

7-30-2009

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Gracia S. Ugut  
*Asian Institute of Management, gugut@aim.edu*

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### Recommended Citation

Ugut, Gracia S. (2009) "Ten-Year after the Asian Financial Crisis: Understanding Spread Determinants on New Emerging Market Bonds," *The Indonesian Capital Market Review*. Vol. 1 : No. 2 , Article 1.

DOI: 10.21002/icmr.v1i2.3630

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# CAPITAL MARKET REVIEW

## Ten-Year after the Asian Financial Crisis: Understanding Spread Determinants on New Emerging Market Bonds

Gracia S. Ugut\*

*The spread determinants of emerging market bonds have shown some similarity with the non-investment grade bonds. In the study, the author found that there are significant numbers of quantifiable factors to explain the variance in the risk premium. The factors were classified into company specific variables and macro-economic variables, such as rating, term, and secondary market spread, interest rate change and rising price of commodities. For the unexplained variance in risk premiums, the study suggested some explanation on the underwriter's effectiveness in presenting the issuer to the investors and correlation of the emerging-market debt to the other asset classes.*

**Keywords:** *emerging-market debt, high-yield bond, credit spreads, primary market, spreads determinants.*

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### Introduction

Ten years after the financial crisis, we see new warnings of bubble economies, global imbalances, a Chinese economy slowdown and terrorism risks. But none of these seems to prevent the highest ever growth at Asian stock exchanges. Perhaps the best example is in Thailand, where the Asian crisis began ten years ago, Thai stocks are at 10-year highs.

The Morgan Stanley Capital International Asia Pacific Index has risen 22 percent over the past 12 months, as clear a sign as that Asia is investment destination once again. Asia equity

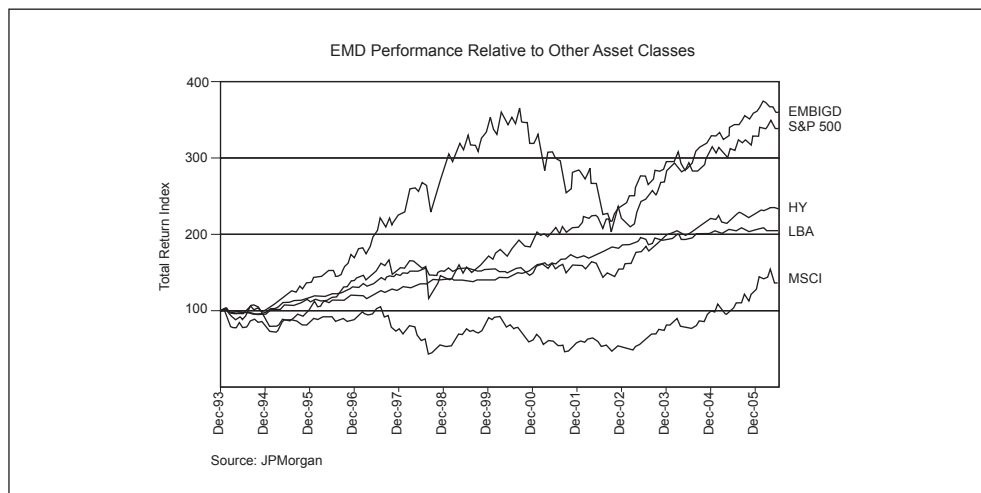
markets have gone as far as they can go without a real bond market. The dire need for world-class debt markets became clear at the height of financial crisis, when underdeveloped financial systems left economies hypersensitive to surging interest rates, credit crunches and currency down-spiraling. Deep debt markets offer investors a haven when stock markets show instability.

For all the high growth rates in Asia, the region still lacks the shock absorbing mechanism provided by liquid bond-markets. Functioning bond markets would reduce companies' reliance on banks for loans, making for more efficient allocation

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\*Correspondence to: Gracia S. Ugut, Asian Institute of Management, 123 Paseo de Roxas, Legaspi Village, Makati City 1260, Manila, Philippines. Email: [gugut@aim.edu](mailto:gugut@aim.edu), [gugut@smart.ap.blackberry.net](mailto:gugut@smart.ap.blackberry.net)

Figure 1. Emerging Market Debt Performance Relative to Other Asset Classes



of wealth and risk. At the moment, Asia also is facing another mismatch scenario with rising equity values and an underlying market infrastructure that may not support the optimism.

