

# AN EMPIRICAL ASSESSMENT OF COUNTRY RISK RATINGS AND ASSOCIATED MODELS

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**Abstract.** Country risk has become a topic of major concern for the international financial community over the last two decades. The importance of country ratings is underscored by the existence of several major country risk rating agencies, namely the Economist Intelligence Unit, Euromoney, Institutional Investor, International Country Risk Guide, Moody's, Political Risk Services, and Standard and Poor's. These risk rating agencies employ different methods to determine country risk ratings, combining a range of qualitative and quantitative information regarding alternative measures of economic, financial and political risk into associated composite risk ratings. However, the accuracy of any risk rating agency with regard to any or all of these measures is open to question. For this reason, it is necessary to review the literature relating to empirical country risk models according to established statistical and econometric criteria used in estimation, evaluation and forecasting. Such an evaluation permits a critical assessment of the relevance and practicality of the country risk literature. The paper also provides an international comparison of risk ratings for twelve countries from six geographic regions. These ratings are compiled by the International Country Risk Guide, which is the only rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries. The time series data permit a comparative assessment of the international country risk ratings, and highlight the importance of economic, financial and political risk ratings as components of a composite risk rating.

**Keywords.** Country risk; Economic risk; Financial risk; Political risk; Composite risk; Risk ratings; Risk returns; Volatilities; Component analysis; International comparison.

## 1. Introduction

### 1.1. *Country risk*

Following the rapid growth in the international debt of less developed countries in the 1970s and the increasing incidence of debt rescheduling in the early 1980s, country risk, which reflects the ability and willingness of a country to service its financial obligations, has become a topic of major concern for the international financial community (Cosset and Roy, 1991). Political changes resulting from the

fall of communism, and the implementation of market-oriented economic and financial reforms, have resulted in an enormous amount of external capital flowing into the emerging markets of Eastern Europe, Latin America, Asia, and Africa (Ramcharran, 1999). These events have alerted international investors to the fact that the globalisation of world trade and open capital markets are risky elements that can cause financial crises with rapid contagion effects, which threaten the stability of the international financial sector (Hayes, 1998). In light of the tumultuous events flowing from September 11, 2001, the risks associated with engaging in international relationships have increased substantially, and become more difficult to analyse and predict for decision makers in the economic, financial and political sectors.

Given these new developments, the need for a detailed assessment of country risk and its impact on international business operations is crucial. Country risk refers broadly to the likelihood that a sovereign state or borrower from a particular country may be unable and/or unwilling to fulfil their obligations towards one or more foreign lenders and/or investors (Krayenbuehl, 1985). A primary function of country risk assessment is to anticipate the possibility of debt repudiation, default or delays in payment by sovereign borrowers (Burton and Inoue, 1985). Country risk assessment evaluates economic, financial, and political factors, and their interactions in determining the risk associated with a particular country. Perceptions of the determinants of country risk are important because they affect both the supply and cost of international capital flows (Brewer and Rivoli, 1990).

Country risk may be prompted by a number of country-specific factors or events. There are three major components of country risk, namely economic, financial and political risk. The country risk literature holds that economic, financial and political risks affect each other. As Overholt (1982) argues, international business scenarios are generally political-economic as businesses and individuals are interested in the economic consequences of political decisions.

The lending risk exposure vis-à-vis a sovereign government is known as sovereign risk (Juttner, 1995). According to Ghose (1988), sovereign risk emerges when a sovereign government repudiates its overseas obligations, and when a sovereign government prevents its subject corporations and/or individuals from fulfilling such obligations. In particular, sovereign risk carries the connotation that the repudiation occurs in situations where the country is in a financial position to meet its obligations. However, sovereign risk also emerges where countries are experiencing genuine difficulties in meeting their obligations. In an attempt to extract concessions from their lenders and to improve rescheduling terms, negotiators sometimes threaten to repudiate their 'borrowings' (Bourke, 1990).

Political risk is generally viewed as a non-business risk introduced strictly by political forces. Banks and other multinational corporations have identified political risk as a factor that could seriously affect the profitability of their international ventures (Shanmugam, 1990). Ghose (1988) argues that political risk is analogous to sovereign risk and lies within the broader framework of country risk. Political risk emerges from events such as wars, internal and external

conflicts, territorial disputes, revolutions leading to changes of government, and terrorist attacks around the world. Social factors include civil unrests due to ideological differences, unequal income distribution, and religious clashes. Shanmugam (1990) introduces external reasons as a further political aspect of country risk. For instance, if the borrowing nation is situated alongside a country that is at war, the country risk level of the prospective borrower will be higher than if its neighbour were at peace. Although the borrowing nation may not be directly involved in the conflict, the chances of a spillover effects may exist. Additionally, the inflow of refugees from the war would affect the economic conditions in the borrowing nation. In practical terms, political risk relates to the possibility that the sovereign government may impose foreign exchange and capital controls, additional taxes, and asset freezes or expropriations. Delays in the transfer of funds can have serious consequences for investment returns, import payments and export receipts, all of which may lead to a removal of the forward cover (Juttner, 1995).

Economic and financial risks are also major components of country risk. They include factors such as sudden deterioration in the country's terms of trade, rapid increases in production costs and/or energy prices, unproductively invested foreign funds, and unwise lending by foreign banks (Nagy, 1988). Changes in the economic and financial management of the country are also important factors. These risk factors interfere with the free flow of capital or arbitrarily alter the expected risk-return features for investment. Foreign direct investors are also concerned about disruptions to production, damage to installations, and threats to personnel (Juttner, 1995).

## 1.2. *Country risk ratings*

Since the Third World debt crisis in the early 1980s, commercial agencies such as Moody's, Standard and Poor's, Euromoney, Institutional Investor, Economist Intelligence Unit, International Country Risk Guide, and Political Risk Services, have compiled sovereign indexes or ratings as measures of credit risk associated with sovereign countries. Risk rating agencies provide qualitative and quantitative country risk ratings, combining information about alternative measures of economic, financial and political risk ratings to obtain a composite risk rating. This paper provides an international comparison of country risk ratings and returns compiled by the International Country Risk Guide (ICRG), which is the only risk rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries.

Derivative assets, such as futures and options, are used to hedge against price risk in commodity markets. In particular, country risk ratings are used to hedge against issued bonds. Optimal hedging strategies and an evaluation of the risk associated with risk ratings require knowledge of the volatility of the underlying process. As volatility is generally unknown, it must be estimated. These estimated and predicted volatilities are fundamental to risk management in financial models that describe the risk-return trade-off. Although there does not yet seem to be an

established market for pricing risk ratings as a primary or derivative asset, estimating and testing the volatility associated with risk ratings would seem to be a first step in this direction. In the finance and financial econometrics literature, conditional volatility has been used to evaluate risk, asymmetric shocks, and leverage effects. The volatility present in risk ratings also reflects risk considerations in risk ratings. As risk ratings are effectively indexes, their rate of change (or returns) merits attention in the same manner as financial returns (for further details, see Hoti *et al.*, 2002).

The plan of the paper is as follows. Section 2 provides a quantitative classification of empirical country risk models, which forms the database, and also classifies and describes the data. Various theoretical and empirical model specifications used in the literature are reviewed analytically and empirically in Section 3. Section 4 discusses the empirical findings of the published studies. A comparison of ICRG country risk ratings, risk returns, and their associated volatilities for twelve representative developing countries is given in Section 5. Concluding remarks and some suggestions for future research are presented in Section 6.

## **2. Classification of Country Risk Models and the Data**

For purposes of evaluating the significance of empirical models of country risk, it is necessary to analyse such models according to established statistical and econometric criteria. The primary purpose of each of these empirical papers is to evaluate the practicality and relevance of the economic, financial and political theories pertaining to country risk. An examination of the empirical impact and statistical significance of the results of the country risk models will be based on an evaluation of the descriptive statistics relating to the models, as well as the econometric procedures used in estimation, testing and forecasting.

This paper reviews 50 published empirical studies on country risk (the papers are listed in the Appendix). A classification of the 50 empirical studies is given according to the model specifications examined, the choice of dependent and explanatory variables considered, the number of explanatory variables used, econometric issues concerning the recognition, type and number of omitted explanatory variables, the number and type of proxy variables used when variables are omitted, the method of estimation, and the use of diagnostic tests of the auxiliary assumptions of the models.

Scrutiny of the ECONLIT software package and the Social Science Citation Index for the most widely cited articles in the Country Risk literature yields at least 50 published empirical papers over the last three decades in refereed journals. Although the first two papers were published by Frank and Cline (1971) (*Journal of International Economics*) and Feder and Just (1977) (*Journal of Development Economics*), there were 16 papers published in the 1980s, a further 30 papers published in the 1990s, and with the 2 most recent papers having been published in 2001. Thus, the literature is essentially two decades old. There is no leading journal in the literature on country risk, with the *Journal*

of Development Economics publishing 6 papers, the Journal of International Business Studies publishing 4 papers, the Journal of Banking and Finance, Economics Letters and Applied Economics each publishing 3 papers, Applied Economics Letters and Global Finance Journal each publishing 2 papers, and 27 other journals each publishing one paper on the topic.

Country risk has been surveyed previously by Saini and Bates (1984) and Eaton and Taylor (1986). Saini and Bates (1984) provide a survey of the quantitative approaches to risk analysis by reviewing the problems in the statistical approaches of published empirical papers. In particular, they examine the shortcomings with regard to definitions of dependent variables, the quality and availability of data, model specifications, appropriateness of statistical methods, and the ability to forecast debt servicing difficulties adequately. Eaton and Taylor (1986) review the theoretical aspects of numerous papers relating to LDC debt and financial crises, with an emphasis on the policy implications to be drawn. Although they do not analyse the empirical aspects of the various papers, they examine the three main issues in empirical applications, namely the determinants of rescheduling, how credit terms are fixed, and the factors determining the amounts borrowed. While the primary purpose of Rockerbie (1993) is to explain the interest spread on sovereign Eurodollar loans on the basis of various indicators of default risk in lesser developed countries and developed countries, he provides a useful summary of risk indicators in the empirical papers examined. Thus, the present paper may be seen as a continuation of these surveys using more recently published contributions to the literature on country risk.

In Table 1, the 50 studies are classified according to the type of data used, namely cross-section or pooled, which combines time series and cross-section samples. Common sources of data are the International Monetary Fund, Bank for International Settlements, various sources of the World Bank, Euromoney, Institutional Investor, Moody's, Standard and Poor's, and various country-specific statistical bureaux. Almost three-quarters of the studies are based on pooled data, with the remaining one-quarter based on cross-section data.

Table 2 classifies the 34 studies using pooled data according to the number of countries, which varies from 5 to 95 countries, with mean 48 and median 47, with the frequency of occurrence of each number generally being 1. The same 34 studies using pooled data are classified according to the number of annual and semi-annual observations in Tables 3 and 4, respectively. For the annual observations, the range of the 19 data sets is 5–24 years, with the mean, median and mode of the number of observations being 12, 11 and 5, respectively, with the frequency of

**Table 1.** Classification by Type of Data Used.

Type of data	Frequency
Pooled	34
Cross-section	16
Total	50

**Table 2.** Classification of Pooled Data by Number of Countries.

Numbers of countries	Number of studies	Frequency
5, 16, 17, 19, 24, 25, 26, 30, 32, 39, 41, 43, 48, 54, 55, 56, 60, 65, 68, 74, 75, 80, 85, 90, 95	25	1
27, 33, 40, 47, 59, 79	6	2
Total		37

Note: Three studies used two data sets.

occurrence of each number varying between 1 and 5. The range of the 8 data sets using semi-annual observations is 8 to 38 half-years, with the mean and median and mode of the number of observations being 18.5 and 17, respectively.

Tables 5 and 6 classify the studies using cross-section data according to the number of countries and the number of time series observations, respectively. In Table 5, 1 study did not report the number of countries used, while another study used data on 892 municipalities. Of the remaining 16 studies, the range is 18 to 143 countries, with mean 55.3 and median 50.5. There are 29 data sets using time series observations in Table 6, with range 1 to 23, mean 5.3, median 3, and mode 1. Indeed, the most commonly used number of time series observations is 1, with a frequency of 10 in the 29 data sets, so that more than one-third of the cross-section data sets used are based on a single year.

### 3. Theoretical and Empirical Model Specifications

The general country risk model typically estimated, tested and evaluated is given as:

$$f(Y_t, X_t, u_t; \beta) = 0 \quad (1)$$

in which  $f(\cdot)$  is an unspecified functional form,  $Y$  is the designated (vector of) endogenous variables,  $X$  is the (vector of) exogenous variables,  $u$  is the (vector of) errors,  $\beta$  is the vector of unknown parameters, and  $t = 1, \dots, n$  observations. As

**Table 3.** Classification of Pooled Data by Number of Annual Observations.

Numbers of observations	Frequency
5	5
8, 10, 12, 19	3
9	2
11	4
13, 14, 15, 16, 17, 18, 22, 24	1
Total	31

Note: One study used two annual data sets, two studies used one annual data set and one semi-annual data set, and another study used one annual data set, one semi-annual data set, and one monthly data set.

**Table 4.** Classification of Pooled Data by Number of Semi-Annual Observations.

Numbers of observations	Frequency
8, 17, 22	2
16, 38	1
Total	8

Note: One study used two semi-annual data sets, two studies used one annual data set and one semi-annual data set, and another study used one annual data set, one semi-annual data set, and one monthly data set.

will be discussed below, equation (1) is typically given as a linear or log-linear regression model, or as a logit, probit or discriminant model. The elements of  $Y$  and  $X$  will also be discussed below. Defining the information set at the end of period  $t-1$  as  $I_{t-1} = [Y_{t-1}, Y_{t-2}, Y_{t-3}, \dots; X_t, X_{t-1}, X_{t-2}, X_{t-3}, \dots]$ , the assumptions of the classical model are typically given as follows:

- (A1)  $E(u_t) = 0$  for all  $t$ ;
- (A2) constant unconditional and conditional variances of  $u_t$ ;
- (A3) serial independence (namely, no covariation between  $u_t$  and  $u_s$  for  $t \neq s$ );
- (A4)  $X$  is weakly exogenous (that is, there is no covariation between  $X_t$  and  $u_s$  for all  $t$  and  $s$ );
- (A5)  $u$  is normally distributed;
- (A6) parameters are constant;
- (A7)  $Y$  and  $X$  are both stationary processes, or are cointegrated if both are non-stationary.

Diagnostic tests play an important role in modern empirical econometrics, and are used to check the adequacy of a model through testing the underlying assumptions. The standard diagnostic checks which are used to test assumptions (A1) through (A7) are various tests of functional form misspecification, heteroscedasticity, serial correlation, exogeneity, third- and higher-order moments of the distribution for non-normality, constancy of parameters and structural change, unit root tests, and tests of cointegration. There is, in general, little or no theoretical basis in the literature for selecting a particular model of country risk. In empirical analysis, however, computational convenience and the ease of

**Table 5.** Classification of Cross-section Data by Number of Countries.

Numbers of countries	Frequency
18, 20, 27, 29, 30, 35, 49, 52, 71, 88, 93, 143, 892, unstated	1
45, 70	2
Total	18

Note: One study used three data sets. The sample with 892 observations refers to municipalities rather than countries.

