The Impact of Sovereign Rating Changes on National Stock Market Risk and Return

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Abstract

In this study we investigate the aggregate stock market impact (on return and risk) of Sovereign rating changes, using a sample of the countries over the period 1990 to 2000. Our analysis is performed with respect to both foreign (FC) and local currency (LC) ratings changes. We perform two levels of investigation – initially an event study analysis and then a cross-sectional regression approach – the latter attempting to explain the change in beta risk around the ratings change event. With reference to the event study experiment, in short our findings echo those widely documented for ratings changes for individual companies – basically, upgrades don't have a great wealth impact while downgrades do. With reference to the cross-sectional regression part of our experiment, several additional findings are identified. First, with regard to the FC ratings change sample the only significant average beta risk change relates to the 'major' (> one step) downgrade sample. Second, when the regression model is modified to accommodate the potentially asymmetric role of size, the size variable is found to be significant – negatively so in the 'minor' FC upgrade sample and positively so in the 'major' FC downgrade sample. Finally, with regard to the cross-sectional analysis of LC rating changes, overwhelmingly there is a universal absence of any statistically significant relationship. These findings should be of great interest to all investor groups (including funds) – particularly, those with a global focus, since there are important implications here regarding international asset allocation – particularly during times of marked Sovereign ratings change.

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Abstract

In this study we investigate the aggregate stock market impact (on return and risk) of Sovereign rating changes, using a sample of the countries over the period 1990 to 2000. Our analysis is performed with respect to both foreign (FC) and local currency (LC) ratings changes. We perform two levels of investigation – initially an event study analysis and then a cross-sectional regression approach – the latter attempting to explain the change in beta risk around the ratings change event. With reference to the event study experiment, in short our findings echo those widely documented for ratings changes for individual companies – basically, upgrades don't have a great wealth impact while downgrades do. With reference to the cross-sectional regression part of our experiment, several additional findings are identified. First, with regard to the FC ratings change sample the only significant average beta risk change relates to the 'major' (> one step) downgrade sample. Second, when the regression model is modified to accommodate the potentially asymmetric role of size, the size variable is found to be significant – negatively so in the 'minor' FC upgrade sample and positively so in the 'major' FC downgrade sample. Finally, with regard to the cross-sectional analysis of LC rating changes, overwhelmingly there is a universal absence of any statistically significant relationship. These findings should be of great interest to all investor groups (including funds) – particularly, those with a global focus, since there are important implications here regarding international asset allocation – particularly during times of marked Sovereign ratings change.

1. Introduction

There exists a large body of literature analysing the impact of bond rating changes on individual stocks. This literature is primarily focused on the information content of bond rating change announcements. If rating agencies base their rating change announcements on publicly available information, then the efficient market hypothesis (EMH) predicts that stock prices will not adjust in response to ratings change event. Therefore to the extent that stock prices are found to react to bond rating changes, this implies either evidence against the semi-strong form EMH, or, the presence of some private information to ratings agencies.

The stylised findings of the literature on bond rating change announcements can be summarised as follows. First, the factors and the factor loadings associated with rating changes seem to have changed over time (for example, see Boyd and Jackson, 1988; Ho and Rao, 1992). Second, the market does seem to be able to anticipate some ratings changes – particularly downgrades (for example, see McCarthy and Melicher, 1988). Third, additions to the 'credit watch list' have been found to have some impact (for example, see Hand, Holthausen and Leftwich, 1992).

Fourth, in general, ratings upgrades have no impact upon the bond and stock markets (see Barron, Clare and Thomas, 1997; Cornell, Landsman and Shapiro, 1989; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999; Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Impson, Karafiath and Glascock, 1992; Liu, Seyyed and Smith, 1999; Matolscy and Lianto, 1995; Wansley, Glascock and Clauretie, 1992; Zaima and McCarthy, 1988). However, some exceptions to this general finding are documented by Glascock, Davidson and Henderson (1987) and Hsueh and Liu (1992).

Fifth, in general ratings downgrades are associated with significant negative returns in stock and bond markets (see Barron, Clare and Thomas, 1997; Cornell, Landsman and Shapiro, 1989; Ederington and Goh, 1998; Glascock, Davidson and Henderson, 1987; Goh

and Ederington, 1993, 1999; Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Hsueh and Liu, 1992; Impson, Karafiath and Glascock, 1992; Liu, Seyyed and Smith, 1999; Matolscy and Lianto, 1995; Wansley, Glascock and Clauretie, 1992; Zaima and McCarthy, 1988). Sixth, the impact of downgrades is not necessarily confined to individual stocks but sometimes the impact spreads to other stocks belonging to the same industry (for example, see Akhigbe and Madura, 1997).

Overall, the previous literature produces a number of clear findings about the impact of ratings changes on individual stocks. However, the literature is silent on the stock market impact of Sovereign rating changes. Accordingly, the primary contribution of the current paper is to help fill this important void in the literature – that is, we will investigate the impact of Sovereign rating changes on the risk[1] (as measured by beta[2]) and returns of the associated national stock market. As such, an important aim of our study is to assess whether and to what extent the key results found in the individual stock context, also apply to the aggregate country level context.

Why is such a study important? A key part of the answer to this question relates to the fact that with the inevitable globalisation of markets, investors – and particularly managed funds, are increasingly focused on international diversification. As stated by Erb, Harvey and Viskanta (1996b, p. 29) …"(g)iven the increasingly global nature of investment portfolios, an understanding of country risk is very important". Further, Harvey and Zhou (1993, p. 107) state "… there is increased interest in international asset allocation. A number of mutual funds offer country index portfolios. Pension funds are beginning to realize the benefit of

[1] Investigation of the role of country credit ratings as a national market risk indicator is not new. For example, Erb, Harvey and Viskanta (1996a, 1996b) propose that country beta depends upon the country credit rating, which in turn is modelled as a function of numerous economic, political and financial variables. Specifically, their variable set include: political risk, inflation, exchange rate volatility, per capita GDP, growth of GDP, the size of the trade sector, the indebtedness of the country, debt service as a percentage of exports, the current account balance as a percentage of exports and the trade balance.

