

Market Volatility and Regulatory Governance in Emerging Markets

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Abstract

We study the relationship of stock return volatility in 32 emerging countries to the governance environment in each country. Our results indicate that the effectiveness of public regulatory processes in different countries explains the differences in the observed market volatility. Aspect of governance relating to the political system does not appear to significantly influence the stock market volatility across countries. On the other hand, the governance aspect relating to market regulation and its effectiveness appears to be negatively associated with market volatility. It indicates that better governance, effective capital markets regulations and efficient conflict resolution mechanisms are likely to lead to a smoother process of regulatory adjustment and to lower market volatility.

Introduction

Capital markets regulators around the world remain concerned about “excessive” market volatility. This concern is institutionalized in the form of regulations such as margin limits and circuit breakers, as well as verbalized by the regulators in expressions such as the now famous phrase “irrational exuberance.” The regulators in the emerging markets are concerned over excessive volatility also because, among other factors, it is considered symptomatic of market manipulation and speculative trading. A lack of trust in the fairness of markets due to potential for manipulation, and irrational trading, highlighted by recurring scandals, scams, and speculative bubbles, exacerbates the market volatility. Such manipulative and speculative behavior imposes implicit costs on the market participants and increases the cost of intermediation and capital which can be a drag on investment and economic development. Containing market volatility is thus a major focus of market regulators (See Beckett, and Gordon (1989) for a discussion of why volatility matters).

One particular source of volatility in the emerging markets is the interplay of regulation and market innovation played out against the backdrop of powerful forces of globalization and information technology revolution. The last two decades have seen unprecedented growth and institutional development in the emerging markets. The legal and regulatory frameworks with respect to the capital markets in these countries continue to evolve along side. The regulatory development, however, does not take place in a smooth fashion, but proceeds with delays, and sub-optimal solutions in part due to its political nature. In the emerging markets it often takes place in response to financial crisis, scandals and scams in an effort to restore the investors’ confidence in the markets and institutions. Financial services firms on the other hand indulge in *avoidance behavior* to circumvent regulation. The interplay of market innovation and regulatory response seems to be similar to the one described by Edward Kane in relation to the regulation of financial institutions (Kane

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1983 and 1988). Kane describes it in Hegelian terms as “a delayed reaction to interacting dialectical processes.” The conflicting elements play out as Hegelian thesis and antithesis, to evolve into a new policy synthesis. However, the new synthesized policy mix generates its own contradictions in the on-going dialectical process. In the case of emerging markets, a similar dialectics seems to develop due to continuing conflict between the free market forces and policy stance of regulators. The cycle of *avoidance-reregulation-avoidance* may be triggered by changes in the market and technological environment. Markets adapt to such changes in the form of innovation, avoidance and circumvention of regulation. The resulting conflict calls for a re-regulation response, which, however, is followed by another round of avoidance. This dynamics of conflict resolution is a particular source of volatility in the market. Kane (1988) sees financial instability as a cost of inefficient financial regulation.

The rest of the paper is organized as follows. The next section provides a brief review of the related research. Section III outlines our hypotheses, methodology and describes the data used. Section IV presents results of the empirical analysis, which is followed by the final section summarizing and concluding the paper.

Related Research

Though stock market volatility has been a well researched area, there have not been many studies looking into cross-country differences in volatility and attempting to systematically explain these. In particular, there have been a few studies on the relationship between governance environment and volatility of the emerging markets. Bekaert and Harvey (1997) document systematic differences in the volatility of the returns in emerging equity markets. They characterize the time-series properties of volatility and the distributional foundations of the variance process. In investigating the cross-section of volatility, they use measures such as asset concentration, market capitalization to GDP, size of the trade sector, cross-sectional volatility of individual securities within each country, turnover, foreign exchange variability and national credit ratings to explain why volatility is different across emerging markets. Du and Wei (2004) study the role of insider trading in explaining cross-country differences in stock market volatility. Their paper finds that countries with more prevalent insider trading have more volatile stock markets, even after one controls for liquidity/maturity of the market, and the volatility of the underlying fundamentals (volatility of real output and of monetary and fiscal policies). They also find that the effect of insider trading is quantitatively significant when compared with the effect of economic fundamentals. Aggarwal, Inclan and Leal (1999) examine events that cause a large shift in the volatility of emerging stock markets, and conclude that most events tend to be local such as the Mexican peso crisis. The October 1987 crash is the only global event during their study period that seems to have affected volatility in several emerging stock markets.

