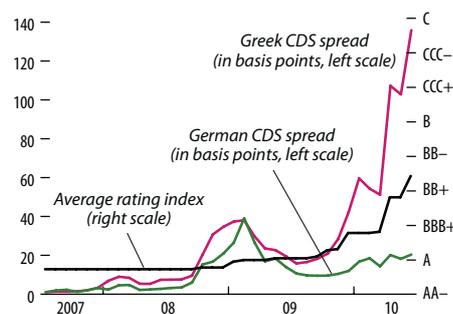
In late autumn 2009, markets became increasingly concerned about the outlook for Greece and its credit-worthiness. This was reflected in the market turmoil seen through 2010, and spreads remain elevated despite the support provided by the IMF program and European bailout. This box examines the information content of the rating actions undertaken for Greece and explores their links with observed changes in credit default swap (CDS) spreads.

The credit rating on Greece was relatively strong until October 2008—S&P had Greece’s A rating on stable outlook since November 2004, while Moody’s put Greece’s A1 rating on positive outlook in January 2007, with Fitch following suit (from an A rating) in March 2007. However, beginning with Fitch, which cut the outlook back to stable in October 2008, the credit rating agencies became increasingly negative on Greece. Notably, S&P put Greece on negative outlook in January 2009, followed by Moody’s cutting its positive outlook back to stable in February 2009. The full chronology of actions over this period is set out in the table. At the same time, CDS spreads on Greece began to diverge from the general market trend in the summer of 2009 (see figure).

Note: This box was prepared by Allison Holland.

Credit Default Swap (CDS) Spreads and Average Rating

(CDS: July 2007 = 100)



Sources: Bloomberg L.P.; and IMF staff estimates.

Note: The average rating shown on the right-hand side reflects the average of three rating agency (Fitch, Moody’s, and S&P) levels (shown are Fitch and S&P symbols; see Table 3.1 for corresponding Moody’s symbols). In addition, in order to capture more fully the information content of the outlook, the rating level is also adjusted by -0.3 ($+0.3$) for a negative (positive) outlook or negative (positive) watch.

To examine the information value of ratings in explaining Greek CDS spreads, a linear transformation is used to translate each rating into a number between 21 and 1. In addition, to capture more fully the information content of the outlook, following Monfort and Mulder (2000), the rating level is

mainly among the worst credits. This additional discrimination during crises has also been recognized in other studies (Sy, 2002).²⁷

The analysis of credit rating events suggests that ratings do in fact reflect information beyond that generally available to market participants (Box 3.7). However, most of the incremental information value is delivered through

²⁷The increasing influence of factors other than credit risk in spreads is evident in the declining explanatory power of ratings during the global crisis. For a decomposition of credit and noncredit components of spread changes, see Annaert and others (2010). See also the Bank of England (2010) discussion of the factors that might distort sovereign CDS spreads. All of this calls for some caution in interpreting CDS spread levels as indicators of the market’s assessment of sovereign default probabilities.

negative credit warnings (see Figure 3.6), rather than actual rating changes. Yet even though rating changes in general have little market impact, crossings of the investment-grade threshold lead to statistically significant widening of CDS spreads. This suggests that some of the market impact associated with rating changes is related to their “certification” value. In contrast, the results provide no support for the monitoring theory.

How Accurately Do Ratings Measure Credit Risk?

There are two dimensions along which credit rating accuracy could be assessed, namely their ability to rank order default risk, and how well their mapped hypothetical default probabilities match true default

Chronology of Greek Sovereign Credit Rating Actions, January 2009–August 2010

Date	Agency	Action
January 9, 2009	S&P	Outlook changed from stable to watch negative
January 14, 2009	S&P	Downgraded one notch to A-; outlook stable
February 25, 2009	Moody's	Outlook changed from positive to stable
May 12, 2009	Fitch	Outlook changed from stable to negative
October 22, 2009	Fitch	Downgraded one notch to A-; outlook remains negative
October 29, 2009	Moody's	Outlook changed from stable to review for downgrade
December 7, 2009	S&P	Outlook changed to watch negative
December 8, 2009	Fitch	Downgraded one notch to BBB+; outlook remains negative
December 16, 2009	S&P	Downgraded one notch to BBB+; remains on watch negative
December 22, 2009	Moody's	Downgraded one notch to A2; outlook negative
March 16, 2010	S&P	Outlook changed from watch negative to negative outlook
April 9, 2010	Fitch	Downgraded two notches to BBB-; outlook remains negative
April 22, 2010	Moody's	Downgraded one notch to A3; on review for downgrade
April 27, 2010	S&P	Downgraded three notches to BB+; outlook remains negative
June 14, 2010	Moody's	Downgraded four notches to Ba1; outlook stable

Sources: Fitch; Moody's; and Standard & Poor's.

adjusted by -0.3 for a negative outlook or watch and by $+0.3$ for a positive outlook or watch. The average of the three rating levels is shown in the figure.

Regressing the (log) level of CDS spreads indicates that there is significant explanatory power in the ratings.¹ Taking ratings as the sole explanatory vari-

¹As discussed in the main text, an exponential transformation is applied to each of the ratings series. The estimated coefficients have the expected sign and are statistically significant.

able, they appear to explain almost 70 percent of the CDS spreads, with the relationship contemporaneous rather than leading. However, taking into account that there are common market factors driving spreads using a two-stage process to isolate the idiosyncratic elements driving Greek CDS spreads (relative to German CDS spreads), ratings explain an additional 32 percent of the residual variation. Overall, these findings are in line with the aggregate findings on information content of ratings as reported in the main body of the chapter.

probabilities. When the CRAs evaluate their own performance, they focus on the first dimension—the discriminatory power of their rating system (that is, the power to differentiate ex ante between potential defaulters and nondefaulters) as well as on the stability of ratings. Their tests only intend to assess if defaults tend to take place among the lowest rating categories.

The discriminatory power of sovereign ratings is validated to some extent by the fact that all of the defaults are among noninvestment-grade sovereigns. Taking into account the difficulty in predicting rare events, Figure 3.7 shows that all 14 sovereign defaulters involving 12 countries between 1975 and 2009 had (S&P) ratings of BB- or below, that is, all noninvestment-grade, one year prior to default, and none in the investment-grade categories.

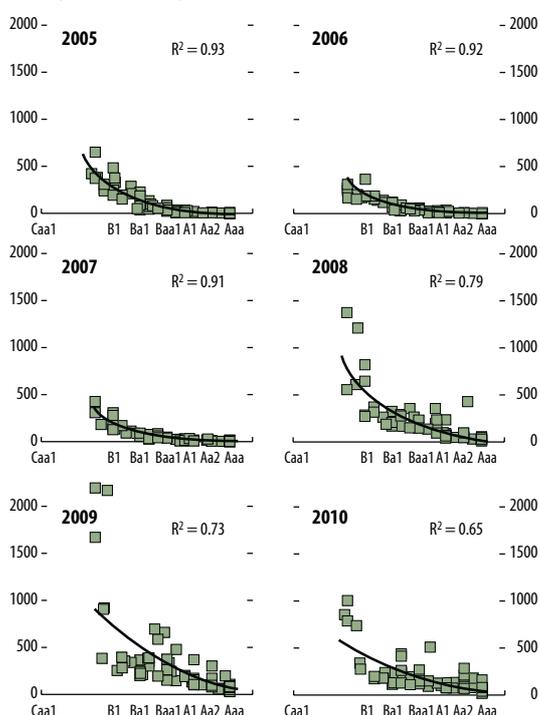
The point made above can be tested more formally with cumulative accuracy profile (CAP) curves and accuracy ratios (ARs), as done by Moody's (Sobehart, Keenan, and Stein, 2000) and S&P (2010a). The CAP curve is derived by plotting out the cumulative proportion of issuers by rating grade (starting by the lowest grade on the left) against the cumulative proportion of defaulters by rating grade. "Ideal" CAP curves (the red lines in Figure 3.8) look almost like vertical lines because all the defaulters should be among the lowest-rated issuers.²⁸ In the "random" curve, all defaults occur

²⁸In spite of the CAP curve's general use, it is not obvious that this ideal curve is a good estimate of "best" rating performance. Even good credits have positive default probabilities. This means

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Figure 3.5. Average Credit Default Swap Spread and Ratings for Countries Rated by Moody's, 2005–10
(CDS spread in basis points)



Sources: Markit; Moody's; and IMF staff calculations.

