



Munich Personal RePEc Archive

## **Sovereign Credit Ratings, Transparency and International Portfolio Flows**

Gande, Amar and Parsley, David

Southern Methodist University, Vanderbilt University

February 2010

Online at <https://mpra.ub.uni-muenchen.de/21118/>  
MPRA Paper No. 21118, posted 07 Mar 2010 02:57 UTC

# Sovereign Credit Ratings, Transparency and International Portfolio Flows

February 2010

Amar Gande  
Cox School of Business  
Southern Methodist University  
Dallas, Texas 75275  
214.768-1945  
[agande@cox.smu.edu](mailto:agande@cox.smu.edu)

David Parsley  
Owen Graduate School of Management  
Vanderbilt University  
Nashville, Tennessee 37203  
615.322-0649  
[dparsley@owen.vanderbilt.edu](mailto:dparsley@owen.vanderbilt.edu)

## Abstract

We examine the response of equity mutual fund flows to sovereign rating changes in a wide sample of countries during the crisis prone years from 1996-2002. We find that Sovereign downgrades are strongly associated with outflows of capital from the downgraded country while improvements in a country's sovereign rating are not associated with discernable changes in equity flows. Transparency, as proxied by the level of corruption matters: more transparent (i.e., less corrupt) countries experience smaller outflows around downgrades. Moreover, abnormal flows around downgrades are consistent with a 'flight to quality' phenomenon. That is, less corrupt non-event countries are net recipients of capital inflows, and these inflows increase with the severity of the cumulative downgrade abroad. The results remain after controlling for country size, legal traditions, market liquidity, crisis versus non-crisis periods. Taken together, the results suggest that increasing transparency could mitigate some of the perceived negative effects often associated with global capital flows.

JEL Classification: G15; F36; G14

Keywords: Asymmetric effects; portfolio flows; sovereign rating agencies

We thank seminar participants at the University of Virginia (Darden School), the Financial Management Association Meetings, the Vanderbilt University Law School, Rice University, Southern Methodist University, the University of Texas at San Antonio, the Owen Graduate School of Management at Vanderbilt University, the European Central Bank, the Federal Reserve Board, the Bank of France, the Bank of Japan, the Hong Kong Institute for Monetary Research, and helpful discussions with Clifford Ball, Allen Berger, Alex Butler, Mark Carey, Yin-Wong Cheung, John Griffin, Graciela Kaminsky, Darius Miller, Federico Nardari, Mark Seasholes, Hans Stoll and Frank Warnock. We gratefully acknowledge financial support from the Dean's Fund for Faculty Research, the Financial Markets Research Center, and the Foundation for Economic Research at the Bank of France. The views expressed in this paper do not necessarily reflect those of any institution with which the authors are associated. Comments are welcome. Please address all correspondence to Amar Gande, Cox School of Business, Southern Methodist University, 6212 Bishop Blvd., Dallas, TX 75205, USA. Tel: (214) 768-1945. Fax: (214) 768-4099. Email: [agande@cox.smu.edu](mailto:agande@cox.smu.edu).

“...transparency and the fight against corruption are essential to tackling the root causes of many challenges”

UN Secretary General Kofi Annan, January 27, 2004

“...certain structures and systems can make government actions more transparent. Corruption is deterred because it is more difficult to hide.”

Susan Rose-Ackerman, 1996

## 1. Introduction

It is easy to understand why sovereign credit rating changes receive prominent coverage in the financial press. Typically, the yield on sovereign debt provides the benchmark for all other debt in an economy. Hence market reactions reflect the anticipated impact of ratings revisions throughout the economy. That is, since the primary data on factors affecting a sovereign's credit worthiness, such as tax collections, government spending, economic growth, the level of foreign exchange reserves, and net exports are generally known at the time of a rating change, a market response to a sovereign rating change would seem to be *prima facie* evidence that rating changes contain new information.<sup>1</sup>

The purpose of this study is to explore these market reactions by focusing on their impact on international portfolio capital flows. Note that even though news announcements may elicit price changes, they need not induce capital flows. Recent research however, provides several plausible justifications for a capital flows response. First, several theoretical models suggest a role for portfolio rebalancing in crisis propagation (e.g., Pavlova and Rigobon, 2006, Pavlova and Rigobon, 2005, and Kodres and Pritsker, 2002). Indeed, rating agencies have been accused of exacerbating boom and bust cycles in capital flows to emerging economies.

Hence, we devote considerable attention to potential asymmetric effects (i.e., downgrades versus upgrades) of ratings changes, following findings by Gande and Parsley (2005), and others, of asymmetric effects of rating changes on prices of sovereign debt. Johnson et al. (2000), provide a corporate finance rationale for such findings. In their model, worsening economic prospects in a country result in more expropriation by managers and thus lead to a larger fall in asset prices. Their model predicts this effect will be amplified in countries with weaker corporate governance, and by extension, in less transparent, more

---

<sup>1</sup> In addition to cases where rating agencies may have access to information not publicly available, market participants may also perceive that rating agencies possess a comparative advantage in synthesizing macroeconomic data (despite widely noted crisis prediction failures) due to their global focus and continuity of coverage and analysis.

corrupt countries. From a different perspective, Brennan and Cao (1997) present a model where domestic investors possess an information advantage relative to foreign investors. In their model, portfolio allocation decisions based on expectations of risk and return will be revised as a result of public announcements due to a revision in expectations. Since the revision is greater for the less well-informed investors, the effect will be more pronounced in countries with higher information asymmetries. Hence, in addition to documenting a portfolio flow response to rating events, our study places special emphasis on understanding the cross-sectional variation in observed flows associated with rating changes.

Specifically, we address several key questions. First, do portfolio capital flows respond to ratings changes, and is that response consistent with existing evidence from studies looking only at price, or interest rate effects alone? Second, is the effect similar (i.e., symmetric) for upgrades and for downgrades? Third, we test whether the observed pattern of response is plausibly related to information asymmetries by relating portfolio flows to a measure of transparency<sup>2</sup>, such as country-specific perceived corruption levels.<sup>3</sup> Since corruption is illegal and therefore often conducted in secret, the reliability of information (as well as its distribution) surrounding economic transactions will be lower in more corrupt environments. That is, more corrupt countries will typically have lower transparency and a corresponding higher degree of information asymmetries between local and international investors. A testable implication is that news, e.g., a sovereign rating change (which is essentially news about an economy's fundamentals), will have greater impact in less transparent, more corrupt economies where agents are poorly informed about the fundamentals. In consequence, a rating change in a more corrupt economy will induce relatively more capital flows since the revision in expectations is correspondingly greater. We also ask whether less corrupt countries are less vulnerable to bad news (e.g., downgrades). Since the quality and quantity of information is likely to be higher in less corrupt countries, we hypothesize that rating announcements should be less informative and hence induce relatively smaller portfolio adjustments for less corrupt countries relative to more corrupt countries. Finally, we explore whether more transparent (i.e., less corrupt) non-event countries benefit from bad news abroad by attracting portfolio flows away from countries experiencing downgrades. Finally,

---

<sup>2</sup> Recent evidence suggests that transparency is an important dimension in explaining capital flows and susceptibility to financial crises, especially in emerging markets. For example, the International Monetary Fund (2001) notes that a "lack of transparency was a feature of the buildup to the Mexican crisis of 1994-95 and of the emerging market crises of 1997-98."

<sup>3</sup> There is a growing recognition and awareness of the economic costs of corruption (e.g., Shleifer and Vishny, 1993, Mauro (1995), Tanzi (1998), Wei (2000)). See Section 2.4 for details.

since the sample period brackets several crisis episodes, we test whether the response systematically varies between crisis and non-crisis periods.

The primary data set we employ is a monthly panel of mutual fund equity positions covering 85 countries during the seven years 1996-2002 encompassing a string of crises in Asia, Russia, and Latin America. By the end of our sample, there were 724 active funds with assets totaling \$138 billion (see Table 1). We match these holdings to sovereign credit rating changes, and a host of country-specific data as additional controls in our regressions, such as country type (developed versus emerging); a country's legal origin (common law versus civil law) and rule of law tradition (see, La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1997, 1998, 1999); the liquidity of its equities market (see, Henry, 2000); the size of the real economy; or the level of a country's sovereign rating. Most of our analysis is conducted at the country level. However, since the raw data are reported at the fund-level, we check whether the results are driven by fund size, domicile, or fund investment strategy (international, global, etc.).

Our findings can be briefly summarized. First, we find that changes in sovereign credit ratings represent new information to capital markets, as evidenced by a non-zero response of portfolio flows to rating changes. We find that the flow response is asymmetric: Positive rating events lead to no statistically significant abnormal capital flows, whereas negative rating events are associated with economically and statistically significant equity outflows. For example, a one-notch downgrade is associated with a contemporaneous outflow of \$89.3 million, or equivalently 5.5% of the end of prior month's country allocation (i.e., fund asset positions cumulated across funds invested in a country) from the downgraded country. Second, we find that, as hypothesized, the capital outflow from more transparent (i.e., less corrupt) countries is much reduced around downgrades. In fact, lower corruption fully offsets the effect of a downgrade on capital flows. For example, a one-notch downgrade of a less corrupt country is associated with a statistically insignificant contemporaneous outflow.

Third, interestingly, we find that more transparent (i.e., less corrupt) non-event countries are net recipients of capital inflows, and that these inflows increase with the extent of the bad news abroad. For example, a one-notch aggregate downgrade in event countries is associated with \$26.6 million inflow, or equivalently 0.8% of the end of prior month's country allocation into a less corrupt non-event country during the same month as that of the downgrade.

All of the above results are robust to controlling for country size, legal traditions, market liquidity, crisis versus non-crisis periods, and are invariant to different assumptions regarding the within-month distribution of equity flows, monthly predicted benchmark flows, or persistence of equity flows.

Importantly, our results show that transparency (i.e., corruption) has an independent, statistically significant and economically meaningful effect on portfolio flows even after controlling for the legal origin (e.g., common law versus civil law). That is, corruption is not subsumed by the legal origin. Moreover, while legal origin is exogenous, improving corruption (say, through greater public disclosure, or enactment and enforcement of new laws) is an endogenous choice for any country. An important policy implication of our results is that improving transparency could be beneficial to a sovereign in terms of smaller outflows around negative news (such as downgrades) domestically, and in attracting larger inflows around negative news abroad. At a broader level, improving transparency could mitigate some of the widely perceived negative effects of greater financial market integration (such as sudden-stops and capital flight), and promote financial development.

The next section provides some background, while Section 3 describes the data we employ. Section 4 presents our findings and Section 5 concludes.

## **2. Brief review of related studies**

This section provides a brief description of several key areas of research that provide motivation for this study.

### **2.1. Law and finance**

Research stressing the roles of incentives, institutions, and legal traditions in economic outcomes provides a natural background for our study. In an influential series of papers (e.g., La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1997, 1998, 1999), the authors conclude that legal origin (e.g., common law versus civil law) substantively accounts for cross-country differences in the financial contracting environment, shareholder protection, financial market development, and even the quality of government. Pistor, Raiser and Gelfer (2000) even suggest that inherited institutions (e.g., from colonizers) cannot easily be replaced by legal reform. Others, such as, Rajan and Zingales (2003), argue that inherited institutions cannot explain changes in countries' relative outcomes over time. For example, the authors point out that despite France's civil law tradition, financial development in 1913 was higher in France

than in the United States. These shifts suggest that factors that can be changed, (e.g., transparency) could be important.

As noted in the introduction, our results indicate that a country's transparency (i.e., corruption) has an independent (i.e., is not subsumed by the legal origin), statistically significant and economically meaningful effect on portfolio flows around rating changes.

## **2.2. International portfolio flows**

International portfolio flows are of interest due to their influence on market efficiency, future growth, and investment, especially in emerging markets. For example, Griffin, Nardari and Stulz (2004) document that unexpectedly high worldwide or local stock returns lead to daily net equity inflows into small countries (such as emerging markets), Li, Morck, Yang, and Yeung (2004) find that greater capital market openness is associated with a higher level of stock market efficiency (e.g., higher firm specific variation of stock returns), and Calvo and Reinhart (2001) suggest that access to capital markets has become more important than independent monetary policy for emerging markets.

Among existing studies of international portfolio flows, early work (primarily using data from developed markets) considers whether portfolios are 'optimally' diversified (e.g., Grauer and Hakansson 1987, Tesar and Werner 1995). These studies find considerable scope for further gains from international portfolio diversification. Despite this 'home-bias', researchers find that U.S. investors tend to acquire foreign stocks when foreign returns are high – especially in large equity markets, e.g., Bohn and Tesar (1996). Moreover, Bohn and Tesar find that such 'return-chasing' underperforms a strategy of holding a market-weighted portfolio of foreign equities.

Other studies focus on information asymmetries between foreign and domestic investors. Kang and Stulz (1997) find that foreign investment in Japanese equities is concentrated in the largest firms, which is consistent with foreign investors having relatively less information about small firms than local investors. Brennan and Cao (1997) show that when domestic investors possess an information advantage over foreign (e.g., U.S.) investors about the domestic market, U.S. investors tend to use a momentum strategy since they, being less well-informed, revise their prior beliefs more than the domestic investors in the foreign market.

More recently, Froot, O’Connell, and Seasholes (2001) examine the evidence of momentum strategies (i.e., inflows increase subsequent to high returns and vice versa) in emerging markets using daily portfolio flows covering flows into and out of 44 countries during the period mid-1994 through 1998. The authors corroborate earlier evidence of momentum, and importantly, find that flows statistically significantly affect future returns. Hence, contemporaneous interest rate effects may only provide a partial view, as they could be influenced by past portfolio flows. This finding motivates the approach we take in this paper.

Finally, Gelos and Wei (2005) study how transparency affects herding and cross-country portfolio allocation by mutual funds. They find that herding is more prevalent in less transparent countries, and such countries are underweighted in international portfolios (i.e., receive less investment from international funds). The authors also find some evidence that less transparent countries experience larger outflows during crises. Results from crisis periods, while interesting, do not necessarily extend to other settings, such as ratings downgrades, since downgrades do not systematically predict or even precede a crisis. For example, Radelet, Sachs, Cooper and Bosworth (1998) argue that the sovereign credit rating agencies failed to predict the onset of the Asian financial crisis and may have even exacerbated it by downgrading countries after the crisis began. Hence, we examine portfolio flows around sovereign credit rating changes in both crisis and non-crisis periods. Furthermore, we examine which non-event countries benefit in terms of attracting portfolio flows away from a downgraded country, a ‘spillover’ aspect that is not examined in Gelos and Wei (2005).

