Rating Changes and Portfolio Flows: Evidence from Active and Passive Funds

Christina E. Bannier* Thomas Heyden† Peter Tillmann‡

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Abstract

We study the impact of sovereign rating and outlook revisions on the course of daily portfolio flows to emerging market economies. More specifically, our main question is whether the impact differs when the flows originate from either actively or passively managed mutual funds located in advanced economies. We answer this question by conducting a modified event study, which accounts for potential cross-border spillover effects. The results show that actively and passively managed fund flows indeed react differently when sovereign ratings and outlooks are revised. Furthermore, the results suggest that the reactions vary strongly depending on the respective region receiving the flows.

JEL Classification: E44, F32, G15

Keywords: Emerging markets, event study, portfolio flows, passive funds, sovereign ratings

*Department of Banking & Finance, University of Giessen, Licher Str. 62, 35394 Giessen, Germany. E-mail: Christina.Bannier@wirtschaft.uni-giessen.de.

†*Corresponding author:* Department of Banking & Finance, University of Giessen, Licher Str. 62, 35394 Giessen, Germany. E-mail: Thomas.Heyden@wirtschaft.uni-giessen.de.

‡Department of Monetary Economics, University of Giessen, Licher Str. 66, 35394 Giessen, Germany. E-mail: Peter.Tillmann@wirtschaft.uni-giessen.de.

1 Introduction

In the course of the recent global financial crisis, the world's largest economies' central banks started lowering interest rates until they were either close to or virtually zero. As a result of the key interest rates being at the so-called zero lower bound, central banks began to employ unconventional measures of monetary policy in order to boost economic growth. These measures involve large scale asset purchase programs, which are commonly referred to as quantitative easing (QE). Although there is mixed evidence concerning the cause, it has been extensively documented that these QE measures were accompanied by strong and volatile private capital flows from advanced economies (AEs) to emerging market economies (EMEs) (see, e.g., Fratzscher, 2012; Lo Duca, 2012; Bluedorn et al., 2013; Chen et al., 2016; Fratzscher et al., 2016; Tillmann, 2016, Anaya et al., 2017). A convenient way to distinguish between external and country-specific drivers is the push-pull framework introduced by Calvo et al. (1993). Milesi-Ferretti and Tille (2011) and Ahmed and Zlate (2014) argue that among other factors a country's fundamental setup is a crucial pull factor for the allocation process of portfolio flows to EMEs. While the portfolio managers responsible for the allocation process are subject to profound informational asymmetries (see Brennan and Cao, 1997), they require some form of proxy for economic fundamentals.

In addition to that, the relevance of passively managed investment funds, i.e. exchange traded funds (ETFs), and thus passively managed portfolio flows to EMEs has grown remarkably over the past decade. In a recent report, Moody's (2017) even goes as far as predicting the "passive market share to overtake active in the U.S. no later than 2024". According to the same report, outflows of actively managed equity funds are growing even faster than inflows to passively managed equity funds. This leads to the question, whether portfolio flows that originate from passively managed funds follow the same signals as active flows do. We propose that sovereign ratings serve as a possible economic fundamentals proxy for portfolio managers, which implies that the revision of a rating should lead to an immediate reaction of active portfolio flows to EMEs equities and bonds. As ETFs typically follow a certain benchmark, namely a bond or an equity index, and the benchmark only responds to rating changes in a few specific situations, we propose that sovereign ratings might not play an overly important role for passive portfolio flows to EMEs equities and bonds.

We address these questions by applying a modified event study approach. While the traditional event study, which has been introduced by Fama et al. (1969), typically tests for market efficiency, we take advantage of the statistical characteristics of this approach and adapt it to daily portfolio flow data. This allows us to draw general inference on the infor-

mational content of sovereign ratings and outlooks for the portfolio allocation process. Our results imply that rating and outlook revisions indeed play a role for portfolio flows to EMEs. However, the reactions are subject to strong regional differences. Both active and passive flows to EMEs bonds seem affected yet in a different size. Revisions only seem to matter for active equity investors with exposure to African equities; for passive equity investors only downgrades appear to play a role.

The remainder of this paper is structured as follows. Section two provides a thorough overview over the related literature. The dataset and some distinctive features of sovereign ratings and outlooks are introduced in section three. Section four describes the model and, perhaps more importantly, why we proceed the way we do. The main results are presented and discussed in section five. Section six summarizes and concludes.

2 Review of the related literature

2.1 Emerging markets portfolio flow characteristics

One of the first studies to assess the determinants of equity and bond flows into EMEs has been conducted by Chuhan et al. (1998). They estimate a panel with monthly data of portfolio flows into equity and debt of 18 EMEs. They include global and country-specific factors and come to the result that both types are important. In summary, U.S. interest rates seem to matter more for Latin American countries, whereas country-specific factors are three to four times more important than global factors for flows into the Asian sample countries. Moreover, equity flows seem to be more sensitive to the global factors and bond flows tend to be more affected by credit ratings.

In the past decade, the debate on the determinants of capital flows into EMEs sparked again when the financial crisis hit the financial markets leading to a "sudden stop" of capital flows. Milesi-Ferretti and Tille (2011) and Forbes and Warnock (2012) document the course of capital flows during and after the crisis and provide insightful empirical evidence concerning their drivers. Whereas Milesi-Ferretti and Tille (2011) point to several influential factors, such as international financial exposure or external financing dependence of the respective recipient country, Forbes and Warnock (2012) highlight the importance of a disaggregated inspection of capital flows to EMEs. In particular, they suggest that investors need to be differentiated by residence, i.e. whether they are domestic or foreign investors. When the Fed started employing their first QE program, especially portfolio flows to EME equities and bonds regained considerable momentum. Fratzscher (2012) addresses the questions whether

push or pull factors are more important for the course of portfolio flows before, during, and after the recent global financial crises. The study uses a dataset containing weekly flows into EME equities and bonds at the fund level. His results show that, although global factors seem to have an influence, domestic factors play a more important role for portfolio flows. In particular, country-specific economic fundamentals and the quality of its institutions and policies have shown to be the dominant factors. This implies that countries with strong institutions and good fundamentals manage to shield their financial markets better against external shocks than weaker EMEs. Moreover, he points out that EMEs tend to be significantly heterogeneous with regard to the country-specific determinants.

Other more recent studies that analyze the post-crisis behavior of monthly equity and bond flows into EMEs are Pyun (2016) and Chari et al. (2017). While Pyun (2016) conducts a multivariate regression approach to distinguish the difference between equity and debt dirvers, Chari et al. (2017) argue that during the times of QE, market expectations became increasingly important and so they try to measure the impact of Federal Open Market Committee (FOMC) meetings on capital flows. In addition to that, they also include various push and pull factors that have been shown to be influential by previous studies. They split their sample period into a pre-crisis period, a QE period, and a tapering period and report that during the pre-crisis and the QE periods, the signs of bond and equity flows have been different for the surprise coefficients, which measure the effect of the FOMC meeting announcements. However, in the tapering period they assume the same sign although the reaction of bond flows seems to be much larger. The time varying character of determinants has also been documented by Lo Duca (2012), Sarno et al. (2016), and Avdjiev et al. (2017). Whereas Avdjiev et al. (2017) provide evidence for the change of the capital flows composition from bank to portfolio flows, Lo Duca (2012) uses daily equity portfolio flows and models endogenously changing continuous regression parameters. Most interestingly, he argues that push factors actually play an important role and that they tend to be underestimated by models with constant parameters. As might have been expected, the variation of all parameters is strongest around times of shocks, may they be to external push or country-specific pull factors. Considering these characteristics and the time varying character, he suggests for EME policy makers to introduce temporary capital controls if need be. Sarno et al. (2016) agree with this suggestion. They propose that EMEs, which are more financially globalized and thus have a large degree of exposure to global risk factors, are rather subject to experience highly volatile portfolio in- and outflows.

2.2 Active vs. passive investments and the benchmark effect

The above studies analyze the determinants of capital flows in a general manner and differentiate them, if at all, by asset class. However, there is another strand in the literature differentiating flows by investor type, namely active or passive. The difference between active and passive investments lies within the choice and management of fund allocation. Typically, an investment fund assumes some sort of benchmark, say, an equity index. The portfolio manager then decides on how to weight the constituents of the benchmark in his portfolio in order to create an outperformance; he actively chooses to deviate from the benchmark. On the contrary, passively managed funds like ETFs and index funds aim to track the benchmark as accurately as possible. While the active management of a fund is a rather complex procedure that typically requires a whole staff of managers who demand compensation, active fund management is expensive. On the other hand, passive investing can be done by computer algorithms that track the benchmark in real time and aim to replicate it. Not surprisingly, fees for this type of fund are substantially below those of active funds (see, e.g., Malkiel, 2013).

While the dataset we employ for our further analysis allows disaggregation between active and passive flows, Ahmed et al. (2015) employ aggregated quarterly equity flow data into 19 EMEs and point out that it is crucial to differentiate between active and passive reallocations. Thereby, the difference is the following: if new money flows into a mutual fund which is invested in EME assets then fund managers have two choices. They can either allocate the money the same way the existing funds are allocated, or they can actively choose a completely new allocation. The authors label the effect arising from the first alternative as "income effect". They argue that a substantial amount of money flowing into EMEs is related to savings and hence procyclical. They disentangle their data by developing a weighting scheme that consists of the flows, the portfolio weights, and the equity prices. This allows them to approximate the size of the "income effect" and the active "switching effect". The results of their actual analysis on the influence of external and country-specific factors on equity portfolio flows show that uncertainty in AEs (as measured by the VIX) seems to be more important for passive flows. Furthermore, the active reallocations into EMEs appear to be driven by the QE measure. In summary, they argue that the strong surge of portfolio flows into EMEs after the financial crisis was rather due to a growth effect than active reallocations. Moreover, they highlight the importance of differentiation between active and passive flows for EME policy makers.

Others to recognize the importance of the difference between active and passive invest-

ments are Raddatz et al. (2017). The authors also observe that the number of passively managed funds has heavily increased in the recent past. They suggest that the role of benchmarks, such as equity or bond indices, is thus increasingly important for funds' international asset allocation. Among other questions, they assess the consequences of changes in benchmark weights on equity and bond portfolio flows. Furthermore, they examine the behavior of security prices on changes of a country's status, i.e. whether it is among the group of EMEs or frontier market economies (FMEs). Consistent with Ahmed et al. (2015), they report that passively managed flows are rather pro-cyclical and that there is evidence for a significant influence of the composition of an index on flows. Moreover, they provide evidence that there are significant cross-country spillover effects between countries that are constituent of the same benchmark. According to them, a country's relevance in a benchmark might increase due to non-fundamental factors. An interesting example is given by means of Israel. When MSCI moved Israel from the EM Index to the World Index, capital actually left Israel, which might be counterintuitive at first thought. After all, the World Index contains only AEs which would speak in favor of Israeli assets being less risky. However, while Israel was among the largest constituents in the EM Index, it shifted into a new group of constituents where it was relatively small. This led for all passive investments, with either of the two indices as a benchmark, to reallocate their funds accordingly. As a result, outflows were larger than inflows.

Further research on the "benchmark effect" has been conducted by Arslanalp and Tsuda (2015). The authors complement Raddatz et al. (2017) in the sense that they try to quantify the role benchmark-driven investors play in EME bond markets, i.e. they assess if there is an influence on flows when a country is included in an index. They also conduct an event study and come to the result that the benchmark membership indeed exerts a significant influence. For example, when J.P. Morgan announced that it would include five more Columbian bonds in March 2014, Columbia's weighting in the EME bond index increased, which led for passive investors to invest more money in Columbian bonds. If the net position of a particular fund is to stay unchanged, then money has to be retraced from other constituent countries. This cross-country heterogeneity is also reported by Arslanalp and Tsuda (2015). Moreover, the authors offer several implications of their findings: they point out that the benchmark effect might lead for country flows to be correlated if the recipients are constituent of the same index, possibly leading to cross-country contagion effects. They also hint towards the importance of sovereign ratings for active flows in EME debt, especially for countries with larger active than passive inflows.

2.3 Sovereign ratings and portfolio flows

The empirical literature on the influence of sovereign ratings on portfolio flows into EMEs is rather scarce; one of the first studies in this particular strand is Kim and Wu (2008). The authors highlight the relevance of a sovereign's rating with regard to the payment philosophy of private entities and thus their creditworthiness. Furthermore, they connect the development status of a country's financial sector to the ratings and to the flows. The authors then use the ratings as a proxy for the development status and estimate a panel with monthly capital flows on ratings. In summary, their results suggest that long-term foreign currency ratings have a positive impact on all types of flows and that short-term ratings seem to have a negative impact. The intuition behind the negative effect of the short-term ratings is the following. Long-term instruments are more expensive for sovereigns and so they tend to expand short-term debt, which then potentially weakens the long-term debt market. The advice herein is for EME policy makers to ensure that their monetary policy direction encourages sound long-term ratings.