The bond markets in Asia are still highly fragmented. Efforts to deepen, link and publicize them are very much a work in progress. In April 2005, the Asian Development Bank launched the Asian Bonds Online web-site, a step-by-step guide on the mechanics of buying and trading Asian securities. Another initiative is the so-called Asian Bond Fund. It is an initiative by central banks to pool funds to buy US dollar bonds issued by the region's governments and local currency debt of economies such as China, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand. The creation of pan-Asia bond funds is making the issuance and trading of bonds more efficient because it eliminates red tape, uncertainties, conflicting regulations, and makes it easier to monitor bond yields and assess the level of risk throughout the region.

Such efforts will have two big pay-offs in the long run. One, they will attract more

capital to Asian debt, deepening markets, boosting liquidity and lowering interest rates. Two, they will help Asia to bring back fund that have been parked in assets such as US Treasuries.

Given the breadth of Asia's financing and infrastructure needs, the region offers almost unparalleled opportunities for developing the bond markets, particularly for non-investment grade debt offering. This paper explores the company specific variables and environmental variables that determine the spread on new high yield or non-investment grade bonds. As many bond traders aware, non-investment grade debt offerings have a reputation for which objective valuation criteria are difficult to establish.

## Literature Review

Many portfolio managers who specialize in the emerging-market bond sector rely heavily on the new-issue market. As a result, the performance of emerging market debt managers is highly sensitive to their valuation skills in the primary market. Curiously, there

was very few has been published on the subject of pricing new emerging market debt issues. In this study, the author was using the literature of high yield bond as the reference for the study on emerging market bonds. Handbooks of high yield bond, such as Altman (1990), Fabozzi and Cheung (1990), Fridson (1989), Reilly (1990) and Yago (1991), discuss credit analysis but do not explicitly link the resulting risk assessments to valuation. This study undertook to fill the study gap on emerging market debt primary pricing by analyzing the variance in a sample of prices as a function of quantitative factors. In this way, the author hoped to measure the extent to which the new issue market reflects objective considerations, as opposed to stories. Eichengreen and Mody (1998) documented that in poor market conditions, primary market spreads do not rise proportionately and even fall at times, when secondary market spreads rise. They attributed this observation to the tendency for the number of issues to fall and for only the less risky borrowers to remain in the market during such turbulent times. The author was aware that to certain extent that institutional investors cannot derive completely objective prices for a new issue floated non-investment grade bond, without considering the quality of the issuer's execution through the effectiveness of the underwriter in presenting the deal to analyst and portfolio managers.

Understanding the factors that influence yields on corporate bonds is not new. There have been three generations of yield premium and yield spread models. The first generation focused on the market yield premium for holding risky debt (the average yield spread between risky debt securities and the risk-free securities) (Altman and Bencivenga, 1995; Fons, 1987). This break-even type approach is a long-run analysis that calculates whether there is a net return (i.e. yield premium

minus default rate) for holding risky bonds over a long period. A second generation of yield spread models developed by Fridson and Jonsson (1995). These models focus on the short-term dynamics of the credit spreads and include liquidity risk measures and a broad definition of default risk. A third-generation model was developed by Barnhill, Joutz and Maxwell (2000). The later model augments the first-generation model by adjusting the default risk in the long run and merges this information with the second-generation yield premium models focusing on the short-run dynamics.

Bookstaber and Jacob (1986), Ramaswami (1991) and Shane (1994) demonstrate that non-investment grade bonds move with equity indexes. This relationship is consistent with the Black and Scholes (1973) model of firm capital structure-contingent claim analysis. The bondholders' payoff is the value of the bonds (on the upside) or the value of the firm on the downside. In this framework, the closer the value of the bond is to the total firm value (high leverage), the more highly correlated changes in bond value and changes in equity value will become. The greater the positive difference in the value of the firm compared to the value of the bonds (low leverage), the more highly correlated changes in bond value and in risk free bond values will become.

Wather (1995) finds that mutual fund investment flow influenced stock and bond returns. Since mutual funds make up large segment of the market, the change in mutual fund flow and the liquidity position of the mutual funds could have significant effect on market yield. Barnhill et al (2000) and Fridson and Jonsson (1995) find fund flow into emerging market bond mutual funds, as a percentage, to be associated with a narrowing of the yield spread an increase in the price of non-investment grade securities. Net inflows

of funds are thought to affect the short-run pricing of securities, but not the fundamentals.