[2] Country betas have been used as a measure of risk in a number of previous papers – for example, see Roll (1988); Cumby and Glen (1990); Harvey (1991); Harvey and Zhou (1993); Erb, Harvey and Viskanta (1996a, 1996b).

international participation. As such, it is important to be able to reliably assess the risk of investing in different national markets…". The formation of international portfolios requires a range of fundamental inputs into the asset allocation decision. Especially in the case of more active investment strategies, there are major information events that may affect the top-down choice of the basic allocation of funds to different regions and national markets. The change of Sovereign ratings is one such key event that may trigger substantial re-weighting of international portfolios. While we may be tempted to simply adopt the basic results that have been established for credit rating changes at the individual stock level (as outlined above), until we directly test the impact of Sovereign rating changes, we will never have total confidence that such an approach is valid. Accordingly, the current study is motivated by a basic need and a fundamental desire to uncover empirical evidence that will either deliver such confidence in applying the outcomes found for bond ratings changes on individual stocks or, alternatively, that will carefully guide our thinking in the appropriate way to modify the translation of empirical knowledge around individual bond ratings changes to the Sovereign rating change domain.

To achieve our objective, we investigate the aggregate stock market impact (on return and risk) of Sovereign rating changes, using a sample of the countries over the period 1990 to 2000. Our analysis is performed with respect to both foreign and local currency ratings changes. We perform two levels of investigation – initially an event study analysis and then a cross-sectional regression approach – the latter attempting to explain the change in beta risk around the ratings change event. The main findings of our paper can be readily summarised as follows. With reference to the event study experiment, two key themes are common to both the foreign (FC) and local (LC) currency re-rating change event. First, the rating upgrades generally over the entire event window (-8 to +12 weeks), show little evidence of abnormal returns behaviour. Second, with regard to rating downgrades, the week 0 impact is

significantly negative and the rating downgrade sample show a general presence of significant abnormal returns throughout the full event window – particularly, over the pre-rating change period. Thus our event study findings echo those documented for ratings changes for individual companies – basically, upgrades don't have a great wealth impact while downgrades do.

With reference to the cross-sectional regression part of our experiment, a further four key findings reveal themselves. First, with regard to the FC ratings change sample the only significant average beta risk change relates to the 'large' downgrade sample. Second, when the regression model is modified to accommodate the potentially asymmetric role of size, the statistical significance previously found for the mean beta change in FC 'major' (> one step) ratings downgrades disappears. Third, the size variable is found to be significant – negatively so in the 'minor' FC upgrade sample and positively so in the 'major' FC downgrade sample. Finally, with regard to the cross-sectional analysis of local currency rating changes, overwhelmingly there is a universal absence of any statistically significant relationship.

The plan of this paper is as follows. In section 2 we outline the data and empirical framework to be used in our analysis. Section 3 presents the results of our empirical analysis, while the final section concludes the paper.

2. Empirical Framework

2.1 Sampling and Data

The Standard and Poor's (S&P) Sovereign Rating Service publish credit ratings histories of all sovereign issuers rated by them since 1975 on their web site.[3] The S&P Issuer credit rating represents a current opinion on the overall creditworthiness of an obligor – both in terms of its capacity and willingness to meet its financial commitments as they fall due. While S&P provide both short-term and long-term ratings, we exclusively analyse long-term ratings changes, as it is felt that these changes will more likely have a larger (detectable) impact. The main set of S&P long-term ratings range from the highest level of 'AAA' (EXTREMELY STRONG) down to 'CC' (CURRENTLY HIGHY-VULNERABLE). Further, S&P distinguish the long-term ratings between Foreign Currency (FC) and Local Currency (LC), as it is believed that the capacity to repay the former obligations may be lower than the latter. This may be particularly so in the case of emerging market economies due to the sovereign government's own relatively lower capacity to repay external versus domestic debt. As we shall see shortly, the assessed level of FC versus LC rating is often different for a given country and ratings changes do not always coincide between the two.

Accordingly, our sample is drawn from all countries analysed by the S&P Sovereign Rating Service between June 1975 and May 2000 – specifically, those countries experiencing long-term foreign and local currency issuer credit re-rating during this period. Initially, we identified 128 foreign currency ratings changes – but of these, 94 rating changes were used in our analysis. The reason for omitting the other 34 ratings change cases was due to a lack of data availability. Similarly, a sample of 55 re-ratings for the local currency data was created (after dropping eight cases of re-ratings again due to lack of adequate data). We obtained weekly market returns in US$ from the 35 countries on which there were re-ratings from

[3] The web address for the S&P Sovereign Rating Service is: www.s&p.com.

Datastream International – notably 25 of these were defined as emerging markets.[4] In addition, the Morgan Stanley World Index is used as the proxy for the world market portfolio. Tables 1, 2 and 3 provide a full list of the credit re-ratings used in this study.

Table 1 (Table 2) shows the 48 (46) Foreign Currency (FC) Sovereign Ratings upgrades (downgrades) in our sample. In Table 1 we see that the earliest FC upgrade in our sample is recorded for Malaysia in July 1991 – a one-step upgrade from 'A-' to 'A'. Similarly, in Table 2 we see that the earliest FC downgrade in our sample is recorded for Greece in July 1990 – a one-step downgrade from 'BBB' to 'BBB-'. Indeed, the majority of ratings changes (whether upgrades or downgrades) involve the minimum one-step variety. Nevertheless, we see that the largest FC upgrade is 5 grades from 'CC' to 'B-' for Pakistan in December 1999 and the largest FC downgrade is 4 grades from 'BBB-' to 'B+' for Korea in December 1997. The maximum number of separate FC ratings upgrades for any single country over our sampling period is three – shared by Israel, Portugal, Korea, Malaysia and Hungary. In contrast, the maximum number of separate FC ratings downgrades over our sampling period is 6 for Indonesia.

Table 3 shows in Panel A (Panel B) the 18 (37) Local Currency (LC) Sovereign Ratings upgrades (downgrades) in our sample. In Panel A we see that the earliest LC upgrade is recorded for the Philippines in May 1995 – a one-step upgrade from 'BBB' to 'BBB+'. Similarly, in Panel B we see that the earliest LC downgrade in our sample is recorded for Mexico in December 1994 – a two-step downgrade from 'AA-' to 'A'. Further we see that the largest LC upgrade is 2 notches from 'BBB-' to 'BBB+' for Korea in February 1998 and the largest LC downgrade is 4 notches for Indonesia, Portugal and Romania during 1998. The maximum number of separate LC ratings upgrades for any given country over our sampling

[4] The choice of weekly data was taken as a research design compromise due to the difficulty in obtaining reliable data for the emerging market portion of our sample.

period is three by Korea. As was the case for FC downgrades, the maximum number of separate LC ratings downgrades over our sampling period is 6 for Indonesia.