The study thematically closest to ours is probably Gande and Parsley (2014). However, they employ a monthly panel of fund level portfolio flows into 85 countries in order to estimate whether up- or downgrades of sovereigns have an impact on these flows. Furthermore, they inspect if the reaction is symmetric for up- and downgrades and whether there are any reactions of countries on rating revisions of a neighbor country. They find evidence for asymmetrical effects suggesting that upgrades lead to statistically insignificant inflows and downgrades lead to significant outflows, which are larger in absolute terms. In addition to that, their results support the hypothesis of cross-country spillover effects, i.e. ratings of neighboring countries are negatively connected with portfolio flows. Obviously, this means that if a country is downgraded, money is retrieved and allocated either to neighboring countries or to other countries in the same index, given the rating was a requirement for membership, as in accordance with sub-section 2.2.

3 The data

We obtain daily data on portfolio equity and bond country flows from January 2012 to February 2017, provided by EPFR Global[1]. The dataset contains daily flows into 54 countries and allows for disaggregation into active and passive flows. Although they employ data at

[1]Other studies that use data from EPFR are for example Fratzscher (2012), Jotikasthira et al. (2012), Lo Duca (2012), Ahmed et al. (2015), Fratzscher et al. (2016), and Raddatz et al. (2017).

the fund level, Fratzscher (2012) and Jotikasthira et al. (2012) argue that the EPFR data is a fairly representative sample, covering up to 20% of the whole market.

Table 1: Distributional properties of daily flows in all countries.

				Debt		Equity	
	Aggregate	Active	Passive	Active	Passive	Active	Passive
Mean	20.9	-47.2	68.1	2.3	26.1	-49.4	42.0
Median	69.6	9.1	66.5	35.4	22.5	-31.4	38.1
S.D.	840.9	494.0	552.0	302.1	96.4	270.5	525.3
Skewness	0.4	-1.2	3.6	-0.7	-0.4	-1.2	4.2
Kurtosis	16.0	8.6	65.5	6.3	10.3	10.9	79.9

Remark: The parameters displayed above are calculated with the summed up daily flows over all countries. The values are denoted in million USD. "Aggregate" denotes that the data has not been disaggregated at all. Accordingly, "Active" and "Passive" denotes that the data has been disaggregated into active and passive flows, and so on.

Table 1 contains the key distributional properties of our data. It is worth highlighting that at least the datasets "Aggregate" and "Debt Passive" are not standardly distributed as the relation of the mean and median would suggest a different sign of the skewness.[2] Comparing active to passive flows shows that they are substantially different. While their volatility is somewhat similar, the active flows are a little bit left skewed, which suggests that, given the low median, large negative flows are more likely than large positive flows. The opposite holds for the passive counterpart. Both series are leptokurtic, which means that their distributions have "fat tails". Splitting both series into their bond and equity components shows that the volatility of passive flows is predominantly driven by passive equity flow volatility, which is larger than its active complement. As expected, the volatility of passive debt is the lowest of all series. For both asset classes, passive kurtosis is strictly above active kurtosis; however, they are both leptokurtic. Judging from the relation of the mean and median values, active flows appear to be left skewed and passive flows right skewed.

We add foreign currency sovereign ratings to the daily flows, which we collect from Thomson Reuters. Albeit there are other agencies that issue sovereign ratings, we only consider ratings that have been issued by S&P, Moody's and Fitch. According to the 2016 "Annual Report on National Recognized Statistical Rating Organizations", which is an annually issued report by the U.S. Securities Exchange Commission (SEC), taken together they accounted for 99% of all sovereign ratings issued in the U.S. as of December 31, 2015. This

[2]In this context, non-standard distribution means that they are likely to be multimodal.

number breaks down into 53.0%, 35.1%, and 10.9%, representing the individual shares for S&P, Moody's and Fitch, respectively. Considering the heterogeneity within this group, it is not surprising that there are studies that only use S&P or S&P and Moody's ratings. For example, Gande and Parsley (2014) argue that ratings by these three are highly correlated and so they focus solely on S&P ratings. They do not base their decision on S&P's market share but conduct a leader-follower test which comes to the result that S&P is the leading agency having the greatest market impact on average.[3] However, we proceed with ratings by all three agencies for a simple reason. While there may be a leading agency, it is not the case that this leader is always first in revising an existing rating. According to Cantor and Packer (1996) and Afonso (2003), the statistically significant determinants of a rating issued by S&P and Moody's appear to be quite similar. Projecting this evidence onto Fitch leads to an intuitive thought. If these determinants change for a particular country, then all three should amend the rating accordingly. If for example, Fitch revises its rating before S&P does, then the revision issued by Fitch should exhibit all the signaling power. When S&P revises its rating eventually, the market will not be overly surprised as the fundamental change of the sovereign has already been processed and announced.

Much in the style of Kaminsky and Schmukler (2002), not only changes in ratings are considered but also changes in outlooks. According to them, revisions in outlooks are at least as revealing as changes in actual ratings. Hence, investors may anticipate a rating change if the rating has been put on outlook shortly before. As might have been expected, the most rating and outlook revisions have been issued by S&P. In order to avoid any anticipation of the events, we only consider ratings which have not been preceded by an outlook change in the same direction. However, if for example, Fitch issues a negative outlook, which is equal to a prospective downgrade but S&P revises its rating upwards, then both events are taken into consideration. If, however, S&P revises its rating downwards after Fitch's negative outlook announcement, then only Fitch's outlook change will appear in the event database. Furthermore, if Fitch eventually downgrades the rating of the country and there is more than two months time between the outlook announcement and the rating announcement then both revisions are considered as events. Table 2 shows the absolute frequencies of all upgrade and downgrade events over the complete sample period.

For our further procedure, we expand the dataset by adding other presumably exogenous variables.[4] Firstly, we collect daily continuous returns of the MSCI World Index, which is widely regarded as the return benchmark of AEs and thus a sort of push factor. Secondly,

[3]For a more detailed description of this test, see Cooper et al. (2001).

[4]We obtain all variables from Thomson Reuters.

Table 2: Absolute frequencies of upgrades and downgrades.

				Debt		Equity	
	Aggregate	Active	Passive	Active	Passive	Active	Passive
Upgrade	28	28	27	25	25	25	21
Downgrade	66	66	65	54	41	53	37
Total	94	94	92	79	66	78	58

Remark: The upgrades and downgrades presented above are only for foreign currency sovereign debt; the category which has been considered is "long term issuer default rating".

we collect daily yield data of U.S. ten year Treasuries, which may be regarded as a proxy for the risk-free rate of AEs and thus as a push factor. Thirdly, as a measure of uncertainty in AEs, we collect the daily values of the VIX, which is the implied volatility of the S&P500 universe. For example, Fratzscher (2012) and Byrne and Fiess (2016) employ a proxy for AE returns, a measure of uncertainty, and the ten-year Treasury yield and find significant relationships between all three measures and flows into EMEs. Furthermore, Koepke (2015) conducts a meta-analysis of 40 empirical studies that are concerned with the drivers of EME capital flows. He finds strong evidence for negative correlations between portfolio flows with global risk aversion and AE interest rates. This is consistent with our expectations and we expect that the same should hold for AE equity returns. When the equity returns and the Treasury yield increase, it might lead investors to shift more money into AEs, which tend to be less risky. If the uncertainty increases, then the negative impact suggests that investors become more risk averse and rather shift their money into "safe havens".

For the further analysis, we abstract from using any further pull factors. The reason behind this is that most sensible pull factors are only available at a low frequency, as economic growth or other fundamental factors, for example. The problem with employing equity (bond) returns is rather obvious: apart from the lack of availability for most countries, most likely there is a strong endogeneity problem for aggregated and equity (bond) portfolio flows. The same should be true for exchange rates and interest rate spreads. As we are eager to obtain unbiased estimates, we settle with the push factors and assume that the rating events are a sufficient proxy for fundamental pull factors.

4 The AR-GARCH methodology

The potentially endogenous character of the sovereign ratings makes it attractive to conduct an event study. We calculate excessive flows

$$EF_{i,t} = F_{i,t} - E(F_{i,t}), \tag{1}$$

defined as the difference of the realized flow $F_{i,t}$ of country i on day t of the event window and the expected flow $E(F_{i,t})$. We standardize all country flows before our analysis as their size varys heavily from country to country. The event window range is defined as $t \in [-10; 10]$, with the day of the rating or outlook revision being $t = 0$. We decide to examine the 10 days preceding the event date as there could be potential run-up effects, which might indicate that market participants expected the subsequent revision. The following 10 days might offer information on whether the reaction (if there is any) is rather enduring or if there is only a short peak. Our procedure is somewhat related to a conventional multi-factor market model approach (see, e.g., MacKinley, 1997). We determine a statistical connection between the exogenous variables we collected and the respective flows over the estimation window, whose range we choose to be $t \in [-160; -11]$ relative to the event day. This connection is then projected into the event window, which allows us to calculate the necessary $E(F)$. However, in order to be able to draw meaningful inference we need to obtain white noise residuals. A detailed inspection of the time series shows that the flows are structurally autocorrelated and exhibit volatility clustering.[5] These are two common characteristics of time series data that lead to inefficient and inconsistent OLS results. Hence, we correct these problems by estimating a multi-factor AR(S) process, modelling GARCH(1,1)[6] error terms that have been proposed by Bollerslev (1996). In general, our equation that provides parameter estimates is

$$\begin{aligned} F_{i,t} =& \beta_0 + \beta_1 msci_t + \beta_2 trsr_t + \beta_3 vix_t + \beta_4 F_{agg,t} + \sum\nolimits_{s=1}^{S} \alpha_s F_{i,t-s} \\ &+ \delta qe_t + \sum\nolimits_{j=1}^{J} \phi_j splup_{j,t} + \sum\nolimits_{k=1}^{K} \psi_k spldn_{k,t} + \nu_{i,t}, \end{aligned} \tag{2}$$

[5] We compute the autocorrelation function (ACF), the partial ACF (PACF), and the Schwarz information criterium (SIC) to assess whether the flows are autocorrelated. Furthermore, we conduct an ARCH Lagrange multiplier (LM) test in order to test for conditional heteroscedasticity. Appendix B shows all ACF and PACF graphs and appendix C contains the corresponding SIC. Moreover, appendix D contains the results of the ARCH LM test.

[6] We choose the rather parsimonious GARCH(1,1) over other ARCH-type models as there is evidence that the GARCH(1,1) is only seldom outperformed (see, e.g., Hansen and Lunde, 2005). While standard ARCH(p) models typically require large lag orders that may induce estimation difficulties, the GARCH(1,1) models the entire past with only one coefficient.

where

$$\nu_{i,t} = \varepsilon_{i,t}\sigma_{i,t},$$

and

$$\sigma^2_{i,t} = \vartheta_0 + \vartheta_1\nu_{i,t-1} + \varphi\sigma^2_{i,t-1}.$$

The regression coefficients are straightforward: β_0 is the intercept, β_1 corresponds to the MSCI index returns, β_2 is the slope parameter of the U.S. Treasury rate, β_3 of the VIX, and β_4 belongs to the aggregated flows, which we include as a substitute for a market factor.[7] The α_s are the parameters of the autoregressive terms. We dynamically calculate the SIC for the portfolio flows to each country in order to obtain the correct lag order S. Moreover, we control for the influence of monetary policy by constructing a QE control variable that accounts for important events.[8] In addition to that, we assign each country to a region. This enables us to control for potential cross-border spillover effects. In order to assess whether our data indeed are subject to spillover effects, we estimate the following panel with country-specific random effects[9]

$$\begin{aligned} F_{i,t} =& \beta_0 + \beta_1 msci_t + \beta_2 trsr_t + \beta_3 vix_t + \beta_4 F_{agg,t} \\ &+ \beta_5 qe_t + \beta_6 splup_{i,t} + \beta_7 spldn_{i,t} + \eta_{i,t}, \end{aligned} \tag{3}$$

where the spillover variables are simple dummy variables containing the upgrade or downgrade events of the countries with the same region assignment. The results[10] suggest that spillover parameters do play a role for the formation of the portfolio flows and should thus be included into the analysis. While we aggregate the countries to determine the significance of spillovers, we consider each country of a particular region separately in our further analysis. Hence, we compute the expected flows of the event window according to

$$\begin{aligned} E(F_{i,t}) =& \hat{\beta}_0 + \hat{\beta}_1 msci_t + \hat{\beta}_2 trsr_t + \hat{\beta}_3 vix_t + \hat{\beta}_4 F_{agg,t} + \sum\nolimits_{s=1}^{S} \hat{\alpha}_s F_{i,t-s} \\ &+ \hat{\delta} qe_t + \sum\nolimits_{j=1}^{J} \hat{\phi}_j splup_{j,t} + \sum\nolimits_{k=1}^{K} \hat{\psi}_k spldn_{k,t}. \end{aligned} \tag{4}$$

In order to obtain the coefficient estimates, we estimate Eq.(2) with the 150 days of the estimation window. There are, however, two exceptions to Eq.(4), considering the rather short estimation window. The QE and spillover dummies are variables that only involve a few observations. Hence, it occurs fairly often that there are simply no observations within

[7] Albeit it is fairly certain that there is an endogeneity problem with this variable, the problem should be rather weak as the aggregate flows consist of over 100 countries, which are not part of our sample.

