Emerging Market Bond Returns – An Investor Perspective

D. Johannes Jüttner[*], David Chung[**], Wayne Leung[***]

Department of Economics, Macquarie University
Sydney, Australia 2109

Abstract

The novel features of this study consist in applying a conventional multifactor global market model to emerging market sovereign bond index rates of return that are denominated in US dollars and subsequently relating the unexplained residuals from the market model's estimates of each country's total bond index return to country specific factors. They include political and financial risks as well as other presumed determinants of bond index rates of return. The results of our study confirm that sovereign countries' bond index rates of return that include interest payments and capital gains/losses may be explained in terms of conventional bond pricing models by combining global market factors with local risk and other country-specific influences.

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[*] Corresponding author: Tel: +61 2 9850 8481 Fax: +61 2 9850 8586.
E-mail address: jjuttner@efs.mq.edu.au (D.J. Jüttner), david.chung@.counterpointgroup.com.au (D. Chung), wleung@efs.mq.edu.au (W. Leung).
[**] Tel.:+61 2 8307 3586; fax: +61 2 9262 7110
[***] Tel.: +61 2 9850 6138; fax:+61 2 9850 8586

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1. Introduction

The last twentyfive years provided international investors in sovereign bonds of emerging market countries with a colourful experience consisting of several defaults that resulted in protracted, frustrating and – most importantly – costly salvage operations.[1] It therefore appears natural to ask how international investors have priced sovereign bonds under these challenging conditions. The contribution of this study to the literature is twofold. *First*, we apply a conventional multifactor global market model to emerging market sovereign bond *index rates of return* that are denominated in US dollars. *Second*, the unexplained residuals from the market model's estimates in each country's total bond index return are then related to country specific factors. They include political and financial risks as well as other presumed determinants of bond index rates of return. The estimation approach allows us to separate out the common influences of global bond market movements from the country-specific factors that drive rates of return on the outstanding bonds of 19 emerging market countries from Latin America, Transition Economies, Asian and African countries.

In the literature on emerging market debt securities, the explanation of *bond spreads* has been the focus of attention where spreads are defined in a variety of ways. Some authors use issue yields of emerging market bonds minus the interest rate on a riskless benchmark bond such as

[1] Bond issues and defaults followed each other in surprisingly short intervals. The period spanning the creation of Brady bonds in 1982 out of the ashes of the preceding Latin American debt binge, the bond defaults associated with the Asian Crisis in 1997, Russia's bond default in July 1998, the near-collapse of the LTCM in September 1998, the Brazilian crisis that started with the devaluation of the Real in 1999 to the ongoing saga of the Argentinean default is characterized by market failures. Myopic behaviour of international investors and borrowers' careless assessment of their economies' strength made resulted in costly mistakes for both. However, bond defaults on a massive scale have a much longer history (See Mauro et al. 2002 and Max Winkler, 1933).

the 10-year US government security or LIBOR for the calculation of spreads – also called launch spreads.[2] Others compute corresponding yield spreads from bonds trading in secondary markets. Yield spreads are then related to a range of macroeconomic determinants, for example by Edwards (1984), Kamin and v. Kleist (1999), Eichengreen and Mody (1998) and Min et al. (2003). Mauro, Sussman and Yafey (2002) explain and compare spreads in the 1990s with those prevailing in an earlier globalization period, 1870 – 1913. Alternatively, such credit spreads are linked to credit ratings and other presumed economic determinants; Cantor and Packer (1996), Cunningham (1999), and Sy (2002) are investigations in this mould. Secondary market credit spreads plus the riskless rate of the appropriate maturity provide, inter alia, a risk adjusted measure of the debt cost of capital for emerging markets. Launch yields measure marginal debt costs and are thus particular important for borrowers. Credit spreads and bond returns for that matter, may be obtained for individual securities or indices of emerging market bonds. Due to liquidity, size and ratings requirements, and most importantly availability, yield spread studies of emerging markets focus on sovereign bonds.

However, from the investor perspective emerging market bond yields and associated credit spreads derived from yields to maturity are of limited value as they remain silent about holding-period yields that fall short of the maturity of the bond. Such investment returns include, besides accrued or received coupon and amortization payments, capital gains (losses) as a result of general market interest rate falls (increases) and of country-specific risk premia adjustments. Total return bond indices capture these various return components on a daily,

[2] The required sovereign bond yield for a particular country is defined as the yield that sets the net present value of the discounted cash flows (coupon payments) equal to zero. This yield is also known as redemption yield, theoretical yield or as the bond's internal rate of return. It only accrues if the bond is held to maturity and reinvestment of interim cash payments at the current yield occurs.

weekly, monthly or any other desired period. By basing our estimates on such indices our research approach pays more attention to the investor perspective than studies employing yields or credit spreads. In the presence of significant capital gains/losses (see Table 2), changes in expected total bond index returns provide a trigger for purchases or sales of bonds rather than pursuing a buy-and-hold strategy.

The research methodology we employ entails a two-stage regression test procedure. *First*, we estimate a two-factor international market model by regressing quarterly rates of return of a particular country's sovereign bond index on quarterly rates of return of the corresponding global bond market index and on crude oil price changes. For the country specific and the global bond market we employ the JP Morgan global emerging market bond index (EMBI Global). *Second*, the unexplained residual from the market model's estimates in each country's total bond index return is then related to country-specific factors. Amongst the presumed explanatory variables are various alternative risk measures that capture changes in emerging markets' financial and political risks as well as other explanatory variables namely GDP growth and inflation. Emerging markets may not form a homogeneous set. We test this hypothesis by splitting up the group into oil-importing and oil-exporting emerging countries and carrying estimates for the two sets of countries separately and, for purposes of comparison, also collectively. In order to obtain information about whether our model has more general validity and robustness we also include a control group of developed countries in our sample estimates. In the next section we develop the underlying model and formulate the test equations. Subsequently in part 3, the data and descriptive statistics are discussed. In section 4 we present the results and the final part concludes.

