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The transmission of emerging market shocks to global equity markets ☆

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ABSTRACT

The paper analyzes whether, and to what extent, emerging market economies (EMEs) have systemic importance for global financial markets, above and beyond their influence during crises episodes. Using a novel database of exogenous economic and political shocks for 14 systematically relevant EMEs, we find that EME shocks not only have a statistically but also economically significant impact on global equity markets. The economic significance of EME shocks is in particular underlined by their remarkably persistent effects over time. Importantly, EMEs are found to influence global equity markets about just as much in "good" times as in "bad" times, though they tend to be stronger during crises or periods of financial turbulence. Finally, we detect a large degree of heterogeneity in the transmission of EME shocks to individual countries' equity markets, stressing the different degrees of financial exposure, which is relatively higher for European equity markets.

1. Introduction

On 27 February 2007, Chinese news reports suggested that the government was about to impose controls to curb speculation in the overheating stock market. These reports triggered a record 9% drop in the local stock markets, and sent down equity markets worldwide by more than 2%. Other emerging economies as well as the US, Europe and Japan were affected. Market observers were unanimous that the drop in global equity markets on that day can be attributed primarily to developments in China.[2] The size and global importance of the Chinese economy, and to an extent also the Chinese equity market at least within Emerging Asia, are likely to be factors that explain why events such as this one imply that emerging market economies (EMEs) may at times be an important or even dominant driver of global financial markets.

This challenges our general perception that EMEs are relevant for global financial markets mainly when they experience financial crises, thus inducing an abrupt portfolio rebalancing that also affects investment decisions and thus returns in markets of

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[1] At the time of writing this paper the author was on secondment at the European Central Bank.

[2] "Stocks worldwide fall on China" (Bloomberg 27 Feb 08); "Equity markets tumble following Asian sell-off" (Financial Times, 28 Feb 07); "Emerging markets were set for the biggest two-day slump in eight months as the effects of the selloff in Chinese markets spread through Asia and Europe" (Bloomberg, 28 Feb 08). "German stocks fell for a second day amid a slump in global equities that wiped almost $1 trillion off the value of world benchmarks. A slide in markets started in China yesterday amid concern the government will tighten controls on investment" (Bloomberg 28 Feb 08).

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mature economies. In fact, there is a large literature focusing on and indeed finding evidence for the international transmission of EME shocks and for contagion during crises in emerging markets, foremost the Latin American crises of 1994–95 the Asian crisis of 1997–98 and the Russian default of August 1998 (see e.g. Kaminsky and Schmukler, 1999; Baig and Goldfajn, 1998; Rigobon, 2002; Wongswan, 2003). However, the evidence on contagion is rather mixed (Bekaert et al., 2005).

However, there have been no major crises in systematically relevant emerging markets since 1998 – apart from the Turkish and Argentine crises of 2000 and 2001 – which arguably have had little systemic repercussions for global financial markets (Krueger, 2002; Fischer, 2002; Hall and Taylor, 2002). At the same time, emerging markets' assets have become increasingly important over the past decade, also for investors in mature economies; and emerging economies have developed into an ever more relevant driver of global economic growth, being increasingly intertwined with mature economies via trade, FDI and the relocation of production.

The present paper asks whether, and to what extent, EMEs have systemic importance for global financial markets, above and beyond their influence during crises episodes. Such an analysis is complicated by an identification problem, i.e. the difficulty to distinguish financial market developments in emerging markets from those in mature economies. We use a novel database of shocks that are truly idiosyncratic and specific to EMEs. These shocks are based on and extracted from "exogenous" sources, i.e. on International Finance Corporation reports (factbooks, quarterly reviews, and monthly reviews of emerging markets, among others), as well as Bekaert and Harvey (1998, 2003) and various IMF reports. The news reported in these sources has been selected based on their country-specific nature and overall economic and political importance, and *not* based on their financial market impact. Considerable effort has been put into dating the various events identified, based on newswire services.

More specifically, the database comprises a broad range of important political and economic events, which covers both "negative" events that drive markets lower as well as "positive" news such as the announcement of important economic reforms. Using daily data over the period 2000–2004, we analyze the transmission of these shocks from 14 EMEs in Latin America, Asia and Eastern Europe to 15 mature economies' equity markets – covering the 12 euro area countries at that time, the United States, Japan and the United Kingdom – plus global equity market returns, as well as the intra-regional and extra-regional spillover across EMEs. Thus the analysis based on such identified EME shocks allows a very rich analysis of the transmission of different types of shocks, and during tranquil rather than only crises periods.

The empirical analysis yields a number of striking findings. Overall, there is a substantial transmission of EME shocks to global equity markets: EME shocks have a significant and sizeable effect, inducing on average a 0.3% change in global daily equity returns on the day a shock occurs. The magnitude of this impact may appear substantial, but it should be noted that we include as EME shocks only events that represent significant economic or policy-relevant news or developments in the country concerned, and that the database contains EME shocks for only about one quarter to one third of all trading days. Moreover, while we have few crisis periods in our sample, this effect is found to be twice as large during times when individual EMEs experience and emit particularly large shocks.

Second, there is evidence that this effect of EMEs on global equity markets is fairly persistent, as it is detectable even after a few days. While it is difficult to quantify precisely the overall explanatory power of the EME shocks for global equity markets, in particular the persistence of the effects stresses the economic relevance and systemic importance of emerging markets for global equity markets. Our empirical analysis indicates that on those days when EME shocks occur, they explain about 20% of global equity return movements. The impact of EME which we can identify is nevertheless not too large given that, as mentioned earlier, our database contains EME shocks for only a limited share of trading days in the sample.

A third key finding of the paper is that global equity markets react almost as strongly to positive EME news as to negative news, with this result being robust across EMEs and over time. This underlines that EMEs matter for global financial markets not only during crises or other less favorable episodes, but that investors in mature economies also share the gains from positive developments in EMEs.

Finally, there are a number of intriguing cross-country differences: although EME equity markets generally react more strongly to shocks in other EMEs of the same region, mature economies overall react mostly more strongly to EME shocks than emerging markets from other regions. Among mature economies, US equity returns respond much more to shocks in Latin America than to those in Emerging European and Asian EMEs, while Japanese markets are somewhat more sensitive to Asian EMEs. By contrast, euro area and UK markets not only show the strongest exposure and overall reaction to EME shocks, but they appear to be roughly equally sensitive to shocks from all the three EME regions of Asia, Emerging Europe and Latin America.

In sum, the findings of the paper emphasize the emergence and relevance of EMEs for global and in particular mature economies' financial markets. Given the importance and ongoing increase of cross-border financial investment as a transmission channel and the rapid growth of EMEs as an asset class, the results suggest that EMEs are likely to continue becoming an even more important factor for the determination of global asset prices in the years to come.

The paper is organized as follows. We start with a brief review of related literature in Section 2, before proceeding to a detailed presentation and some stylized facts of our dataset in Section 3. Section 4 presents the empirical methodology as well as the benchmark empirical results for the transmission of EME shocks. Section 5 then discusses various extensions to the benchmark model and several robustness tests. Section 6 concludes.

2. Related literature

The empirical literature has pointed towards a rapidly increasing degree of financial market integration, at least over the past decade. In the early 1990s, most evidence pointed towards no or little market integration, as shown e.g. by King et al. (1994) who

find evidence against the null hypothesis of integrated capital markets, or Bekaert and Harvey (1995) who only find a partial integration of equity markets, in particular of EMEs, based on an international CAPM modeling framework. However, in recent years the evidence on financial integration has changed due to financial liberalization and macroeconomic convergence, among other factors. As regards stock markets in Europe, Kim et al. (2005) find that over the period 1999–2003 there has been an increase in integration significantly driven (in part) by macroeconomic convergence associated with European Economic and Monetary Union. Among the consequences of the increased integration, Albuquerque et al. (2005), point to a greater role for worldwide sources of risk.