[8] Please refer to appendix E for further details on the QE variable.

[9] The results of a standard Hausman test show that the random effects model is our selection of choice.

[10] Please refer to appendix F for the panel regression results.

the estimation period. This would not be crucial if there were also no observations within the event period. However, if there is an observation that might have an effect on the particular flows, then it would be falsely neglected. We circumvent this issue by computing the aggregate effect of QE and potential spillovers in advance. Subsequently, every time there are no observations for either variable, we apply the aggregate parameter estimates when computing $E(F_{i,t})$.

Once we have computed the EF, we follow the traditional approach and take the daily means over all EF for a given event and flow type. Thus, we compute

$$\overline{EF}_{i,t} = \frac{1}{N} \sum\nolimits_{i=1}^{N} EF_{i,t}, \tag{5}$$

where N is the total number of events, i.e. upgrades or downgrades. Taking the average over all events is advantageous as it permits inference conclusions for a particular event type. For graphical presentation purposes we cumulate the average excessive flows over the event period according to

$$\overline{CEF}(-10, \tau) = \sum\nolimits_{t=-10}^{\tau} \overline{EF}_t, \tag{6}$$

where $\tau \in (-10; 10]$. In the last step, we compute the unconditional variance every time we estimated Eq.(2) in order to obtain the significance levels of the CEF. Provided the estimated variance equation below Eq.(2) is stationary, i.e. $\hat{\vartheta}_1 + \hat{\varphi} < 1$, we can easily calculate $\sigma_i^2 = \frac{\hat{\vartheta}_0}{1-\hat{\vartheta}_1-\hat{\varphi}}$. Every time the stationarity condition is not satisfied, we exclude the particular event from the analysis. To obtain a cumulative daily variance for the event window we compute

$$Var(\overline{EF}_t) = \frac{1}{N^2} \sum\nolimits_{i=1}^{N} \sigma_{i,t}^2. \tag{7}$$

In order to test the $\overline{CEF}$ for their level of significance, the variance resulting from Eq.(7) has to be cumulated, as well. This then enables a simple t-test, which results in a test statistic that is assumed to be standard normally distributed. Let

$$\theta = \frac{\overline{CEF}(-10, \tau) - 0}{\sqrt{Var(\overline{CEF}(-10, \tau))}} \tag{8}$$

be the standardized test statistic with $\theta \sim \mathcal{N}(0, 1)$, which provides evidence on the significance level of the EF resulting from a rating or outlook revision.

5 Empirical results

We estimate the AR-GARCH model with disaggregated data into four continents, namely Africa, Asia, emerging Europe, and Latin America. This shall ensure that potential cross-

regional differences are identified. We consider both directions of ratings and outlooks. The graph on the left-hand side (lhs) is the reaction on upgrades; the right-hand side (rhs) on downgrades. The horizontal axis denotes the time relative to the event in $t = 0$ and the vertical axis measures "million USD". As the flows have been standardized, a movement of one, which would be one standard deviation, is equal to one million USD. Furthermore, the gray shaded areas denote the flows significance at least at the 10% level.[11]

Figure 1: Up- (lhs) and downgrade (rhs) reactions of active bond flows to Africa.

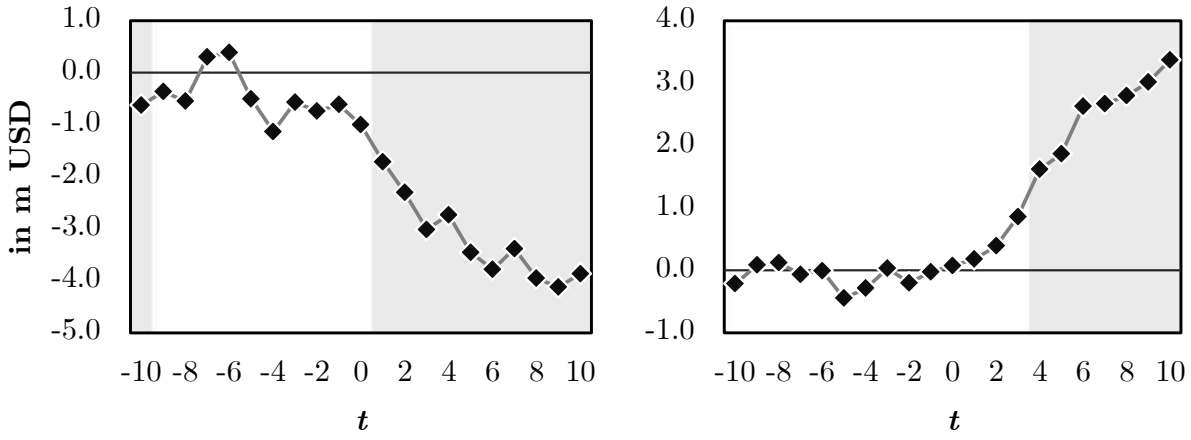
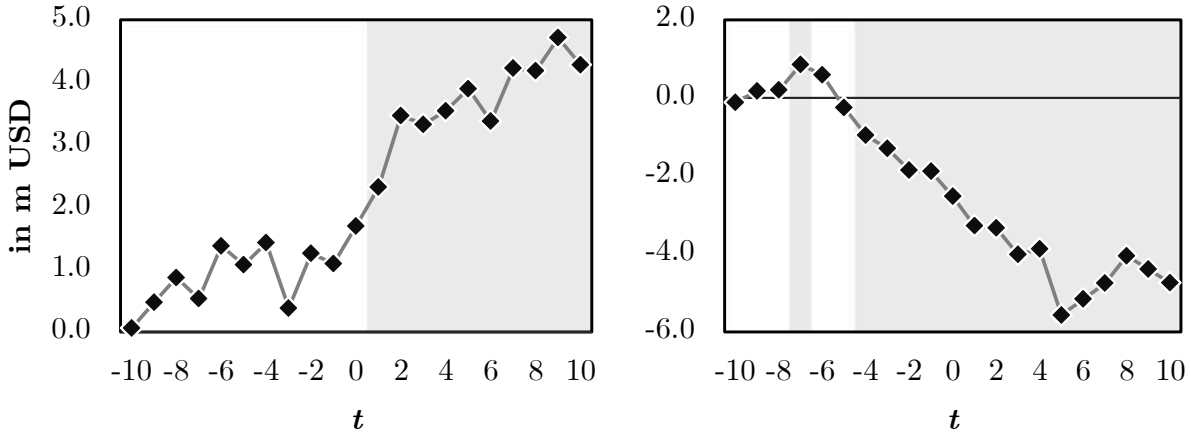


Figure 2: Up- (lhs) and downgrade (rhs) reactions of active bond flows to Asia.



[11]While our primary focus is to address the difference between actively and passively managed portfolio flows, we abstract from displaying further details on the aggregated portfolio flows. However, appendices G-J show the complete detailed results of the event study with all continents.

Figure 3: Up- (lhs) and downgrade (rhs) reactions of active bond flows to Europe.

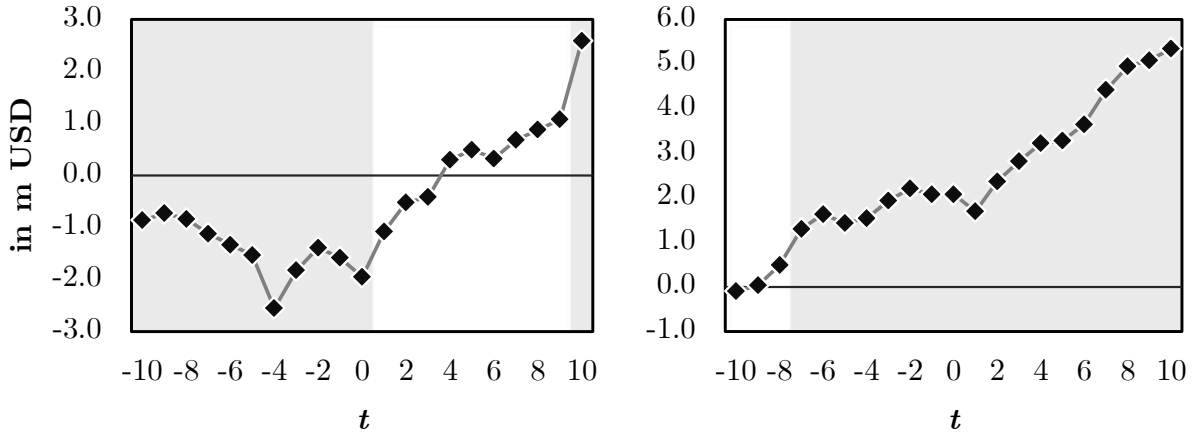
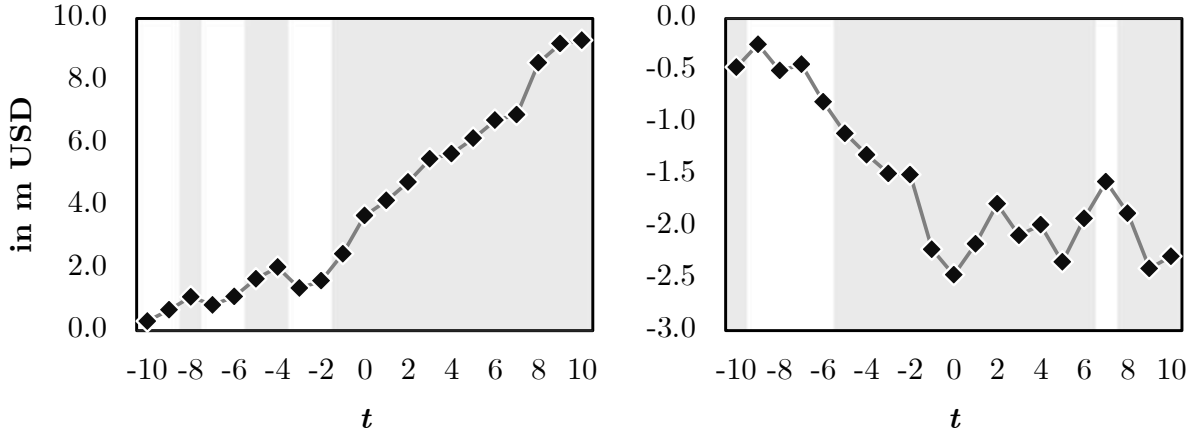


Figure 4: Up- (lhs) and downgrade (rhs) reactions of active bond flows to Latin America.



Figures 1 to 4 show the active CEF to African, Asian, European and Latin American debt, respectively. The reaction of African flows on upgrades is significantly negative for the days after the event. Interestingly, the reaction on a downgrade is significant from $t = 4$ to $t = 10$ and positive. However, the effects are not fully symmetric as the reaction on upgrades is larger in absolute terms than the downgrade reaction. The response of the flows into Asia is completely different. While the CEF are significant after an upgrade and positive, they are negative after a downgrade and significant from $t = -4$ to $t = 10$. This reaction is perhaps the most plausible one. It seems to be fairly symmetrical as the differences between the values in $t = 0$ and $t = 10$ are both of similar size. The reactions of the European CEF on upgrades and downgrades are both positive after the event, yet insignificant for the upgrade situation. This is probably caused by the observation period. During the European debt crisis, there were large capital retrenchments from European debt markets. In the post crisis period, the retrenchment reversed and, at least on average, sovereign ratings appear to play only a minor role for active debt investors during this process. Although we report the flows

into Latin America, we have to point out that the CEF resulting from an upgrade are only those into Argentina and they are, of course, strongly positive. The rating event happened before Argentina regained access to global capital markets and issued new sovereign bonds in May 2016. For the downgrades, the reaction is significantly negative before $t = 0$, which could mean that investors expected the negative revision.

Figure 5: Up- (lhs) and downgrade (rhs) reactions of passive bond flows to Africa.