The connection between speculation, market manipulation and volatility has been strongly indicated. For example, De Long, Daouk, Lee and Ng (2004) examine the link between capital market governance (CMG) and several key measures of market performance. The authors develop a composite CMG index that captures three dimensions of security laws: the degree of earnings opacity, the enforcement of insider laws, and the effect of removing short-selling restrictions. The authors find that improvements in the CMG index are

associated with decreases in the cost-of-equity capital (both implied and realized), increases in market liquidity (trading volume, market depth, and U.S. foreign investments), and increases in market pricing efficiency (reduced price synchronicity and IPO under-pricing).

Other sources of market volatility can be traced to speculation and potential for market manipulation. Shleifer, et al. (1990a, 1990b) show that *noise traders* cause excessive trading and volatility. Speculative trading in derivative securities has also been blamed for causing excessive volatility (Jegadeesh and Subrahmanyam, 1993). Some economists have even argued for imposing tax on short-term trades to contain volatility (e.g., Stiglitz 1989). Among the research on emerging markets volatility, Ahmed, Rosser and Uppal (1996) document the existence of bubbles and volatility. Mangla and Uppal (1996) report market inefficiencies and volatility across emerging markets. The price manipulative behavior on the Karachi Stock Exchange is rigorously documented by Khawja and Mian (2005).

Empirical Hypothesis, Methodology and Data

We examine the relationship of stock return volatility to the governance environment in 32 emerging countries. We expect that the cross-country market volatility is negatively related to the quality of governance environment and especially to the quality of market regulation. A better quality of governance and capital market regulations and efficient conflict resolution mechanisms in a country are likely to lead to smoother dialectic processes and hence to lower market volatility. A follow up question is, “which aspects of governance are more likely to impact market volatility?” We can broadly divide a country’s governance environment into two spheres; one relating to the political and civic sphere, and the other relating to financial markets and the regulatory effectiveness. We hypothesize that the first dimension, i.e., political, is likely to be weakly (negatively) associated with the market volatility. On the other hand the second governance dimension, relating to markets, is expected to be more strongly (negatively) associated with market volatility.

We use a sample of 32 emerging markets included in the S&P/IFCG index over the period 2001-2005 (Standard and Poor’s (2006)). *First*, we measure “returns” (R_t) as the first differences of the natural log of the index level P_t thus: $R_t = \ln(P_t) - \ln(P_{t-1})$. *Second*, we adjust the “returns” to exclude possible influences of the international stock markets and *conditional auto-regressive heteroskedasticity* on the variance process. Standard deviations of the residuals from the GARCH-M model of the individual countries returns (conditional volatility, σ_i) are then used in the cross-country regression on various measures of governance. Autoregressive conditional heteroskedasticity was proposed by Engle (1982) to explain the tendency of large residuals to cluster together. A general form of an ARCH/GARCH model is:

$$y_t = \mathbf{X}_t\beta + u_t, \text{ and the variance of } u_t, h_t \text{ follows the process:}$$

$$h_t = h(u_{t-1}, u_{t-2}, \dots, u_{t-q}, h_{t-1}, h_{t-2}, \dots, h_{t-p}, X_{t-1}, X_{t-2}, \dots, X_{t-k}, \alpha)$$

Where α is a set of parameters to be estimated. In Bollerslav (1986), to model persistence in volatility, the variance term depends upon the lagged variances as well as the lagged squared residuals. The variance model for the standard GARCH (p, q) model is:

$$h_t = c_0 + a_1 u_{t-1}^2 + a_2 u_{t-2}^2 + \dots + a_q u_{t-q}^2 + b_1 h_{t-1} + a_2 h_{t-2} + \dots + b_p h_{t-p}$$