2. Model Development

The investigation focuses on the investor perspective of emerging markets' bond index returns. The research methodology is embedded in the capital asset pricing approach at the international level. The market model estimates postulate a positive relationship between the return on a suitably chosen emerging market bond index and the return on individual countries' own outstanding foreign-currency bonds where the bonds underlying both indices are all denominated in US dollars. Bonds denominated in local currencies, or in any other denomination, are excluded. This seemingly excludes exchange rate risk for dollar-based investors. However, exchange rate risk of the emerging market countries may affect the prices of their corresponding dollar bonds. For example, during the recent peso-crisis in Argentina, we also observed a dramatic fall in this country's dollar-denominated bond prices. Therefore, the denomination in the numéraire currency notwithstanding, exchange rate risk appears to be a local risk factor even for dollar-based holders of EMBI bonds.

Our research hypothesis contends that yields on sovereign bonds are influenced by common global market risk factors on the one hand and local idiosyncratic influences due to diversification limitations and other capital market imperfections on the other. Our research strategy attempts to separate out the impact of the common market on countries bond rates of return from the risk influences in local bond markets by applying a two-stage estimation procedure. Using an international multi-factor model (IMFM) we regress in a first stage estimation a panel data set of emerging market bond rates of return on a suitably chosen global market return index. In order to test whether bond rates of return of emerging market countries are, in addition, systematically influenced by oil price changes, we

augment the one-factor model by including the oil price change. Oil importing countries form the vast majority of our sample. In our estimates we use quarterly percentage changes of the dependent and the independent variables.

The estimation equation for the international multifactor model (IMFM) for the EMBIG-countries may be written as

$$r_{i,t}^{EMBIG} = \alpha_i + \beta_{1i}\, r_{M,t}^{EMBIG} + \beta_{2i}\, r_t^{OIL} + r_{it}^{RES\text{-}EMBIG} \qquad (1)$$

where

r_i^{EMBIG} = percentage rate of return on Emerging Market Bond Index Global of country *i*

r_M^{EMBIG} = percentage rate of return on Emerging Market Bond Index Global of all index countries

r^{OIL} = percentage rate of return of oil price

α_i = intercept

β_{1i} = sensitivity measure of individual country's rate of return to changes in market rate of return

β_{2i} = sensitivity measure of individual country's rate of return to changes in oil prices

$r_i^{RES\text{-}EMBIG}$ = unexplained residual of the EMBIG return of country *i*.

The explanatory content of (1) is reflected, in the first instance, in the two beta-coefficients; we expect the coefficient β_{1i} for all *i* countries to be positive, implying that a global rise in bond index returns spills over into an increase in bond returns in country *i*. The sign of the coefficient β_{2i} of the crude oil price is expected to be negative for oil importing countries and positive for oil exporting countries. The unexplained variation in each country's total bond index return component of the estimation approach is reflected in the residual $r_i^{RES\text{-}EMBIG}$. We link this component in a second-stage estimation procedure to country-specific risk factors.

In order to check on the robustness of the results we have carried out parallel investigations for a select control group of developed OECD countries. In contrast to the emerging market group of countries we do not expect oil price changes to exert a systematic influence on the bond returns of OECD countries. The reasons for this view will be discussed jointly with the results. Consequently we specify the estimation equation for the international market model (IMM) using MSCI bond index returns of OECD countries to have the following form:

$$r_{i,t}^{\text{MSCI-OECD}} = \alpha_i + \beta_i \, r_{M,t}^{\text{MSCI}} + r_{it}^{\text{RES-OECD}} \qquad (2)$$

where

$r_i^{\text{MSCI-OECD}}$ = percentage rate of return on MSCI Bond Index of OECD country *i*
r_M^{MSCI} = percentage rate of return on MSCI Bond Index of MSCI index countries
$r_i^{\text{RES-OECD}}$ = unexplained residual of the bond index return of MSCI country *i*
β_i = sensitivity measure of individual country's rate of return to changes in MSCI rate of return

Subsequent to having estimated the two versions of the index model as given in (1) and (2) we will regress the residuals of the equations in stage two on local risk factors.[3] The unexplained residuals of estimating the factor models ($r_{it}^{\text{RES-EMBIG}}$ and $r_{it}^{\text{RES-OECD}}$) are related to country-specific risk factors in (3) and (4). Which local factors in emerging markets are the most likely to exert their impact on the residual of the multi-factor equation? While no theoretical model exists to guide us in this task we can lean from the experience of ratings

[3] In applying a two-stage estimation procedure we follow Bilson et a. (2002) who investigate the relationship between political risk and stock returns in emerging markets. They choose this estimation approach in order to avoid problems arising from non-orthogonality between the global and local risk factors. Our estimation method is motivated in addition by clearly separating the market model technique of (1) and (2) from the empirical specifications of equations (3) and (4).

agencies when they assess the creditworthiness of companies and countries in emerging markets and follow the literature on credit spreads.[4] Emulating the approach taken by ratings agencies and following previous yield spread studies, we focus on three broad categories of relevant local factors: political, financial and certain macroeconomic risks. We expect the estimation results to reveal to what extent these three categories of country-specific risk factors add explanatory power to the pricing of bond index returns of equations (1) and (2).

The initial version of the country-specific risk factor model of bond returns for emerging market countries is given in (3). For the local risk factors of EMBIG countries we alternatively employ summary political and financial risk variables in the regression equation (3) as well as in (4) for the control group of countries. In addition we also include the rate of change of the corresponding local exchange rate vis-à-vis the dollar in both equations.

$$r_{it}^{\text{RES-EMBIG}} = a_i + b\ PRisk_{it} + c\ FRisk_{it} + d\ FX_{it} + e_{it} \qquad (3)$$

$$r_{jt}^{\text{RES-OECD}} = a_j + b\ PRisk_{jt} + c\ FRisk_{jt} + d\ FX_{jt} + e_{jt} \qquad (4)$$

where
$PRisk_i$ = political risk of country *i*
$FRisk_i$ = financial risk of country *i*
FX_i = quarterly changes in the local/US$ exchange rate of country *i*
The subscript j in (4) refers to the control group of OECD countries.

