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THE EFFECT OF CREDIT RATING ACTIONS ON BOND YIELDS IN THE CARIBBEAN

By

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Paper Abstract

Paper Topic: The effect of Credit Rating actions on bond yields in the Caribbean.

Paper Objective: The paper aims to answer the question "Do Credit Ratings have an impact on bond yields?"

With the current drive to develop a regional rating agency, this topic will be of growing importance in the Caribbean. Currently there are six rated sovereigns in the region, which shows the need for increasing awareness of credit rating and the impact on the cost of funds. The paper demonstrates the effect of post announcement yield drift and the mean reverting tendencies by analyzing the historical time series prior to and following a rating announcement.

The advent of a credit rating agency will increase the international competitiveness of the region since countries and corporations will attract funding from rating conscious investors. The drive to have high ratings would also fuel competitiveness within the region with countries and corporations trying to maintain or improve their rating.

Based on our study we will show that rating actions have an effect in the cost of funds as indicated in the yields. The benefit of the rating agency would now be to transfer that effect to the entire Caribbean universe.

Key Issues Covered:

- Why Credit Rating is important to the Caribbean
- The Methodology used in determining the impact of credit rating on bond yields
- The impact of Rating announcements on bond yield trends
- The Role of the Credit Rating Agency

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Presenter Bio:

Mr. Ram Ramesh is the Managing Director of Caribbean Money Market Brokers (CMMB) – the first full-service brokerage house in Trinidad & Tobago.

Mr. Ramesh has the hands-on experience of pioneering the money market in Trinidad & Tobago leveraging on his experience in Jamaica.

Under his stewardship, CMMB has become known as a pioneer in the capital markets of the region with over TT$3 billion in funds under management.

Mr. Ramesh is a Chartered Financial Analyst (CFA) and an MBA with over sixteen years experience in financial services industry having worked for international firms such as Citicorp and Price Waterhouse Coopers.

His experience spans many countries including India, Jamaica and Trinidad.

He was the first man to achieve the CFA charter in Jamaica, and was named in the Who's Who of International Professionals in 1998.

He is a regular financial columnist in the Thursday Business Guardian, in Trinidad and he is also the author of the book "Financial Analyst's Indispensable Pocket Guide" published by McGraw-Hill & Company, USA.

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THE EFFECT OF CREDIT RATING ACTIONS ON BOND YIELDS IN THE CARIBBEAN

Paper prepared and presented by
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Introduction

For decades rating agencies have played a major role in the development and functioning of financial markets. Ratings from the major rating agencies have become a very trusted source of information especially for investors in the fixed income markets. A credit rating is a risk assessment assigned by a rating agency to a bond issue, and it gives an investor an indication of the credit quality of the issuer . Bonds with higher credit ratings usually offer lower rates of return than those with lower credit ratings since they are considered lower risk investments.

For the larger markets of the world, credit ratings play a dominant role in determining the yields of bonds. A recent example is the downgrade of the Finnish firm M-Real in the European market. M-Real was downgraded by Moody's from Baa3 to Ba1, which represented a move out of investment grade. The result was an increase in the yield by 40 basis points by the next day. This is just one example of the effect of a rating change on yield in the world's more developed markets.

In the Caribbean there are six countries with ratings. These are Trinidad and Tobago, Barbados, Belize, Dominican Republic, Jamaica and Grenada. Yet even with this small universe of rated sovereigns, the postulate is that ratings still have a significant impact on the cost of funds in these Caribbean territories. By extension, the establishment of an indigenous Caribbean credit rating agency would extend its role and increase the accessibility of capital to other developing countries in the Caribbean. The future role of this prospective agency in determining bond yields is thus becoming an important topic of discussion in the region.

Credit ratings can play an integral role in the development of the region in a number of different ways. Credit ratings are issued from an independent source and as such would promote transparency in risk assessment thereby boosting investor confidence. Governments and corporations would now have access to funding from the risk

conscious class of investors who would usually desist from investing in unrated instruments. Institutional investors in particular prefer rated over unrated securities.

Competitiveness in the region would also increase especially among the corporations. Firms would compete with their industry peers for higher ratings. This would lead to improved production, investment and management practices within industry groups. In the banking industry for example, with the advent of Basle II in the near future, banks would be required to hold capital for corporate and sovereign investments according to their credit rating. This would also boost the need for regional ratings and the understanding of its effect since there are very few rated sovereigns and corporations in the region.

The following section presents the analysis of some of the different emerging market bonds and the reaction of their yields to changes in credit ratings.

Methodology

Four different analyses were conducted in order to assess the impact of ratings on the costs of capital of sovereign nations.

1. Difference of means hypothesis test

The methodology chosen to assess the impact of rating changes on bond yields was to declare a null hypothesis and test for statistical significance. The analysis involved a one-tailed hypothesis test of the difference of means of a time series before and after a rating announcement using a pooled standard deviation. Due to the relatively small sample, the t-distribution was utilized to compare the test statistic. The bonds used in our sample consisted of sovereign Eurobonds in the Caribbean and Latin American Bond universe. The time series was considered one month before the rating change and then one month after to determine the transmission effect of the rating action on each bond's yield and price. The specific bonds, which were used to conduct the analysis, were:

1. Trinidad & Tobago 2020
2. Trinidad & Tobago 2009
3. Dominican Republic 2006
4. Dominican Republic 2013
5. Belize 2012
6. Brazil 2010
7. Brazil 2020
8. Mexico 2011
9. Mexico 2031
10. Peru 2027

2. Difference of Means Hypothesis test for yield spreads between risk categories
This analysis involved testing the null hypothesis that the difference of means between the yield spreads in immediately adjacent risk categories is different from zero. That is, the mean of the lower risk category less the mean of the higher risk category is greater than or equal to zero. A number of paired time series tests were conducted for credits with liquid bonds in order to derive the greatest price efficiency.

3. A correlation matrix was developed to test the degree of co-movement between bonds, which experienced similar as well as dissimilar rating actions. The intervals of comparison were shortened to time periods just before and after rating actions to control for other variables.

4. Daily Earnings at Risk analysis was conducted to demonstrate the differential volatility between investment grade and speculative credits and between speculative credits with different ratings. The analysis was again conducted for the widely held bonds to facilitate the price efficiency needed for this analysis.