**Table 6.** Classification of Cross-Section Data by Number of Time Series Observations.

Numbers of observations	Frequency
1	10
2	4
3, 7, 8, 10, 11, 23	1
4, 20	2
5	5
Total	29

Note: More than one time series data set was used in some studies.

interpretation of models are primary considerations for purposes of model selection.

Of the 70 models used in the 50 studies, which are reported in Table 7, all but six are univariate models. The most popular model in the literature is the logit model, which is used 23 times, followed by the probit, discriminant, and Tobit models, which are used 10, 7, and 3 times, respectively. Thus, more than half of the models used in the literature are probability-based models. Given the popularity of the linear and log-linear regression models in empirical economic research, it is surprising to see that the linear regression model is used four times, the log-linear regression model is used only twice, and both regression models are used in the same study only twice. The artificial neural network model is also used twice. Of the remainder, the multi-group hierarchical discrimination model, two-way error components model, random-effect error component equations, naive model, combination model, G-logit model, nested trinomial logit,

**Table 7.** Classification by Type of Model.

Model	Frequency
Only linear single equations	4
Only log-linear single equations	2
Both linear and log-linear single equations	2
Logit	23
Probit	10
Discriminant model	7
Tobit	3
System of equations	6
Artificial neural network model	2
Others	11
Total	70

Note: More than one model was used in some studies and two studies used no model. The 'Others' category includes one entry for each of multi-group hierarchical discrimination model, two-way error components model, random-effect error component equations, naive model, combination model, G-Logit model, nested trinomial logit, sequential-response logit, unordered-response logit, classification and regression trees, and cluster analysis.



sequential-response logit, unordered-response logit, classification and regression trees, and cluster analysis, are used once each.

The dependent variable for purposes of analysing country risk is broadly classified as the ability to repay debt. Of the different types of dependent variables given in Table 8, with more than one dependent variable being used in some studies, the most frequently used variable is debt rescheduling, which is used 36 times. This dependent variable is defined as the probability of general, commercial, and official debt rescheduling or debt default (in the current year or in the future), and discriminant score of whether a country belongs to a rescheduling or non-rescheduling group. The second most frequently used variable is agency country risk ratings, which is used 18 times. In the empirical analyses, this

**Table 8.** Classification by Type of Dependent Variable Used<sup>1</sup>.

Type	Frequency
Debt rescheduling <sup>2</sup>	36
Agency country risk ratings <sup>3</sup>	18
Debt arrears <sup>4</sup>	4
(Average) value of debt rescheduling	3
Exchange rate movements	3
Fundamental valuation ratios	3
Demand for debt	3
Supply of debt	3
Propensity to obtain agency municipality credit risk ratings	2
Public debt to private creditors	2
Total reserves	2
(Relative) bond spreads	2
Weighted average loan spread	1
Spread over LIBOR	1
Yield spreads of international bonds	1
Payment interruption likelihood index	1
Sovereign loan default	1
Credit risk rating	1
Income classification	1
Stock returns	1
Secondary market price of foreign debt	1
Dummy for debt crisis	1
Total	91

Notes:

1. More than one dependent variable was used in some studies.
2. Includes variables defined as the probability of debt rescheduling (as proxy for debt default), the probability of partial reneging when a borrower has decided to reschedule, trichotomous variable of debt rescheduling, the probability of general, commercial, official, and bank debt rescheduling (in the current year or in the future), the probability of debt default, and discriminant score of whether a country belongs to a rescheduling or non-rescheduling group.
3. Refers to Institutional Investor, Euromoney, Standard and Poor's, Moody's, and Economist Intelligence Unit country or municipality credit risk ratings, and average agency country risk ratings.
4. Includes one entry for each of limit on debt arrears, dummy for significant debt arrears, probability of experiencing significant debt arrears, and probability of emerging debt-servicing arrears.

dependent variable is defined as Institutional Investor, Euromoney, Standard and Poor's, Moody's, and Economist Intelligence Unit country or municipality risk ratings, and the average of agency country risk ratings. Ten types of dependent variable are used more than once, with debt arrears (defined as the limit on debt arrears), dummy for significant debt arrears, probability of experiencing significant debt arrears, and probability of emerging debt-servicing arrears being used 4 times each, and average value of debt rescheduling, exchange rate movements, fundamental valuation ratios, demand for debt, and supply of debt being used 3 times each. Dependent variables, such as the propensity to obtain agency municipality credit risk ratings, public debt to private creditors, total reserves, and total or relative bond spread, are used twice each, with the remaining 10 types of dependent variable, which are used once each, including weighted average loan spread, spread over LIBOR, yield spreads of international bonds, payment interruption likelihood index, sovereign loan default, credit risk rating, income classification, stock returns, secondary market price of foreign debt, and dummy for debt crisis.

There are three types of explanatory variables used in the various empirical studies, namely economic, financial and political. Treating country risk variables as economic and/or financial, and regional differences as political, Tables 9 and 10 present the numbers of each type of variable and their frequency. In Table 9, the number of economic and financial variables ranges from 2 to 32, with mean 11.5, median 8 and mode 6. Seven of the 19 sets of economic and financial variables have a frequency of one, with a frequency of 2 occurring 3 times, a frequency of 3 occurring 5 times, and frequencies of 4, 5, and 6 occurring once each. In Table 10, the number of political variables ranges from 0 to 13, with mean 1.86, median 0 and mode 0. The absence of any political variable occurs 30 times in the 50 studies.

Of the remaining 10 sets of political variables, 2 have a frequency of 4, one has a frequency of 3, 2 have a frequency of 2, and five have a frequency of one. Hundreds of different economic, financial and political explanatory variables have been used in the 50 separate studies. The set of economic and financial variables includes indicators for country risk ratings, debt service, domestic and

**Table 9.** Classification by Number of Economic and Financial Explanatory Variables.

Number	Frequency
2, 3, 7, 13, 16	3
4	4
5, 9, 10	2
6	7
8	5
11, 14, 15, 18, 20, 23, 32	1
12	6
Total	50

Note: Country risk indicators are treated as economic and/or financial variables.

**Table 10.** Classification by Number of Political Explanatory Variables.

Number	Frequency
0	30
1, 2	4
3, 8, 10, 11, 13	1
4, 5	2
6	3
Total	50

Note: Regional differences are treated as political variables.

international economic performance, domestic and international financial performance, monetary reserves, and structural differences. Indicators for country political risk ratings, domestic and international armed conflict, political events, and regional differences are used in the set of political variables.

The unavailability of the required data means that proxy variables have frequently been used for the unobserved variables. Tables 11 and 12 are concerned with the important issue of omitted explanatory variables in each of the 50 studies. It is well known that, in general, omission of relevant explanatory variables from a linear regression model yields biased estimates of the coefficients of the included variables, unless the omitted variables are uncorrelated with each of the included explanatory variables. For non-linear models, consistency replaces unbiasedness as a desirable statistical characteristic of an estimation method. In some studies, there is an indication of the various types of variables that are recognised as being important. Nevertheless, some of these variables have been omitted because they are simply unavailable. The classification in Table 11 is by recognition of omitted explanatory variables, where the recognition is explicitly stated in the study. Such an explicit recognition of omitted explanatory variables is used primarily as a check of consistency against the number of proxy variables used.

Of the 50 studies in Table 11, exactly three-fifths did not explicitly recognise that any variables had knowingly been omitted, with the remaining 20 studies

**Table 11.** Classification by Recognition of Omitted Explanatory Variables.

Number omitted	Frequency
0	30
1	13
2, 3, 4	2
8	1
Total	50

Note: The classification is based on explicit recognition of omitted explanatory variables, and is used primarily as a check of consistency against the number of proxy variables used in the corresponding studies.

**Table 12.** Classification by Type of Omitted Explanatory Variables.

Omitted variable	Frequency
Economic and financial factors	28
Political factors	11
Total	39

Notes: The various omitted variables are classified according to whether they are predominantly economic and financial or political in nature.

recognising that 39 explanatory variables had been omitted. The number of explanatory variables explicitly recognised as having been omitted varies from 1 to 8. Including and excluding the 30 zero entries for omitted explanatory variables give mean numbers omitted of 0.78 and 1.95, respectively, medians of 0 and 1, and modes of 0 and 1. Thirteen of the 20 studies, which explicitly recognised the omission of explanatory variables, noted that a single variable had been omitted.

The classification in Table 12 is given according to the type of omitted explanatory variable, which is interpreted as predominantly economic and financial or political. More than two-thirds of the omitted explanatory variables are predominantly economic and financial in nature, and the remaining one-third is predominantly political. Somewhat surprisingly, very few studies stated dynamics as having been omitted from the analysis, even though most did not explicitly incorporate dynamics into the empirical specifications.

As important economic, financial and political explanatory variables have been recognised as having been omitted from two-fifths of the 50 studies (see Table 11), proxy variables have been used in most of these studies. Tables 13 and 14 are concerned with the issues of the number and type of proxy variables used. The problems associated with the use of ordinary least squares (OLS) to estimate the parameters of linear models in the presence of one or more proxy variables are generally well known in the econometrics literature, but extensions to non-linear models, which dominate the literature on country risk, are not yet available. Nevertheless, as a guide for analysis, the basic results are outlined below. These results are of special concern as one-half of the studies explicitly recognises the omission of at least one explanatory variable.

In the case where only one proxy variable is used to replace a variable which is unavailable, the well-known results are as follows: (1) the absolute bias in the estimated coefficient of the proxy variable is less than the case where the proxy variable is excluded; (2) the absolute bias in the estimated coefficient of the correctly measured variable is less than in the case where the proxy variable is excluded; (3) a reduction in measurement error is beneficial; and (4) it is preferable to include the proxy variable than to exclude it. When two or more proxy variables are used to replace two or more variables, which are unavailable, it is not necessarily the case that the four basic results stated above actually hold. Thus, among other outcomes, the absolute bias in the estimated coefficients of both the correctly measured and incorrectly measured variables may be higher if

**Table 13.** Classification by Number of Proxy Variables Used.

Number	Frequency
0, 3, 6	2
1	7
2	4
4, 5, 7	1
Total	20

Note: Two studies explicitly recognized the omission of explanatory variables but used no proxy variables.

two or more proxy variables are not used than when they are used, a reduction in measurement error may not be beneficial, and it may not be preferable to include two or more proxy variables than to exclude them. The reason for the different outcomes is that the covariation in two or more measurement errors may exacerbate the problem of measurement error rather than containing it.

Table 13 classifies the 20 studies by the use of proxy variables, which ranges from 1 to 7. Including and excluding the 2 zero entries for the number of proxy variables used give mean numbers omitted of 2.45 and 2.72, respectively, a median of 2 in each case, and a mode of 1 in each case. By comparison with Table 11, in which 13 of the 20 studies explicitly recognised the omission of a single explanatory variable, Table 13 shows that only 7 studies used a single proxy variable. Otherwise, the results in Tables 11 and 13 are reasonably similar.

The classification in Table 14 is given according to the type of proxy variable used, which is interpreted as comprising predominantly economic and financial or political factors. More than two-thirds of the proxy variables are predominantly economic and financial in nature, and the remaining one-third is predominantly political, which is very similar to the results given in Table 12.

In Table 15 the classification is by method of estimation, in which more than one estimation method is used in some studies. Five categories are listed, namely OLS, maximum likelihood (ML), Heckman's two-step procedure, discriminant methods, and Others, which includes entries for, among others, propagation algorithm, regression-based techniques, approximation, minimax, Bayesian, optimal minimum distance, stepwise, optimisation, binary splits, jack-knife methods and OLS and WLS. Even though logit, probit, and Tobit models in Table 7 are used 40 times in total, ML

**Table 14.** Classification by Type of Proxy Variables Used.

Proxy variables	Frequency
Economic and financial factors	34
Political factors	15
Total	49

Note: Some studies used economic, financial and political proxy variables.

**Table 15.** Classification by Method of Estimation.

Method	Frequency
OLS	14
ML	35
Heckman's two-step procedure	2
Discriminant methods	3
Others	17
Total	71

Note: More than one estimation method was used in some studies. The 'Others' category includes entries for, among others, propagation algorithm, regression-based technique, approximation, mini-max, Bayesian, optimal minimum distance, stepwise optimisation, binary splits, jack-knife methods, and OLS and WLS.

is used for estimation purposes only 35 times. Moreover, while linear and log-linear models are used only 7 times in total in Table 7, OLS is used 14 times in Table 15 (15 times if both OLS and WLS are included). Finally, while discriminant models are used 7 times in Table 7, discriminant estimation is used only three times in Table 15.

Finally, the classification in Table 16 is by use of diagnostics to test one or more auxiliary assumptions of the models. The role of diagnostic tests has become well established in the econometrics literature in recent years, and plays an increasingly prominent role in modern applied econometrics (see McAleer (1994) for further details). Most diagnostic tests of the auxiliary assumptions are standard, and are available in widely used econometric software packages. Unbelievably, 42 of the 50 studies did not report any diagnostic tests whatsoever. Of the eight which did report any diagnostic tests at all, there were two entries for White's standard errors for heteroscedasticity, and one entry for each of WLS and heteroscedasticity, transformation for non-normality, White's covariance matrix for heteroscedasticity, Chow test, Hajivassiliou's test for exogeneity, and serial correlation. This is of serious concern, especially as the ML method is known to lack robustness to departures from the stated assumptions, but is nevertheless used 35 times. Models such as the logit and probit are also sensitive to departures from the underlying logistic and normal densities, respectively, so that the underlying assumptions should be checked rigorously. As the use of diagnostics has been ignored in the country risk literature, in general, the empirical results should be interpreted with some caution and scepticism.

**Table 16.** Classification by Use of Diagnostics.

Type of diagnostics	Frequencies
None	42
Others	8
Total	50

Note: The 'Others' category includes entries for WLS and heteroscedasticity, White's standard errors for heteroscedasticity, White's covariance matrix for heteroscedasticity, Chow test, transformation for non-normality, Hajivassiliou test for exogeneity, and serial correlation.

#### 4. Empirical Findings for Country Risk Ratings

Of the 91 types of dependent variables used in the 50 studies, 27 studies examined debt rescheduling on 36 occasions and 17 considered country risk ratings on 18 occasions (see Table 8 for definitions of these two types of variables). Table 17 reports four types of risk component variables used in the 17 country risk ratings studies, namely economic, financial, political, and composite. Composite risk variables are ratings or aggregates that comprise economic, financial and political risk component variables, and were used in all 17 studies. Of these studies, only two did not use economic variables and only one did not use financial variables. Political variables have been used less frequently, namely in 10 studies. Table 18 presents the number of country risk components used, as well as their frequency. All four country risk components have been used in 10 studies, 4 studies used variables representing three risk components, 3 studies used variables representing two risk components, and no study used variables representing only one risk component.

In Table 19, the 17 are classified according to the risk rating agency they used, namely Institutional Investor, Euromoney, Moody's Standard and Poor's, International Country Risk Guide, Economist Intelligence Unit, and Political Risk Services. These agencies are leading commercial analysts of country risk. While the rating system for the International Country Risk Guide will be analysed in the next section, the rating systems for the other agencies are briefly discussed below. Unless otherwise stated, the information regarding the agency rating systems has been obtained from the website of Foreign Investment Advisory Service Program, which is a joint service of two leading multilateral development institutions, namely the International Finance Corporation and World Bank ([http://www.fias.net/investment\\_climate.html](http://www.fias.net/investment_climate.html)).