### **2.3. Cross-market contagion and spillovers**

Further motivation for this study comes from the extensive empirical literature demonstrating transmission of shocks across markets and asset classes (e.g., debt rating changes on stock markets)<sup>4</sup>. Recent theoretical models suggest a role for portfolio rebalancing in crisis propagation (e.g., Pavlova and Rigobon, 2006, Pavlova and Rigobon, 2005, and Kodres and Pritsker, 2002). Rating changes on corporate (i.e., non-sovereign) bonds have been shown to be associated with significant announcement effects on stock prices. For example, Hand, Holthausen, and Leftwich (1992) analyze the effect of bond rating agency announcements on U.S. stock prices. These authors find differential impacts of upgrades

---

<sup>4</sup> See Forbes and Rigobon (2002) for a discussion of methodological issues involved in measuring cross-market contagion. Also, see Bae, Karolyi and Stulz (2003) who propose a multinomial logistic regression approach to measure contagion.



based on the grade (e.g., investment versus non-investment) of the bond being rated and on the direction of the rating change (upgrade versus downgrade).

In an international context, Rigobon (2002) examines the impact of an upgrade in sovereign credit rating of Mexico from non-investment grade to investment grade in 2000 and shows a statistically significant change in the propagation of shocks between Mexico and several Latin American countries around the time the upgrade was announced. In addition, Kaminsky and Schmukler (2002) focus on 16 emerging markets and ask whether changes in sovereign credit ratings contribute to market instability. They find evidence of cross-country contagion, particularly during crisis times and among neighbor countries.

## 2.4. Corruption

There is a growing recognition and awareness of the economic costs of corruption (e.g., Shleifer and Vishny, 1993, and Mauro, 1995). In a recent study, Tanzi (1998) documents that, despite increased global attention, corruption has likely become *more* prevalent in recent decades. A much discussed case in point is the recent East Asian financial crisis, where corruption, weak corporate governance, and insider dealing are the primary consensus explanations for its severity according to Radelet, Sachs, Cooper and Bosworth (1998). Given that countries have more influence over policies impacting transparency and domestic corruption (e.g., through standards, legislation, and enforcement), than say, the overall size of their economy, financial market liquidity, or which legal system they inherited, the prevalence of corruption is somewhat puzzling.<sup>5</sup>

Recent empirical studies have demonstrated an inverse relationship between corruption and aggregate investment and economic growth, public investment in infrastructure and in education, and significantly, that corruption tilts the *composition* of capital flows away from longer term foreign direct investment toward shorter term flows (e.g., Mauro, 1995, Tanzi, 1998, Wei 2000).<sup>6</sup> This latter impact of corruption suggests our emphasis in this paper. Specifically, we investigate whether the impact of ratings changes varies with the level of corruption in an economy. Our findings include specific news announcements in both crisis and non-crisis periods, and we provide new results on the impact of corruption on cross-country portfolio shifts.

---

<sup>5</sup> Formal models of the persistence of corruption do exist however, see, e.g., Mauro (2004).

<sup>6</sup> As noted by Tanzi (1998), an extensive public sector facilitates, but is not sufficient for corruption to have negative effects on investment and growth.

### 3. Data

We use a three-dimensional monthly panel of portfolio holdings of stock funds that invest globally. The data set is commercially available from eMergingPortfolio.com and represents approximately 34% of total portfolio flows to emerging markets (see Gelos and Wei (2005) who also use this dataset for additional details).<sup>7</sup> The panel contains a mixture of fund types, e.g., global, international, regional, and single country funds in the data set. Table 1 lists the country coverage and the number of funds reporting for each as of December 2002. Importantly, the data identifies monthly (end-of-month) holdings, by fund, in 85 countries world wide. The data set begins January 1996 and ends December 2002 (84 months total). At the beginning of the sample the data set contains 368 funds with assets totaling \$113 billion; at the end of 2002, there are 724 funds, with a total of \$138 billion under management, and in total has 340,428 positive fund-country-month observations.

We examine all sovereign rating changes made by the three principal sovereign rating agencies. Standard & Poor's (S&P) and Moody's Investor Service are widely regarded as the two major sovereign rating agencies, with Fitch Investor Service also frequently mentioned. It is well known that ratings are highly correlated across agencies. As an alternative to replicating each aspect of our analysis on data from each rating agency, we test for the existence of a leader/follower relationship among these agencies. The statistical test is an extension of that in Cooper, Day, and Lewis (2001), who find that 'lead' equity analysts consistently have the greatest market impact. We describe the details of the Cooper, Day, and Lewis (2001) leader-follower ratio (LFR) test and our adaptation of it, in Appendix A. The results indicate that S&P is the lead rating agency. This conclusion remains unchanged whether we restrict the sample to the 85 countries in this study, or if we include all countries rated by at least two rating agencies (i.e., not limited to the 85 countries in Table 1), and whether we consider the entire history of sovereign ratings from 1941-2003, or if we restrict the sample to the sample period used in this study (1996-2002).<sup>8</sup> Hence we focus our subsequent analysis on ratings announcements by S&P.

Additionally, we use the country-specific time series of corruption indices provided by Transparency International. All existing indexes of transparency and corruption are based on

---

<sup>7</sup> Another data set on capital flows is the U.S. Treasury data on international capital flows. However, the well-documented transactional and custodial biases of the Treasury data preclude their use in this study (see <http://www.treas.gov/tic/faq2.html#q4>). The data set we use here does not have these biases.

<sup>8</sup> The historical sovereign ratings dataset starts from January 1, 1941 for S&P (United States), February 05, 1949 for Moody's (United States), and August 10, 1994 for Fitch (Austria).

international comparisons (surveys) of perceptions of e.g., the extent of bribery, red tape, public and private sector transparency and accountability, and judicial and public sector malfeasance. Quantifying these subjective and/or illegal practices is achieved via surveys of corporate representatives with international experience concerning their impressions of the extent of corruption, transparency, etc. We use Transparency International's corruption perceptions index (CPI) because: it is a composite measure based on multiple information providers; it covers multiple aspects of transparency and corruption; it is well known; and it is available for a large (and growing) number of countries on an annual basis since 1995.<sup>9</sup> In 2003 for example, the Transparency International combined information from 17 independent sources (e.g., the Economist Intelligence Unit, the World Bank, PricewaterhouseCoopers, and Columbia University) to produce a single ranking. An important feature of the CPI is that year-to-year comparisons are made on the basis of the country's score, and thus are unaffected by changes in the number of countries in the annual rankings. The number of countries ranked by Transparency International has grown from 41 in 1995 to 133 today.

We also use other country specific and time series macroeconomic data including: (1) country index returns from Datastream, MSCI, and S&P/IFC; (2) the International Monetary Fund's World Economic Outlook 2003 database; and (3) and the S&P/IFC Global Stock Markets Factbook (2003).

Finally, we include a host of country specific and time-invariant data that have been suggested by related studies, e.g., the legal and institutional market characteristics as suggested in La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1997, 1998, 1999), Pistor, Raiser, and Gelfer (2000), and Henry (2000).

#### **4. Empirical specification and results**

This section is divided into four parts. In the first part, we discuss issues related to the measurement of capital flows from the underlying portfolio holdings data. Since rating changes can impact the valuation of existing country allocations (especially in emerging markets) as well as flows, we construct measures of flows that account for these valuation changes. The second part lays out the estimation strategy and discusses our main results. The

---

<sup>9</sup> Transparency International's corruption perceptions index has been widely used in recent studies, e.g., Alesina and Weder (2002), and Treisman (2000). As Alesina and Weder (2002) point out, alternative rankings compiled by different institutions using very different methodologies and sources are highly correlated. Current and past CPI rankings, as well as further information on their construction, is available at: [http://www.user.gwdg.de/~uwww/corruption.cpi\\_olderindices.html](http://www.user.gwdg.de/~uwww/corruption.cpi_olderindices.html).

third part discusses our results on the impact of a country's transparency (i.e., corruption ranking) on the estimated response of portfolio flows to a sovereign credit rating change. This section concludes with additional robustness tests.

#### 4.1. Rating events

In defining a rating event, we follow Gande and Parsley (2005) and consider changes in the stated grade given to a country (represented by the letter-grade D thru AAA) as well as the information in secondary announcements that qualify a country's stated grade. For example, Standard & Poors frequently revises sovereigns on its 'credit outlook' a few months prior to an actual upgrade of a country's stated grade. We term the combined rating (stated rating plus any credit outlook information) as the country's 'comprehensive' credit rating (CCR), and study equity flows in response to changes in the CCR. Procedurally, we numerically code the letter ratings on a scale from 0 (lowest) thru 21 (highest). Similarly, we code the credit outlook on a scale between -1 to +1, in five increments based on the five distinct credit outlook categories S&P uses. We sum these two to produce the comprehensive credit rating. Appendix B presents a tabulation of the construction of the CCR. Thus each country has a rating for each time period, and multiple events during a month are summed; our interest is any change in the aggregate comprehensive credit rating of a sovereign and how this impacts capital flows.

Table 2 presents a summary of the individual country rating changes that occurred during the 1996-2002 period. Overall, there are 247 rating events during this time period. Of these, 115 are upgrades (positive change in the CCR from the prior month) – while 132 are downgrades (negative change in CCR from the prior month). The countries with the largest number of changes during the sample are: Indonesia (16), Turkey (15), Argentina, Russia, and Malaysia (each with 11 events).

Figure 1 presents a monthly view of the time series distribution of rating changes, aggregated across all types of changes (upgrades and downgrades) and across all countries. Figures 2 and 3 present the information for upgrades and downgrades separately. Across all countries, there are very few months with no ratings activity, and activity appears to have both increased and become more variable over time. Downgrades appear to be more clustered, i.e., occurring in several countries simultaneously (or within the month), and are concentrated more toward the latter part of the sample. As pointed out by other authors, e.g., Radelet and

Sachs (1998), the Asian Crisis seems not to have been preceded by an increase in ratings activity.

## 4.2. Measuring flows

The dependent variable in our regressions is the amount of portfolio equity capital flowing into or out of each country each month. The primary question we address is whether changes in sovereign credit ratings impact these flows. The raw data from eMergingPortfolio.com Fund Research (EPFR) records each fund's holdings (i.e., asset positions) at the end of each month, on a country by country basis. From these holdings data, EPFR computes and markets various measures of cross border capital flows to investment professionals. In this study, we use the raw data provided by EPFR on equity fund holdings. A snapshot of the data is presented in Table 1, which summarizes the number of active funds (i.e., with a positive asset position in equities) in each country, and the aggregate country allocation (i.e., sum across funds active) as of December 2002, the end of our sample period. The table suggests substantial variation along several dimensions: in number of countries; in number of active funds within each country; and, in total allocation in each country.

Typically estimates of monthly capital flows from asset positions are computed as the difference between asset positions at the end of the period ( $A_t$ ) and those at the beginning of the period ( $A_{t-1}$ ), compounded for the *ex post* (realized) return ( $m_t$ ), as in equation 1 below.

$$Flow_t = A_t - A_{t-1} * [1 + m_t] \quad (1)$$

Since the event (rating change) is likely to have a market impact (which we verify below in Section 4.2.1), we also estimate flows based on the market return *absent* the rating change, i.e., an *ex ante* (expected) return  $E(m_t)$  rather than an *ex post* (realized) return  $m_t$  as shown in equation (2) below.

$$Flow_t = A_t - A_{t-1} * [1 + E(m_t)] \quad (2)$$

We refer to the  $Flow_t$  implied by equation 1 as the explicit flow, and the  $Flow_t$  implied by equation 2 as the comprehensive flow, which can be interpreted as a measure of the economic impact of a rating change. Though equation 2 is more comprehensive in the sense that it accounts for market effects of ratings changes explicitly, we also report an initial benchmark specification using the explicit flow computed as in equation 1.

We next discuss the way we measure the expected return,  $E(m)$ , in equation 2, after first verifying that rating changes do have an economically and statistically significant market impact on country index returns.

#### 4.2.1. Market impact of rating changes

In this section we use an event study framework to demonstrate the impact of sovereign rating changes on country index returns. Empirically, we estimate the average effect of a rating change on a country index returns ( $\bar{\delta}_t$ ) as follows. Formally, define  $\delta_{i,t} = m_{i,t} - E(m_{i,t})$ , where  $\delta_{i,t}$  is the abnormal return in country  $i$ ,  $m_{i,t}$  is the observed logarithmic return  $\ln(P_{i,t}/P_{i,t-1})$  on the local market index ( $P_{i,t}$  expressed in U.S. dollars), and  $E(m_{i,t})$  is the expected return on the  $i^{\text{th}}$  market's index as predicted from the (OLS) coefficients estimated in the market model regression. That is,  $E(m_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i mkt_t$ , where  $mkt_t$  is the return on a world market index.