The model proposed by the author for the new emerging market debt in this study is based on many factors that affect the spread of non-investment grade (or new high-yield) bond. There are two underlying variables used in the model: company specific variables and macro-economic variables.

Completing the model requires estimates of the features of the bond and various macro-economic variables related to the credit spread over the treasuries and within the BB-B rating classes and the change in the interest rates that will have an impact to the volatility of the initial bond spread.

The full functional dependence of the value of the emerging market bond spread may be expressed as follows:

$Spread(R, S, T, C, \alpha, \beta, \chi, \delta, \varepsilon, \varphi, \gamma, \mu, \pi, r)$

Where:

$R$  = Credit-risk rating; Moody's senior equivalent rating

$S$  = Seniority; dummy variable: 0=senior, 1=subordinated

$T$  = Term; Maturity in years

$C$  = Callability; dummy variable: 0= non-callable, 1= callable

$\alpha$  = Float size; Principal amount at issue (in USD millions)

$\beta$  = First time issuer; dummy variable: 0=no, 1= yes

$\chi$  = Underwriter type; Dummy variable: 0= investment bank, 1= commercial bank

$\delta$  = Spread versus Treasuries; yield differential between EMBI Master Index minus 10-year Treasuries, in basis points

$\varepsilon$  = BB-B spread; yield differential Single B index minus Double B Index in Basis points

$\varphi$  = Default rate; Moody's trailing-12 month issuer based default rate

$\gamma$  = World Commodity Price; S&P Goldman Sachs Commodity Index Price

$\mu$  = IPO Volume; Monthly initial public offerings (in USD)

$\pi$  = Mutual fund Flows; Monthly net inflows to emerging market bond funds, in USD

$r$  = Interest rate change; Month-over-month change in yield on 10-year Treasuries (in basis points).

## Methodology

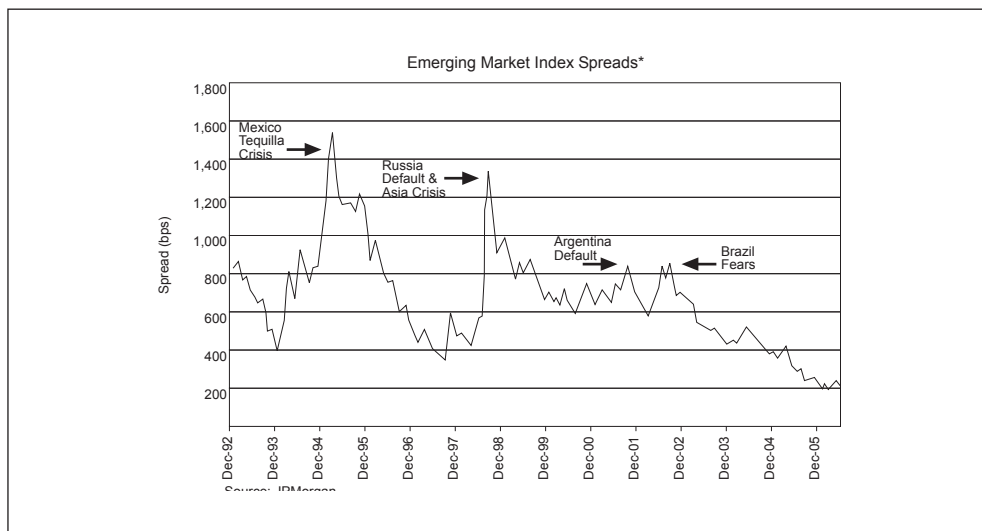
### Data and Hypotheses

The observation period for this study covered the period of 2004 and 2005. This two-year span offered reasonable variation in market conditions. The emerging market credit spreads have narrowed steadily (Figure 2), which has been the principal driver of the improved performance. Emerging market debt credit spreads, in fact, are now at all-time lows.

From Euromoney Bondware, Dealogic and IFR Asia data, there was an initial sample of 56 emerging-market bonds issue floated during the observation period. After eliminating issues that were non-rated, and rated above B3 by Moody's Investor Service, or had issue floating-rate coupons, we obtained a final sample of 48 issues. The sample only included the conventionally underwritten public bond.