Prior to moving on to the next section, one final set of comments – that take a combined view of the FC and LC ratings – are worth making. These comments are best motivated by posing the following question – to what extent do the FC and LC ratings represent separate measures of different aspects of a country's Sovereign risk? To answer this question, consider a comparison of the information recorded in Table 1 versus Panel A of Table 3. On the one hand we observe a number of instances in which non-simultaneous FC and LC ratings changes take place. As an example of this, notice that on 29 February 2000 Brazil's LC rating was upgraded one notch from 'BB-' to 'BB', while no change occurred for its FC rating. On the other hand, it can be seen that there are several cases of simultaneous change of both ratings for a given country – for example, on 2 April 1997 Brazil had a one-step upgrade in both ratings. However, it should be noted that in many of these cases the level of rating differs between the FC and LC cases. For example, after a simultaneous upgrade of ratings on 21 February 1997, the Philippines had a 'BB+' FC rating compared to an LC rating of 'A-'. Finally, of additional interest it is noted that even on occasions when the FC and LC rating change are simultaneous, the magnitude of the change (in terms of steps) can differ – for example, on 18 February 1998 Korea experienced an FC upgrade of three steps compared to a simultaneous upgrade of two steps in its LC rating.

2.2 Research Design

We separately analyse foreign and local currency issuer re-ratings using two approaches. First, we use a conventional event study methodology to test for abnormal returns around the date of the re-rating. Second, we employ a cross-sectional regression technique with the

estimated shift in beta around the re-rating as the dependent variable against a number of other identified factors such as whether or not the country is an emerging market.

2.2.1 Event Study

Following conventional practice, we assume that the underlying stock return generating process for each of the country market returns (*i)* can be completely described by the single index market model (SIMM). As such, an abnormal return is defined as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \qquad (1)$$

where R_{it} is the return on the market index for country i in week t; R_{mt} is the return on the World Index in week t; and α_i , β_i are market model parameters generated from a 50 week estimation period beginning 59 weeks through 9 weeks before the Sovereign Re-Rating date. Separate analysis is carried out for foreign and local currency issuer re-ratings as well as for upgrade and downgrade re-rating events. The event window reported is from t = -8 to t = +12 weeks around the re-rating event at t = 0.

2.2.2 Cross-sectional Regression Analysis.

From a cross-sectional regression analysis we can obtain more evidence regarding the impact of the sovereign currency issuers re-rating. Specifically, our focus is on explaining the change in beta risk around the re-rating event. Accordingly, we use the market model to estimate beta before (from t = -50 to t = -1) and after (from t = +1 to t = +50) the re-rating event date.

Our estimated model can be represented as:

$$\delta_j = \lambda_0 + \sum_{n=1}^{N} \lambda_n D_{jn} + \gamma_0 Size_j + \sum_{n=1}^{N} \gamma_n D_{jn} * Size_j + e_j \qquad (2)$$

where δ_j is the change in beta for country j (the 50 week post-ratings change beta minus the 50 week pre-ratings change beta); $size_j$ is size measured by the World Stock Market Turnover Ratio for country j (sourced from the IFC 1998 Emerging Market Fact Book, page 8); and D_{jn} are a set of dummy variables defined as follows. D_{U1}: takes a value of unity if the rating is raised one step and zero otherwise; D_{U2} takes a value of unity if the rating is raised by more than one step; D_{D1} takes a value of unity if the rating is lowered one step; and D_{D2} takes a value of unity if the rating is lowered by more than one step. The cross-sectional specification may have heteroskedastic errors – therefore, the t-statistics are adjusted by White's (1980) heteroskedasticity-consistent standard errors.[5]

[5] We also investigated versions of the cross-sectional model that included two further dummy variables – a dummy that captured the effect of emerging markets and a dummy variable that isolated the effect during the Asian currency crisis. Specifications involving either or both of these variables were problematic due to data constraints. Specifically, the emerging market variable is too closely related to size – emerging markets are all small, and the vast majority of ratings changes involve emerging market economies any way (the major economies typically have very stable and high ratings). Further, the re-ratings occurring during the period of the currency crisis, which undoubtedly involve notable cases, were in relative terms too small in number. Hence, we do not report the outcome of these extended models.

3. Empirical Results

3.1 Event Study Evidence

The event study results for the foreign currency (FC) re-ratings are reported in Table 4. Several notable features are evident from the table. First, with regard to the FC rating upgrade sample, the week 0 impact is negative (43.8 % AR cases positive, with AAR = -0.004) but clearly insignificant – for both non-parametric and parametric analysis. Second, our results for the FC rating upgrade sample show a general absence of significant abnormal returns. Specifically, based on the non-parametric sign test, only one rejection of a 50:50 split of positive and negative ARs is found – event week –3, with 65% of the sample producing positive ARs. Similarly, only one rejection is found for the t-test – in week –6. Given the apparent randomness of these cases, they can be discounted as products of chance.

Third, with regard to the FC rating downgrade sample, the week 0 impact is negative (only 28.3 % AR cases positive, with AAR = -0.074) and statistically significant – for both non-parametric and parametric analysis. Fourth, our results for the FC rating downgrade sample show a general presence of significant abnormal returns. Specifically, based on the non-parametric sign test, there are five rejections of a 50:50 split of positive and negative ARs – namely, event weeks –8, -7, -6, 0 and +5 with all these cases having positive ARs for less than a third of the sample. An even stronger negative reaction is found based on the t-tests, with six significant cases – again weeks –7, -6 and 0 as well as weeks -3, -2, -1.[6] Thus in the case of FC rating downgrades, we see considerable evidence of a negative market reaction that begins as early as eight weeks prior to the rating downgrade. This suggests that to some extent the market anticipates the downgrade – although importantly, the most significant negative impact is recorded in week 0 itself (as week 0 has the lowest percentage, 28.3%, of positive ARs and the highest negative t-statistic of –6.02).