Following Gelos and Wei (2005), we assume that in any given country, funds hold that country's index, since the data set provides asset positions in each country at a given point in time (month end) and not individual fund returns. The coefficients  $\hat{\alpha}_i, \hat{\beta}_i$  are ordinary least squares (OLS) coefficients from the market-model regression during the estimation time period. We follow Brown and Warner (1985), and test the null hypothesis that the abnormal return for any month  $t$  is equal to zero ( $H_0: \bar{\delta}_t = 0$ ) using the ratio of the average abnormal return to its estimated time-series cross-sectional dependence adjusted standard error, i.e.,

$$\begin{aligned} \frac{\bar{\delta}_t}{\hat{S}_t(\bar{\delta}_t)} &\sim N(0, 1) \\ \text{where, } \bar{\delta}_t &= \frac{1}{N_t} \sum_{i=1}^{N_t} \delta_{it} \\ \text{and, } \hat{S}_t(\bar{\delta}_t) &= \frac{1}{59} \left( \sum_{t=-65}^{-6} (\bar{\delta}_t - \tilde{\delta})^2 \right), \\ \text{where, } \bar{\delta}_t &= \frac{1}{N_t} \sum_{i=1}^{N_t} \delta_{it} \\ \text{and, } \tilde{\delta} &= \frac{1}{60} \sum_{t=-65}^{-6} \bar{\delta}_t \end{aligned} \quad (3)$$

where  $N_t$  is the number of countries whose abnormal returns are available at month  $t$ . For tests over multi-period intervals, e.g.,  $[-1, +1]$ , the test statistic is the ratio of the cumulative

average abnormal return (CAR) to its estimated time-series cross-sectional dependence adjusted standard error for the multi-period interval, i.e.,

$$\frac{\sum_{t=-1}^1 \bar{\delta}_t}{\sum_{t=-1}^1 (\hat{s}^2(\bar{\delta}_t))^5} \sim N(0, 1). \quad (4)$$

Appendix C reports our estimates of  $\bar{\delta}_t$ , the average effect of a ratings change on the local market index, using monthly index returns. For upgrades, only two months (-1, and 0) appear statistically significant, and the CAR rises by 7.5%. For downgrades, five of the six months [-5, 0] are statistically significant at the 1% level, and in the same two month time frame leading up to a downgrade, the market index drops by 11.5%.<sup>10</sup>

#### 4.2.2. Flow measures

Before moving to estimation of the flow response to a rating change in the next section, we discuss an additional measurement detail, namely to what extent are the results influenced by the implicit assumption concerning the timing of the flow during the month. That is, because our raw data reflects monthly (end of month) fund investment position data ( $A_t$ ), our estimate of flows ( $Flow_t$ ) depends on what we assume about how the flows are distributed within the month. To address this issue, we consider several estimates of monthly flows, based on different assumptions as to their timing within each month. In all, we consider results using six different assumptions regarding the intra-month flow. For example, flows could occur on the last day of the month (*Flow measure 1*, same as in equation 2), on the first day of the month (*Flow measure 2*), in the middle of the month (*Flow measure 3*), or distributed in equal amounts at various times during the month (*Flow measures 4-6*). Details of the construction of these measures are provided in Appendix E.

#### 4.3. Measuring flow responses to rating events

---

<sup>10</sup> We find evidence of a similar market impact using daily data – though due to data availability we are able to do such analysis only for a sub-sample of 54 countries. Appendix D and Figures 4 and 5 summarize the results. Interestingly, there appears to be some anticipation of the event for both positive and negative rating changes. However, the effect is economically and statistically larger for downgrades. According to the summary at the bottom of Appendix D, the CAR surrounding downgrades is more than twice as large as that for upgrades in absolute value. This impression is also confirmed in Figures 4 and 5.

As the first step in the empirical analysis, we ask whether flows respond to the type of a ratings event (positive or negative). Specifically, we examine whether the flows during event months are economically and statistically different from flows in non-event months, defined as (a) months where no rating change event occurred in the event country, and more conservatively, or (b) months where no ratings event occurred in any of the sample countries (that is, we consider flows in each event country  $i$  in months where there was no ratings activity in any country). We initially measure flows by  $F6$  as described in Appendix E, which assumes the monthly flows are distributed in equal daily amounts.<sup>11</sup> We subsequently consider other flow measures (see Section 4.5 for details).

We examine flow responses to the magnitude of a rating change using the stricter requirement (i.e., using condition b) by pooling the data for all event countries ( $i$ ), at each event month ( $t$ ) into two sub-samples, one for positive events, and another for negative events. For ease of interpretation, we normalize the sign of  $Event_{i,t}$  to be the same for both negative and positive regressions. That is,  $Event_{i,t}$  is defined as the absolute value of the aggregate change in comprehensive credit rating across all days in a month for country,  $i$ .<sup>12</sup> We stack the event data (positive or negative) with non-event data (defined initially as months where no ratings event occurred in any of the sample countries) to run OLS regressions. By definition, the  $Event_{i,t}$  is zero for non-event data.

Our regression equation is given in equation 5, and we present two specifications in Table 3. We report estimates from equation 5 for both upgrades and downgrades beginning with a benchmark regression that includes only the event country's comprehensive credit rating ( $CCR_{i,t}$ ) as a control variable since it has been noted by other authors, e.g., Cantor and Packer (1996) that a country's credit rating succinctly summarizes the comparative macroeconomic environment of a country. Hence, initially the vector  $X_k$  in equation 5 contains controls for the lagged CCR. Appendix F provides more detail on sources and construction of the variables in  $X_k$ .

$$Flow_{i,t} = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i. \quad (5)$$

---

<sup>11</sup> Flow measure 6 also approximates the behavior of fund managers sensitive to investing a large lump sum of capital, especially in emerging markets (which constitute a large portion of our sample – 61 of the 85 countries) which may have limited ‘market depth’ and ‘liquidity’.

<sup>12</sup> This does not affect our interpretation of the coefficients since we run the positive and negative analysis separately.



In the second regression specification of Table 3, we control for important differences among countries, e.g., factors such as size of the economy, market liquidity, and legal origin. Hence, the vector  $X_k$  in equation 5 now contains controls for the level of the event country's comprehensive credit rating (CCR), gross domestic product, dummies for emerging/developed status, origin of legal system (i.e., common law versus other forms), rule of law, liquidity, an indicator variable corresponding to crisis periods, and year dummies. Many of these factors have been central to recent contributions concerning the economics of financial markets in emerging countries (e.g., Henry, 2000, La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1997, 1998, 1999). Moreover, capital flows have been the center of global attention following the succession of national crises during the time period under study. Hence, given the time frame and cross country breadth of the current data set, the inclusion of these controls seems warranted. Subsequently, we consider additional explanatory variables as well as different definitions of the dependent variable.

Clearly, portfolio flows appear to respond to rating changes, and the effect is asymmetric. That is, positive rating events (in columns 1 and 2 of Table 3), have no discernable impact on portfolio flows (the coefficient on *Event* is not statistically different from zero). Negative rating events, in contrast, are associated with portfolio outflows, i.e., the coefficient has the anticipated sign and is statistically significant at the 1% level for negative rating events. According to the table, on average, a one-notch downgrade in the sovereign credit rating is associated with a \$115.4 million outflow (see column 4) of capital from the country experiencing a negative rating event.

In Table 4, we present the results as a percentage of the previous month's country allocation, i.e., we scale the dependent variable by the aggregate (i.e., summed across all funds investing in a country) asset position. On average, a one-notch downgrade in a country's sovereign credit rating is associated with an outflow of 6.9% (see column 4) of the previous month's country allocation. The results are qualitatively similar to those obtained in Table 3, and the explanatory power is higher than in Table 3. Hence, we will report percentage flows for the remainder of the paper, though we do report dollar amounts in appendices.

The results so far utilize a non-event sample defined as flows in months where no ratings event occurred in any of the sample countries. In Appendix G we repeat the analysis in Table 3, defining the non-event sample for each country as flows in months where no rating event occurred in the event country. As shown in the table, the results are qualitatively

unchanged using this looser benchmark. Hence, in the remainder of the paper we will focus on the stricter benchmark of non-event data.

For comparison, we replicate Table 4 using the explicit flow (computed using equation 1) rather than the comprehensive flow (equation 2), measured as a percentage of the previous month's country allocation. The results are presented in Appendix H. As expected, the results are qualitatively similar, albeit the statistical significance is marginally lower.

Thus we conclude that rating changes have an asymmetric effect. One possible explanation for the direction-specific impact of rating changes on flows is that rating agencies may be reluctant to lowering the sovereign credit rating or the credit outlook due to a fear of losing continued access to critical information, such as the level of foreign currency reserves, etc., which may be privately observed by the foreign governments.<sup>13</sup>

#### 4.4. Information Asymmetries

Based on the importance and increasing attention paid to governance and public accountability issues in recent years, we analyze the link between rating changes and transparency. Since we find no discernable portfolio flows around positive rating events, we primarily concentrate the discussion on rating downgrades. Specifically, we investigate whether more transparent (i.e., less corrupt) countries are less vulnerable to bad news, such as rating downgrades. Since the amount and quality of information is likely to be higher in less corrupt countries, we hypothesize that downgrades should be less informative and hence induce smaller portfolio adjustments for less corrupt countries.

To test this hypothesis, we define a low corruption country as having a ranking of 7.5 or above (out of 10) on Transparency International's corruption perceptions index (CPI). We take a literal reading of the rankings so that a country enters the sample only after the country has been ranked by Transparency International.<sup>14</sup> In principle, the time-series dimension allows each country's score to reflect whether corruption improved or worsened year by year.

---

<sup>13</sup> Asymmetric effects have been documented in studies of interest rate effects in both sovereign debt markets (Gande and Parsley, 2005) and in domestic asset markets (Goh and Ederington, 1993). A reluctance to downgrade has been well documented in the literature on equity analysts. For example, Womack (1996) documents that "... new buy recommendations occur seven times more often than sell recommendations, suggesting that brokers are reluctant to issue sell recommendations".

<sup>14</sup> However, in order to maintain our cross-section of 85 countries, we also considered an alternative ranking that used the first ranking available to 'back-cast' a country's ranking to the beginning of the data set. For example, if a country first appears in 1998, we used its 1998 corruption score for 1996 and 1997. In practice, this had little impact on the results; hence we report only the results with the literal ranking. Our results are also unaffected by redefining high corruption as the top 25% of distribution of rankings.

The regression results are summarized in Table 5. The asymmetric pattern of portfolio response to ratings changes is confirmed. For example, a one-notch downgrade is associated with a contemporaneous outflow of 5.5% (see column 3) of the end of prior month's country allocation (i.e., fund asset positions cumulated across funds invested in a country) from the downgraded country. In Appendix I, we report the results in dollar terms. The results are qualitatively similar, e.g., a one-notch downgrade is associated with a contemporaneous outflow of \$89.3 million from the downgraded country.

The marginal effect of the corruption variable interacted with the  $Event_{i,t}$  variable is positive for downgrades (and statistically insignificant for upgrades), suggesting that an additional beneficial effect of higher transparency (i.e., lower corruption) is that it can dampen the capital flight associated with a negative rating event. In fact, lower corruption fully offsets the effect of a downgrade on capital flows, e.g., a one-notch downgrade of a less corrupt country is associated with a statistically insignificant contemporaneous outflow. This result is not simply re-stating that less corrupt countries have higher credit ratings; the result here suggests that *changes* in ratings have larger effects in more corrupt countries. The other control variables used in the regressions in Appendix I and Table 5 have signs and significance levels comparable to those in Table 3 and Table 4 respectively.

We explore the impact of corruption levels further by examining spillover effects of flows, i.e., flows into and out of other (i.e., non-event) countries surrounding ratings events. In particular, in Table 6 we report regressions (in percentage terms as in Table 5) for the sample of non-event countries. In this case,  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries during a month. For non-event countries, the  $Event$  variable is not statistically significant, regardless of the specification. The variables we are most interested in however are those relating to corruption. In particular, we find that less corrupt countries are recipients of higher levels of capital inflows surrounding downgrades. The marginal effect of the corruption variable interacted with the  $Event_{i,t}$  variable is positive for downgrades in Table 6, suggesting that capital is flowing out of countries being downgraded (based on evidence in Table 5), and into less corrupt non-event countries. For example, a one-notch aggregate downgrade in event countries is associated with an inflow of 0.8% (see column 3) of the end of prior month's country allocation (statistically significant at the 5% level) into a less corrupt non-event country during the same month as that of the aggregate downgrade. As before, we report the results in Appendix J in dollar terms for non-event countries. The explanatory power is

higher, and the results are qualitatively similar to those in Table 6, e.g., a one-notch aggregate downgrade in event countries is associated with an inflow of \$26.6 million inflow into a less corrupt non-event country during the same month as that of the aggregate downgrade.

Overall our results can be summarized as follows: First, we find evidence of informational value in sovereign credit ratings – sovereign credit rating changes are associated with significant flows for the country experiencing a rating change. Second, this effect is asymmetric: Positive rating events have no discernable impact on portfolio flows, whereas negative rating events are associated with portfolio outflows. Third, we find that more transparent (i.e., less corrupt) countries experience less capital flight following downgrades. In fact, lower corruption fully offsets the effect of a downgrade on capital flows, i.e., for less corrupt countries the flow response is statistically insignificant. Finally, we find that more transparent (i.e., less corrupt) non-event countries are net recipients of capital inflows around downgrades, and that these inflows increase with the extent of the bad news abroad.

#### **4.5. Robustness checks**

Next we conduct several robustness checks to the core results in Tables 5 and 6.

##### **4.5.1. Global funds**

It may be argued that our results implicitly assume that every fund in our sample has the ability to shift its investment from one country to another. In fact however, some of the funds are single-country funds. In Tables 7 and 8, we consider this issue by aggregating the flows of only the global funds (i.e., those invested in more than one country) rather than all funds at a country-level. The results are qualitatively similar to those in Tables 5 and 6.

##### **4.5.2. Flow measures**

We check whether our results depend on the particular flow measure we have chosen from those described in Appendix E. Specifically, one may argue that since the exact date (within a month) of deployment of funds flow into the equities of a country is unobservable, an unbiased estimate of the date of deployment of funds flow is the middle of the month, the relevant flow measure may not be  $F6$ . Hence we repeat the regressions in Tables 5 and 6 by replacing the dependent variable flow measure 6 with flow measure 3 (and similarly the lagged dependent variable). The results, presented in Tables 9 and 10, are again qualitatively unchanged. In addition, we repeat the regressions in Tables 5 and 6 with other flow measures (not reported here) and the results remain qualitatively similar.

### **4.5.3. Outliers**

We investigate whether our results are driven by outliers. In Tables 11 and 12 we run the regressions in Tables 5 and 6 after excluding approximately one percent of our sample. Again, the results are qualitatively the same as before, although here the statistical significance and overall fit of the regression model improves. Hence, we conclude that our results are not driven by these types of measurement and data issues.

### **4.5.4. Country clustering effects**

We examine whether our results are robust to clustering effects, for example, based on country of investment. We run the regressions in Tables 5 and 6 after controlling for country clustering effects and find that the results reported in Appendixes K and L are robust.