The study has excluded variance related to the general rise and fall of default-free bond yields. To filter out this, each emerging market-bond issue's initial offering yield is defined as a spread over the same day yield on a Treasury security of similar maturity. The author then set out to identify the factors that caused this spread to vary from issue to issue by putting new issue spread as dependent variable in the multiple regression analysis for this study.

Figure 2. Emerging Market Index Spreads



The author uses a multivariate model of in order to determine emerging-market bond spreads. The independent variables consist of six Company Specific Variables and eight Macro-environmental specific variables.

### Company Specific Variables

There were six variables specific to individual issuing companies, i.e. credit-risk rating, seniority, term, callability, issue size, whether the bond was from a first-time issuer and the type of underwriter.

### Credit-Risk Rating

In general the lower the rating is (which means the higher the indicated probability of default), the wider the spread should be. To obtain pure default risk measures, all the rating sin this study is expressed in senior equivalent terms. As explained by Fridson and Garman (1995), the correlation between ratings and spreads is constrained by the fact that ratings measure both probability and severity of default. The consequent of problem is that the like-

rated bonds do not always have equivalent implied total risk (i.e. probability times severity). As an example, a B+ bond may be either a senior issue of a company with B+ default probability or a subordinated issue of a company with considerably lower BB default probability. Fridson and Garman (1998) also demonstrated that the senior bond's lesser severity does not fully offset the disadvantage of its greater default probability.

### Seniority

Given the two bonds of equivalent default probability, a rational investor will demand a larger risk premium for the one that has default severity. Consequently, the study should observe a correlation between initial offering yield and ranking within the capital structure. Ranking boils down to whether the issue is senior or subordinated. Subordinated implies greater default severity, hence requires higher yield. In this study, the author used a dummy variable to indicate subordination, and no gradations within the broad rankings are taken into consideration in this study.

## **Term**

Instead of using the term structure of interest rates, the possible pricing influence is captured in the prevailing yield curve of pure interest rates, i.e. the rates of default-free Treasuries. The author used final maturity as a measure of term.

Kim, Ramaswamy and Sundersan (1993) presented a theoretical model for yield spread as a function of maturity. In the case of callable bonds, they predicted a general pattern of spreads: smallest in very short maturities, peaking in intermediate maturities and declining with maturity in the long end. Longstaff and Schwartz (1995) derived a more complex relationship in which spread increases between the first 5 to 10 years of maturity, then declines.

On the other hand, Fons (1994) empirically observed a pattern of the spread increasing with maturity of investment grade bonds but decreasing with maturity for non-investment grade bonds. The author hypothesized that the data on non-investment grade issues in this paper would corroborate Fons' results.

## **Issue Size**

Marketability of a bond is a very important benefit. It enhances the ability of a security's holders to shift their portfolio mixes in response to changes in personal circumstances, market conditions, or the security's expected return or risk. The author hypothesized that the larger the issue size, the smaller the risk premium.

## **Callability**

An option to retire a bond prior to its final maturity has considerable value for its issuer. If the general interest rate declines between the issuance date and the scheduled maturity, the issuer can refinance at a lower rate. According to

Kalotay (1997), the issuer also will call the bond if its credit quality improves to obtain a lower cost of financing.

The call option that is triggered by the improvement in credit quality is especially pertinent for non-investment grade issues because it can represent sizable cost savings for issuers.

On the other hand, an early redemption represents a cost to investor, who is forced to reinvest at a reduced interest rate. The rational investor will demand compensation for incurring this risk, so the author hypothesized that callable bonds carry wider spreads than non-callable bonds. In the study, the author modeled the callability as a simple yes/ no proposition, without further distinction on the length of call protection and required premiums to be paid to investors.

## **First-Time Issuer**

Portfolio managers demand an incremental risk premium on bonds of companies that have not been in the public markets previously, because there is no basis for judging management credibility. The author hypothesized that companies identified by a dummy variable, as first-time issuers would have larger spreads than seasoned issuers.

## **Underwriter Type**

In general, portfolio managers report that they need an extra yield inducement to participate in a emerging market offering by an underwriter that lacks of strong reputation for supporting its deals in the aftermarket because providing a supporting bid in a volatile market requires capital commitment.

In the more developed bond market, commercial banks are treated as newcomers to corporate bond underwriting. In this paper, the author hypothesized that issues

underwritten by commercial banks have larger spreads than issues underwritten by investment bank. A dummy variable represented this variable.