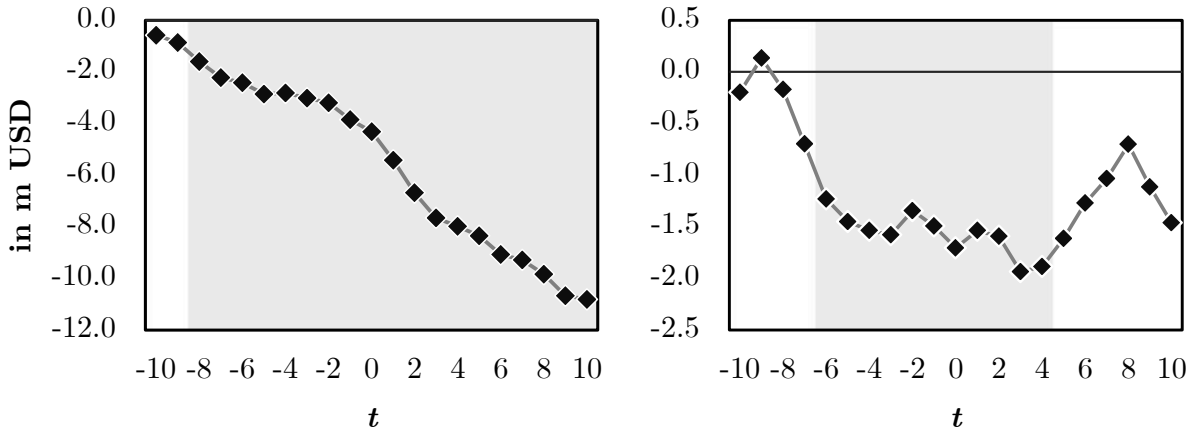


Figure 6: Up- (lhs) and downgrade (rhs) reactions of passive bond flows to Asia.

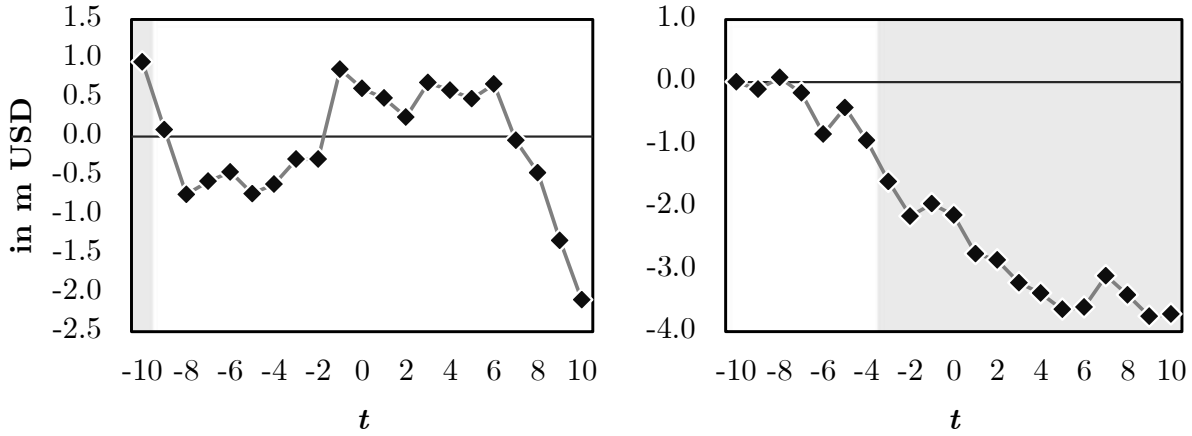


Figure 7: Up- (lhs) and downgrade (rhs) reactions of passive bond flows to Europe.

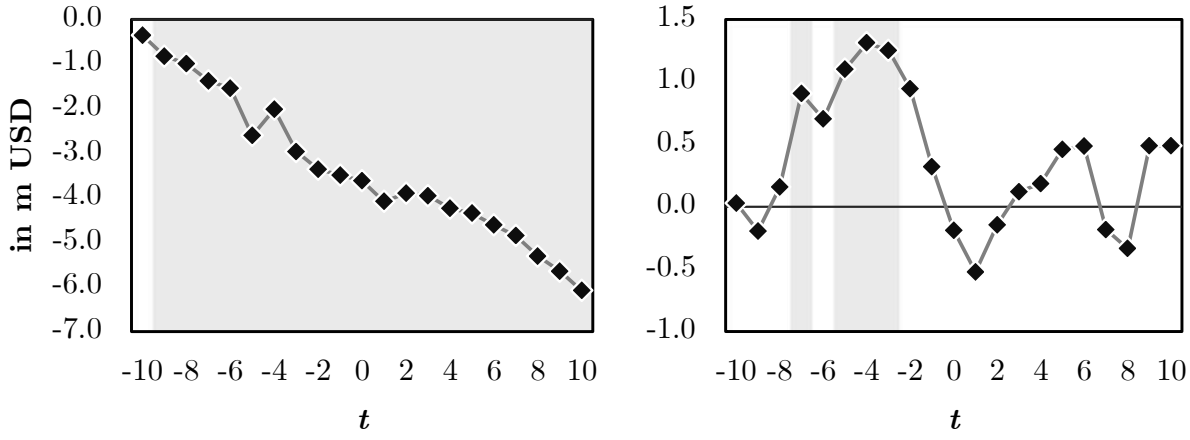
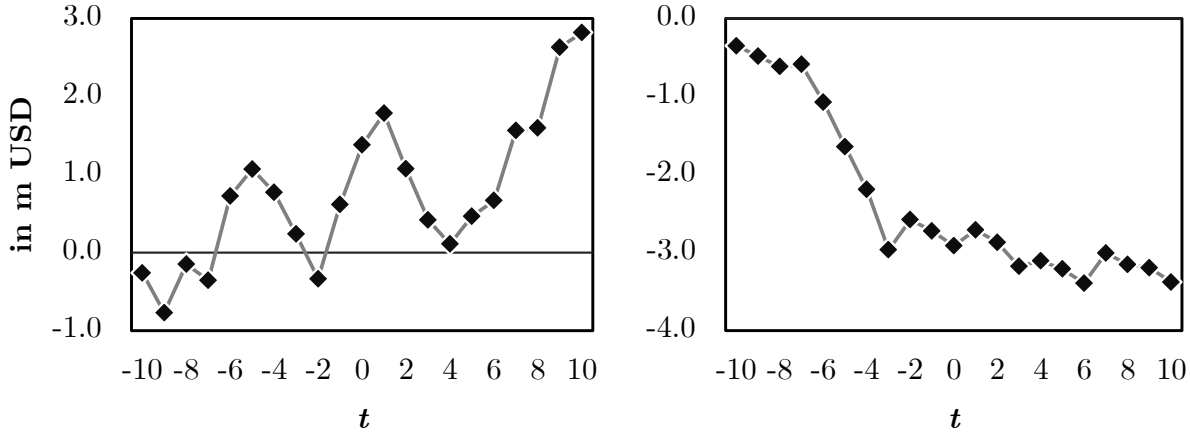


Figure 8: Up- (lhs) and downgrade (rhs) reactions of passive bond flows to Latin America.



Figures 5 to 8 show the passive CEF to African, Asian, European, and Latin American bonds, respectively. Considering the overall significance of CEF resulting from upgrades and the large rather linear decline, passive investors appear to have retrieved their money from Africa. The reaction on downgrades does not contradict this implication as the flows are significantly declining around the event date. However, it is worth mentioning that due to the disaggregation, there are only few events left. As there have been generally more downgrades than upgrades, this is especially true for the upgrades. The response of Asian flows is distinctive for the downgrade situation, whereas the upgrade reaction is not significant and appears to be at random. While the course of the CEF to emerging Europe is similar to the African CEF, both CEF into Latin America are not significant.

Figure 9: Up- (lhs) and downgrade (rhs) reactions of active equity flows to Africa.

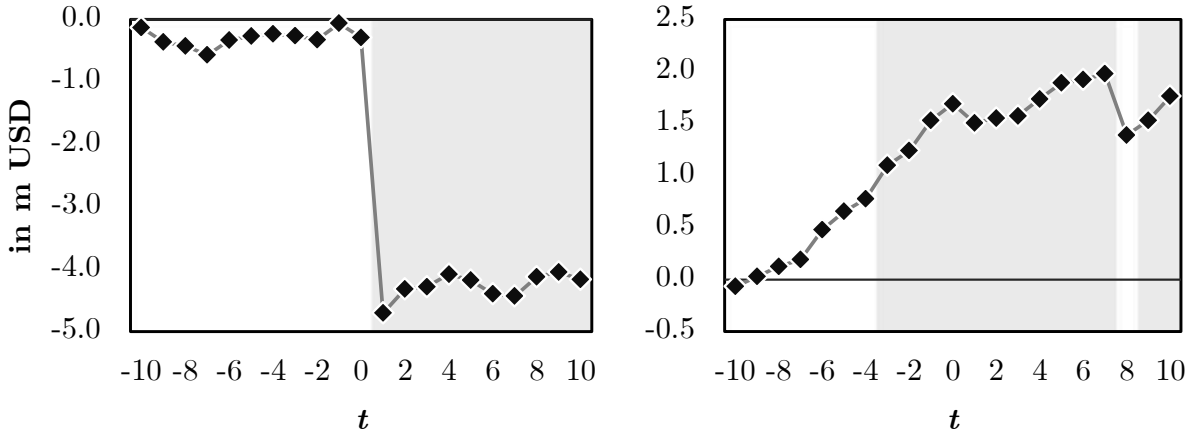


Figure 10: Up- (lhs) and downgrade (rhs) reactions of active equity flows to Asia.

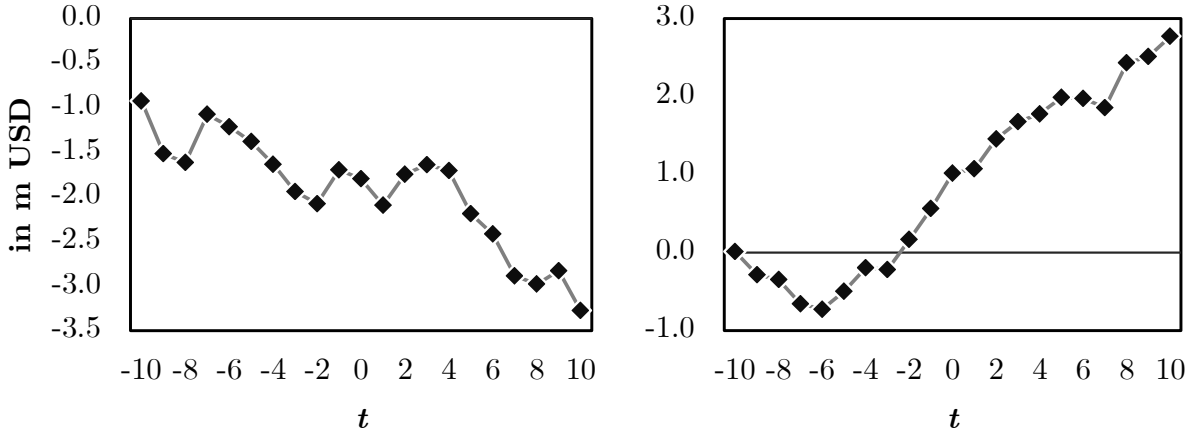


Figure 11: Up- (lhs) and downgrade (rhs) reactions of active equity flows to Europe.

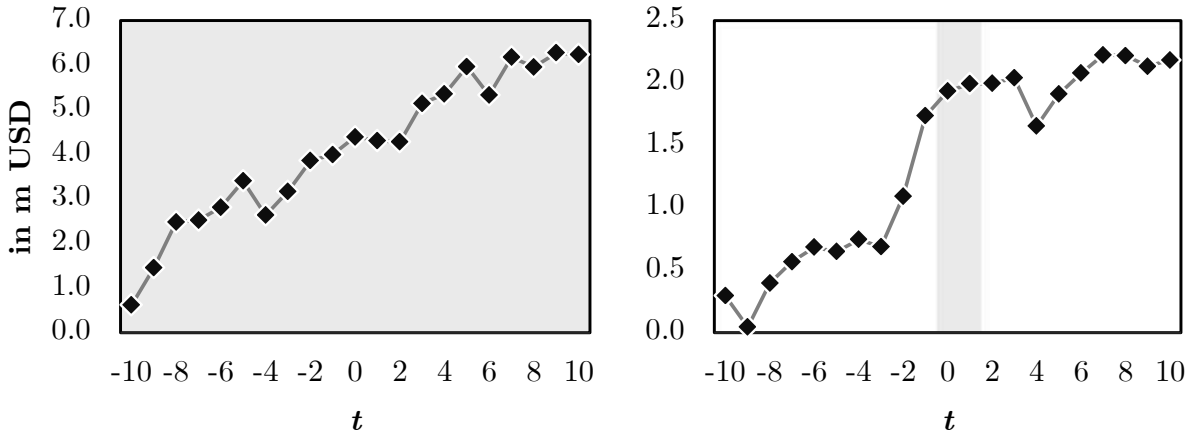
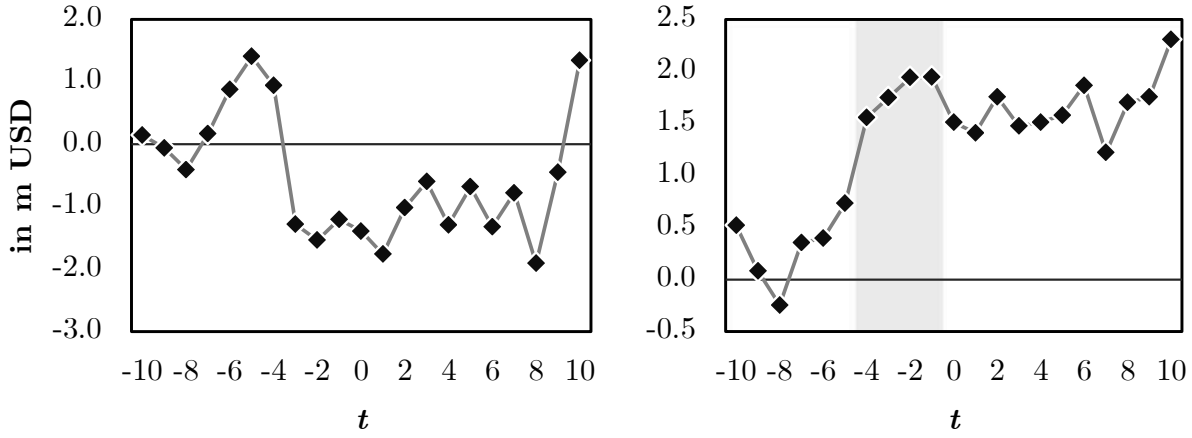


Figure 12: Up- (lhs) and downgrade (rhs) reactions of active equity flows to Latin America.