However, for the context of the present paper we are particularly interested in the evidence of financial integration and interdependence of emerging markets. Much of the focus on EMEs in this context over the past decade has been on crises and contagion in and their impact on mature economies. A starting point for this discussion is the definition of contagion, which is not unanimous and rather controversial in the literature. In fact, Karolyi (2003) observes that the perception of market contagion is not always consistent with the empirical evidence. Some researchers define contagion as an increase in the degree of interdependence, and find that little of such an increase has taken place in financial crises of the 1990s (Forbes and Rigobon, 2002). Others, as Bekaert et al. (2005) define contagion as an unexpectedly higher degree of correlation given economic fundamentals, and find little evidence of contagion on the Mexican crisis, but do find it in Asia during the Asian crisis. In the same line, Baele (2005) finds evidence of contagion from the US markets to European markets during periods of high market volatility.

Considering the literature on the channels of contagion, shocks affecting world's financial centers are determinants of contagion according to Kaminsky and Reinhart (2002), who find that financial turbulence in Brazil, Russia, and Thailand in the late 1990s spread globally when it affected asset markets in one or more of the world's financial centers. Similarly, herding behavior is another source of contagion, as indicated by Kaminsky and Schmukler (1999), who analyze the sources of the largest daily swings in markets during the Asian crisis by testing the impact of news on daily returns, and show that large swings affect local and international markets due to herding behavior. In the same vein, Baig and Goldfajn (1998) test for contagion during the Asian crisis and suggest that there exist discernible patterns of contagion during periods of financial market instability when market participants tend to move together across a set of countries. More recently, Rigobon (2002) supports the idea that the transmission of shocks was intensified during the Russian and the Asian crises, as well as Cappiello et al. (2005) who find that co-movements in equity returns tend to increase significantly during crises, as they should according to any factor model (Bekaert et al., 2005).

Concerning the speed of the transmission, the general consensus is that the transmission occurs very rapidly and is intensified during crisis periods, as shown in Ederington and Lee (1993), Fleming and Remolona (1999), and Andersen et al. (2003). These findings are in line with Ehrmann, Fratzscher and Rigobon (2005) who find that there are substantial international spillovers, and that the international propagation of shocks is strengthened in times of recession.

A second important strand relevant for the present paper is the transmission of macroeconomic shocks. The key argument here is that asset prices are determined simultaneously and thus it is difficult to identify which individual markets are the drivers of global markets. Several studies have therefore taken macroeconomic announcements or news to identify shocks, and to analyze their transmission. The most frequent approach in the literature has been to study the impact of US and/or other developed market economies news on global financial markets. Canova (2005) find that US monetary shocks produce significant fluctuations in Latin America, but real demand and supply shocks do not. Wongswan (2003) finds a large and significant association between emerging-economy equity volatility and trading volume and developed-economy macroeconomic announcements at short-time horizons. Other studies focusing on the impact of US news on asset prices and foreign exchange rates include Andersen et al. (2003), Miniane and Rogers (2003) and Ehrmann and Fratzscher (2004). For instance, Andersen et al. (2003) analyze the response of the US dollar exchange rate to macroeconomic announcements and find that the market reacts in an asymmetric fashion to good and bad news.

A third strand relevant for the present paper focuses on the role of financial and real integration as a determinant of the financial transmission process. For instance, considering the linkages among financial markets, Dungey and Martin (2007) provide evidence that cross market linkages played a key role during the Asian crisis. In this sense, the consensus in the literature is that trade and financial channels are important factors in determining how crises are transmitted internationally (Eichengreen et al., 1996, Glick and Rose, 1999; Forbes and Chinn, 2004). Focusing on the US during tranquil times, Ehrmann and Fratzscher (2006) link the strength of the transmission of US monetary policy shocks to the underlying asset holdings and find that the degree of global integration of countries is a key determinant for the transmission process.

In summary, the literature has so far primarily concentrated on measuring the degree of integration of EMEs into global financial markets or generally on how various EMEs respond to external and internal shocks. As to the relevance of EMEs for global financial markets, the focus has been on crisis periods and on contagion issues. To our knowledge, there is no systematic work so far assessing how important EMEs are as drivers of global financial markets overall, and not only during crises episodes. The analysis of this issue constitutes the aim of the present paper and its intended contribution to the literature.

3. The data

This section presents our data and discusses how we identify EME shocks. A key difficulty with every type of analysis of financial market linkages is identification: as asset prices are determined simultaneously in global markets, with shocks often triggering reactions of several asset prices within minutes, it is difficult to identify the source of asset price movements and the corresponding direction of causality.

Table 1
Summary statistics

	Shocks			Economic shocks			Political shocks		
	Total	Positive	Negative	Total	Positive	Negative	Total	Positive	Negative
Emerging markets	424	204	220	308	152	156	176	80	96
Latin America	214	113	101	146	77	69	76	39	37
Argentina	58	24	34	29	11	18	29	13	16
Brazil	39	22	17	34	19	15	5	3	2
Chile	38	22	16	20	14	6	18	8	10
Mexico	92	50	42	67	35	32	25	15	10
Emerging Asia	152	67	85	99	45	54	55	23	32
India	48	19	29	27	12	15	21	7	14
Indonesia	35	10	25	16	4	12	19	6	13
Korea	40	21	19	19	10	9	21	11	10
Malaysia	21	9	12	12	4	8	9	5	4
Taiwan	31	17	14	20	11	9	11	6	5
Thailand	26	15	11	24	14	10	2	1	1
Emerging Europe	168	81	87	123	61	62	55	24	31
Czech Republic	28	14	14	15	9	6	13	5	8
Poland	56	30	26	44	24	20	12	6	6
Russia	77	32	45	56	22	34	21	10	11
Turkey	24	13	11	15	8	7	9	3	6

Notes: The table shows the number of news, economic news and political news recorded for each country and region.
Sources: IMF; IFC; Bekaert and Harvey (1998, 2003); Factiva.

We solve this identification issue by using exogenous events occurring in EMEs. The list of events for each of the 14 EMEs mostly comes from reports by the International Finance Corporation (factbooks, quarterly reviews, monthly reviews of emerging stock markets) and the IMF (Independent Evaluation Office reports), which have partly been collected and summarized by Bekaert and Harvey (1998, 2003). More specifically, Bekaert and Harvey (2004) extend this detailed database for important political and economic events in 20 emerging economies from the early 1970s. This database was later updated on the website they created to compile further developments (Bekaert and Harvey, 2004). The database currently provides key events for more than 50 countries until mid-2004. Unfortunately, in many cases these events do not reflect the exact date where the events took place.

For the present paper, we have dated the events when the exact date is not available in the Bekaert and Harvey database. We did so through different newswire services to find the first instance when each event was reported. To do this, we used mainly Factiva, as well as some newspaper libraries to attribute each of the events to the particular day when it was first reported (see details in Appendix A). By relying on the event selection available through the database of Bekaert and Harvey and by completing the information with the exact dates, we build a new events database with a daily frequency.

We believe that using these sources helps mitigate the identification problem as they are reliable and, importantly, the news reported in these sources have been selected based on their country-specific nature and overall economic and political importance, and *not* based on their financial market impact. This selection criterion implies that these news events are largely exogenous and specific to the identified EMEs. Given the focus on important idiosyncratic events in EMEs, the number of identified shocks is limited to, on average, only about 6 to 7 shocks per emerging market per year.

Our database includes economic and political news, and not only covers negative events, but also "positive" news that e.g. indicates better than expected economic growth or the announcement of important economic reforms. The shocks to emerging market j at time t are coded as follows:

$$S_{jt} = \begin{cases} +1 & \text{positive shock} \\ 0 & \text{no shock} \\ -1 & \text{negative shock} \end{cases}$$

This signing of EME news may not be always clear. However, in the large majority of cases their signing appears unanimous and there are only few EME developments for which it was unclear whether they should have a positive or negative effect on financial markets.[3] Another important caveat is that events should have an impact on financial markets only to the extent that they come unexpected and have not been fully anticipated by market participants. It is obviously impossible to determine and to consider in our identification of shocks the extent to which e.g. a terrorist attack or a collapse of a government was anticipated. We note, however, that such a potential bias should work to strengthen our results and make the true transmission of EME shocks larger — e.g. a collapse of a government may have a smaller effect on markets on the day it occurs (and hence in our empirical analysis) than its true overall effect, which may already partly have been priced in during the days and weeks before.