Results

1. Rating Changes do impact bond yields in Caribbean Eurobond universe

In modern financial markets the postulate is that rating actions would not have an effect on bond yields after the fact. This is due to informational efficiency of markets, which was studied extensively by Eugene Fama. Coined the Efficient Market Hypothesis, the assertion is that all information in the market is impounded into the prices of marketable securities such as bonds and equities. It is therefore impossible to derive superior risk adjusted returns after transaction costs by trading on public information. The implication here is that default risk premia are autoregressive due to market overreactions. Quite simply, investors are constantly reevaluating a bond's risk profile from active trading and as information becomes apparent the market may bid up or down the prices of bonds in anticipation of credit upgrades or downgrades. The corrections take place when the actions are different from the market expectations.

However, in the Caribbean Eurobond universe this was not the case. Anecdotal evidence has shown that there is significant post rating-action price drift after the announcement of a rating action. This is due to the fact that the issue sizes of Caribbean debt are small and do not lend themselves to wide participation. A lot of the bonds are also held by local investors, who adopt mostly buy and hold strategies and the lack of active trading militates against the process of price discovery. Compounding this problem is the asymmetrical distribution of debt holdings by accounts in the Caribbean and with these holdings virtually locked away there is only

a very small float left for trading and hence a lack of depth in the market. However, once a significant event occurs the yields do adjust to reflect changing risk profiles. Whether it involves the threat of war, political upheaval or an IMF Standby Credit approval, bond prices in the Caribbean bond universe tend to change subsequent to these events. Serendipitously, it is these imperfections in the efficiency of this market, which makes it possible to test the impact of a rating action on bond yields.

The null hypothesis used for a downgrade situation was that the post-rating change in mean-yield minus the pre-rating change in mean-yield is less than or equal to zero versus its one-tailed alternative where the difference of means is greater than zero. In the case of an upgrade the null hypothesis tested was that the post-rating change in mean-yield minus the pre rating change in mean-yield is greater than or equal to zero versus its one-tailed alternative where the difference of means is less than zero.

For example, in the case of Belize and Brazil downgrades were experienced over the last two years. The null hypothesis tested in these cases was therefore that the post-rating change yields are less than or equal to pre-rating change yields. As seen in **Appendix 1** in all cases the null hypothesis was rejected at the 95% confidence level. In these tests not only were the test statistics outside of the confidence limits but also the p-values were much less than the significance levels. In fact the p levels were significantly less than .001 which gives extremely strong evidence that the null hypothesis is not true.

The null hypothesis is therefore rejected and so it can be said that the mean yields after the rating changes were significantly higher from those before the rating change. The period used was thirty days before and thirty days after to control for any other exogenous shocks. These are common in the speculative grade credits in the Latin American universe such as Brazil and Peru where developments are taking place constantly and a post rating announcement period of thirty days after may have been coincided with another event, say an IMF approval or a political crisis. This made sure that the effect of the rating event would have been isolated from other significant events.

Due to this phenomenon of price drift after rating actions it is found that the market incorporates the wisdom of rating agencies into assessing the risk profile of sovereign credits. The implication is that the cost of capital in these economies would thus be profoundly affected by the actions of rating agencies.

2. Ratings actions impact yield spreads to Treasuries

In order to examine the relationship between yield spreads in adjacent risk categories, the process of yield curve construction had to be undertaken. This was necessary, as most of the Caribbean sovereigns have not issued more than two Eurodollar bonds. Belize and the Dominican Republic have two issues each while Grenada has one

issue. Trinidad & Tobago has four issues but only two of them are actively traded. Jamaica, however, is the exception and has four issues which are regularly traded. This is similar to issues out of Latin America such as Brazil and Mexico where there are at least three liquid issues. So to correct for this deficiency in the Caribbean bond market, yield to maturity curves were developed for rated sovereigns in the Caribbean, after which tenor-equivalent costs of capital across risk classes were compared to observe the behavior of the yield differential. The methodology adopted was dualistic. Firstly the yields on the Eurodollar debt for each country were collected as at a certain date. Then, a curve was populated by using linear interpolation between the empirical yield data points. After reaching the end points of the range of interpolation, yields from those two points in either direction along the curve were calculated using a relative spread analysis. The assumption made is that the spread above US Treasuries is at a constant ratio to US Treasuries along the rest of the curve as at the end data point, and the extrapolation was based on this simplifying assumption. An examination of the yield spreads between risk classes along the interpolated part of the curve serves as exposition.

In **Appendix 2** it is seen that in Standard & Poor's classification, the lower the risk category the lower is the required return on bonds. The taxonomy is intuitively obvious with AAA being the lowest risk category and C being the highest. As one moves down from the lower risk categories to the higher risk categories the rates for equivalent tenor bonds increases. This is also seen in **Appendix 3** where the graphs are successively translated upward as the ratings move from a lower risk category to a higher one.

Apart from the absolute increase from one category to the next, the null hypothesis that the differences in means between adjacent yield curves is less than or equal to zero is rejected at the 95.0% confidence level as seen in **Appendix 4**.

Consider the example of Mexico being rated BBB and Trinidad & Tobago being BBB+. The reason for testing these two sovereigns just one risk category apart is to increase the probability that the yield differential between the higher and lower risk category can be less than zero at some points along the yield curve due to technical effects and /or mispricing arising from demand supply disequilibria. The assumption made in this case is that only sovereigns which are exhibiting normal or upward sloping yield curves would be compared. Those with flat or downward sloping yield curves were taken out of the analysis as they represent less than normal situations where default risk premia takes on a different characteristic.

An example of a country in the Caribbean that is currently exhibiting an almost flat yield curve is that of the Dominican Republic (Dom Rep). As at November 13, 2003 the 2006 bond was trading at a yield of 13.363% while the 2013 bond was trading at a yield to maturity of 12.686%. Given that the 3-year US treasury at the time was yielding 2.1070% and the 10 year at 4.4%, the default risk premium for the 2006

bond was computed at 11.255% while that for the 2013 bond was 8.286%. While in most developing countries default risk premia increases over time in this case it is actually declining. This is not unusual given the situation in Dominican Republic at the time of writing where there are significant external liquidity problems. The market therefore expects a higher probability of default in the short-term. On the other hand the implication is that if the immediate hurdles can be surmounted, the default risk over time would subsequently decline. Such a situation is excluded from the analysis.