Institutional Investor compiles semi-annual country risk surveys, which are based on responses provided by leading international banks. Bankers from 75 to 100 banks rate more than 135 countries on a scale of 0 to 100, with 100 representing the lowest risk. The individual ratings are weighted using the Institutional Investor formula, with greater weights assigned to responses based on the extent of a bank's worldwide exposure and the degree of sophistication of a bank's country risk model. The names of the participating banks are kept strictly confidential (Howell, 2001). Institutional Investor country risk surveys are published in the March and September issues of the monthly magazine. In the

**Table 17.** Risk Component Variables Used in Country Risk Ratings.

Variables	Frequency
Economic	15
Financial	16
Political	10
Composite	17
Number of studies	17

**Table 18.** Frequency of Risk Component Variables Used in Country Risk Ratings.

Risk components used	Frequency
4	10
3	4
2	3
1	0
Total	17

country risk literature, the Institutional Investor country risk assessment is known as the banker's judgment.

Like Institutional Investor, Euromoney provides semi-annual risk ratings and rankings for 185 sovereign countries. Countries are given their respective scores based on nine components, and are ranked accordingly. In order to obtain the overall country risk score, a weight is assigned to each of the nine categories (political risk, 25%; economic performance, 25%; debt indicators, 10%; debt in default or rescheduled, 10%; credit ratings, 10%; access to bank finance, 5%; access to short-term finance, 5%; access to capital markets, 5%; and discount on forfeiting, 5%). The best underlying value per category achieves the full weighting, while the worst scores zero. All other values are calculated relative to the best and worst scores. Surveys are published in the March and September issues of this monthly magazine.

Standard and Poor's (S&P's) provides weekly updates on the credit ratings of sovereign issuers in 77 countries and territories. Sovereign ratings are not country ratings as they address the credit risks of national governments, not the credit risk of other issuers. However, sovereign ratings set the benchmark for the ratings assigned to other issuers in the country. S&P's provides short- and long-term ratings, as well as a qualitative outlook on the sovereign's domestic and foreign currency reserves. Ratings are provided for seven major areas, namely long-term debt, commercial paper, preferred stock, certificates of deposit, money market funds, mutual bond funds, and the claims-paying ability of insurance companies. The determination of credit risk incorporates political risk (the willingness of a

**Table 19.** Agency Data Used.

Agency	Frequency
Institutional Investor	13
Euromoney	6
Moody's	2
Standard and Poor's	2
International Country Risk Guide	2
Economist Intelligence Unit	1
Political Risk Services	1

Note: Some studies used data from more than one agency.



government to service its debt obligations) and economic risk (the government's ability to service its debt obligations) (Howell, 2001). Foreign currency issuer ratings are also distinguished from local currency issuer ratings to identify those instances where sovereign risk makes them different for the same issuer. Quantitative letter ratings range from C (lowest) to AAA (highest). The rating outlook assesses the potential direction of a long-term credit rating over the intermediate to longer term. In determining a rating outlook, consideration is given to any changes in the economic and/or fundamental business conditions.

Moody's provides sovereign credit risk analysis for more than 100 nations, virtually every one of which participates in the world's capital markets. For each nation, Moody's publishes several different types of ratings to capture divergent risks, including country ratings for both short- and long-term foreign currency securities. In establishing country risk, Moody's analysts assess both political and economic variables to derive country risk ratings, which act as sovereign ceilings or caps on ratings of foreign currency securities of any entity that falls under the political control of a sovereign state (Howell, 2001). Country risk ratings account for foreign currency transfer risk and systemic risk in the nation. Using Moody's Aaa to C rating scale, foreign currency long-term government bonds and domestic currency long-term government bonds are rated. Local currency guideline ratings, which indicate the highest rating level likely for debt issues denominated in local currency, are also provided.

Political Risk Services (PRS) provides reports for 100 countries. Each report assesses potential economic, financial and political risks to business investments and trade. Country reports are the only source for risk forecasts and analysis based on the PRS rating system, which assesses different political scenarios. PRS provides a political risk model with three industry forecasts at the micro level, namely financial transfers (banking and lending), foreign direct investment (such as retail, manufacturing, and mining), and exports to the host country market. The 100 reports are revised on a quarterly basis (<http://www.prsgroup.com/commonhtml/methods.html>).

Economist Intelligence Unit (EIU) publishes country risk reports that are available quarterly with monthly updates. These reports summarise the risk ratings for all 100 key emerging and highly indebted countries that are monitored by the Country Risk Service (CRS). The CRS risk rating methodology examines two different types of risk: (1) country risk, as determined by (with weights in parentheses) political (22%), economic policy (28%), economic structure (27%), and liquidity (23%) factors; and (2) specific investment risk. Three different types of specific investment risk are currency risk (associated with accepting foreign exchange exposure against the US dollar), sovereign debt risk (associated with foreign currency loans to sovereign states), and banking sector risk (associated with foreign currency loans to banks). These specific investment risk ratings are also determined by the same four factors, with different weights. For currency risk, economic policy is the most heavily weighted factor at 65%, with economic structure, political, and liquidity factors having weights of 17%, 14%, and 4%, respectively. In the case of sovereign debt risk, liquidity has the highest weight at

31%, with economic policy and economic structure each being weighted at 27%, and the political factor at 15%. Finally, for banking sector risk, economic structure is the most heavily weighted at 44%, with economic policy, liquidity, and political factors weighted at 35%, 15%, and 6%, respectively (<http://store.eiu.com>).

Table 20 examines the 27 studies concerned with debt rescheduling, in which three types of variables were used, namely economic, financial and political. The economic and financial variables were used in each of the 27 studies, whereas political variables were used in only 9 studies. Table 21 presents the number of variables used in debt rescheduling, as well as their frequency. All three variables have been used in 9 studies, two of the three variables were used in the remaining 18 studies, and no study used only one of the three variables.

## 5. Comparison of ICRG Country Risk Ratings

Since January 1984, the International Country Risk Guide (ICRG) has been compiling economic, financial, political and composite risk ratings for 90 countries on a monthly basis. As of October 2002, the four risk ratings were available for a total of 140 countries and 144 entries, the extra four entries relating to the former sovereign states of Czechoslovakia, East Germany, West Germany and the USSR. According to the ICRG, its risk ratings have been cited by experts at the IMF, World Bank, United Nations, and other international institutions, as a standard against which other ratings can be measured. The ICRG has been acclaimed by publications such as *Barron's* and *The Wall Street Journal* for the strength of its analysis and rating system.

Several issues relating to the ICRG coverage of the listed countries should be emphasised. Some sovereign states, such as the former Soviet Union republics and the former Communist Block countries, have been covered only recently. Furthermore, structural changes are, in general, not accommodated in the risk ratings. The ICRG rating system was adjusted in late-1997 to reflect the changing international climate created by the ending of the Cold War. Prior to this structural change, the financial risk ratings were entirely subjective because of the lack of reliable statistics. By 1997, the risk assessments were made by the ICRG on the basis of independently generated data, such as from the IMF, which could be referenced consistently over time.

Until the dissolution of the former Federal Republic of Yugoslavia, ICRG covered Yugoslavia which comprised all six republics. After the dissolution,

**Table 20.** Types of Variables Used in Debt Rescheduling.

Variables	Frequency
Economic	27
Financial	27
Political	9
Number of studies	27

**Table 21.** Frequency of Types of Variables Used in Debt Rescheduling

Risk components used	Frequency
3	9
2	18
1	0
Total	27

Yugoslavia refers to the currently constituted Federal Republic of Yugoslavia, comprising the Republic of Montenegro and the Republic of Serbia, which includes the UN-administered southern province of Kosovo and the northern province of Vojvodina. Since December 1998, ICRG has been covering separately two of the former Yugoslavian republics, namely Croatia and Slovenia, which are now internationally recognised sovereign states. Data for the other two new sovereign states, namely Bosnia-Herzegovina and the Former Yugoslav Republic of Macedonia, are not currently available. The ICRG coverage of the former East and West Germany also merits discussion. After the fall of the Berlin Wall in November 1989, East and West Germany were reunited, so there is only one entry for Germany in the ICRG series from October 1990. Data for the former West Germany and East Germany are available separately for January 1984 to September 1990 and June 1984 to September 1990, respectively.

The ICRG rating system comprises 22 variables representing three major components of country risk, namely economic, financial and political. These variables essentially represent risk-free measures. There are 5 variables representing each of the economic and financial components of risk, while the political component is based on 12 variables.

Economic risk rating measures a country's current economic strengths and weaknesses. In general, when a country's strengths outweigh its weaknesses it presents a low economic risk, and when its weaknesses outweigh its strengths the country presents a high economic risk. This permits an assessment of the ability to finance its official, commercial, and trade debt obligations. The 5 economic variables, and the range of risk points assigned to each, are as follows:

- (i) GDP per Head of Population (0–5);
- (ii) Real Annual GDP Growth (0–10);
- (iii) Annual Inflation Rate (0–10);
- (iv) Budget Balance as a Percentage of GDP (0–10);
- (v) Current Account Balance as a Percentage of GDP (0–15).

Financial risk rating is another measure of a country's ability to service its financial obligations. This rating assesses a country's financial environment based on the following 5 financial variables and their associated risk points:

- (i) Foreign Debt as a Percentage of GDP (0–10);
- (ii) Foreign Debt Service as a Percentage of Export in Goods and Services (0–10);

- (iii) Current Account as a Percentage of Export in Goods and Services (0–15);
- (iv) Net Liquidity as Months of Import Cover (0–5);
- (v) Exchange Rate Stability (0–10).

Political risk rating measures the political stability of a country, which affects the country's ability and willingness to service its financial obligations. The 12 political risk variables, and the range of risk points assigned to each, are as follows:

- (i) Government Stability (0–12);
- (ii) Socio-economic Conditions (0–12);
- (iii) Investment Profile (0–12);
- (iv) Internal Conflict (0–12);
- (v) External Conflict (0–12);
- (vi) Corruption (0–6);
- (vii) Military in Politics (0–6);
- (viii) Religious Tensions (0–6);
- (ix) Law and Order (0–6);
- (x) Ethnic Tensions (0–6);
- (xi) Democratic Accountability (0–6);
- (xii) Bureaucracy Quality (0–4).

Using each set of variables, a separate risk rating is created for the three components. The 5 variables for the economic risk rating are weighted equally to give a score of 50 points, the 5 variables for the financial risk rating are weighted equally to give a score of 50 points, and the 12 variables for the political risk rating are weighted equally to give a score of 100 points. As the composite risk rating is obtained by dividing the sum of the three component risk ratings by 2, the economic and financial components account for 25% each and the political component accounts for 50% of the composite risk rating.

In all cases, the lower (higher) is a given risk rating, the higher (lower) is the associated risk. In essence, the country risk rating is a measure of country credit-worthiness. The range of the ICRG risk ratings for economic, financial, political and composite risk are 0–50, 0–50, 0–100, and 0–100, respectively. In order to facilitate direct comparison, in this paper the range of the four risk ratings is given as 0–100.

### 5.1. *Twelve Selected Countries*

The risk ratings and volatilities are discussed for twelve representative developing countries, namely Albania, Argentina, Chile, Cuba, Indonesia, Iraq, Malaysia, Mexico, Romania, Saudi Arabia, South Africa, and Zimbabwe. Following the ICRG classification method, Table 22 groups the countries in pairs according to their geographic regions. The twelve countries represent six geographical regions, namely East Europe (Albania, Romania), South America (Argentina, Chile), North and Central America (Cuba, Mexico), East Asia and the Pacific (Indonesia, Malaysia), Middle East and North Africa (Iraq, Saudi Arabia), and Sub-Saharan Africa (South Africa, Zimbabwe). Data for these countries have been collected since January 1984, apart from Albania and Cuba, for which the data are available

**Table 22.** ICRG Classification of Countries by Geographical Region.

Country pairs	Selected from geographic region
Albania, Romania	East Europe
Argentina, Chile	South America
Cuba, Mexico	North and Central America
Indonesia, Malaysia	East Asia and the Pacific
Iraq, Saudi Arabia	Middle East and North Africa
South Africa, Zimbabwe	Sub-Saharan Africa

from October 1985, and Romania, for which the data are available from August 1984. Each of these countries generally has a low risk rating for each of the four categories, which is consistent with low creditworthiness and high associated risk.

### 5.2. Risk Rating Indexes and Volatilities

Risk rating indexes and volatilities for the twelve representative countries are given in Figures 1a–12a. For each country, the risk rating indexes and volatilities are denoted ECO-R, FIN-R, POL-R, and COM-R for the economic, financial, political and composite risk rating indexes, respectively. Defining volatility as the squared deviation of each observation from the respective sample mean risk rating index, the four volatilities are denoted ECO-V, FIN-V, POL-V, and COM-V.

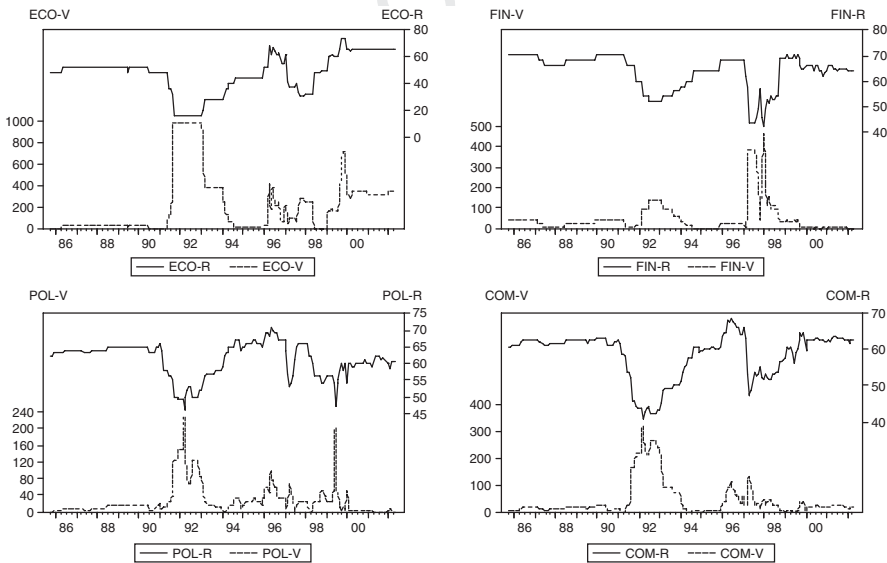
Descriptive statistics for the four risk ratings by country are given in Table 23, in which the twelve countries are ranked according to their means for the economic, financial, political and composite risk ratings. In this group of countries, Iraq has the lowest mean risk ratings in all four risk categories, and hence is ranked last, while Malaysia has the highest mean risk ratings in all four risk ratings, and hence is ranked first. The rankings are generally similar across the four risk ratings, with a mean range of 3 and a mode of 2. Argentina (3–9), Indonesia (5–11) and Saudi Arabia (2–8) have the highest range of 6 from the lowest to the highest ranking across the four risk ratings. In terms of the mean rank for the four risk ratings, Malaysia is followed by Chile, {Mexico, Saudi Arabia}, South Africa, Argentina, {Indonesia, Romania}, Albania, Zimbabwe, Cuba, and Iraq.