[3] The empirical analysis of the paper was also conducted removing such ambiguous events from the database. The results are, however, very similar to the ones presented below. The results based on the restricted sample are available upon request.

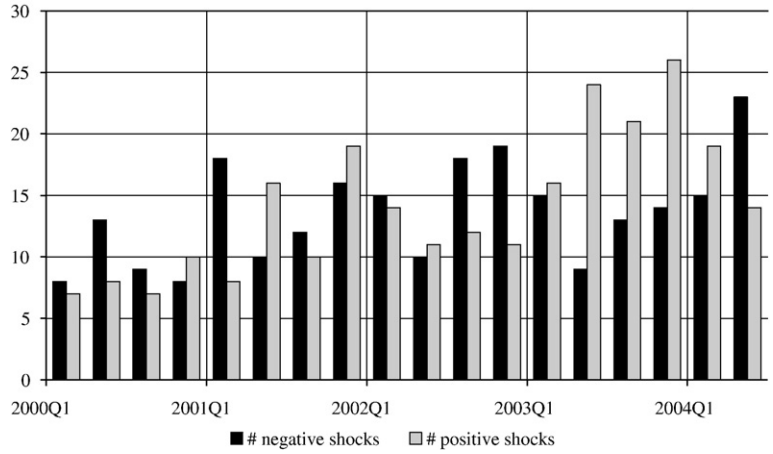

Fig. 1. Distribution of EME shocks over time. Notes: The figure shows the cumulated positive and negative shocks in a quarterly basis.

Appendix A provides an overview and some specific examples of our database for the case of Argentina to illustrate the above discussed points. The news includes events such as announcements of new regulations, monetary and fiscal policy announcements, the collapse of a financial institution or the election or resignation of a politician in individual EMEs. It should be stressed again that the "exogeneity" of the events, or shocks, captured by the IFC/IMF database is of fundamental importance for the validity of the analysis of the paper. As Appendix A illustrates for the case of Argentina, most of the news events indeed appear to be country-specific and exogenous in the sense that their origin is primarily a domestic and not a foreign one, and they can be considered as significant pieces of news going well beyond "business as usual" in economic or political terms. Moreover, although some of the news may not come entirely unexpected by the markets, at least part of the news and their timing are likely to be unanticipated.

We are also comforted by the fact that the primary source of the data is the IFC and the IMF, and their stated purpose is to identify country-specific events that have large economic relevance, and not primarily those that have a global market impact. For all these arguments, we believe this database provides the best possible identification method for EME-specific shocks in order to conduct our analysis of the impact of EMEs on global equity markets. As we will discuss further below, we also include a set of "global" shocks in order to control for a possible correlation of EME shocks with other unrelated global developments.

As to the country coverage, the database covers 14 EMEs, four in Latin America (Argentina, Brazil, Chile and Mexico), four in Emerging Europe (Czech Republic, Poland, Russia and Turkey) and six in Asia (India, Indonesia, Korea, Malaysia, Taiwan and Thailand), while the time period is 1 January 2000 to 31 July 2004. This list covers most of the systemically important EMEs, possibly with the exception of China. Hong Kong and Singapore are also not included, partly due to data availability and partly also as they may not be considered as emerging markets any longer given their degree of development and also financial market depth.

Table 1 gives a summary for the distribution of the shocks across EMEs. Overall, there are 424 days with shocks for all 14 EMEs over the whole sample period. This means that on average each EME had about 30 shocks over the close to 5-year sample period, or about 6 to 7 shocks per year. While some countries experience significantly more shocks over that period – these are, as expected, Argentina, Mexico and Russia – others have experienced very few shocks. Moreover, the shocks can mostly relatively easily be classified as political or economic shocks, and as positive or negative shocks. In the few cases where the sign of the news cannot be readily identified, we use the direction of the domestic stock market reaction to sign the news.

Fig. 1 shows the distribution of the shocks over time, quarter by quarter since 2000. The key point of this chart is that both positive and negative shocks are distributed relatively equally over time. Hence this underlines that the empirical findings are not driven by individual episodes during the sample period. This point is further investigated and confirmed in Section 4 when analyzing the time variations in the transmission of EME shocks.

Equity market returns come from Datastream market price indices. We chose Datastream indices as they have a very broad coverage of stocks within individual markets and are most readily comparable across countries. Datastream market indices are also available for a broad set of countries, thus providing an ideal source for our analysis of equity market spillovers.[4]

The empirical analysis is based on daily financial market data, using closing quotes of the respective national stock markets in local currency. It is important to consider this timing issue in the empirical modeling due to the fact that several equity markets do not have an overlap in trading times so that e.g. yesterday's shocks in Latin American EMEs need to be used to analyze the effects on Asian markets today. This means that Asian shocks are always included contemporaneously in the models for countries in all

[4] However, there are also some potential drawbacks of Datastream indices, for instance, the fact that IFC equity indices may in some instances be of higher quality. However, the need for indices that cover a broad set of countries and are directly comparable with one another point to Datastream indices as our preferred choice.

Table 2
Transmission of EME shocks — all shocks, by region

Event shock to	All 14 EMEs		Latin America 4 (LA4)		Emerging Asia 6 (EA6)		Emerging Europe 4 (EE4)		*R*-squared	Significance		
Market reaction of	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.		LA4 vs EA6	LA4 vs EE4	EA6 vs EE4
World	0.304***	0.04	0.362***	0.06	0.149**	0.07	0.270***	0.08	0.111	Y		
Latin America	0.403***	0.06	0.593***	0.07	0.099	0.08	0.314***	0.10	0.123	Y	Y	
Emerging Asia	0.299***	0.04	0.215***	0.06	0.405***	0.09	0.234***	0.08	0.113			
Emerging Europe	0.629***	0.08	0.390***	0.10	0.328***	0.13	0.947***	0.17	0.110		Y	Y
Euro area	0.354***	0.06	0.307***	0.08	0.278***	0.11	0.373***	0.09	0.104			
Japan	0.216***	0.07	0.238***	0.10	0.211*	0.12	0.072	0.11	0.093			
United Kingdom	0.317***	0.05	0.314***	0.07	0.234***	0.10	0.292***	0.10	0.109			
United States	0.328***	0.06	0.457***	0.08	0.106	0.10	0.273***	0.10	0.103	Y		
All countries (panel)	0.324***	0.03	0.275***	0.04	0.262***	0.04	0.335***	0.05	0.111			

Notes: The table shows the transmission coefficients β_j for EME shocks based on model 1 (1), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$, with $r_{i,t}$ as the equity return of country i, S_{jt} the shocks emanating from the 14 EMEs in the sample, G_{it} as a set of global controls and X_{it} a vector of controls. ***, **, * indicate statistical significance at the 99%, 95%, and 90% levels. The last set of columns, labeled "Significance", shows whether the regional differences are statistically significant. *R*-squared measures are based on the estimations with the three regional event dummies.

regions, while shocks in Emerging Europe are included with a lag for Asian returns, and shocks in Latin America with a lag for Asian returns and European returns.[5]

4. Empirical results

This section constitutes the core of the paper, providing the empirical results for the transmission of EME shocks to global equity markets. We start with the benchmark model and results in Section 4.1, discuss their economic relevance (Section 4.2) and then present several extensions and robustness tests in Section 5.

4.1. Methodology

As the first step of the analysis, we want to measure the transmission of shocks in emerging market country j to the equity market of country i. Our benchmark empirical specification looks as follows:

$$r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it} \quad (1)$$

which estimates the response of the equity return of country i, r_{it}, to the shocks emanating from the 14 EMEs in the sample, S_{jt}, a vector of global common factors, G_{it}, and to a vector of controls, X_{it}, such as own past returns and day-of-the-week effects.[6] Note that this model is estimated in a panel for all 29 countries i in our sample, including a country fixed effect α_i. The model thus yields transmission coefficients β_j for each of the 14 EMEs, which measure the average effects of each of the 14 EMEs on the other 29 countries.[7] Moreover, we form various EME groups by region so as to test whether e.g. the effect of the shocks emanating from Latin American EMEs is different from that stemming from Asian EMEs.

