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STOCK MARKET RETURNS
AND VOLATILITY: A PANEL
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**Investor Panic, IMF Actions, and Emerging Stock
Market Returns and Volatility: A Panel Investigation**

by

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Abstract

In this paper, we examine the reaction of stock market returns and volatility in a diverse group of six emerging markets to a set of IMF events. In particular, we test within a panel framework whether there was an “investor panic” causing a significant drop in stock market returns on the days of negative IMF events. We find that on average negative (positive) IMF news reduce (increase) daily stock returns by about one percentage point. The most influential single event is the delay of loans from the IMF, which reduces stock returns by about one and a half percentage points. IMF news do not have a significant impact on the volatility of stock markets. Thus, it appears that IMF actions and events primarily have an effect on pay-offs but not on risk, and do not appear to support the hypothesis of IMF induced “investor panics”.

JEL: F300, G100

Keywords: IMF news, stock market returns, emerging markets

I. Introduction

International Monetary Fund (IMF) policies during the Asian financial crisis were severely criticized by some observers and the debate on the effectiveness of IMF policies has intensified since the crisis (see, for instance, Katz, 1998 and Naim, 2000). Indeed, some have argued that the Asian crisis has, in part, resulted from a “creditor panic” created by IMF actions. Foreign creditors panic because they realize that the domestic banks cannot act as a lender of resort for dollar-denominated debts and therefore they try to move their assets out of the country as fast as possible. Sachs (1999) argues that “... provocative IMF actions have probably contributed to the [creditor] panics” (p. 389).

During the first half of the 1990s, the developing countries of East Asia were able to borrow substantial amounts from international banks. By mid-1997, an amount roughly corresponding to half of the total loans consisted of short-term debts and these significantly exceeded the level of foreign exchange reserves. In 1996, foreign creditors’ concerns about the debtor countries’ overvalued currencies, declining exports, and overcapacity led international banks to begin to reduce their lending to the region. After the devaluation of the Thai bath in mid-1997, these banks almost stopped lending to this region. The IMF’s declaration that Asia needed drastic financial reforms is thought to have led investor withdrawal from the region. According to this view, declining confidence investor in the region was an important factor, among other things, in initiating the crisis. IMF statements and poor IMF advice further contributed to the crisis (Sachs 1999).

In this paper, we examine whether IMF statements and actions had a similar impact on investors in emerging stock markets by studying the reaction of stock markets to a set of IMF events. We test whether there was a corresponding “investor panic” in stock markets, causing a significant drop in market returns on the days of negative IMF

statements and other IMF-related events and vice versa.¹ To the extent that foreign banks and creditors affected by the Asian crisis also invest in emerging stock markets, this would contribute to the investor panic. In addition, withdrawal of foreign loans from an emerging market may increase the country risk in that country, affecting the local stock market negatively, and that risk may easily spread to other emerging markets.

A finding that stock market returns decline significantly on the days of specific negative IMF events would indicate that IMF actions undermine investor confidence in markets, because of expected liquidity shortage in markets due to IMF statements, such as delay of loans by IMF, and hence result in negative returns as investors sell off their assets quickly. Further, we also analyze whether IMF news contribute to the overall volatility of the stock markets.

The rest of the paper is organized as follows. In the next section, we briefly summarize previous work on this topic. Section III describes the construction of IMF events while in section IV we report our results. The last section concludes the paper and discusses policy implications of our findings.

II. Previous literature and our contribution

There is scant literature on the effects of IMF events on financial markets. Kho and Stulz (1999) use an events study to examine the impact of IMF assistance on the value of bank stocks. Their focus is on Asian markets during the financial crisis. They conclude that the IMF program announcements increased bank shareholder wealth. In a related study, Dong, Kho and Stulz (2000) examine the impact of the announcement dates of IMF support programs on the abnormal returns of the U.S. banks during crises,

¹ It is well known that volatility linkages among bond, money, and stock markets are highly strong. Thus panics in emerging credit markets may easily get transmitted to stock markets in such countries. For evidence on this issue, see Fleming et al. (1998) and the references cited therein.

and they report similar results in that these banks tend to earn high abnormal returns. Overall, IMF news is found to have a significant influence on returns.