The risk rating indexes and associated volatilities for the twelve countries are given in Figures 1a–12a. There are substantial changes in the means of the risk rating indexes, as well as in their associated volatilities. Information on the economic and political profiles and backgrounds for the twelve representative countries has been obtained from three sources, namely the US Department of State: Countries and Regions [<http://www.state.gov/countries/>], the Australian Department of Foreign Affairs and Trade: Country, Economy and Regional Information [<http://www.dfat.gov.au/geo/index.html>], The Economist: Country Briefings [<http://www.economist.com/countries/>], and The World Factbook 2002, prepared by the Central Intelligence Agency [<http://www.odci.gov/cia/publications/factbook/index.html>].

**Table 23.** Descriptive Statistics for Risk Ratings by Country.

Country	Risk ratings	Mean	SD	Skewness	Minimum	Maximum	Ranking
Albania	Economic	47.43	14.57	-0.64	16	74	10
	Financial	63.57	6.86	-1.28	42	70	7
	Political	61.17	5.16	-0.82	46	71	7
	Composite	58.33	6.52	-1.18	41	69	7
Argentina	Economic	53.33	19.45	-0.02	21	84	8
	Financial	52.23	20.27	-0.41	16	78	9
	Political	66.35	8.32	-0.25	50	78	3
Chile	Composite	59.56	13.45	-0.35	36	76	6
	Economic	67.46	12.95	-0.56	41	84	4
	Financial	73.32	12.93	-0.96	45	86	2
Cuba	Political	65.19	12.27	-0.53	43	83	4
	Composite	67.79	12.05	-0.81	44	84	2
	Economic	44.09	15.75	0.38	24	72	11
	Financial	48.89	11.42	-0.03	32	64	11
Indonesia	Political	59.12	4.44	0.11	52	69	9
	Composite	52.81	8.20	-0.02	41	65	10
	Economic	66.59	9.47	-1.96	36	77	5
	Financial	64.49	16.84	-0.10	36	88	6
Iraq	Political	50.78	8.98	0.43	39	67	11
	Composite	58.16	9.67	0.07	41	72	8
	Economic	42.33	11.22	-0.51	21	59	12
	Financial	29.07	17.68	0.59	4	66	12
Malaysia	Political	32.54	5.82	-1.28	16	41	12
	Composite	34.12	7.18	0.35	20	49	12
	Economic	78.97	5.59	-0.77	61	88	1
	Financial	76.63	12.72	-0.67	52	90	1
Mexico	Political	69.46	5.80	-0.16	57	82	1
	Composite	73.63	5.83	-0.36	63	83	1
	Economic	60.97	8.02	0.00	45	80	6
	Financial	67.48	13.59	-0.43	36	88	4
Romania	Political	68.03	3.46	-0.27	60	78	2
	Composite	66.13	6.13	-0.71	52	75	4
	Economic	53.51	8.97	-0.24	30	68	7
	Financial	54.39	13.52	-0.38	30	72	8
Saudi Arabia	Political	61.17	9.61	-0.16	45	78	6
	Composite	57.56	6.52	-0.10	47	70	9
	Economic	75.33	5.99	-0.53	56	89	2
	Financial	72.86	15.94	-0.41	46	92	3
South Africa	Political	60.74	7.83	-0.39	45	73	8
	Composite	67.42	8.36	-0.36	52	81	3
	Economic	68.72	4.19	0.08	59	77	3
	Financial	66.90	9.75	-0.56	42	82	5
Zimbabwe	Political	64.02	7.74	-0.15	49	77	5
	Composite	65.91	6.89	-0.32	51	77	5
	Economic	51.11	9.77	-1.22	22	65	9
	Financial	51.98	6.18	0.59	43	67	10
Zimbabwe	Political	53.80	9.41	-0.08	34	68	10
	Composite	52.67	6.96	0.02	38	66	11

In Figure 1a, the four risk ratings reflect the transition market economy of Albania, which ended 44 years of xenophobic communist rule in 1990. Moving from a centrally planned to a market system has been difficult due to severe economic, social and political inherited problems. Throughout the sample, the economic, financial and political indexes followed similar trends, with a discernable clustering of volatility from 1991 to 2000. The three indexes were low with mild variation until the end of Communist rule. However, changes in the former communist bloc by 1990 also affected Albania, with the collapse in social and economic life. In 1991, clashes between Communists and their opponents led to the fall of the regime, with a sharp fall in the three indexes and associated volatility peaks. The 1992 Democratic Party government, led by President Sali Berisha, launched an ambitious program which resulted in price and exchange rate liberalisation, fiscal consolidation, monetary restraint, privatisation, enterprise and financial reform, and high growth. However, progress was stalled in 1997 when several pyramid financial schemes collapsed and the indexes dropped. The collapse caused panic and led to the fall of the government, with the Socialist Party coming to power in June 1997. After 1998, the economic and financial indexes rose and remained flat, as the economy recovered from foreign remittances, expansion of the construction and service industries, and an increase in seaside tourism. Major unresolved problems include soaring unemployment, high inflation, dilapidated infrastructure, unexploited natural resources, low foreign investment, high trade deficits, and inefficient energy production. In an effort to

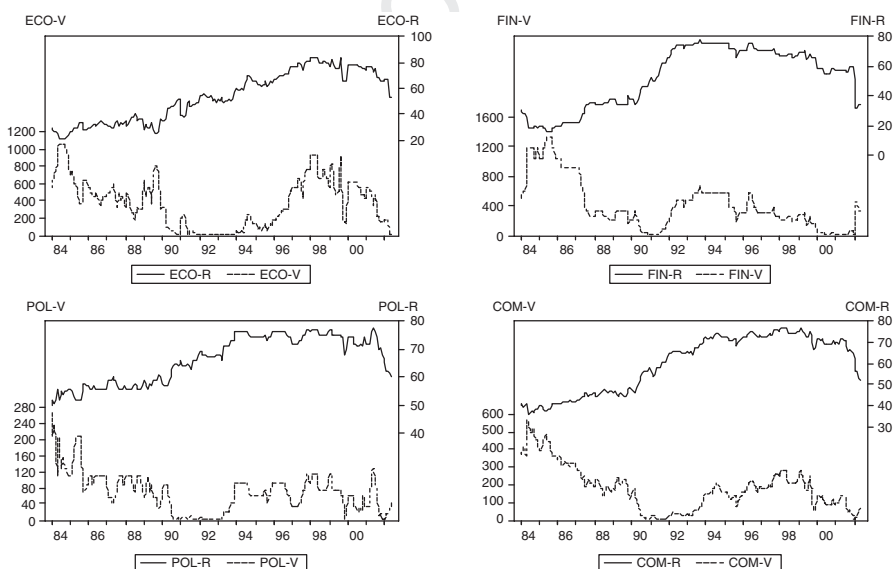


**Figure 1a.** Risk Rating Indexes and Volatilities for Albania.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

promote regional trade, in 2001 Albania agreed with Macedonia, Bulgaria, Croatia, Yugoslavia, and Romania to establish a free trade area in south central Europe by 2004. Political instability was high from 1997–2000, after which the political index was consistently flat. While democratic reforms continue, government and judicial corruption, and widespread organised crime, remain unchecked. Albania pursues greater Euro-Atlantic integration and restored its relations with Yugoslavia following the ouster of Milosevic, but the status of Kosovo remains a key unresolved issue. As an overall measure of country risk, the composite index reflects the trends and volatility in the three component risk indexes.

The four risk rating indexes for Argentina are given in Figure 2a. Argentina is rich in resources and has a well-educated workforce, but economic growth has generally not matched expectations. From 1880 to the 1930s, Argentina was one of the world's ten wealthiest countries owing to the rapid expansion of agriculture and foreign investment in infrastructure. However, over the past 25 years, Argentina has struggled with military dictatorship, the war over the Falkland Islands, and severe economic difficulties. There is a similar pattern, with a discernable clustering of volatility, in the economic and political indexes, starting at very low values and following a generally increasing trend until 1999, after which they have returned to their original values. Similarly, the financial index increased to 1995 and then decreased, with an associated clustering of volatility. The low indexes in the 1980s were the result of protectionist and populist economic policies in the



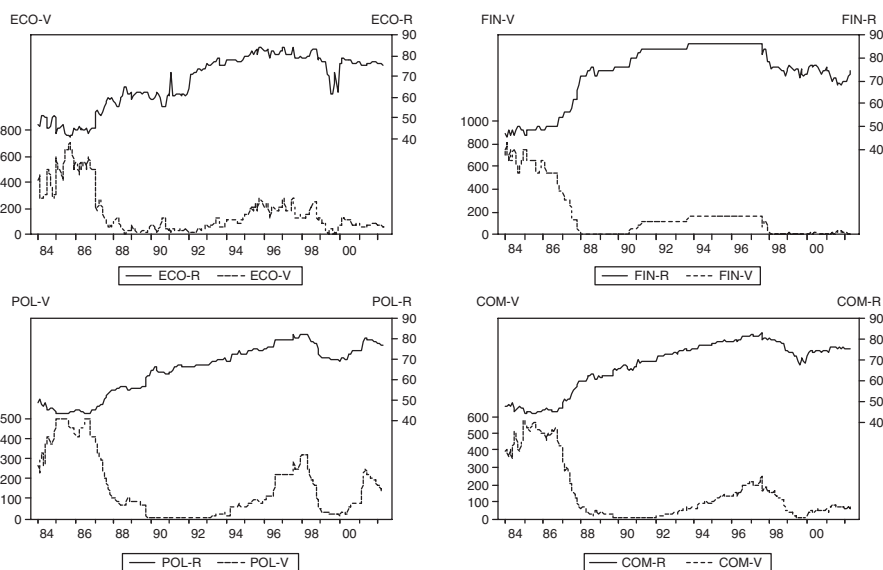
**Figure 2a.** Risk Rating Indexes and Volatilities for Argentina.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.



post-war era that led to economic stagnation and hyperinflation. When Carlos Menem was elected President in 1989, he abandoned the former policies in favour of market economics and liberalisation, resulting in a period of rapid growth. His failure to sustain the fiscal and structural reforms in his second term from 1995 to 1999 left the economy vulnerable to the 1994 Mexican 'Tequila' crisis, the 1997 South East Asian crisis, the Russian default of 1998, and the Brazilian devaluation of 1999. These shocks led to a higher cost of foreign borrowing and less competitive exports. An IMF bailout package of nearly \$40 billion in late 2000, involving tax rises and cuts in social welfare programs, resulted in a political crisis that caused the government to collapse amid violent protests. A new government was elected in January 2002, when Argentina abandoned the quasi-currency board system, which pegged the peso at parity to the US dollar for over 10 years. The subsequently floated peso increased a sense of expropriation for depositors, so that almost all dollar loans were converted to the peso at parity. Consequently, bank balance sheets and reputations were destroyed, and the number of banks and the scale of banking operations shrank significantly. The banking system, formerly one of the strongest in Latin America, has been decimated. Overall, the composite risk index closely reflects the trends and volatility in the economic and political risk indexes.

Figure 3a presents the risk rating indexes for Chile, one of the world's most open economies. Reforms such as privatisation, liberalisation and deregulation of trade and investment, were initiated by the military government and continued by subsequent democratic administrations. The economic, financial, and political indexes were low and flat until 1987, after which they followed an increasing trend and then decreased, with virtually no change in the financial index between 1991 and 1997. There are discernable clusterings of volatility for the three component risk indexes. The economic index fell in 1998 and remained low in 1999 as a result of the recession due to the global downturn. However, it increased as economic recovery began in 2000, but followed a slight declining trend to 2002, while both domestic and foreign investments fell, unemployment rose, and economic growth slowed. In early 2002, the government committed to undertake microeconomic reforms to create new incentives for private investment. After a period of stability, the financial index also fell in 1997 and varied around the mid 70s until 2002. The government implemented further liberalisation of capital markets in 2001, leading to a rise in the index until the end of the sample, and was repaying foreign debt by 2002, which was low by Latin American standards. Changes in the political scene in December 1988, when Augusto Pinochet failed to win a referendum, led to democratic elections in December 1989. There have since been three consecutive presidents from the Concertacion de Partidos por la Democracia coalition. After the defeat of Pinochet's military regime, the constitution was amended to ease provisions for future amendments and diminish the role of the National Security Council by equalising the number of civilian and military members. However, further constitutional reforms are still necessary to complete the full transition to democracy. Since the return to democracy, Chile has become an active participant in the international political arena, but the political index decreased in 1998 before increasing in 2000 due to the detention

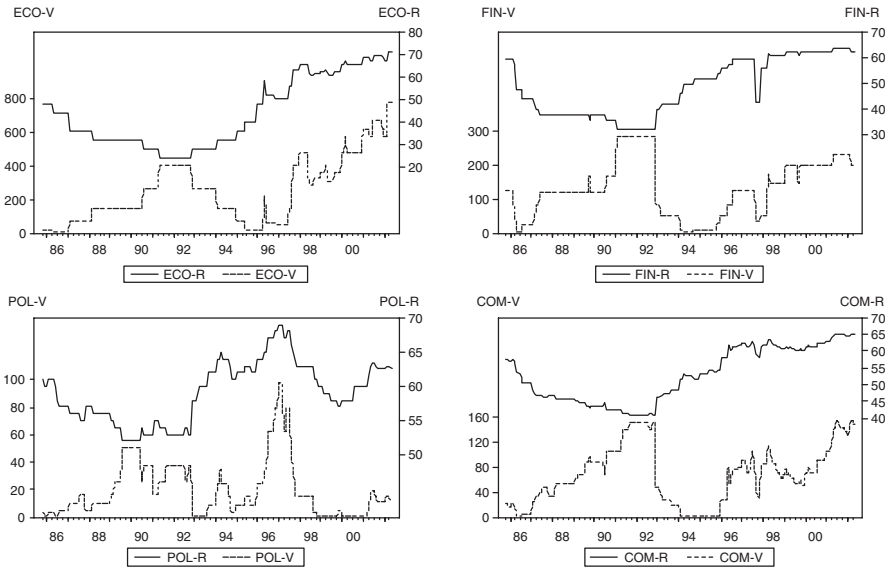


**Figure 3a.** Risk Rating Indexes and Volatilities for Chile.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

of Pinochet in the UK in response to an extradition request by Spain. This period witnessed demonstrations by supporters and opponents of Pinochet, which led to clashes with the police. Overall, the composite risk index reflects the trends and volatility in the three component risk ratings.