Note: CDS = credit default swap. Each data point represents a different sovereign's average credit rating and average CDS spread throughout the year. R^2 shows the proportion of the average CDS spreads' movement that can be attributed to credit ratings. Data for 2010 are through June 30, 2010.

randomly throughout the rating distribution (admittedly an unrealistically low bar for a CRA), so it lies along the diagonal (the green lines in Figure 3.8). The closer the CAP curve to the ideal curve, the better the discriminatory power of that CRA's ratings. The AR is the ratio of two areas: (1) the area bounded by the CAP curve and the random curve; and (2) the area bounded by the ideal curve and the random curve. An AR equal to 1 is equivalent to perfect discriminatory power while an AR equal to 0 implies no discriminatory power.²⁹

The S&P CAP curves for sovereigns at different risk horizons tend to suggest that, as expected, discriminatory power is a function of time, since some power is lost as the risk horizon increases (Figure 3.8). This loss of power is indicated by the ARs: 92 percent over the one-year horizon, 82 percent over three years, 80 percent over five, and 84 percent over 10. Hence, the CRAs are better at predicting defaults over short horizons than long ones. ARs that were calculated for S&P corporate ratings suggest that they are better at pinpointing potential defaulters among sovereign issuers than among corporates. The corporate-rating ARs over a one-year horizon are 77 percent for financials and 81 percent for nonfinancials (versus 92 percent for sovereigns), and 63 percent and 71 percent over five years (versus 80 percent).³⁰

A welcome contribution of the CRAs would be the calibration of ratings to target credit risk metrics, such as default probabilities, and the publication of validation tests against such standards. This would make the message embedded in a rating more transparent and would also allow more relevant tests of accuracy and—in the end—review of the quality of the work produced by CRAs. The Basel Committee on Banking Supervision (BCBS, 2005) suggests a number of cardinal accuracy tests, but they presuppose specific default probabilities for individual rating grades. However, the CRAs put little emphasis on such tests, preferring to

that the ideal curve (in which all defaults happen among the worst credits) does not measure "best" rating performance.

²⁹Engelmann, Hayden, and Tasche (2003) propose a statistical test of the accuracy ratios that measures the quality of credit rating models. However, the test requires that the sample contain at least 50 defaults and thus cannot be applied to the sovereign dataset.

³⁰The S&P sovereign ARs were estimated based on 1975–2009 data, and the corporate ARs based on 1981–2009 data.

focus on ordinal accuracy tests, because they do not target specific risk metrics for their ratings.³¹

An Examination of Rating Stability

There is an inevitable trade-off between rating accuracy and stability, but users have expressed a preference for stability. This is driven by the certification role played by ratings, and the transaction costs induced by trading when ratings change frequently. In an attempt to satisfy their users, CRAs use several mechanisms to promote stability. Though of less interest to CRAs, rating stability is important at a systemic level, since rating downgrades can be associated with forced sales.

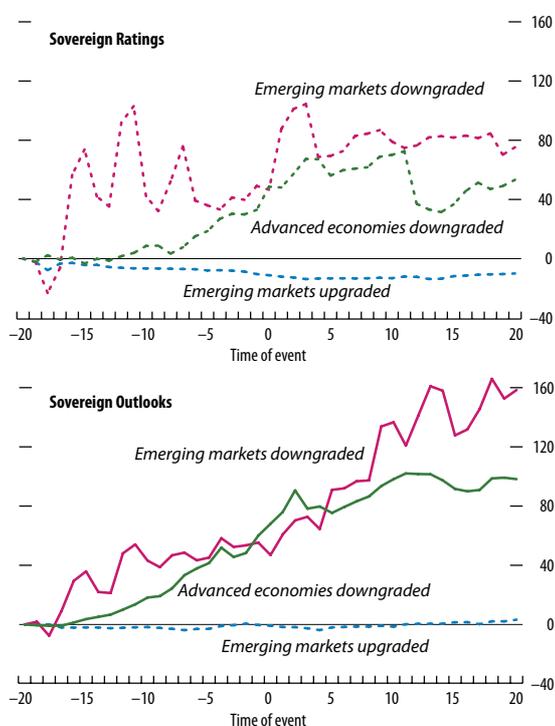
In practice, rating agencies seek to ensure rating stability by focusing on rank ordering credit risk, instead of rating to specific credit metrics. Hence, the impact of cyclical fluctuations on ratings is automatically muted. Also, CRAs generally try to rate “through the cycle,” as opposed to rating based on “point in time” information. Conceptually, this means that they rate based on the issuer’s ex-ante perceived ability to survive cyclical troughs, which provides a cushion against the impact of economic downturns. Lastly, the CRAs apply smoothing rules that, for example, change ratings only if (1) the anticipated rating change is expected to be persistent, and/or (2) the prescribed change is more than one notch (Cantor and Mann, 2007).

Figures 3.9 and 3.10 show that higher ratings are more stable than lower ones, and that sovereign ratings are more stable than corporate ones.³² Using S&P data from 1975, Figure 3.9 shows the average percent of ratings that remain at the same level over one-year horizons by rating grade. For example, 82.1 percent of A-rated sovereigns were still A-rated at the end of each year, versus 77.5 percent of the corporates. It clearly shows that the percent of unchanged ratings decreases

³¹Nevertheless, Moody’s, for example, conducts some cardinal accuracy assessments—investment-grade default rates over multiple horizons and average ratings of defaulting issuers up to three years prior to default (Cantor and Mann, 2003). Alternatively, cardinal accuracy tests could be conducted against the target default probabilities (in the case of Fitch and S&P) or expected losses (Moody’s), which have been used to rate structured credit products (Fender and Kiff, 2005).

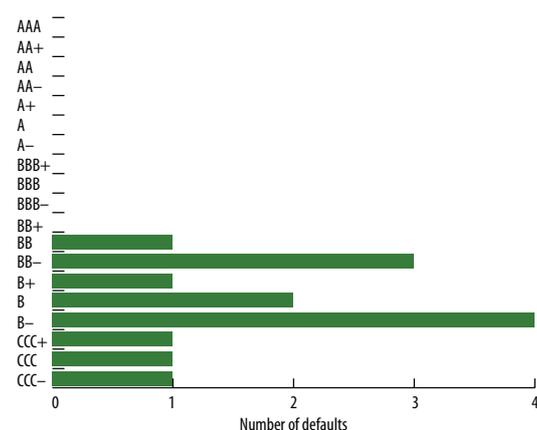
³²Figures 3.9 and 3.10 are based on S&P ratings, but similar results were found for Fitch and Moody’s ratings (see Kiff, Nowak, and Schumacher, forthcoming).

Figure 3.6. Impact of Change in Sovereign Ratings and Credit Warnings on Credit Default Swap Spread (CDS spread in basis points)



Sources: Markit; Moody’s; and IMF staff estimates.
Note: CDS = credit default swap. Solid lines indicate rating events that have a statistically significant impact on CDS spreads; dashed lines indicate insignificant events.

Figure 3.7. Ratings One Year Prior to Sovereign Default, 1975–2009

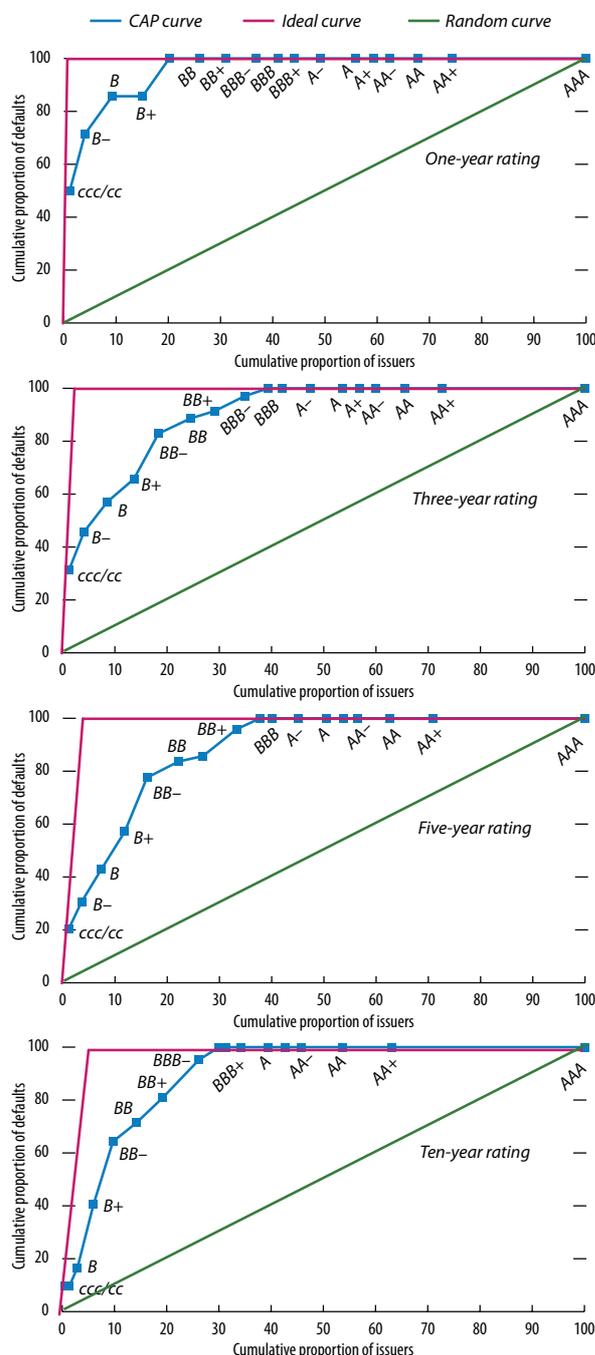


Source: Standard & Poor’s.