## **4.6. Alternative explanations**

We next examine whether alternative explanations rationalize our empirical evidence.

### **4.6.1. Rating changes surrounding investment grade category**

It is easy to envision that all rating changes are not equal. One could imagine that it is much worse to go down one-notch from investment grade (BBB and above) to speculative grade (below BBB) than being down one-notch from the top end of the investment grade. Similarly, a one-notch upgrade from speculative grade to investment grade category could be much better than a one-notch upgrade from the bottom end of the speculative grade. In other words, our results in Table 5 may be entirely driven by rating changes surrounding the boundary between investment grade and speculative grade categories. To address this issue, we augment the regression in Table 5 with an indicator variable that measures an upgrade from speculative grade to investment grade category in case of positive rating changes, and an analogously defined indicator variable for negative rating changes that measures a downgrade from investment grade into speculative grade category. The results reported in Appendix M are qualitatively unchanged.

### **4.6.2. Non-linearity of credit rating**

The empirical evidence, for example, in Table 5 is based on an implied linear relationship between flows and the level of credit rating. To test whether our results are robust to non-linearity in the level of credit rating, we follow Reisen and von Maltzan (1998)

and utilize the logistic transformation of the credit rating in place of the level of the credit rating. The results reported in Appendix N are qualitatively similar to those in Table 5.

#### **4.6.3. Other factors**

In addition, since the raw data are reported at the fund-level, we check and find that our results are robust to additional control variables, such as fund size, domicile, or fund investment strategy (international, global, etc.). Finally, we tried other proxies of transparency, such as ICRG measure, and enforcement of insider trading laws and found the results to be qualitatively unchanged.

## **5. Conclusions**

Using monthly data from 85 countries we find that sovereign rating changes are valuable in terms of their information. We find that rating changes are associated with significant changes in contemporaneous portfolios flows. This finding is robust to the different ways of measuring capital flows that we consider in this study. We find that the effects are asymmetric; sovereign downgrades are strongly associated with outflows of capital from the country being downgraded while improvements in a country's sovereign rating are not associated with discernable changes in equity flows. High levels of transparency (i.e., low levels of corruption) however, are associated with a statistically significant reduction in the responsiveness of equity flows to downgrades. Moreover, observed flows are consistent with a flight to quality phenomenon. That is, aggregating rating changes across event countries, we find that more transparent (i.e., less corrupt) non-event countries are net recipients of capital inflows, and that these inflows increase with the severity of the aggregate downgrade abroad. These results do not appear sensitive to country size, legal traditions, market liquidity, or crisis versus non-crisis periods, and are robust to different assumptions regarding the within-month distribution of equity flows, monthly predicted benchmark flows, or persistence of equity flows.

Our analysis has several implications related to the impact and value of sovereign credit rating agencies, as well as (a) how countries are likely to be affected, (b) which subsets are most impacted, and (c) the ultimate influence on the cost of capital to firms. At a broader level, it is clear that the impact itself can be affected by public policy – such as encouraging more competition, regulation, and transparency. In particular, our results suggest that

improving transparency (i.e., reducing corruption) could mitigate some of the widely perceived negative effects of greater financial market integration.

## References

- Alesina, A., and B. Weder, 2002, "Do Corrupt Governments Receive Less Foreign Aid?", *American Economic Review*, 92, 1126-1137.
- Bae, K.H., Karolyi, G.A., Stulz, R.M., 2003. A new approach to measuring financial contagion. *Review of Financial Studies* 16, 717-763.
- Bohn, H., and L. Tesar, 1996, "U.S. equity investment in foreign markets: portfolio rebalancing or return chasing?", *American Economic Review*, 86(5), 77-81.
- Brennan M. J. and H. H. Cao, 1997, "International portfolio investment flows", *Journal of Finance*, December, 52(5), 1851-1880.
- Brown S. J., and J. B. Warner, 1985, "Using daily stock returns: the case of event studies", *Journal of Financial Economics*, 14, 3-31.
- Calvo, Guillermo, and Reinhart, C. 2001, "Reflections on Dollarization", in Alberto Alesina and Robert Barro (eds.), *Currency Unions*, Stanford: Hoover Institute Press, 39-47.
- Cantor, R., and F. Packer, 1996, "Determinants and impact of sovereign credit ratings", *Federal Reserve Bank of New York Economic Policy Review*, 2(2), 37-53.
- Cooper, A. C., T. E. Day, and C. M. Lewis, 2001, "Following the leader: a study of individual analysts' earnings forecasts", *Journal of Financial Economics*, 61, 383-416.
- Forbes, K., and R. Rigobon, 2002, "No contagion, only interdependence: measuring stock market co-movements," *Journal of Finance*, 57(5), 2223-2261.
- Froot, K., P. G. J. O'Connell, and M. Seasholes, 2001, "The portfolio flows of international investors: I", *Journal of Financial Economics*, 59, 151-93.
- Froot, K., and T. Ramadorai, 2003, "The Information Content of International Portfolio flows", unpublished working paper, Harvard University.
- Gande, A., and D. C. Parsley, 2005, "News spillovers in the sovereign debt market", *Journal of Financial Economics*, 75(3), 691-734.
- Gelos, R. G., and S. J. Wei, 2005, "Transparency and international portfolio holdings", *Journal of Finance*, 60(6), 2987-3020.
- Goh J. C., and L. H. Ederington, 1993, "Is a bond rating downgrade bad news, good news, or no news for stockholders?", *Journal of Finance*, 48, 2001-2008.
- Grauer, R., and N. Hakansson, 1987, "Gains from international diversification: 1968-85 returns on portfolios of stocks and bonds", *Journal of Finance*, July, 42, 721-741.
- Griffin, J., F. Nardari, and R. M. Stulz, 2004, "Are Daily Cross - Border Equity Flows Pushed or Pulled?", *Review of Economics and Statistics*, 86(3), 642-657.
- Hand J, R. Holthausen, and R. Leftwich, 1992, "The effect of bond rating agency announcements on bond and stock prices", *Journal of Finance*, 47(2), pp 733-752.
- Henry, P. B., 2000, "Do stock market liberalizations cause investment booms?", *Journal of Financial Economics*, 58, 301-334.
- International Monetary Fund (IMF), 2001, *IMF Survey Supplement*, 30, 7-8, Washington, D.C.
- Johnson Simon, P. Boone, A. Breach, E. Friedman (2000), "Corporate Governance in the Asian Financial Crisis", *Journal of Financial Economics*, 58(1-2), 141-186.



- Kaminsky, G. L., and S. L., Schmukler, 2002, "Emerging market instability: do sovereign ratings affect country risk and stock returns?" *World Bank Economic Review*, 16, 171-195.
- Kang, J. K., and R. M., Stulz, 1997, "Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan" *Journal of Financial Economics*, 46(1), 3-28.
- Kodres, L. E. and M. Pritsker, 2002, "A Rational Expectations Model of Financial Contagion", *Journal of Finance* 57, 769-799.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1997, "Legal determinants of external finance", *Journal of Finance*, 52(3), 1131-1150.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998, "Law and finance", *Journal of Political Economy*, 106(6), 1113-1155.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1999, "The quality of government", *Journal of Political Economy*, 15(1), 222-279.
- La Porta, R., F. Lopez-de-Silanes, and A. Shleifer, 2002, "Government ownership of banks", *Journal of Finance*, 57(1), 265-302.
- Li, K., R. Morck, F. Yang, and B. Yeung, 2004, "Firm-specific variation and openness in emerging markets", *Review of Economics and Statistics*, 86(3), 658-669.
- Mauro, P., 1995, "Corruption and Growth", *Quarterly Journal of Economics*, 110(3), 681-712.
- Mauro, P., 2004, "The Persistence of Corruption and Slow Economic Growth, *IMF Staff Papers*, 51(1) 1-18.
- Pavlova, A., and R. Rigobon, 2006, "Asset Prices and Exchange Rates", *Review of Financial Studies*, Forthcoming.
- Pavlova, A., and R. Rigobon, 2005, "Flight to quality, contagion, and portfolio constraints", unpublished working paper, MIT Sloan School of Management.
- Pistor, K., M. Raiser, and S. Gelfer, 2000, "Law and finance in transition economies", *Economics of Transition* 8, 325-368.
- Rajan, R. and L. Zingales, 2003, "The great reversals: the politics of financial development in the twentieth century", *Journal of Financial Economics*, 69, 5-50.
- Radelet, S., J. Sachs, R. Cooper, and B. Bosworth, 1998, "The east asian financial crisis: diagnosis, remedies, prospects", *Brookings Papers on Economic Activity*, 28(1), 1-90.
- Reisen, H., and J. von Maltzan, 1998, "Sovereign Credit Ratings, Emerging market Risk and Financial Market Volatility", HWWA-discussion paper #55.
- Rigobon, R. 2002, "The curse of non-investment grade countries," *Journal of Development Economics*, 69(2), 423-449.
- Shleifer, A. and R. Vishny, 1993, "Corruption", *Quarterly Journal of Economics*, 108(3), 599-617.
- Tanzi, V., 1998, "Corruption around the world: causes, consequences, and cures", *International Monetary Fund Staff Papers*, 45(4), 559-594.
- Tesar, L., and I. Werner, 1995, "Home bias and high turnover", *Journal of International Money and Finance*, 14, 467-492.
- Treisman, D., 2000, "The causes of corruption: a cross-national study", *Journal of Public Economics*, 76, 399-457.

- Wei, S., 2000, "Local corruption and global capital flows", *Brookings Papers on Economic Activity*, 30(2), 303-354.
- Womack, K. L., 1996, "Do analysts' recommendations have investment value?", *Journal of Finance*, 51(1), 137-167.

**Table 1: Number of funds per country and aggregate country allocation, December 2002**

The following table lists the number of active funds (i.e., with a positive asset position) in each country (reported by eMergingPortfolio.com), and the aggregate country allocation (i.e., sum across all active funds) as of December 2002, the end of our sample period.

<i>Country</i>	<i>Active Funds</i>	<i>Allocation (\$m)</i>	<i>Country</i>	<i>Active Funds</i>	<i>Allocation (\$m)</i>
1 Argentina	104	148.11	44 Malawi	6	0.12
2 Australia	140	3,060.22	45 Malaysia	284	1,997.75
3 Austria	45	172.72	46 Mauritius	4	2.05
4 Bahrain	1	1.11	47 Mexico	255	7,087.56
5 Bangladesh	2	1.25	48 Morocco	13	20.58
6 Belgium	42	606.02	49 Namibia	0	0.00
7 Bolivia	0	0.00	50 Netherlands	96	4,578.26
8 Botswana	3	2.42	51 New Zealand	69	235.78
9 Brazil	255	5,530.88	52 Nigeria	10	11.86
10 Bulgaria	2	0.20	53 Norway	50	643.92
11 Canada	83	2,611.30	54 Oman	7	7.29
12 Chile	148	986.05	55 Pakistan	8	6.80
13 China	361	4,006.46	56 Panama	7	0.66
14 Colombia	14	19.97	57 Papua New Guinea	0	0.00
15 Cote d'Ivoire	0	0.00	58 Peru	99	158.23
16 Croatia	79	227.75	59 Philippines	128	457.57
17 Cyprus	1	0.29	60 Poland	163	1,245.80
18 Czech Republic	149	534.52	61 Portugal	45	134.59
19 Denmark	63	731.43	62 Romania	8	39.10
20 Ecuador	4	6.66	63 Russia	210	3,595.92
21 Egypt	39	131.86	64 Saudi Arabia	1	1.56
22 Estonia	47	114.12	65 Singapore	290	2,160.73
23 Finland	97	1,842.04	66 Slovakia	5	1.28
24 France	105	5,359.96	67 Slovenia	7	8.96
25 Germany	97	3,167.03	68 South Africa	147	3,179.94
26 Ghana	5	30.05	69 Spain	92	2,178.63
27 Greece	37	121.91	70 Sri Lanka	21	43.51
28 Hong Kong	365	6,596.51	71 Sweden	77	1,565.67
29 Hungary	179	1,410.68	72 Switzerland	101	4,320.48
30 India	296	5,421.07	73 Taiwan	362	5,464.45
31 Indonesia	202	1,156.66	74 Tajikistan	0	0.00
32 Ireland	49	436.92	75 Thailand	291	1,896.07
33 Israel	154	586.50	76 Tunisia	3	0.80
34 Italy	91	1,517.97	77 Turkey	149	885.18
35 Jamaica	0	0.00	78 Ukraine	8	1.64
36 Japan	146	11,761.16	79 United Kingdom	106	13,447.53
37 Jordan	3	10.15	80 United States	69	8,794.93
38 Kazakhstan	1	1.45	81 Uruguay	0	0.00
39 Kenya	2	0.71	82 Venezuela	72	52.09
40 Korea, South	415	15,233.12	83 Vietnam	11	10.84
41 Latvia	0	0.00	84 Zambia	0	0.00
42 Lebanon	4	1.37	85 Zimbabwe	4	5.30
43 Lithuania	7	2.76			
			Total	724*	137,794.82

\* many funds invest in more than one country – this number represents funds that are active in at least one country.

**Table 2: Number and type of rating changes, by country**

The following table lists the number of sovereign credit rating changes by Standard & Poors' (S&P) during 1996-2002 by country, and by type: upgrades (pos.), downgrades (neg.), and the total for each of the 85 countries for which we have country specific fund investment position data. See Appendix B for a more complete description of positive and negative rating events.