Brealey and Kaplanis (2000) look at a broad sample of IMF programs, other than those implemented during the Asian crisis, and they cover a wider range of financial assets than those included in Kho and Stulz (1999) and Dong, Kho and Stulz (2000). They find substantial declines in asset prices in the weeks leading up to the announcement of the IMF programs, but there is no evidence that the announcement of the IMF support causes any part of these wealth losses to be reversed.

Ganapolsky and Schmukler (2001) examine the impact of the IMF agreement announcement during the Tequila crisis in Argentina. They find the announcement had a positive impact on stock and bond returns. They also show that the agreement announcement played an instrumental role in reverting the dynamics of the crisis.

These four previous studies focus on a particular IMF event. For example, Kho, Lee and Stulz (2000) investigate IMF bailout news, while Kho and Stulz (1999) concentrate on IMF program announcements. In another study, Kaminsky and Schmukler (1999) and Ganapolsky and Schmukler (2001) study, among other news, debtor country agreements with international organizations, including IMF agreements. Besides IMF assistance, Brealey and Kaplanis (2000) also cover the progress of negotiations with the IMF by separating news into "good" and "bad" news.²

Our analysis differs from the previous ones in several ways. The earlier studies focus on a particular event or some selected events. This may not capture the overall impact of IMF actions. In this paper, we collect, categorize, and use a wide spectrum of the available information about IMF-related actions and events that occurred during our sample period (see next section).

Another common feature of the previous studies is that, except for Kaminsky and Schmukler 1999, they use abnormal returns as the dependent variable. Instead, we examine stock market returns, because we test the hypothesis that some IMF actions can create dramatic negative shocks to markets, as argued by Sachs (1999), and investors react to these by selling off their assets quickly. In other words, our focus is on the wealth effects of IMF actions. Because a typical risk-averse investor tends to hold a portfolio of assets from different sectors, rather than concentrating on one or a few sectors, returns are best captured by utilizing a composite index.

A second common factor of the earlier studies is that they all focus on returns, and they do not investigate how IMF events affect the conditional volatility of markets. But if stock market volatility is a measure of stock market risk or uncertainty, then a multi-country investigation of how IMF actions affect the volatility can broaden our general understanding of the determinants of such risk and allow us to price such risk more efficiently. Policymakers may take appropriate policy actions to reduce the risk to the extent that IMF policies significantly affect stock market volatility. Finally, better knowledge of the determinants of conditional second moments of asset returns is crucial for improving our understanding of asset pricing and effective asset allocation decisions. Thus, this paper provides evidence whether the stock market volatility is affected by IMF actions and related events.

Finally, the previous papers use an event study whereas we use a regression approach following Kaminsky and Schmukler (1999), who utilize both approaches. Because we cover “all” IMF news, a regression approach is more effective and also avoids such potential shortcomings of an event study as discussed in Kho, Lee and Stulz (2000) and Brealey and Kaplanis (2000). We also attempt to overcome some of the

² Brealey and Kaplanis (2000) also study returns on currencies and emerging bond indexes.

methodological shortcomings of the Kaminsky and Schmukler study, which uses an OLS equation with pooled data. Such an estimation procedure ignores the typical finding of time-varying volatility observed in emerging stock market returns.³ Moreover, Kaminsky and Schmukler do not provide any information about the statistical validity of their model, and they do not include a control variable to capture the general evolution of stock markets.

We employ a panel data model with country fixed effects and use a GARCH model to capture the autoregressive conditional heteroscedasticity inherent in financial data. Moreover, we include returns based on the Standards & Poor stock market index as a control variable. Finally, we provide a number of statistical tests to ensure the adequacy of our models.

