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*“A Market Based Composite Political Risk Indicator for the  
International Banking Industry”*

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**A MARKET BASED COMPOSITE POLITICAL RISK INDICATOR FOR THE  
INTERNATIONAL BANKING INDUSTRY**

**John Simpson<sup>1</sup>**

**Abstract**

The purpose of this paper is to test an international bank market pricing model, hypothesised to arrive at new indicator of pure composite political risk for country banking sectors. The motivation is that current political risk ratings (rating social, legal and cultural factors that impact political environments in countries) are largely subjectively quantified and are not frequently published. Political risk has not been a focus in media commentary to date on the global economic and financial spillovers of 2008/2009. An international capital asset pricing model for a banking system is useful as long as systemic interdependence, the degree of global integration, and country size and wealth can be controlled for as well as the impact on a country banking system of that country's stock market. The selected sample contains examples of country banking systems in developed and developing countries. The policy implications of the paper are that investors in banking portfolios, trade and investment policy formulators as well as banking regulators should be aware that it is possible that pure political risk indicators may be obtained as a daily management tool rather than monthly, from an analysis of international stock and banking market generated data.

**Key words: Political risk, market model, risks scores, economic and financial risk.**

**JEL Classification: F 36**

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## Introduction

Media comment by financial economists on the 2008/2009 global financial crisis to date has focused on the economic and financial aspects of US banking and stock-market spillovers. The comment ascribes the recent global financial crisis to the spill-over effects of the collapse of the sub-prime mortgage market in the United States. Put generally, the US mortgage market is an important part of the US banking market, which is an important part of the US stock market, which is a highly influential part of global banking and financial markets, particularly in developed countries where market interdependence is greater than in developing countries. Empirical cointegration and causality examination of global banking and stock market data in international banking market models undertaken prior to the onset of the crisis provides evidence that the US markets have been the principal driver of global markets<sup>2</sup>.

Pure composite political risk interacting with international stock markets and market sectors, such as banking, has not been properly dealt with in empirical studies to date. Pure composite political risk, according to risk ratings agencies, is described as the slowing down in the meeting of international obligations by a country due to political factors (such as riots, strikes and civil unrest) and influenced by human and cultural factors (such as corruption, history of law and order and quality of bureaucracy). Political risk reflects the willingness of countries to fulfil their international obligations. The components of pure composite political risk, as defined by ICRG (2009), are contained in Appendix 1.

It is hypothesised that the risks to international banking systems due to composite political factors may be indicated daily by the errors of regressions of international banking market pricing models and country banking market models to separately capture both international and country effects. In each banking market, the international models control for United States markets (because of their global importance) and global economic conditions using respectively the United States banking and stock market indices and the global banking and stock market price indices. The ultimate test is whether or not there is a similar stochastic movement in international bank market model residuals to that of political risk ratings and a similar ranking between the adjusted standard errors of the market models (adapted for country stock market effects, bank country size and wealth effects) and the composite political risk ratings for each country by risk rating agencies. In summary, the purpose of this

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<sup>2</sup> Simpson (2008).

paper is to provide the framework for the calculation of a daily composite political risk indicator for international banking systems.

### **Theory and literature**

The theoretical base for the study derives from financial economic theory and draws specifically on portfolio theory (Markowitz, 1959), the theory of the capital asset pricing model or CAPM (Sharpe, 1964; Ross, 1976; Roll, 1977, Fama and French,1992) and the efficient market hypothesis of EMH (Fama, 1970<sup>3</sup>). In this paper the assumptions are generally compliant with and in particular arbitrage pricing theory based on the CAPM (Roll, 1977), when extended to an international context in an international capital asset pricing model for country banking markets. That is, systematic or quantifiable (expected) components of the model are economic and financial in nature and the unsystematic (unexpected) component is country specific. If this is the case the latter element is reflective of human behaviour in a country's political system, which in turn is affected by social, legal and cultural factors in that country.

The sampled countries are Australia, Canada, Malaysia, China and India. The groups of countries have different economic positions in gross domestic product and populations and the final analysis of this study will require an adjustment of standard errors of market models to include the latest statistics for each country banking market in per capita income. Purchasing power parity is used so that control may be introduced for the relative cost of living and inflation rates of the sampled countries rather than simply the exchange rate. The exchange rate alone may not account for real difference in income between bank countries.

The literature review draws on substantive evidence of significant relationships between economic and financial information and sovereign risk, country risk and political risk (For example, Holthausen and Leftwich, 1986 (Footnote 2); Hand, Holthausen and Leftwich, 1992 (Footnote 2); Maltosky and Lianto, 1995<sup>4</sup>; Cantor and Packer, 1996<sup>5</sup>; Erb, Harvey and Viskanta, 1996<sup>6</sup>; Diamonte, Liew and Stevens, 1996<sup>7</sup>; Hill, 1998<sup>8</sup>; Radelet and Sachs, 1998<sup>9</sup>;

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<sup>3</sup> Security markets can be tested for informational efficiency at three levels. They are weak-form efficient if stock prices and/or returns are a random walk, semi-strong-form efficient if stock prices and/or returns immediately reflect all available public information and they are strong-form efficient if stock prices and/or returns reflect all public and private information.

<sup>4</sup> Sovereign risk rating downgrades are informative to equity markets, but upgrades do not supply markets with new information.

<sup>5</sup> Sovereign risk ratings had a significant impact on bond yield spreads.

<sup>6</sup> Country risk measures are correlated with future equity returns but financial risk measures reflect greater information. They also found that country risk measures are also highly correlated with country equity valuation measures and that country equity value oriented strategies generated higher returns.

<sup>7</sup> Country risk represents a more important determinant of stock returns in emerging rather than in developed markets. They also found that over the past 10 years country risk had decreased in emerging markets and increased in developed markets. They speculated that if that trend continued the differential impacts of country risks in each of those markets would narrow.

<sup>8</sup> In times of crisis many investors may be determined to minimise exposure to securities affected by country risk until they have more information, but after a period of calm the spreads being offered appear to be too high relative to the risks. After more investors return to the market the spreads get less and when there is another crisis the cycle recommences.