In order to allow for economic factors to exert their impact on local bond returns, we include for each emerging country their respective growth rate of GDP and the inflation

[4] Bhatia (2002) provides an assessment of the ratings methodology; relevant studies of the literature on credit spreads have been listed above.

rate in (5). The corresponding test equation for the control group of OECD countries is portrayed in equation (6). We omitted price changes as inflation did not appear to pose a problem in this group.

$$r_{it}^{\text{RES-EMBIG}} = a_i + b\ PRisk_{it} + c\ FRisk_{it} + d\ FX_{it} + e\ GDP_{it} + f\ CPI_{it} + \varepsilon_{it} \quad (5)$$

$$r_{jt}^{\text{RES-OECD}} = a_j + b\ PRisk_{it} + c\ FRisk_{it} + d\ FX_{jt} + e\ GDP_{jt} + \varepsilon_{jt} \quad (6)$$

where
GDP_i = quarterly growth rates of real GDP of country *i*
CPI_i = quarterly inflation rates of country *i*
ε_i and ε_j are stochastic error terms. All other variables have been defined before.

Including the 10-year US government bond yield, commonly regarded as the riskless benchmark for the pricing of emerging market bonds, did not contribute any additional explanatory power to equation (5). The literature is divided on the issue whether emerging market bond yields are influenced by the US bond interest rate. Ferrucci and Taylor (2004), McGuire and Schrijvers (2003) as well as Eichengreen and Mody (1998) find a positive relationship between the US long-term yield and emerging market spreads while Arora and Cerisola's (2001) tests show a negative relationship.[5] Our negative finding may be due to the bond rates of return being dominated by capital gains/losses during a turbulent period.

[5] We also included amongst the local risk factors international liquidity and solvency measures such as the ratio of international reserves to GDP and imports. These variables may perform a signalling function to international investors. None of the ratios yielded significant results. This is hardly surprising since foreign currency reserves data for most of the sample period were unreliable. For example, some central banks intervene in forward markets to prop up the value of their currencies. This involves forward selling of foreign reserves against delivery of their own currency in the future. As a result the stock of reserves on central banks' balance sheets may be misleading as recorded reserves have already been committed for delivery at maturity of the sold forward contracts. This lack of transparency may have undermined the reliability of foreign reserves as an indicator of a country's solvency and stability in the eyes of international investors which would explain our inconclusive estimation results.

3. Data

Most of the data has been sourced from DataStream with the exception of the risk indices which were bought from *International Country Risk Guide*. The JP Morgan (1999) emerging markets bond index (EMBI Global) represents the market-capitalization-weighted average bond index returns for twenty seven emerging markets bonds.[6] The index includes exclusively US$-denominated Brady bonds, Eurobonds, traded loans and local market debt instruments of sovereign or quasi-sovereign entities. Bonds of a minimum issue size of US$500 million and a broad maturity range are included in EMBI Global. Only instruments with at least 2.5 years until maturity are considered for inclusion and they remain in the index until 12 months before maturity. Bonds with a maturity of less than one year are infrequently traded; consequently their prices could be distorted. The eligibility as an emerging country coincides with the World Bank's definition of having a low or middle per capita income level. Moreover, a country with a debt restructuring history will also be included in the bond index regardless of income level. In order to broaden the market representation of the index, no minimum bid-ask spreads or a specific number of inter-dealer quotes are required. The less demanding liquidity requirements of the index broaden its market capitalization as more issues can be included. The total bond market index returns for the universe of selected emerging market bonds, denoted r_M^{EMBIG}, include interest payments, capital gains/losses and capital entitlement payments. Since all included bonds are dollar-denominated, returns are naturally expressed in US dollars. While US investors thus do not directly face nominal exchange rate risk, non-US investors, on the other hand, would be exposed to currency risk. The index returns for individual emerging

[6] Cunningham (1999) explains and compares in detail several emerging market bond indices, including the EMBI Global.

market countries (r_i^{EMBIG}) are similarly defined and measured as they are the constituent components of the return on the market. As already mentioned, new-issue and secondary market yields are quite different from total rates of return on outstanding bonds. The former are of paramount importance for borrowers' cost of debt capital but they play a subordinate role for investors with holding periods that diverge from the maturities of the bonds in their portfolios.

The IMM for the control group of developed countries employs the Morgan Stanley Capital International (MSCI) World bond index rates of return ($r_M^{MSCI\text{-}OECD}$) as the independent variable in (2). For sample countries we use the rate of return on the MSCI World bond index for the appropriate country *i* ($r_i^{MSCI\text{-}OECD}$). The structure of the MSCI for sovereign bonds is very similar to that of the EMBI Global, except that it includes foreign currency denominated sovereign bonds of a range of countries (see www.msci.com/income/index.html for the country/weighting composition). Our study is based on the MSCI denominated in US dollars. In other words, bonds issued by OECD countries and denominated in US dollars, euros, yen and other major currencies are included and all are expressed in US dollars. However, the US is excluded form the sample as the dollar serves as the numéraire currency.

As we are regressing the EMBI Global and the MSCI on the respective countries' bond index returns of the two groups, we have to purge the two market indices of the countries' shares in the index in equations (1) and (2). For example, the rate of return on Japanese sovereign bonds should be regressed on the return on the MSCI-without-Japan. However,

this breakdown is not available for the EMBIG and for the MSCI only for Japan, the US, the UK, Australia and Switzerland.

The quarterly Crude Oil (Brent) prices are averages of daily quotations from DataStream; the real GDP growth rates, the inflation rates and the exchange rate changes come from the same source. The frequency of all data is quarterly. For the identification and measurement of country-specific political and financial risks we rely on the Political Risk Services (2003) of the *International Country Risk Guide* (ICRG) that specializes in the risk assessment of countries. In each risk category numerical risk points are assigned to a predetermined range of risk components according to a preset, weighted scale for each country (See Table 1).