Figures 9 to 12 show the active CEF to African, Asian, European, and Latin American equities, respectively. Keeping in mind that there are only five upgrade events for the upgrade situation, the response of African CEF is quite striking. The CEF are insignificant and rather unremarkable until $t = 0$. However, on the day after the event there is a very strong reaction with minus five standard deviations and then the flows significantly remain at this level. On the contrary, the response on downgrades is, although not as strong but significant, towards the opposite direction. While CEF to Asia appear to follow some non-random pattern, they are insignificant for both revision types suggesting only minor importance of sovereign ratings for equity investors. The course of the active European flows to equities is uniformly significant and positive. Considering the strictly negative passive flows into European debt, which are of the same size in absolute terms, one might conclude that the investors shift money from passive investments into European bonds to active investments into European equity. This is however only a conjecture for which we have no further evidence. The CEF into Latin American equities are significant on the five days preceding the negative event. The movement is rather small and only significant at the 10% level, which makes it difficult to draw any conclusions.

Figure 13: Up- (lhs) and downgrade (rhs) reactions of passive equity flows to Africa.

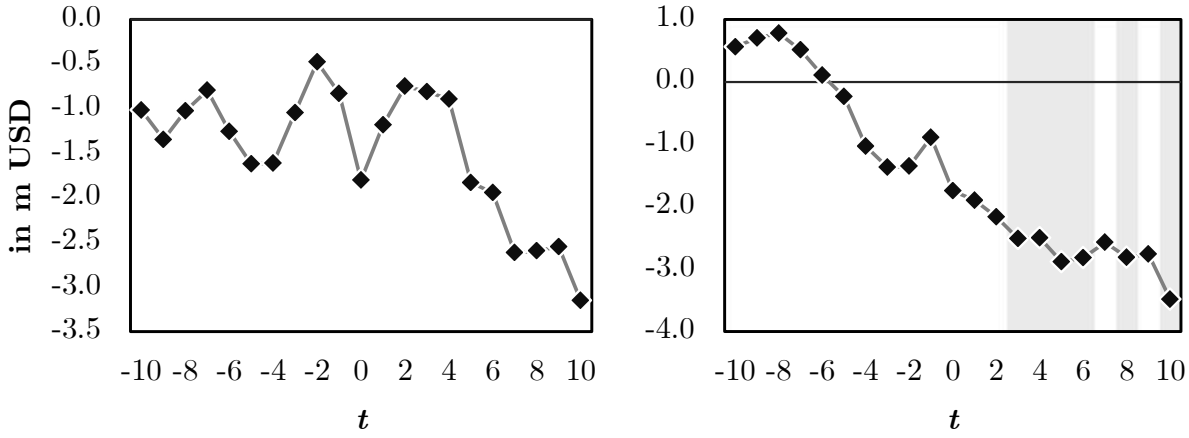


Figure 14: Up- (lhs) and downgrade (rhs) reactions of passive equity flows to Asia.

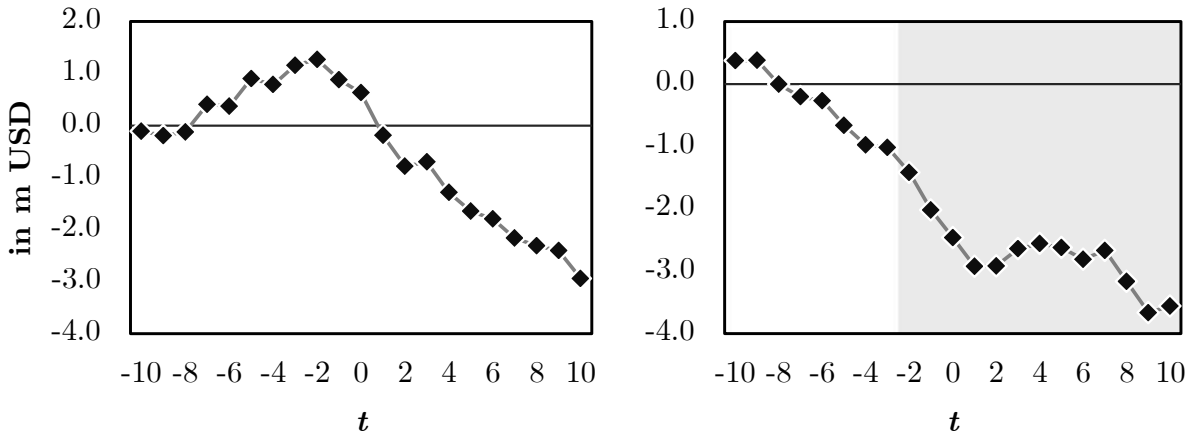


Figure 15: Up- (lhs) and downgrade (rhs) reactions of passive equity flows to Europe.

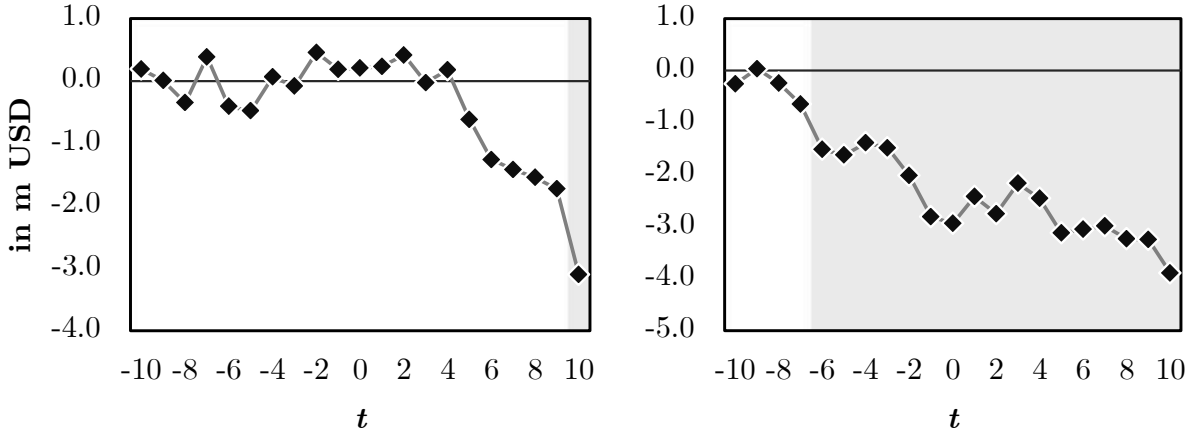
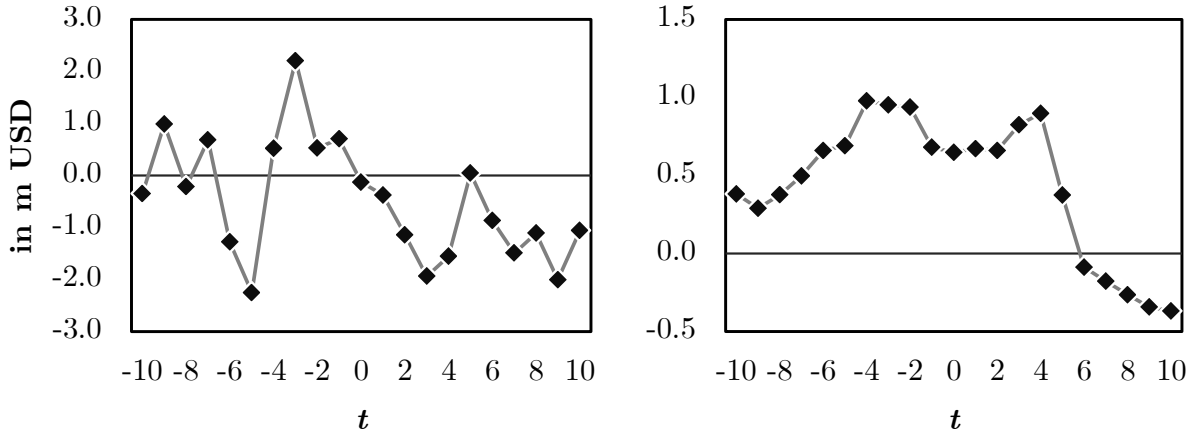


Figure 16: Up- (lhs) and downgrade (rhs) reactions of passive equity flows to Latin America.



Figures 13 to 16 show the passive CEF to African, Asian, European, and Latin American equities, respectively. Most interestingly, the reaction on upgrades is not significant for all four continents. This suggests that sovereign rating upgrades are only of little importance for passive EME equity investors. However, the response on downgrades is, except for Latin America, significantly negative around or after the rating or outlook revision, suggesting that downgrades are indeed a criterion that passive equity investors consider.

To summarize, all of the above results underline the findings by Chuhan et al. (1998) in the sense that EMEs are far from being a homogeneous group; they appear rather heterogeneous. This is also noted by Fratzscher (2012), who shows that EMEs differ vastly with respect to the importance of push and pull factors and that this difference became more pronounced during the recent financial crisis. Another study to note cross-country heterogeneity among EMEs is McQuade and Schmitz (2017). They highlight the importance for EME policy makers with regard to an increasing importance of macroeconomic fundamentals for capital flows. We follow up on this argument as our findings support the importance of sovereign ratings particularly for EME debt flows. Furthermore, we emphasize the different behaviors of equity investors into Africa and Europe, for which sovereign rating appear to play a significant role.

6 Conclusions

Large and uncertain capital in- and outflows impose a serious problem for EME monetary policy makers. They exert pressure on a country's exchange rate as well as on its asset prices and thus on its exports/imports and on financial markets. Although the volatility has substantially declined in recent years according to McQuade and Schmitz (2017), the question is if there are other determinants driving capital flows that would permit some kind

of forecast. This would enable policy makers to prepare and position their monetary policy accordingly. In the course of the debate whether AEs are to be held accountable for the high level of volatility, some oppose that EME fundamentals significantly contribute to the allocation process of the monetary flows. Ahmed et al. (2017) point out that fundamentals indeed play a role for shocks to capital flows into EMEs.

Considering the increasing importance of passively managed investments, we answer the question whether sovereign rating and outlook revisions have a short-run impact on active and passive portfolio flows into EMEs. Furthermore, we assess if the reactions are similar for active and passive flows and if there is a difference between investments into EME equity and debt. We do so by means of an event study, which we modify in order to anticipate the characteristics of the flow data. As the flows appear to be structurally autocorrelated and heteroscedastic, we employ an AR-GARCH multi-factor model, that accounts for various push factors, including a proxy for AE equity returns, the risk-free rate, and uncertainty. Moreover, we control for cross-country spillover effects and cross-regional heterogeneity in accordance with Christopher et al. (2012), by conducting our study on a disaggregated level. Hence, we split the sample and cluster the countries by continent. Our findings can be summarized as follows.

It appears that active bond investors into Asia and emerging Europe are profoundly driven by revisions as upgrades have a positive effect on portfolio flows. Considering that inflows into Europe were generally large after the European debt crisis, negative revisions show a negative effect on flows for Europe and Asia. On the contrary, the reactions of active bond investors into Africa are the opposite. Our results for active bond investments into Latin America are only interpretable for downgrades as there is only one upgrade event in our sample. However, downgrades appear to be expected and anticipated by the investors as the flows are significantly negative before the event. Passive bond investments seem to be significantly declining in Africa and Europe before and after upgrade news. Given that these results are almost uniformly significant and declining, they might hint that rating and outlook revisions do not play an overly important role for passive investments, as long as the rating is not revised from investment to non-investment grade and vice versa.