The risk rating indexes for Cuba are presented in Figure 4a. Cuba has been a communist country since Fidel Castro led his army to victory in 1959. During the Cold War, Cuba relied on strong Soviet support, and built reputable health and education systems. Amid the USA trade sanctions, Castro failed to diversify the economy, which continues to depend on sugar exports. Economic hardship was heightened by the high price of foreign financing. Cuba relies heavily on short-term loans to finance imports. The government defaulted on most of its international debt in 1986 and does not have access to credit from international financial institutions, such as the World Bank. There was a falling trend in the economic, financial and political indexes until 1992, after which the economic and financial indexes rose, but the political index increased and fell before increasing again in the last two years. The falling economic and financial indexes were due to the withdrawal of aid from the former Soviet Union, as well as domestic incompetence, which led to a severe economic recession in 1990–1992. In response to the economic crisis, in 1993 and 1994 the government launched some market reforms, including opening tourism, allowing foreign investment from Canada, Europe, and Latin America, legalising the dollar, and authorising self-employment for 150 occupations, which resulted in modest economic growth. However, living



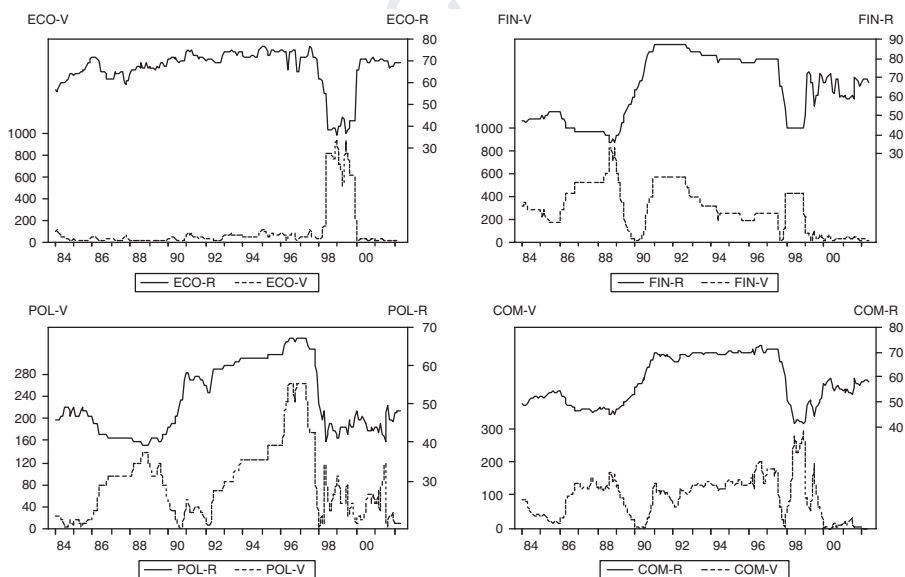
**Figure 4a.** Risk Rating Indexes and Volatilities for Cuba.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

standards by 2000 have remained well below 1989 levels, as lower sugar and nickel prices, higher petroleum costs, a post-September 11, 2001 decline in tourism, and a devastating November 2001 hurricane, created new economic pressures. Furthermore, the legalisation of the US dollar created a serious economic gap between those with and without access to dollars. Continuing hardships led to an increase in prostitution, corruption, black market activity, and desperate efforts to escape the country. After the Cold War, Cuba abandoned monetary support for guerrilla movements in Latin America and Africa, but maintained relations with several guerrilla and terrorist groups. The USA Helms-Burton legislation against trade with, and investment in, Cuba in 1996 led to a decreasing political index. There is a discernable clustering of volatility in the three component risk indexes, with the composite risk index reflecting the trends and volatility in the economic and financial risk indexes.

Figure 5a presents the four risk ratings for Indonesia, which has a market-based economy with significant government participation and ownership. Indonesia has experienced unprecedented turmoil since 1997 due to the South-East Asian financial crisis, the fall of President Suharto after 32 years, the first free elections since the 1960s, the loss of East Timor, independence demands from restive provinces, bloody inter-ethnic and religious conflicts, and unending corruption scandals. Political and judicial reforms and the restructuring of the banking sector and offshore debt are crucial steps towards economic recovery and growth. The economic index had a slightly increasing trend until 1997, when it fell due to the

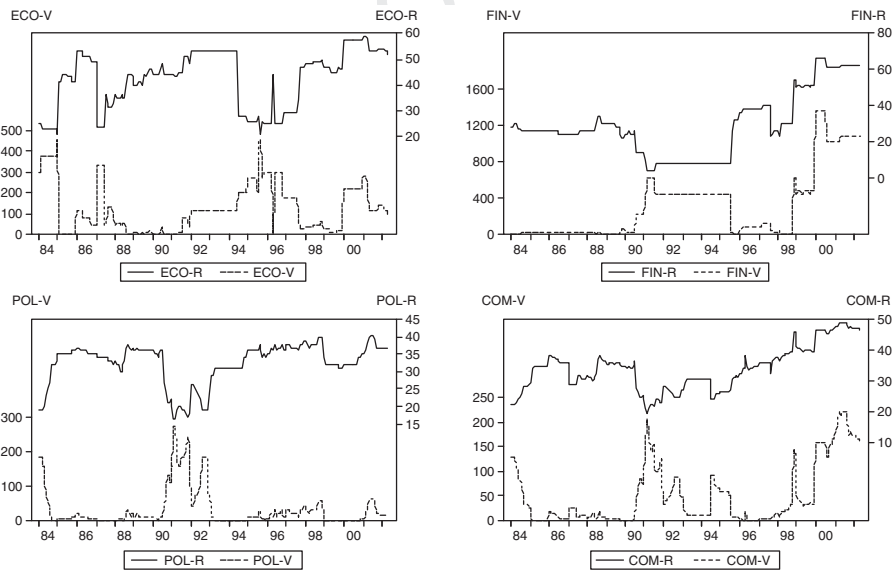
severe financial crisis, varied around the 40s until 2000, when it increased by almost 30 points, and was flat at 70 until 2002, with discernable volatility from 1996 to 2000. Prior to 1997, the government removed most regulatory obstacles to the external and financial sectors, which led to increased employment, higher growth in the non-oil export sector, and a growth rate of 7% from 1987 to 1997. While economic recovery after the crisis has been slow, consumer confidence and exports increased and the rupiah was stabilised. Indonesia had a low financial index until 1988, after which it increased substantially, remained in the high 80s until 1992, followed a downward trend until the 1997 crisis, fell by almost 40 points until 1998, increased in 1999, and remained highly volatile until 2002. While the rupiah has stabilised since 2001, the investment climate has remained troubled due to the lack of legal protection, confusion over regional autonomy policies and fiscal decentralisation, uneven implementation of economic reforms, and tax and labour issues. The political scene has also been volatile, with the index improving substantially from 1988 to 1997, after which it fell and remained low, but with high variation. Such a fall in the index was due to Soeharto, who presided over 32 years of authoritarian rule, having been forced out in May 1998, amid deepening economic, financial and social crises. In 2001, there was a peak in volatility when President Wahid was impeached due to competence and replaced by President Soekarnoputri. As a weighted average of the three component risk indexes, the composite index reflects the trends and volatility in the financial and political risk indexes.



**Figure 5a.** Risk Rating Indexes and Volatilities for Indonesia.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

The four risk rating indexes for Iraq in Figure 6a are all very low. Although Iraq is an oil-rich country, the war with Iran from 1980–1988 seriously damaged its oil export facilities, depleted foreign exchange reserves, devastated the economy, and left significant foreign debt. Consequently, the economic index was in the mid 20s in 1987, with discernable volatility prior to mid 1987, but followed a rising trend from 1988–1991 as new pipelines were constructed, damaged facilities were repaired, and oil exports gradually increased. Iraq’s seizure of Kuwait in 1990 and the 1991 war with the US-led UN coalition resulted in international sanctions, which drastically reduced economic activity. During this period, the index dropped by 30 points, after which it followed an upward trend, with discernable volatility after 1994. A UN oil-for-food program launched in 1996 improved living conditions, and Iraq was authorised in 1991 to export unlimited oil quantities to finance humanitarian needs, including food, medicine, and infrastructure. There was no trend and little variation in the financial index to 1990, being very low during this period, with a clustering of volatility in 1990–1991. In the 1980s, financial difficulties caused by massive expenditures on the war with Iran led to the implementation of austerity measures, heavy borrowing, and debt rescheduling. From 1991 to 1994, the financial index was virtually flat at 10, after which it had a rising trend associated with increasing volatility. The end of the war with Iran in 1988 saw a rise in the political index, followed by a drop during the Gulf Crisis from 1990 to 1992, a clustering of volatility, and then an increasing trend, with little variation. After the Gulf Crisis, the major issue for Saddam Hussein’s regime was to retain

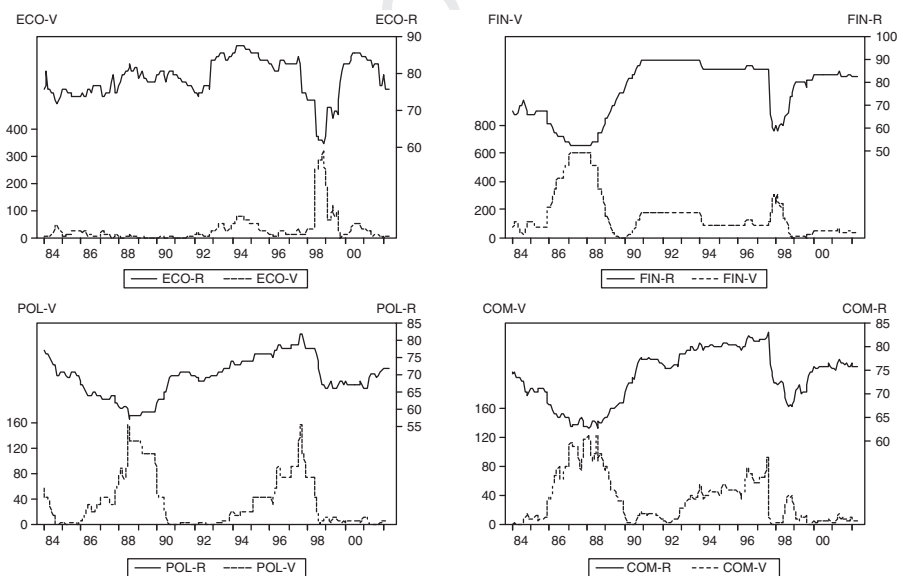


**Figure 6a.** Risk Rating Indexes and Volatilities for Iraq.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

power while overcoming international isolation, and dealing with calls to surrender weapons of mass destruction and submit to UN inspections. The regime refused to cooperate fully with the UN inspectors, and allowed no inspections in Iraq after 1998. Relations with the Arab nations have been unstable, and Iraq has embraced the most extreme anti-Israeli position. In 2002, US President George W. Bush declared Iraq to be part of 'an axis of evil', which led to rising tensions in global politics. Overall, the composite risk index has followed a similar trend to that of the political index, but reflects the volatility in all three component risk ratings.

Figure 7a presents the four risk ratings for Malaysia. After independence in 1957, the economy was based on two commodities, rubber and tin, but the economic performance was impressive for the following 40 years. New foreign and domestic investments from the early 1980s to mid 1990s played a significant role in transforming the economy from a commodity-based to a manufacturing system. Although one of the world's largest exporters of semiconductors and targeted toward being a leading producer and developer of high-tech products, the sustained high growth ended with the Asian crisis in 1997. The economic index followed an increasing trend until the economic and financial crises in 1997, after which it fell, reaching the low 60s in 1998, with an associated peak in volatility. During 1998, the government focused on expansionary measures to deal with the crises. A range of capital controls was implemented to restrict the flow of capital in and out of Malaysia, and the ringgit was pegged against the US dollar. The economic index increased from 1999 to 2000 as capital controls were

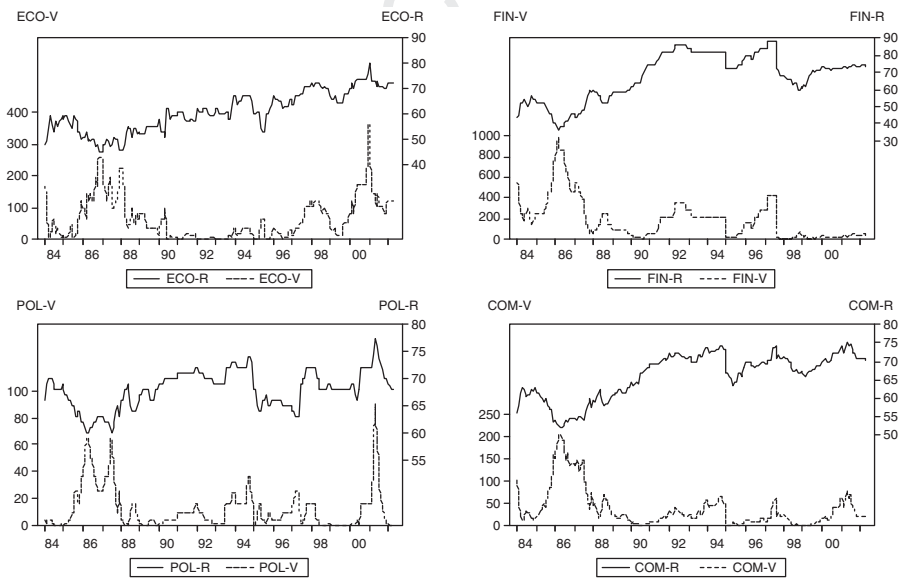


**Figure 7a.** Risk Rating Indexes and Volatilities for Malaysia.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

eased to restore foreign investor confidence and the economy recovered. A downward trend in the index after 2000 reflected the impact of the global downturn on exports and economic growth. The financial index was also affected by the crises in 1997. However, the index started to increase in the same year, with an associated peak in volatility, and remained flat after 1999. Malaysia is a multi-ethnic federation, with the Malay community benefiting from positive discrimination in business, education and the civil service. However, the ethnic Chinese hold economic power and are the wealthiest community. A decreasing trend in the political index to 1988 was followed by an increasing trend until the 1997 Asian crisis, after which the index fell and followed a slight upward trend from 1998, with discernable volatility throughout the sample. A serious challenge remains to sustain political stability amid the economic downturn and the ethnic wealth gap. As a founding member of ASEAN, Malaysia views regional cooperation as the basis for its foreign policy. Overall, the composite risk index closely reflects the trends in the financial and political risk indexes, and is less volatile than the political index.