	Country	Pos.	Neg.	Total		Country	Pos.	Neg.	Total
1	Argentina	2	9	11	44	Malawi	0	0	0
2	Australia	1	0	1	45	Malaysia	5	6	11
3	Austria	0	0	0	46	Mauritius	0	0	0
4	Bahrain	0	0	0	47	Mexico	4	1	5
5	Bangladesh	0	0	0	48	Morocco	0	1	1
6	Belgium	0	0	0	49	Namibia	0	0	0
7	Bolivia	0	2	2	50	Netherlands	0	0	0
8	Botswana	0	0	0	51	New Zealand	2	1	3
9	Brazil	2	4	6	52	Nigeria	0	0	0
10	Bulgaria	2	0	2	53	Norway	0	0	0
11	Canada	2	0	2	54	Oman	2	1	3
12	Chile	1	0	1	55	Pakistan	3	6	9
13	China	0	1	1	56	Panama	1	2	3
14	Colombia	0	4	4	57	Papua New Guinea	1	4	5
15	Cote d'Ivoire	0	0	0	58	Peru	2	3	5
16	Croatia	1	1	2	59	Philippines	3	4	7
17	Cyprus	0	2	2	60	Poland	4	1	5
18	Czech Republic	0	1	1	61	Portugal	1	0	1
19	Denmark	1	0	1	62	Romania	4	3	7
20	Ecuador	2	1	3	63	Russia	6	5	11
21	Egypt	0	1	1	64	Saudi Arabia	0	0	0
22	Estonia	1	0	1	65	Singapore	0	0	0
23	Finland	2	0	2	66	Slovakia	5	2	7
24	France	0	0	0	67	Slovenia	1	0	1
25	Germany	0	0	0	68	South Africa	2	1	3
26	Ghana	0	0	0	69	Spain	1	1	2
27	Greece	4	0	4	70	Sri Lanka	0	0	0
28	Hong Kong	2	2	4	71	Sweden	2	0	2
29	Hungary	5	0	5	72	Switzerland	0	0	0
30	India	2	4	6	73	Taiwan	0	2	2
31	Indonesia	4	12	16	74	Tajikistan	0	0	0
32	Ireland	2	0	2	75	Thailand	2	4	6
33	Israel	1	2	3	76	Tunisia	1	0	1
34	Italy	1	0	1	77	Turkey	6	9	15
35	Jamaica	1	1	2	78	Ukraine	0	1	1
36	Japan	0	4	4	79	United Kingdom	0	0	0
37	Jordan	2	2	4	80	United States	0	0	0
38	Kazakhstan	4	1	5	81	Uruguay	1	5	6
39	Kenya	0	0	0	82	Venezuela	2	6	8
40	Korea, South	5	4	9	83	Vietnam	0	0	0
41	Latvia	1	0	1	84	Zambia	0	0	0
42	Lebanon	2	5	7	85	Zimbabwe	0	0	0
43	Lithuania	1	0	1					
						Total	115	132	247

---

**Table 3: Asymmetric effects of rating changes**

This table presents the coefficient estimates from the following equation:

$$F6_{i,t} = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$ , which assumes the monthly flows are distributed in equal daily amounts throughout the month. For each country with a rating event, we include in the regressions flows in event months and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as a positive change in the comprehensive credit rating from the prior month. A downgrade, or negative rating event, is defined as a decline in the comprehensive credit rating from the prior month. Regressions include variables for the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, liquidity, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

---

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	64.062	1.158	-20.469	-0.139	70.933	1.031	253.597	1.374
Event	9.348	0.489	-2.292	-0.105	-113.917	-4.930 <sup>a</sup>	-115.385	-4.109 <sup>a</sup>
Comprehensive credit rating (lagged)	0.034	0.007	2.154	0.235	-1.359	-0.186	-1.795	-0.261
Emerging			17.147	0.261			-158.427	-1.272
Common law			-38.953	-0.589			-23.868	-0.370
Rule of law			9.082	0.531			5.459	0.318
GDP			0.201	0.980			0.033	0.554
Liquidity			89.208	1.593			46.112	0.993
Crisis			38.812	0.608			-114.874	-0.998
Year Dummies	no		yes		no		yes	
Adjusted R <sup>2</sup>	-0.007		0.023		0.059		0.119	
Observations	250		250		267		267	

---

**Table 4: Asymmetric effects of rating changes (percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts throughout the month. For each country with a rating event, we include in the regressions flows in event months and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as a positive change in the comprehensive credit rating from the prior month. A downgrade, or negative rating event, is defined as a decline in the comprehensive credit rating from the prior month. Regressions include variables for the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, liquidity, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a and c indicate statistical significance at the 1% and 10% levels using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.058	1.955 <sup>c</sup>	0.028	0.529	0.037	1.364	0.022	0.327
Event	0.014	1.165	0.005	0.410	-0.073	-5.031 <sup>a</sup>	-0.069	-3.649 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.003	-1.339	-0.005	-1.861 <sup>c</sup>	-0.001	-0.473	-0.002	-0.826
Emerging			0.022	0.919			0.016	0.403
Common law			0.031	1.519			0.023	1.014
Rule of law			0.015	1.737 <sup>c</sup>			0.012	1.369
GDP			0.000	-0.259			0.000	1.165
Liquidity			0.003	0.344			0.001	0.162
Crisis			0.025	0.813			-0.048	-1.165
Year Dummies	no		yes		no		yes	
Adjusted R <sup>2</sup>	0.015		0.034		0.157		0.183	
Observations	250		250		267		267	

**Table 5: Asymmetric effects of rating changes and transparency (percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.037	0.704	0.036	0.688	-0.003	-0.040	-0.008	-0.116
Event	0.008	0.582	0.008	0.586	-0.055	-3.170 <sup>a</sup>	-0.055	-3.173 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.004	-1.343	-0.004	-1.344	-0.002	-0.898	-0.002	-0.916
Lagged Flow (percent)	0.088	0.723	0.088	0.725	0.080	1.240	0.080	1.243
Emerging	0.016	0.663	0.018	0.748	0.027	0.872	0.032	0.834
Common law	0.024	1.034	0.023	1.089	0.021	0.922	0.020	0.925
Rule of law	0.010	1.078	0.010	1.058	0.013	1.528	0.013	1.528
GDP	-0.000	-0.320	-0.000	-0.341	0.000	1.327	0.000	1.385
Transparency	-0.007	-0.238			-0.010	-0.382		
Transparency x Event	0.012	0.204	0.008	0.140	0.122	3.023 <sup>a</sup>	0.119	3.180 <sup>a</sup>
Liquidity	-0.006	-0.641	-0.006	-0.627	-0.006	-0.701	-0.006	-0.698
Crisis	0.025	0.784	0.025	0.782	-0.039	-1.038	-0.039	-1.035
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.020		0.024		0.187		0.191	
Observations	240		240		253		253	

**Table 6: Non-event country effects and transparency (percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{j,t} / CA_{j,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) at time  $t$ . Here, we report flow measure  $F6$ , deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $\neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.002	-0.097	0.005	0.187	0.030	1.226	0.028	1.136
Event	-0.000	-0.051	-0.001	-0.414	-0.001	-0.590	-0.001	-0.467
Comprehensive credit rating (lagged)	-0.003	-2.497 <sup>b</sup>	-0.003	-2.394 <sup>b</sup>	-0.003	-2.283 <sup>b</sup>	-0.003	-2.309 <sup>b</sup>
Lagged Flow (percent)	-0.004	-0.058	-0.005	-0.062	0.067	1.589	0.068	1.604
Emerging	0.023	2.111 <sup>b</sup>	0.014	1.203	-0.006	-0.449	-0.003	-0.218
Common law	0.012	1.642	0.017	2.183 <sup>b</sup>	-0.004	-0.479	-0.006	-0.745
Rule of law	0.008	2.073 <sup>b</sup>	0.009	2.295 <sup>b</sup>	0.009	2.185 <sup>b</sup>	0.008	2.122 <sup>b</sup>
GDP	-0.000	-0.828	-0.000	-0.753	-0.000	-0.366	-0.000	-0.354
Transparency	0.037	2.107 <sup>b</sup>			-0.015	-0.985		
Transparency x Event	-0.006	-1.632	0.000	0.000	0.008	2.208 <sup>b</sup>	0.006	1.915 <sup>c</sup>
Liquidity	0.001	0.341	0.001	0.188	0.002	0.461	0.002	0.499
Crisis	0.033	3.525 <sup>a</sup>	0.033	3.500 <sup>a</sup>	-0.002	-0.155	-0.002	-0.187
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.034		0.031		0.030		0.030	
Observations	1352		1352		1356		1356	



**Table 7: Asymmetric effects of rating changes and transparency (global funds, percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all global funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.030	0.555	0.029	0.532	-0.017	-0.269	-0.025	-0.353
Event	0.009	0.648	0.009	0.655	-0.051	-2.868 <sup>a</sup>	-0.051	-2.872 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.004	-1.253	-0.004	-1.255	-0.002	-0.668	-0.002	-0.689
Lagged Flow (percent)	0.106	0.933	0.106	0.938	0.078	1.212	0.078	1.215
Emerging	0.017	0.627	0.019	0.759	0.032	1.007	0.039	0.986
Common law	0.025	1.052	0.023	1.067	0.022	0.913	0.021	0.910
Rule of law	0.010	1.118	0.010	1.085	0.014	1.554	0.014	1.554
GDP	-0.000	-0.283	-0.000	-0.316	0.000	1.352	0.000	1.443
Transparency	-0.012	-0.360			-0.013	-0.503		
Transparency x Event	0.013	0.205	0.006	0.100	0.126	3.107 <sup>a</sup>	0.122	3.234 <sup>a</sup>
Liquidity	-0.006	-0.602	-0.006	-0.573	-0.006	-0.628	-0.006	-0.623
Crisis	0.029	0.871	0.029	0.869	-0.041	-1.076	-0.041	-1.071
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.014		0.018		0.170		0.174	
Observations	240		240		253		253	

**Table 8: Non-event country effects and transparency (global funds, percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{j,t} / CA_{j,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) at time  $t$ . Here, we report flow measure  $F6$ , deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all global funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $\neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	Positive rating events				Negative rating events			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.008	-0.325	-0.001	-0.036	0.023	0.916	0.020	0.815
Event	0.000	0.154	-0.000	-0.199	-0.001	-0.637	-0.001	-0.504
Comprehensive credit rating (lagged)	-0.003	-2.215 <sup>b</sup>	-0.003	-2.111 <sup>b</sup>	-0.003	-1.902 <sup>c</sup>	-0.003	-1.930 <sup>c</sup>
Lagged Flow (percent)	0.013	0.177	0.012	0.171	0.067	1.609	0.068	1.626
Emerging	0.024	2.212 <sup>b</sup>	0.016	1.315	-0.002	-0.163	0.001	0.103
Common law	0.013	1.688 <sup>c</sup>	0.018	2.207 <sup>b</sup>	-0.005	-0.514	-0.007	-0.798
Rule of law	0.007	1.944 <sup>c</sup>	0.008	2.159 <sup>b</sup>	0.008	2.042 <sup>b</sup>	0.008	1.972 <sup>b</sup>
GDP	-0.000	-1.031	-0.000	-0.974	-0.000	-0.471	-0.000	-0.456
Transparency	0.036	2.022 <sup>b</sup>			-0.016	-1.051		
Transparency x Event	-0.007	-1.717 <sup>c</sup>	-0.001	-0.182	0.009	2.306 <sup>b</sup>	0.006	1.971 <sup>b</sup>
Liquidity	0.003	0.974	0.003	0.833	0.003	0.686	0.003	0.727
Crisis	0.036	3.895 <sup>a</sup>	0.036	3.873 <sup>a</sup>	-0.001	-0.129	-0.002	-0.163
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.034		0.032		0.026		0.026	
Observations	1352		1352		1356		1356	

**Table 9: Asymmetric effects of rating changes (flow measure 3, percent)**

This table presents the coefficient estimates from the following equation:

$$(F3_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F3$ , deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed as a lump sum amount at the middle of a month. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F3$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.037	0.703	0.036	0.688	-0.003	-0.040	-0.008	-0.117
Event	0.008	0.582	0.008	0.586	-0.055	-3.167 <sup>a</sup>	-0.055	-3.170 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.004	-1.344	-0.004	-1.346	-0.002	-0.902	-0.002	-0.920
Lagged Flow (percent)	0.087	0.721	0.088	0.723	0.080	1.236	0.080	1.238
Emerging	0.017	0.665	0.018	0.750	0.027	0.875	0.033	0.836
Common law	0.024	1.035	0.023	1.089	0.021	0.924	0.020	0.926
Rule of law	0.010	1.081	0.010	1.061	0.013	1.532	0.013	1.532
GDP	-0.000	-0.321	-0.000	-0.342	0.000	1.328	0.000	1.387
Transparency	-0.008	-0.240			-0.010	-0.384		
Transparency x Event	0.013	0.207	0.009	0.143	0.122	3.032 <sup>a</sup>	0.120	3.189 <sup>a</sup>
Liquidity	-0.006	-0.639	-0.006	-0.625	-0.006	-0.700	-0.006	-0.697
Crisis	0.025	0.783	0.025	0.782	-0.039	-1.039	-0.039	-1.036
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.020		0.024		0.187		0.191	
Observations	240		240		253		253	

**Table 10: Non-event country effects and transparency (flow measure 3, percent)**

This table presents the coefficient estimates from the following equation:

$$(F3_{j,t} / CA_{j,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) at time  $t$ . Here, we report flow measure  $F3$ , deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed as a lump sum amount at the middle of a month. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $i \neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F3$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.002	-0.091	0.005	0.192	0.030	1.227	0.028	1.137
Event	-0.000	-0.056	-0.001	-0.419	-0.001	-0.594	-0.001	-0.471
Comprehensive credit rating (lagged)	-0.003	-2.499 <sup>b</sup>	-0.003	-2.396 <sup>b</sup>	-0.003	-2.284 <sup>b</sup>	-0.003	-2.310 <sup>b</sup>
Lagged Flow (percent)	-0.004	-0.058	-0.005	-0.062	0.067	1.590	0.068	1.605
Emerging	0.023	2.111 <sup>b</sup>	0.014	1.202	-0.006	-0.448	-0.003	-0.216
Common law	0.012	1.644	0.017	2.184 <sup>b</sup>	-0.004	-0.477	-0.006	-0.743
Rule of law	0.008	2.070 <sup>b</sup>	0.009	2.292 <sup>b</sup>	0.009	2.185 <sup>b</sup>	0.008	2.122 <sup>b</sup>
GDP	-0.000	-0.830	-0.000	-0.756	-0.000	-0.366	-0.000	-0.354
Transparency	0.037	2.104 <sup>b</sup>			-0.015	-0.987		
Transparency x Event	-0.006	-1.629	0.000	0.002	0.008	2.210 <sup>b</sup>	0.006	1.915 <sup>c</sup>
Liquidity	0.001	0.339	0.001	0.187	0.002	0.460	0.002	0.499
Crisis	0.033	3.525 <sup>a</sup>	0.033	3.500 <sup>a</sup>	-0.002	-0.159	-0.002	-0.191
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.034		0.031		0.030		0.030	
Observations	1352		1352		1356		1356	