Ferri, Liu and Stiglitz, 1999<sup>10</sup>; Reisen and von Maltzan, 1999<sup>11</sup>; Hooper and Heaney, 2001<sup>12</sup>; Brooks, Faff, Hillier and Hillier, 2004<sup>13</sup>; Hooper, Hume and Kim, 2004<sup>14</sup>; Busse and Hefeker, 2005<sup>15</sup>; Simpson, 2007, 2007a<sup>16</sup>). Most researchers (except, for example, Busse and Hefeker (2004) and Simpson (2007, 2007a) examine country and sovereign risk ratings rather than pure political risk ratings.

However, most evidence indicates that country/sovereign risk (which includes pure political risk) has a significant relationship with stock market prices and returns (including banking market prices and returns). It should be noted that some evidence is produced that indicates that financial crises reflected in reduced stock market prices and returns are the main influences on sovereign risk ratings. If this is the case, risk ratings agencies cannot contribute new information to financial markets for investors and nor could they be useful to regulators and government policy makers. This issue shall also be investigated.

It is noted in Simpson (2009) that multifactor models have attempted use a variety of macro and micro economic factors to explain risk and return. Many of these multifactor models may not be firmly founded in capital market or economic theory and there are many different specifications (Reilly & Brown, 2003). Ultimately, if political, social, legal and cultural factors are to be taken into account in a model of country stock market prices, it is necessary to assume that they are incorporated in such a basic market model. This avoids the myriad of problems encountered in more advanced versions of the CAPM or the APT or the multifactor models. Reilly and Brown (2003) imply that it is feasible to apply a basic market model to a financial system using systemic stock price index data provided the constituents of the indices used are representative of the industry in the country concerned.

As noted in Simpson (2008) the global financial crisis has highlighted the concept of contagion, spillovers and the importance of the interconnection of global financial markets and economies. Western international banking markets are proven to be highly interrelated in

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<sup>9</sup> Country/sovereign risk ratings agencies were too slow to react to crises and when they did react it was suggested that their ratings intensified and prolonged the crisis.

<sup>10</sup> Ratings agencies behaved in a pro-cyclical manner by upgrading country/sovereign risk ratings during boom times and downgrading them during crises.

<sup>11</sup> Ratings agencies exacerbated boom-bust cycles in financial markets and put emerging markets at greater risk.

<sup>12</sup> Concluded that multi index models should be tested that incorporate a regional index, an economic development attribute, commodity factors and a political risk variable in order to more effectively price securities.

<sup>13</sup> Equity market responses to country/sovereign risk ratings changes revealed significant responses following downgrades.

<sup>14</sup> Ratings agencies provided stock markets and foreign exchange markets in the United States with new tradeable information. Ratings upgrades increased stock markets returns and decreased volatility significantly.

<sup>15</sup> Government stability, the absence of internal conflicts and ethnic tensions, basic democratic rights and the ensuring of law and order are highly significant determinants of foreign investment flows.

<sup>16</sup> Evidence of the direct adverse effects of extreme political acts on industries and economies is provided and cited.

interbank borrowing and lending and likely to be highly interrelated in cross bank shareholdings and mutual client lists<sup>17</sup>.

Researchers that have studied stock market spillovers are many, but include Baig and Goldfajn (1998), Forbes and Rigobon (1999), Dungey and Zhumabekova (2001), Caporale, Cipollini and Spagnolo (2003), Rigobon (2004) and also currency market literature in Ellis and Lewis (2000). This literature has focused on the manifestation of financial contagion. The study in this paper controls for US spill-over effects and global banking and stock market effects on different banking systems.

The analysis emphasises an important aspect of regression errors. The first is that the error term of a basic market model, according to portfolio theory, is an indicator of unsystematic risk. This component of total risk, in a systemic international market model, is the diversifiable component and it encapsulates country specific factors as well as other factors such as natural disasters. Control cannot be introduced into the model for natural disasters. However, the former country specific factors, by definition, includes difficult to measure human and legal factors that impact political risk and these factors are grouped into a measure of pure composite political risk. Of course regression errors have both a fixed and a variable component. The omission of fixed or measurable effects may indicate a misspecification, however; the specified market models in the first steps of the analysis cannot include all measurable factors (such as, wealth and size effects) because these factors are not measured daily.

### **The model, method and data**

In addition the model that follows<sup>18</sup> cannot control for the various components of pure political risk. However, it is recognised that there is a composite political risk value that is comprised of all of these human and legal components. Political news good or bad arrives randomly. Composite political risk ratings should be available at least on a daily basis, if not in formal risk ratings, and then in daily market generated data.

The major assumptions of the portfolio, efficient markets and financial contagion theories are carried over to the specified model. That is, that all economic and financial influences on a country banking sector are captured in the regression intercept and its coefficients. All country specific and therefore all human, social, cultural, legal and political influences (which collectively make up composite political risk) on the country banking industry are captured in the unsystematic risk component (that is, the error or the residual). Natural

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<sup>17</sup> Simpson, Evans and De Mello (2008).

<sup>18</sup> The basic model is put in Simpson (2009).

disasters are also unsystematic but are not controlled for in the specified model. The basic international capital asset pricing model is expanded to be assumed to be applicable to an industry sector (the banking sector) rather than a firm within that sector. The model is also expanded to include control for global interaction. These are unique features of the model which, in its expanded form, is more likely to avoid model risk problems and model misspecification. The daily price index data for each country, for the United States and for global banking and stock markets are obtained from representative indices published by DataStream. In the final analysis pure political risk ratings from the International Country Risk Guide (ICRG, 2009) are used for comparison purposes.

### **Step 1**

Daily data are gathered from Datastream for each series and the period of analysis is from 5<sup>th</sup> October 2000 to 5<sup>th</sup> October 2009. A basic international market model is specified for each country banking system in the sample of countries selected, which contains a mixture of developed and developing country banking systems. The United States banking and stock market variables are included as independent variables in all regressions as the United States banking and financial system is proven to be a global market driver<sup>19</sup>. For example, the global financial crisis is proven to be a largely a spillover effect from banking and financial problems emanating from the United States.