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Figure 3.8. Sovereign Rating Performance by Standard & Poor's
(In percent)



Source: Standard & Poor's.
Note: CAP = cumulative accuracy profile.

as rating categories decline. Figure 3.10 shows the average percent of ratings that are downgraded by three or more notches, a definition of “rating failure” suggested by Bhatia (2002) and S&P (2010b).³³ For example, 1.8 percent of A-rated sovereigns were downgraded three or more notches, versus 6.9 percent of corporates.

However, Figures 3.11 and 3.12 show that these long-term averages hide signs of significant rating instability during periods of market stress, suggesting that smoothing techniques work less well during such times. The figures summarize Moody’s upgrades and downgrades during the Asian crisis and the recent financial crisis. Sovereigns on the 45 degree line maintained their ratings while those below (above) were downgraded (upgraded).³⁴ The figures show that 68 percent of ratings remained unchanged during the Asian crisis and 63 percent during the current crisis (so far). Similar conclusions would be drawn from a similar analysis of Fitch and S&P sovereign rating transitions (Kiff, Nowak, and Schumacher, forthcoming). Focusing on the magnitude of the rating changes, Tables 3.4 and 3.5 show that big downgrades (three or more notches) have been concentrated in the investment-grade categories, even though these higher rating categories are supposed to be more stable than lower rating categories by design. All of this highlights the fact that risk is a forward-looking measure that—to be meaningful—needs to be conditioned on specific scenarios. While CRAs condition ratings to surviving a cyclical trough, they do not condition on crisis survival, which is reflected in the data.

Confronted with these evident “failures,” CRAs have been developing rating procedures that would condition a rating to the country’s ability to survive a crisis. However, it is not clear whether this methodology enhances stability beyond that provided by the TTC approach. Although Box 3.8 shows that TTC ratings are inherently more stable than PIT assessments, some of this stability is undermined by the aforementioned rating change smoothing rules. If the smoothing rule’s prescribed downgrade turns out to be persistent, and

³³The three or more notch stability threshold is also in line with a practice used by CRAs in their stability studies (Moody’s, 2010b).

³⁴Some caution must be exercised in interpreting Figures 3.11 and 3.12. Although the equivalent Fitch and S&P figures are very similar, the number of rated sovereigns has grown significantly.

the creditworthiness of the issuer has possibly worsened, a more abrupt downgrade is required. In other words, by attempting to smooth ratings, typical TTC methodologies run the danger of actually exacerbating procyclical cliff effects. Even “through the crisis” methodologies will be prone to these smoothing-induced cliff effects, although perhaps with less frequency, because of the more severe ex ante stress tests.

Conclusions and Policy Implications

The empirical analysis shows that CRAs do have an impact on the funding costs of issuers and consequently their actions can be a financial stability issue. Also, the theoretical analysis suggests that the way that CRAs try to smooth their rating changes may make them prone to procyclical cliff effects. Furthermore, the market impact of these rating changes is exacerbated by the overreliance on ratings in legislation, regulations, and private sector contracts. Beyond this “certification role” the empirical work shows that sovereign ratings do provide useful informational value. However, most of this is delivered through “outlooks,” “reviews” and “watches” that signal the likely direction and timing of future rating actions, as opposed to actual rating changes. Nevertheless, an examination of the widening of CDS spreads when ratings are downgraded through the investment-grade threshold confirms the importance of the certification role.

The empirical work has also shown that credit ratings quite accurately rank sovereign credit risk, but they should not be expected to be consistent with specific default probabilities or other quantitative default risk metrics. This is because CRAs do not target such specific metrics for their sovereign (or corporate) ratings, despite the fact that many ratings users, including regulators, assume that there are specific and stable relationships between ratings and these metrics.

While some advocate the elimination of the major CRAs’ issuer-pay business model, this compensation model is expected to stay for the foreseeable future.³⁵

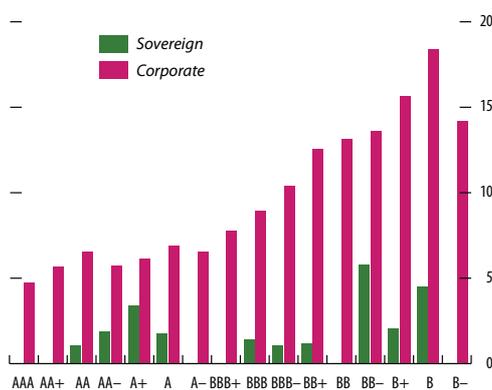
³⁵It offsets a more prevalent free-rider problem that would arise if the CRAs were to return to an investor-pay business model in an information environment where it is difficult to limit access. Nevertheless, additional policy work and research should be carried out to examine whether it is feasible to have an investor-pay model without free riders.

Figure 3.9. Average Proportion of S&P Sovereign Ratings Unchanged Over One Year (In percent)



Source: Standard & Poor's.
Note: Sovereign ratings for 1975–2009, and corporate ratings for 1981–2009.

Figure 3.10. Average Proportion of S&P Sovereign Ratings Downgraded More Than Two Notches Over One Year (In percent)

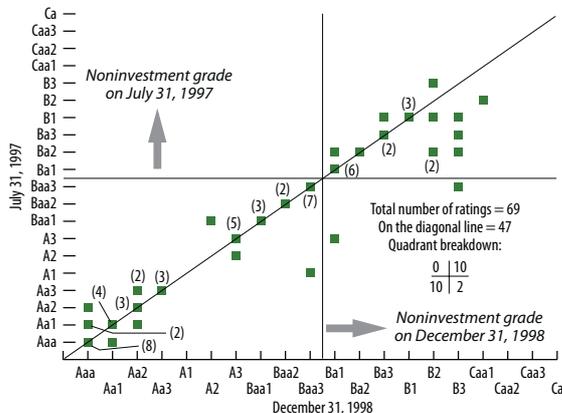


Source: Standard & Poor's.
Note: Sovereign ratings for 1975–2009, and corporate ratings for 1981–2009.

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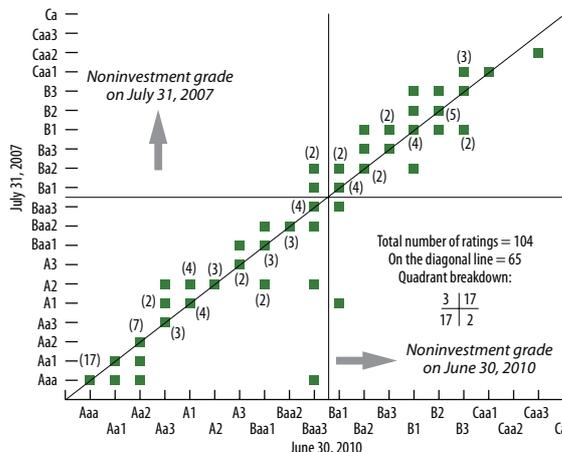
Figure 3.11. Asian Crisis: Sovereigns Rated by Moody's between July 31, 1997 and December 31, 1998



Source: Moody's.

Note: The numbers in parentheses indicate the number of issuers associated with that rating.

Figure 3.12. Current Crisis: Sovereigns Rated by Moody's between July 31, 2007 and June 30, 2010



Source: Moody's.

Note: The numbers in parentheses indicate the number of issuers associated with that rating.

Rather, a better way forward is a combination of gradually reducing the regulatory reliance on credit ratings to the extent possible, while at the same time enhancing CRA regulatory oversight. Also, the mitigation of procyclical cliff effects should be a priority. In that regard, key policies to deal with these issues include the following:

Reduce rating reliance. Policymakers should continue their efforts to reduce their own reliance on credit ratings, and wherever possible remove or replace references to ratings in laws and regulations, and in central bank collateral policies. They should discourage the mechanistic use of ratings in private contracts, including investment manager internal limits and investment policies. However, they should recognize that smaller and less sophisticated investors and institutions that do not have the economies of scale to do their own credit assessments will inevitably continue to use ratings extensively. Hence, any steps to reduce overreliance on ratings should differentiate both according to the size and sophistication of the institution, and the instruments concerned.