3. Ratings have an impact on cost of capital

Yet another methodology was adopted in order to test the impact of rating agencies on cost of capital. This is seen in the correlation matrix developed in **Appendix 5**.

The correlation co-efficient was calculated for Trinidad & Tobago bonds against tenor-equivalent Jamaica bonds. The T&T 2009 was compared to the Jamaica 2007 in order to remove differential effects from non-parallel shifts in the US Treasury yield curve over that period. If there were a shift in the equivalent benchmark Treasury it would affect the yield on these issues in the same way. The co-efficient was found to be -0.841. This high negative correlation between the two series after controlling for the Security Market Line could be a result of the fact that over the period of comparison the rating actions by Standard & Poor's on these countries was bifurcated. In April 2003 Trinidad & Tobago's long term foreign currency rating was upgraded from BBB- to BBB while over the test period Jamaica's long term foreign currency rating was downgraded from B+ to B. Similarly if the correlation between the Jamaica 2022 and the T&T 2020 is examined it is found to be -0.874. Similarly the long-term foreign currency rating on the Dominican Republic was downgraded from B+ to B- over the period and when the Dom Rep 06 is compared to the T&T 2009 of similar tenor, the coefficient of correlation is found to be -0.702. Now when the Dom Rep 06 is compared to the Jamaica 07s the co-efficient changes to a positive one at 0.435. Similarly when the Dom Rep 2013 is compared against the Jamaica 2017s the correlation is also positive at 0.587. Both these countries were downgraded over the period of comparison.

The final test of the effect of risk ratings is the effect on the volatility of bond prices. The theory is that speculative grade credits, which are of a lower quality, are more responsive to macroeconomic and political events than higher-grade credits. In order to test this hypothesis the adverse yield movement per day at a 95.0% confidence level was calculated. Then the daily earnings at risk were calculated to test the volatility of bonds with the same face value of similar tenors across different risk categories. In **Appendix 6** the table looks at the daily earnings at Risk for the T&T 2009 against the Jamaica 2011. The daily earnings at risk for the T&T 2009 is USD20.21 as opposed to USD106.80 for the Jamaica 2011. Similarly the daily earnings at risk for the GOTT 2020 is USD34.37 as compared to USD191.80 for the GOJ 2022 at the 95.0% confidence level. This is consistent with the hypothesis that

speculative grade debt such as Jamaica has a higher value at risk per day than investment grade credits such as Trinidad & Tobago.

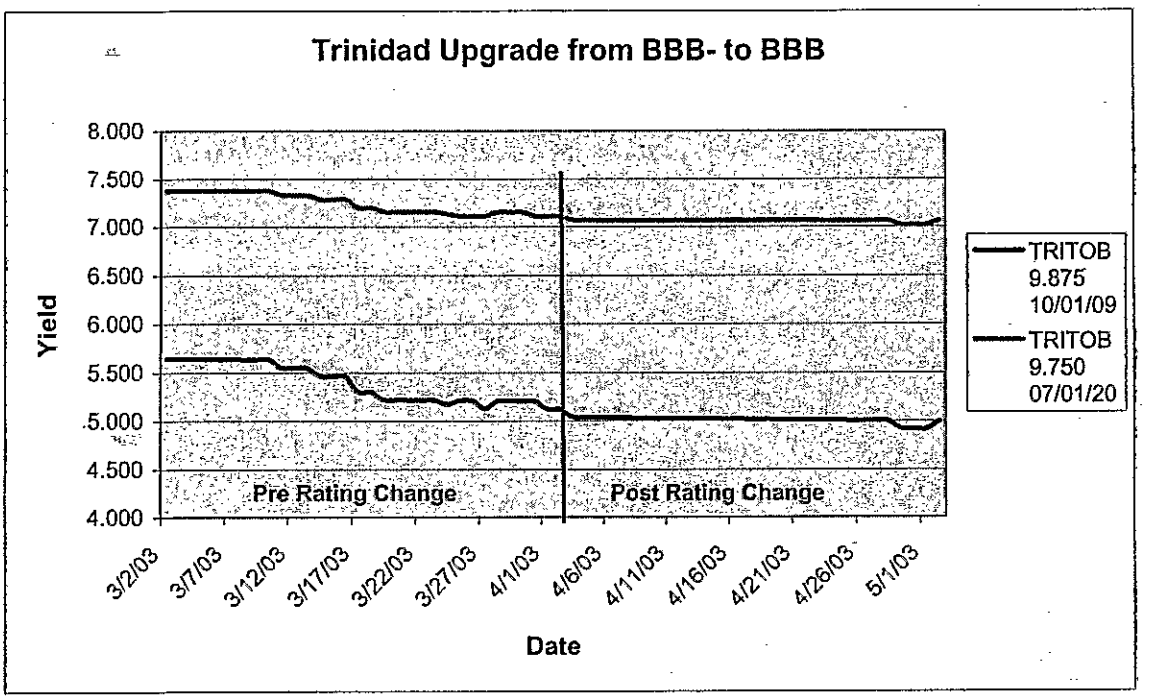
The differential even operates within the speculative grade sector. For example the daily earnings at risk is USD79.38 for the Dominican Republic 2013 as opposed to the Government of Jamaica 2011s, which has a value at risk per day of USD106.80. This is consistent with theory for as at the time of the analysis Jamaica was rated a B and Dom Rep a B+. Dom rep is currently rated a B-, having been downgraded recently but the market is factoring distress premia given the extremely low international reserve position and the IMF freeze on Standby credit. Comparing this credit as at present day would therefore have distorted the analysis.

Conclusion

From the analyses above it may be concluded that rating agencies and a system of ratings impact the cost of capital of rated Caribbean Sovereigns in a significant way. Since there are other small unrated economies as well as unrated companies in all territories in the Caribbean, a strong argument can be put forward for the establishment of an indigenous rating agency in order to increase the universe of rated sovereigns and corporations. The ultimate result of this would be greater access to capital from international investors who would now have an objective measure by which to assess the required returns for country risk. Currently the uncertainty surrounding economies due to a lack of reliable and timely data makes the access to capital on the international markets almost impossible. Even when funds are available regionally it is at exorbitant costs strangulating these developing economies from achieving their full potential. Access to capital from the international marketplace at a fair price is critical to the development of these small and open economies. This becomes especially important in the context of the need for diversification and restructuring of these economies in an era where protectionism is being eschewed. Once an internationally recognized rating agency can be established in the Caribbean with risk classes which can be equated to those of the existing agencies then capital providers would be more confident about investing in these territories. This would open up new vistas of opportunity for these nations.