Figure 8a gives the four risk ratings for Mexico, which two decades ago was closed to foreign investment and trade, with strong government participation. Now one of the world's most trade-dependent countries, Mexico has Free Trade Agreements with the USA, Canada, EU, and others. There is a large oil sector, which provides a third of government revenues, but is not enough for economic



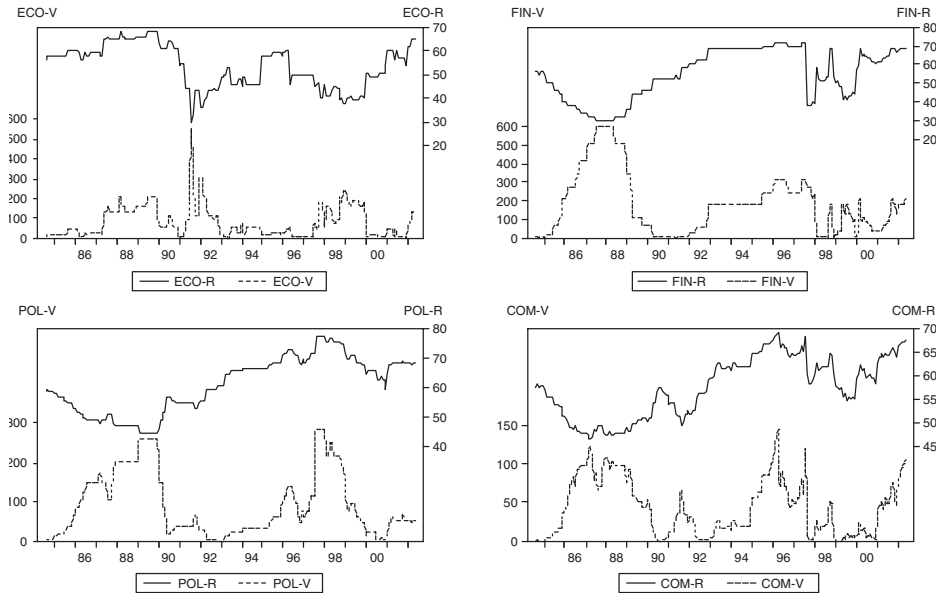
**Figure 8a.** Risk Rating Indexes and Volatilities for Mexico.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

prosperity. However, the country is undergoing substantial change, as the 1997 elections resulted in a victory for the combined opposition, breaking the one-party system with a democratic façade. The 2000 presidential elections confirmed the development, as an opposition candidate, Vicente Fox, became president for the first time. Massive external debt default in 1982, the 1984 oil price crisis, and accession to GATT in 1986, are reflected in movements in the economic, financial and political indexes, which followed a declining trend to 1986. The upward trend after 1986 was due to economic reforms by the government, including trade and investment liberalisation, privatisation, deregulation and fiscal consolidation. From 1988 to 1994, President Salinas began a process of restructuring the economy, which was continued by the Zedillo administration from 1994 to 2000. These reforms and growing ties with the USA led to a period of relatively strong growth and stability in the economy. The 1994–1995 peso crisis led to a fall in the financial index, which rose and fell in 1997. However, the economy recorded a contraction in 2001, which affected the economic and political indexes, but not the financial index. While the Argentine debt crisis had no significant effect on Mexico, the downturn was attributed to economic factors in the USA and the events of September 11, 2001 that led to caution towards US border trade, in particular, and a significant reduction in tourism. The socio-political conflict in the southern province of Chiapas remains unresolved. In response to pressures for greater rights for indigenous people, President Fox has shown a willingness to deal with the demands of guerrillas. Traditionally, Mexico's foreign policy has been based on non-intervention and self-determination. Overall, the composite risk index reflects the trends and volatility in the economic, financial and political risk indexes.

The four risk rating indexes in Figure 9a reflect Romania, with rich agricultural lands, diverse energy sources, large manufacturing industrial base, an educated and well trained labour force, and great potential for tourism in the Black Sea and the mountains. Romania has moved slowly from its communist past relative to its Eastern European neighbours. Despite the 1989 uprising that ended the severe rule of President Nicolae Ceausescu, the former communists remain a dominant force in national politics. Since the change in regime, successive governments have tried to build a Western style market economy. The pace of restructuring has been slow due to a persistent failure to undertake structural reforms, with periods of high growth followed by high inflation and economic imbalance. Further fiscal consolidation, restructuring and privatisation of large state enterprises and utilities remain major economic policy issues. The economic index had a declining trend to 1991, after which it followed a generally increasing trend, with greater volatility. As reflected in the falling trend, Romania entered a period of deep recession in mid-1997, due mainly to industrial restructuring. Economic recovery started in 1999 and, though inflation remained high, foreign investment increased slowly and trade with the West also grew. The financial and political indexes decreased until the fall of the regime in the late 1980s and followed increasing trends until 1997, with noticeable volatility, especially for the political index. There was a fall in the financial index in 1997 as a result of the recession, after which it was unstable until early 2000, with a



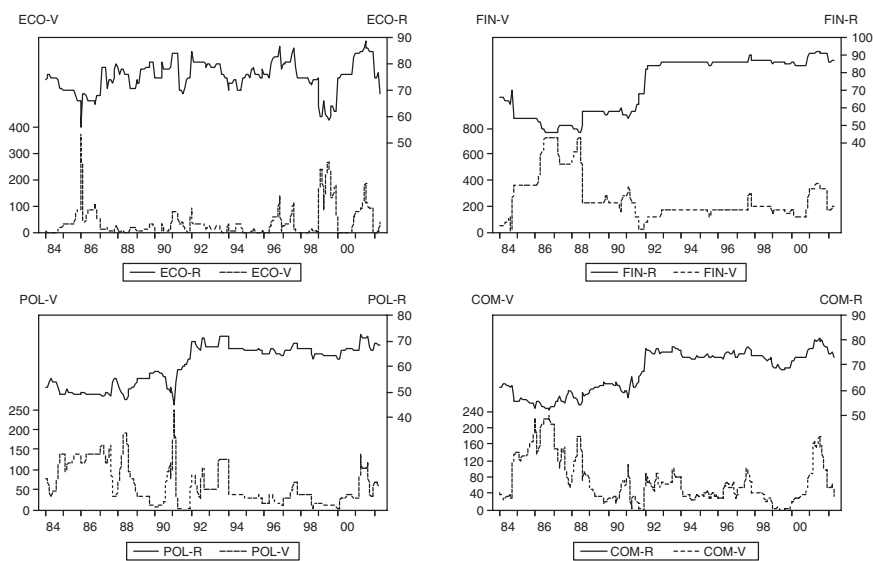


**Figure 9a.** Risk Rating Indexes and Volatilities for Romania.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

noticeable volatility clustering from mid 1997 to early 2001 owing to foreign exchange shortages and a poorly developed financial sector. Two major political changes occurred in Romania after 1989 which led to downward movements in the political index and increasing volatility, namely the electoral defeat in 1996 of the former Communists, who came to power after Ceausescu's demise, and the 2000 elections, which saw the former Communists returned to power. Under new President Iliescu, the political situation has stabilised, as shown by the flat political index, and low associated volatility. Romania aims to strengthen relations with the West, particularly the USA and EU. Generally, the composite risk index closely reflects the trends and volatility in the financial and political indexes.

Figure 10a gives the four risk rating indexes for Saudi Arabia. Ruled as an absolute monarchy since its creation in 1932, Saudi Arabia emerged from an underdeveloped desert kingdom to be one of the wealthiest Middle Eastern nations due to its vast oil resources. The oil reserves are the world's largest and account for more than 90% of national exports and almost 75% of government revenues. Since 1970, economic development has been based on five-year plans focusing on infrastructure, education, health and social services, private enterprise, foreign investment, and consolidation of national defence. The 2000–2004 plan emphasised economic diversification, a greater role for the private sector, and expansion of the oil and gas industry. There are noticeable structural changes in the financial and political indexes, but not the economic index, which followed

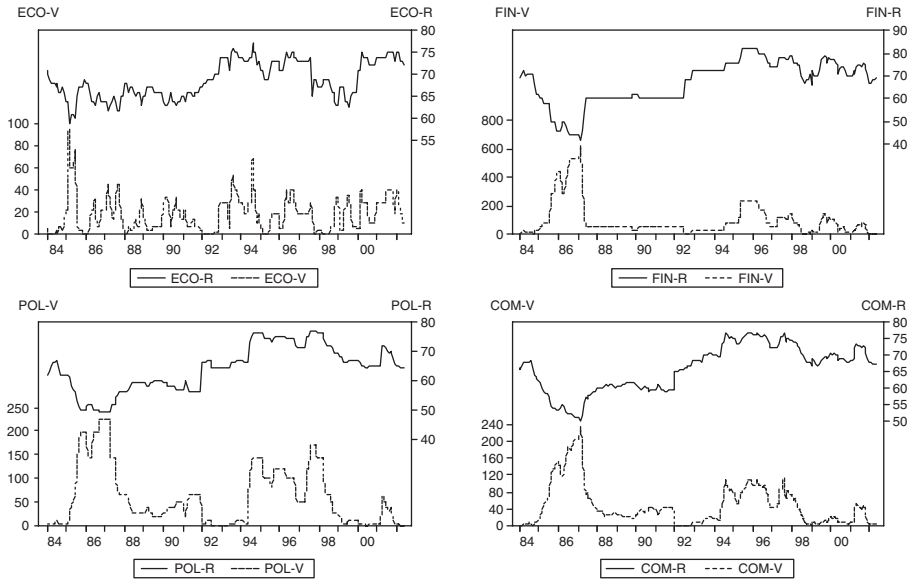


**Figure 10a.** Risk Rating Indexes and Volatilities for Saudi Arabia.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

a generally increasing trend, with discernable volatility throughout the sample. From 1997 to 1999, low oil prices slowed state-led industrial development, causing the index to fall. In 2000, the index started to increase, due to high oil prices, but fell again in 2001, due to the sharp fall in oil prices. Recently, the government focus has been on providing sustainable utilities, services and jobs for a growing population. The Gulf Crisis in early 1991 was associated with structural changes in the financial and political indexes. Such changes indicate that, since 1991, Saudi Arabia has been safer with respect to financial and political risk. Political and judicial institutions are ruled by Islamic principles, with the King holding absolute legislative and executive power. The government faces a number of political challenges, with an overstuffed civil service, conservative education system, and widespread corruption and waste. There are fears that the large unemployed youth could be drawn to radical Islamic groups. Saudi Arabia's foreign policy objectives are to maintain security and a dominant position in the Arabian Peninsula, defend general Arab and Islamic interests, promote solidarity among Islamic governments, and maintain cooperative relations with major oil-producing and oil-consuming nations. The government has acted as a mediator in regional crises and in Israeli-Palestinian peace negotiations. As an overall measure of country risk, the composite index reflects the trends and volatility in the financial and political indexes.

The four risk rating indexes in Figure 11a are for South Africa, a middle-income developing country with daunting economic problems inherited from the apartheid



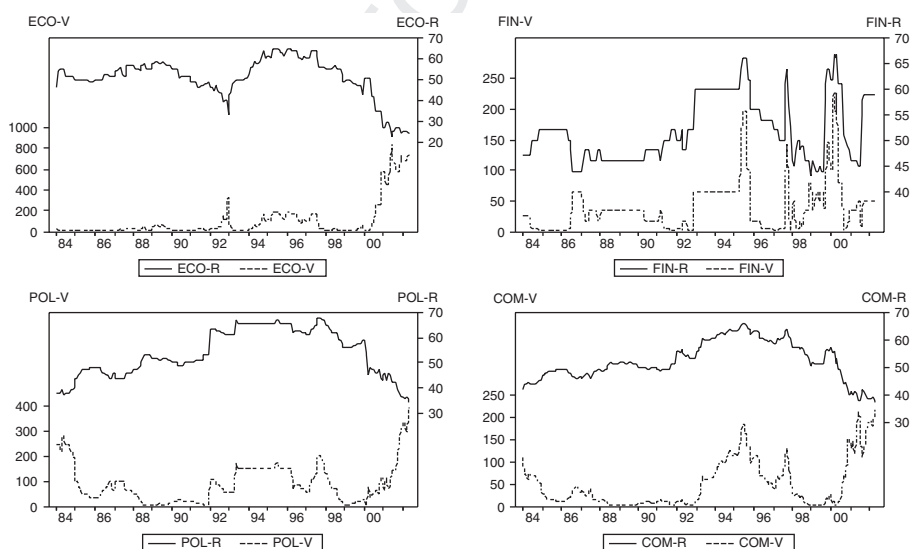
**Figure 11a.** Risk Rating Indexes and Volatilities for South Africa.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

era, especially poverty and little economic power among disadvantaged groups. South Africa is productive and industrialised, with a high division of labour between the formal and informal sectors, and an uneven wealth and income distribution. A diverse manufacturing industry has made it a world leader in several specialised sectors, including railway rolling stock, synthetic fuels, and mining equipment and machinery. The Growth, Employment and Redistribution (GEAR) strategy was directed toward open markets, privatisation and a favourable investment climate, but had mixed results. However, great progress has been made in restructuring the economic system, which was based on import substitution, high tariffs and subsidies, anti-competitive behaviour, and government intervention. The declining trend in the economic and financial indexes in 1994–1999 was due to low and unstable growth, high unemployment, skyrocketing crime, corruption, and HIV/AIDS. After 1999, the indexes started to increase as President Mbeki vowed to promote economic growth and foreign investment, and to reduce poverty by relaxing restrictive labour laws, increasing the pace of privatisation, and reducing government spending. The economy slowed in 2001 as a result of the international downturn. South Africa has a sophisticated financial structure, with a large and active stock exchange and mild exchange controls. The political index fell to 1987, followed a generally increasing trend to 1997 and a declining trend thereafter, with discernable volatility throughout the sample. Ruled by a white minority until 1994, South African activists struggled for much of the last century before succeeding in

overthrowing apartheid and extending democracy. After 1994, President Mandela's leadership encouraged democratic reforms and reconciliation, amid painful legacies of lawlessness, social disruption and lost education. Under the 1999 government of President Mbeki, economic transformation became a priority. Having emerged from the isolation of the apartheid era, South Africa has become an active player in international politics. Overall, the composite risk index closely reflects the trends and volatility in the three component risk ratings.

Figure 12a gives the four risk rating indexes for Zimbabwe. Robert Mugabe, the first prime minister and president since 1987, has been the sole ruler and dominated the political landscape since independence, but now presides over chaos, a land crisis and faltering economy. Under proper economic management, the wide range of natural resources should be able to support sustained economic growth. The country has large reserves of metallurgical-grade chromite and other commercial mineral deposits, and has long been the world's third largest tobacco exporter. There was a generally declining trend in the economic and political indexes, with a noticeable clustering of volatility, while the financial index followed no trend but was highly volatile. Earlier moves to develop a market-oriented economy led to a reduction in the economic index, with an associated volatility peak in 1992. The index followed an increasing trend after 1992, but started to decline in 1997, with increasing volatility. Similarly, while the financial index varied substantially throughout the sample, its associated volatility was higher in the second half of the sample because IMF support was suspended due



**Figure 12a.** Risk Rating Indexes and Volatilities for Zimbabwe.

Note: Economic (ECO), Financial (FIN), Political (POL) and Composite (COM) risk rating indexes and their associated volatilities are denoted by R and V, respectively.