Increase the oversight of CRAs when their ratings are used in regulations. It is important that the authorities continue efforts to push CRAs to improve their procedures, including transparency, governance, and the mitigation of conflict of interest. In particular, CRAs whose ratings are used in the Basel II standardized approach should have to meet similar validation standards as those required for banks that use their own internal ratings. CRAs should be encouraged to calibrate ratings to target credit risk metrics, such as default probabilities, and publish validation tests against such standards. CRAs should also be transparent about the quantitative measures they calibrate in the rating process and how they validate their ratings.

Encourage accurate through-the-cycle approaches. CRAs should be discouraged from over-smoothing downgrades (and upgrades) that effectively merely delay what is likely to be inevitable. Encouraging more accurate smoothing methods could be part of the enhanced oversight and validation testing. If the rating change eventually does take place, it can be more abrupt and cliff-like if the credit's situation has continued to deteriorate (or improve). Remaining cliff effects and what may be labeled rating failures should be addressed by emphasizing that risk is a forward-looking dimension conditional on the

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Table 3.4. Sovereign Rating “Failures” during the 1997–98 Asian Crisis

	Fitch			Moody's			S&P		
	Start	End	Notches	Start	End	Notches	Start	End	Notches
Indonesia	BBB-	B-	-6	Baa3	B3	-6	BBB	B-	-7
Korea ¹	AA-	B-	-12				AA-	B+	-10
Korea ¹	B-	BBB-	6				B+	BBB-	4
Malaysia				A1	Baa3	-5	A+	BBB-	-5
Romania				Ba3	B3	-3	BB-	B-	-3
Russia	BB+	B-	-5	Ba2	B3	-4	BB-	B-	-3
Thailand				A2	Ba1	-5	A	BBB-	-4
Venezuela				Ba2	B2	-3			

Sources: Fitch; Moody's; and Standard & Poor's.

Note: Table shows successive downgrades or upgrades by three or more notches in aggregate during any rolling 12-month period, excluding downgrades or upgrades into, out of, within, or between the CCC or Caa categories downward; 1997 through January 1999.

¹Korea was downgraded by Fitch and S&P in October 1997–December 1997; and then a series of upgrades occurred between February 1998 and January 1999.

Table 3.5. Sovereign Rating “Failures” during the 2007–10 Crisis

	Fitch			Moody's			S&P		
	Start	End	Notches	Start	End	Notches	Start	End	Notches
Greece	A	BBB-	-4	A1	Ba1	-6	A-	BB+	-4
Iceland ¹	A+	BBB-	-5	Aaa	Baa1	-7	A+	BBB-	-5
Iceland ¹				A1	Baa3	-5			
Ireland	AAA	AA-	-3						
Latvia	BBB+	BB+	-3	A2	Baa3	-4	BBB+	BB	-4
Lithuania	A	BBB	-3						
San Marino	AA	A	-3						

Sources: Fitch; Moody's; and Standard & Poor's.

Note: The table shows successive downgrades or upgrades by three or more notches in aggregate during any rolling 12-month period, excluding downgrades or upgrades into, out of, within, or between the CCC or Caa categories downward; 2007 through June 2010.

¹The Iceland downgrades by Moody's involve overlapping periods. The first period includes downgrades from May 2008 through end-December 2008, while the second period includes downgrades from December 1, 2008 through end-November 2009. That is, both periods include the three-notch downgrade on December 4, 2008.

macroeconomic and financial environment scenario that may change more rapidly than typical TTC approaches accommodate.

The analysis of the factors that underlie sovereign ratings shows that CRAs take into account a broad array of fundamental factors and weigh them very dynamically. Although there are some methodological differences among the big three CRAs, their ratings do track each other very closely. Also, the recent Greek downgrades point to some important data issues, particularly with respect to accuracy and coverage (for example contingent liabilities as provided by sovereigns). Hence, as was also the case with structured credit product issuance, sovereigns should do more to provide relevant and timely information to CRAs and other market participants to enable them to conduct their own independent credit analysis. This should include disclosure of contingent liabilities. In that regard, the IMF encourages countries to prepare and

make publicly available a fiscal risk statement (Everaert and others, 2009).

Credit ratings can play an important and positive role in capital markets, primarily by using their economies of scale to provide cost-effective information services that increase the pool of potential borrowers and promote liquid markets. For the most part, they have been a positive force in fixed-income markets, particularly in their traditional corporate markets, as well as in the markets for sovereign bonds. However, the structured finance rating crisis has exposed some flaws in the system (rating overreliance), and some concerning aspects of the CRAs' own rating philosophies (rating smoothing). However, these flaws can be rectified, although admittedly it will not be easy. In particular, reducing rating overreliance will require finding appropriate replacements, and it will be important that the authorities remain wary of unintended adverse consequences.

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Box 3.7. Empirical Tests of Rating Information Value

In summarizing the empirical tests of rating information value, this box shows that credit rating agencies provide information and certification services to investors, with credit outlooks and watch lists as the main instruments to deliver information.

The theoretical literature asserts that credit rating agencies influence financial markets by providing three types of services: informational, certification, and monitoring. This box assesses the impact of sovereign rating events on credit default swap (CDS) spreads to gauge the importance of these services to market participants. The main analysis covers 72 sovereigns for which both Moody's ratings and the relevant CDS data are available from January 2005 to July 2010.¹ This includes 194 credit rating events: 26 downgrades, 57 upgrades, 71 positive outlooks/reviews for upgrade, and 40 negative outlooks/reviews for downgrade. In addition, the box reviews the impact of rating actions by S&P and Fitch. Both event studies and causality tests are used.

The event study measures the impact of rating changes and credit warnings (that is, "outlooks," "reviews," and "watches") by averaging cumulative changes in CDS spreads across individual rating events. Changes in CDS spreads are analyzed within an event window of 41 days, starting from 20 days before the event until 20 days after the event. Spread changes are calculated against the level at the beginning of the event window ($t = 0$) to make them comparable across events and sovereigns. For tractability, the sovereigns are divided into advanced economies and emerging markets. Hence, within each group, the relationship between credit ratings and CDS spreads can be assumed to be linear, so that a two-notch downgrade

leads to spread widening that is twice as large as that associated with a one-notch downgrade. However, the results are robust to relaxing this assumption, as discussed below. The significance is tested using a standard one-sided t -test, with the hypothesis that negative rating actions (downgrades, negative outlooks, and reviews for downgrade) should lead to an increase in spreads, and positive rating actions (upgrades, positive outlooks, and reviews for upgrade) to a decrease.

The baseline results for Moody's (see first table) confirm the agencies' traditional role as information providers. However, most of the incremental information value is transmitted through negative credit warnings (see Figure 3.6), rather than actual rating changes.² The event study found very little market reaction to positive rating actions, in contrast to Cantor and Packer (1996), Reisen and von Maltzan (1999), and Ismailescu and Kazemi (forthcoming). Yet even though rating changes in general have little market impact, a downgrade through the investment-grade classification boundary is associated with a statistically significant widening of CDS spreads. This suggests that some of the market impact associated with rating changes is related to their "certification" value. In contrast, the results provide no support for the monitoring theory.³

The event study results are robust to (1) shortening or lengthening the event window to 10 days before and after or 45 days before and after, from the base of 20 days; (2) controlling for global volatility (as proxied by the S&P 500 VIX), the liquidity risk premium (as proxied by the U.S. LIBOR), and the daily business conditions in the United States (as tracked by the Aruoba-Diebold-Scotti business conditions index; see Aruoba, Diebold, and Scotti, 2009); (3) using natural logarithms of spreads to account for the nonlinear relationship between the CDS spreads and rating/credit warning events; (4) splitting the sample into the pre- and during-crisis periods; and (5) disaggregating announcements for

Note: This box was prepared by Sylwia Nowak, based on Kiff, Nowak, and Schumacher (forthcoming).

¹The countries are Argentina, Australia, Austria, Belgium, Bulgaria, Brazil, Tunisia, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Germany, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Greece, Guatemala, Iceland, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Korea, Latvia, Lebanon, Lithuania, Malaysia, Malta, Mexico, Morocco, Netherlands, Norway, New Zealand, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Hungary, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, United Kingdom, Ukraine, Uruguay, United States, Venezuela, and Vietnam.

²The predictive power of S&P "watch" and "outlook" notices has been documented in Hessol, Erturk, and Ontko (2007) and Chambers (2010). Hamilton and Cantor (2005) and Hartelius, Kashiwase, and Kodres (2008) document similar results for Moody's "outlook" notices.