It is important to emphasize that ideally one would like to control for all other relevant factors G_{it} which may affect global equity markets, in particular "global" shocks. In order to control for such shocks as much as possible, we include two sets of proxies for global shocks G_{it}. First, we include a measure of global risk aversion, measured by the Chicago Board Options Exchange's SPX Volatility Index (VIX), which reflects a market estimate of future volatility, based on the weighted average of implied volatilities for a wide range of strike prices. The rationale for including this proxy for risk aversion is that the strength in the transmission may differ over time and may in part depend on the overall risk attitude of investors.[8] Moreover, we include daily US short-term interest rate changes as a proxy for world interest rates in the model.

Second, we include 12 of the most important US macroeconomic shocks, as measured through the news or unanticipated component of US macroeconomic announcement, as a proxy for global economic shocks. Although these macroeconomic shocks are US-based in nature, they have been shown in the literature to have a substantial effect on global FX and equity markets (Andersen et al., 2003; Ehrmann and Fratzscher, 2006). The rationale for including these shocks is to avoid that the EME shocks overlay with global economic shocks. Specifically, the US shocks are the surprise component of the US announcements of GDP (advance release), industrial production, CPI, PPI, retail sales, trade balance, non-farm payroll (NFP) employment, ISM business

[5] A potential caveat is that we do not have the exact time of day for all of the identified EME shocks. This means that e.g. some Latin American shocks may have a contemporaneous effect on European returns on the same day if they occurred in the early morning in Latin America. However, such a potential bias would work towards making the true spillover effects even stronger.

[6] The inclusion of the lagged dependent variable in a panel with fixed effects may induce a bias of the coefficients if there is a significant autocorrelation in the dependent variable. However, this is not the case here as the inclusion of lagged returns makes no substantive difference to the parameters of interest β_j, indicating that markets are efficient in incorporating past information.

[7] Note that we ensure in the estimation that shocks from country j are excluded when this same country is included as country i in the estimation.

[8] The VIX index is a frequently used proxy of investor risk aversion.

Table 3
Transmission of EME shocks — within EME countries and regions

Event shock to	Own country	EMEs All 14	America 4 Latin	Asia 6 Emerging	Europe 4 Emerging	*R*-squared	Significance		
Market reaction of							LA4 vs EA6	LA4 vs EE4	EA6 vs EE4
Latin America									
Argentina	2.399***	0.376***	0.825***	0.019	0.062	0.128	Y	Y	
Brazil	1.422***	0.508***	0.642***	0.135	0.496***	0.082	Y		
Chile	0.657***	0.241***	0.347***	0.073	0.213***	0.087	Y		
Mexico	0.953***	0.365***	0.650***	0.078	0.183*	0.102	Y	Y	
Emerging Asia									
India	1.286***	0.286***	0.080	0.510***	0.311***	0.083	Y		Y
Indonesia	2.224***	0.309***	−0.006	0.724***	0.234	0.105	Y		
Korea	1.567***	0.368***	0.291 **	0.410**	0.289*	0.113			
Malaysia	0.503***	0.087*	−0.035	0.179**	0.131*	0.089	Y		
Taiwan	2.094***	0.334***	0.257 *	0.610***	0.136	0.121	Y		Y
Thailand	1.134***	0.231***	0.140	0.268**	0.264*	0.101			
Emerging Europe									
Czech Republic	1.331***	0.269***	0.077	0.285***	0.375***	0.117		Y	
Poland	0.958	0.443***	0.253***	0.302***	0.576***	0.099		Y	
Russia	1.379***	0.723***	0.587***	0.398***	0.946***	0.108			Y
Turkey	7.724***	0.781***	0.299	0.407	1.411***	0.106		Y	Y

Notes: The table shows the transmission coefficients β_j for EME shocks based on model 1 (1), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$, with $r_{i,t}$ as the equity return of country i, S_{jt} the shocks emanating from the 14 EMEs in the sample, G_{it} as a set of global controls and X_{it} a vector of controls. In contrast to Table 2, this table shows the response of the individual EME equity returns to shocks. ***, **, * indicate statistical significance at the 99%, 95%, and 90% levels. The last set of columns, labeled "Significance", shows whether the regional differences are statistically significant. *R*-squared measures are based on the estimations with the three regional event dummies.

confidence, unemployment, consumer confidence, workweek and housing starts. The surprise component of each of these variables is calculated as the difference between the announced value and the expected value, where this latter is measured as the median expectation from surveys conducted by Money Market Services (MMS) International.

We use an OLS estimator with panel-corrected standard errors (PCSE) throughout the paper for the estimations in order to take account of and to correct for the heteroskedasticity as well as the cross-sectional correlation in the data. Using such an estimator is important in order to obtain correct variance–covariance matrices as otherwise we would underestimate the true standard errors of the coefficients.

4.2. Benchmark results

Table 2 shows the benchmark result for model (1) for global, regional and mature economies' equity markets. The market reaction of "world" shows the β coefficient when using the Datastream world market return index. The subsequent rows show the response of regional equity market return indices for Latin America, Emerging Asia and Emerging Europe, as well as the return indices of the large mature markets of the euro area, Japan, UK and the USA. The last row titled "All countries (panel)" shows the panel estimates indicating the average response of the 29 equity markets in the sample.[9]

Table 2 indicates that global equity returns react by 0.30% on average in response to a shock in one of the 14 EMEs. Global returns appear to be most sensitive to shocks in the Latin American EMEs, though they also sensitive to shocks in Emerging Asia and in Emerging Europe. The panel estimates in the last row are similar in magnitude when all EME shocks are taken together, giving a point estimate of 0.32%, though there are different responses from the world index to shocks from different regions.

How large is this effect of 0.3% of an EME shock, on average, on global equity markets? It is hard to gauge what this implies for global markets precisely. Given that our database contains, and thus the estimates are based on, EME shocks for about one third of the days in the sample (or, to be precise, 424 days out of 1193 days in the sample period), these EME shocks indeed exert an economically meaningful effect on global equity markets. However, the effect should also not be overstated: the median absolute daily global equity return over the sample period was 0.55%. Hence a daily average effect of 0.3% of EME shocks does not appear overly large compared to the "normal" daily movements in global equity markets. We will return to goodness-of-fit measures in more detail in the next sub-section.

Turning to the response of mature economies sheds light on these different regional effects and provides a number of interesting results. In particular, US, Japanese and European markets react quite differently to regional EME shocks. US equity markets change substantially more in response to Latin American than to Asian or Emerging European shocks. By contrast, Japanese markets appear to respond most to Asian and Latin American shocks, and not at all to shocks emanating from Emerging Europe. The euro area and the UK are very different again in that their reaction is very similar to shocks from all three EME regions.

[9] This panel estimate is comparable to the first row of using the world market index itself, only that the 29 countries in our sample do not constitute the whole global equity market – though they account for well over 90% of it – and that they are non-weighted in the sense that in the panel regression each equity market return r_{it} has an equal influence on the coefficient, i.e. independent of their actual share in global equity market capitalisation.