[6] However, one case (week 4) does produce a significantly positive impact.

The event study results for the local currency (LC) re-ratings are reported in Table 5. Several notable features are evident from the table. First, with regard to the LC rating upgrade sample, the week 0 impact is positive (72.2 % AR cases positive, with AAR = 0.0055) and significant at the 10 percent level for the non-parametric sign test. Second, our results for the LC rating upgrade sample show a general absence of significant abnormal returns. Specifically, based on the non-parametric sign test, only one rejection of a 50:50 split of positive and negative ARs is found – event week –3, with 83% of the sample producing positive ARs.

Third, with regard to the LC rating downgrade sample, the week 0 impact is statistically significant and negative (only 24.3 % AR cases positive, with AAR = -0.063) – for both non-parametric and parametric analysis. Fourth, similar to the FC case discussed above, the LC rating downgrade sample shows a general presence of significantly negative abnormal returns. Specifically, based on the non-parametric sign test, there are four rejections of a 50:50 split of positive and negative ARs – namely, event weeks -6, 0, +3 and +5. Once more, an even stronger negative reaction is found based on the t-tests, with six significant cases – weeks –7, -6, -4, -2, 0 and +3.[7] Again, this suggests that to some extent the market anticipates the downgrade – although importantly, the most significant negative impact is recorded in week 0 itself (as week 0 has the lowest percentage, 24.3%, of positive ARs and the highest negative t-statistic of –5.09).

In summary, with reference to the event study experiment, our findings echo those widely documented for ratings changes for individual companies. That is, basically upgrades don't have a great wealth impact (see for example, Barron, Clare and Thomas, 1997; Cornell, Landsman and Shapiro, 1989; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999; Griffin and Sanvicente, 1982) while downgrades do and negatively so (see for example,

[7] However, one case (week 4) does produce a significantly positive impact.

Barron, Clare and Thomas, 1997; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999; Liu, Seyyed and Smith, 1999).

3.2 Cross-Sectional Regression Evidence

3.2.1 Foreign Currency Sovereign Rating Change Analysis

The results of cross-sectional regressions aimed at explaining the change in market beta around the time of Sovereign re-rating are presented in Table 6. In Panel A the outcome with regard to our foreign currency sample is presented and the following key features are evident.

First, regression 1 simply partitions the beta change into four groups – namely, the cases where an upgrade of one step has occurred; the cases where an upgrade exceeding one step has occurred; the cases where a downgrade of just one step has occurred; and the cases where a downgrade of more than one step has occurred. It can be seen from this regression that the only significant average beta risk change relates to the 'large' downgrade sample – in this case beta has increased significantly – on average by about 0.05 units. This result is not surprising – a rating downgrade equates to increased sovereign risk and it is consistent with the findings of Impson et al (1992) in their study of US firm bond rating changes. Not only is this change significant in its own right, but in unreported tests the beta change for this group is statistically different to all other groups – and the change in beta for the other three groups is not statistically different from each other (nor from zero). Taken in conjunction with the associated event study results reported in Table 4, this perhaps suggests that the abnormal return pattern in the post FC rating downgrade period is biased toward showing positive returns (although it should remembered that the event study results combine 'minor' and 'major' rating changes together). If such a positive bias exists, this would not only help explain away the isolated occurrence of significantly positive abnormal return behaviour

around weeks +4/+5, but would also reinforce the earlier conclusion of a negative equity market reaction to the Sovereign rating downgrade event.

Second, regression 2 augments the simple intercept dummy variable regression model of the previous model, with the size variable (market turnover ratio). In this case we see that the 'major' FC downgrade sample still provide the only significant association with an average (positive) beta risk change. However, size provides no apparent additional explanatory power. This result contrasts that of Impson et al (1992) in their study of US firm bond rating changes, who found positive correlation with size.

Third, regression 3 modifies the previous regression specification to accommodate the potentially asymmetric role of size in the model. Specifically, it allows for the possibility that the role of size may be conditional on the type (upgrade versus downgrade) and strength (one step change versus multiple step) of re-rating change – that is, size enters interactively with each of the four re-rating dummy variables. The results for this regression are very interesting. Specifically, the introduction of the interactive size/dummy variables destroys the statistical significance previously found for the mean beta change in FC 'major' (> one step) ratings downgrades. Moreover, the statistical significance seems to have metamorphosed into two of the interactive variables – namely size in the 'minor' upgrade sample and size in the 'major' downgrade sample. While this new evidence is not surprising in the latter case – since it relates to the previously identified 'major' FC downgrade circumstance, the result for 'minor' upgrades is a surprise. This surprise comes in two forms – it is seemingly unrelated to the previous insignificance (in regressions 1 & 2) found for this re-rating category and it is also puzzling that 'minor' FC upgrades should show significance when their 'major' upgrade counterparts do not.

These issues aside, what can we deduce about the apparent conditional role of size in explaining beta risk change? With regard to the 'minor' FC upgrade category, size has a

significantly negative role – as size increases the beta change falls and, given the very small intercept term, becomes negative. That is, given the construction of the beta change variable (post-rating change beta minus pre-rating change beta), a small FC ratings upgrade for larger economies tends to be associated with a larger decline in beta risk – an outcome at odds with Impson et al (1992) in their study of US firm bond rating changes who found a positive relationship. Perhaps the negative relationship we uncover is a reflection of the belief that the rating upgrade is much more sustainable for larger established economies than it is for smaller emerging markets. That the 'major' upgrades do not also reveal such a relationship is most likely a reflection of the fact that the multi-step FC upgrades mostly involve the smaller emerging markets and that the sample size is also very small.[8] With regard to the 'major' FC downgrade category, size has a significantly positive role – as size increases the beta change increases. Thus, given the construction of the beta change variable (post-rating change beta minus pre-rating change beta), a 'large' FC ratings downgrade for larger economies tends to be associated with a larger increase in beta risk (consistent with the findings of Impson et al, 1992, in their study of US firm bond rating changes). This may reflect that a ratings downgrade is a greater (risk change) 'surprise' in the case of larger economies – in the sense that particularly for larger established economies with higher Sovereign ratings, there is a 'sticky downwards' process to re-rating. Hence, once a 'major' downgrade is announced it is perceived to have an additional (negative) signalling content. However, reference to Table 2, Panel B reveals that the 'major' FC downgrades exclusively involve emerging market economies – hence, the credibility of this explanation is weakened.