³Hill and Faff (2008) reached a similar conclusion using national stock market indices instead of CDS spreads.

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The Empirical Tests of Rating Information Value

	Information Services	Certification Services	Monitoring Services
Theory	Ratings include new information ➔ market prices react to rating actions.	Classifying securities into investment-grade and high-yield grade ➔ market prices react to rating changes in and out of the investment grade.	Rating warnings influence issuers to take corrective actions to avert downgrades ➔ market prices react to rating confirmations.
Test	Event study of the impact of credit rating and credit warning changes on credit default swap (CDS) spreads.	Event study of the impact of rating changes and downgrades/upgrades in and out of investment grade on CDS spreads.	Event study of the impact of downgrades/upgrades preceded/not preceded by a matching warning or review on CDS spreads.
Results	Negative credit warning announcements are followed by statistically significant spread widening; 100 basis points for advanced economies and 160 basis points for emerging markets. The impact of rating changes is insignificant (see Figure 3.5).	Downgrades through the investment grade threshold lead to statistically significant CDS spread widening of 38 basis points.	No evidence

Sources: Fitch; Moody's; and IMF staff estimates.

Multi-Agency Dynamics

	The first credit rating agency to take a negative rating action:			The last credit rating agency to take a negative rating action:		
	Fitch	Moody's	S&P	Fitch	Moody's	S&P
All countries	28	13	59	36	36	28
Advanced economies	22	4	74	30	52	17
Emerging economies	32	17	51	39	27	34

Sources: Fitch; Moody's; Standard & Poor's; and IMF staff estimates.

Note: The table reports the frequencies with which each credit rating agency (CRA) either acts first or last within each rating adjustment cycle, defined as either until three months following the initial rating adjustment or until the originating CRA takes another action, depending on which event comes first.

investment/noninvestment-grade sovereigns as opposed to advanced economies and emerging markets.

Statistical causality tests yield results consistent with event study results by finding information about preceding negative credit warning helps predict changes in CDS spreads of emerging economies, even when the past values of CDS spreads are accounted for. The causality tests are panel Granger-causality tests (Granger, 1969; and Hurlin and Venet, 2001), estimated using the generalized method of moments with fixed effects. Instruments used are lagged S&P 500 VIX, lagged U.S. LIBOR, lagged Aruoba-Diebold-Scotti business conditions index for the United States, and CDS spreads lagged two periods.

An extension of the analysis to sovereign rating actions by S&P and Fitch largely confirms the above findings while pointing to two important differences. First, Moody's most frequently precedes its rating changes with credit warnings (27 percent of rating changes are preceded by corresponding credit watches, compared

with 14 percent in the case of S&P and only 8 percent in the case of Fitch). This suggests different information value of downgrades and credit warnings across the CRAs. Second, Moody's tends to lag behind Fitch and S&P. An analysis of the dynamics of rating adjustments, as summarized in the second table, reveals that Moody's and Fitch tend to follow S&P negative rating actions more often than S&P follows the others. This is consistent with conclusions of Güttler (2009) and Alsakka and ap Gwilym (forthcoming) that Moody's is more likely to adjust its rating given a rating change by S&P. In addition, on occasions when Moody's leads the rating adjustment cycle, it tends to issue credit watches rather than actual downgrades. Consequently, Moody's downgrades have no significant impact on financial markets while Fitch's and S&P's do. This result, consistent with Brooks and others (2004), indicates that markets react to new information but not all CRAs convey new information through the same channels.

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Box 3.8. Point-in-Time versus Through-the-Cycle Credit Ratings

This box uses a simple contingent claims analysis (CCA) framework to compare through-the-cycle (TTC) and point-in-time (PIT) credit ratings. It shows that although TTC ratings are more stable than PIT ratings, credit rating agency (CRA) attempts to smooth TTC-prescribed rating changes can generate procyclical cliff effects.

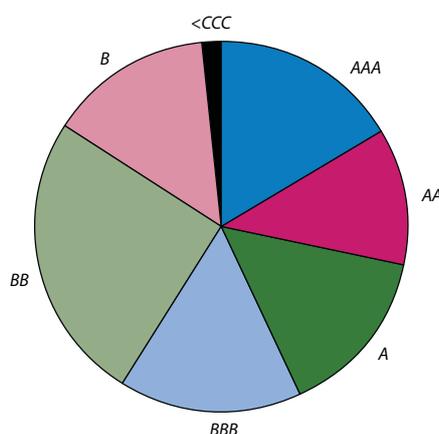
In the CCA framework, a sovereign defaults when the value of its assets falls through a distress threshold that is related to its liabilities (Gray, Merton, and Bodie, 2007).¹ The simple model used here is based on Loeffler (2004) and assumes that asset values are driven by (1) the sovereign's fundamentals and (2) cyclical factor fluctuations. Conceptually, the PIT rating process involves estimating the difference between future values of the assets and liabilities ("distance to default"), and mapping this difference into a default-probability-related credit rating.²

A TTC rating process estimates the distance to default based on fundamental values but imposes a stress scenario on the cyclical component. In a second stage, the CRAs typically apply a smoothing rule to rating changes to avoid overshooting or subsequent reversals. In other words, it is a two-step process in which ex-ante ratings are based on fundamentals and a stress scenario and ex-post rating changes are smoothed, and not adjusted immediately. For purposes of this box, the factor that represents the sovereign's "fundamentals" is assumed to follow a random walk, whereas the cyclical component is assumed to follow an autoregressive process.

The pie charts show the distribution of actual S&P sovereign ratings (top) and of the model-implied ratings under the TTC approach under various net asset value and volatility assumptions (bottom). One can see that the parameters underlying the model provide a realistic set of assumptions for the next set of experiments.

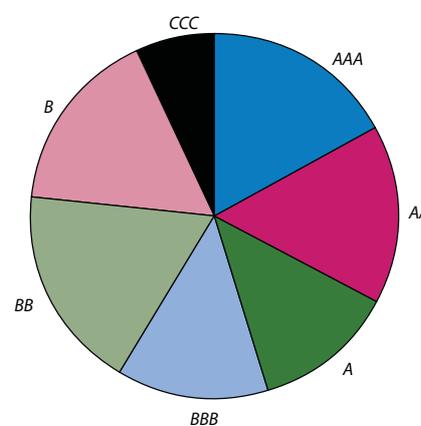
The main interest of this analysis lies in how ratings evolve over time and how well the two approaches

Actual Rating Grade Distribution



Source: IMF staff estimates based on Standard & Poor's data.

Model-Implied Through-the-Cycle Rating Grade Distribution



Source: IMF staff estimates.

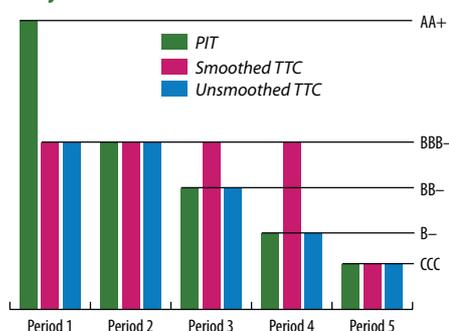
predict future defaults. It therefore assumes that future asset values do not evolve according to their expected values but instead come in well below. While the PIT approach would imply immediate downgrades for this case, a CRA following the TTC approach would typically wait to see if the deviation is only of a cyclical nature. For example, in the case below downgrades are assumed to occur only if (1) the rating change is

Note: This box was prepared by Michael Kisser, based on Kiff, Kisser, and Schumacher (forthcoming).

¹In the case of a sovereign, assets include foreign reserves and fiscal assets such as the present value of taxes and other revenues, and liabilities include base money, public debt (local and foreign currency), and guarantees (explicit and implicit).

²In this box the mapping of distance-to-default-derived default probabilities into ratings is done using Moody's idealized probabilities such as those in Table 3.1.

Impact of Rating Approaches on Downgrade Trajectories



Source: IMF staff estimates.
Note: PIT = point in time; TTC = through the cycle.

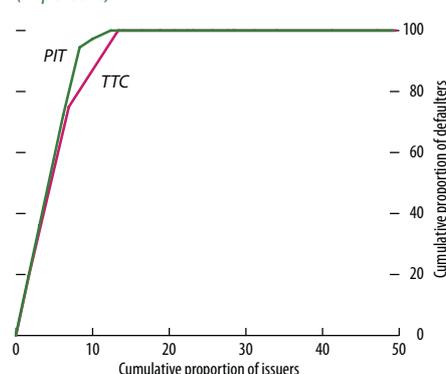
expected to be persistent and (2) the implied change is larger than one notch. This is one of several smoothing rules discussed in Cantor and Mann (2006), which also accounts for the empirically documented fact that CRAs are slow in adjusting their ratings (Loeffler, 2005). Clearly, other definitions could be employed.³

The figure above on stability visualizes rating downgrades under the PIT and smoothed TTC methodologies and compares them to the case in which a CRA switches from a TTC to a PIT rating method once the initial stress scenario is breached (“unsmoothed TTC”). One can see that ratings decline faster under the PIT approach whereas a downgrade is less likely if the CRA followed a TTC approach. The intuitive reason is that TTC ratings built in a pessimistic forecast so the rating is already lower and does not have to fall as much as the more “optimistic” PIT ratings would imply.