III. Construction of IMF news

IMF news covering the interactions between the IMF and the countries searching for help in a regional or global crisis or for reasons unique to each country were collected from the IMF website, the Washington Post, and BBC News. The news were then categorized according to different types of IMF actions. Because consistency is crucial for categorization, a substantial effort was made to put similar news under the same heading. The different categories were constructed from the basic news observations. They are listed and described in Table 1.

After completing the categorization process, the dates for which this news was published were matched with the dates for the daily stock return data of the corresponding country. A dummy variable was created for each different category such

³ Bekaert and Harvey (1997) and Aggarwal et al. (1999) provide evidence that emerging market stock returns also exhibit time-varying volatility, similar to more mature, developed markets.

that the variable was equal to one on the day the particular news was published, and zero otherwise.

Over and above categorizing the variables in a neutral way, it is also useful to group IMF events into “good” and “bad” from the point of view of the respective country. The guiding idea is that IMF news conveys information that is similar to either a positive or negative shock to the value of stocks. There are two basic hypotheses.

First, it could be the case that stockholders are neutral or even negative about an IMF intervention, as the loan part of IMF programs has to be paid back later.⁴ The money to pay back the loans has to be obtained by the government either through collecting taxes, printing money or selling bonds. The first alternative may reduce net dividends in the country, the second alternative may generate high inflation, and the third alternative may lead to a public sector debt problem. Because the second and third alternatives are usually ruled out by the non-loan parts of IMF stabilization programs, it is usually by taxation that governments pay back the loans. But it is not clear *a priori* that IMF loans will have a positive impact on stock returns if investors know that they have to pay back the money later.

Second, one can argue that a supportive IMF intervention will, in general, be beneficial to the country in question and to equity holders. We subscribe to this view, because countries asking for help are often liquidity constrained, but their assets still outweigh their liabilities. The cash inflow from IMF loans keeps the system working until liquidity has been restored, enabling the economy to keep going by itself. A similar view is suggested by Sachs (1999) who emphasizes the liquidity crisis as a major factor for the worsening of the Asian crisis as foreign investors withdrew their assets due to a financial

⁴ To our knowledge, so far every IMF credit has been paid back to involved countries, usually with market interest rates.

panic. Thus, by injecting liquidity into the markets, IMF actions can positively influence market returns. On the other hand, a delay of loans by the IMF may signal future liquidity constraints, thus causing a decline in market returns today. It may also represent an unfavorable external evaluation of a country's macroeconomic policies. Further, the IMF is usually market-oriented, and the loan part of programs always comes with obligations to de-regulate the economy, which, on average, is good for business.

IV. Data and econometric methodology

The analysis is based on daily closing stock returns for six countries, Indonesia, South Korea, Argentina, Brazil, Pakistan, and Russia over the time period 1 July 1997 to 31 December 1999. The data for the closing stock prices were obtained from the Yahoo finance website, <http://finance.yahoo.com/m2>. Countries are chosen to represent different regional groups. The first two countries were hit by the Asian financial crisis countries while the next two were affected by the crisis in South America. The last one belongs to a diverse group of other countries whose crises were more *sui generis*. Composite stock returns (Returns) are computed by taking the first differences of logged daily stock price indices and multiplying by 100. As a control variable and to capture the impact of general market developments, we also include the Standard & Poors Stock Price Index daily returns in our estimations.

Descriptive statistics for both variables can be found in Table 2. The mean return is about four times as high in the U.S. as it is in the emerging countries over our sample period, while the standard deviation is less than half as big. The returns series exhibits excess kurtosis but almost no skewness. Excess kurtosis signals a typical problem with financial data, namely that the series do not conform to a normal distribution. Another problem is that time periods with high volatility are followed by periods of low volatility,

which is also called volatility clustering. The existence of volatility clustering implies that classical methods of estimation are not efficient. In the literature, a class of statistical models has been developed that helps to address this situation, namely ARCH models (Engle, 1982). We employ a more general specification based on Bollerslev (1986), called GARCH, to cope with volatility clustering.