Table 1 here

The highest value of the overall political risk rating (100 points) indicates lowest risk and the lowest ranking (theoretically 0) measures highest risk. In a similar way financial risk is assessed; however, the maximal attainable points in each risk category are limited to 50. The political and financial indices are used as proxies for the corresponding risks. Their multifaceted and difficult to measure nature makes it virtually impossible to capture each in a single quantifiable variable.[7]

[7] We decided against including a raft of proxy variables for political and financial risks in our estimation equations. Assuming their availability, the majority would presumably be highly correlated and some political risk components may reflect unique events. We do not know of any study that has evaluated the reliability of the ICRG's data, though they have been successfully applied by Erb *et al*. (1996) and Bilson *et a.* (2002). The use of indices for complex qualitative/quantitative variables is not unknown in the literature; see for example, the innumerous studies explaining and employing credit ratings.

The sample includes the 19 emerging market countries that are part of the EMBI Global. The countries are then further separated into six (net) oil-exporting and 13 (net) oil-importing nations according to the 2002 edition of the OPEC Annual Statistical Bulletin. Lack of data for some of the independent variables prevented us from including the total set of emerging market countries.[8] A control group of 17 countries was selected from the listed 30 OECD countries. We eliminated those overlapping with our emerging market group and others with no MSCI indices or incomplete MSCI data for the whole period of 1994(1) to 2003(3), leaving us with 17 countries as the control group.[9] The data for the group of developed countries cover the whole period, this is not so for emerging market countries. The data sample number is given at the bottom of Panel A of Table 2.[10]

Table 2 here

The descriptive statistics of the two country groups in Table 2 paint a familiar picture. Required rates of return in emerging bond markets are significantly higher than those available in developed countries (3% versus 2%) but at the same time they are associated with greater risk (SD of 7% vs 4%). The differences between the highest maximal and minimal rates of return for the two country groups are remarkable. They amount to 44% and – 54%, respectively, for emerging market countries and 18% and – 13% for the control group of countries. The magnitudes of maxima and minima for emerging market countries appear to suggest that capital gains swamp interest incomes. The return distributions show for 16 of the 19 EMBIG countries the expected negative (left) skewness while three countries have positively skewed return distributions. The at times significantly negative minimal rates of

[8] The 19 EM countries include 13 oil importing countries comprise Argentina, Brazil, Bulgaria, Chile, Croatia, Hungary, Korea, Peru, Philippines, Poland, South Africa, Thailand and Turkey. The oil exporting countries are Colombia, Ecuador, Malaysia, Mexico, Russia and Venezuela.

[9] They consist of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland and the UK.

[10] A list of the sample periods applying to each of the merging market countries is available upon request.

returns for individual countries as well for the group confirm this observation. The number of leptokurtic (16) exceeds those of platykurtic (3) distributions. According to the Jarque-Bera statistic we accept normality for 10 and reject it for the remainder of countries at the 5% level. All countries' distributions of quarterly returns of the MSCI bond index are positively skewed; as well seven are leptokurtic and ten are platykurtic; most (except for two) are normally distributed.

One caveat has to be mentioned. When comparing the rates of return in the bond markets for the two groups of countries, one has to be aware of the differing roles currency appreciations and depreciations play in the two indices. For bond yields in the EMBIG currency risk does not play an *explicit* role as the index contains only dollar-denominated bonds while the bonds in the MSCI are sovereign-currency-denominated bonds. The rates of return in the MSCI therefore contain possible diversification benefits from low or negative correlations between bond returns and currency adjustments. Such potential benefits are absent form the return calculations of EMBIG.[11]

The research is carried out as unbalanced panel estimates with quarterly data for the years 1994(1) to 2003(3). Results of unit root tests for panel data using test by Levin-Lin-Chu (2002), Im-Pesaran-Shin (2003), and Hardi (2000), Fisher-type Augmented Dickey-Fuller (ADF) and PP test [Maddala and Wu (1999) and Choi (2001)] indicate stationarity for the vast majority of the dependent and independent variables at both estimation stages. The remainder passed at least two of the five tests of the sample data with the exception of the

[11] Whether any diversification benefits accrue to international investors depends on the existence of low or negative correlations between bond returns of one country and its exchange rate with the US dollar.

GDP growth and the inflation rates; they therefore enter the estimation equations in first difference form. The empirical tests yield highly relevant results in terms of adjusted R^2s, as well as significant estimates for most of the variables in terms of p-values, F-statistics and other diagnostic statistics appropriate for panel data. Standard errors are corrected using period Seemingly Unrelated Regression (SUR) with Panel Corrected Standard Errors (PCSE). This corrects for both period heteroskedasticity and general correlation of observations within a given cross section (Beck and Katz, 1995). A first order autoregressive AR(1) term is added to all equations and estimates are calculated using period SUR PCSE methods for the computation of standard errors that are robust to more general serial correlation using EVIEW 5.

4. Results

The results for the IMFM and the IMM of equations (1) and (2), respectively, are presented in Table 3. For all EMBIG countries taken together, the coefficient of the percentage change of the sovereign bond market index return shows the expected positive sign and is highly significant. When the rate of return of the global bond index of emerging markets rises (falls), the local bond index rates of return likewise increase (decrease). The strength of this relationship is measured by the size of the coefficients, given the coefficient of determinations and the test statistics. Not unexpectedly, the oil price fails to significantly impact on the bond index rates of return of all countries since the sample comprises oil-importing and oil-exporting countries. Splitting up the total sample of emerging market economies into oil-importing and oil-exporting countries does not affect the dominant influence of the total bond market index returns for country-specific bond index returns. Oil price changes strongly affect, with the expected negative sign, the bond index returns

only in the equation for oil-importing countries. The estimation results reveal the marked differences regarding the role that the crude oil price plays as a risk factor for bond rates of return. The crude price of the oil-importing countries exerts a negative systematic influence on the country-specific bond rates of return with high statistical significance. When oil prices rise, the cost base of oil importing countries increases which dampens real economic growth. Most importantly, less foreign reserves are available for servicing the foreign-currency debt of the country. Investors consequently will factor a higher default risk premium into the bond discount rate, reducing bond prices for both new and outstanding bonds. As a consequence of both influences, bond index returns fall. In line with expectations, the crude oil variable for oil-exporting nations has the expected positive sign but the coefficient is statistically insignificant. We use the term expected because an oil price increase would tend to lift the real growth rate of GDP in these countries, improve the terms of trade and reduce any country risk premium in its wake, generating capital gains on bond portfolios. The coefficient of determination amounts to 37 percent for all countries and 36 and 41 percent for the oil-importing and exporting countries, respectively. Overall, the results appear to caution against treating emerging markets as a homogeneous group for bond investment purposes. Considering the sovereign and private sector default history over the sample period, the results of the IMFM are surprisingly positive. A series of international financial crises during the sample period imposed heavy costs on bond holders in addition to the losses suffered by the countries involved and the burden imposed on the global economy generally.[12]