However, as time passes the PIT rating would eventually drop below the smoothed TTC rating (Period 3), which is precisely the point when the smoothed TTC approach becomes prone to potential cliff effects. By not reacting to new information in Periods 3 and 4, the TTC ratings would drop from BBB- to CCC in Period 5, thereby generating a rating downgrade of eight notches. From a stability perspective it would therefore be optimal if a CRA followed the TTC approach ex ante but would immediately adjust the rating once the initial forecast has been breached.

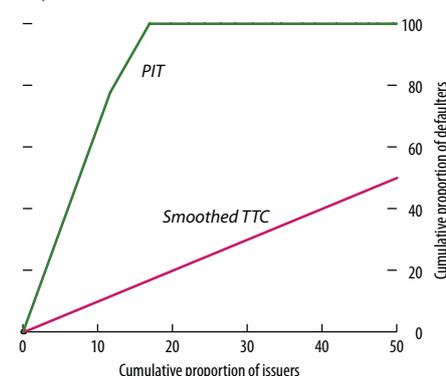
³Further details can be found in Altman and Rijken (2006), Loeffler (2004 and 2005), and Carey and Hrycay (2001).

Cumulative Accuracy Profile Curve for PIT and TTC Ratings for Defaults at the End of Period 1 (In percent)



Source: IMF staff estimates.
Note: PIT = point in time; TTC = through the cycle.

Cumulative Accuracy Profile Curve for PIT and Smoothed TTC Ratings for Defaults at the End of Period 2 (In percent)



Source: IMF staff estimates.
Note: PIT = point in time; TTC = through the cycle.

Finally, the analysis looks at how well both approaches predict future defaults by computing the cumulative accuracy profile (CAP) for defaults taking place at the end of Periods 1 and 2. It turns out that initially the TTC approach is only slightly less accurate at forecasting future defaults (see top figure above) but as time passes the PIT approach becomes clearly more accurate (see second figure above) as it immediately incorporates new information into its

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Box 3.8 (concluded)

ratings whereas the TTC approach only reacts with a lag due to its smoothing policy.

In summary, the experiment has shown that, from an ex-ante viewpoint, the TTC approach produces more stable and only slightly less accurate ratings when current net asset values are higher than in the stress scenario. However, once ratings drop below those implied by the stress scenario, the smoothed TTC approach is less accurate at predicting defaults and it runs the risk of generating rating cliff effects that may lead to dangerous second-round liquidity effects.

Current discussions on the usefulness of the TTC approach should therefore focus on the reaction to new information when net asset values drop below those implied by the initial stress scenario. The implementation of a “through the crisis” methodology, which has been mentioned by the CRAs themselves, seems to require a more severe stress test ex ante. However, it currently does not address the slow adjustment typically taking place once the cushion built in by a TTC methodology is eroded, nor does it address the potential for cliff effects created by smoothing policies.

Annex 3.1. Credit Rating Agencies around the World¹

A.M. Best Company, Inc. (U.S.)
Agusto & Co. Ltd. (Nigeria)
Ahbor Rating (Uzbekistan)
Apoyo & Asociados Internacionales S.A.C. (Peru)
Bank Watch Ratings S.A. (Ecuador)
BRC Investor Services S.A. (Columbia)
Calificadora de Riesgo, PCA (Uruguay)
Capital Intelligence, Ltd. (Cyprus)
Caribbean Information & Credit Rating Services Ltd. (CariCRIS) (Caribbean)
Central European Rating Agency (CERA) (a/k/a: Fitch Polska, S.A., Poland)
Cerved Group (Italy)
Chengxin International Credit Rating Co., Ltd. (China)
China Lianhe Credit Rating, Co. Ltd. (China)
Clasificadora de Riesgo Humphreys, Ltda. (Chile)
Class y Asociados S.A. Clasificadora de Riesgo (Peru)
CMC International, Ltd. (Nigeria)
Companhia Portuguesa de Rating, SA (CPR) (Portugal)
Credit Analysis & Research Ltd (CARE) (India)
Credit-Rating Agency: A Ukrainian rating agency (Ukraine)

Credit Rating Agency of Bangladesh, Ltd. (CRAB) (Bangladesh)
Credit Rating Information and Services, Ltd. (CRISL) (Bangladesh)
CRISIL, Ltd. (a/k/a: Credit Rating Information Services of India, India)
Dagong Global Credit Rating Co., Ltd. (China)
Demotech, Inc. (U.S.)
Dominion Bond Rating Service (DBRS) (Canada)
Duff & Phelps de Colombia, S.A., S.C.V (Columbia)
Ecuability, SA (Ecuador)
Egan-Jones Rating Company (U.S.)
Equilibrium Clasificadora de Riesgo (Peru)
European Rating Agency, a.s. (Slovak Republic)
European Rating Agency (ERA) (U.K.)
Feller Rate Clasificadora de Riesgo (Chile)
Fitch Ratings, Ltd. (U.S./U.K.)
Global Credit Rating Co. (South Africa)
HR Ratings de Mexico, S.A. de C.V. (Mexico)
Interfax Rating Agency (IRA) (Russia)
Investment Information and Credit Rating Agency (ICRA) (India)
Islamic International Rating Agency, B.S.C. (IIRA) (Bahrain)
Istanbul International Rating Services, Inc. (a/k/a: TurkRating, Turkey)
Japan Credit Rating Agency, Ltd. (JCR) (Japan)
JCR Avrasya Derecelendime A.S. (a/k/a: JCR Eurasia Rating, Turkey)
JCR-VIS Credit Rating Co. Ltd. (Pakistan)

¹The main source of this annex is DefaultRisk.com as of October 2009.

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Kobirate Uluslararası Kredi Derecelendirme ve Kurumsal Yönetim Hizmetleri A.Ş. (a/k/a/ Kobirate, Turkey)

Korea Investors Service, Inc. (KIS) (Korea)

Korea Ratings Corporation (a/k/a: Korea Management Consulting and Credit Rating Corp. (KMCC) (Korea)

LACE Financial Corporation (U.S.)

Lanka Rating Agency, Ltd. (LRA) (Sri Lanka)

Malaysian Rating Corporation Berhad (MARC) (Malaysia)

Mikuni & Co., Ltd. (Japan)

Moody's Investors Service (U.S.)

National Information & Credit Evaluation, Inc. (NICE) (Korea)

Onicra Credit Rating Agency of India, Ltd. (India)

P.T. Kasnic Credit Rating Indonesia—Indonesia (Indonesia)

P.T. PEFINDO Credit Rating Indonesia (a/k/a: PT Pemingkat Efek Indonesia, Indonesia)

Pacific Credit Rating (PCR) (a/k/a: Clasificadora de Riesgo Pacific Credit Rating S.A.C., Peru)

Pakistan Credit Rating Agency, Ltd. (PACRA) (Pakistan)

Philippine Rating Services, Corp. (PhilRatings) (Philippines)

RAM Rating Services Berhad (RAM) (f/k/a: Rating Agency Malaysia Berhad, Malaysia)

Rapid Ratings International, Inc. (Australia/New Zealand)

Rating and Investment Information, Inc. (R&I) (Japan)

Realpoint, LLC (U.S.)

Rus Ratings (Russia)

Saha Kurumsal Yönetim ve Kredi Derecelendirme Hizmetleri A.Ş. (Turkey)

Seoul Credit Rating & Information, Inc. (SCI) (Korea)

Shanghai Credit Information Services Co., Ltd. (China)

Shanghai Far East Credit Rating Co., Ltd. (China)

SME Rating Agency of India Limited (SMERA) (India)

Sociedad Calificadora de Riesgo Centroamericana, S.A. (SCRiesgo) (Costa Rica)

Standard and Poor's (S&P) (U.S.)

Taiwan Ratings Corp. (TCR) (Taiwan Province of China)

Thai Rating and Information Services Co., Ltd. (TRIS) (Thailand)

TheStreet.com Ratings, Inc. (a/k/a: Weiss Ratings, Inc., U.S.)