Daily data on the six countries were combined into one panel data set. We then specify a GARCH-model with country fixed effects. A model that works well for our sample with regard to eliminating ARCH effects is the following GARCH (1,1) model with student-t distributed residuals (see Bollerslev, 1987):

$$\begin{aligned} \text{Returns}_t &= \mu + \sum_{r=1}^5 \delta_r \text{Returns}_{t-r} + \sum_{r=0}^5 \gamma_r S \& P_{t-r} + \phi \text{ Dummies} + u_t, \quad u_t = \varepsilon_t h_t^{1/2}, \\ h_t &= \alpha_0 + \alpha_1 u_{t-1}^2 + \beta_1 h_{t-1}, \end{aligned}$$

with: α , β , δ , γ parameters, ϕ a vector of parameters, Dummies is a matrix containing country and IMF news dummies, and $\varepsilon_t | \Gamma_{t-1} = t[v]$; with Γ_{t-1} capturing all information up to $t-1$ and $t[v]$ a t -distribution with v degrees of freedom.

The use of a panel framework is necessary as otherwise it would not be possible to obtain enough relevant data points for IMF news. In particular, the aggregation of IMF events in the panel allows us not only to test for the effects of good versus bad IMF news but also to analyze the more detailed categorization outlined above. In the next section, we commence the analysis by studying the effects of good versus bad IMF-related news.

V. Analyzing the effect of IMF news on stock returns

Our benchmark model initially included five lags of the dependent variable, the same number of lags for the Standard & Poors' returns, and country dummies. It has been estimated as a GARCH (1,1) model with student-t distributed residuals using quasi-

maximum likelihood techniques over the time period 1 July 1997 to 31 December 1999. Then, reducing the number of variables in a consistent testing-down process ($\text{Chi}^2(10) = 7.9$), we have arrived at a more parsimonious model (Model 1) given in Table 3. We find that all parameters of the GARCH(1,1) are significant. A sufficient condition for the conditional variance h_t to be non-negative is that α_0 , α_1 , and β_1 are non-negative, which is fulfilled here. Moreover, the sum of α_1 and β_1 is below unity, ruling out that the model is an integrated GARCH (see Nelson, 1990).⁵ The estimate of the student-t points towards a distribution with four degrees of freedom, which has fatter tails than a normal distribution. The diagnostics tests for Model 1 indicate that there is neither any trace of ARCH left nor is the Portmanteau-type test for autocorrelation (for 60 lags) significant. The only problem is non-normality of the residuals. However, a non-parametric estimate of the residual density indicates that it is uni-modal and symmetric around zero, and therefore testing should not be too adversely affected. Moreover, we use robust standard errors based on Bollerslev and Wooldridge (1992) in Table 2. In any case, for most variables both types of standard errors are quite similar.

We also find that both lags of the dependent variable as well as Standard & Poors' returns matter. Judging from the country dummies, only Indonesia shows a significant, below average performance of its stock market. With regard to our variables of interest, we find significant coefficient estimates for both positive and negative IMF events. In line with our expectations, positive (negative) news have a positive (negative) effect on returns. The size of the estimates suggests that there is some asymmetry, namely that negative IMF news have a larger absolute impact than do positive ones. Testing the absolute size of the coefficient for equality, however, reveals that the data does not reject

⁵ Estimates of ARFIMA models show no evidence of fractional integration (results omitted). Thus, the model is both strictly stationary as well as covariance stationary.

such a hypothesis ($\text{Chi}^2(1) = 1.77$). Thus, we conclude that IMF news effects are symmetric.