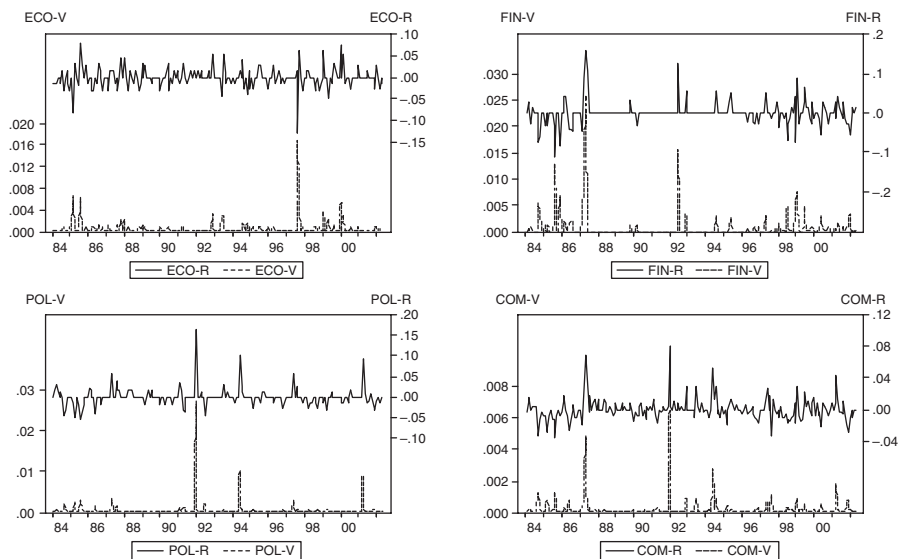
to a failure to meet budget targets. Moreover, the economy had been steadily weakened by excessive government deficits, AIDS, rampant inflation, and extreme income inequality. The government's land reform program, characterised by chaos and violence, derailed the commercial sector, which had been a traditional source of exports, foreign exchange and employment. Politically, Zimbabwe had been improving, as shown by the increasing trend in the political index to 1998. However, involvement in the war in the Democratic Republic of the Congo, which began in 1998, contributed to domestic woes and caused the index to enter a steep declining trend, reaching the mid 30s by 2002. In early 1999, Zimbabwe experienced considerable political and economic upheaval, and growing opposition against Mugabe's regime. Local and international human rights monitors have noted a marked increase in human rights abuses since early 2000. Parliamentary elections in mid 2000 and presidential elections in early 2002 were associated with violent intimidation against opposition supporters, the press and judiciary. Overall, the composite risk index closely reflects the trends and volatility in the economic and political indexes.

### 5.3. Risk Rating Returns and Volatilities

Risk returns are defined as the monthly percentage change in the respective risk rating indexes. The descriptive statistics for risk returns by country are given in Table 24, and the correlation coefficients for risk returns by country are given in Table 25. For each country the risk returns in Figures 1b–12b are denoted ECO-R, FIN-R, POL-R and COM-R for the economic, financial, political and composite risk returns, respectively. Defining volatility as the squared deviation of each observation from the respective sample mean risk return, the four volatilities associated with the risk returns are denoted ECO-V, FIN-V, POL-V and COM-V, respectively.

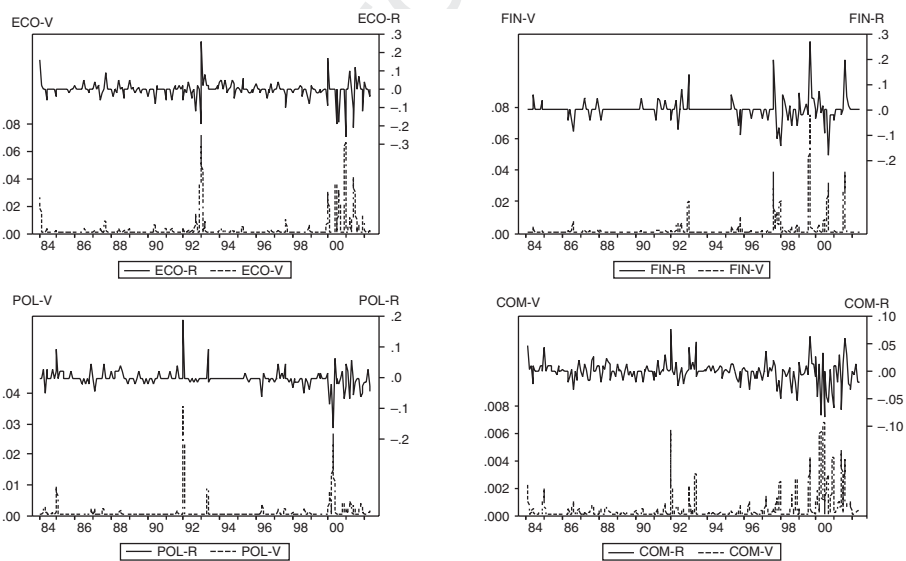
Table 24 reports the descriptive statistics for the four risk returns by country. The means of all four risk returns for the twelve countries are close to zero with standard deviations ranging from 0.0205 (Indonesia) to 0.1117 (Iraq) for economic risk returns, 0.0202 (Chile) to 0.1391 (Iraq) for financial risk returns, 0.0130 (Malaysia) to 0.0558 (Iraq) for political risk returns, and 0.0103 (Indonesia) to 0.0486 (Iraq) for composite risk returns. Of the twelve countries, Iraq has the highest standard deviation for the four risk returns. There is no general pattern of skewness for the four risk returns for the twelve countries, with all four risk returns being negatively skewed for Albania and Malaysia, and all positively skewed for Saudi Arabia. While both the financial and political risk returns are positively skewed for Iraq and Zimbabwe, only the political risk returns are positively skewed for Argentina and Romania. Economic risk returns are the only positively skewed risk returns for Indonesia, but the only negatively skewed risk returns for South Africa. For Mexico, the financial and composite risk returns are both negatively skewed, for Cuba only the financial risk returns are negatively skewed, and only the composite risk returns are negatively skewed for Chile.

Table 25 reports the correlation coefficients for the four risk returns by country. The economic, financial and political risk returns seem to be highly correlated



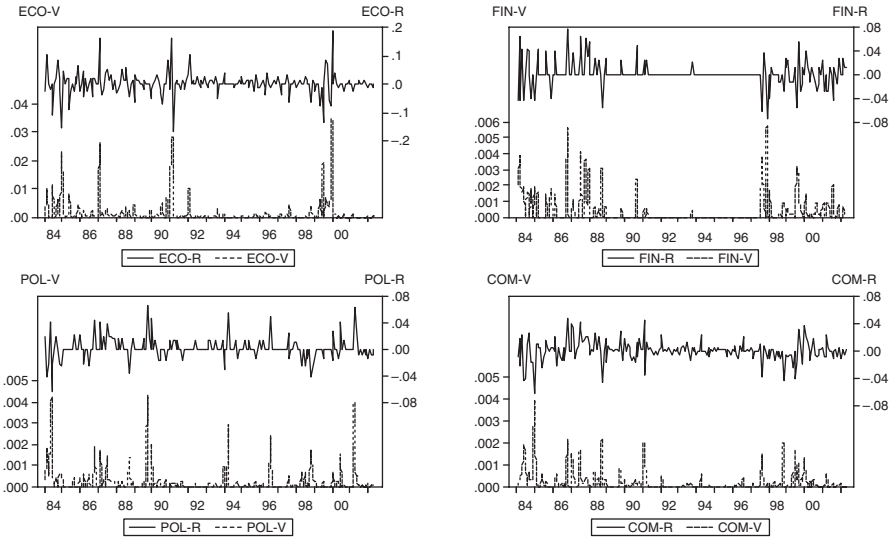
**Figure 1b.** Risk Returns and Volatilities for Albania.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



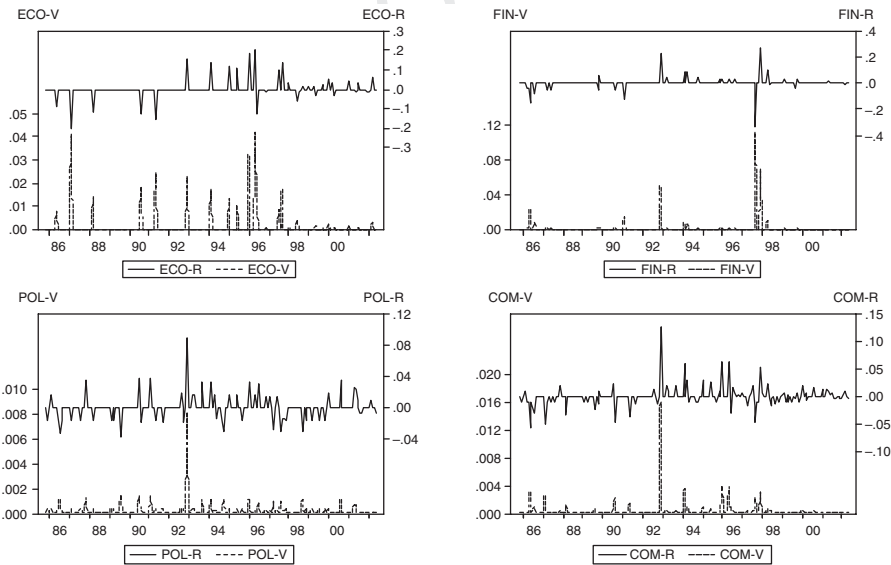
**Figure 2b.** Risk Returns and Volatilities for Argentina.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



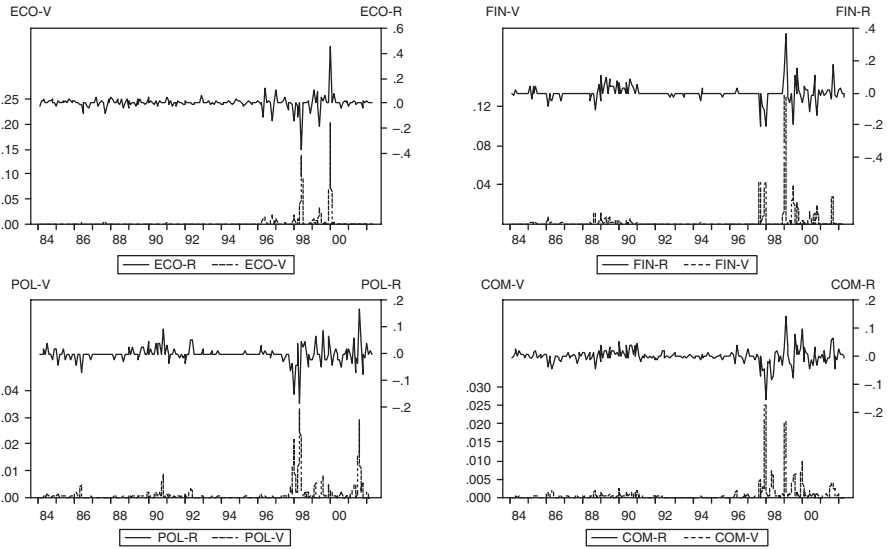
**Figure 3b.** Risk Returns and Volatilities for Chile.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



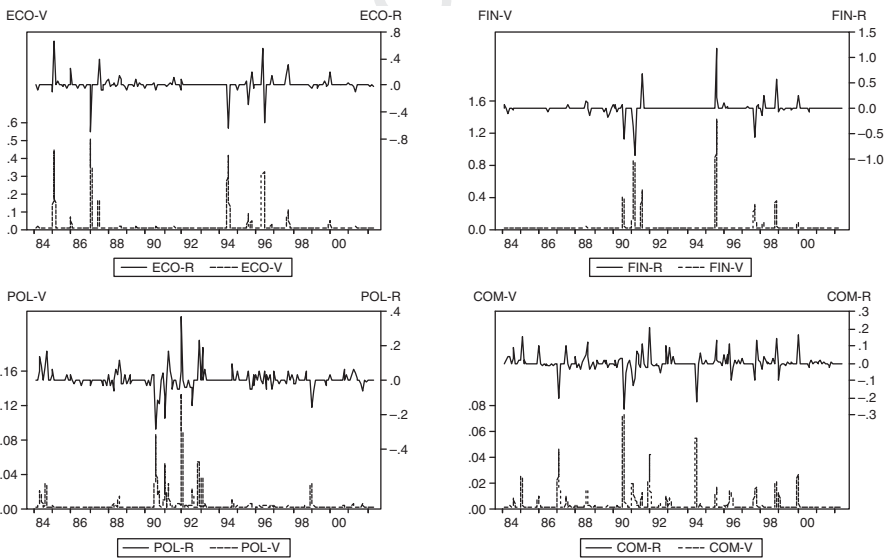
**Figure 4b.** Risk Returns and Volatilities for Cuba.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



**Figure 5b.** Risk Returns and Volatilities for Indonesia.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



**Figure 6b.** Risk Returns and Volatilities for Iraq.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



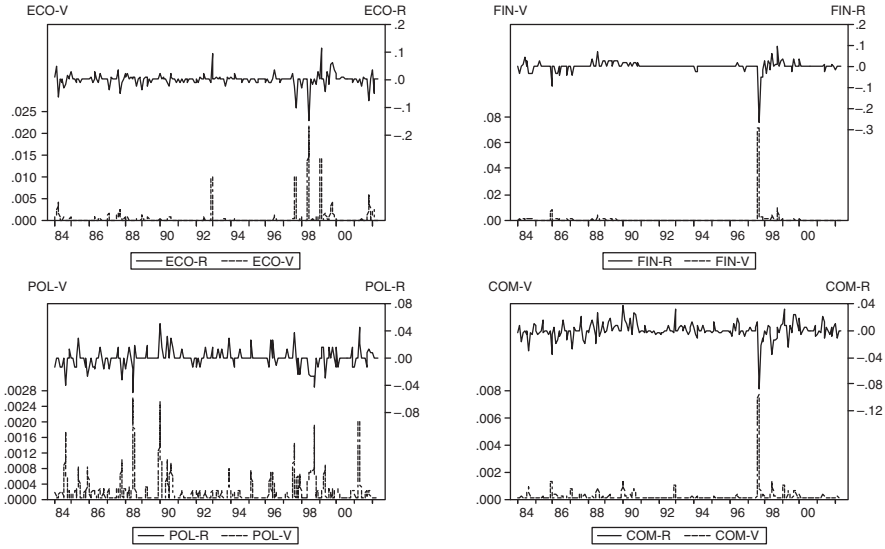


Figure 7b. Risk Returns and Volatilities for Malaysia.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.