[12] Brandt et al. (2004) estimate that real output fell by more than 10 percent after the outbreak of the Mexican crisis over two quarters in 1995. The real interest rate on Mexican Brady (US dollar-denominated) bonds more than doubled suddenly, leading to an appreciable drop in capital utilization and consequent output loss. International rescue operations prompted by financial crises tend to focus more on the investor side. The LTCM debacle with its government orchestrated rescue and the serial bailouts by the IMF raise the question to what

We expect the control group and the emerging markets countries both to fit into the international market model mode, allowing for variations in the estimation outcomes due to the different stages of their development. In the equation of the control group of countries (Table 3) we employ the quarterly rate of return on the MSCI global bond market index (r_M^{MSCI}). It alone explains 36 percent of the variability of individual countries' bond returns ($r_i^{MSCI\text{-}OECD}$). As expected, oil price changes do not have any explanatory value when added to equation (2). This applies to the panel estimates as well as to the results of individual country estimates which are not reported but available from the authors. The irrelevance of the oil price as a market factor may reflect the reality in developed countries where alternative sources of energy have been substituted for oil and more energy-efficient technologies have been developed. To boot, any remaining oil-price risk may be diversified away in this group of countries.

Table 3 here

Our estimation approach is predicated on the existence of two distinctly different asset classes, namely emerging and developed market sovereign bonds. Implicitly this conclusion can also be drawn form the availability of two separate (EMBI Global and MSCI World), non-overlapping bond indices. The nature and the level of risk presumably account for the distinguishing features between the two asset classes; only the empirical evidence can decide this conjecture. For the purpose of assessing the importance of the MSCI in explaining individual emerging countries' rates of return we replaced in (1) the variable r_M^{EMBIG} with r_M^{MSCI} and registered a dramatic fall of the values for the adjusted R^2

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extent international investor in emerging market debt securities have benefited from these safety nets. Haldane and Taylor (2003) discuss the issue of moral hazard of IMF lending as it affects debtor and creditor incentives. However, to the best of my knowledge, no study has investigated the total global costs of financial crises.

squared from 0.37 to 0.04 for estimates involving the panel of all emerging markets. In addition, the coefficient of MSCI index returns showed the 'wrong' (negative) sign at a high significance level. Moreover, the oil price change failed to attain statistical significance. This modification in the model's estimates appears to confirm our surmise of the two bond indices reflecting separate asset classes, and it justifies the separation of the two market indices as benchmarks. The negative sign of the MSCI coefficient rules out any idea of a positive co-movement of the index rates of return in emerging and developed countries' bond markets which could have been triggered by revisions of common interest rate and credit risk expectations.

The estimates from the stage one regressions generate for each country the inputs in the form of the unexplained residuals for the stage two tests which are then regressed on local risk factors as specified in equations (3) and (4).[13] The estimation results for the emerging market countries as well as for the control group of OECD economies are given in Table 4 in the form of (3') and (4') after adding an autoregressive term. Across the board, *political* and *financial* risks all have the expected positive sign and most coefficients are statistically significant at the five percent or higher significance level. This result does not hold surprises. As presented above, both risk components are suggesting themselves to financial analyst as indicators for assessing a country's threat to political stability as well as its financial ability to service its debt obligations. These risk features appear to be systematic, that is, not diversifiable. Improvements or deteriorations of *political risk* appear to matter

[13] Mauro et al. (2002) estimate, *inter alia,* market models on a univariate basis, using excess bond returns, for their historical and modern era samples countries. Our two-factor market model serves the purpose of sorting out the common from the country-specific risk components.

strongly for emerging market nations and for the control group. The rationale for the positive risk coefficients is as follows. Whenever, say, political risk falls (rises) the term PRisk in (3') increases (decreases), pushing up (down) the rate of return, say, on emerging markets' bond index returns. This appears to be counter-intuitive as we are used to thinking in terms of a negative relationship between risk and return. However, a moment's reflection resolves this seemingly puzzling outcome. A fall in the political assessment of, say, Argentina lowers the risk premium (increases the risk score further towards 100) that is factored into the bond yield. Investors are now prepared to pay higher prices for outstanding bonds, creating capital gains and pushing up the rate of return on the country's bond index. True, bond market yields as well as launch yields (to maturity) fall with a lower risk premium but total rates of return on *outstanding bonds* rise due to capital gains. The opposite outcome results, should the political risk barometer rise, say, in Argentina. The variable $PRisk_{Argent}$ in equation (3') falls, causing the rate of return on sovereign bonds to do likewise. As before, the credit default premium goes up and with it the discount rate that the market applies to the bonds' cash flows. The same reasoning can be applied to the positive coefficient of financial risk.