Given that the size of the coefficients for both and good news is close to 1, one may conjecture that the economic significance of these news on returns is very similar (1 percent) on stock returns. Testing the coefficient for good news against the hypothesis that it is equal to one, we are unable to reject the hypothesis at a 5% but 10% level ($\text{Chi}^2(1) = 3.3$). In the case of bad news, we cannot reject that the coefficient is equal to unity in absolute terms ($\text{Chi}^2(1) = 0.66$), and neither do we have to reject the hypothesis when testing the hypotheses jointly ($\text{Chi}^2(2) = 3.96$). This is not necessarily the result of a weak testing procedure, as testing the joint hypotheses that both news coefficients are equal to zero in absolute terms can be easily rejected ($\text{Chi}^2(2) = 8.78^*$). Although there remain some indications that negative shocks tend to have an absolutely greater effect, based on the statistical tests, we conclude that the data is consistent with a statement that positive (negative) IMF news on average increase (decrease) stock returns by about one percentage point.

Next, we replace the simple dichotomy good versus bad IMF news with a detailed classification of IMF-related news items. These categories include signed agreements, delay of loans or talks between the countries and the IMF, IMF supportive announcements, loan approvals, request of funds, talks/negotiations, resume of negotiations, visits, anti-IMF government policies, and favorable and unfavorable IMF statements about the countries' economic performance. The detailed explanation of these categories is given in Table 1.

Again we start with the general model outlined above and remove all insignificant variables that are of no particular interest for this study in a testing-down process

($\text{Chi}^2(10) = 8.19$), and the outcome is Model 2 in Table 3. With regard to diagnostics, everything said for Model 1 carries over to Model 2.

The impacts of different news categories turn out to be insignificant except for “delay in loans”. We cannot reject ($\text{Chi}^2(10) = 11.2$) the hypothesis that all IMF news items have a zero coefficient apart from “delays”. Because we cannot reject the hypothesis that the impact of delay news is 1.5 ($\text{Chi}^2(1) = 0.005$), we conclude that an announcement of a delay in loans on average reduces stock returns by about one and a half percentage points.⁶

Finally, there is the question whether IMF news have an impact on the volatility of stock markets. Or, more technically, whether news enters the variance equation significantly (see Bollerslev and Ghysels, 1996).⁷ We constructed two aggregate news categories. First is based on the categories good and bad news, and the second one on the other items displayed in Table 1. Table 4 lists the estimation results, the diagnostics of which are very similar to those in Table 3.

We find that the first news aggregate, based on good and bad news events, which were included in Model 4, does not enter the variance equation significantly. The same conclusion is true for the news variable computed using all available IMF news categories, displayed in Model 4. In addition, relaxing the restriction that all news items contribute to the same extent to volatility does not yield any significant parameter estimates (results omitted).

⁶ This finding seems paradoxical in light of our results for the simple good and bad news category. An obvious explanation for such finding is that good news and bad news, when disaggregated into different categories, comes in clumps. In other words, a whole number of different good things happen within a week or two, affecting our estimation results significantly.

⁷ As another robustness check, we also considered modeling within an EGARCH framework (Nelson, 1991). However, for our sample, estimating an EGARCH with a non-normal distribution did not lead to converging estimates. The EGARCH with normal distribution turned out to be inferior to the model in Table 4 with regard to log likelihood value and Akaike information criterion. In any case, point estimates were of similar magnitude.

Moreover, neither the statistical nor the economic significance of IMF events on stock returns is affected by including the news variables into the variance equation. To summarize, in our framework, IMF news do not significantly contribute to stock market volatility.

VI. Policy Implications and Conclusions

We have analyzed the impact of IMF-related events on six emerging stock market returns over the period of recent financial crises and IMF bailouts. During such difficult times, IMF can be viewed as a lender of last resort and investors trading in these markets form their actions based on their anticipation of the actions of the IMF in the near future. Our hypothesis was that these expectations are directly reflected in stock market returns as investors trade securities based on their expectations about the outcome of future IMF events. To test this hypothesis, we have constructed a panel data set covering six emerging markets and found that good and bad news have a statistically significant effect on stock market returns. This finding suggests that IMF actions have important wealth effects for investors. On average, bad (good) IMF news decrease (increase) stock returns by one percentage point. These results are consistent with earlier studies that also report significant effects of IMF announcements on asset returns.