Table 4
Transmission of EME shocks to world equity markets — with global controls and US macro controls; goodness-of-fit

	A. All days				B. Only days with EME shocks				C. Only days with EME shocks: intensity of EME shocks			
Market reaction of global equity returns	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.
EME shocks	0.302***	0.04	0.304***	0.04	0.302***	0.04	0.297***	0.04	0.159***	0.02	0.160***	0.02
Global controls												
VIX			−0.020***	0.01			−0.025***	0.01			−0.030***	0.01
US interest rates			−6.281***	1.48			−6.293***	1.91			−5.968***	1.61
US macro shocks												
GDP (advance)			0.500***	0.21			0.756***	0.36			0.734***	0.35
Consumer confidence			1.000**	0.45			0.941**	0.46			0.930**	0.42
CPI inflation			−0.307	0.26			−0.508	0.67			−0.525	0.68
Housing starts			0.298	0.57			0.271	0.87			0.265	0.86
Industrial production			0.818***	0.36			0.843***	0.39			0.854***	0.34
ISM — NAPM			2.077***	0.93			2.047***	0.91			2.088***	0.92
NFP employment			2.119**	0.10			2.492**	0.11			2.473**	0.13
PPI inflation			0.039	0.07			−0.022	0.14			−0.021	0.13
Retail sales			−0.036	0.07			0.053	0.06			0.059	0.07
Trade balance			0.261	0.36			0.259	0.57			0.256	0.57
Unemployment			−1.780*	0.93			−1.727*	0.96			−1.722*	0.95
Workweek			0.605	0.29			0.791	0.58			0.792	0.59
# of observations	1193		1193		424		424		424		424	
R-squared	0.076		0.111		0.157		0.214		0.190		0.261	

Notes: The table shows the transmission coefficients β_j for EME shocks and coefficients μ for global shocks/controls $G_{i,t}$ based on model 1 (1), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$, with $r_{i,t}$ as the equity return of country i, S_{jt} the shocks emanating from the 14 EMEs in the sample, G_{it} as a set of global controls and X_{it} a vector of controls. Panel B restricts the sample to only days when EME shocks occurred; Panel C based on model 3 (3), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt} r_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$. ***, **, * indicate statistical significance at the 99%, 95%, and 90% levels.

For instance, euro area and UK markets react substantially more to shocks from Emerging Europe then do the United States and Japan. The last set of columns, labeled "significance", shows whether the regional differences are statistically significant, which they are for several of the cases.

A final point relates to the reaction of EME stock markets to shocks in other EMEs. Table 2 nicely illustrates that EME equity markets react very strongly to shocks in the own region; this is the case for Latin America (0.59%), Asia (0.41%) and Emerging Europe (0.95%). However, the evidence on cross-regional spillovers points to a more limited transmission of shocks from one EME region to other regions.

Table 3 shows the full matrix of spillovers for the 14 individual EMEs. Table 3 confirms the results of Table 2, only that it provides a much more detailed breakdown of the country-by-country transmission of shocks to individual EMEs. For instance, the findings in the table confirm that EME spillovers to other EMEs are much stronger within regions than across regions, though cross-regional spillovers do exist and are sometimes sizeable. Moreover, there are various other differences of interest, such as the different strength in the response of countries to own shocks. For instance, Turkey's stock market has been reacting much more strongly to domestic shocks than other EMEs, which may partly reflect the fact that Turkey went through a severe financial crisis in 2001 and 2002.

In summary, we find significant and sizeable spillovers from EMEs to global equity markets, with world equity returns responding on average 0.3% to EME shocks. The disaggregation of the shocks by source EME and by affected countries shows a heterogeneous picture, with mature economies being most sensitive to EME shocks from their own region, with the exception of Europe which appears to be roughly equally responsive to all three EME regions.

5. Robustness and extensions

As a final step, this section presents various extensions and robustness checks and discusses the overall economic relevance of EMEs shocks for global equity markets.

5.1. Controlling for global and US-specific factors, and goodness-of-fit

A crucial issue is whether the EME shocks included are endogenous to other, global developments. As outlined in detail in Section 3, we have argued that the sources and construction of the database, but importantly also the daily frequency of the data help us minimize such a potential endogeneity issue. Hence, endogeneity becomes a serious problem for our empirical model only when EME events are systematically caused by other events contemporaneously on the same day. To deal with this issue, we want to investigate to what extent our estimates are influenced by the inclusion of the global factors $G_{i,t}$ and other controls.

Panel A of Table 4 presents the empirical estimates for model (1) without these global and US controls, and for model (2) with the controls, with daily global equity returns as the dependent variable. The controls indeed are found to exert a significant effect

Table 5
Asymmetries of transmission — small versus large shocks

	Large shocks		Small shocks		Signif.
Market reaction of	Coef.	Std. err.	Coef.	Std. err.	
World	0.628***	0.20	0.274***	0.04	Y
Latin America	1.198***	0.28	0.351***	0.05	Y
Emerging Asia	0.992***	0.24	0.244***	0.05	Y
Emerging Europe	3.150***	0.59	0.427***	0.07	Y
Euro area	0.734***	0.23	0.320***	0.06	Y
Japan	0.238	0.34	0.212***	0.07	
United Kingdom	0.571***	0.19	0.290***	0.06	
United States	0.863**	0.35	0.298***	0.06	Y
# of EME shocks	32		392		

Notes: The table shows the transmission coefficients β_j for EME shocks based on model 1 (1), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$, as in Table 2, only that a further distinction is made between small shocks and large shocks. ***, **, * indicate statistical significance at the 99%, 95%, and 90% levels. The last column, labeled "Signif.", shows whether the difference between both is statistically significant.

on global equity returns: a higher risk aversion and an increase in US interest rates both lower global equity returns. The parameter estimate for US short-term interest rates indicates that a 100 basis point tightening in the US lowers global equity returns by 6.2%, which is line with what the literature has found (e.g. Ehrmann and Fratzscher, 2006). Moreover, many of the US macro variables exert a significant effect on equity markets, with a better than expected US performance raising global equity returns (e.g. higher GDP, consumer confidence, ISM, or non-farm payroll employment) while a worse than expected performance lowering stock returns.

Most importantly for the purpose of the present paper, the parameter estimate for the effect of EME shocks on global equity markets remains virtually unchanged: the coefficient changes from 0.302 in the model of column (1) without global controls to 0.304 in column (2) with the controls. This confirms our prior formulated above: global factors and US-specific shocks should influence the impact of EME shocks on global equity markets only to the extent that they systematically induce or coincide with EME developments, which does not seem to be the case.

How important are EMEs overall as a driver of global equity markets? To gauge the goodness-of-fit, Table 4 shows the *R*-squared for various specification of our model with the EME shocks. In fact the *R*-squared for the benchmark model

Table 6
Asymmetries of transmission

Panel A. Positive versus negative shocks					
	Positive shocks		Negative shocks		Signif.
Market reaction of	Coef.	Std. err.	Coef.	Std. err.	
World	0.285 ***	0.06	−0.331 ***	0.06	
Latin America	0.447 ***	0.08	−0.368 ***	0.08	
Emerging Asia	0.321 ***	0.07	−0.289 ***	0.08	
Emerging Europe	0.804 ***	0.11	−0.480 ***	0.12	
Euro area	0.384 ***	0.08	−0.334 ***	0.09	
Japan	0.249 ***	0.10	−0.181 *	0.09	
United Kingdom	0.289 ***	0.07	−0.364 ***	0.09	
United States	0.301 ***	0.09	−0.380 ***	0.09	
# of EME shocks	204		220		
Panel B. Political versus economic shocks					
	Political shocks		Economic shocks		Signif.
Market reaction of	Coef.	Std. err.	Coef.	Std. err.	
World	0.292***	0.06	0.288***	0.05	
Latin America	0.503***	0.08	0.327***	0.07	
Emerging Asia	0.321***	0.08	0.295***	0.06	
Emerging Europe	0.445***	0.11	0.696***	0.10	
Euro area	0.253***	0.09	0.382***	0.07	
Japan	0.123	0.11	0.220***	0.08	
United Kingdom	0.285***	0.08	0.326***	0.07	
United States	0.367***	0.09	0.293***	0.07	
# of EME shocks	176		308		

Notes: The table shows the transmission coefficients β_j for EME shocks based on model 1 (1), $r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \mu G_{it} + \delta X_{it} + \varepsilon_{it}$, as in Table 2, only that a further distinction is made between positive and negative shocks (Panel A) and political and economic shocks (Panel B). ***, **, * indicate statistical significance at the 99%, 95%, and 90% levels. The last column, labeled "Signif.", shows whether the difference between both is statistically significant.

with only EME shocks is merely 0.076 (Panel A of Table 4). This is not surprising given that very few days actually have EME events — recall that in total only about one third of the days in the sample have identified EME shocks. As an alternative, Panel B of Table 4 reports the results of the model including only those days on which EME shocks occurred, and we find that the *R*-squared more than doubles up to 0.157.