One therefore has to caution against regarding the yield to maturity of merging market bonds as anything more than a measure of the cost of debt capital. It provides misleading signals as an indicator of investment returns. Capital gains and losses can drive a deep wedge between both.[14] We also noted in our analysis of the descriptive return statistics (Table 2) the much larger means and maximal and minimal values for emerging market

[14] For Russia the quarterly bond index rates of return between 1994(1) and 2003(3) fluctuated between 44% and a low of – 54%. Considering the clustering of financial crises during the 1990s in emerging markets bond yields presumably have been swamped by capital gains/losses.

countries. Due to their magnitude at times and their frequent occurrence, we can plausibly assume that investment decisions include, besides interest payments, expected bond price changes and the length of the holding period which deviates from the term to maturity of bonds.[15]

For the Control Group of countries, due to their greater financial and political stability, we would have expected the link between both risk components and bond returns to be more tenuous. The similar role of both risk factors as determinants of local bond index rates of return in emerging market and developed countries is somewhat surprising. One plausible conjectural explanation for the case of the control countries is their bond markets are highly integrated. Any change in the financial/political risk outlook is transmitted quickly through interest rate adjustments among the countries in this group, reducing the potential diversification benefits. Political/financial risks are priced separately because they cannot be entirely diversified away.

Even though emerging market bonds included in EMBI Global are all denominated in US dollars, their rates of return are nevertheless influenced by exchange rate changes of local currencies vis-à-vis the dollar. The FX variable in (3') is designed to capture any remaining exchange rate risk. The negative and significant value of the coefficient of FX suggests that an increase in this type of risk lowers investors' total rate of return on a country's sovereign bond (expressed in dollars) for all groups of emerging markets. For example, a devaluation of the Argentinean peso (the variable FX increases) tends to add to the country's credit risk

[15] One source of timely information about changing risk premia is provided by the credit default swap market (Zhang, 2003).

premium in this country's bond yields. The rising credit risk premium in turn boosts the required yield (to maturity) on bonds, thereby depressing bond prices. The associated capital losses depress the total rate of return of their US dollar denominated bonds. Obviously, investors regard currency devaluations as a weakness of the country and mark down their bond prices accordingly. This tends to raise the country risk premium, driving down the rate of return on Argentinean dollar-bonds. The reverse happens in the case of a revaluation of the local currency. The variable FX appears to proxy for local systematic risks that are commonly associated with a country's exchange rate problems such as low level of foreign reserves, the threat of exchange controls, bank runs or other upheavals in the financial system.

Table 4 here

Exchange rate changes play a completely different role in the OECD data set. The variable FX fulfils the function of a control factor. As the MSCI is denominated in US dollars but contains US$-bonds along-side of an amalgam of euro, pound sterling, yen, Swiss franc and other foreign currency sovereign bonds, exchange rate changes of these currencies vis-à-vis the dollar affect the MSCI indices, for given co-variances. We control for the relationship between the MSCI dollar-return changes and the various currencies by including the corresponding exchange rates in each country's the equation. For example, an appreciation of the euro against the dollar (FX decreases) increases on average the rate of return of the panel country indices which are expressed in US dollars.

Despite the broad coverage of local risk factors international investors might cast their risk net even wider considering the at times excessively high volatilities of emerging market

bond returns. Under these circumstances changes in key economic variables such as the GDP growth rate or the inflation may contain pertinent information for the forward looking investment process. In order to test whether their first differences exert a significant impact on individual countries' bond rates of return we included – after some experimentations - the change in the GDP-growth and inflation rates in our second stage regression equation (3). In (4) only the first difference of the GDP growth rate turned out to be relvant. The results for all countries are given in Table 5.

Table 5 here

In fact, the macro-variables are highly significant for all emerging markets' bond returns and for the oil-importing group when combined in a regression equation with the three local risk factors. The first differences of the two macro-variables indeed add explanatory power to the estimates. For the control group of selected OECD-countries only the first difference of the GDP growth is significant. The coefficients of determination of all regression equations increase markedly. An increased pace of real GDP growth signals to investors in emerging and developed bond markets favourable economic conditions with higher output, lower unemployment and an increased capacity to service its debt. As a result, international investors factor a lower country risk premium into their required bond yields. Consequently, the lower discount rate which is now applied to outstanding bonds raises their prices and the capital gains component increases the total rate of return on the sovereign bond index. Inflation matters only for bond index returns for the oil-importing and the all countries group; the estimated coefficients from the panel data regressions are positive and strongly significant but insignificant for the oil-exporting countries.

5. Conclusions

The results of this paper contribute to a better understanding of the pricing of emerging market countries' sovereign bonds. Utilizing sovereign bond index return data for a panel of 19 emerging market countries from 1994(1) to 2003(3) we show that the rates of return expected by international investors are determined by two distinct types of influences. *First*, local bond index returns are determined by a global bond market index model augmented by an oil price factor. Splitting up our sample into oil-importing and oil-exporting countries we find marked differences in the results for both. While the oil price changes in the first group of countries and country-specific bond index returns are negatively and significantly related, oil-exporting countries seemingly do not respond to oil price changes in a systematic way. *Second*, country-specific risk factors reflecting political and financial conditions and several macroeconomic variables systematically and significantly impact on the unexplained residuals of local bond returns from the stage one tests. Parallel estimates for a control group of OECD countries conform more closely to the international market model than emerging bond markets' rates of return. They also have fewer priced country-specific risk factors. This divergent experience is hardly surprising considering the default history of investments in emerging market bonds in the last quarter of a century. Our findings also suggest that emerging and developed bond markets constitute separate asset classes with few, if any, cross-over investors. Due to their on average below investment grade status, emerging market bonds are not the domain of large institutional investors. The extraordinarily large swings in rates of return appear to provide fertile soil for speculative position taking. By focussing on the investor perspective of emerging market bond rates of return, this paper complements the large literature dealing

with merging market bond yields and bond spreads that emphasize issuers' cost of debt capital.

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Table 1
Political and financial risks

Political Risk, components and weights of 100	**Financial Risk**, components and weights of 50
- Government stability is assigned 12 points, - Socioeconomic conditions (12) - Investment profile (12) - Internal conflict (12) - External conflict (12) - Corruption (6) - Military politics (6) - Religion in politics (6) - Law and order (6) - Ethnic tension (6) - Democratic accountability (6) and - Bureaucracy Quality (4)	- foreign debt as % of GDP (10 points) - foreign debt service as a % of exports of goods and services (10) - current account as a % of exports of goods and services (15) - net international liquidity as months of import cover (5) and - exchange rate stability (10)

Source: International Country Risk Guide (ICRG)
Political Risk (PR) is assigned a total point score of 100, where its individual components receive allocated weights in the form of points (in brackets). The components of *Financial Risk* (FR) sum to 50 points.
All risk data are available at monthly frequency.