**Table 11: Asymmetric effects of rating changes (excluding outliers, percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. Event is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. This table repeats the analysis in Table 5 excluding outliers – identified as those observations from the regressions in Table 5 associated with absolute studentized residuals greater than 2.5 (i.e., lower than -2.5 or higher than 2.5). The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	Positive rating events				Negative rating events			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.046	0.952	0.045	0.935	-0.009	-0.145	-0.008	-0.122
Event	-0.000	-0.059	-0.000	-0.047	-0.049	-3.010 <sup>a</sup>	-0.049	-3.012 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.002	-0.640	-0.002	-0.641	-0.001	-0.471	-0.001	-0.471
Lagged Flow (percent)	0.161	2.674 <sup>a</sup>	0.161	2.681 <sup>a</sup>	0.122	2.063 <sup>b</sup>	0.122	2.063 <sup>b</sup>
Emerging	0.005	0.190	0.007	0.291	0.021	0.696	0.020	0.534
Common law	0.030	1.601	0.028	1.670 <sup>c</sup>	0.009	0.439	0.009	0.455
Rule of law	0.004	0.597	0.004	0.551	0.012	1.469	0.012	1.470
GDP	-0.000	-0.855	-0.000	-0.902	0.000	1.814 <sup>c</sup>	0.000	1.751 <sup>c</sup>
Transparency	-0.010	-0.339			0.002	0.063		
Transparency x Event	0.003	0.060	-0.002	-0.035	0.108	2.803 <sup>a</sup>	0.109	3.102 <sup>a</sup>
Liquidity	-0.000	-0.038	-0.000	-0.002	-0.007	-0.915	-0.007	-0.920
Crisis	0.010	0.468	0.009	0.466	-0.032	-0.924	-0.032	-0.925
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.086		0.090		0.226		0.230	
Observations	232		232		245		245	

**Table 12: Non-event country effects and transparency (excluding outliers, percent)**

This table presents the coefficient estimates from the following equation:

$$(F6_{j,t} / CA_{j,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) in month  $t$  with rating changes in event countries. Here, we report flow measure  $F6$ , deflated by the lagged country allocation ( $CA$ ), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $\neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. This table repeats the analysis in Table 6 excluding outliers – identified as those observations from the regressions in Table 6 associated with absolute studentized residuals greater than 2.5 (i.e., lower than -2.5 or higher than 2.5). The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	Positive rating events				Negative rating events			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.007	-0.393	-0.004	-0.230	0.000	0.017	-0.001	-0.069
Event	-0.000	-0.171	-0.001	-0.527	0.001	0.345	0.001	0.689
Comprehensive credit rating (lagged)	-0.003	-3.016 <sup>a</sup>	-0.003	-2.952 <sup>a</sup>	-0.001	-1.074	-0.001	-1.207
Lagged Flow (percent)	0.069	2.195 <sup>b</sup>	0.070	2.227 <sup>b</sup>	0.107	3.783 <sup>a</sup>	0.109	3.838 <sup>a</sup>
Emerging	0.020	2.102 <sup>b</sup>	0.015	1.699 <sup>c</sup>	0.009	0.805	0.011	1.065
Common law	0.009	1.388	0.013	2.052 <sup>b</sup>	0.003	0.417	0.001	0.120
Rule of law	0.008	2.522 <sup>b</sup>	0.008	2.693 <sup>a</sup>	0.006	1.811 <sup>c</sup>	0.006	1.765 <sup>c</sup>
GDP	-0.000	-0.964	-0.000	-0.915	-0.000	-0.503	-0.000	-0.509
Transparency	0.020	1.772 <sup>c</sup>			-0.012	-0.869		
Transparency x Event	-0.002	-0.702	0.001	0.568	0.007	1.899 <sup>c</sup>	0.005	1.766 <sup>c</sup>
Liquidity	0.005	1.833 <sup>c</sup>	0.005	1.738 <sup>c</sup>	-0.001	-0.183	0.000	0.052
Crisis	0.038	4.761 <sup>a</sup>	0.039	4.851 <sup>a</sup>	-0.007	-0.811	-0.006	-0.669
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.075		0.075		0.064		0.062	
Observations	1320		1320		1317		1317	

---

### Appendix A: Leader-follower ratio (LFR)

This appendix describes the Cooper, Day, and Lewis (2001), hereafter CDL, test for whether a particular rating agency (or equity analyst in their case) leads or lags other rating agencies in making rating change announcements. In their study of earnings forecasts by individual analysts in U.S. equity markets, CDL develop a methodology to rank analysts based on whether they lead or follow other analysts in announcing forecast revisions. We adapt their procedure to the case of sovereign rating changes, and compare the three principal sovereign credit rating agencies (S&P, Moody's, and Fitch). The procedure identifies leaders by comparing the rating activity of other agencies (e.g., Moody's, and Fitch) in the period before and after a rating change by a particular agency (say, S&P). Following CDL, we define  $t_{jik}^0$  ( $t_{jik}^1$ ) as the number of days by which forecast  $i$  of other rating agencies (Moody's and Fitch) precedes (follows) forecast  $k$  of a selected rating agency (e.g., S&P). In our context we focus on the forecast of each of the other rating agencies immediately preceding or lagging forecast  $k$  of a selected rating agency (i.e.,  $N=1$  below). Aggregating over all rating announcements ( $k$ ) of a selected rating agency, the time to the immediately preceding forecast across all other rating agencies, and across all countries ( $j$ ), defines the cumulative lead-time for the selected rating agency,  $T_0$ :

$$T_0 = \sum_{j=1}^J \sum_{i=1}^N \sum_{k=1}^K t_{jik}^0 .$$

The cumulative lag-time,  $T_1$ , for the given firm is defined similarly using  $t_{ik}^1$ . That is,

$$T_1 = \sum_{j=1}^J \sum_{i=1}^N \sum_{k=1}^K t_{jik}^1 .$$

Next, we form the leader-follower ratio (LFR) for a particular rating agency, as the ratio of aggregate lead time  $T_0$ , to aggregate lag time, i.e.,  $LFR = T_0/T_1$ . This test statistic is distributed as  $F_{(2JNK, 2JNK)}$ , and since a lead rating agency systematically releases ratings changes before other agencies, the ratio will be greater than one. See CDL (2001) for additional details. We summarize the test for each of the three agencies (S&P, Moody's, and Fitch) for four different samples. In column (a) we use only the 85 countries in Table 1 during the sample period 1996-2002, in column (b) we consider historical ratings data for the same 85 sample countries from 1941-2003, in column (c) we include ratings of all countries (i.e., not limited to the 85 countries in Table 1) during the sample period, and finally, in column (d) we use the historical ratings data for all countries from 1941-2003. P-values are given in parenthesis below the empirical LFR test statistic. The superscript b implies statistical significance at the 5% level.

<i>Rating Agency:</i>	<i>LFR Test Statistic and (p-value)</i>			
	(a)	(b)	(c)	(d)
Standard & Poor's	1.276 (0.025) <sup>b</sup>	1.295 (0.015) <sup>b</sup>	1.277 (0.025) <sup>b</sup>	1.294 (0.015) <sup>b</sup>
Moody's	1.095 (0.232)	1.128 (0.158)	1.101 (0.219)	1.132 (0.147)
Fitch	0.954 (0.641)	1.012 (0.462)	0.977 (0.570)	1.033 (0.396)

---

---

## Appendix B: Comprehensive credit rating

This appendix describes the construction of the comprehensive credit rating (CCR) measure. The reported credit rating is assigned a numerical code from 0 thru 21 as indicated to obtain the explicit credit rating (ECR). Next, we add the reported information on the credit outlook (OL), coded from -1 to +1, to obtain the comprehensive credit rating (CCR), i.e.,  $CCR = ECR + OL$ . For example, if a country is rated BB+ with stable credit outlook, its ECR and CCR are 11. If S&P revises the outlook to credit watch-negative. (from stable), the ECR is still 11. However, its CCR is 10.50.

---

### Explicit Credit Rating

<i>Sovereign Rating</i>	<i>ECR</i>
AAA	21
AA+	20
AA	19
AA-	18
A+	17
A	16
A-	15
BBB+	14
BBB	13
BBB-	12
BB+	11
BB	10
BB-	9
B+	8
B	7
B-	6
CCC+	5
CCC	4
CCC-	3
CC	2
C	1
SD, D	0

### Credit Outlook

	<i>Add to ECR</i>
Positive	1
Credit Watch-Developing	0.5
Stable	0
Credit Watch-Negative	-0.5
Negative	-1

---



---

### Appendix C: Monthly event study results

This table presents the average cumulative abnormal return (CAR) of the effect of a sovereign credit rating change on portfolio flows. We compute the average abnormal returns (AR), i.e.,  $\bar{\delta}_i$  in equation (3) based on the market-model adjusted method. That is, the monthly return based on a market-model regression using the World Market Index, is subtracted from the local country's monthly index return as explained in Section 4.2.1. The returns are computed based on indices measured in U.S. dollars. The t-statistics of ARs and CARs are computed using the methodology of Brown and Warner (1985) that considers both the time-series and cross-sectional dependence in returns, where a, b, and c stand for significance at the 1%, 5%, and 10% levels using a two-tailed test.

---

<i>Positive rating changes</i>				<i>Negative rating changes</i>			
Month	N	AR	T-stat	Month	N	AR	T-stat
-5	104	2.34%	1.538	-5	114	-3.64%	-3.130 <sup>a</sup>
-4	104	2.00%	1.316	-4	114	-1.57%	-1.354
-3	104	2.38%	1.567	-3	114	-3.08%	-2.649 <sup>a</sup>
-2	104	1.66%	1.096	-2	114	-3.56%	-3.063 <sup>a</sup>
-1	104	3.57%	2.352 <sup>b</sup>	-1	114	-6.35%	-5.458 <sup>a</sup>
0	104	3.95%	2.599 <sup>a</sup>	0	114	-5.15%	-4.426 <sup>a</sup>
1	104	-0.22%	-0.142	1	114	0.13%	0.112
2	104	2.31%	1.521	2	114	1.96%	1.686 <sup>c</sup>
3	104	1.18%	0.778	3	114	-1.19%	-1.025
4	104	0.10%	0.066	4	114	-1.16%	-1.000
5	104	1.41%	0.931	5	114	1.36%	1.166
Months	N	ACAR	T-stat	Months	N	ACAR	T-stat
(-5,+5)	104	20.68%	4.107 <sup>a</sup>	(-5,+5)	114	-22.26%	-5.771 <sup>a</sup>
(-2,+2)	104	11.28%	3.321 <sup>a</sup>	(-2,+2)	114	-12.97%	-4.986 <sup>a</sup>
(-1,+1)	104	7.30%	2.777 <sup>a</sup>	(-1,+1)	114	-11.37%	-5.642 <sup>a</sup>
(-1, 0)	104	7.52%	3.501 <sup>a</sup>	(-1, 0)	114	-11.50%	-6.989 <sup>a</sup>
(0,+1)	104	3.73%	1.737 <sup>c</sup>	(0,+1)	114	-5.02%	-3.051 <sup>a</sup>

---

---

### Appendix D: Daily event study results

This table presents the average cumulative abnormal return (CAR) of the effect of a sovereign credit rating change on portfolio flows. We compute the average abnormal returns (AR), i.e.,  $\bar{\delta}_t$  in equation (3) based on the market-model adjusted method. That is, the monthly return based on a market-model regression using the World Market Index, is subtracted from the local country's monthly index return as explained in Section 4.2.1. The returns are computed based on indices measured in U.S. dollars. The t-statistics of ARs and CARs are computed using the methodology of Brown and Warner (1985) that considers both the time-series and cross-sectional dependence in returns, where a, b, and c stand for significance at the 1%, 5%, and 10% levels using a two-tailed test.

---

<i>Positive rating changes</i>				<i>Negative rating changes</i>			
Day	N	AR	T-stat	Day	N	AR	T-stat
-10	107	-0.10%	-0.479	-10	109	-0.24%	-0.808
-9	107	0.39%	1.913 <sup>c</sup>	-9	109	0.05%	0.170
-8	107	-0.02%	-0.087	-8	109	-0.40%	-1.323
-7	107	-0.02%	-0.089	-7	109	-0.60%	-1.995 <sup>b</sup>
-6	107	0.11%	0.511	-6	109	-0.19%	-0.649
-5	107	-0.09%	-0.452	-5	109	-0.45%	-1.504
-4	107	0.41%	1.982 <sup>b</sup>	-4	109	-0.17%	-0.580
-3	107	0.09%	0.452	-3	109	-0.92%	-3.080 <sup>a</sup>
-2	107	0.02%	0.120	-2	109	-0.94%	-3.130 <sup>a</sup>
-1	107	0.33%	1.604	-1	109	-0.79%	-2.632 <sup>a</sup>
0	107	0.88%	4.272 <sup>a</sup>	0	109	-1.07%	-3.574 <sup>a</sup>
1	107	0.11%	0.550	1	109	-0.27%	-0.886
2	107	-0.34%	-1.653 <sup>c</sup>	2	109	0.33%	1.098
3	107	-0.11%	-0.538	3	109	0.96%	3.220 <sup>a</sup>
4	107	-0.18%	-0.894	4	109	0.13%	0.435
5	107	0.04%	0.194	5	109	0.12%	0.409
6	107	-0.25%	-1.192	6	109	-0.18%	-0.585
7	107	-0.02%	-0.094	7	109	0.36%	1.210
8	107	0.11%	0.518	8	109	-0.30%	-1.001
9	107	0.09%	0.460	9	109	0.10%	0.337
10	107	0.64%	3.120 <sup>a</sup>	10	109	0.20%	0.679

Days	N	CAR	T-stat	Days	N	CAR	T-stat
(-10,+10)	107	2.10%	2.230 <sup>b</sup>	(-10,+10)	109	-4.25%	-3.097 <sup>a</sup>
(-5,+5)	107	1.16%	1.700 <sup>c</sup>	(-5,+5)	109	-3.06%	-3.083 <sup>a</sup>
(-2,+2)	107	1.01%	2.188 <sup>b</sup>	(-2,+2)	109	-2.73%	-4.081 <sup>a</sup>
(-1,+1)	107	1.32%	3.710 <sup>a</sup>	(-1,+1)	109	-2.12%	-4.095 <sup>a</sup>
(-1, 0)	107	1.21%	4.155 <sup>a</sup>	(-1, 0)	109	-1.86%	-4.388 <sup>a</sup>
(0,+1)	107	0.99%	3.409 <sup>a</sup>	(0,+1)	109	-1.34%	-3.154 <sup>a</sup>

---

---

## Appendix E: Measures of international portfolio flows

This appendix describes the construction of several different measures of monthly equity flows discussed in the text. The measures described here reflect different assumptions concerning the timing of the flows within the month – since our raw data reflect monthly (end of month) fund investment position data ( $A_t$ ), and not the intra-month timing of flows ( $FN_t$ ). Empirically, we estimate fund flows based on differences in the fund investment position from the prior month, and on the estimated expected return on a market index ( $E(m_t)$ ). We estimate  $E(m_t)$  by an event study approach, where the expected return on a market index ( $E(m_t)$ ) is obtained by regressing the country's index returns on the returns on a world index using during a 60 month estimation period, i.e., from [-65,-6] where month 0 represents an event month. We consider several different flow measures for robustness. Explicit flow measures based on  $m_t$  can easily be derived by simply substituting  $E(m_t)$  with  $m_t$  in the expressions below.