TCR Kurumsal Yönetim ve Kredi Derecelendirme Hizmetleri A.S. (a/k/a: Türk KrediRating (TCRating), Turkey)

Veribanc, Inc. (U.S.)

References

- Afonso, António, Pedro Gomes, and Philipp Rother, 2007, "What 'Hides' Behind Sovereign Debt Ratings?" ECB Working Paper Series No. 711 (Frankfurt: European Central Bank).
- Allen, Mark, Christoph B. Rosenberg, Christian Keller, Brad Setser, and Nouriel Roubini, 2002, "A Balance Sheet Approach to Financial Crisis," IMF Working Paper 02/210 (Washington: International Monetary Fund).
- Alsakka, Rasha, and Owain ap Gwilym, forthcoming, "Leads and Lags in Sovereign Credit Ratings," *Journal of Banking and Finance*.
- Altman, Edward I., and Herbert A. Rijken, 2006, "A Point-in-Time Perspective on Through-the-Cycle Ratings," *Financial Analysts Journal*, Vol. 62, No. 1, pp. 54–70.
- Annaert, Jan, Marc De Ceuster, Patrick Van Roy, and Cristina Vespro, 2010, "What Determines Euro Area Bank CDS Spreads?" National Bank of Belgium Working Paper No. 190.
- Arezki, Rabah, Bertrand Candelon, and Amadou Sy, forthcoming, "Sovereign Ratings News and Financial Markets Spillovers," IMF Working Paper (Washington: International Monetary Fund).
- Aruoba, S. Boragan, Francis X. Diebold, and Chiara Scotti, 2009, "Real-Time Measurement of Business Conditions," *Journal of Business and Economic Statistics*, Vol. 27, No. 4, pp. 417–27.
- Bank of England, 2010, "Markets and Operations," *Quarterly Bulletin* (London, Q1).
- Basel Committee on Banking Supervision (BCBS), 2005, "Studies on the Validation of the Internal Rating Systems," BCBS Working Papers No. 14 (Basel: Basel Committee on Banking Supervision).
- , 2006, "International Convergence of Capital Measurement and Capital Standards: A Revised Framework—Comprehensive Version" (Basel: Basel Committee on Banking Supervision).
- Becker, Bo, and Todd Milbourn, 2010, "How Did Increased Competition Affect Credit Ratings?" April. Available via

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- the Internet: <http://apps.olin.wustl.edu/faculty/milbourn/BeckerMilbournApril2010.pdf>.
- Bergevin, Philippe, 2010, "Addicted to Ratings: The Case for Reducing Governments' Reliance on Credit Ratings," C.D. Howe Institute Backgrounder No. 130 (Toronto: C. D. Howe Institute).
- Bhatia, Ashok Vir, 2002, "Sovereign Credit Ratings Methodology: An Evaluation," IMF Working Paper 02/170 (Washington: International Monetary Fund).
- Bongaerts, Dion, K. J. Martijn Cremers, and William Goetzmann, 2009, "Multiple Ratings and Credit Spreads," NBER Working Paper No. 15331 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Boot, Arnoud W. A., Todd T. Milbourn, and Anjolein Schmeits, 2006, "Credit Ratings as Coordination Mechanisms," *Review of Financial Studies*, Vol. 19, No. 1, pp. 81–118.
- Cantor, Richard, and Christopher Mann, 2003, "Measuring the Performance of Corporate Bond Ratings," Moody's Investors Service Special Comment (New York: Moody's Investors Service, April). Available via the Internet: <http://ssrn.com/abstract=996025>.
- , 2007, "Analyzing the Tradeoff between Ratings Accuracy and Stability," *Journal of Fixed Income*, Vol. 16, No. 4, pp. 60–68.
- Cantor, Richard, and Frank Packer, 1994, "The Credit Rating Industry," *FRBNY Quarterly Review*, Vol. 19, No. 2, pp. 1–26 (New York: Federal Reserve Bank of New York).
- , 1996, "Determinants and Impact of Sovereign Credit Ratings," *FRBNY Economic Policy Review*, Vol. 2, No. 2, pp. 37–54 (New York: Federal Reserve Bank of New York).
- Carey, Mark, and Mark Hrycay, 2001, "Parameterizing Credit Risk Models with Rating Data," *Journal of Banking and Finance*, Vol. 25, No. 1, pp. 197–270.
- Chambers, John, 2010, "Outlooks: The Sovereign Credit Weathervane, 2009/2010 Update," Standard & Poor's RatingsDirect, April 20. Available via the Internet (by subscription): [www2.standardandpoors.com/portal/site/sp/en/la/page.topic/ratings_sov/2,1,8,0,0,0,0,0,0,3,1,0,0,50,0,0.html](http://www.standardandpoors.com/portal/site/sp/en/la/page.topic/ratings_sov/2,1,8,0,0,0,0,0,0,3,1,0,0,50,0,0.html).
- Davis Polk, 2010, "Summary of the Dodd-Frank Wall Street Reform and Consumer Protection Act, Passed by the House of Representatives on June 30, 2010," July 9. Available via the Internet: <http://www.davispolk.com/publications/list.aspx>.
- Engelmann, Bernd, Evelyn Hayden, and Dirk Tasche, 2003, "Testing Rating Accuracy," *Risk*, January, pp. 82–86. Available via the Internet: www.german-zscore.de/docs/engelmann_2003.pdf.
- European Central Bank (ECB), 2008a, "Technical Specifications for the Temporary Expansion of the Central Framework," ECB Press Release, October 17.
- , 2008b, "The Implementation of Monetary Policy in the Euro Area: General Documentation on Eurosystem Monetary Policy Instruments and Procedures," November.
- , 2009, "Guideline of the European Central Bank of 20 January 2009 Amending Guideline ECB/2000/7 on Monetary Policy Instruments and Procedures of the Eurosystem," Official Journal of the European Central Bank, February.
- Everaert, Greetje, Manal Fouad, Edouard Martin, and Ricardo Velloso, 2009, "Disclosing Fiscal Risks in the Post-Crisis World," IMF Staff Position Note 09/18 (Washington: International Monetary Fund).
- Federal Register, 2008, *Securities and Exchange Commission: References to Ratings of Nationally Recognized Statistical Rating Organizations; Security Ratings; Proposed Rules*, Part IV, July 11, Available via the Internet: www.federalregister.gov/articles/2008/07/11/E8-15280/references-to-ratings-of-nationally-recognized-statistical-rating-organizations.
- Fender, Ingo, and John Kiff, 2005, "CDO Rating Methodology: Some Thoughts on Model Risk and its Implications," *Journal of Credit Risk*, Vol. 1, No. 3, pp. 37–58.
- Ferri, Giovanni, Li-gang Liu, and Joseph E. Stiglitz, 1999, "The Procyclical Role of Rating Agencies: Evidence from the East Asian Crisis," *Economic Notes*, Vol. 28, No. 3, pp. 335–55.
- Fitch Ratings, 2010a, "Sovereign Rating Methodology," Fitch Ratings Master Criteria Report, August 16. Available via the Internet (by subscription): www.fitchratings.com/creditdesk/reports/report_frame.cfm?rpt_id=547765.
- , 2010b, "Definitions of Ratings and Other Forms of Opinion," August. Available via the Internet: www.fitchratings.com/web_content/ratings/fitch_ratings_definitions_and_scales.pdf.
- Fons, Jerome S., 2002, "Understanding Moody's Corporate Bond Ratings and Rating Process," Moody's Investors Service Special Comment, May. Available via the Internet: <http://v3.moodys.com/sites/products/AboutMoodyRatingsAttachments/2001400000389218.pdf?frameOfRef=corporatefor>.
- , 2004, "Tracing the Origins of 'Investment Grade'," Moody's Investors Service Special Report, January. Available via the Internet: www.moodys.com.br/brasil/pdf/InvGradeOrigins.pdf.
- Granger, Clive W. J., 1969, "Investigating Causal Relations by Econometric Models and Cross-spectral Methods," *Econometrica*, Vol. 37, No. 3, pp. 424–38.