Table 2
Descriptive statistics
Panel A Quarterly returns of emerging Market bond index

	TOTAL	OIL EXPORTING COUNTRIES						OIL IMPORTING COUNTRIES												
	GROUP	COL	ECU	MYS	MEX	RUS	VEN	ARG	BRA	BER	CHL	HRV	HUN	PER	PHL	POL	ZAF	KOR	THA	TUR
Mean	0.03	0.03	0.05	0.02	0.03	0.07	0.04	0.00	0.04	0.05	0.03	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.03	0.03
Median	0.04	0.03	0.05	0.02	0.04	0.09	0.05	0.02	0.06	0.06	0.03	0.01	0.02	0.07	0.03	0.03	0.04	0.02	0.03	0.04
Maximum	0.15	0.15	0.36	0.21	0.12	0.44	0.22	0.22	0.25	0.23	0.09	0.12	0.05	0.24	0.13	0.22	0.13	0.12	0.21	0.15
Minimum	-0.16	-0.10	-0.25	-0.14	-0.19	-0.54	-0.28	-0.36	-0.27	-0.20	-0.02	-0.09	-0.01	-0.35	-0.10	-0.23	-0.10	-0.09	-0.16	-0.13
Std. Dev.	0.07	0.07	0.16	0.06	0.06	0.20	0.10	0.12	0.11	0.09	0.03	0.05	0.02	0.12	0.05	0.07	0.04	0.04	0.07	0.06
Skewness	-1.02	0.01	-0.16	0.27	-1.57	-1.08	-1.08	-1.03	-0.75	-0.44	0.23	-0.39	-0.03	-1.06	-0.31	-0.51	-0.66	-0.07	-0.36	-0.70
Kurtosis	3.97	2.42	2.55	6.99	7.18	5.28	5.18	4.58	3.97	3.40	3.66	3.78	2.99	4.94	3.36	7.51	4.95	4.50	5.82	4.33
Jarque-Bera	8.08	0.35	0.49	18.22	43.23	15.61	14.83	10.60	5.07	1.49	0.44	1.36	0.00	13.12	0.82	33.84	7.86	3.58	8.44	4.35
Probability	0.02	0.84	0.78	0.00	0.00	0.00	0.00	0.00	0.08	0.48	0.80	0.51	1.00	0.00	0.66	0.00	0.02	0.17	0.01	0.11
Observations	38	25	38	27	38	38	38	38	38	38	16	27	18	38	38	38	34	38	24	28

Panel B Quarterly returns of MSCI bond index – Control group countries

	MSCI	MSCI WORLD excluding																				
	WORLD	AUS	JPN	CHF	UKD	AUS	ATR	BEL	CAN	DEN	FIN	FRA	GER	JPN	NET	NOR	SPN	SDN	CHF	UKD	IRE	ITL
Mean	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Median	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.02	0.02	0.03
Maximum	0.11	0.12	0.11	0.12	0.12	0.16	0.15	0.15	0.15	0.14	0.14	0.15	0.16	0.18	0.16	0.17	0.15	0.14	0.17	0.11	0.15	0.15
Minimum	-0.04	-0.04	-0.05	-0.04	-0.05	-0.08	-0.07	-0.07	-0.08	-0.07	-0.07	-0.07	-0.07	-0.13	-0.07	-0.05	-0.08	-0.11	-0.07	-0.07	-0.07	-0.10
Std. Dev.	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.06	0.04	0.05	0.06	0.06	0.06	0.07	0.06	0.05	0.06	0.05	0.06	0.04	0.05	0.06
Skewness	0.56	1.00	0.40	1.00	1.05	0.11	0.73	0.65	0.75	0.53	0.37	0.58	0.80	0.67	0.77	1.13	0.45	0.12	0.69	0.12	0.53	0.07
Kurtosis	2.64	3.79	2.56	3.79	3.89	3.21	2.92	2.75	5.22	2.58	2.16	2.69	3.12	3.45	3.06	4.34	2.60	3.86	2.83	2.31	2.64	2.35
Jarque-Bera	2.19	7.37	1.32	7.35	8.20	0.15	3.36	2.74	11.32	2.04	1.98	2.30	4.08	3.15	3.81	10.88	1.54	1.27	3.08	0.84	1.96	0.69
Probability	0.33	0.03	0.52	0.03	0.02	0.93	0.19	0.25	0.00	0.36	0.37	0.32	0.13	0.21	0.15	0.00	0.46	0.53	0.21	0.66	0.38	0.71
Observations	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38

Table 3
Index model estimations

	All Emerging Countries	Oil - Import Countries	Oil - Export Countries		Control Group Countries
EMBIG	0.894	0.726	1.182	**MSCI**	0.888
	0.00	0.00	0.00		0.00
CRUDE OIL PRICE	-0.014	-0.034	0.023		
	0.42	0.00	0.57		
AR(1)	0.217	0.142	0.243	**AR(1)**	-0.043
	0.00	0.02	0.00		0.50
Adjusted R^2	0.37	0.36	0.41	**Adjusted R^2**	0.36
F - Statistics	17.39	15.80	18.12	**F - Statistics**	20.99
Prob(F-statistics)	0.00	0.00	0.00	**Prob(F-statistics)**	0.00

$$r_{i,t}^{EMBIG} \quad r_{i,t}^{EMBIG} = \alpha_i + \beta_{1i}\, r_{M,t}^{EMBIG} + \beta_{2i}\, r_t^{OIL} + \beta_{3i}\, r_{i,t-1}^{EMBIG} + r_{it}^{RES-EMBIG} \quad (1')$$

$$r_{i,t}^{MSCI-OECD} = \alpha_i + \beta_{1i}\, r_{M,t}^{MSCI} + \beta_{3i}\, r_{i,t-1}^{MSCI-OECD} + r_{i,t}^{RES-OECD} \quad (2')$$

P-values are under the coefficients. Standard errors are corrected using period Seemingly Unrelated Regression (SUR) – Panel Corrected Standard Errors (PCSE): correction for both period heteroskedasticity and general correlation of observations within a given cross section (Beck and Katz, 1995). A first order autoregressive AR(1) term is added to equations (1) and (2) and estimates are calculated using period SUR PCSE methods for the computation of standard errors that are robust to more general serial correlation using EVIEW 5.