This is sizeable and not negligible, especially given that the EME events in the benchmark model have been coded merely as dummies. Hence they do not allow distinguishing EME shocks according to their importance. To gauge the importance of EME shocks when allowing for differences in the relative importance of each shock, the following modification of the model weights each EME shock $S_{j,t}$ by the reaction of the domestic stock market $r_{j,t}$ to the shock (i.e. a larger domestic stock market reaction to a domestic, EME shock implies a relatively larger weight of this shock in the model):

$$r_{it} = \alpha_i + \sum_{j=1}^{14} \left(\beta_j S_{jt} r_{jt}\right) + \mu G_{it} + \delta X_{it} + \varepsilon_{it} \tag{2}$$

Panel C of Table 4 indicates that the *R*-squared of model (2) without global and US controls rises to 0.19, while the point estimates suggests that an EME shock that e.g. lowers domestic EME equity returns by 1% reduces global equity returns by on average 0.16%. Overall, this means that close to 20% of daily global equity market movements can be explained by EME shocks on those days when important EME shocks occur. We interpret this as compelling evidence for the overall, systemic importance of EMEs for global equity markets.

As the final step of this sub-section, we analyze the presence of various asymmetries in the transmission process. In particular, we ask whether large EME shocks have a higher impact on global equity markets than smaller ones. As discussed, we obviously lack in our sample period systemic EME crises. However, we try to get at this issue by distinguishing more important EME events from less relevant ones by classifying them as particularly important when they move the domestic equity market by more than 5%, and less important when local markets react by less than 5%. Table 5 shows the parameter estimates when re-estimating Eq. (1) using

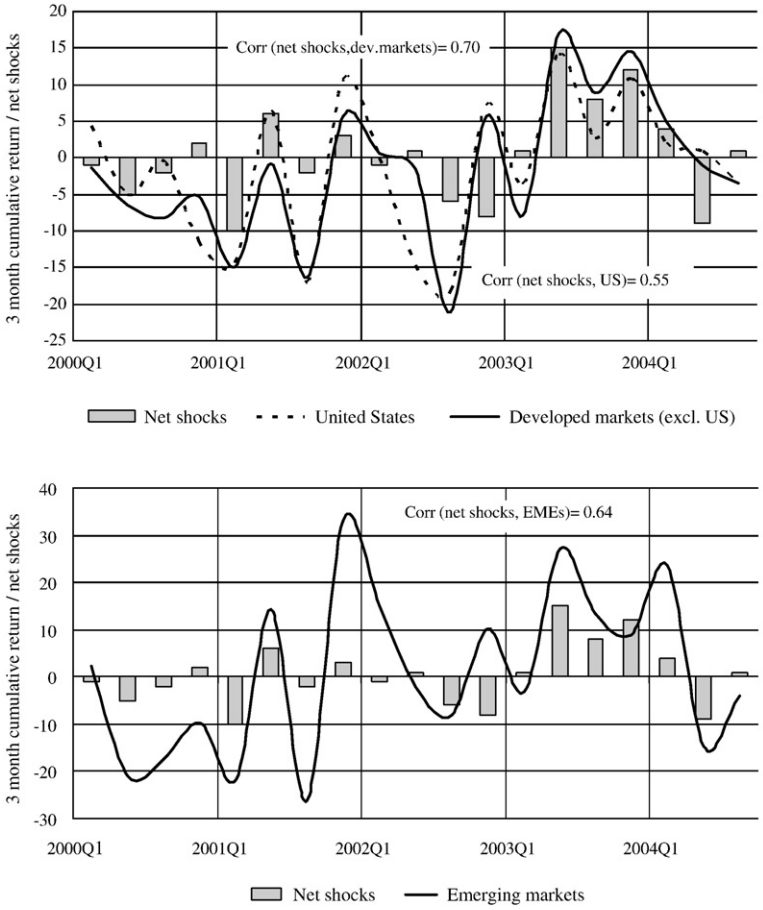

Fig. 2. EME shocks and global equity returns — 3-months cumulated. Notes: The figure shows the cumulated net shocks (cumulated difference between positive and negative shocks) and the cumulated stock market return on a quarterly basis.

this distinction. Overall, large shocks move global equity markets by 0.62%, and significantly more so than smaller shocks. Nevertheless, even those events considered relatively less important continue to exert a statistically and economically meaningful effect on global equity markets, with a coefficient of 0.27%.

Moreover, we investigate whether negative EME shocks have a larger effect than positive one. As discussed above, this hypothesis has been emphasized in particular in the literature on financial crises, which frequently suggests that negative EME shocks may have a much larger relevance for mature financial markets. Moreover, we also compare different types of shocks, i.e. political versus economic shocks. Table 6, Panel A shows that negative EME shocks only have a slightly larger effect on the global equity market index (−0.33%) than positive events (0.28%). This underlines that also positive EME developments induce financial spillovers.

Overall, the effect of EME shocks on global equity markets appears robust to the inclusion of various global and US-specific controls. Moreover, the systemic relevance of EMEs for global markets is further underlined by the finding that EME shocks explain up to 20% of the movements in global equity markets on days when EME shocks occur.

5.2. Caveats and robustness

In this sub-section, we tackle two issues that are important for gauging the robustness of the empirical findings. The first refers to the question of how exogenous the EME shocks are that we identify. The second issue concerns the economic significance of the empirical estimates.

Regarding the first of these issues, we have discussed in detail in Section 3 the issue of endogeneity of the identified EME events, implying that the events should be exogenous to global equity markets *at the time they occur*. Nevertheless, it cannot be ruled out that over *longer horizons* of several months or years EME events may be influenced by external or global factors. For instance, a global economic slowdown may make economic conditions more difficult and therefore raise the probability of e.g. government collapses or negative economic events in EMEs.

To gauge this possibility and the overall relevance of EME shocks for global markets, an interesting stylized fact is to plot the "net" number of shocks per quarter – subtracting the total number of negative shocks from the total number of positive shocks across all 14 EMEs – together with the global equity market return during that quarter. Fig. 2 shows a high degree of comovement between both, in particular since the end of 2002. In fact, the correlation coefficient between the two series is 0.70 for the whole sample period. It should be stressed that while this obviously does not necessarily imply causality, it underlines that developments in EMEs strongly co-move with those in global equity markets. While this is merely indicative of the overall importance of EMEs, it appears to be a striking stylized fact of the data. Recall that in our empirical analysis above we use a daily data frequency. Hence while EME events may to some extent be influenced by global developments over longer horizons – such as used for Fig. 2 – the effects identified on a daily basis are unlikely to be subject to this caveat and should measure the true contemporaneous effect of EME shocks to global markets.

A complementary interpretation of this high correlation between EME shocks and global equity returns at low, quarterly frequencies is that global economic developments reflected in global equity market movements may help induce economic and political events in EMEs. However, the relatively high daily frequency of the empirical analysis above helps us minimize this potential problem: while it may be the case that EME events, such as e.g. the collapse of a government or other political turmoil, could partly have been influenced by global factors in the weeks, months and years prior to the events, our empirical analysis above focuses on the contemporaneous daily effect of EME shocks on the days on which they take place. Hence endogeneity becomes a problem for our empirical model only when an EME event is triggered by other events contemporaneously on the same day. Given the high frequency of the analysis, such a possibility is unlikely to be present for the great majority of the identified events.

Concerning the second issue, an important question is about how permanent and long-lasting the effects of EME shocks on global equity markets are. From a more general perspective, EME events may have a statistically significant effect on global equity markets on a particular day, but they may in the medium- to long-run – e.g. over several weeks or months – be dominated by other developments, like economic and political developments in mature economies, such that EMEs may play only a small overall role for global equity markets.

This issue is hard to tackle because our data includes only a small, albeit relevant fraction of EME events that affects global financial markets. In other words, our data includes only "shocks", i.e. well identified, mostly *unanticipated* events while many other unanticipated or anticipated EME developments are clearly not captured by our data. This means that it is impossible to determine precisely how much of global equity market movements are explained by developments in EMEs and how much by mature economies or truly common shocks.