The model development follows:

$$P_{B_i,t} = \alpha_t + \beta_1(P_{USB,t}) + \beta_2(P_{GB,t}) + \beta_3(P_{USS,t}) + \beta_4(P_{GS,t}) + e_{i,t} \quad 1)$$

Where;

$P_{B_i,t}$  is the price index value on a country's banking shares  $i$  at time  $t$ .

$P_{USB,t}$  is the price index value on the United States banking industry at time  $t$ .

$P_{GB,t}$  is the price index value on the global banking industry at time  $t$ .

$P_{USS,t}$  is the price index value on the United States stocks at time  $t$ .

$P_{GS,t}$  is the price index value on the global stock market at time  $t$ .

$\alpha_t$  and  $\beta_t$ 's the regression coefficients representing the proportion of systematic or market risk in country banking system  $i$  at time  $t$ .

$e_{i,t}$  is the error term of the regression indicating the unsystematic risk in banking system  $i$  at time  $t$ .

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<sup>19</sup> Refer Simpson (2008).

The international model in Equation 1) is specified to firstly capture the daily errors in level series so that these may be converted to monthly series and stochastically compared to the monthly level series pure political risk ratings. Heteroskedasticity<sup>20</sup> is also persistent in these market models. Unequal variances of errors could be controlled for by the specification of a generalised least squares regression or an autoregressive conditional heteroskedasticity model. For ease of analysis and for the purposes in demonstrating the strong stochastic relationship between level series ordinary least squares (OLS) regression errors and political risk ratings, this study utilises OLS regression analysis and examines level series price index values as the first step of the analysis.

### **Step 2**

The daily residuals of Equation 1) are converted to monthly average residuals to compare with monthly political risk ratings for the period October 2000 to March 2009. The sample period covered in Equation 1) on daily data is reduced by a few months to accommodate missing values of political risk ratings. According to the main hypothesis of the study the standard errors of the residuals of the international market model will behave in a similar fashion to pure composite political risk scores. For the purposes of this study it is deemed necessary to treat lower political risk country systems as having a lower risk score. The ratings agencies treat higher scores as being associated with lower risk and the risk scores are in a scale of 1 to 100. The raw risk score in this study is deducted from 100 so that a lower score represents lower political risk.

Standard errors of the international market model (adapted for bank country size and wealth effects) might be considered a proxy for composite political risk ratings. But, prior to this a series of market model regression errors need to be compared to political risk ratings to compare the behaviour of these series. The following is the model to be used to test the central hypothesis in respect to the strength of the relationship and stochastic trends.

$$E_{B_{i_t}} = \alpha_{B_{i_t}} + \beta (PR_{i_t}) + e_{i_t} \quad 2)$$

Where  $E_{B_{i_t}}$  is the error of the level series regression in Equation 1) and  $PR_{i_t}$  is the pure composite political risk rating for country i at time t.

The purpose of specifying this equation is to compare the stochastic relationship between the errors of the daily level series market models for each country banking system converted to monthly series (the average residual for each month) to the monthly level series political risk ratings. If the errors terms of Equation 2) are stationary it may give an indication of

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<sup>20</sup> Unequal variance of the error term.

cointegration of the series of market model regression errors and political risk ratings. Unit root tests in Augmented Dickey Fuller (ADF) and Phillips Peron (PP) are utilised to test the stationarity of the errors of Equation 2). The stronger tests of the strength of that relationship are carried out using a vector autoregressive model (VAR) and VAR based tests of cointegration. Equation 2) is respecified into a VAR with both variables in Equation 2), optimally lagged according to various information criteria. If the cointegration tests are positive and if the VAR has a strong explanatory power in adjusted R Squared statistics, then the related variables are demonstrated to behave in a similar stochastic fashion. This is because the series will have been proven to exhibit similar trends in variability and will together achieve equilibrium at some point in the long-term. The explanatory power of the VAR model is a test of the strength of the relationship.

### **Step 3**

If the adjusted R Square value in the VAR is high and if cointegration is demonstrated it is clear that the international bank market model residual and the political risk ratings are strongly related. The final part of the analysis is to adjust the standard errors of each country bank market regression for differences in per capita income. The per capita income numbers are extracted from International Monetary Fund (2009) calculations for countries of the world sorted by gross domestic product at purchasing power parity per capita. The adjusted standard errors are then ranked and compared to the rankings of the mean political risk scores for each country. If the rankings are similar then the illustration of the proxy for political risk will lie in the adjusted standard errors of the country bank market models. The lower the adjusted errors, the lower the political risk.

### **Step 4**

The initial analysis examined level series in international market models so that the residuals could be captured to in turn capture the standard errors for each country bank model, but also to specify a VAR to compare the behaviour of the residuals series to that of the political risk ratings series. An additional test is to rank the standard errors of combined domestic and international models when the bank country stock market prices are added in to the international market model and first differences taken of the new regression variables. First differencing of the price series removes the problems of serial correlation in the errors and the combined model allows for control of domestic effects. These standard residuals can then be adjusted according to size and wealth effects.

## Findings

### Step 1

The results of the regression in Equation 1) are reported in Table 1 as follows.

**Table 1**  
**Country international banking price regression results**

| Country   | Adjusted R Square | t-statistic US Banking | t-statistic US stock market | t-statistic world banking | t-statistic world stock market | Standard Error of Regression (DW statistic in levels/DW statistic in first differences) |
|-----------|-------------------|------------------------|-----------------------------|---------------------------|--------------------------------|---|
| Australia | 0.776             | 8.657                  | -3.010                      | -2.587                    | 8.236                          | 157.620<br>(0.025/2.068)  |
| Canada    | 0.818             | 5.520                  | -6.121                      | -0.802                    | 9.733                          | 191.849<br>(0.012/2.111)  |
| China     | 0.774             | 11.209                 | -16.883                     | -19.484                   | 24.661                         | 470.772<br>(0.014/2.050)  |
| India     | 0.895             | 6.868                  | -23.274                     | -11.376                   | 25.955                         | 1106.188<br>(0.025/1.871)   |
| Malaysia  | 0.785             | 18.618                 | -20.112                     | -19.832                   | 27.071                         | 158.776<br>(0.014/1.902)  |

The t statistics are all significant at the 1% level. However, the Durbin Watson (DW) statistics indicate in each case that there is an initial problem with serial correlation making the regression results spurious. First differencing reduces the explanatory power of the model, but removes the problem of serial correlation in the errors of the regression (as demonstrated in the DW results reported in the last column of Table 1).