GARCH-M models (Engle, Lilien, Robins (1987)) generalize the GARCH model by allowing a function of the variance (typically the variance itself) to enter the regression function. We employ a GARCH-M(1,1) model to account for the persistence in volatility in the returns series as follows:

$$R_t = \gamma_0 + \gamma_1 RI_t + \gamma_2 h_t + u_t \quad \text{where } u_t \sim N(0, h_t) \quad \dots (1)$$

$$h_t = \text{var}(u_t) = c_0 + a_1 u_{t-1}^2 + b_1 h_{t-1} \quad \dots (2)$$

In our model the set of explanatory variables (X_t) consists of, besides the constant (γ_0), a vector of 'returns' on the MSCI World Index measured as $RI_t = \ln(I_t) - \ln(I_{t-1})$, as well as the conditional variance (h_t). The MSCI world index is included in the mean equation to capture the transmission of volatility from the international markets to the local market, which has been well documented in empirical research, and to allow us to focus on volatility arising from domestic factors. The conditional variance h_t is included in the mean equation to include risk-return trade-off predicted in the finance literature, allowing for a more general specification of the return generating process.

In order to capture the governance environment in different countries we use aggregate governance indicators for the year 2005 developed at the Worldwide Governance Indicators (WGI) research project of the World Bank. The indicators measure six dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The indicators are based on data collected by surveying firms and individuals, and the assessments of risk rating agencies, non-governmental organizations, and multilateral aid agencies. The 2005 WGI indicators are based on a total of 276 variables measuring different dimensions of governance and are collected from 31 different sources by 25 different organizations. These individual measures of governance are assigned to categories capturing key dimensions of governance, and six aggregate governance indicators are constructed using the *unobserved components methodology*. For a detailed discussion see, Kaufmann, Kraay, and Mastruzzi (2007).¹ The indicators of six governance dimensions are as follows:

1. *Voice and accountability (VA)*, the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media.

2. *Political stability and absence of violence (PV)*, perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism.

3. *Government effectiveness (GE)*, the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy

¹ The WGI indicators are available at <http://info.worldbank.org/governance/wgi2007/home.htm>.

formulation and implementation, and the credibility of the government's commitment to such policies.

4. *Regulatory quality (RQ)*, the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

5. *Rule of law (RL)*, the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.

6. *Control of corruption (CC)*, the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Control Variable: The cross-country stock market volatility can be affected by several domestic and international factors. To account for the international spill-over of volatility to the domestic markets we include the MSCI-World index in the GARCH-M model as explained above. In order to account for the volatility arising from the country's domestic sector we include the standard deviation of the year to year growth rate (GDP-variability) for each country over the past 15 years. This control variable enters the cross sectional regressions along with each of the governance indicators as an explanatory variable.

Results

Table I provides descriptive statistics on the 32 markets in the study sample, and the MSCI World index. Considerable difference in the volatility measure is observed. Table II reports results from estimation of the GARCH-M model. We note here that all GARCH variables C, A and B, corresponding to the GARCH equation (2) are statistically significant. In addition, the coefficient for MSCI World Index is statistically significant for majority of the markets, which points out to the greater integration of the emerging stock markets with the financial markets of the rest of the world. We also observe that the coefficient on the GARCH-variance (h_t) is insignificant except for two markets which is consistent with the weak and mixed results reported elsewhere on the relationship between volatility and the mean return. (e.g., see Shin 2005).

Results from regressing volatility (conditional volatility, σ_t) on the indicators of six governance dimensions are reported in Table III. As the table shows the coefficients on the first two explanatory variables *Voice and Accountability* and *Political Stability and Absence of Violence* are not significant at the conventional level of 10% or lower. This result is in line with our expectation that the political and civic dimension of the regulatory environment, which is reflected by these two indicators, is likely to be only weakly associated with market volatility.

The next four explanatory variables, *Government Effectiveness*, *Regulatory Quality*, *Rule of Law*, and *Control of Corruption*, are, however, all statistically significant at 5% or less p-value. It appears that the governance dimensions relating to political system, represented by the first two independent variables, *Voice and Accountability* and *Political Stability and Absence of Violence*, only weakly influence the stock market volatility across countries. On the other hand, the governance dimension relating to market regulation and its

effectiveness appears to be negatively associated with market volatility. It should be noted that the signs on all explanatory variables are negative, i.e., higher scores on the governance measures are associated with lower market volatility. It is also to be noted that the real gross domestic product variability variable (GDP-variability) has a significant coefficient in the first two models, but loses its significance when combined with the regulatory governance measures. It is quite possible that *Voice and Accountability* and *Political Stability and Absence of Violence* may not affect variance of returns at daily intervals. It is likely that the markets may incorporate expectations of political change in the mean and not in the variance of the return process.