### **Macro-Environmental Variables**

There were eight environmental variables: spread versus treasuries, BB-B spread, yield curve, rising commodity price, default rate, mutual fund flows, and changes in interest rate.

### **Spread versus Treasuries**

According to the law of one price, the issuer's valuation must be affected by the returns available on substitutable assets. Seasoned emerging market bonds are substantially substitutable for new issues. Accordingly an increase or decrease in the yield spread on an index of seasoned issues should be accompanied by a roughly parallel move in new issue spreads. The author hypothesized that the wider the emerging market sector's spread versus Treasuries at the time of issue, the wider the new issue's spread.

### **BB-B Spread**

New issue spreads may also be sensitive to changes in risk premiums in intra-market spreads in emerging market bonds universe.

Fridson and Garman (1998) showed that the spread between BB and B corporate bonds move somewhat independently overtime. Therefore, it is reasonable to surmise that the BB-B spread may have explanatory power distinct from that of the market-wide spread versus Treasuries (please see Spread versus Treasuries). The author hypothesized that a wide BB-B spread is associated with wide new-issue spreads.

### **Default Rate**

It seems reasonable to suppose that the risk premium on new emerging market debt issues increases when perceived credit risk increases in the market as a whole. The author hypothesized that the high default rates coincide with wide spread.

### **Yield Curve Slope and Shape**

When a short-term interest rate are high relative to long-term bond yields (indicate a negative sloped yield curve), the interpretation is that the central bank is keeping credit tight, which may lead to recession, and implies increased default risk. Accordingly, the author hypothesized that the treasury long-term yield minus short-term yield was negatively correlated with the spread versus Treasuries.

### **World Commodity Prices**

Many developing economies are heavily exposed to commodity markets. Lu and Neftci (2008) found that by extracting commodity price risk out of a bond, the bond credit spread would be lower and marketability and liquidity of the bonds would increase. Accordingly, the author hypothesized that the rising commodity prices was positively correlated with the spread of the Asian emerging market bond

### **IPO volume**

Investors may accept comparatively modest risk premiums on emerging market bond when the stock market is ebullient. High equity valuations connote general optimism about the economic outlook. A bull marketing stocks can enable non-investment grade companies to strengthen their balance sheets by raising new equity. The author hypothesized that large IPO volume is associated with narrow spreads



on new emerging market debt issues.

### Mutual Fund Flows

The demand side of the supply-and-demand equation may be captured reasonably well by the flow of capital into or out of emerging market bond mutual funds. The author hypothesized that large-inflows to the emerging market bond funds to be associated with narrow spreads over Treasuries.

### Interest Rate Change

Fridson and Kenney (1994) found a negative correlation between changes in the yield on 10-year Treasuries and changes in the spread versus Treasuries. Therefore, the author hypothesized a negative correlation between the spread versus Treasuries.

## Result and Discussion

Table 1 shows the ranking of the proposed independent variables in order of their absolute correlation ( $R$ ) with the spread versus Treasuries for 2004-2005 period. Table 1 also contains each

variable's percentage of variance explained ( $R^2$ ), which was considered in assessing its fitness as a variable in the final model. Most of the correlation signs are consistent with the authors' hypotheses. There are two variables with absolute weak correlations, i.e. below 0.10: default rate and term). These two variables are considered as immaterial rather than to be the indicators of irrational behavior by investors.

Table 1 shows that ratings have the highest correlation of any variable with new issue spreads. The strength of the correlation with new issue spreads drop sharply below the line for ratings.

The author sought to maximize the model's explanatory power ( $R^2$ ), subject to avoiding statistical distortions that might arise from effects such as multicollinearity. Stepwise regression was among the tools used, but not the sole technique, that the author used in identifying the optimal combination of variables.

Various combination of the proposed independent variables explained respectable percentages of the variance in new-issue spreads. Through various combinations, the highest  $R^2$  is approximately 55%. The best obtainable model is shown in Table 2 The percentage of variance explained is 59

Table 1. Variables Affecting New Issue Spread, 2004-2005

| Description            | Sign | $R^2$  |
|------------------------|------|--------|
| Rating                 | +    | 51.31% |
| Callability            | +    | 17.45% |
| First time Issuer      | +    | 4.12%  |
| Underwriter Type       | +    | 2.83%  |
| Seniority              | +    | 1.045% |
| Issue size             | -    | 0.94%  |
| Term                   | -    | 0.88%  |
| Default rate           | -    | 0.59%  |
| Spread over Treasuries | +    | 0.38%  |
| Yield curve            | -    | 0.67%  |
| Mutual Fund flows      | +    | 0.39%  |
| Commodity Price        | -    | 0.30%  |
| BB-B spread            | +    | 0.17%  |
| IPO volume             | -    | 0.43%  |
| Interest rate change   | -    | 0.05%  |