### Step2

However, the purpose of running the level series regression in Equation 1) is to obtain a level series of residuals to be converted to monthly series and stochastically compared to the monthly level series of political risk in an optimally lagged VAR based on Equation 2). For this to occur it needs to be demonstrated that in Equation 2), the new monthly series (the market model residuals,  $E_B$ ) together with the level political risk series (PR) are non-stationary and that the errors of that regression (e) are stationary. The results are shown in Table 2.

**Table 2**

**Unit root tests (ADF/PP) for monthly residuals series of international bank market models ( $E_B$ ) against monthly political risk ratings (PR) and the errors (e) in that relationship**

| Country   | Bank regression residual from Equation 1)<br><br>( $E_B$ ) | Political risk rating<br><br>(PR) | Errors of the relationship $E_B$ and PR in levels<br><br>(e) | Errors of the relationship $E_B$ and PR in first differences<br><br>D(e) |
|-----------|--|-----------------------------------|--|--|
| Australia | -2.506/-2.658<br>(0.117/0.085)                             | -3.445/-3.458<br>(0.012/0.011)    | -10.451/-11.036<br>(0.0.000/0.000)                           | -36.914/50.784<br>(0.000/0.000)  |
| Canada    | -2.244/-2.374<br>(0.193/0.152)                             | -1.794/-2.109<br>(0.382/0.242)    | -2.243/-2.373<br>(0.192/0.151)                               | -38.240/-50.784<br>(0.000/0.000)   |
| China     | -2.261/-2.571<br>(0.1867/0.102)                            | -2.171/-2.128<br>(0.218/0.234)    | -2.260/-2.570<br>(0.187/0.103)                               | -49.650/-49.593<br>(0.000/0.000)   |
| India     | -5.302/-3.410<br>(0.000/0.012)                             | -2.397/-2.362<br>(0.145/0.155)    | -5.316/-3.413<br>(0.000/0.013)                               | -45.424/-45352<br>(0.000/0.000)  |
| Malaysia  | -3.102/-2.126<br>(0.029/0.235)                             | -2.401/-2.422<br>(0.144/0.138)    | -3.103/-2.126<br>(0.030/0.235)                               | -46.125/-46.169<br>(0.000/0.000)   |

Note: The test critical values for ADF and PP test statistics are 1% at -3.496, 5% at -2.890 and 1% at -2.582. The probabilities of these test statistics are in parenthesis.

The above results for the greater part show that the level series  $E_B$  are non-stationary (the exception is in the case of India) and the level series PR are also in the main non-stationary (the exception is in the case of Australia). The level series errors (e) of the regression of  $E_B$  and PR are stationary (with the exceptions in the cases of Canada and China. Note Malaysia is stationary at the 5% level in ADF tests), but first differencing converts all series to stationarity (as indicated in ADF/PP test statistics reported specifically for (e) in the last column of Table 2). Overall evidence is produced of integrated non-stationary processes. There is justification applying a VAR based on Equation 2) to verify explanatory power and to run VAR based tests of cointegration and causality.

On a 1: 4 lag specification for each VAR it is found that no root lies outside the unit circle and all VARs satisfy the stability condition. The optimal lags for each banking system are tested over 20 periods (20 months) using various information criteria and results are provided in Table 3. It is clear that the developed country bank systems in VAR adjust to equilibrium faster than the developing economies.

**Table 3**  
**VAR optimal lags**

| Country   | Lag (in months) | Criteria            |
|-----------|-----------------|---------------------|
| Australia | 1               | FPE, AIC, SC and HQ |
| Canada    | 1               | FPE, AIC, SC and HQ |
| China     | 4               | FPE and AIC         |
| India     | 4               | LR, FPE and AIC     |
| Malaysia  | 3               | FPE and AIC         |

Note: LR denotes Likelihood Ratio, FPE-Final Prediction Error, AIC-Akaike Information Criterion, SC-Schwarz Information Criterion and HQ-Hannan-Quinn Information Criterion.

The results of the testing of Equation 2) in a VAR format are provided in Table 4.

**Table 4**  
**Results the VAR where bank market model residuals interact with political risk ratings: t statistics and adjusted R Square values**

| Country   | -1<br>month $E_B$  | -2<br>months $E_B$ | -3<br>months $E_B$ | -4<br>months $E_B$ | -1<br>month<br>PR | -2<br>months<br>PR | -3<br>months<br>PR | -4<br>months<br>PR | Adjusted<br>R<br>Square |
|-----------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|-------------------------|
| Australia | 10.077<br>(1.674)  | -1.841<br>(-1.951) | 0.160<br>(0.878)   | 0.108<br>(0.608)   | 0.320<br>(7.435)  | 0.192<br>(0.644)   | -0.630<br>(0.279)  | 0.132<br>(-1.368)  | 0.781<br>(0.664)        |
| Canada    | 9.654<br>(0.026)   | -1.232<br>(0.541)  | -0.020<br>(-0.452) | 0.319<br>(0.132)   | -0.052<br>(9.414) | 0.517<br>(0.186)   | 0.964<br>(0.236)   | -1.957<br>(-1.514) | 0.804<br>(0.867)        |
| China     | 9.661<br>(0.690)   | -0.957<br>(0.407)  | 1.845<br>(1.259)   | -2.442<br>(-0.952) | 0.557<br>(7.940)  | -1.324<br>(1.249)  | -0.445<br>(-0.556) | 2.150<br>(-0.025)  | 0.830<br>(0.885)        |
| India     | 12.957<br>(-1.246) | -5.165<br>(1.184)  | 2.932<br>(-1.094)  | -3.081<br>(0.786)  | 0.230<br>(7.236)  | 0.360<br>(1.023)   | -1.213<br>(-0.537) | 0.432<br>(0.994)   | 0.760<br>(0.901)        |
| Malaysia  | 12.099<br>(-0.423) | -3.909<br>(0.652)  | 2.394<br>(-0.473)  | -1.243<br>(-0.566) | -0.024<br>(9.912) | 1.776<br>(-0.798)  | -2.055<br>(-0.519) | 0.643<br>(0.523)   | 0.827<br>(0.914)        |