Appendix 1

Trinidad and Tobago



The graph above shows the downward trend in yields as a result of the rating upgrade on the 2nd April 2003.

A hypothesis test was conducted using the time series before and after the rating change and testing for the samples for equality.

H0: Post rating change mean $\equiv$ pre rating change mean
H1: Post rating change mean < pre rating change mean

Trinidad and Tobago 2020

Test of difference>=0 versus one-tailed alternative	
Hypothesized mean difference	0.000
Sample mean difference	-0.170
Pooled standard deviation	0.076
Std error of difference	0.020
Degrees of freedom	58
t-test statistic	-8.650
p-value	0.000

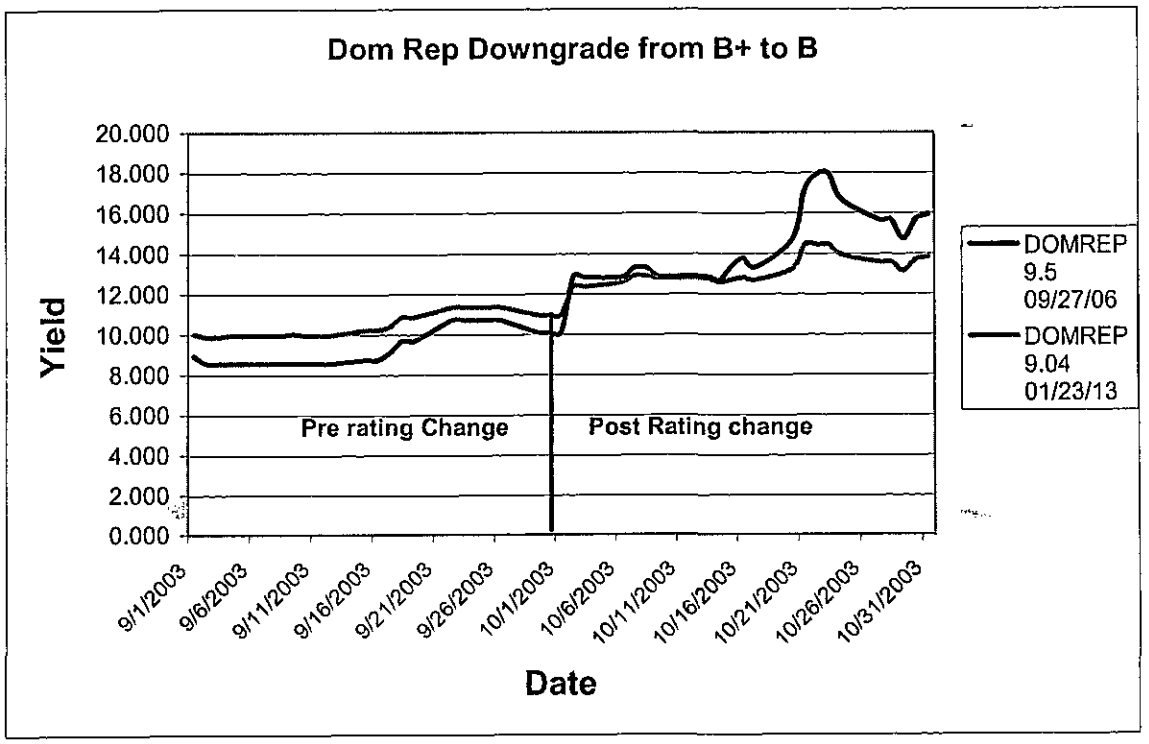
Dominican Republic 2013

Test of difference<=0 versus one-tailed alternative

Hypothesized mean difference	0.000
Sample mean difference	2.633
Pooled standard deviation	0.706
Std error of difference	0.208
Degrees of freedom	44
t-test statistic	12.649
p-value	0.000

The results of the tests for both bonds show that we reject the null hypothesis and conclude that there is a rise in rates after the rating downgrade.

Dominican Republic



The graph above shows the upward trend in yields as a result of the rating downgrade on the 1st October 2003.

A hypothesis test was conducted using the time series before and after the rating change and testing for the samples for equality.

H0: Post rating change mean =pre rating change mean
H1: Post rating change mean > pre rating change mean

Dominican Republic 2006

Test of difference<=0 versus one-tailed alternative

Hypothesized mean difference	0.000
Sample mean difference	4.961
Pooled standard deviation	1.533
Std error of difference	0.452
Degrees of freedom	44
t-test statistic	10.978
p-value	0.000