Table 2. Multiple Regression Model of New High Yield Issue Spread, 2004-2005

|                      | Coefficient | t-stats | p-value | Confidence Level |
|----------------------|-------------|---------|---------|------------------|
| Intercept            | -189.87     | -3.98   | 0.00    | 99%              |
| Rating               | 71.54       | 15.44   | 0.00    | 99%              |
| BB-B Spread          | 94.76       | 3.98    | 0.00    | 99%              |
| Term                 | - 9.67      | -3.64   | 0.00    | 99%              |
| Seniority            | 39.65       | 3.15    | 0.00    | 99%              |
| Callability          | 54.88       | 3.06    | 0.00    | 99%              |
| Interest rate Change | 48.56       | 2.74    | 0.02    | 97%              |
| First time issuer    | 27.81       | 2.53    | 0.03    | 95%              |
| Underwriter type     | 24.32       | 2.32    | 0.03    | 95%              |
| $R^2$                | 0.59        |         |         |                  |
| Adjusted $R^2$       | 0.57        |         |         |                  |
| Observations         | 48          |         |         |                  |

percent (adjusted  $R^2= 57$  percent). There are eight explanatory variables significant at the 95 percent confidence level or higher and have p-values, which indicating the probability of the indicated correlation sign being wrong) of 5 percent or less.

The explanatory variables ranked by absolute value of t-statistic are:

1. Rating
2. BB-B spread
3. Term
4. Seniority
5. Callability
6. Interest rate change
7. Commodity price
8. First time issuer
9. Underwriter type

The 59 percent  $R^2$  that the author encountered suggests that the pricing of new emerging market issues is highly dependent on factors that do not lend themselves to the sort of modeling used in this study. One of the explanation stems from the quality of the management communication during the “roadshow”. A good roadshow might be one in which credible investment merits are communicated effectively. The other possible explanation of unexplained variance is the correlation of emerging market debt to the other asset classes. Table 3 showed correlations of monthly

total return indices for the period 1990 to 2006.

Table 3 showed that there is a strong correlation between emerging market debt with various asset classes during the period 1990 to 2005.

## Conclusion

The pricing of newly issued emerging market bonds is sensitive to quantifiable characteristics of the issue and the prevailing market environment. In the issue-characteristics category, a non-investment grade bond’s yield spread will be greater, all other things being equal, the lower its seniority in the capital structure, the longer its maturity, and if it is callable prior to maturity, if it is the bond of first-time issuer, or if it is underwritten by a commercial bank. As for the market environment, the yield will be higher, all other things being equal, the wider the secondary spread between BB and B corporate bonds and if Treasury yields rose in the month preceding issuance.

In the study, the author found that no more than 60% of the variance in pricing of new emerging market debt issues could be explained by objective factors. Two factors contributed to the explanation of the variance: the quality of the management

Table 3. Emerging Market Debt Correlation with Other Asset Classes

|            | UST  | High<br>Grade | High<br>Yield | MBS  | GI Agg | GBI  | S&P<br>500 |
|------------|------|---------------|---------------|------|--------|------|------------|
| UST        | 100% |               |               |      |        |      |            |
| High Grade | 91%  | 100%          |               |      |        |      |            |
| High Yield | 11%  | 40%           | 100%          |      |        |      |            |
| MBS        | 86%  | 85%           | 24%           | 100% |        |      |            |
| GI Agg     | 71%  | 70%           | 14%           | 64%  | 100%   |      |            |
| GBI        | 62%  | 56%           | 0%            | 53%  | 91%    | 100% |            |
| S&P 500    | -2%  | 19%           | 47%           | 12%  | 8%     | -1%  | 100%       |
| Average    | 49%  | 57%           | 26%           | 50%  | 48%    | 38%  | 19%        |

Correlations of monthly return indices calculated for the period of December 1990-December 2005.

Source: JP Morgan

communication during roadshow and the possible strong correlation of the emerging

market debt to the other asset classes for the period of 1990-2005.

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