Note: The number in parenthesis is the t-statistic when PR is treated endogenously. In the last column is the adjusted R Square value when PR is treated endogenously.

The strong explanatory power of each model is noted in adjusted R Square values. Johansen cointegration tests are applied for each country bank VAR. Lags intervals tested are 1 to 4 months and the trend assumption is a linear deterministic trend. The political risk variable is treated exogenously. Trace tests and maximum eigenvalue tests indicate two cointegrating equations for each country bank system at the 5% level of significance. Stronger evidence is thus provided that the residuals from a country bank market regression ( $E_B$ ) and the country political risk ratings (PR) in monthly series have similar stochastic trends and together move to stability in the long-term<sup>21</sup>. The VAR Granger causality/Block exogeneity Wald tests for each country bank system, when run on up to 4 lags, produces no significant evidence of one way or dual causality between ( $E_B$ ) and (PR) (That is, the Chi-squared tests statistic is not significant at any level).

### **Step 3**

The standard errors (reported in Table 1, but based on the raw international market model residuals) are adjusted according to size and wealth affects in each bank country and compared to the mean political risk ratings for each country. If there is a similar ranking in the adjusted standard errors to the ranking of the mean political risk ratings there may be some basis for saying that these adjusted standard errors of international bank market models are an indicator of bank country political risk. Lower values of the adjusted standard error would represent lower political risk.

Bank country per capita income levels are shown in Table 5. These levels are divided into the standard errors (to adjust the errors for bank country size and wealth effects) initially reported in Table 1 and repeated in Table 9.

**Table 5**

| <b>Level (ranking)</b> | <b>Per capita income range \$</b> |
|------------------------|-----------------------------------|
| 8 (1)                  | 35,000 to 40,000                  |
| 7 (2)                  | 30,000 to 35,000                  |
| 6 (3)                  | 25,000 to 30,000                  |
| 5 (4)                  | 20,000 to 25,000                  |
| 4 (5)                  | 15,000 to 20,000                  |
| 3 (6)                  | 10,000 to 15,000                  |
| 2 (7)                  | 5,000 to 10,000                   |
| 1 (8)                  | 0 to 5,000                        |

**Note:** The number in parenthesis is the ranking of the country income group.

<sup>21</sup> Appendix 2 shows the graphs of residuals of each of the variables in the VAR when each is treated endogenously and indicates similar stochastic trends.

The results of this brief analysis are shown in Table 6. The levels in Table 5 are divided into the standard errors in Table 6 to adjust the errors and to provide a ranking of adjusted errors to compare with the mean political risk ratings for each bank country.

**Table 6**

**Ranking of bank market model standard errors and mean political risk ratings**

| Country   | Standard error of international market regressions | Per capita income in USD (per capita income level) | Adjusted standard errors (ranking in sample) | Political risk ratings (ranking in sample) |
|-----------|--|--|--|--|
| (1)       | (2)  | (3)  | (4)  | (5)  |
| Australia | 157.620  | 37,302 (8)   | 19.703 (1)                                   | 12.743 (1)                                 |
| Canada    | 191.849  | 38,290 (8)   | 23.981 (2)                                   | 13.015 (2)                                 |
| Malaysia  | 158.776  | 13,551 (3)   | 52.926 (3)                                   | 26.208 (3)                                 |
| China     | 470.772  | 6,546 (2)  | 235.386 (4)                                  | 32.188 (4)                                 |
| India     | 1106.118   | 2,932 (1)  | 1106.118 (5)                                 | 39.446 (5)                                 |

Note: For example 8 represents the highest level of per capita income of \$35,000 to \$40,000. This category includes Australia and Canada whose standard errors are divided by 8. Australia's standard error of 157.620 in Column 2 is divided by 8 to obtain an adjusted standard error of 19.703 in Column 3.

Note that the rankings for per capita income are similar to the rankings of political risk. Note also that India's adjusted standard error is disproportionately high and this is only partly explained by its very low per capita income level. This might also be explained in the distance the country needs to travel in macro and microeconomic reforms to improve economic performance and may also have something to do with the level of informational efficiency in the Indian stock market. To an extent this may be the same case in China although China has made giant strides in its process of globalisation and market reforms.

**Step 4**

In the final analysis an additional methodology could be applied. It is noted that the standard errors of level series international market models have been used. A better method may be to also control for domestic effects and introduce the domestic market model into the international model and take the first differences of that model. The standard errors could then be adjusted by a multiplier of the ranking of the bank countries in terms of income and wealth effects. An OLS in first differences is run on the combined domestic and international market model for each country banking system as follows where  $P_{s_i}$ 's are the prices in the bank country share markets. The rest of the variables are those captured in Equation 1).

$\Delta P_{B_i} = f(\Delta P_{S_i}, \Delta P_{USB_i}, \Delta P_{USS_i}, \Delta P_{WB_i}, \Delta P_{WS_i})$ . The results show a reduction in explanatory power of the combined domestic and international market model with an adjusted R Square values for Australia, Canada, Malaysia, china and India of 0.662, 0.577, 0.0.740, 0.249, and 0.732 respectively all significant at the 1% level. All independent variables in all models have t statistics that are significant at the 1% level except in the case of China where most of the variance of the Chinese banking market is explained by the Chinese stock market and where the variables for the US banking market, the US stock market, the world banking market and the world stock market are not statistically significant at any level. The interest however lies in the standard errors of these equations and these are reported in Table 7.