*Unadjusted flow measure:* The unadjusted flow measure ( $F0_t$ ) is simply the difference in the fund investment position data, aggregated across all funds investing in a particular country. We define the unadjusted flow measure as:

$$F0_t = A_t - A_{t-1}$$

*Flow measure 1:* This measure assumes that a fund flow is invested as a single lump sum amount at the end of the month. We define flow measure 1 as follows:

$$F1_t = A_t - A_{t-1} * [1 + E(m_t)]$$

*Flow measure 2:* This measure assumes that the fund flow is invested as a lump sum amount at the beginning of a month. We define flow measure 2 as:

$$F2_t = \frac{A_t - A_{t-1} * [1 + E(m_t)]}{[1 + E(m_t)]}$$

*Flow measure 3:* This measure assumes that the fund flow is invested as a lump sum amount at the middle of a month. We define flow measure 3 as:

$$F3_t = \frac{A_t - A_{t-1} * [1 + E(m_t)]}{[1 + E(m_t)]^{1/2}}$$

*Flow measure 4-6:* Flow measures 4-6 assume that flows are distributed throughout the month at regularly spaced intervals. Measure 4 assumes that the fund flow is invested as two equal amounts, one half at the middle of a month, and the other half at the end of a month. Flow measure 5 assumes that a fund flow is invested in four equal amounts, one quarter each at the end of first, second, third and fourth weeks. Finally, flow measure 6 assumes that the flow amount is invested in equal amounts daily. For simplification, we assume there are 20 trading days in a month. In general, it can be shown that flow measures 4 thru 6 can be characterized by:

$$FN_t = \frac{\{A_t - A_{t-1} * [1 + E(m_t)]\} \{[1 + E(m_t)]^{1/n} - 1\}}{\{E(m_t) / n\}}$$

Substituting  $n=2$  in the above expression yields flow measure 4. Similarly, substituting  $n=4$  in the above expression yields flow measure 5, and finally substituting  $n=20$  in the above expression yields flow measure 6.

---

---

## Appendix F: Sources and description of independent variables

---

This appendix describes the construction of the variables in our econometric tests of effects of rating changes and a brief description of the data sources.

---

*Emerging*: An indicator variable that takes a value of one if a country is an emerging market and zero otherwise. The primary source for this variable is the Standard & Poors' (S&P) Global Stock Markets 2003 Factbook. Three countries (Papua New Guinea, Tajikistan, and Vietnam) were not listed as either developed or emerging markets in the S&P Global Stock Markets 2003 Factbook. We classified these as emerging markets based on the International Finance Corporation (IFC)'s 2003 Annual Report and the Euromoney's Internet Securities Inc (ISI) Emerging Markets website (<http://www.securities.com>).

*Comprehensive credit rating*: A variable that takes a value from 0 to 21 as described in Appendix B, where a higher value indicates a stronger (e.g., investment grade) credit rating.

*Event*: Absolute change (from the previous month) in the comprehensive credit rating of a country.

*Flow*: The estimated flow of funds into a country, measured in millions of U.S. dollars as described in the text and in Appendix E.

*Common Law*: An indicator variable that takes a value of one (and zero otherwise) if the legal origin of a country is identified as having an English common law system as tabulated in Appendix B of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999).

*Rule of Law*: A variable that takes a value from 0 to 6, where higher values indicate a higher tradition for law and order. The primary source for this variable is the rule of law variable from the La Porta, Lopez-de-Silanes, and Shleifer (2002) dataset ([http://www.som.yale.edu/Faculty/fl69/datasets/gbk\\_allvar.xls](http://www.som.yale.edu/Faculty/fl69/datasets/gbk_allvar.xls)). For the ten countries in our sample with missing values, namely Croatia, Czech Republic, Estonia, Kazakhstan, Latvia, Lithuania, Russia, Slovenia, and Tajikistan, we obtained the rule of law variable from Pistor, Raiser and Gelfer (2000), and scaled it to be between 0 and 6. For example, the rule of law measure of 7 for Croatia from Pistor, Raiser and Gelfer (2000) which is based on a scale from 0 to 10, was converted to 4.20 to be based on a scale from 0 to 6.

*Crisis*: An indicator variable that takes a value of one (and zero otherwise) if a sample observation is from a crisis period, such as the Asian (7:01:97- 3:31:98), Russian (8:01:98 - 12:31:98), Brazilian (1:01:99 - 3:31:99), Turkish (11:15:00 – 2:28:01), and the Argentinean (12:03:01 - 2:03:02) crises.

*Transparency*: An indicator variable that takes a value of one (and zero otherwise) if a country has a low level of corruption, namely a score greater than 7.5 (on a scale of 0-10) in the Corruption Perceptions Index produced by Transparency International (<http://www.corruption.org>). Note that since we use data from each annual publication of the Index, the set of low corruption countries may change each year.

*Liquidity*: Following Henry (2000), we calculate our liquidity as the value of shares traded divided by the stock market capitalization. The source for this variable is the Standard & Poors' (S&P) Global Stock Markets 2003 Factbook which provides annual data for constructing this variable. Those countries not listed in the S&P Global Stock Markets 2003 Factbook (Papua New Guinea, Tajikistan, and Vietnam) were assigned missing values.

*GDP*: The source for this variable, measured annually in current U.S. dollars is the World Economic Outlook Database (<http://www.imf.org/external/pubs/ft/wco/2003/02/data/index.htm>).

---

---

### Appendix G: Asymmetric effects of rating changes (alternative definition of non-events)

This table presents the coefficient estimates from the following equation:

$$F6_{i,t} = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$ , which assumes the monthly flows were distributed in equal daily amounts throughout the month. For each country with a rating event, we include in the regressions flows in event months and flows in non-event months where there was no change in the comprehensive credit rating (event) of the same country. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as a positive change in the comprehensive credit rating from the prior month. A downgrade, or negative rating event, is defined as a decline in the comprehensive credit rating from the prior month. Regressions include variables for the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, liquidity, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c, imply statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

---

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	32.474	2.305 <sup>b</sup>	-25.982	-0.683	43.561	2.175 <sup>b</sup>	-83.905	-1.350
Event	33.167	1.565	31.121	1.528	-87.428	-4.334 <sup>a</sup>	-79.245	-3.899 <sup>a</sup>
Comprehensive credit rating (lagged)	-2.843	-2.535 <sup>b</sup>	0.512	0.239	-3.848	-1.900 <sup>c</sup>	0.793	0.366
Emerging			57.737	2.289 <sup>b</sup>			122.481	2.328 <sup>b</sup>
Common law			-26.651	-1.529			-4.864	-0.279
Rule of law			-3.071	-0.636			-2.487	-0.514
GDP			0.070	1.283			0.052	1.790 <sup>c</sup>
Liquidity			14.645	0.857			2.649	0.194
Crisis			41.959	2.487 <sup>b</sup>			33.538	1.743 <sup>c</sup>
Year Dummies	no		yes		no		yes	
Adjusted R <sup>2</sup>	0.002		0.031		0.007		0.038	
Observations	2468		2468		2327		2327	

---

---

## Appendix H: Asymmetric effects of rating changes (explicit flow measure 6, percent)

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report the flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts throughout the month. For each country with a rating event, we include in the regressions flows in event months and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. The realized return for a country index is used in constructing the explicit flow measure. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as a positive change in the comprehensive credit rating from the prior month. A downgrade, or negative rating event, is defined as a decline in the comprehensive credit rating from the prior month. Regressions include variables for the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, liquidity, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts b and c indicate statistical significance at the 5% and 10% levels using robust standard errors in a two-tailed test.

---

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.014	-0.856	-0.083	-2.388 <sup>b</sup>	-0.015	-0.994	-0.019	-0.482
Event	0.007	1.158	0.008	1.386	-0.021	-2.337 <sup>b</sup>	-0.021	-1.746 <sup>c</sup>
Comprehensive credit rating (lagged)	0.001	1.214	0.001	0.568	0.002	1.809 <sup>c</sup>	0.002	1.179
Emerging			0.024	1.948 <sup>c</sup>			0.011	0.535
Common law			0.012	1.205			-0.003	-0.223
Rule of law			0.007	1.294			-0.002	-0.377
GDP			0.000	0.532			0.000	1.121
Liquidity			-0.004	-0.792			0.004	1.021
Crisis			-0.007	-0.511			-0.003	-0.139
Year Dummies	no		yes		no		yes	
Adjusted R <sup>2</sup>	0.002		0.000		0.005		0.023	
Observations	252		252		270		270	

---

## Appendix I: Asymmetric effects of rating changes and transparency

This table presents the coefficient estimates from the following equation:

$$F6_{i,t} = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$ , which assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$ , the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c, indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-29.666	-0.199	-23.731	-0.158	320.876	1.902 <sup>c</sup>	258.603	1.437
Event	-4.896	-0.221	-5.279	-0.239	-89.298	-3.269 <sup>a</sup>	-89.138	-3.282 <sup>a</sup>
Comprehensive credit rating (lagged)	1.603	0.176	1.627	0.179	-1.027	-0.150	-1.430	-0.211
Lagged Flow ( $F6_{t-1}$ )	-0.085	-0.534	-0.084	-0.531	0.262	3.382 <sup>a</sup>	0.260	3.366 <sup>a</sup>
Emerging	37.816	0.549	24.783	0.360	-264.946	-2.283 <sup>b</sup>	-200.633	-1.610
Common law	-46.444	-0.615	-35.701	-0.535	-23.997	-0.381	-29.026	-0.470
Rule of law	6.135	0.338	7.780	0.435	7.941	0.462	7.871	0.458
GDP	0.224	1.095	0.232	1.133	-0.001	-0.011	0.014	0.280
Transparency	58.572	0.574			-112.905	-1.018		
Transparency x Event	-27.307	-0.107	3.799	0.015	244.276	2.033 <sup>b</sup>	210.220	1.776 <sup>c</sup>
Liquidity	106.006	1.851 <sup>c</sup>	104.091	1.816 <sup>c</sup>	54.697	1.085	55.318	1.100
Crisis	40.369	0.616	40.704	0.622	-103.963	-0.991	-102.845	-0.978
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.018		0.022		0.202		0.203	
Observations	240		240		253		253	

## Appendix J: Non-event country effects and transparency

This table presents the coefficient estimates from the following equation:

$$F6_{j,t} = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) in month  $t$  with rating changes in event countries. Here, we report flow measure  $F6$ , which assumes that the monthly flows are distributed in equal daily amounts. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $\neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F6$ , the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c, indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-27.669	-0.611	-10.076	-0.226	42.370	0.701	36.481	0.634
Event	3.618	0.655	1.708	0.313	5.368	1.105	6.053	1.257
Comprehensive credit rating (lagged)	-1.831	-0.725	-1.452	-0.575	-0.666	-0.218	-0.742	-0.241
Lagged Flow ( $F6_{t-1}$ )	0.042	0.664	0.041	0.656	0.116	2.002 <sup>b</sup>	0.116	1.992 <sup>b</sup>
Emerging	67.662	2.165 <sup>b</sup>	45.319	1.532	33.379	0.740	40.928	1.052
Common law	-32.991	-1.336	-20.773	-0.878	-51.838	-1.898 <sup>c</sup>	-56.424	-2.389 <sup>b</sup>
Rule of law	2.339	0.380	4.017	0.666	-6.272	-0.832	-6.975	-0.959
GDP	-0.011	-0.783	-0.010	-0.746	-0.008	-0.526	-0.008	-0.521
Transparency	92.006	2.144 <sup>b</sup>			-34.935	-0.658		
Transparency x Event	-10.852	-0.817	4.952	0.431	26.639	2.090 <sup>b</sup>	20.238	1.745 <sup>c</sup>
Liquidity	-9.309	-0.434	-10.444	-0.489	7.123	0.358	7.529	0.378
Crisis	95.113	4.236 <sup>a</sup>	94.829	4.216 <sup>a</sup>	6.883	0.265	6.095	0.235
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.037		0.034		0.055		0.056	
Observations	1352		1352		1356		1356	



## Appendix K: Asymmetric effects of rating changes and transparency (percent)

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation ( $CA$ ), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test that additionally account for clustering based on country of investment.