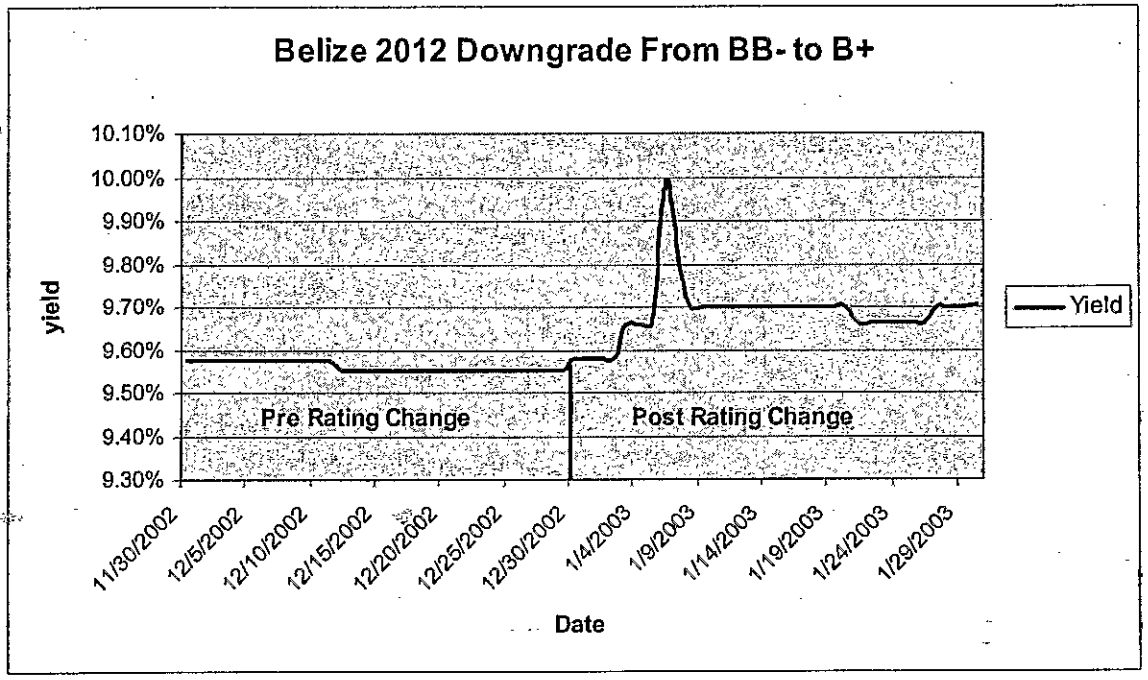
Dominican Republic 2013

Test of difference<=0 versus one-tailed alternative

Hypothesized mean difference	0.000
Sample mean difference	2.633
Pooled standard deviation	0.706
Std error of difference	0.208
Degrees of freedom	44
t-test statistic	12.649
p-value	0.000

The results of the tests for both bonds show that we reject the null hypothesis and conclude that there is a rise in rates after the rating downgrade.

Belize



The graph above shows the upward trend in yields as a result of the rating downgrade on the 30th December 2002.

A hypothesis test was conducted using the time series before and after the rating change and testing for the samples for equality.

H0: Post rating change mean =pre rating change mean
H1: Post rating change mean > pre rating change mean

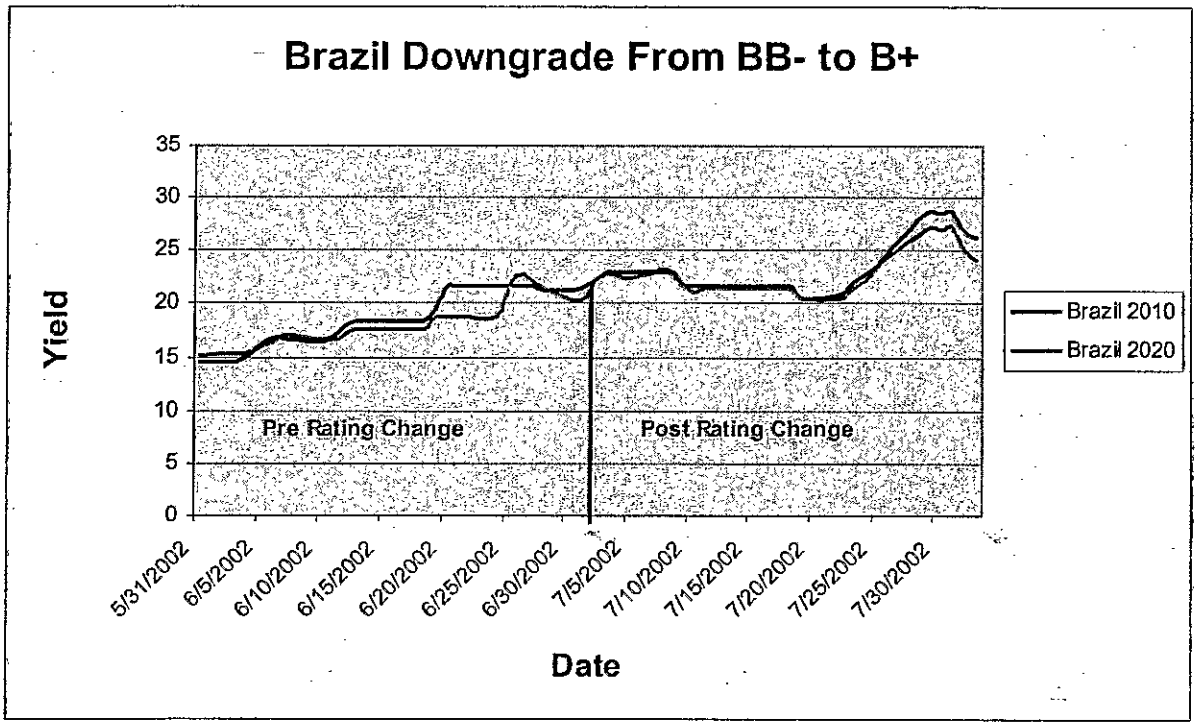
Belize 2012

Test of difference<=0 versus one-tailed alternative

Hypothesized mean difference	0.000
Sample mean difference	0.001
Pooled standard deviation	0.001
Std error of difference	0.000
Degrees of freedom	60
t-test statistic	9.755
p-value	0.000

The result of the tests for the bond shows that we reject the null hypothesis and conclude that there is a rise in rates after the rating downgrade.

Brazil



The graph above shows the upward trend in yields as a result of the rating downgrade on the 2nd July 2002.

A hypothesis test was conducted using the time series before and after the rating change and testing for the samples for equality.