**Table 7**

**Standard errors of a combined domestic and international banking market model adjusted by per capita income rankings**

| Country   | Combined market model standard error | Ranking according to per capita income | Adjusted residual (ranking) | Political risk rating (ranking) |
|-----------|--------------------------------------|--|-----------------------------|---------------------------------|
| Australia | 12.757                               | 1                                      | 12.757 (1)                  | 12.743 (1)                      |
| Canada    | 16.032                               | 1                                      | 16.032 (2)                  | 13.015 (2)                      |
| Malaysia  | 7.334                                | 6                                      | 44.004 (3)                  | 26.208 (3)                      |
| China     | 43.321                               | 7                                      | 303.245 (4)                 | 32.188 (4)                      |
| India     | 78.703                               | 8                                      | 629.624 (5)                 | 39.446 (5)                      |

Note: The ranking according to per capita income for each country system is multiplied by the standard error for the combined market model to arrive at the adjusted standard error for each system with the ranking in parenthesis.

**Limitations**

Whilst the above results are encouraging, further research is needed to lend greater support for the central hypothesis. It would appear that a combined market (international and domestic) model in first differences needs to be specified and the standard errors of that model may then be adjusted for country size and income effects. Problems of serial correlation in the level series model would be removed at the outset. A more comprehensive list of bank countries needs to be included in the empirical investigation. It may be more appropriate to adjust the standard errors for the VAR of the level series against political risk rather than adjust the standard errors of the international, domestic and/or combined market models. A Vector Error Correction Model may be more appropriate prior to running cointegration tests. An ARCH model or one of its derivatives may be more appropriate than an OLS. The removal of these limitations is the object of future research.

**Conclusion**

This paper set out to provide, based on financial economics theory and evidence, support for the hypothesis that systemic international banking market models can be used to indicate pure

composite political risk using daily stock market generated data. It is suggested that this information is useful to investors in portfolios of banking stocks, trade and investment policy makers and banking regulators because at present political risk ratings are largely subjectively quantified and are infrequently published. The sample of countries chosen to test the central hypothesis contains 2 developed countries and 3 developing and transitional economies.

The first step in the analysis is to specify international banking market models for each banking system. Following this the residuals for each market model are collected in a daily series but then converted to a monthly series so that that variable can be compared to monthly political risk ratings. These now monthly variables are again tested for non-stationarity (and the errors of that relationship for stationarity) to ensure they could be made to interact in a VAR as integrated non-stationary processes. The study then moved to run VAR based tested of cointegration and causality.

The findings are that the residuals of the international market model for each banking system studied possess similar stochastic trends to the political risk ratings and together these variables achieve equilibrium in the long-term. The explanatory power of the respective VARs in the adjusted R Square values is high. In relation to short-term dynamics on lags of up to 4 months, there is no evidence of significant dual or one-way causality (according to VAR based Granger causality tests) in any of the country banking systems studied between the international market model residual and the political risk variable. In the final analysis standard errors of regressions are adjusted for country wealth and size effects and the rankings are compared to those of political risk. The rankings are similar in this study and this means that lower (higher) adjusted standard errors are indicators of lower (higher) political risk. A combined domestic and international market model in first differences with standard errors adjusted according to per capita income effects for each bank country yields similar results in terms of country banking system ratings and the numerical value of the adjusted residuals is closer to that of the political risk ratings.

The conclusion is that an analysis of daily international stock and banking market data for each country bank market can reveal a daily indication of pure composite political risk. More research needs to be done, but initial results are encouraging and should be of interest to banking market investors, trade and investment policy formulators, portfolio managers and banking regulators. This is because some of the subjectivity of risk ratings is removed and the indication of political risk is more frequent.

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## Appendix 1

### Definitions and explanations of pure political risk components (ICRG, 2005)

**Government stability** ratings are an assessment of a government's ability to remain in office by carrying out declared policy plans. The subcomponents of this factor are government unity, legislative strength and popular support. According to the ICRG ratings, socio-economic conditions relate to pressures that conspire to constrain government action or to fuel social dissatisfaction. The subcomponents in this category are the level of unemployment, the degree of consumer confidence and the level of poverty.

**The investment profile factor** affects the risk to investment not covered by other political, economic and financial components and is made up of contract viability and expropriation, profit repatriation, and payment delays.

**Internal conflict** is an assessment of political violence in a country and its impact on governance. The highest rating means that there is no armed or civil opposition to the government and the government does not engage in arbitrary violence (either direct or indirect) against its own people. Under this rationale the lowest scores would apply to those countries where there is ongoing civil war. The subcomponents of this risk factor are thus, civil war or coups threat, terrorism or political violence, and civil disorder.

**External conflict** measures are an assessment of the risk to the incumbent government from foreign action, which includes non-violent external pressure (for example, diplomatic pressure, withholding of aid, trade restrictions, territorial disputes, and sanctions) to violent external pressure (such as, cross-border disputes and all-out war). The subcomponents of this category of pure political risk are cross-border conflict, and foreign pressures.

**Corruption** is an internal assessment of the political system. Corruption distorts the economic and financial environment and reduces the efficiency of government and business in the way the foreign direct investment is handled. Corrupt practices enable people to assume positions of power through patronage rather than ability. By so doing, an inherent instability is introduced into the political process. Examples of corruption include special financial payments and bribes, which ultimately may force the withdrawal of or withholding of a foreign investment. However, excessive patronage, nepotism, job reservations, "favour for favours", secret party funding, and suspiciously close ties between government and business have a lot to do with corruption. A black market can be encouraged with these forms of corruption. The potential downside is that popular backlash may lead to the rendering of the country ungovernable.