The quarterly rates of return, for example, for the oil price is computed as $(r_t^{OIL} - r_{t-1}^{OIL})/ r_{t-1}^{OIL}$.

Data sources:

EMBIG (EMBI-Global) Datastream: JPM EMBI GLOBAL TOTAL - TOT RETURN IND (JPMGTOT)

Crude Oil Price: Datastream: Brent Crude - Current month, fob U$/BBL (OILBREN(P)) - mid of quarter of daily prices

MSCI (MSCI-World): Datastream: MSCI WRLD. SOV.($) - TOT RETURN IND (~U$) - (MBWSVT$(RI)~U$)

* Due to data unavailability we were only able to exclude the own-country components in the market index for Australia, Japan, Switzerland and the UK. That is, for Australia we used as the independent variable MSCI-World (excluding AUS), etc. For the remaining 13 countries the unadjusted MSCI was employed in the regressions.

Table 4
Impact of local risk factors and investment returns

	All Emerging Countries	Oil- Import Countries	Oil- Export Countries	Control Group Countries
POLITICAL RISK	0.310	0.340	0.240	0.191
	0.00	0.00	0.03	0.00
FINANCE RISK	0.135	0.095	0.223	0.096
	0.00	0.00	0.05	0.01
FX	-0.071	-0.033	-0.168	-0.539
	0.00	0.10	0.00	0.00
AR(1)	-0.018	0.018	-0.072	-0.118
	0.68	0.70	0.32	0.01
Adjusted R^2	0.07	0.06	0.12	0.38
F - Statistics	3.02	2.43	3.99	20.10
Prob(F-statistics)	0.00	0.00	0.00	0.00

$$r_{it}^{RES\text{-}EMBIG} = a_i + b\,PRisk_{it} + c\,FRisk_{it} + d\,FX_{it} + g\,r_{it-1}^{RES\text{-}EMBIG} + \varepsilon_{it} \quad (3')$$

$$r_{jt}^{RES\text{-}OECD} = a_j + b\,PRisk_{jt} + c\,FRisk_{jt} + d\,FX_{jt} + g\,r_{jt-1}^{RES\text{-}OECD} + \varepsilon_{jt} \quad (4')$$

The quarterly rate of change of variables is computed, say for FX, as $(FX_t - FX_{t-1})/FX_{t-1}$.
P-values are under the coefficients. Standard errors are corrected using period Seemingly Unrelated Regression (SUR) – Panel Corrected Standard Errors (PCSE): correction for both period heteroskedasticity and general correlation of observations within a given cross section (Beck and Katz, 1995). A first order autoregressive AR(1) term is added to equations (3) and (4) and estimates are calculated using period SUR PCSE methods for the computation of standard errors that are robust to more general serial correlation using EVIEW 5.

Data Source:

Financial Risk	International Country Risk Guide Table 2B
Political Risk	International Country Risk Guide Table 2B
FX	IFS line AE – Foreign Exchange Rate (National currency per USD)

Table 5
Additional local risk factors and investment returns

	All Emerging Countries	Oil-Import Countries	Oil-Export Countries	Control Group Countries
POLITICAL RISK	0.284	0.347	0.055	0.187
	0.00	0.00	0.63	0.00
FINANCE RISK	0.095	0.082	-0.013	0.106
	0.03	0.02	0.88	0.01
FX	-0.084	-0.040	-0.182	-0.515
	0.00	0.08	0.00	0.00
ΔGDP	0.050	0.022	0.172	0.069
	0.00	0.07	0.00	0.00
ΔCPI	0.078	0.035	-0.204	
	0.00	0.08	0.17	
AR(1)	-0.012	0.019	-0.111	-0.105
	0.80	0.72	0.22	0.04
Adjusted R^2	0.09	0.06	0.26	0.40
F - Statistics	3.18	2.34	6.72	20.28
Prob(F-statistics)	0.00	0.00	0.00	0.00

$$r_{it}^{\text{RES-EMBIG}} = a_i + b\ PRisk_{it} + c\ FRisk_{it} + d\ FX_{it} + e\ \Delta GDP_{it} + f\ \Delta CPI_{it} + g\ r_{it-1}^{\text{RES-EMBIG}} + \varepsilon_{it} \quad (5')$$

$$r_{jt}^{\text{RES-OECD}} = a_j + b\ PRisk_{jt} + c\ FRisk_{jt} + d\ FX_{jt} + e\ \Delta GDP_{jt} + g\ r_{jt-1}^{\text{RES-OECD}} + \varepsilon_{jt} \quad (6')$$

The quarterly rate of change of the variables is computed, say for FX, as $(FX_t - FX_{t-1})/FX_{t-1}$. Δ indicates first differences.
P-values are under the coefficients. Standard errors are corrected using period Seemingly Unrelated Regression (SUR) – Panel Corrected Standard Errors (PCSE): correction for both period heteroskedasticity and general correlation of observations within a given cross section (Beck and Katz, 1995). A first order autoregressive AR(1) term is added to equations (5) and (6) and estimates are calculated using period SUR PCSE methods for the computation of standard errors that are robust to more general serial correlation using EVIEW 5.

Data Source:

Financial Risk	International Country Risk Guide Table 2B
Political Risk	International Country Risk Guide Table 2B
FX	IFS line AE – Foreign Exchange Rate (National currency per USD)
CPI	IFS line 64 – Consumer Price
GDP	IFS and central banks' GDP data from Datastream.