	Positive rating events				Negative rating events			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.037	0.777	0.036	0.761	-0.003	-0.048	-0.008	-0.143
Event	0.008	0.556	0.008	0.562	-0.055	-3.407 <sup>a</sup>	-0.055	-3.422 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.004	-1.835 <sup>c</sup>	-0.004	-1.847 <sup>c</sup>	-0.002	-0.821	-0.002	-0.846
Lagged Flow (percent)	0.088	0.586	0.088	0.588	0.080	0.912	0.080	0.916
Emerging	0.016	0.831	0.018	0.956	0.027	1.016	0.032	1.094
Common law	0.024	1.363	0.023	1.493	0.021	1.172	0.020	1.168
Rule of law	0.010	1.053	0.010	1.045	0.013	1.405	0.013	1.405
GDP	0.000	-0.279	0.000	-0.296	0.000	1.333	0.000	1.525
Transparency	-0.007	-0.395			-0.010	-0.375		
Transparency x Event	0.012	0.215	0.008	0.140	0.122	3.752 <sup>a</sup>	0.119	3.693 <sup>a</sup>
Liquidity	-0.006	-0.441	-0.006	-0.432	-0.006	-0.779	-0.006	-0.775
Crisis	0.025	0.791	0.025	0.791	-0.039	-1.339	-0.039	-1.337
Year Dummies	yes		yes		yes		yes	
Clustering (country)	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.020		0.024		0.187		0.191	
Observations	240		240		253		253	

## Appendix L: Non-event country effects and transparency (percent)

This table presents the coefficient estimates from the following equation:

$$(F6_{j,t} / CA_{j,t-1}) = \alpha + \beta_1 Event_t + \sum_k \beta_k X_k + \varepsilon_{j,t}, \forall j.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $j$  (a non-event country) at time  $t$ . Here, we report flow measure  $F6$ , deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each rating event, we include in the regressions flows in the event months, and flows in non-event months. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month.  $Event$  is defined as the absolute aggregate change (from the previous month) in the comprehensive credit rating across all event countries  $i$  ( $\neq j$ ). A positive rating event is defined as one if the aggregate ratings change is positive (and zero otherwise), and a negative rating event is defined as one if the aggregate ratings change is negative (and zero otherwise). Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscripts a, b, and c indicate statistical significance at the 1%, 5%, and 10% levels using robust standard errors in a two-tailed test that additionally account for clustering based on country of investment.

	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	-0.002	-0.086	0.005	0.161	0.030	1.278	0.028	1.156
Event	0.000	-0.050	-0.001	-0.400	-0.001	-0.701	-0.001	-0.549
Comprehensive credit rating (lagged)	-0.003	-2.653 <sup>b</sup>	-0.003	-2.495 <sup>b</sup>	-0.003	-2.146 <sup>b</sup>	-0.003	-2.184 <sup>b</sup>
Lagged Flow (percent)	-0.004	-0.058	-0.005	-0.062	0.067	1.329	0.068	1.344
Emerging	0.023	2.348 <sup>b</sup>	0.014	1.190	-0.006	-0.479	-0.003	-0.221
Common law	0.012	1.806 <sup>c</sup>	0.017	2.368 <sup>b</sup>	-0.004	-0.383	-0.006	-0.605
Rule of law	0.008	2.316 <sup>b</sup>	0.009	2.424 <sup>b</sup>	0.009	1.928 <sup>c</sup>	0.008	1.883 <sup>c</sup>
GDP	0.000	-0.579	0.000	-0.557	0.000	-0.322	0.000	-0.297
Transparency	0.037	2.385 <sup>b</sup>			-0.015	-1.025		
Transparency x Event	-0.006	-1.698 <sup>c</sup>	0.000	0.000	0.008	3.163 <sup>a</sup>	0.006	2.058 <sup>b</sup>
Liquidity	0.001	0.297	0.001	0.163	0.002	0.517	0.002	0.575
Crisis	0.033	3.455 <sup>a</sup>	0.033	3.444 <sup>a</sup>	-0.002	-0.172	-0.002	-0.207
Year Dummies	yes		yes		yes		yes	
Clustering (country)	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.034		0.031		0.030		0.030	
Observations	1352		1352		1356		1356	

## Appendix M: Asymmetric effects of rating changes and transparency (percent)

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation ( $CA$ ), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), the lagged comprehensive credit rating, an indicator variable for upgrade to or down grade from investment grade status, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript a indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

	Positive rating events				Negative rating events			
	(1)		(2)		(3)		(4)	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.022	0.383	0.021	0.366	0.001	0.022	-0.003	-0.045
Event	0.011	0.744	0.011	0.749	-0.057	-2.998 <sup>a</sup>	-0.057	-3.006 <sup>a</sup>
Comprehensive credit rating (lagged)	-0.004	-1.191	-0.004	-1.197	-0.002	-0.936	-0.002	-0.954
Up-dn from invgrade	-0.059	-1.850 <sup>c</sup>	-0.058	-1.839 <sup>c</sup>	0.027	0.488	0.027	0.493
Lagged Flow (percent)	0.094	0.735	0.094	0.739	0.079	1.167	0.079	1.171
Emerging	0.021	0.790	0.023	0.905	0.026	0.817	0.031	0.772
Common law	0.027	1.112	0.024	1.145	0.021	0.881	0.020	0.888
Rule of law	0.010	1.112	0.010	1.084	0.013	1.456	0.013	1.458
GDP	0.000	-0.266	0.000	-0.298	0.000	1.306	0.000	1.351
Transparency	-0.011	-0.348			-0.009	-0.318		
Transparency x Event	0.010	0.153	0.004	0.059	0.125	2.987 <sup>a</sup>	0.122	3.174 <sup>a</sup>
Liquidity	-0.007	-0.655	-0.006	-0.632	-0.006	-0.627	-0.006	-0.626
Crisis	0.033	0.970	0.033	0.967	-0.038	-0.983	-0.038	-0.982
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.023		0.027		0.185		0.188	
Observations	240		240		253		253	

---

### Appendix N: Asymmetric effects of rating changes and transparency (percent)

This table presents the coefficient estimates from the following equation:

$$(F6_{i,t} / CA_{i,t-1}) = \alpha + \beta_1 Event_{i,t} + \sum_k \beta_k X_k + \varepsilon_{i,t}, \forall i.$$

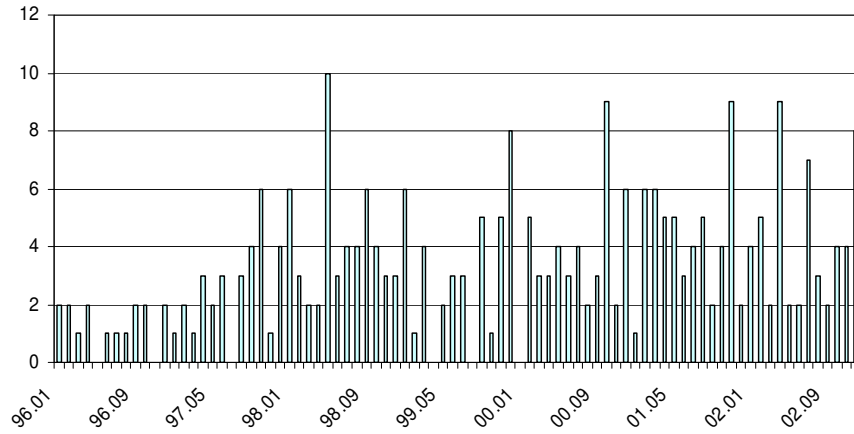
The dependent variable is the change in mutual fund asset allocation levels in country  $i$  (the event country) at time  $t$ . Here, we report flow measure  $F6$  deflated by the lagged country allocation (CA), i.e., fund asset position cumulated across all funds investing in a country. This measure assumes that the monthly flows are distributed in equal daily amounts. For each country with a rating event, we include in the regressions flows in event months, and flows in non-event months where there was no change in the comprehensive credit rating (event) for any of the countries in our sample. Transparency is an indicator that takes the value 1 if the country's corruption perceptions index (CPI) is greater than 7.5 out of 10. The expected return for a country index (used in constructing the flow measure) is based on a single-factor market model regression of the index returns of a country on the returns on a world index during an estimation period of 60 months, i.e., from [-65,-6] where month 0 represents an event month. *Event* is defined as the absolute change (from the previous month) in the comprehensive credit rating in country  $i$ . A positive rating event is defined as an increase in the comprehensive credit rating, and a negative rating event occurs whenever the comprehensive credit rating declines from the prior month. Regressions include variables for lagged flow measure  $F6$  (percent), logistic transformation of the lagged comprehensive credit rating, country status as emerging/developed, origin of legal system (i.e., common law versus other forms), rule of law, GDP, transparency, liquidity, an interactive variable formed from the Transparency and Event variables, and an indicator variable corresponding to crisis periods. See Appendices E and F for a complete description of variable construction. The superscript  $a$  indicates statistical significance at the 1% level using robust standard errors in a two-tailed test.

---

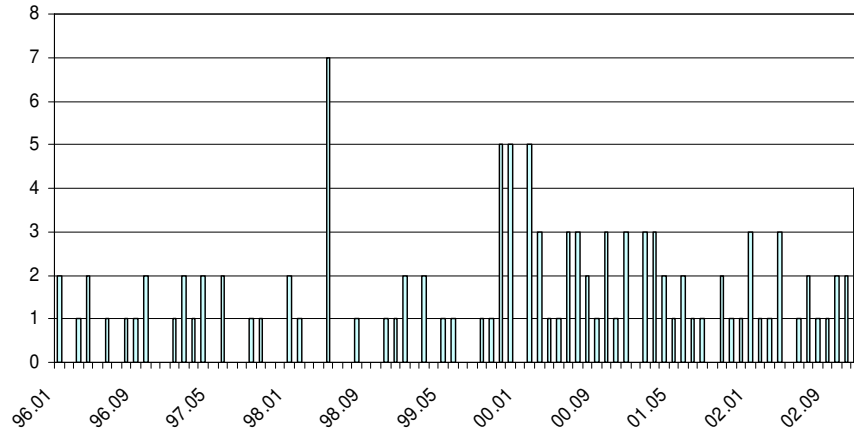
	<u>Positive rating events</u>				<u>Negative rating events</u>			
	<u>(1)</u>		<u>(2)</u>		<u>(3)</u>		<u>(4)</u>	
	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Constant	0.000	0.009	0.001	0.013	-0.014	-0.211	-0.019	-0.281
Event	0.012	0.916	0.012	0.918	-0.056	-3.095 <sup>a</sup>	-0.055	-3.104 <sup>a</sup>
Comprehensive credit rating (lagged-logistic)	-0.027	-1.895 <sup>c</sup>	-0.027	-1.912 <sup>c</sup>	-0.011	-1.004	-0.011	-1.021
Lagged Flow (percent)	0.092	0.783	0.092	0.785	0.093	1.430	0.094	1.436
Emerging	0.006	0.247	0.006	0.235	0.021	0.653	0.026	0.657
Common law	0.025	1.041	0.026	1.165	0.016	0.698	0.016	0.697
Rule of law	0.010	1.080	0.010	1.089	0.011	1.304	0.011	1.306
GDP	0.000	-0.121	0.000	-0.115	0.000	1.316	0.000	1.375
Transparency	0.002	0.068			-0.010	-0.384		
Transparency x Event	0.011	0.170	0.012	0.190	0.123	2.958 <sup>a</sup>	0.120	3.118 <sup>a</sup>
Liquidity	-0.006	-0.607	-0.006	-0.624	-0.006	-0.642	-0.006	-0.640
Crisis	0.024	0.718	0.024	0.720	-0.041	-1.043	-0.041	-1.042
Year Dummies	yes		yes		yes		yes	
Adjusted R <sup>2</sup>	0.020		0.024		0.190		0.193	
Observations	245		245		261		261	

---

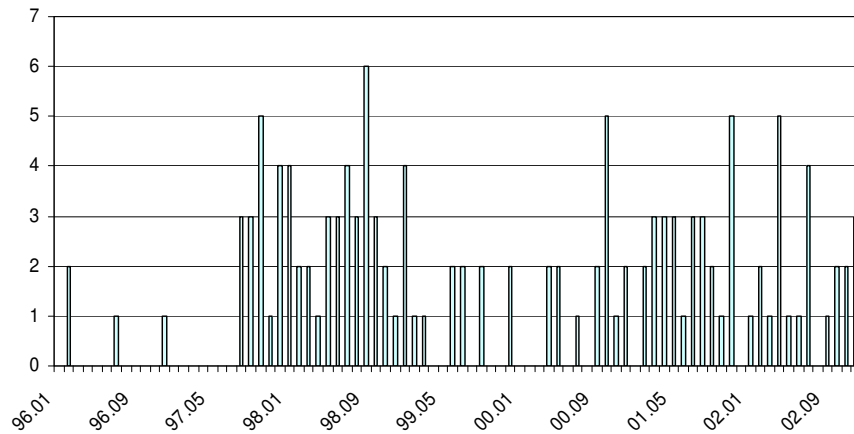
**Figure 1: Sovereign Ratings Activity**  
(Number of ratings changes across all countries, by period)



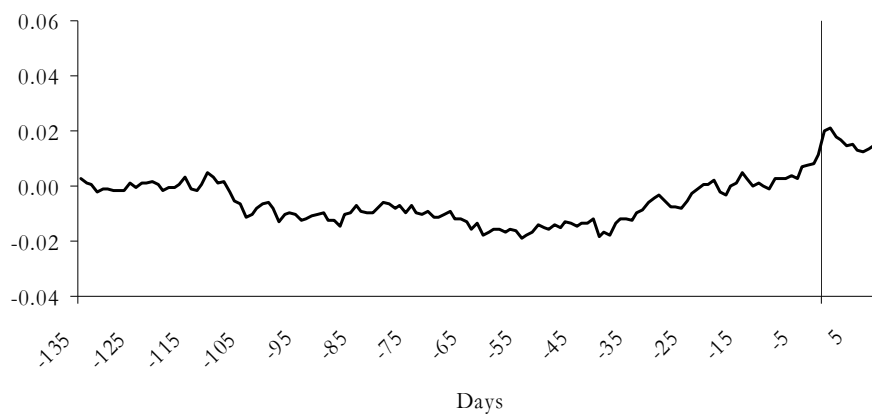
**Figure 2: Positive Sovereign Ratings Activity**  
(Number of ratings changes across all countries, by period)



**Figure 3: Negative Sovereign Ratings Activity**  
(Number of ratings changes across all countries, by period)



**Figure 4: Cumulative average abnormal returns of country index due to a positive ratings change**



**Figure 5: Cumulative average abnormal returns of country index due to a negative ratings change**