H0: Post rating change mean =pre rating change mean
H1: Post rating change mean > pre rating change mean

Brazil 2010

Test of difference<=0 versus one-tailed alternative	
Hypothesized mean difference	0.000
Sample mean difference	4.598
Pooled standard deviation	2.561
Std error of difference	0.755
Degrees of freedom	44
t-test statistic	6.088
p-value	0.000

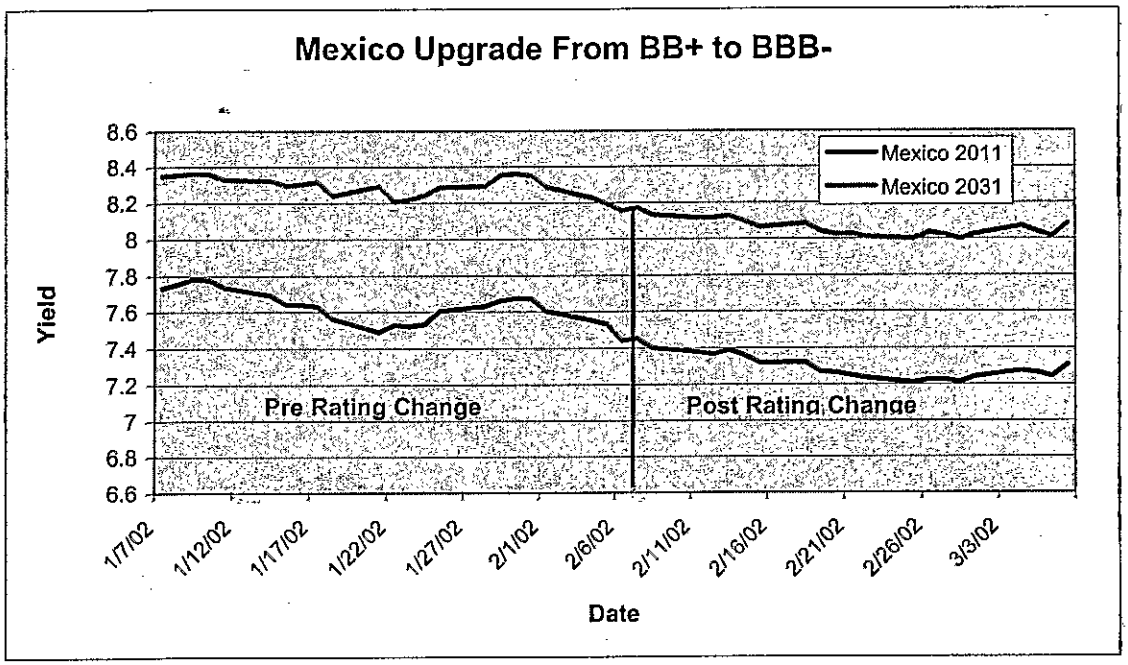
Brazil 2020

Test of difference<=0 versus one-tailed alternative

Hypothesized mean difference	0.000
Sample mean difference	4.536
Pooled standard deviation	2.204
Std error of difference	0.650
Degrees of freedom	44
t-test statistic	6.978
p-value	0.000

The results of the tests for the both bonds shows that we reject the null hypothesis and conclude that there is a rise in rates after the rating downgrade.

Mexico



The graph above shows the downward trend in yields as a result of the rating upgrade on the 7th February 2002.

A hypothesis test was conducted using the time series before and after the rating change and testing for the samples for equality.

H0: Post rating change mean =pre rating change mean
H1: Post rating change mean < pre rating change mean

Mexico 2011

Test of difference>=0 versus one-tailed alternative	
Hypothesized mean difference	0.000
Sample mean difference	-0.319
Pooled standard deviation	0.082
Std error of difference	0.025
Degrees of freedom	40
t-test statistic	-12.599
p-value	0.000

Mexico 2031

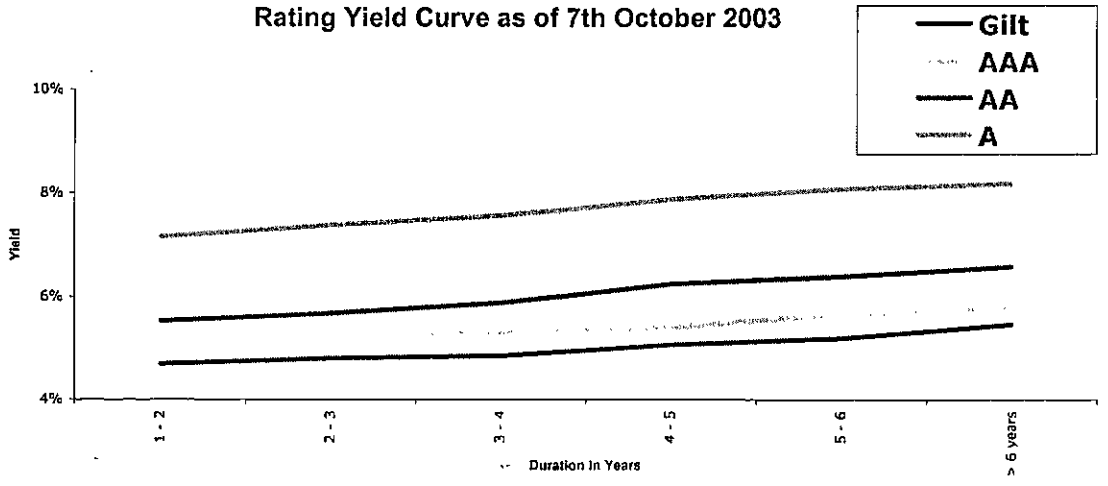
Test of difference>=0 versus one-tailed alternative

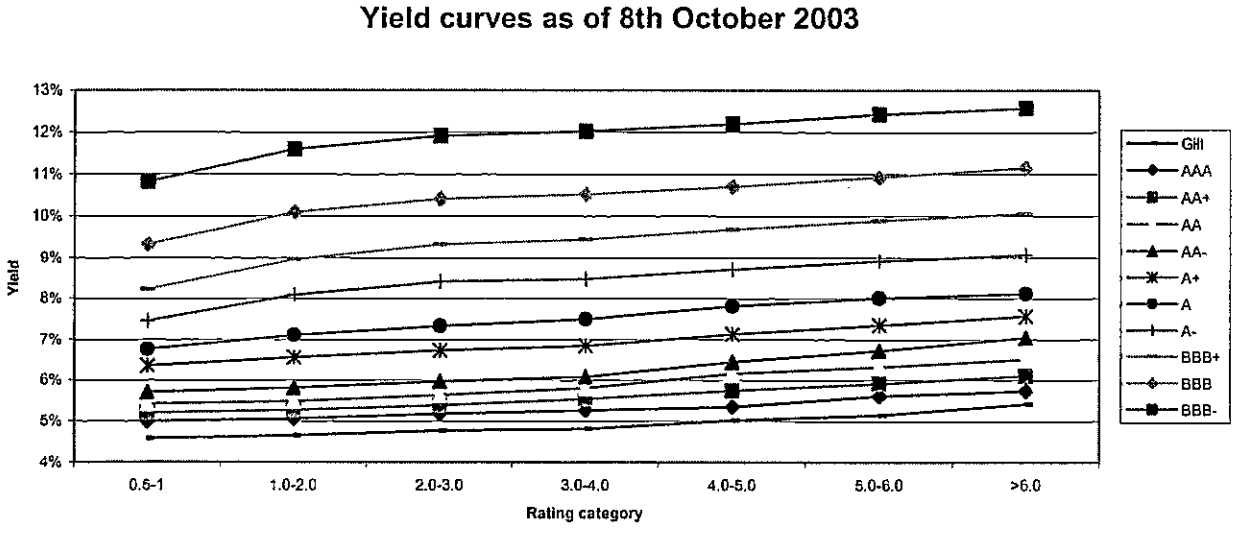
Hypothesized mean difference	0.000
Sample mean difference	-0.217
Pooled standard deviation	0.054
Std error of difference	0.017
Degrees of freedom	38
t-test statistic	-12.779
p-value	0.000