Among the different categories of the IMF actions, we have found that markets react only to delays in making loans or talks, suggesting that “liquidity concerns” have played a very significant role in emerging markets during financial crises. As a rule of thumb, delays in loans reduce stock market returns by about one and a half percentage points.

This finding is only partially consistent with Sachs (1999) who stresses the importance of the liquidity crisis during the Asian crisis as foreign short-term credit was

withdrawn due to the creditor panic. We do find that returns go down as a result of negative IMF news. But since the absolute effect of IMF news is relatively modest compared to the overall variation of returns in the data (in our sample, returns fluctuate between -26.6 and $+28.8$ percent), we do not find support for the hypothesis of IMF induced “investor panics”. Further, we did not find strong evidence that IMF news increase market volatility. Hence, although IMF news has wealth effects, they do not appear to contribute significantly to overall market uncertainty. Based on these results, we would argue that IMF actions and events primarily have an effect on pay-offs but not on risk.⁸

With regard to policy conclusions, we would recommend that the IMF attempts to be particularly sensitive about its announcements and actions. If stock market wealth effects play an important role in the current economic situation of a country, then delays in processing loans should be avoided. This really amounts to a rather passive role of the IMF in the sense that it has to be aware of the consequences of its decisions. With respect to this aspect, it is not obvious whether the IMF needs a special reminder.

One can also imagine a more active role of IMF news in shaping stock market returns. Assuming super-exogeneity of the estimated parameters (see Engle et al., 1983), the IMF can in principle exploit its position to manipulate stock market returns in both directions. We are not very favorable with regard to this alternative.

First, based on our estimates, the IMF is not able to dramatically alter market returns or volatility. Moreover, it is not clear whether super-exogeneity is a reasonable

⁸ We have recently received a paper by Peter Tilmann (2001) who test the hypothesis of moral hazard induced by IMF crisis lending. Under moral hazard argument, the relationship between risk and return weakens during a crisis. Using daily bond market data, Tilmann shows that IMF lending does not lead to IMF induced moral hazard problem, but he finds that such IMF actions assist investors to calculate the riskiness of their assets carefully. Our result that IMF news did not have much impact on stock market volatility, which is a proxy for risk, complements Tilmann’s findings.

assumption, and further research would be necessary to establish such a result. Thus, in view of the relatively modest absolute effects of IMF actions compared to the movements of returns during crises, and doubts about its ability to exploit its influence on market returns, we cannot recommend using IMF news actively to affect stock market returns.

References

- Aggarwal, R., C. Inclan, and R. Leal (1999), "Volatility in Emerging Stock Markets." *Journal of Financial and Quantitative Analysis* 34, 33-35.
- Bekaert, G. and C.R. Harvey (1997), "Emerging Market Volatility." *Journal of Financial Economics* 43, 29-77.
- Brealey, R.A. and E.C. Kaplanis (2000), "The Impact of the IMF Programs on Asset Values", *Working Paper*, London Business School, July.
- Bollerslev, T. (1986), "Generalized Autoregressive Conditional Heteroscedasticity", *Journal of Econometrics* 31, 307-327.
- Bollerslev, T. (1987), "A Conditional Heteroscedastic Model for Speculative Prices and Rates of Return", *Review of Economics and Statistics* 69, 542-547
- Bollerslev, T. and G. Ghysels (1996), "Periodic Autoregressive Heteroscedasticity", *Journal of Business and Economics Statistics* 14, 139-151.
- Bollerslev, T. and J.M. Wooldridge (1992) "Quasi-Maximum Likelihood Estimation and Inference in Dynamic Models with Time Varying Covariances," *Econometric Reviews* 11, 143-172.
- Dong, L., B.C. Kho and R. Stulz (2000), "US Banks, Crises and Bailouts: From Mexico to LTCM", *American Economic Review* 90, 28-37.
- Engle, R. (1982), "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation", *Econometrica* 50, 987-1008.
- Engle, R.F., D.F. Hendry, and J. F. Richard (1983), "Exogeneity", *Econometrica*, 51, 277-304.
- Fleming, J., C. Kirby, and B. Ostdiek (1998), "Information and Volatility Linkages in the Stock, Bond, and Money Markets", *Journal of Financial Economics*, 49, 111-37.