Finally, with regard to the cross-sectional results for the FC rating change sample, in Panel A of Table 6 we have Regression 4. This variation of the model simply serves to check the robustness of the results found for regression 3 by collapsing the intercept term into a

[8] To gain an appreciation of this point, refer to Panel A of Table 2 where it can be seen that of the seven cases of multi-step FC upgrades, only one (Singapore in March 1995) belongs to non-emerging market economies.

single unconditional coefficient (given the lack of significance for the conditional intercepts found above). As seen in the table the results are robust and no further comment is necessary.[9]

3.2.2 Local Currency Sovereign Rating Change Analysis

In parallel to the FC rating change analysis reported above, Local Currency rating changes were also investigated in the cross-sectional regression framework. Unfortunately, largely due to smaller sample sizes, the findings are much less conclusive and, hence, only a brief discussion is provided. The findings for this LC analysis are presented in Panel B of Table 6.[10] First, it should be noted that in the regressions the 'major' LC upgrade variable is omitted due to a lack of data – only one major LC downgrade case occurred (a two-step upgrade for Korea in February 1998). Second, the most overwhelming observation is the universal absence of any statistically significant relationship. Interestingly however, in the counterpart cases that were found significant for the FC sample, at least the signs of coefficient estimates in the LC regressions are the same. For example, in regressions 3 and 4 with regard to the 'minor' LC upgrade category, size has a negative role, while for the 'major' LC downgrade category, size has a positive role. Notably, while the closest these coefficients get to statistical significance is a t-statistic of 1.32 (in the latter case), the magnitude of the point estimates are very comparable to their FC counterparts – for example, the LC coefficient on the size variable for the 'major' downgrade category is 0.05 compared to 0.04 in the FC regression (regression 3).

[9] A range of additional robustness checks was explored in the form of regression model variations. For example, we also estimated 'aggregated' versions of the specifications – that is, models in which only the type of re-rating is distinguished (upgrade versus downgrade) but not the 'strength' or magnitude of change. This additional analysis confirms the robustness of our findings.

[10] Similar to the case for the FC ratings change sample, a range of additional robustness checks was explored in the form of regression model variations for the LC counterpart. This additional analysis confirms the robustness of our findings – namely, that (in contrast to the FC sample) very little additional insights into the LC rating change phenomena are provided by the cross-sectional framework.

4. Conclusion

While the impact of ratings changes on individual stocks is a widely researched area (for example, see Barron, Clare and Thomas, 1997; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999; Griffin and Sanvicente, 1982; Holthausen and Leftwich, 1986; Impson, Karafiath and Glascock, 1992; Liu, Seyyed and Smith, 1999; Wansley, Glascock and Clauretie, 1992;), the literature is silent on the stock market impact (on return and risk) of Sovereign rating changes. Our primary aim has been to help fill this gap in the literature.

To investigate the market impact of Sovereign rating changes we obtain a sample from the countries analysed by the S&P Sovereign Rating Service between June1975 and May 2000. Our final sample includes those countries experiencing long-term foreign and local currency issuer credit re-rating during the period 1990 to 2000. Specifically, with regard to foreign (local) currency ratings changes, 94 (55) rating changes were used in our analysis. Further, the re-ratings were classified in terms of their direction (ratings upgrade versus a ratings downgrade) and their 'strength' or magnitude (one-step re-rating versus a multi-step re-rating).

We perform two levels of investigation – initially an event study analysis and then a cross-sectional regression approach attempting to explain the change in beta risk around the ratings change event. A summary of our findings is as follows. Initially, with reference to the event study experiment, two key findings are common to both the foreign (FC) and local (LC) currency re-rating change event. First, with regard to the upgrade event, we find that the week 0 impact is statistically insignificant. Moreover, the rating upgrades generally over the entire event window (-8 to +12 weeks), show little evidence of abnormal returns. Notably, this finding that rating upgrades are largely unimportant confirms the existing evidence established for individual stocks (see for example, Barron, Clare and Thomas, 1997; Cornell, Landsman and Shapiro, 1989; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999;

Griffin and Sanvicente, 1982). Second, with regard to rating downgrades, the week 0 impact is significantly negative – for both non-parametric and parametric analysis. Indeed, our results for the rating downgrade sample show a general presence of significant abnormal returns throughout the full event window – particularly, over the pre-rating change period. This suggests that to some extent the market anticipates the downgrade – although importantly, the most significant negative impact is found to occur in week 0 itself. Again, this finding that rating downgrades are important largely confirms the existing evidence of a negative impact established for individual stocks (see for example, Barron, Clare and Thomas, 1997; Ederington and Goh, 1998; Goh and Ederington, 1993, 1999; Liu, Seyyed and Smith, 1999).

With reference to the cross-sectional regression part of our experiment (aimed at explaining the beta risk change of our ratings change countries), a further four key findings reveal themselves. First, with regard to the foreign currency (FC) ratings change sample the only significant average beta risk change relates to the 'large' downgrade sample – in this case beta increased significantly – on average by about 0.05 units. This result is not surprising – a rating downgrade equates to increased sovereign risk. Moreover, it is consistent with the findings of Impson et al (1992) in their study of US firm bond rating changes. Second, when the regression model is modified to accommodate the potentially asymmetric role of size (as proxied by market turnover ratio), the statistical significance previously found for the mean beta change in FC 'major' (> one step) ratings downgrades disappears. Third, the size variable is found to be significant – negatively so in the 'minor' FC upgrade sample and positively so in the 'major' FC downgrade sample (which, respectively, is inconsistent and consistent with the findings of Impson et al, 1992, in their study of US firm bond rating changes). That is, for example in the case of the former, given the construction of the beta change variable (post-rating change beta minus pre-rating change beta), a small FC ratings

upgrade for larger economies tends to be associated with a larger decline in beta risk – perhaps a reflection of the belief that the rating upgrade is much more sustainable for larger established economies than it is for smaller emerging markets. Finally, with regard to the cross-sectional analysis local currency rating changes were also investigated but, largely due to smaller sample sizes, the findings are much less conclusive – indeed, overwhelmingly there is a universal absence of any statistically significant relationship.