As an alternative to the various *R*-squared measures discussed in the previous sub-section, we can gauge the importance of EMEs for global equity markets also by analyzing the *permanence* of the transmission of EME shocks. The intuition is as follows: if EMEs are an important driver of global equity markets *and* if our data captures relevant EME events, then the impact of our EME shocks on global equity markets should be detectable in the data at least for several days or even weeks. We test for this permanence in two alternative ways. First, we estimate a dynamic version of model (1) by including and testing for the lagged effects of EME shocks:

$$r_{it} = \alpha_i + \sum_{k=0}^{K} \beta_{ik} \sum_{j=1}^{14} \left(S_{jt-k}\right) + \delta X_{it} + \varepsilon_{it} \tag{3}$$

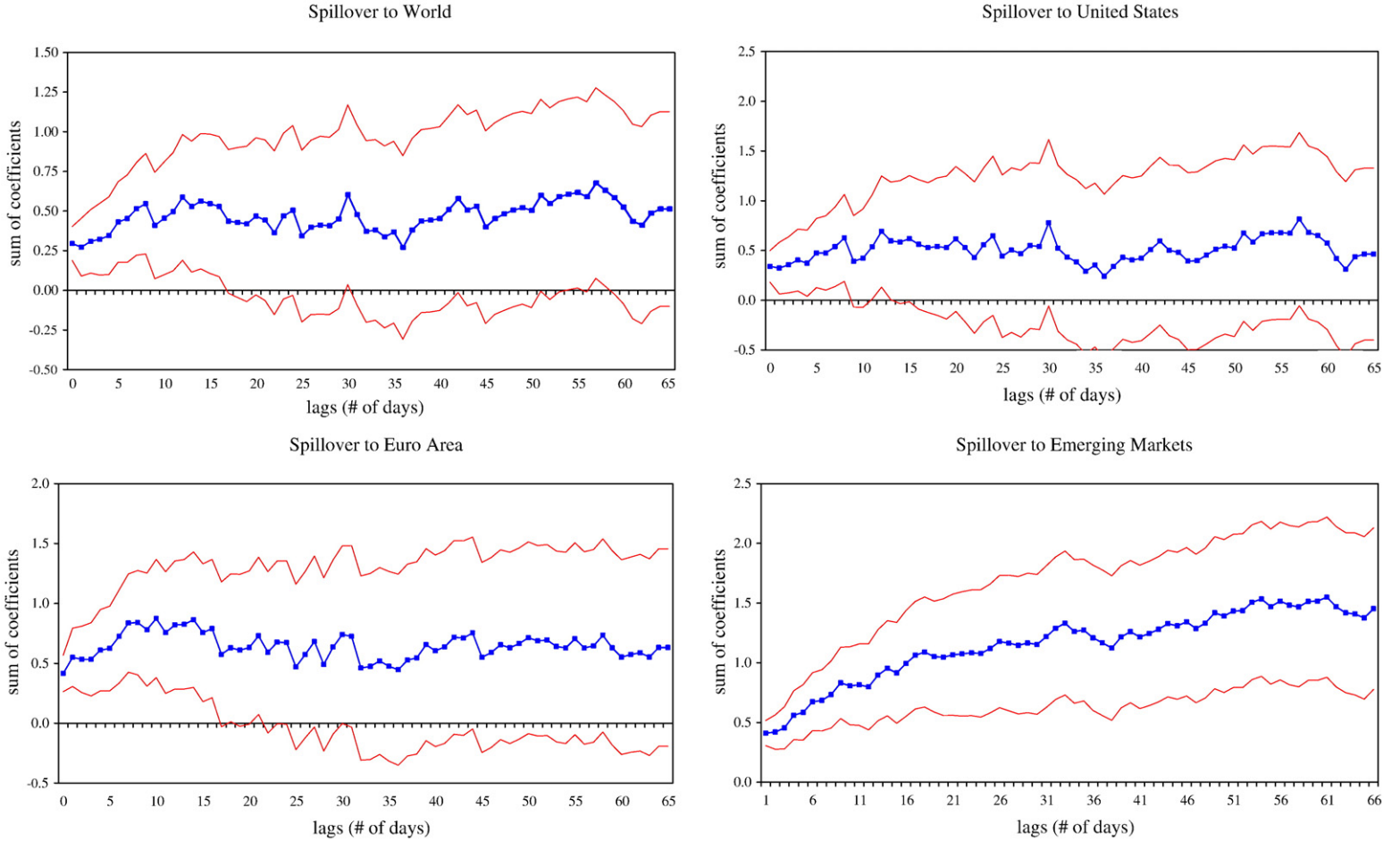

Fig. 3. Shock transmission to World, US, Euro Area and EMEs — cumulated dynamic effects up to 3 months (65 days). Notes: The figure is based on model (3) and shows the cumulated coefficients up to k days, testing the null hypothesis $H_0 : \sum_{k=0}^{K} \beta_k = 0$, for the returns of the world equity index, as well as for the United States', the euro area' and the emerging markets' equity indices. The dotted lines show the 90% confidence intervals.

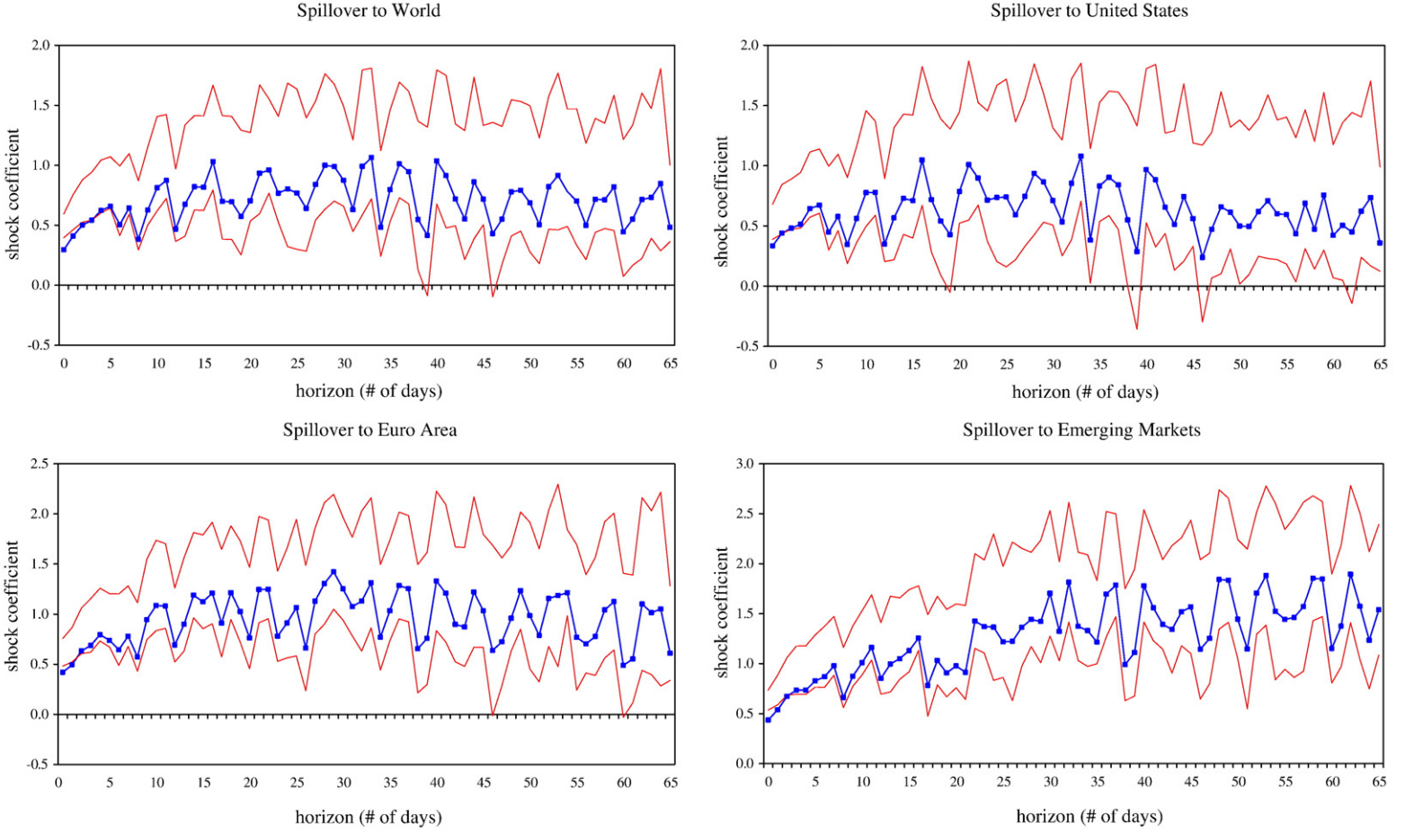

Fig. 4. Shock transmission to World, US, Euro Area and EMEs — data frequency up to 3 months (65 days). Notes: The figure is based on model (1) for different data frequencies ranging from 1 day to 65 days, showing the transmission coefficient β for the returns of the world equity index, as well as for the United States', the euro area' and the emerging markets' equity indices. The dotted lines show the 90% confidence intervals.