- Ganapolsky, E. and S. L. Schmukler (2001), "Crisis Management in Argentina during The 1994-95 Mexican Crisis: How Did Markets React?" *World Bank Economists' Forum*, 1, 3-30.
- Kaminsky, G. L. and S. L. Schmukler (1999), "What Triggers Market Jitters?: A Chronicle of the Asian Crisis", *Journal of International Money and Finance* 18, 1999, 501-514.
- Katz, S.S. (1998), "The Asian Crisis, the IMF and the Critics," *Eastern Economic Journal* 25, 421-439.
- Kho, B.C and R. Stulz (1999), "Banks, the IMF and the Asian Crisis", *Working Paper*, Ohio State University, August.
- Naim, M. (2000), "Washington Consensus or Washington Confusion?" *Foreign Policy* 118, 87-103.
- Nelson, D. (1990), Stationarity and Persistence in the GARCH(1,1) model, *Econometric Theory* 6, 318-334.
- Nelson, D. (1991), Conditional Heteroscedasticity in Asset Pricing: A New Approach, *Econometrica* 59, 347-370.
- Sachs, J. (1999), "Creditor Panics: Causes and Remedies", *Cato Journal* 18, 377-390, Winter.
- Tillmann, P. (2001), "Switching Risk-Perception on Bond Markets; Does IMF Lending Induce Moral Hazard?" Working Paper, University of Cologne, Germany.

Table 1: Defining IMF news categories

Category	Definition	No. of cases
Agreements	Signing of agreements to implement a new economic program over a period of time.	9
Delays	Delay of loans or talks between the countries and the IMF as a result of disagreements between the counter-parties on issues such as the reforms that should be made, or the conditions that must be fulfilled in order to achieve an agreement.	6
IMF supportive announcements	Positive statements made by the countries' government officials towards IMF policies or announcements of economic program that favor IMF policies or necessary to be eligible for new loans.	23
Loan Approval	Credits and loans extended by the IMF to the member countries with payment problems through stand-by arrangements, extended fund facility, reserve tranche policies, credit tranche policies, and policy on emergency assistance.	35
Request of funds from the IMF	Request of loans, including "bail-out" loans. Such requests usually come from the president of the country, usually in a situation of financial or economical crisis, in search of support funds to make reforms in the economy.	4
Talks / negotiations	Negotiations that take place between a country and the IMF on a loan approval or implementation of an economic program.	14
Anti-IMF policies / statements	Government announced policies and statements that do not comply with or support IMF policies.	7

Resumptions	This captures the resume of the negotiations between a country and the IMF following a period of delay of loans or talks.	5
Visits	Each year a team of four or five IMF staff members travels to the capitals of the countries that it is helping and spend some time gathering information and holding discussions with government officials about the countries' economic policies. Statements, agreements or loan approvals usually accompany these visits.	12
Favorable statements	Statements made by the IMF officials praising the reform measures taken by the countries, the developments in the economical or financial situation of the country.	28
Unfavorable statements	Statements made by the IMF officials usually for the countries that did not fulfill or that did not put enough effort to satisfy the restrictive conditions brought by an agreement or a loan approval.	10
Bad news	Combines the above categories "delays" and "unfavorable statements", and partially "talks".	17
Good news	Combines the above categories "agreements", "loan approval", "resumptions", "visits", "favorable statements", and partially "talks".	90