The results of the tests for the both shows that we reject the null hypothesis and conclude that there is a rise in rates after the rating upgrade.

Data on Corporate Debt From the Indian Market

The following shows data received by CRISIL from the Indian secondary market.





The first - based on data from the Indian secondary debt markets - demonstrates the increase in cost of funds as the rating reduces from AAA through the A range. It can be seen that this relationship holds across tenor buckets.
The second takes a much wider range of ratings, giving spreads across investment grades. The same relationships hold across a much wider scale of ratings.

From these graphs we can clearly see the implications of credit rating on the cost of funds for Corporations.

Daily Earnings at Risk

Eurobond Issuer	Maturity Date	Coupon	Yield	Nominal Value	Modified Macualay Duration	Volatility	Adverse Yield Movement per day @ 95% C.L.	DEaR	VAR
GORTT 2009	1-Oct-09	9.875%	4.032%	$1,000,000.00	4.84	0.0062767677	0.0000041758	$20.21	$110.70
GORTT 2020	1-Jul-20	9.750%	6.430%	$1,000,000.00	9.10	0.0035602224	0.0000037772	$34.37	$188.27
GOJ 2011	15-Jul-11	12.750%	10.879%	$1,000,000.00	5.06	0.0117580658	0.0000211061	$106.80	$584.95
GOJ 2022	15-Jan-22	11.625%	12.101%	$1,000,000.00	6.99	0.0137426431	0.0000274395	$191.80	$1,050.54
Dominican Republic 2013	23-Jan-13	9.040%	10.028%	$1,000,000.00	5.94	0.0080765673	0.0000133636	$79.38	$434.78
Total				$5,000,000.00					$2,369.24

Difference of Means Hypothesis test for yield spreads between risk categories

Paired-sample analysis for BBB- minus BBB	
Summary measures for BBB--BBB	
Sample size	27
Sample mean	0.002
Sample standard deviation	0.003
Test of mean<=0 versus one-tailed alternative	
Hypothesized mean	0.000
Sample mean	0.002
Std error of mean	0.001
Degrees of freedom	26
t-test statistic	3.559
p-value	0.001

Paired-sample analysis for BB+ minus BBB-	
Summary measures for BB+-BBB-	
Sample size	27
Sample mean	0.009
Sample standard deviation	0.005
Test of mean<=0 versus one-tailed alternative	
Hypothesized mean	0.000
Sample mean	0.009
Std error of mean	0.001
Degrees of freedom	26
t-test statistic	9.953
p-value	0.000

Paired-sample analysis for BB- minus BB	
Summary measures for BB--BB	
Sample size	27
Sample mean	0.009
Sample standard deviation	0.005
Test of mean<=0 versus one-tailed alternative	
Hypothesized mean	0.000
Sample mean	0.009
Std error of mean	0.001
Degrees of freedom	26
t-test statistic	9.756
p-value	0.000

Paired-sample analysis for B+ minus BB-	
Summary measures for B+-BB-	
Sample size	27
Sample mean	0.023
Sample standard deviation	0.010
Test of mean<=0 versus one-tailed alternative	
Hypothesized mean	0.000
Sample mean	0.023
Std error of mean	0.002
Degrees of freedom	26
t-test statistic	12.435
p-value	0.000

	TRITOB 9.875 10/01/09	TRITOB 9.750 07/01/20	JAMAICA 10.875% 06/10/05	JAMAICA 12.75% 09/01/07	JAMAICA 10.625 06/20/17	JAMAICA 11.75% 05/15/11	JAMAICA 11.625% 01/15/22	BARBAD 7.25% 12/15/21	BARBAD 8.75% 06/15/10	DOM REP 9.50% 09/27/06
TRITOB 9.875 10/01/09	1.000	0.994	-0.688	-0.841	-0.920	-0.859	-0.906	0.952	0.317	-0.702
TRITOB 9.750 07/01/20		1.000	-0.646	-0.800	-0.896	-0.824	-0.874	0.961	0.317	-0.754
JAMAICA 10.875% 06/10/05			1.000	0.910	0.833	0.882	0.833	-0.587	-0.110	0.291
JAMAICA 12.75% 09/01/07				1.000	0.958	0.979	0.967	-0.784	-0.215	0.435
JAMAICA 10.625 06/20/17					1.000	0.976	0.988	-0.877	-0.261	0.566
JAMAICA 11.75% 05/15/11						1.000	0.983	-0.807	-0.212	0.506
JAMAICA 11.625% 01/15/22							1.000	-0.861	-0.250	0.535
BARBAD 7.25% 12/15/21								1.000	0.327	-0.769
BARBAD 8.75% 06/15/10									1.000	-0.219
DOM REP 9.50% 09/27/06										1.000
DOM REP 9.04% 01/23/13										
BELIZE 9.50% 08/15/12										
GRENADA 9.375% 6/30/12										
Brazil 10.0% 10/01/07										
Brazil 14.5% 10/15/09										
Brazil 11% 01/11/12										
Brazil 10.125% 05/15/27										
Brazil 8% 4/15/2014										
Colombia 10.75% 1/15/2013										
Mexico 6.375% 1/16/2013										
Mexico 11.5% 5/15/2026										