In order to directly compare the influence of political dimension and the market regulatory dimension of the governance environment, first principal component from both types of governance indicators were extracted. Political dimension variable is the first principal component extracted from *Voice and Accountability* and *Political Stability and Absence of Violence* indicators. Market regulatory dimension variable is the principal component extracted from the four indices, *Government Effectiveness*, *Regulatory Quality*, *Rule of Law*, and *Control of Corruption*. These principal components explain 75% and 95% of the variation in the indices respectively. The new formed variables were then regressed on the market volatility variable, including the variability of the GDP as the control variable. The results from the least squares regression are reported in Table IV. The results show that the coefficient on the political dimension variable is not significant at 10% level, while the coefficient on the market regulatory variable is statistically significant with a p-value of less than 2%. The coefficient on the GDP variability which is significant for models A-F (Table III) is no longer significant. The results underscore the important influence of the market regulatory aspect of governance, which seems to dominate the influence of real sector variability.

Summary and Conclusions

In Kane's (1988) theoretical framework of regulatory-dialectics, depicting the interaction of financial and regulatory innovation, the innovation discovery and execution lags are shorter for regulatees than for regulators. Kane attributes this difference to "differences in relevant information costs, differences in the extent of managerial commitment to the goals of regulation, and differences in the extent to which principal-agent conflicts can be resolved in government and private enterprises." It follows that good governance, and efficient mechanism for regulatory development and conflict resolution should shorten these lags, and make the process of regulatory adjustments smoother and more transparent. It would likely result in reduced market volatility. It is, therefore, expected that the cross-country market volatility would be negatively related to the quality of governance environment and especially the quality of regulations in different countries. Our empirical study of the relationship between good governance and market volatility across emerging markets shows that the effectiveness of public regulatory processes in different countries may help to explain difference in the observed market volatility. In particular the better governance indicators of government effectiveness, regulatory quality, rule of law, and control of corruption seem to be associated with lower market volatility.

**Table I: Country Indices
Descriptive Statistics for Index Returns**

| Country Index | Mean | Std Error | Minimum | Maximum |
|-------------------------|---------------|------------------|----------------|----------------|
| Argentina | 0.0010 | 0.0238 | -0.1129 | 0.1612 |
| Bahrain | 0.0006 | 0.0068 | -0.0398 | 0.0444 |
| Brazil | 0.0006 | 0.0179 | -0.0963 | 0.0734 |
| Chile | 0.0005 | 0.0052 | -0.0233 | 0.0186 |
| China | -0.0004 | 0.0130 | -0.0654 | 0.0940 |
| Colombia | 0.0019 | 0.0123 | -0.0672 | 0.0736 |
| Czech Republic | 0.0008 | 0.0130 | -0.0666 | 0.0535 |
| Egypt | 0.0016 | 0.0158 | -0.0790 | 0.1358 |
| Hungary | 0.0009 | 0.0116 | -0.0600 | 0.0398 |
| Indonesia | 0.0008 | 0.0129 | -0.1093 | 0.0485 |
| India | 0.0007 | 0.0134 | -0.1181 | 0.0793 |
| Israel | 0.0004 | 0.0115 | -0.0545 | 0.0657 |
| Jordan | 0.0014 | 0.0109 | -0.0758 | 0.0682 |
| Korea, South | 0.0008 | 0.0167 | -0.1280 | 0.0736 |
| Sri Lanka | 0.0011 | 0.0154 | -0.1390 | 0.1829 |
| Morocco | 0.0001 | 0.0075 | -0.0373 | 0.0516 |
| Mexico | 0.0009 | 0.0116 | -0.0571 | 0.0578 |
| Malaysia | 0.0002 | 0.0082 | -0.0634 | 0.0450 |
| Nigeria | 0.0010 | 0.0105 | -0.0473 | 0.0658 |
| Oman | 0.0007 | 0.0083 | -0.1101 | 0.0990 |
| Pakistan | 0.0014 | 0.0150 | -0.0866 | 0.0851 |
| Peru | 0.0011 | 0.0084 | -0.0688 | 0.0429 |
| Philippines | 0.0003 | 0.0122 | -0.0619 | 0.1618 |
| Poland | 0.0003 | 0.0144 | -0.0449 | 0.0629 |
| Russia | 0.0017 | 0.0184 | -0.0988 | 0.0865 |
| Saudi Arabia | 0.0014 | 0.0111 | -0.0875 | 0.0718 |
| Thailand | 0.0007 | 0.0131 | -0.0696 | 0.0543 |
| Turkey | 0.0011 | 0.0259 | -0.1998 | 0.1269 |
| Taiwan | 0.0002 | 0.0149 | -0.0691 | 0.0561 |
| Venezuela | 0.0010 | 0.0197 | -0.1606 | 0.1920 |
| South Africa | 0.0005 | 0.0116 | -0.0509 | 0.0546 |
| Zimbabwe | 0.0053 | 0.0255 | -0.1004 | 0.2216 |
| <i>MSCI World Index</i> | <i>0.0000</i> | <i>0.0092</i> | <i>-0.0392</i> | <i>0.0475</i> |