Table 2: Descriptive Statistics of Returns and S&P

	Mean	St.Dev.	Minimum	Maximum	Skewness	Excess kurtosis
Returns	0.02	3.33	-26.6	28.8	-0.09	8.7
S&P	0.08	1.24	-7.1	5.0	-0.48	4.1

Table 3: Explaining stock returns using a GARCH (1,1) model with t-student distribution

	Model 1		Model 2	
	Coeff.	SE	Coeff.	SE
α_0	0.35**	0.09	0.35	0.09
α_1	0.22**	0.03	0.22	0.03
β_1	0.78**	0.03	0.78	0.03
Student-t degrees of freedom (ν)	4.33		4.31	
Returns _{t-1}	0.06**	0.02	0.06**	0.02
Returns _{t-4}	-0.05**	0.02	-0.05**	0.02
S&P _t	0.41**	0.04	0.41**	0.04
S&P _{t-1}	0.19**	0.03	0.19**	0.03
S&P _{t-4}	0.08*	0.03	0.08*	0.03
S&P _{t-5}	0.08*	0.03	0.08*	0.03
Indonesia	-0.15*	0.08	-0.16*	0.08
Positive IMF news	0.54*	0.27		
Negative IMF news	-1.64**	0.66		
Favorable IMF statement			0.93	0.65
Request from the IMF			-0.13	1.48
IMF-supportive announcement by gov.			0.65	0.38
Loan approval			0.46	0.33
Visit by IMF delegation			-0.05	0.82
Unfavorable statement by the IMF			-1.47	1.05
Agreement			0.64	0.52
Talks or Negotiations			0.26	0.67
Anti-IMF announcements by governm.			-1.34	1.37
Delay of loans or talks			-1.42**	0.47
Resumption of loans			1.41	2.12
Number of observations	3497		3497	
Log-likelihood	-8272.4		-8240.4	
Normality test	Chi ² (2) = 2315**		Chi ² (2) = 2277**	
ARCH 1-2 test	F(2, 3480) = 0.53		F(2, 3471) = 0.54	
Portmanteau (60) test	Chi ² (58) = 74.5		Chi ² (58) = 74.9	

Notes: * (**) indicates significance at a 5% (1%) level. Standard errors are heteroscedasticity-consistent.

Table 4: Explaining stock returns with IMF news in the variance equation

	Model 3		Model 4	
	Coeff.	SE	Coeff.	SE
α_0	0.34**	0.09	0.35**	0.10
α_1	0.23**	0.03	0.23**	0.04
β_1	0.77**	0.03	0.77**	0.04
Student-t degrees of freedom (ν)	4.32		4.31	
Returns _{t-1}	0.06**	0.02	0.06**	0.02
Returns _{t-4}	-0.05**	0.02	-0.05**	0.02
S&P _t	0.41**	0.04	0.41**	0.04
S&P _{t-1}	0.19**	0.03	0.20**	0.03
S&P _{t-4}	0.08*	0.03	0.08*	0.03
S&P _{t-5}	0.07*	0.03	0.07*	0.03
Indonesia	-0.15*	0.08	-0.13	0.08
Positive IMF news	0.54*	0.26		
Negative IMF news	-1.63*	0.65		
Delay of loans or talks			-1.54**	0.50
IMF News aggregate based on good and bad in variance equation	0.96	0.93		
IMF News aggregate based on all items in variance equation			0.92	0.83
Number of observations	3497		3497	
Log-likelihood	-8271.6		-8275	
Normality test	Chi ² (2) = 2336**		Chi ² (2) = 2380**	
ARCH 1-2 test	F(2, 3479) = 0.54		F(2, 3480) = 0.52	
Portmanteau (60) test	Chi ² (58) = 73.4		Chi ² (58) = 73.4	

Notes: * (**) indicates significance at a 5% (1%) level. Standard errors are heteroscedasticity-consistent.

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