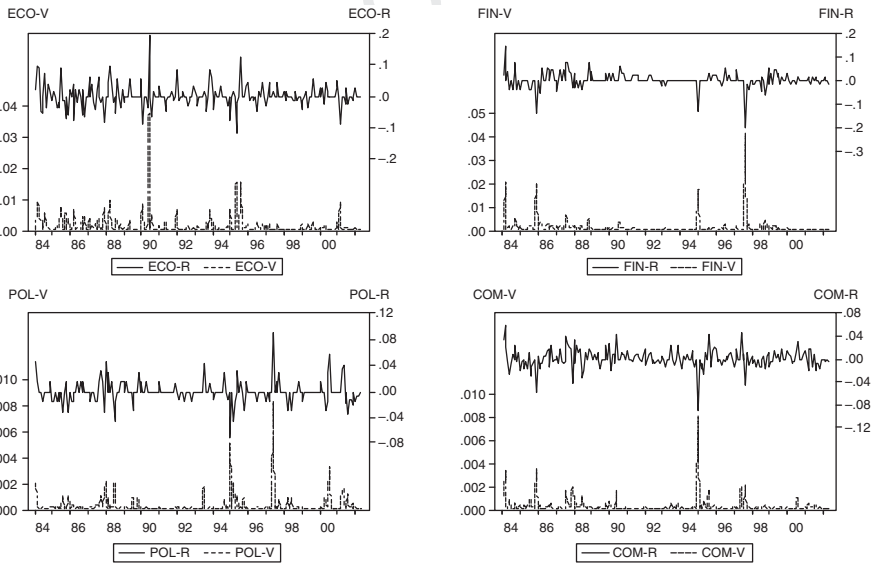
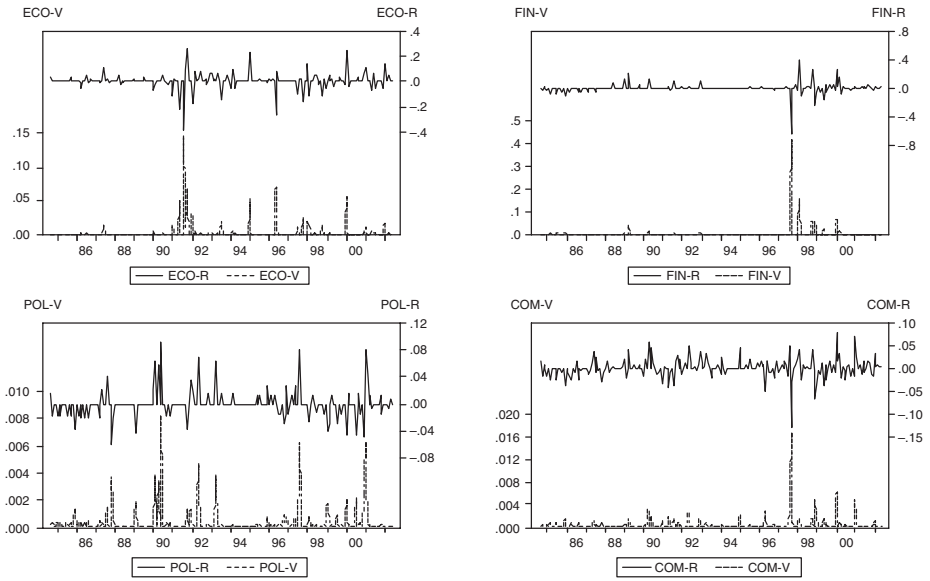


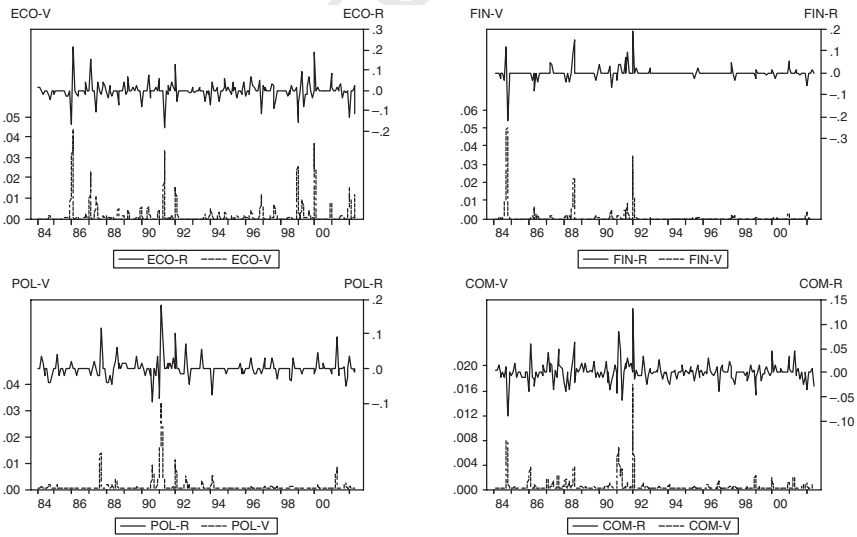
Figure 8b. Risk Returns and Volatilities for Mexico.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



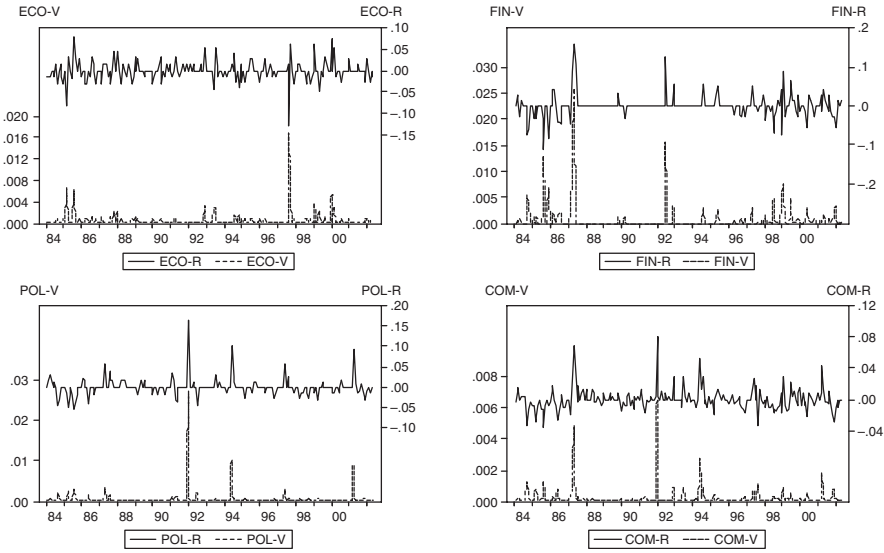
**Figure 9b.** Risk Returns and Volatilities for Romania.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



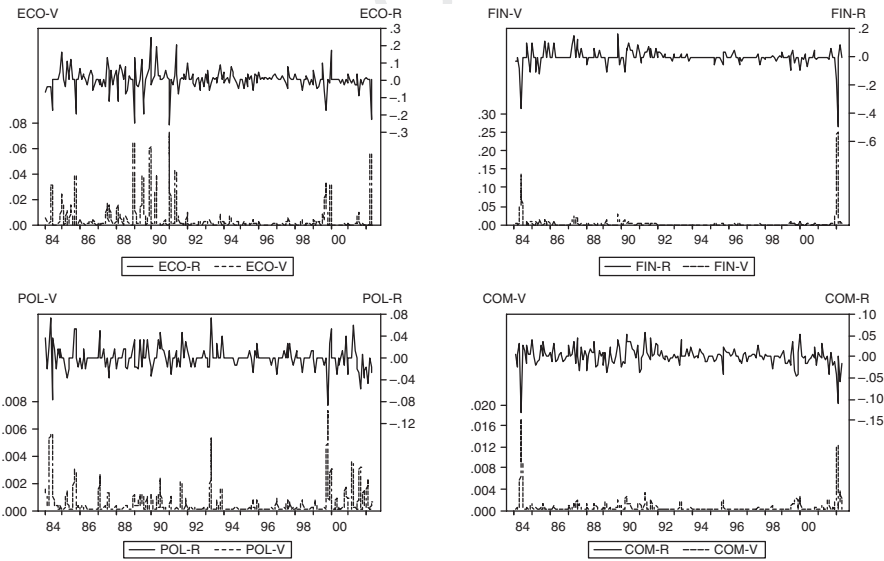
**Figure 10b.** Risk Returns and Volatilities for Saudi Arabia.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



**Figure 11b.** Risk Returns and Volatilities for South Africa.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.



**Figure 12b.** Risk Returns and Volatilities for Zimbabwe.

Note: Risk returns (R) and their associated volatilities (V) refer to the rates of change in the respective risk rating indexes.

**Table 24.** Descriptive Statistics for Risk Returns by Country.

Country	Risk returns	Mean	SD	Skewness
Albania	Economic	0.0016	0.0853	-2.3776
	Financial	-0.0005	0.0400	-0.8775
	Political	-0.0001	0.0301	-0.5235
Argentina	Composite	0.0002	0.0276	-2.1586
	Economic	0.0026	0.0636	-0.5162
	Financial	0.0006	0.0585	-3.8034
	Political	0.0008	0.0207	0.2672
Chile	Composite	0.0012	0.0222	-1.4046
	Economic	0.0021	0.0390	0.3235
	Financial	0.0021	0.0202	0.2447
	Political	0.0021	0.0157	0.7824
Cuba	Composite	0.0021	0.0148	-0.2724
	Economic	0.0020	0.0393	0.5590
	Financial	0.0002	0.0410	-0.8419
	Political	0.0001	0.0133	1.7161
Indonesia	Composite	0.0006	0.0169	2.4361
	Economic	0.0000	0.0205	2.6154
	Financial	-0.0011	0.0310	-3.3830
	Political	-0.0007	0.0137	-0.8328
Iraq	Composite	-0.0007	0.0103	-0.7032
	Economic	0.0033	0.1117	-0.7442
	Financial	0.0036	0.1391	1.6272
	Political	0.0030	0.0558	0.8633
Malaysia	Composite	0.0033	0.0486	-0.6748
	Economic	0.0000	0.0229	-0.6627
	Financial	0.0009	0.0255	-4.9462
	Political	-0.0003	0.0130	-0.0264
Mexico	Composite	0.0000	0.0118	-1.7884
	Economic	0.0019	0.0359	0.7234
	Financial	0.0023	0.0312	-1.3627
	Political	0.0001	0.0160	0.7132
Romania	Composite	0.0010	0.0160	-0.6843
	Economic	0.0007	0.0602	-1.0832
	Financial	0.0010	0.0688	-2.5329
	Political	0.0007	0.0189	1.4416
Saudi Arabia	Composite	0.0008	0.0207	-0.7155
	Economic	-0.0003	0.0419	0.1291
	Financial	0.0013	0.0293	0.1001
	Political	0.0013	0.0266	2.0621
South Africa	Composite	0.0008	0.0203	1.2961
	Economic	0.0000	0.0221	-0.4408
	Financial	0.0000	0.0278	1.1759
	Political	0.0001	0.0205	3.1660
Zimbabwe	Composite	0.0000	0.0140	1.6166
	Economic	-0.0030	0.0498	-0.6041
	Financial	0.0010	0.0413	1.7427
	Political	-0.0005	0.0274	0.6096
	Composite	-0.0005	0.0207	-0.4461

**Table 25.** Correlation Coefficients for Risk Returns by Country.

Country	Risk returns	Economic	Financial	Political	Composite
Albania	Economic	1.000	0.077	0.312	0.725
	Financial		1.000	0.089	0.477
	Political			1.000	0.749
	Composite				1.000
Argentina	Economic	1.000	0.063	-0.021	0.581
	Financial		1.000	0.276	0.623
	Political			1.000	0.675
	Composite				1.000
Chile	Economic	1.000	0.187	0.026	0.725
	Financial		1.000	0.227	0.592
	Political			1.000	0.618
	Composite				1.000
Cuba	Economic	1.000	0.108	0.380	0.701
	Financial		1.000	0.271	0.667
	Political			1.000	0.751
	Composite				1.000
Indonesia	Economic	1.000	0.124	0.047	0.572
	Financial		1.000	0.244	0.727
	Political			1.000	0.649
	Composite				1.000
Iraq	Economic	1.000	-0.056	0.026	0.603
	Financial		1.000	0.205	0.520
	Political			1.000	0.653
	Composite				1.000
Malaysia	Economic	1.000	0.161	0.138	0.662
	Financial		1.000	0.094	0.640
	Political			1.000	0.641
	Composite				1.000
Mexico	Economic	1.000	0.056	0.188	0.629
	Financial		1.000	0.286	0.645
	Political			1.000	0.735
	Composite				1.000
Romania	Economic	1.000	-0.072	-0.068	0.490
	Financial		1.000	0.017	0.676
	Political			1.000	0.459
	Composite				1.000
Saudi Arabia	Economic	1.000	0.177	0.000	0.645
	Financial		1.000	0.289	0.638
	Political			1.000	0.675
	Composite				1.000
South Africa	Economic	1.000	0.018	-0.035	0.389
	Financial		1.000	0.159	0.601
	Political			1.000	0.774
	Composite				1.000
Zimbabwe	Economic	1.000	-0.026	0.043	0.508
	Financial		1.000	0.052	0.527
	Political			1.000	0.707
	Composite				1.000

with the composite risk returns, but not with each other. For eight countries, namely Albania, Argentina, Cuba, Iraq, Mexico, Saudi Arabia, South Africa and Zimbabwe, the highest correlation coefficient is between the political and composite risk returns. Of these eight countries, the second highest correlation for Albania, Cuba, Iraq and Saudi Arabia is between economic and composite risk return, while for Argentina, Mexico, South Africa and Zimbabwe the second highest correlation coefficient is between financial and composite risk returns. For Chile and Malaysia, the highest correlation coefficient is between the economic and composite risk returns, while for Indonesia and Romania the highest correlation coefficient is between the financial and composite risk returns.

The risk returns and associated volatilities for the twelve countries are given in Figures 1b–12b. Substantial differences are evident in the risk returns, as well as in their volatilities. Both Albania and Romania have noticeable outliers for three of the four risk returns, the exception being political risk returns, for which there is a clustering of volatilities. Argentina has outliers in the case of financial and composite risk returns, and clustering for the other two risk returns, whereas Chile has clustering in the case of all four risk returns. Outliers are evident in three of the four risk returns for Cuba, with the exception being economic risk returns, for which there appears to be little clustering. In the case of all four risk returns for Mexico, outliers seem to be present. With the exception of composite risk returns for Indonesia, and political risk returns for Malaysia, outliers are more obvious than clustering. There is evidence of clustering of volatilities only in the case of political risk returns for Malaysia. Volatilities seem to cluster only for economic risk returns for Saudi Arabia, with outliers seeming to dominate the remaining three risk returns. Outliers are also evident for Iraq in the case of financial and political risk returns, but with little evidence of clustering of volatilities. South Africa and Zimbabwe display different patterns. Outliers are present in all four risk returns for South Africa, and clustering for financial risk returns, whereas Zimbabwe has outliers in the case of economics and political risk returns and clustering for composite risk returns.

## 6. Concluding Remarks

This paper evaluated the significance of 50 published empirical papers in the country risk literature according to established statistical and econometric criteria used in estimation, evaluation and forecasting. Such an evaluation permits a critical assessment of the relevance and practicality of the economic, financial and political theories pertaining to country risk. Discussion of the empirical findings relating to the published studies included descriptions of the country risk rating systems by the leading commercial analysts of country risk which were used, namely Institutional Investor, Euromoney, Moody's, Standard and Poor's, International Country Risk Guide, and Political Risk Services.

The rating system of International Country Risk Guide (ICRG), which is the only risk rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries, was discussed in detail. A comparison of ICRG country risk ratings, risk returns and associated volatilities

was provided for twelve developing countries, representing six geographic regions. The time series data permitted a comparative assessment of the international country risk ratings, and highlighted the importance of economic, financial and political risk ratings as components of a composite risk rating.

Future research in the area could analyse the monthly time series data for all the countries covered by the ICRG. The monthly data on country risk ratings and returns could be used to estimate and test a variety of models, including ARMA models of risk returns, and both time-varying conditional volatility and stochastic volatility models of innovations to risk returns. Univariate and multivariate models of volatility could be used to estimate alternative static and dynamic conditional correlation matrices of the innovations to risk returns in order to examine the direction of any causality in the economic, financial, political and composite risk ratings across countries. Hoti *et al.* (2002) have estimated several static conditional correlation matrices for Australia, Canada, Japan and the USA using alternative multivariate time-varying conditional volatility models. This analysis could be extended to estimate and test alternative dynamic multivariate time-varying conditional volatility and stochastic volatility models.

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## APPENDIX

### Published Empirical Studies on Country Risk

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