For active equity investors, revisions in both directions appear to matter for investments into Africa and Europe. Although the reaction for flows to European equities is almost uniformly positive for both upgrades and downgrades, there appears to be a significant slowdown of the positive flows after a downgrade. The reaction of active flows into African equities is, again, the opposite. While active Asian equity investments are not significant, they are

significantly negative around downgrades for passive equity investments. This is also true for African and European passive equity investments.

In summary, our findings suggest that sovereign ratings indeed influence the course of portfolio flows and hence the allocation decision of fund managers and private investors. As sovereign ratings may be considered a proxy for a country's fundamentals, we follow up on the argument that fundamentals are a determinant for portfolio flows. However, they appear to be more important for debt investors, which might have been expected. Although we obtain significant values for passive flows, there seems to be no influence of upgrade events on passive equity investors.

Hence, the implications for EME policy makers are in line with Sahay et al. (2014) and Bussiere and Phylaktis (2016). Given the short term reactions of capital flows, countries with relatively weak fundamentals should aim to keep their rating at least unchanged or should even improve it. Furthermore, they should introduce measures that would allow them to counteract on large and volatile capital flows, i.e. accumulate foreign exchange reserves. If need be, they might consider imposing capital controls as a last resort.

While we assess the robustness and power of the model by means of a Monte Carlo simulation,[12] there are a few thoughts on what might be done following our research. One promising action might be to incorporate an instrument for the fundamental situation of the particular recipient country. Other variables that have shown to be influential by Fratzscher (2012) are local equity returns and bond yields. While we excluded these on purpose due to endogeneity problems, there might be other instruments or methods that could also be included and applied.

[12]The results of our power of the model MC analysis are available as an online appendix on our faculty website.

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Appendix

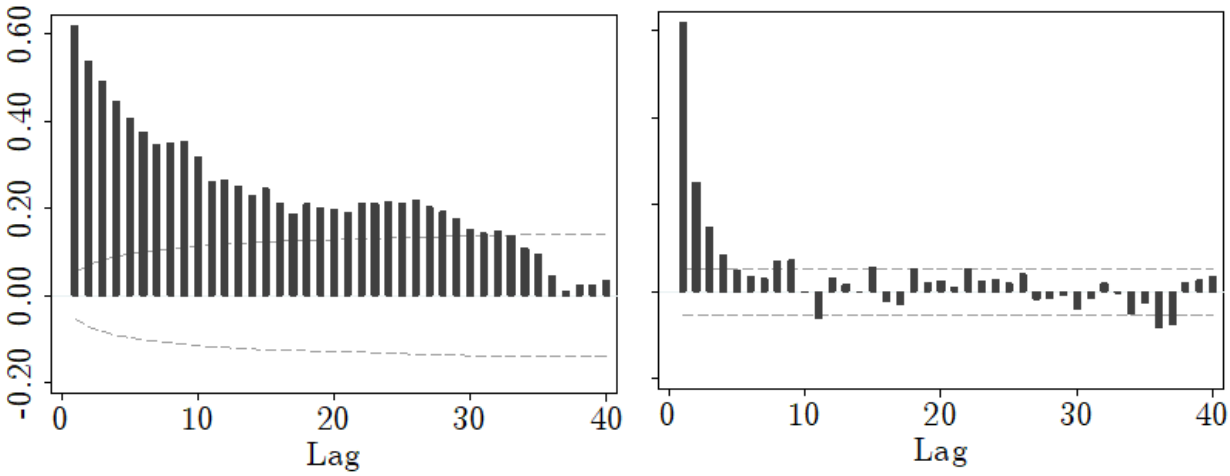
Appendix A: List of sample countries and their region assignment.

Africa	Asia	Europe	Latin America
Eastern Africa:	*Central Asia:*	*Eastern Europe:*	*Latin America:*
Kenya	Kazakhstan	Hungary	Argentina
Mozambique		Poland	Bolivia
Rwanda	*Central Asia:*	Russia	Brazil
Uganda	China	Ukraine	Chile
Zambia	Korea (South)		Colombia
	Mongolia	*Southern Europe:*	Uruguay
Middle Africa:		Croatia	Venezuela
Angola	*Southern Asia:*	Macedonia	
Gabon	Sri Lanka	Serbia	*Central America:*
		Slovenia	Costa Rica
Northern Africa:	*South-Eastern Asia:*		El Salvador
Egypt	Indonesia		Guatemala
Tunisia	Malaysia		Mexico
Southern Africa:	*Western Asia:*		*Caribbean:*
Botswana	Azerbaijan		Dominican Rep.
Namibia	Bahrain		Jamaica
South Africa	Cyprus		Trinidad Tobago
	Georgia		
Western Africa:	Iraq		
Ghana	Israel		
Nigeria	Jordan		
	Lebanon		
	Oman		
	Saudi Arabia		
	Turkey		

Appendix B: ACF and PACF of daily portfolio flows.

Remark: The gray bars are the ACF (lhs) and PACF (rhs) and the dashed light grayish lines indicate the corresponding 95% confidence band.

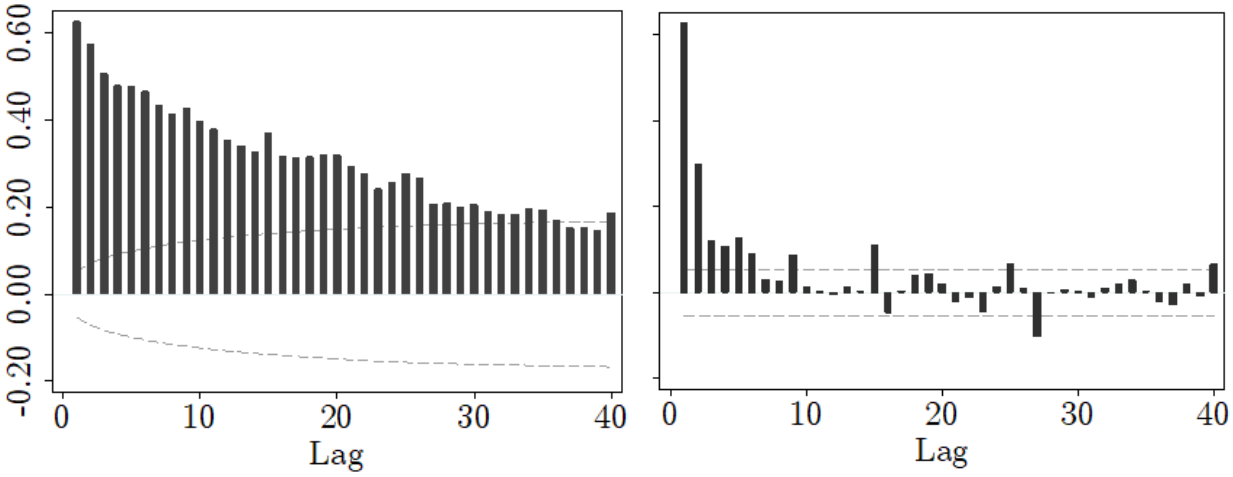
Appendix B.1: ACF and PACF of daily aggregate portfolio flows.



(a) ACF

(b) PACF

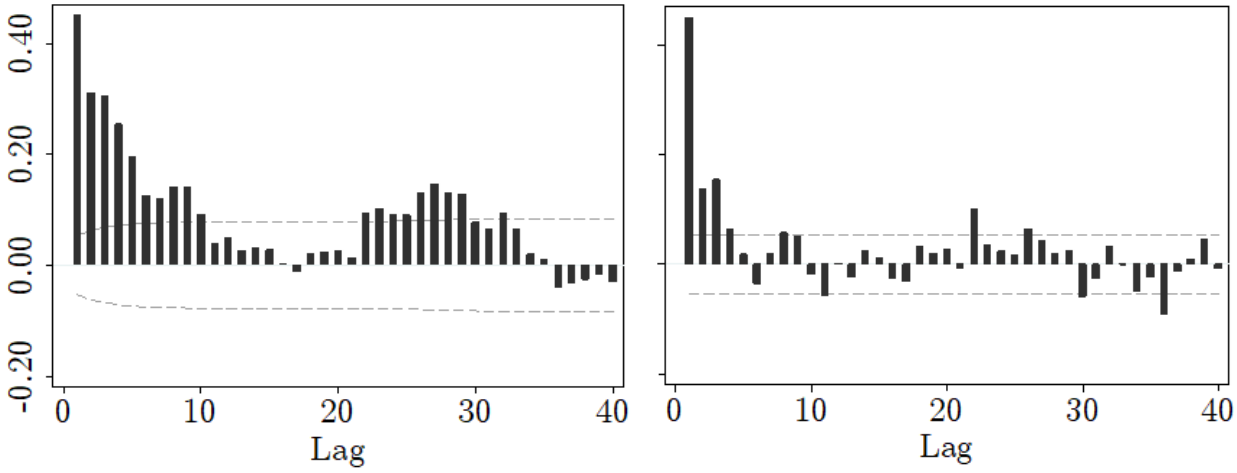
Appendix B.2: ACF and PACF of daily active portfolio flows.



(a) ACF

(b) PACF

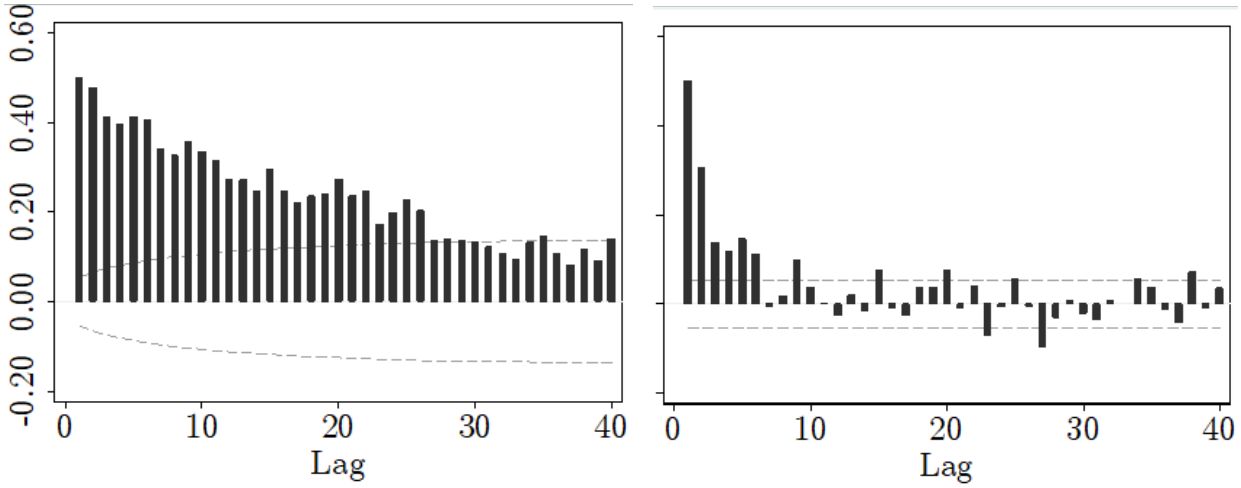
Appendix B.3: ACF and PACF of daily passive portfolio flows.



(a) ACF

(b) PACF

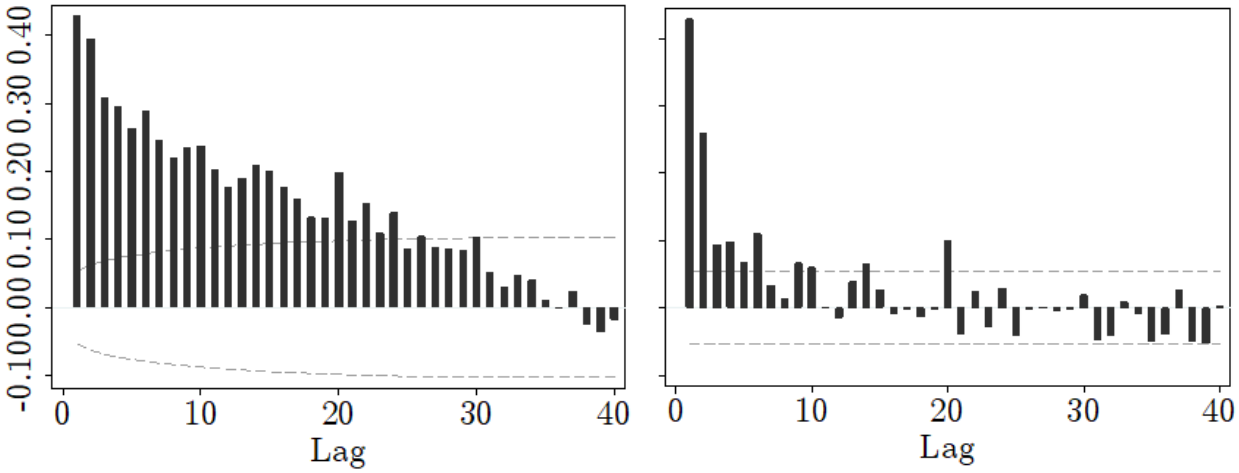
Appendix B.4: ACF and PACF of daily active bond portfolio flows.