	DOM REP 9.04% 01/23/13	BELIZE 9.50% 08/15/12	GRENADA 9.375% 6/30/12	Brazil 10.0%10/01/07	Brazil 14.5% 10/15/09	Brazil 11% 01/11/12	Brazil 10.125% 05/15/27	Brazil 8% 4/15/2014	Colombia 10.75% 1/15/2013	Mexico 6.375% 1/16/2013	Mexico 11.5% 5/15/2026
TRITOB 9.875 10/01/09	-0.645	0.865	0.768	0.452	0.922	0.936	0.947	0.918	0.898	0.940	0.941
TRITOB 9.750 07/01/20	-0.672	0.874	0.770	0.475	0.897	0.912	0.932	0.892	0.890	0.938	0.942
JAMAICA 10.875% 06/10/05	0.457	-0.398	-0.328	-0.259	-0.758	-0.752	-0.708	-0.762	-0.467	-0.284	-0.582
JAMAICA 12.75% 09/01/07	0.500	-0.647	-0.544	-0.089	-0.873	-0.878	-0.855	-0.874	-0.746	-0.673	-0.766
JAMAICA 10.625 06/20/17	0.587	-0.754	-0.593	-0.761	-0.907	-0.920	-0.911	-0.907	-0.854	-0.869	-0.854
JAMAICA 11.75% 05/15/11	0.578	-0.690	-0.518	-0.616	-0.864	-0.874	-0.854	-0.865	-0.769	-0.738	-0.784
JAMAICA 11.625% 01/15/22	0.576	-0.755	-0.587	-0.324	-0.899	-0.912	-0.900	-0.899	-0.841	-0.837	-0.841
BARBAD 7.25% 12/15/21	-0.619	0.900	0.824	0.354	0.850	0.871	0.903	0.844	0.922	0.958	0.935
BARBAD 8.75% 06/15/10	-0.128	0.326	0.340	0.129	0.289	0.295	0.308	0.287	0.287	0.286	0.313
DOM REP 9.50% 09/27/06	0.838	-0.740	-0.565	-0.625	-0.487	-0.511	-0.569	-0.484	-0.619	-0.737	-0.683
DOM REP 9.04% 01/23/13	1.000	-0.559	-0.311	-0.555	-0.519	-0.532	-0.549	-0.526	-0.373	-0.455	-0.602
BELIZE 9.50% 08/15/12		1.000	0.801	0.309	0.697	0.724	0.766	0.689	0.845	0.937	0.841
GRENADA 9.375% 6/30/12			1.000	-0.198	0.677	0.692	0.732	0.667	0.737	0.761	0.788
Brazil 10.0%10/01/07				1.000	-0.177	-0.032	0.111	0.014	-0.043	0.498	0.485
Brazil 14.5% 10/15/09					1.000	0.998	0.990	0.999	0.925	0.935	0.932
Brazil 11% 01/11/12						1.000	0.993	0.997	0.931	0.942	0.941
Brazil 10.125% 05/15/27							1.000	0.988	0.960	0.972	0.967
Brazil 8% 4/15/2014								1.000	0.920	0.929	0.929
Colombia 10.75% 1/15/2013									1.000	0.963	0.958
Mexico 6.375% 1/16/2013										1.000	0.993
Mexico 11.5% 5/15/2026											1.000

Notch	Issuer	Credit-Rating	9	10	11	12	13	14	15	16	17	18	19	20
1	US Treasuries	AAA	3.8758%	4.0890%	4.1340%	4.1790%	4.2240%	4.2690%	4.3140%	4.3590%	4.4040%	4.4490%	4.4940%	4.5390%
2		AAA-												
3		AA+												
4		AA												
5		AA-												
6		A+												
7		A												
8	Barbados	A-	5.9031%	6.3312%	6.4215%	6.5119%	6.6022%	6.6926%	6.7829%	6.8733%	6.9636%	7.0540%	7.0540%	7.2346%
9		BBB+	5.4279%	5.7567%	5.9167%	6.0766%	6.2366%	6.3965%	6.5565%	6.7164%	6.8764%	7.0363%	7.0718%	7.1426%
11	Trinidad & Tobago	BBB	4.953%	5.182%	5.412%	5.641%	5.871%	6.100%	6.330%	6.560%	6.789%	7.019%	7.090%	7.161%
12	Mexico	BBB-												
	El Salvador	BB+	6.964%	7.060%	7.080%	7.101%	7.121%	7.141%	7.162%	7.182%	7.202%	7.222%	7.243%	7.263%
		BB	7.8365%	8.1221%	8.1846%	8.2455%	8.3062%	8.3669%	8.4276%	8.4883%	8.5490%	8.6097%	8.6704%	8.7311%
14	Grenada	BB-	8.71%											
13	Dominican Republic	B+	10.6666%	10.7600%										
15	Belize	B+	9.16%											
16	Jamaica	B+	10.4436%	10.5663%	10.6889%	10.8115%	10.9342%	11.0568%	11.1795%	11.3021%	11.4247%	11.5474%		
17		B-												
18		CCC+												
19		CCC												
20		CCC-												
21		CC+												
22		CC												
23		CC-												
24		C+												
25		C												
26		C-												

Notch	Issuer	Credit-Rating	21	22	23	24	25	26	27	28	29	30
1	*US Treasuries*	AAA	4.5840%	4.6290%	4.6740%	4.7190%	4.7640%	4.8090%	4.8540%	4.8990%	4.9440%	4.9890%
2		AAA-										
3		AA+										
4		AA										
5		AA-										
6		A+										
7		A										
8	Barbados	A-										
9		BBB+	7.213%	7.284%	7.355%	7.426%	7.496%					
11	Trinidad & Tobago	BBB	7.232%	7.303%	7.374%	7.445%	7.516%					
12	Mexico	BBB-										
	El Salvador	BB+	7.399%	7.534%	7.670%	7.805%	7.941%	8.076%	8.212%	8.347%	8.483%	
		BB	8.549%	8.067%	19.086%	9.204%	9.322%					
14	Grenada	BB-										
13	Dominican Republic	B+										
15	Belize	B+										
16	Jamaica	B+										
17		B-										
18		CCC+										
19		CCC										
20		CCC-										
21		CC+										
22		CC										
23		CC-										
24		C+										
25		C										
26		C-										