So finally what is the important message that comes from this study? Recall we argued that with the inevitable globalisation of markets, investors – and particularly managed funds, are increasingly focused on international diversification – the formation of international portfolios requires a range of fundamental inputs into the asset allocation decision. The change of Sovereign ratings is one such key event that may trigger substantial re-weighting of international portfolios. Can we safely and legitimately apply the basic results that have been established for credit rating changes at the individual stock level, to the international domain? Mostly, our evidence suggests that the answer to this question is yes – but importantly, in some areas we need to be careful – the details of these qualifications have been outlined above.

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Table 1: Summary List of Sovereign Rating Upgrades - Foreign Currency

Date	Country	Degree of Up-Grade	Comment*
08/07/91	Malaysia	1	A- TO A
24/07/91	Venezuela	2	B+ TO BB
02/08/91	Taiwan	1	AA TO AA+
25/10/91	Portugal	1	A TO A+
19/01/93	Israel	1	BBB- TO BBB
27/05/93	Portugal	1	A+ TO AA-
21/09/93	Israel	1	BBB TO BBB+
21/12/93	Chile	1	BBB TO BBB+
22/12/94	New Zealand	1	AA- TO AA
29/12/94	Malaysia	1	A TO A+
29/12/94	Thailand	1	A- TO A
06/03/95	Singapore	2	AA+ TO AAA
18/04/95	Indonesia	1	BBB- TO BBB
03/05/95	Ireland	1	AA- TO AA
03/05/95	Korea	1	A+ TO AA-
11/07/95	Chile	1	BBB+ TO A-
18/07/95	Brazil	1	B TO B+
20/11/95	South Africa	1	BB TO BB+
04/12/95	Israel	1	BBB+ TO A-
31/01/96	New Zealand	1	AA TO AA+
15/03/96	Iceland	1	A TO A+
10/04/96	Poland	2	BB TO BBB-
26/09/96	Jordan	1	B+ TO BB-
28/10/96	Hungary	1	BB+ TO BBB-
17/12/96	Finland	1	AA- TO AA
21/02/97	Philippines	2	BB- TO BB+
02/04/97	Argentina	1	BB- TO BB
02/04/97	Brazil	1	B+ TO BB-
14/05/97	China	1	BBB TO BBB+
14/05/97	Hong Kong	1	A TO A+
05/06/97	Venezuela	1	B TO B+
18/02/98	Korea	3	B+ TO BB+
06/05/98	Ireland	1	AA TO AA+
30/11/98	Greece	1	BBB- TO BBB
11/12/98	Hungary	1	BBB- TO BBB
15/12/98	Portugal	1	AA- TO AA
25/01/99	Korea	1	BB+ TO BBB-
31/03/99	Spain	1	AA TO AA+
18/05/99	Australia	1	AA TO AA+
01/09/99	Finland	1	AA TO AA+
11/11/99	Malaysia	1	BBB- TO BBB
24/11/99	Greece	2	BBB TO A-
21/12/99	Pakistan	5	CC TO B-
02/02/00	Hungary	1	BBB TO BBB+
25/02/00	South Africa	1	BB+ TO BBB-
10/03/00	Mexico	1	BB TO BB+
25/04/00	Turkey	1	B TO B+
15/05/00	Poland	1	BBB TO BBB+

* Long-term Issuer Credit Ratings come from Standard & Poor's web site at www.standardpoor.com

Table 2: Summary List of Sovereign Rating Downgrades - Foreign Currency

Date	Country	Degree of Down-Grade	Comment*
19/07/90	Greece	1	BBB TO BBB-
22/01/91	New Zealand	1	AA TO AA-
29/05/91	India	1	BBB- TO BB+
04/03/94	Venezuela	1	BB TO BB-
22/03/94	Turkey	2	BBB- TO BB
29/04/94	Turkey	2	BB TO B+
27/07/94	Venezuela	1	BB- TO B+
10/02/95	Mexico	1	BB+ TO BB
23/02/96	Venezuela	1	B+ TO B
13/12/96	Turkey	1	B+ TO B
03/09/97	Thailand	1	A TO A-
10/10/97	Indonesia	1	BBB TO BBB-
24/10/97	Korea	1	AA- TO A+
24/10/97	Thailand	2	A- TO BBB
25/11/97	Korea	2	A+ TO A-
11/12/97	Korea	3	A- TO BBB-
22/12/97	Korea	4	BBB- TO B+
23/12/97	Malaysia	1	A+ TO A
31/12/97	Indonesia	2	BBB- TO BB+
08/01/98	Thailand	1	BBB TO BBB-
09/01/98	Indonesia	1	BB+ TO BB
27/01/98	Indonesia	2	BB TO B
11/03/98	Indonesia	1	B TO B-
17/04/98	Malaysia	1	A TO A-
15/05/98	Indonesia	1	B- TO CCC+
01/06/98	Pakistan	2	B+ TO B-
09/06/98	Russia	1	BB- TO B+
14/07/98	Pakistan	2	B- TO CCC
24/07/98	Malaysia	1	A- TO BBB+
13/08/98	Russia	2	B+ TO B-
17/08/98	Russia	2	B- TO CCC
31/08/98	Hong Kong	1	A+ TO A
15/09/98	Malaysia	2	BBB+ TO BBB-
16/09/98	Russia	1	CCC TO CCC-
12/10/98	Pakistan	1	CCC TO CCC-
22/10/98	India	1	BB+ TO BB
04/11/98	Czech Republic	1	A TO A-
09/11/98	Cyprus	1	AA- TO A+
03/12/98	Pakistan	2	CCC- TO CC
14/01/99	Brazil	1	BB- TO B+
10/03/99	Malta	1	A+ TO A
21/07/99	China	1	BBB+ TO BBB
21/09/99	Columbia	1	BBB- TO BB+
11/11/99	Korea	1	BBB- TO BBB
03/12/99	Cyprus	1	A+ TO A
21/12/99	Venezuela	1	B+ TO B

* Long-term Issuer Credit Ratings come from Standard & Poor's web site at www.standardpoor.com