with k as the number of lags. Fig. 3 shows the cumulated coefficients up to 3 months (65 days), while testing the null hypothesis $H_0 : \sum_{k=0}^{K} \beta_k = 0$, for the returns of the world equity index, as well as for the United States', the euro area' and the emerging markets' equity indices. The key finding is that there is a high degree of persistence or permanence in the spillover effects of EME shocks. The coefficients shown for $t=0$ are the same as in Table 2, i.e. the contemporaneous effects of EME shocks on the respective equity markets, the coefficients for $t=1$ or the contemporaneous coefficient plus the point estimate of the first lag, and so on. For the world, US and euro area indices the effect increases for a number of days after a shock occurs and then stabilizes. Most importantly, statistically the impact of EME shocks is mostly significant even after 10 business days. This is somewhat less the case for the US equity markets, for which the effects of EME shocks are still statistically significant for up to 10 days, or 2 weeks.

The figure should not be interpreted as evidence against the efficient market hypothesis. What it shows can be thought of as impulse responses. That is, an EME shock has a relatively large and statistically significant contemporaneous effect (on day 0 in the figures), and no additional effect thereafter. After day 0 equity markets move around but the key point is that this contemporaneous effect is not reversed. The figures contain 90% confidence intervals showing that the confidence intervals obviously widen continuously thereafter as other factors affect equity markets, and the initial EME shocks can be detected statistically even after up to 10 business days.

A second and alternative way of testing for the permanence of the effects is to use different data frequencies. For this exercise, we repeat the estimation of model (1) using different data frequencies starting with daily data (as in the benchmark model), then moving to two-day frequencies and so on up to using 65-day or quarterly frequency. Fig. 4 gives the results again for four of the equity market indices. This second exercise gives us essentially the same results as the first one: the effect of EME shocks appears to increase slightly in the first few days and then levels off. Again, the key result is that the effect of EME shocks on global equity markets is present in the data even when using quarterly data. Both of the tests underline the overall economic importance of EMEs for global equity markets.

6. Conclusions

How important are emerging markets as drivers of global financial markets? While there is a large literature and plenty of evidence for the role and impact of EMEs during financial crises, much less attention has been paid to the systemic importance of global financial markets overall, including during “normal” or tranquil times. In fact, the last few years have been marked by the absence of major crises or systemic turbulence in EMEs as well as the strong emergence, or re-emergence, of EMEs as a key asset class for investors in mature economies.

This paper has focused on the importance of EMEs for global financial markets by analyzing the transmission of EME shocks to global equity markets. Our database for this analysis has the key advantage of containing largely exogenous shocks that are specific to individual emerging economies. We have estimated the transmission of these shocks to 29 mature economies and emerging markets and find that EME shocks have a statistically and economically significant impact on global equity markets. On average, shocks to the 14 EMEs in our sample move world equity markets by 0.3% on the day they occur. Overall, EME shocks explain up to 20% of the daily movements in global equity markets on those days when EME shocks occur. Importantly, these findings are robust to the inclusion of various global and US-specific factors to account for a potential endogeneity bias. Moreover, EMEs influence global equity markets not just in “bad” times but also in “good” times. In fact, the average effect of positive shocks stemming from EMEs is in many cases very similar to that of negative events.

A second key result of the paper is that we detect a large degree of heterogeneity in the response of individual countries' equity markets to EME shocks. For mature economies, US equity markets appear to be more sensitive to developments in Latin America than in Emerging Asia or Emerging Europe, while the Japanese market reacts the strongest to shocks elsewhere in Asia. By contrast, an interesting finding is that European (euro area and UK) equity markets appear to be different as they are exposed the strongest and also roughly equally responsive to shocks in all three emerging market regions.

Overall, the findings underline the importance of emerging markets as drivers of global asset price developments in recent years. In many ways, this is what one would expect given the substantial contribution of EMEs to global economic growth and their rapidly increasing clout in global financial markets as investors. Understanding the evolution of EMEs as a global player in financial markets is an important topic from a financial market angle, but also from a policy perspective given their rapid emergence and the rising economic interdependence between mature and emerging market economies.

Appendix A. Data description and examples

Description of the databases

1. As for the selection of events

- A Chronology of Important Financial, Economic and Political Events in Emerging Markets, by G. Bekaert and C. Harvey. This database compiles a selection of economic and political events on more than 50 countries on a varying time span depending on the country.

- For Argentina: "Timeline of Selected Events, 1991–2002", by the Independent Evaluation Office of the International Monetary Fund. This is a collection of important economic and political events in Argentina since 1991 until 2002.

2. Identification of dates

- Factiva: this is a platform by Dow Jones that offers access to a large collection of newswire services and journals.

Date	News
24 February 2000	A strike is called against the labor market reform proposal, stipulating decentralization of collective labor contracts.
10 March 2000	IMF Board approves Stand-By Arrangement with Argentina.
6 June 2000	A national strike is called.
17 August 2000	Responding to public denunciations, President De La Rúa creates a special commission, chaired by Vice President Carlos Álvarez, to investigate the bribery charges associated with the Senate approval of the labor reform law.
6 October 2000	Vice President Carlos Álvarez resigns.
5 March 2001	Ricardo López Murphy is appointed Minister of Economy.
29 March 2001	Minister Cavallo secures "emergency powers" from Congress.
16 April 2001	Minister Cavallo announces a modification of the convertibility law, with the replacement of the dollar by an equally weighted basket of the dollar and the euro.
26 April 2001	The Central Bank Governor is replaced over alleged money laundering charges.
8 May 2001	A national strike is called against the labor reform.
11 July 2001	Standard & Poor's lowers Argentina's long-term sovereign rating further from B+ to B.
21 August 2001	A zero deficit plan is announced, with a mandatory reduction in expenditures to balance the budget.
3 December 2001	IMF announces planned augmentation of Stand-By Arrangement by $8 billion.
6 December 2001	The government introduces a partial deposit freeze (corralito) and capital controls.
10 December 2001	Minister Cavallo travels to the United States to meet with IMF management.
19 December 2001	Minister Cavallo resigns.
20 December 2001	President Fernando De La Rúa resigns over death of demonstrators. Ramón Puerta, President of the Senate, becomes interim President.
3 January 2002	President Duhalde announces the end of convertibility, and the introduction of a dual foreign exchange regime.
7 January 2002	The convertibility law ceases to be in effect. A dual exchange rate regime is introduced, one fixed at 1.40 pesos to a dollar for foreign trade, and the other determined in the free market.
8 March 2002	The pesoization of government debt under Argentine law is decreed.
5 March 2003	The Supreme Court ruled that conversion to pesos was illegal. According to the Central Bank, approximately to 8760 million US dollars are at stake.
10 September 2003	Argentine finance officials reached an agreement with the IMF for a three-year, US$ 12.6 billion stand-by credit. Under the terms of the new arrangement, the government pledges to raise the consolidated primary fiscal surplus
14 June 2004	Roberto Lavagna sent a "fiscal responsibility" bill to Congress to set limits on spending by provincial governments.
2 July 2004	Argentina obtained regulatory approval in the U.S. for a debt exchange to restructure some 00 billion in defaulted debt.

Source: Factiva, Datastream Bekaert and campbell (2004) and Independent Evaluation Office, International Monetary Fund (2004). *The IMF and Argentina, 1991-2001.*

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