IMF - Global Financial Stability Report - autumn 2010

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- Gray, Dale F., Robert Merton, and Zvi Bodie, 2007, "Contingent Claims Approach to Measuring and Managing Sovereign Credit Risk," *Journal of Investment Management*, Vol. 5, No. 4, pp. 1–24.
- Group of Twenty (G-20), 2009, *Declaration on Strengthening the Financial System*, London Summit Communiqué, Annex, April 2, Available via the Internet: www.london-summit.gov.uk/en/summit-aims/summit-communication/.
- , 2010, *The G-20 Toronto Summit Declaration*, Annex 2, June 26–27, www.g20.org/pub_communiques.aspx/.
- Güttler, Andre, 2009, "Lead-lag Relationships and Rating Convergence Among Credit Rating Agencies," European Business School Research Paper 09–14
- Hamilton, David T., and Richard Cantor, 2005, "Rating Transitions and Defaults Conditional on Rating Outlooks Revisited: 1995–2005," Moody's Investor Service Special Comment, December. Available via the Internet: <http://v2.moody.com/content/content.ashx?source=StaticContent/Free%20pages/Credit%20Policy%20Research/documents/current/2004700000425139.pdf>.
- Hartelius, Kristian, Kenichiro Kashiwase, and Laura Kodres, 2008, "Emerging Market Spread Compression: Is it Real or is it Liquidity?" IMF Working Paper 08/10 (Washington: International Monetary Fund).
- Hessol, Gail I., Erkan Erturk, and Jason Ontko, 2007, "Credit Watch and Rating Outlooks Provide Powerful Warning Signals," Standard & Poor's RatingsDirect, August 7. Available via the Internet: www.alacrastore.com/research/s-and-p-credit-research-CreditWatch_And_Rating_Outlooks_Provide_Powerful_Warning_Signals-595377.
- Hill, Paula, and Robert Faff, 2008, "Do Credit Watch Procedures Affect the Information Content of Sovereign Credit Rating Changes?" Paper presented at the Financial Management Association European Conference, Prague, Czech Republic, June. Available via the Internet: http://69.175.2.130/~finman/Prague/Papers/FMA-Euro_2008_Submission_HillnFaff.pdf.
- Hurlin, Christophe, and Baptiste Venet, 2001, "Granger Causality Tests in Panel Data Models with Fixed Coefficients," Working Paper Eurisco 2001–09 (Paris: Université Paris IX Dauphine).
- International Monetary Fund (IMF), 1999, *International Capital Markets* (Washington, July).
- , 2010, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington, April).
- International Organization of Securities Commissions (IOSCO), 2008, "Code of Conduct Fundamentals for Credit Rating Agencies," May. Available via the Internet: www.iosco.org/.
- , 2009, "A Review of Implementation of the IOSSCO Code of Conduct Fundamentals for Credit Rating Agencies," March. Available via the Internet: www.iosco.org/.
- , 2010, "Objectives and Principles of Securities Regulation," June. Available via the Internet: www.iosco.org/.
- Ismailescu, Iuliana, and Hossein Kazemi, forthcoming, "The Reaction of Emerging Market Credit Default Swap Spreads to Sovereign Credit Rating Changes," *Journal of Banking and Finance*.
- Jaramillo, Laura, 2010, "Determinants of Investment Grade Status in Emerging Markets" IMF Working Paper 10/117 (Washington: International Monetary Fund).
- Joint Forum, 2009, *Stocktaking on the Use of Credit Ratings* (Basel: Bank for International Settlements). Available via the Internet: www.bis.org/publ/joint22.htm
- Jüttner, D.J., and J. McCarthy, 2000, "Modelling a Rating Crisis" (unpublished; Sydney: Macquarie University).
- Kiff, John, Michael Kisser, and Liliana Schumacher, forthcoming, "An Inspection of the Through-the-Cycle Rating Methodology," IMF Working Paper (Washington: International Monetary Fund).
- Kiff, John, Sylwia Nowak, and Liliana Schumacher, forthcoming, "Are Rating Agencies Powerful? An Investigation into the Impact and Accuracy of Sovereign Ratings," IMF Working Paper (Washington: International Monetary Fund).
- Larrain, Guillermo, Helmut Reisen and Julia von Maltzan, 1997, "Emerging Market Risk and Sovereign Credit Rating," OECD Development Centre, Working Paper 124 (Paris: Organization for International Cooperation and Development).
- Loeffler, Gunter, 2004, "An Anatomy of Rating Through the Cycle," *Journal of Banking and Finance*, Vol. 28, No. 3, pp. 695–720.
- , 2005, "Avoiding the Rating Bounce: Why Rating Agencies are Slow to React to New Information," *Journal of Economic Behavior and Organization*, Vol. 56, No. 3, pp. 365–81.
- Monfort, Brieuc, and Christian Mulder, 2000, "Using Credit Ratings for Capital Requirements on Lending to Emerging Market Economies: Possible Impact of a New Basel Accord," IMF Working Paper 00/69 (Washington: International Monetary Fund).
- Moody's Investors Service, 2001, "The Unintended Consequences of Rating Triggers," Moody's Investors Service Special Comment, December. Available via the Internet (by subscription): www.moody.com.

IMF - Global Financial Stability Report - autumn 2010

GLOBAL FINANCIAL STABILITY REPORT SOVEREIGNS, FUNDING, AND SYSTEMIC LIQUIDITY

- , 2008, “Sovereign Bond Ratings,” Moody’s Investors Service, September. Available via the Internet (by subscription): http://v3.moodys.com/viewresearchdoc.aspx?docid=PBC_109490.
- , 2010a, “Sovereign Methodology Update: Narrowing the Gap – A Clarification of Moody’s Approach to Local vs. Foreign Currency Government Bond Ratings,” Moody’s Investors Service, February. Available via the Internet (by subscription): http://v3.moodys.com/viewresearchdoc.aspx?docid=PBC_118820
- , 2010b, “The Performance of Moody’s Structured Finance Ratings: March 2010 Quarterly Update,” Moody’s Investors Service, June. Available via the Internet (by subscription): http://v3.moodys.com/viewresearchdoc.aspx?docid=PBC_125378.
- , 2010c, “Rating Symbols and Definitions,” Moody’s Investors Service, July. Available via the Internet: http://v3.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_79004.
- Mulder, Christian, and Roberto A. Perrelli, 2001, “Foreign Currency Credit Ratings for Emerging Market Economies,” IMF Working Paper 01/191 (Washington: International Monetary Fund).
- Partnoy, Frank, 1999, “The Siskel and Ebert of Financial Markets? Two Thumbs Down for the Credit Rating Agencies,” *Washington University Law Quarterly*, Vol. 77, No. 3. Available via the Internet: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=167412.
- , 2009, “Rethinking Regulation of Credit Rating Agencies: An Institutional Investor Perspective,” White Paper (Washington: Council of Institutional Investors). Available via the Internet: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1430608.
- Reisen, Helmut, and Julia von Maltzan, 1999, “Boom and Bust in Sovereign Ratings,” *International Finance*, Vol. 2, pp. 273–93.
- Rowland, Peter, 2004, “Determinants of Spread, Credit Ratings and Creditworthiness for Emerging Market Sovereign Debt: A Follow-Up Study Using Pooled Data Analysis,” *Borradores de Economía* 296 (Bogotá: Banco de la República de Colombia).
- , and José L. Torres, 2004, “Determinants of Spread and Creditworthiness for Emerging Market Sovereign Debt: A Panel Data Study,” *Borradores de Economía* 295 (Bogotá: Banco de la República de Colombia).
- Securities and Exchange Commission (SEC), 2003, *Report on the Role and Function of Credit Rating Agencies in the Operation of the Securities Markets* (Washington, January). Available via the Internet: www.sec.gov/news/studies/credatingreport0103.pdf.
- Sobehart, Jorge R., Sean C. Keenan, and Roger M. Stein, 2000, “Benchmarking Quantitative Default Risk Models: A Validation Methodology,” Moody’s Investors Service Rating Methodology, March. Available via the Internet: www.moodyskmv.com/research/files/wp/53621.pdf
- Standard & Poor’s (S&P), 2008, “Sovereign Credit Ratings: A Primer,” Standard & Poor’s RatingsDirect, May 19. Available via the Internet: www.investinginbondseurope.org/uploadedFiles/Learn_About_Bonds/What_You_Should_Know/Market_and_Economic_Influences_on_Your_Bond_Investments/Sovereign%20Credit%20Ratings%20Primer%20-%20SP.pdf.
- , 2009, “Understanding Standard & Poor’s Rating Definitions,” Standard & Poor’s RatingsDirect, June 3. Available via the Internet: www2.standardandpoors.com/spf/pdf/fixedincome/Understanding_Rating_Definitions.pdf.
- , 2010a, “Another Perspective on Rating Comparability and Performance,” Standard & Poor’s RatingsDirect, April 9. Available via the Internet (by subscription): www.standardandpoors.com/ratings/articles/en/us/?assetID=1245209944177.
- , 2010b, “Methodology: Credit Stability Criteria,” Standard & Poor’s RatingsDirect, May 3. Available via the Internet (by subscription): www.standardandpoors.com/ratings/articles/en/us/?assetID=1245211382965.
- Sy, Amadou N. R., 2002, “Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals,” *Emerging Markets Review*, Vol. 3, No. 4, pp. 380–408.