Table II Results of GARCH Model Estimation

| Country | Constant | | MSWRLDL | | GARCH-V | | C | | A | | B | |
|--------------|----------|-----------|---------|-----------|---------|----------|-------|----------|-------|----------|-------|------------|
| | Coeff | T-Stat | Coeff | T-Stat | Coeff | T-Stat | Coeff | T-Stat | Coeff | T-Stat | Coeff | T-Stat |
| ARGENTINA | 0.0012 | 1.22 | 0.09 | 1.36 | 0.72 | 0.35 | 0.00 | 3.04 *** | 0.08 | 6.02 *** | 0.91 | 61.38 *** |
| BAHRAIN | 0.0002 | 0.71 | -0.03 | -1.71 * | 9.58 | 1.28 | 0.00 | 3.19 *** | 0.17 | 4.70 *** | 0.69 | 9.23 *** |
| BRAZIL | 0.0006 | 0.40 | 0.20 | 3.48 *** | 1.23 | 0.24 | 0.00 | 1.99 ** | 0.04 | 3.71 *** | 0.93 | 46.06 *** |
| CHILE | 0.0002 | 0.48 | 0.18 | 13.06 *** | 11.56 | 0.87 | 0.00 | 2.63 *** | 0.13 | 4.38 *** | 0.79 | 14.63 *** |
| CHINA | -0.0024 | -4.76 *** | 0.00 | 0.12 | 14.35 | 5.15 *** | 0.00 | 4.10 *** | 0.19 | 5.78 *** | 0.69 | 13.83 *** |
| COLOMBIA | 0.0003 | 0.81 | 0.01 | 0.35 | 7.34 | 2.17 ** | 0.00 | 4.49 *** | 0.35 | 6.72 *** | 0.52 | 8.03 *** |
| CZECH REP | 0.0012 | 1.04 | 0.46 | 11.94 *** | -2.33 | -0.29 | 0.00 | 2.79 *** | 0.06 | 3.86 *** | 0.89 | 31.61 *** |
| EGYPT | 0.0018 | 2.33 ** | -0.05 | -1.25 | -1.46 | -0.45 | 0.00 | 3.03 *** | 0.14 | 5.69 *** | 0.78 | 17.99 *** |
| HUNGARY | 0.0021 | 3.38 *** | 0.38 | 11.70 *** | -7.47 | -1.34 | 0.00 | 2.77 *** | 0.09 | 5.39 *** | 0.87 | 34.59 *** |
| INDIA | 0.0011 | 1.76 * | 0.04 | 1.06 | 0.63 | 0.17 | 0.00 | 3.72 *** | 0.15 | 6.22 *** | 0.77 | 21.09 *** |
| INDONESIA | 0.0012 | 1.18 | -0.02 | -0.46 | 1.38 | 0.23 | 0.00 | 2.47 ** | 0.15 | 3.74 *** | 0.70 | 7.41 *** |
| ISRAEL | -0.0006 | -0.74 | 0.03 | 0.90 | 9.02 | 1.45 | 0.00 | 1.86 * | 0.06 | 3.80 *** | 0.93 | 44.68 *** |
| JORDAN | 0.0006 | 1.17 | 0.04 | 1.65 * | 4.29 | 0.94 | 0.00 | 3.72 *** | 0.04 | 6.45 *** | 0.94 | 115.16 *** |
| KOREA, SOUTH | 0.0016 | 2.19 ** | 0.08 | 1.68 * | -1.40 | -0.49 | 0.00 | 2.05 ** | 0.06 | 4.29 *** | 0.93 | 61.09 *** |
| MALAYSIA | 0.0000 | 0.01 | -0.01 | -0.60 | 4.77 | 0.85 | 0.00 | 2.24 ** | 0.12 | 4.97 *** | 0.84 | 22.28 *** |