Table 3: Summary List of Sovereign Rating Changes – Local Currency

Panel A: Sovereign Ratings Upgrades			
Date	Country	Degree of Up-Grade	Comment*
30/5/95	Philippines	1	BBB to BBB+
21/2/97	Philippines	1	BBB+ to A-
2/4/97	Brazil	1	BB to BB+
14/5/97	Hong Kong	1	A+ to AA-
18/2/98	Korea	2	BBB- to BBB+
11/12/98	Hungary	1	A- to A
15/12/98	Portugal	1	AA- to AA
25/1/99	Korea	1	BBB+ to A-
31/3/99	Spain	1	AA to AA+
10/6/99	Poland	1	A- to A
1/9/99	Finland	1	AA to AA+
11/11/99	Korea	1	A- to A
11/11/99	Malaysia	1	A- to A
21/12/99	Pakistan	1	B to B+
15/2/00	Russia	1	CCC to CCC+
25/2/00	South Africa	1	BBB+ to A-
29/2/00	Brazil	1	BB- to BB
15/5/00	Poland	1	A to A+
Panel B: Sovereign Ratings Downgrades			
Date	Country	Degree of Down-Grade	Comment*
23/12/94	Mexico	2	AA- to A
10/2/95	Mexico	1	A+ to A
23/3/95	Mexico	2	A to BBB+
3/9/97	Thailand	1	AA to AA-
10/10/97	Indonesia	2	A+ to A-
24/10/97	Thailand	2	AA- to A
25/11/97	Korea	2	AA to A+
11/12/97	Korea	2	A+ to A-
22/12/97	Korea	3	A- to BBB-
23/12/97	Malaysia	1	AA+ to AA
31/12/97	Indonesia	1	A- to BBB+
8/1/98	Thailand	1	A to A-
9/1/98	Indonesia	1	BBB+ to BBB
27/1/98	Indonesia	4	BBB to BB-
23/2/98	Philippines	1	A- to BBB+
11/3/98	Indonesia	1	BB- to B+
17/4/98	Malaysia	1	AA to AA-
5/5/98	Columbia	1	A+ to A
6/5/98	Finland	3	AAA to AA
6/5/98	Ireland	2	AAA to AA+
6/5/98	Italy	2	AAA to AA
6/5/98	Portugal	4	AAA to AA-
6/5/98	Spain	3	AAA to AA
15/5/98	Indonesia	2	B+ to B-
24/7/98	Malaysia	1	AA- to A+
31/8/98	Hong Kong	1	AA- to A+
15/9/98	Malaysia	2	A+ to A-
19/10/98	Romania	4	BBB- to B+
22/10/98	India	1	BBB+ to BBB
5/11/98	Czech Republic	1	AA to AA-
9/11/98	Cyprus	1	AA+ to AA
14/1/99	Brazil	2	BB+ to BB-
10/3/99	Malta	2	AA+ to AA-
1/4/99	Romania	1	B+ to B
11/6/99	Columbia	1	A to A-
21/9/99	Columbia	1	A- to BBB+
3/12/99	Cyprus	1	AA to AA-

* Long Term Issuer Credit Ratings come from Standard & Poor's web site at www.standardpoor.com

Table 4: Event Study Results around the Foreign Currency Re-Rating Date

Average abnormal returns (AAR) and cumulative abnormal returns (CAR) are generated using a standard event study methodology where the market model is used to determine the expected return. Thus, abnormal returns are defined as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where R_{it} is the return on country i on week t; R_{mt} is the return on the World Index on week t; and α_i , β_i are market model parameters generated from a 50-week estimation period beginning 59 weeks through 9 weeks before the Sovereign Re-Rating.

Event	Rating Upgrade Sample				Rating Downgrade Sample			
Week	AAR	%+veAR[a]	CAR	t-stat	AAR	%+veAR[a]	CAR	t-stat
-8	0.0074	54.2	0.0074	1.12	-0.0201	32.6*	-0.0201	-1.65
-7	-0.0003	50.0	0.0071	-0.04	-0.0524	32.6*	-0.0726	**-4.29**
-6	0.0149	60.4	0.0221	**2.25**	-0.0395	30.4*	-0.1120	**-3.23**
-5	0.0083	54.2	0.0304	1.25	0.0052	52.2	-0.1069	0.42
-4	-0.0047	41.7	0.0256	-0.71	-0.0195	39.1	-0.1264	-1.60
-3	0.0124	64.6*	0.0380	1.86	-0.0340	39.1	-0.1604	**-2.78**
-2	0.0061	52.1	0.0440	0.92	-0.0390	41.3	-0.1995	**-3.19**
-1	0.0079	54.2	0.0519	1.19	-0.0306	41.3	-0.2300	**-2.50**
0	-0.0041	43.8	0.0478	-0.61	-0.0736	28.3*	-0.3036	**-6.02**
1	0.0005	47.9	0.0484	0.08	-0.0097	43.5	-0.3133	-0.79
2	-0.0032	52.1	0.0452	-0.48	-0.0077	43.5	-0.3210	-0.63
3	0.0024	52.1	0.0475	0.36	-0.0230	37.0	-0.3440	-1.88
4	0.0084	62.5	0.0559	1.27	0.0452	60.9	-0.2988	**3.70**
5	-0.0009	45.8	0.0550	-0.14	-0.0216	30.4*	-0.3204	-1.77
6	0.0001	54.2	0.0551	0.02	0.0130	56.5	-0.3074	1.06
7	0.0076	60.4	0.0628	1.15	0.0236	63.0	-0.2839	1.93
8	0.0001	45.8	0.0629	0.02	0.0026	43.5	-0.2812	0.22
9	0.0025	54.2	0.0654	0.38	0.0127	54.3	-0.2685	1.04
10	-0.0030	54.2	0.0625	-0.45	-0.0048	50.0	-0.2733	-0.39
11	0.0008	60.4	0.0632	0.12	0.0109	63.0	-0.2624	0.89
12	0.0012	52.1	0.0645	0.19	-0.0026	45.7	-0.2649	-0.21

* Non-parametric sign test is significant at the 5 % level

Bold denotes significance of t-test statistic at the 5% level.

[a] Percentage of cases in the sample that produce a positive abnormal return.