**Military in politics** is a problem because the military are not democratically elected. Their involvement in politics is thus a diminution of accountability. Other substantial ramifications are that the military becomes involved in government because of an actual or created internal or external threat. Government policy is then distorted (for example, defence budgets are increased at the expense of other pressing budgetary needs). Inappropriate policy changes may be a result of military blackmail. A full-scale military regime poses the greatest risk. Business risks may be reduced in the short-term but in the longer-term the risk will rise because the system of governance is susceptible to corruption and because armed opposition in the future is likely. In some cases, military participation will represent a symptom rather than a cause of higher political risk.

**Religious tensions** emanate from the domination of society and or governance by a single religious group that seeks to replace civil law and order by religious law. Other religions are excluded from the political and social process. The risk involved in such scenarios involves inexperienced people dictating inappropriate policies through civil dissent to outright civil war.

**The law and order components** are assessments of the strength and impartiality of the legal system and popular observance of the law respectively.

**Ethnic tensions** relate to racial, nationality or language divisions where opposing groups are intolerant and unwilling to compromise.

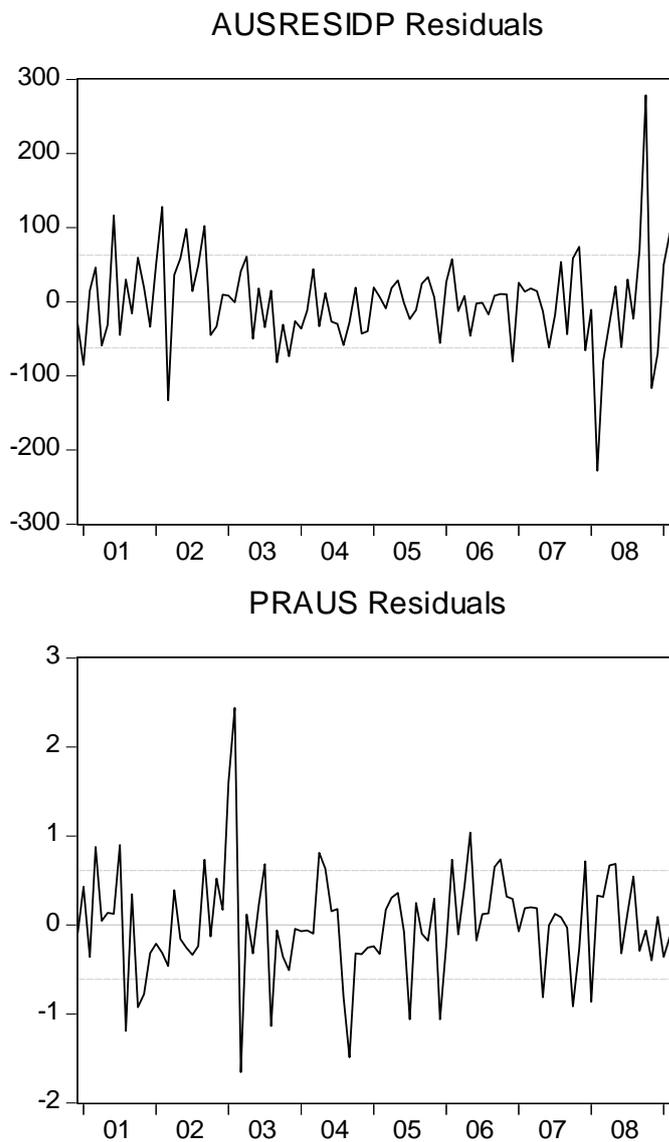
**The democratic accountability component** is a measure of how responsive government is to its people. The less responsive it is the greater the chance that the government will fall. This fall will be peaceful in a democratic country but possible violent in a non-democratic country. The institutional strength and the quality of the bureaucracy is a measure that reflects the revisions of policy when governments change. Low risk in this area applies to countries where the bureaucracy has the strength and expertise to govern without major changes in policy or interruptions in government services. That is, bureaucracies have a degree of autonomy from political pressure with an established independent mechanism for recruitment and training.

## Appendix 2

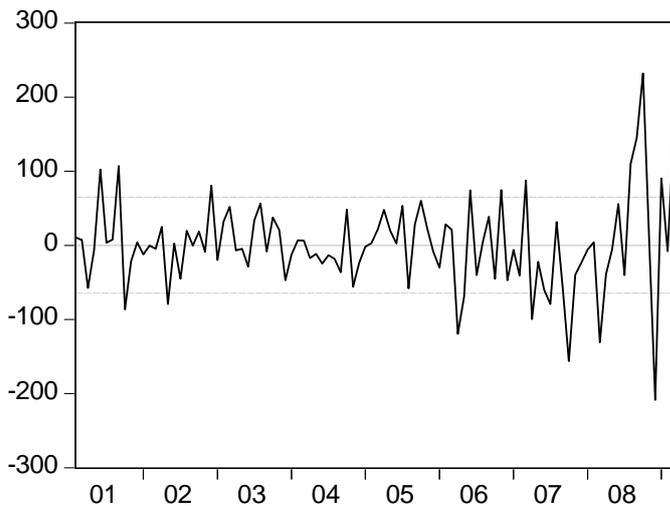
### Graphs of endogenous residuals in country bank VARs

NOTE: Top panel residual series; bottom panel political risk series:

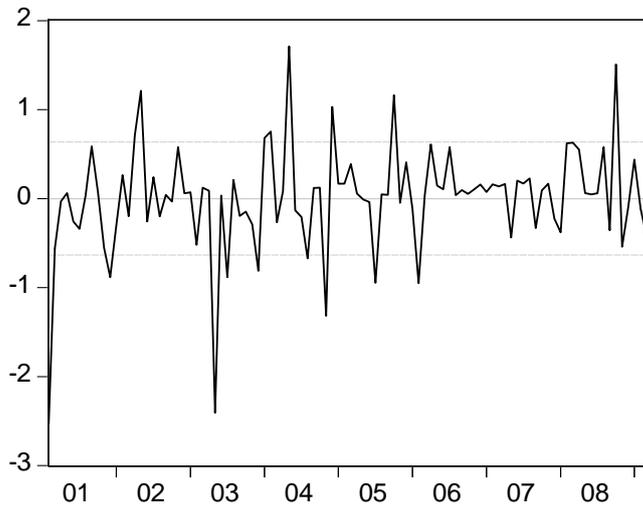
**AUSRESIDP**-Australia market models treated endogenously. **PRAUS**-Australian political risk treated endogenously in a univariate model. Similarly, **CANRESIDP** (Canada), **PRCAN** (Canada) and for China (**CHINRESIDP**, **PRCHIN**), Malaysia (**MALESIDP**, **PRMAL**) and for India (**INDRESIDP**, **PRIND**).