| MEXICO | 0.0014 | 1.96 ** | 0.07 | 2.04 ** | 0.82 | 0.14 | 0.00 | 2.89 *** | 0.13 | 3.96 *** | 0.73 | 13.70 *** |
| MOROCCO | 0.0000 | -0.03 | 0.03 | 1.53 | 2.97 | 0.65 | 0.00 | 4.57 *** | 0.34 | 6.72 *** | 0.61 | 12.59 *** |
| NIGERIA | -0.0002 | -0.46 | -0.01 | -0.61 | 7.13 | 1.89 * | 0.00 | 6.05 *** | 0.34 | 8.12 *** | 0.53 | 11.59 *** |
| OMAN | 0.0010 | 2.10 ** | -0.04 | -1.75 * | -5.16 | -0.71 | 0.00 | 4.44 *** | 0.06 | 4.69 *** | 0.83 | 26.25 *** |
| PAKISTAN | 0.0016 | 2.85 *** | -0.01 | -0.22 | -0.20 | -0.07 | 0.00 | 5.04 *** | 0.17 | 6.83 *** | 0.77 | 26.97 *** |
| PERU | 0.0005 | 1.10 | 0.22 | 10.04 *** | 8.68 | 1.21 | 0.00 | 4.19 *** | 0.14 | 6.07 *** | 0.73 | 16.39 *** |
| PHILIPPINES | -0.0008 | -1.42 | 0.03 | 0.76 | 7.00 | 1.97 ** | 0.00 | 4.76 *** | 0.17 | 6.37 *** | 0.72 | 19.33 *** |
| POLAND | -0.0009 | -0.85 | 0.52 | 13.05 *** | 6.45 | 0.88 | 0.00 | 5.05 *** | 0.06 | 2.29 ** | -0.22 | -1.01 |
| RUSSIA | 0.0019 | 1.94 ** | 0.49 | 9.27 *** | 0.24 | 0.07 | 0.00 | 2.54 ** | 0.09 | 4.78 *** | 0.87 | 28.79 *** |
| SAUDI ARABIA | 0.0004 | 1.18 | 0.04 | 1.69 * | 6.68 | 2.10 ** | 0.00 | 4.66 *** | 0.10 | 7.50 *** | 0.83 | 66.08 *** |
| SOUTH AFRICA | 0.0007 | 0.94 | 0.48 | 13.78 *** | 0.60 | 0.09 | 0.00 | 1.63 * | 0.07 | 3.62 *** | 0.89 | 23.45 *** |
| SRI LANKA | 0.0005 | 1.96 ** | 0.01 | 0.56 | 0.76 | 0.73 | 0.00 | 4.82 *** | 0.53 | 9.89 *** | 0.63 | 28.29 *** |
| TAIWAN | 0.0002 | 0.43 | 0.08 | 1.87 * | 1.54 | 0.55 | 0.00 | 1.82 * | 0.05 | 5.15 *** | 0.95 | 94.24 *** |
| THAILAND | 0.0010 | 1.41 | -0.06 | -1.66 * | -0.68 | -0.15 | 0.00 | 2.26 ** | 0.08 | 4.80 *** | 0.89 | 34.36 *** |
| TURKEY | 0.0016 | 1.95 ** | 0.49 | 6.45 *** | -0.65 | -0.40 | 0.00 | 1.63 * | 0.05 | 5.00 *** | 0.95 | 91.00 *** |
| VENEZUELA | 0.0036 | 1.83 * | 0.27 | 4.65 *** | -7.41 | -1.38 | 0.00 | 4.88 *** | 0.08 | 4.16 *** | 0.63 | 10.58 *** |
| ZIMBABWE | 0.0011 | 1.63 * | -0.06 | -1.33 | 2.67 | 2.42 ** | 0.00 | 5.58 *** | 0.41 | 8.26 *** | 0.55 | 12.07 *** |