(a) ACF

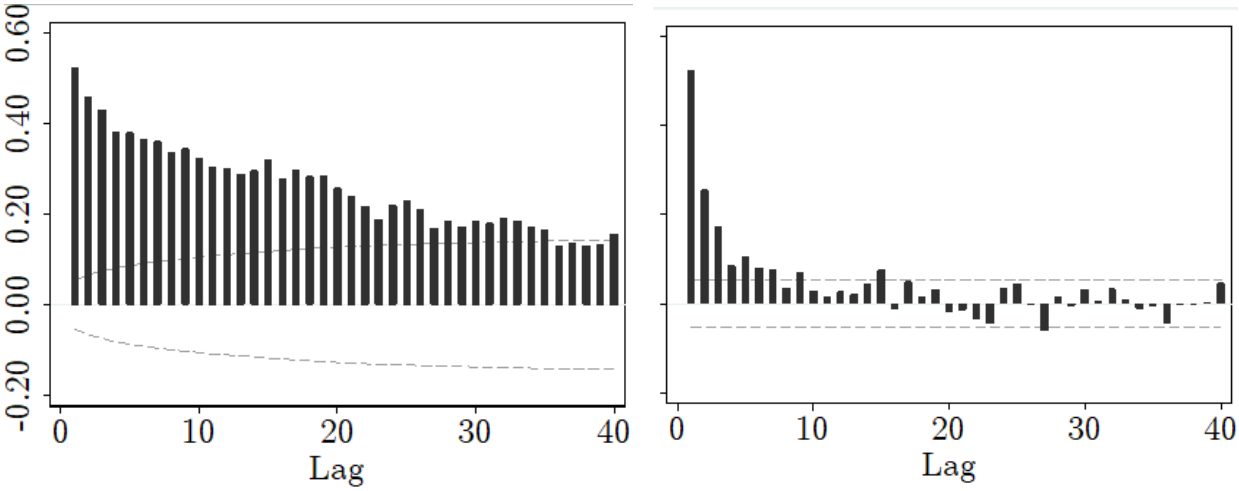
(b) PACF

Appendix B.5: ACF and PACF of daily passive bond portfolio flows.



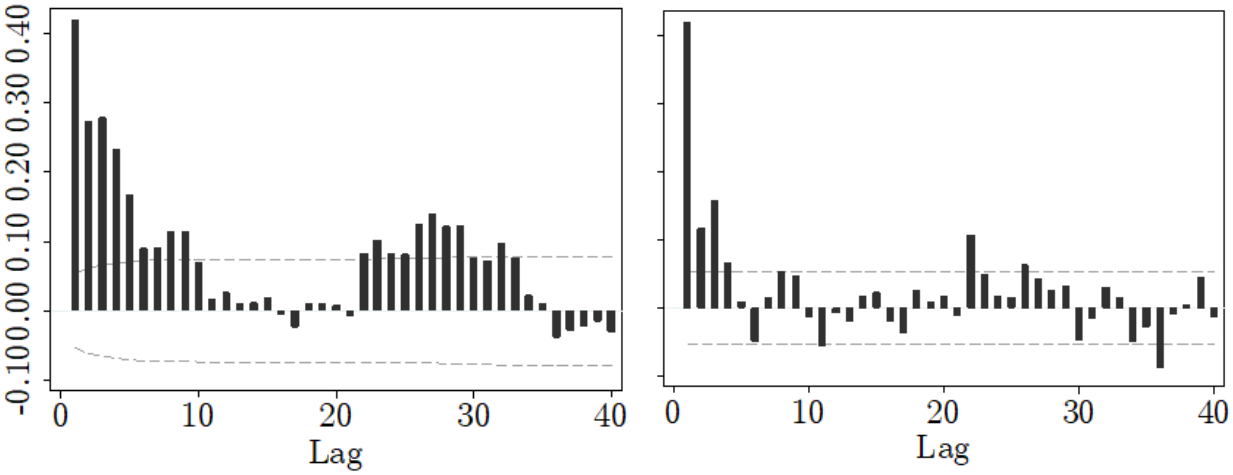
(a) ACF (b) PACF

Appendix B.6: ACF and PACF of daily active equity portfolio flows.



(a) ACF (b) PACF

Appendix B.7: ACF and PACF of daily passive equity portfolio flows.



(a) ACF

(b) PACF

Appendix C: Schwarz information criteria of all portfolio flows.

				Debt		Equity	
	Aggregate	Active	Passive	Active	Passive	Active	Passive
0	16.317	15.253	15.475	14.271	11.986	14.047	15.376
1	15.841	14.759	15.255	13.988	11.788	13.731	15.187
2	15.782	14.671	15.241	13.895	11.724	13.669	15.178
3	15.765	14.662	15.222*	13.881	11.720	13.644	15.159*
4	15.763*	14.655	15.223	13.872	11.716	13.642	15.160
5	15.766	14.645	15.229	13.855	11.717	13.637	15.165
6	15.770	14.642*	15.233	13.848*	11.710*	13.636	15.168
7	15.775	14.646	15.238	13.854	11.715	13.635*	15.173
8	15.775	14.651	15.240	13.859	11.720	13.639	15.176
9	15.775	14.649	15.243	13.854	11.721	13.64	15.179
10	15.781	14.654	15.248	13.858	11.723	13.644	15.184

Remark: The values displayed are the Schwarz Information Criterion (SIC) for the particular flow variable at lag lengths one to ten. Column one reports the lags that were included. The asterisk indicates the lowest SIC for each variable.

Appendix D: ARCH LM test with five lags.

				Debt		Equity	
	Aggregate	Active	Passive	Active	Passive	Active	Passive
χ^2	126.81	103.02	96.68	52.51	68.41	83.63	76.54
$p > \chi^2$	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remark: The values displayed above are the χ^2 distributed test statistics and their corresponding p-values. The ARCH LM test assesses whether the squared residuals of an autoregression with n lags are autocorrelated. The null of no autocorrelation has to be strongly rejected in each case, suggesting that the time series indeed exhibit volatility clustering and thus conditional heteroscedasticity.

Appendix E: Event dates of QE control variable.

Date	Description
(1) September 13, 2012	Announcement of open-ended QE3
(2) June 19, 2013	FOMC meeting and announcement of prospective tapering
(3) March 19, 2014	Announcement of further reduction of bond purchases by Janet Yellen
(4) October 29, 2014	Fed stopped all bond purchases
(5) January 22, 2015	Announcement of ECB QE
(6) March 10, 2016	Announcement of further ECB QE expansion
(7) December 8, 2016	Announcement of reduction of ECB QE

Remark: The dates are considered in the form of dummy values.

Appendix F: Test for relevance of cross-border spillover effects.

				Debt		Equity	
	Aggregate	Active	Passive	Active	Passive	Active	Passive
c	0.00	0.01	-0.01**	0.01	-0.01	0.00	-0.01
$msci$	4.99***	-2.55***	16.54***	-1.57*	16.58***	-4.51***	13.18***
$trsr$	-13.54*	30.29***	-108.2***	49.82***	-168.40***	-8.90	11.75
vix	0. 24***	0.27***	-0.02	0.28***	-0.31***	0.13	0.54***
F_{agg}	0.59***	0.54***	0.43***	0.55***	0.36***	0.34***	0.45***
qe	-0.26***	-0.40***	0.08*	-0.46***	-0.06	-0.02	0.27***
$splup$	-0.20**	-0.40***	0.35***	-0.43***	0.47***	0.05	0.21
$spldn$	0.08	-0.17***	0.38***	-0.23***	0.39***	-0.06	0.15*
Obs.	65,611	65,611	64,271	48,204	48,204	45,526	32,136
Countries	49	49	48	36	36	34	24

Remark: The values displayed are the parameter estimates of Eq. 5. Columns two to eight report the parameters for the standardized aggregate, active, passive, ac-tive and passive debt, and active and passive equity flows. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Appendix G: Cumulative excessive flows to Africa.

	Upgrade							Downgrade						
				Debt		Equity					Debt		Equity	
t	Aggregate	Active	Passive	Active	Passive	Active	Passive	Aggregate	Active	Passive	Active	Passive	Active	Passive
-10	-0.88***	-0.54*	-1.12***	-0.62**	-0.57	-0.13	-1.02	-0.07	-0.14	0.32	-0.21	-0.2	-0.07	0.56
-9	-1.19***	-0.74*	-1.55***	-0.36	-0.86	-0.36	-1.35	0.12	0.04	0.55	0.09	0.13	0.03	0.7
-8	-1.4***	-0.78	-1.92***	-0.55	-1.6**	-0.42	-1.03	0.13	0.22	0.52	0.13	-0.17	0.13	0.78
-7	-0.96**	-0.2	-2.16***	0.31	-2.21***	-0.57	-0.8	0.36	0.03	0.14	-0.06	-0.7	0.19	0.51
-6	-1.63***	-0.7	-2.55***	0.39	-2.42***	-0.33	-1.26	0.39	0.36	-0.29	-0.01	-1.23**	0.48	0.11
-5	-2.32***	-0.98	-3.03***	-0.5	-2.86***	-0.27	-1.62	0.08	-0.01	-0.34	-0.44	-1.45**	0.65	-0.24
-4	-2.7***	-1.3*	-3.06***	-1.13	-2.82***	-0.23	-1.61	0.14	0.27	-0.95	-0.28	-1.54**	0.78	-1.03
-3	-1.74***	-0.88	-2.55**	-0.56	-3.02***	-0.26	-1.04	0.63	0.82	-1	0.03	-1.58**	1.1*	-1.37
-2	-1.59**	-1.3	-2.16*	-0.74	-3.2***	-0.32	-0.48	0.72	0.62	-0.73	-0.2	-1.34*	1.24**	-1.35
-1	-1.65**	-0.88	-2.51*	-0.61	-3.85***	-0.06	-0.83	1.41**	0.78	0.13	-0.02	-1.49*	1.53**	-0.89
0	-2.11***	-1.34	-3.22**	-1	-4.31***	-0.29	-1.8	1.6***	0.94	-0.23	0.08	-1.71**	1.69**	-1.75
1	-2.71***	-2.96***	-2.62*	-1.71*	-5.42***	-4.7***	-1.18	1.62**	0.86	-0.1	0.18	-1.54*	1.51**	-1.9
2	-2.48***	-2.88***	-3.11**	-2.3**	-6.68***	-4.32***	-0.75	1.74***	0.8	-0.05	0.39	-1.59*	1.55**	-2.16
3	-2.81***	-3.21***	-3.28**	-3.01***	-7.66***	-4.28***	-0.81	2***	1.13	-0.5	0.86	-1.94**	1.57**	-2.51*
4	-2.66***	-3.06***	-3.64**	-2.73**	-7.98***	-4.08***	-0.89	2.39***	1.47**	-0.24	1.62**	-1.89**	1.74**	-2.5*
5	-2.89***	-3.38***	-4.12**	-3.45***	-8.34***	-4.18***	-1.83	2.6***	1.63**	-0.13	1.87**	-1.62	1.89**	-2.88*
6	-3.29***	-3.69***	-4.37**	-3.78***	-9.06***	-4.4***	-1.94	3.31***	2.25***	0.4	2.63***	-1.27	1.92**	-2.82*
7	-3.27***	-3.47***	-4.94***	-3.38***	-9.28***	-4.43***	-2.62	3.5***	2.28***	1.33	2.67***	-1.03	1.98**	-2.57
8	-3.49***	-3.74***	-5.23***	-3.95***	-9.84***	-4.12***	-2.59	2.85***	1.26	1.77	2.8***	-0.7	1.39	-2.81*
9	-3.7***	-4.08***	-5.75***	-4.12***	-10.67***	-4.05***	-2.55	2.74***	1.3	1.4	3.02***	-1.11	1.53*	-2.76
10	-3.9***	-4.17***	-6.05***	-3.86***	-10.8***	-4.17***	-3.15	2.61***	1.44*	0.94	3.37***	-1.46	1.76*	-3.48**
N	8	6	7	6	7	5	5	30	30	28	26	27	22	15

Remark: The results presented above show the standardized cumulative excessive portfolio flows to African EMEs as a reaction on an upgrade or a downgrade of the recipient sovereign; the flows are measured in million USD. The values have been calculated with an AR(S)-GARCH(1,1) approach. The first column shows the time relative to the date of the rating or outlook revision t=0. The last line displays the number of events. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Appendix H: Cumulative excessive flows to Asia.