Table 5: Event Study Results around the Local Currency Re-Rating Date

Average abnormal returns (AAR) and cumulative abnormal returns (CAR) are generated using a standard event study methodology where the market model is used to determine the expected return. Thus, abnormal returns are defined as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where R_{it} is the return on country i on week t; R_{mt} is the return on the World Index on week t; and α_i , β_i are market model parameters generated from a 50-week estimation period beginning 59 weeks through 9 weeks before the Sovereign Re-Rating.

Event	Rating Upgrade Sample				Rating Downgrade Sample			
Week	AAR	%+veAR[a]	CAR	t-stat	AAR	%+veAR[a]	CAR	t-stat
-8	0.0293	55.6	0.0293	1.65	-0.0133	43.2	-0.0133	-1.07
-7	0.0024	72.2	0.0316	0.13	-0.0278	43.2	-0.0411	**-2.25**
-6	0.0265	66.7	0.0581	1.49	-0.0362	24.3*	-0.0773	**-2.93**
-5	0.0225	61.1	0.0806	1.26	0.0061	54.1	-0.0712	0.49
-4	-0.0140	33.3	0.0665	-0.79	-0.0319	35.1	-0.1031	**-2.58**
-3	0.0291	83.3*	0.0956	1.64	-0.0198	45.9	-0.1229	-1.60
-2	0.0030	38.9	0.0986	0.17	-0.0384	35.1	-0.1613	**-3.11**
-1	-0.0065	33.3	0.0921	-0.36	-0.0120	45.9	-0.1733	-0.97
0	0.0055	72.2	0.0976	0.31	-0.0630	24.3*	-0.2363	**-5.09**
+1	0.0091	66.7	0.1067	0.51	0.0079	40.5	-0.2285	0.64
+2	-0.0071	44.4	0.0996	-0.40	-0.0073	35.1	-0.2357	-0.59
+3	0.0170	55.6	0.1166	0.96	-0.0244	32.4*	-0.2602	**-1.97**
+4	0.0243	72.2	0.1408	1.37	0.0461	56.8	-0.2140	**3.73**
+5	-0.0088	44.4	0.1320	-0.50	-0.0097	29.7*	-0.2237	-0.78
+6	-0.0086	50.0	0.1234	-0.49	0.0111	51.4	-0.2126	0.89
+7	-0.0042	50.0	0.1192	-0.24	0.0235	51.4	-0.1891	1.90
+8	-0.0017	50.0	0.1174	-0.10	-0.0047	48.6	-0.1938	-0.38
+9	0.0070	55.6	0.1244	0.39	0.0054	56.8	-0.1884	0.43
+10	0.0021	55.6	0.1265	0.12	0.0044	45.9	-0.1841	0.36
+11	-0.0052	55.6	0.1213	-0.29	0.0025	54.1	-0.1815	0.20
+12	-0.0112	33.3	0.1101	-0.63	-0.0090	40.5	-0.1905	-0.73

* Non-parametric sign test is significant at the 5 % level

Bold denotes significance of t-test statistic at the 5% level.

[a] Percentage of cases in the sample that produce a positive abnormal return.

Table 6: Cross-sectional Regression Analysis of Beta Change around Sovereign Rating Change

This table reports the outcome of running restricted variations of the following regression equation:

$$\delta_j = \lambda_0 + \sum_{n=1}^{N} \lambda_n D_{jn} + \gamma_0 Size_j + \sum_{n=1}^{N} \gamma_n D_{jn} * Size_j + e_j$$

where δ_j is the change in beta for country j (the 50 week post-ratings change beta minus the 50 week pre-ratings change beta); $size_j$ is size measured by the World Stock Market Turnover Ratio for country j; and D_{jn} are a set of dummy variables defined as follows. D_{U1}: takes a value of unity if the rating is raised one step and zero otherwise; D_{U2} takes a value of unity if the rating is raised by more than one step; D_{D1} takes a value of unity if the rating is lowered one step; and D_{D2} takes a value of unity if the rating is lowered by more than one step. Dummies used in the foreign currency regression (Panel A) are preceded by 'F', while dummies used in the local currency regression (Panel B) are preceded by 'L'. All regressions employ White (1980) heteroskedasticity – consistent standard errors.

Panel A: Foreign Currency Sovereign Ratings Change Sample (N=94)

Model	Constant	FD_{U1}	FD_{U2}	FD_{D1}	FD_{D2}	Size	FD_{U1}*Size	FD_{U2}*Size	FD_{D1}*Size	FD_{D2}*Size	R^2
Regression 1	-	-0.0125	-0.0034	0.0005	0.0491*	-	-	-	-	-	0.0342
		(-0.53)	(-0.09)	(0.04)	(3.54)						
Regression 2	-	0.0029	0.0120	0.0128	0.0687*	-0.0191	-	-	-	-	0.0469
		(0.10)	(0.32)	(0.81)	(3.53)	(-1.54)					
Regression 3	-	0.0201	-0.0062	-0.0022	0.0073	-	-0.0404*	0.0035	0.0041	0.0409*	0.0755
		(0.64)	(-0.12)	(-0.10)	(0.60)		(-2.40)	(0.06)	(0.15)	(4.57)	
Regression 4	0.0098	-	-	-	-	-	-0.0338*	-0.0108	-0.0069	0.0390*	0.0717
	(0.55)						(-2.78)	(-0.26)	(-0.30)	(2.36)	

Panel B: Local Currency Sovereign Ratings Change Sample (N=55)

Model	Constant	LD_{U1}	LD_{U2}	LD_{D1}	LD_{D2}	Size	LD_{U1}*Size	LD_{U2}*Size	LD_{D1}*Size	LD_{D2}*Size	R^2
Regression 1	-	-0.0450	-	0.0218	0.0160	-	-	-	-	-	0.0493
		(-0.91)		(1.15)	(0.77)						
Regression 2	-	-0.0498	-	0.0191	0.0109	0.0056	-	-	-	-	0.0497
		(-0.77)		(0.77)	(0.34)	(0.21)					
Regression 3	-	-0.0110	-	0.0428	-0.0305	-	-0.0392	-	-0.0438	0.0505	0.0719
		(-0.11)		(1.05)	(-0.74)		(-0.53)		(-0.79)	(1.32)	
Regression 4	0.0050	-	-	-	-	-	-0.0529	-	0.0147	0.0212	0.0584
	(0.14)						(-1.38)		(0.28)	(0.61)	

* Statistically significant at the 5 % level.