Note: ***, **, * denote significance level of 1%, 5% and 10% respectively.

Table III: Results from Cross-Country Regression

| Dependent Variable: Market Volatility (σ_i) | | | | | | |
|--|---------------------------------|-------------|--------|---------------|--------------------|------|
| Independent Variables: Governance indicators & GDP Variability | | | | | | |
| Model | Variable | Coefficient | T-Stat | P-value | Regression Stats | |
| A | Constant | 0.0091 | 5.16 | 0.0000 | Adj R ² | 0.16 |
| | GDP-Variability | 0.0013 | 2.73 | 0.0105 | F(2,29) | 3.91 |
| | Voice and Accountability | -0.0002 | -0.19 | 0.8522 | Sig (F) | 0.03 |
| B | Constant | 0.0089 | 5.15 | 0.0000 | Adj R ² | 0.20 |
| | GDP-Variability | 0.0012 | 2.53 | 0.0172 | F(2,29) | 4.81 |
| | Political Stability | -0.0012 | -1.21 | 0.2370 | Sig (F) | 0.02 |
| C | Constant | 0.0101 | 5.67 | 0.0000 | Adj R ² | 0.23 |
| | GDP-Variability | 0.0011 | 2.24 | 0.0329 | F(2,29) | 5.74 |
| | Government Effectiveness | -0.0021 | -1.71 | 0.0977 | Sig (F) | 0.01 |
| D | Constant | 0.0109 | 6.18 | 0.0000 | Adj R ² | 0.30 |
| | GDP-Variability | 0.0009 | 1.78 | 0.0849 | F(2,29) | 7.74 |
| | Regulatory Quality | -0.0027 | -2.47 | 0.0198 | Sig (F) | 0.00 |
| E | Constant | 0.0101 | 5.71 | 0.0000 | Adj R ² | 0.24 |
| | GDP-Variability | 0.0010 | 1.97 | 0.0587 | F(2,29) | 5.88 |
| | Rule of Law | -0.0021 | -1.77 | 0.0870 | Sig (F) | 0.01 |
| F | Constant | 0.0100 | 5.90 | 0.0000 | Adj R ² | 0.27 |
| | GDP-Variability | 0.0010 | 2.06 | 0.0486 | F(2,29) | 6.78 |
| | Control of Corruption | -0.0027 | -2.14 | 0.0411 | Sig (F) | 0.00 |

Table IV: Results from Regressing Principal Components of Political Governance and Market Regulatory Indicators

| Dependent Variable: Market Volatility (σ_i) | | | | | | |
|---|------------------------------------|-------------|--------|---------------|--------------------|------|
| Independent Variables: Political and Market Regulation Dimensions of Governance, GDP Variability (Control Variable) | | | | | | |
| Model | Variable | Coefficient | T-Stat | P-value | Regression Stats | |
| G | Constant | 0.0108 | 6.22 | 0.0000 | Adj R ² | 0.30 |
| | GDP-Variability | 0.0008 | 1.65 | 0.1107 | F(2,29) | 5.43 |
| | Political Dimension | 0.0020 | 1.48 | 0.1490 | Sig (F) | 0.00 |
| | Market Regulatory Dimension | -0.0041 | -2.47 | 0.0199 | | |

Note: Political dimension variable is the principal component extracted from Voice and Accountability and Political Stability and Absence of Violence indices. Market Regulatory Dimension is the principal component extracted from the four indices, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption.

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