	Upgrade							Downgrade						
				Debt		Equity					Debt		Equity	
t	Aggregate	Active	Passive	Active	Passive	Active	Passive	Aggregate	Active	Passive	Active	Passive	Active	Passive
-10	0.2	-0.23	0.49	0.06	0.95*	-0.92	-0.11	-0.05	-0.31	0.31	-0.12	0	0.01	0.37
-9	-0.02	-0.36	-0.01	0.47	0.09	-1.51	-0.19	0.02	-0.24	0.19	0.17	-0.12	-0.28	0.38
-8	0.03	-0.24	-0.71	0.87	-0.74	-1.62	-0.12	-0.19	-0.24	0.03	0.2	0.07	-0.35	0
-7	0.42	-0.03	-0.32	0.53	-0.58	-1.08	0.41	-0.01	0.06	-0.35	0.86**	-0.18	-0.66	-0.21
-6	0.62	0.32	-0.2	1.38	-0.46	-1.21	0.37	-0.37	-0.37	-0.98**	0.59	-0.83	-0.73	-0.27
-5	0.75	0.44	-0.12	1.07	-0.73	-1.38	0.9	-0.86**	-0.55	-0.98**	-0.25	-0.41	-0.5	-0.66
-4	0.66	0.42	-0.39	1.43	-0.61	-1.63	0.79	-1.33***	-0.78	-1.49***	-0.96**	-0.94	-0.19	-0.98
-3	0.39	-0.36	0.24	0.38	-0.29	-1.94	1.16	-1.75***	-1.07**	-1.97***	-1.3**	-1.6**	-0.22	-1.02
-2	0.38	-0.23	0.1	1.26	-0.29	-2.08	1.27	-2.03***	-1.09*	-2.63***	-1.86***	-2.15***	0.17	-1.42*
-1	0.61	-0.19	0.38	1.09	0.86	-1.7	0.88	-1.93***	-0.96	-2.72***	-1.88***	-1.95**	0.56	-2.02**
0	0.58	0.11	-0.43	1.7	0.61	-1.8	0.63	-2.14***	-1.17*	-2.95***	-2.53***	-2.13**	1.02	-2.46***
1	0.45	0.45	-1.32	2.32*	0.49	-2.09	-0.19	-2.48***	-1.12*	-3.39***	-3.28***	-2.75***	1.07	-2.92***
2	0.53	1.03	-2.26*	3.47**	0.25	-1.75	-0.78	-2.3***	-0.76	-3.39***	-3.33***	-2.86***	1.46	-2.92***
3	0.49	0.92	-2.09*	3.32**	0.69	-1.64	-0.7	-2.41***	-0.9	-3.35***	-4.01***	-3.22***	1.68	-2.64**
4	0.11	0.85	-2.84**	3.54**	0.59	-1.71	-1.29	-2.25***	-0.5	-3.49***	-3.87***	-3.38***	1.78	-2.56**
5	-0.27	0.78	-3.48***	3.9**	0.48	-2.19	-1.65	-2.92***	-1.17	-3.49***	-5.57***	-3.64***	1.99	-2.62**
6	-0.53	0.57	-3.65***	3.37**	0.67	-2.42	-1.79	-2.93***	-0.75	-3.67***	-5.16***	-3.61***	1.98	-2.81**
7	-0.58	1.03	-4.29***	4.22***	-0.05	-2.89	-2.16	-2.64***	-0.41	-3.49***	-4.75***	-3.11***	1.86	-2.67**
8	-0.68	1.11	-4.66***	4.18**	-0.46	-2.98	-2.31	-2.07***	0.61	-3.74***	-4.05***	-3.42***	2.43	-3.17***
9	-0.87	1.29	-5.25***	4.71***	-1.33	-2.83	-2.41	-2.2***	0.48	-4.06***	-4.39***	-3.76***	2.51	-3.67***
10	-1.47	1.08	-6.29***	4.28**	-2.09	-3.28	-2.94	-2.39***	0.59	-3.9***	-4.74***	-3.72***	2.77	-3.56***
N	5	5	5	4	4	3	4	30	30	31	23	24	18	18

Remark: The results presented above show the standardized cumulative excessive portfolio flows to Asian EMEs as a reaction on an upgrade or a downgrade of the recipient sovereign; the flows are measured in million USD. The values have been calculated with an AR(S)-GARCH(1,1) approach. The first column shows the time relative to the date of the rating or outlook revision t=0. The last line displays the number of events. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Appendix I: Cumulative excessive flows to emerging Europe.

	Upgrade							Downgrade						
				Debt		Equity					Debt		Equity	
t	Aggregate	Active	Passive	Active	Passive	Active	Passive	Aggregate	Active	Passive	Active	Passive	Active	Passive
-10	-0.71***	-0.76***	0	-0.86***	-0.35	0.62**	0.19	-0.22	-0.23	-0.08	-0.1	0.03	0.3	-0.26
-9	-0.6***	-0.4	-0.43	-0.73**	-0.83**	1.46***	0.01	-0.22	-0.23	-0.43	0.03	-0.2	0.05	0.04
-8	-0.62**	-0.35	-0.81*	-0.84**	-0.99**	2.48***	-0.35	0.17	0.18	-0.39	0.49	0.16	0.4	-0.24
-7	-0.64*	-0.47	-0.95*	-1.12***	-1.38***	2.53***	0.39	0.66**	0.81**	0.12	1.3***	0.91*	0.57	-0.64
-6	-0.83**	-0.49	-1.36**	-1.33***	-1.55***	2.82***	-0.41	0.54	1.04**	-0.37	1.63***	0.7	0.69	-1.52**
-5	-1.2***	-0.62	-2.22***	-1.53***	-2.61***	3.4***	-0.48	0.56	0.79	-0.23	1.43***	1.1*	0.65	-1.62**
-4	-1.73***	-1.6***	-1.38**	-2.56***	-2.01***	2.64***	0.06	0.57	0.92*	-0.22	1.54***	1.31**	0.75	-1.39*
-3	-1.42***	-0.73	-2.17***	-1.83***	-2.97***	3.17***	-0.08	0.75	1.23**	-0.36	1.94***	1.25*	0.69	-1.49*
-2	-1.06**	-0.19	-2.31***	-1.39**	-3.36***	3.86***	0.46	0.86*	1.47**	-0.89	2.21***	0.94	1.09	-2.02**
-1	-1.21**	-0.31	-2.51***	-1.59**	-3.49***	3.99***	0.18	0.65	1.38**	-1.58**	2.08***	0.32	1.74	-2.81***
0	-1.49***	-0.54	-2.75***	-1.95***	-3.62***	4.39***	0.21	0.41	1.27*	-2.12***	2.08***	-0.19	1.94*	-2.94***
1	-1.05*	0.41	-3.01***	-1.08	-4.08***	4.31***	0.23	0.17	0.79	-2.39***	1.69***	-0.52	1.99*	-2.42**
2	-0.42	1.04	-2.55***	-0.52	-3.9***	4.28***	0.42	0.8	1.25*	-2.12**	2.37***	-0.15	2	-2.75***
3	-0.15	1.25	-2.4***	-0.42	-3.96***	5.14***	-0.03	1.19*	1.56**	-1.85**	2.81***	0.12	2.04	-2.17**
4	0.53	2.05**	-2.46***	0.3	-4.24***	5.35***	0.18	1.42**	1.66**	-1.89**	3.22***	0.18	1.66	-2.46**
5	0.6	2.37***	-2.91***	0.49	-4.35***	5.97***	-0.62	1.43**	1.61**	-1.81*	3.28***	0.46	1.91	-3.12***
6	0.44	2.22**	-3.31***	0.32	-4.61***	5.33***	-1.26	1.63**	1.92**	-1.87*	3.64***	0.49	2.08	-3.05***
7	0.77	2.77***	-3.63***	0.68	-4.85***	6.18***	-1.42	1.99***	2.69***	-2.65***	4.42***	-0.18	2.23	-2.99**
8	0.81	2.99***	-4.08***	0.88	-5.31***	5.96***	-1.55	2.22***	3.07***	-2.99***	4.95***	-0.34	2.22	-3.24***
9	0.88	3.24***	-4.32***	1.08	-5.65***	6.28***	-1.73	2.61***	3.14***	-2.35**	5.08***	0.49	2.13	-3.25***
10	1.72**	4.81***	-5.06***	2.59***	-6.08***	6.24***	-3.1*	2.67***	3.35***	-2.41**	5.35***	0.49	2.18	-3.89***
N	12	11	12	11	12	9	6	21	22	22	21	22	16	18

Remark: The results presented above show the standardized cumulative excessive portfolio flows to European EMEs as a reaction on an upgrade or a downgrade of the recipient sovereign; the flows are measured in million USD. The values have been calculated with an AR(S)-GARCH(1,1) approach. The first column shows the time relative to the date of the rating or outlook revision t=0. The last line displays the number of events. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Appendix J: Cumulative excessive flows to Latin America.

	Upgrade							Downgrade						
				Debt		Equity					Debt		Equity	
t	Aggregate	Active	Passive	Active	Passive	Active	Passive	Aggregate	Active	Passive	Active	Passive	Active	Passive
-10	-0.08	0.15	-0.17	0.3	-0.26	0.15	-0.35	-0.12	-0.31*	-0.06	-0.47**	-0.35*	0.52	0.38
-9	-1.26	-1.73*	-0.33	0.66	-0.77	-0.06	0.98	-0.15	-0.41*	-0.15	-0.25	-0.48	0.08	0.29
-8	-1.46	-0.97	-1.55	1.08*	-0.15	-0.41	-0.22	-0.44*	-0.82***	-0.34	-0.5	-0.62*	-0.25	0.38
-7	-1.54	-0.8	-1.92	0.82	-0.36	0.17	0.68	-0.34	-0.78**	-0.31	-0.44	-0.59	0.35	0.5
-6	-2.42*	-1.84	-2.18	1.08	0.72	0.88	-1.28	-0.54	-1.03***	-0.56	-0.8	-1.07**	0.4	0.66
-5	-2.36	-1.88	-1.78	1.66*	1.07	1.41	-2.25	-0.95**	-1.41***	-0.94**	-1.1**	-1.64***	0.73	0.69
-4	-2.43	-2.07	-0.41	2.03**	0.77	0.94	0.52	-1.19***	-1.57***	-1.34***	-1.31**	-2.19***	1.56*	0.98
-3	-3.06*	-2.81	-0.42	1.36	0.24	-1.28	2.21	-1.41***	-1.8***	-1.86***	-1.49**	-2.97***	1.75*	0.95
-2	-3.05	-2.47	-1.75	1.59	-0.34	-1.54	0.53	-1.26***	-1.87***	-1.81***	-1.5**	-2.58***	1.94*	0.94
-1	-2.9	-2.14	-1.96	2.46**	0.62	-1.2	0.7	-1.38***	-2.14***	-2.08***	-2.22***	-2.72***	1.95*	0.68
0	-2.53	-1.56	-1.62	3.68***	1.38	-1.39	-0.13	-1.74***	-2.7***	-2.5***	-2.46***	-2.91***	1.51	0.65
1	-3.55*	-2.37	-2.19	4.17***	1.78	-1.76	-0.38	-1.51***	-2.6***	-2.45***	-2.17***	-2.71***	1.41	0.67
2	-3.94*	-2.14	-2.88	4.76***	1.07	-1.01	-1.14	-1.29**	-2.4***	-2.61***	-1.78**	-2.87***	1.76	0.66
3	-4.5*	-2.5	-3.09	5.5***	0.42	-0.6	-1.94	-1.29**	-2.55***	-2.97***	-2.08**	-3.18***	1.47	0.82
4	-4.31*	-2.34	-2.85	5.67***	0.11	-1.29	-1.55	-1.19**	-2.55***	-2.93***	-1.98**	-3.1***	1.51	0.9
5	-4.36*	-2.69	-2.36	6.16***	0.47	-0.68	0.05	-1.52**	-2.81***	-3.16***	-2.34**	-3.21***	1.58	0.37
6	-5.15**	-3.54	-1.87	6.73***	0.67	-1.32	-0.86	-1.58**	-2.7***	-3.3***	-1.92**	-3.39***	1.87	-0.09
7	-5.2**	-3.5	-2.12	6.92***	1.56	-0.78	-1.49	-1.46**	-2.72***	-3.29***	-1.57	-3.01***	1.22	-0.18
8	-3.34	-1.23	-1.69	8.58***	1.59	-1.91	-1.11	-1.43**	-2.51***	-3.51***	-1.87*	-3.15***	1.7	-0.26
9	-3.53	-1.55	-1.31	9.19***	2.63	-0.45	-2	-1.85***	-3.01***	-3.66***	-2.4**	-3.19***	1.75	-0.34
10	-3.02	-0.92	-0.59	9.3***	2.82	1.34	-1.06	-2.1***	-3.14***	-3.92***	-2.29**	-3.38***	2.31	-0.37
N	2	2	2	1	1	1	1	39	38	42	24	28	17	20

Remark: The results presented above show the standardized cumulative excessive portfolio flows to Latin American EMEs as a reaction on an upgrade or a downgrade of the recipient sovereign; the flows are measured in million USD. The values have been calculated with an AR(S)-GARCH(1,1) approach. The first column shows the time relative to the date of the rating or outlook revision t=0. The last line displays the number of events. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.