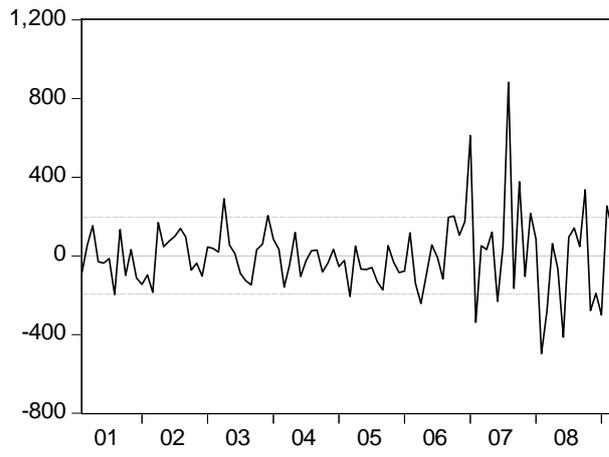
CANRESIDP Residuals



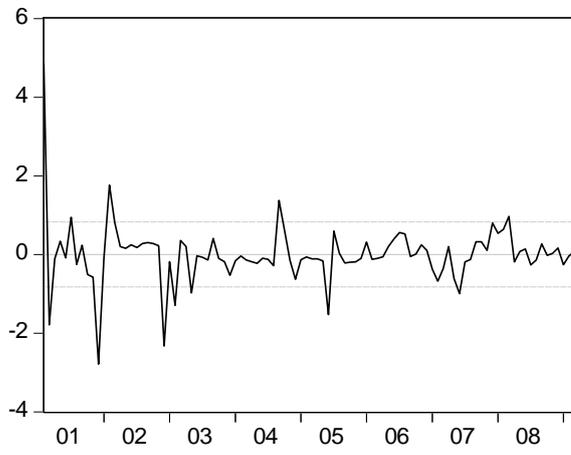
PRCAN Residuals



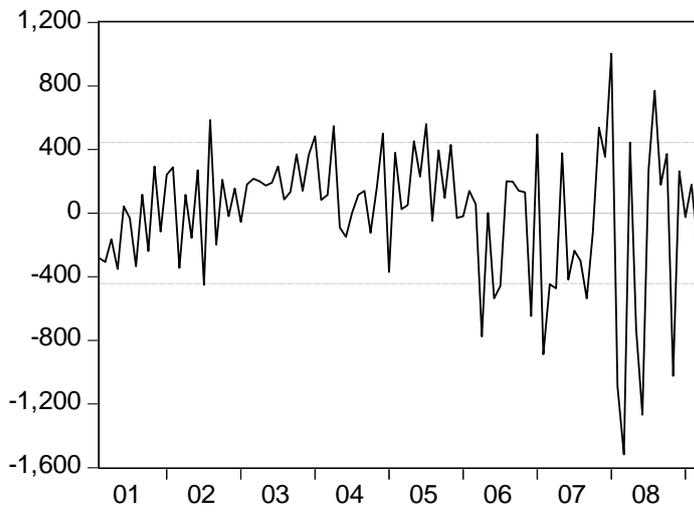
CHINRESIDP Residuals



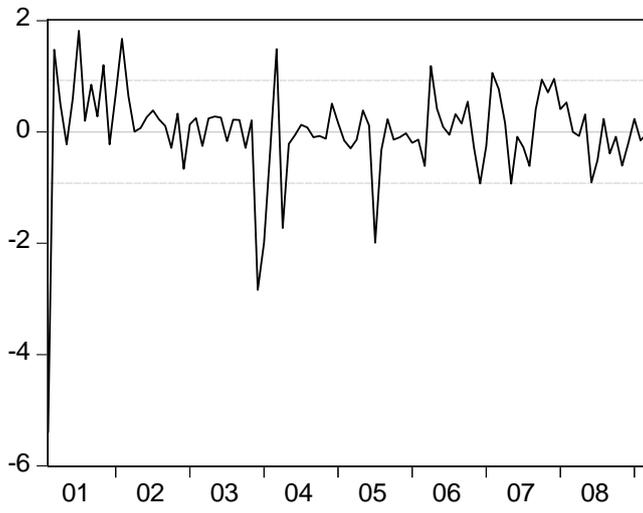
PRCHIN Residuals



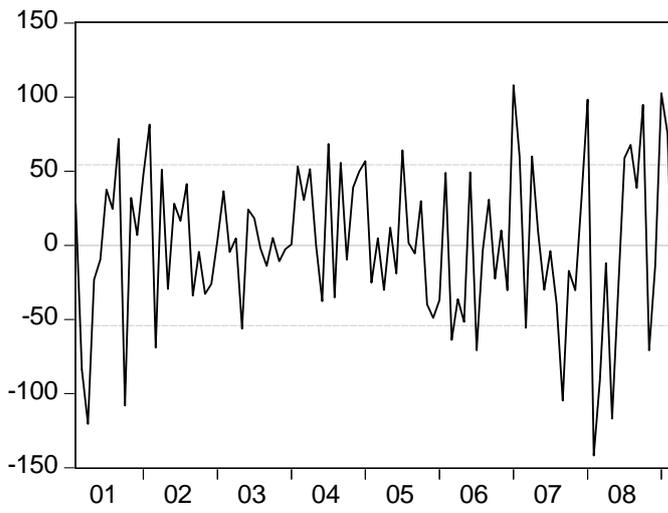
INDRESIDP Residuals



PRIND Residuals



MALRESIDP Residuals



PRMAL Residuals

