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Abstract

This paper analyzes the financial spillovers of shocks originating in China to emerging markets. Using a high-frequency identification strategy based on sign and narrative restrictions, we find that equity markets react strongly and persistently to Chinese macroeconomic shocks, while monetary policy shocks have limited or no spillovers. The impact is particularly strong in Latin American equity markets, with the likely channel being the effect of shocks in China on international commodity prices. These effects extend to various financial variables, such as sovereign and corporate spreads and exchange rates, suggesting that macroeconomic shocks in China may have implications for economic cycles and financial stability in emerging markets.

Keywords: China, emerging markets, financial spillovers.

JEL classification: F31, F37, F62, F65, G15, N26.

Resumen

Este documento analiza los efectos de las perturbaciones económicas originadas en China en los mercados financieros de las economías emergentes. Mediante el uso de datos de alta frecuencia y la aplicación de una estrategia de identificación basada en restricciones de signo y narrativas, se muestra que los mercados bursátiles reaccionan de manera fuerte y persistente a las perturbaciones macroeconómicas en China, mientras que las alteraciones de la política monetaria tienen efectos de contagio limitados o nulos. El impacto es particularmente intenso en los mercados de renta variable latinoamericanos, siendo el canal probable el efecto de las perturbaciones en China sobre los precios internacionales de las materias primas. Esta reacción se observa en diversas variables financieras, como en los diferenciales soberanos y corporativos y en los tipos de cambio, lo que sugiere que los *shocks* macroeconómicos en China podrían tener implicaciones para los ciclos económicos y la estabilidad financiera de los mercados emergentes.

Palabras clave: China, mercados emergentes, efectos derrame financieros.

Códigos JEL: F31, F37, F62, F65, G15, N26.

1 Introduction

Global financial markets are interconnected, and market movements often reflect global economic conditions rather than events in individual countries. This interconnectedness has resulted in a high degree of correlation between stock markets, making it challenging to pinpoint the exact location of the events responsible for changes in equity prices. This has sparked a prolific economic literature that has attempted to identify the ultimate location of events responsible for movements in stock markets.

Events in the United States are seen as a major driver of movements in global financial markets. Miranda-Agrippino and Rey (2015), Miranda-Agrippino et al. (2020), and Boehm and Kroner (2023) have documented the importance of the business cycle and changes in economic policy in the United States in shaping the global financial cycle. This influence of the United States, particularly its monetary policy, is sometimes framed in terms of spillovers from events in the United States to emerging markets (e.g., Uribe and Yue, 2006; Canova, 2005; Maćkowiak, 2007).

More recently, the literature has also focused on China as a driver of the global financial cycle, as this country has undergone significant structural changes that have increased its importance for the global economy. China's GDP made up roughly 20% of global GDP in 2022. The country's exports and imports amounted to around 10% of the world total in 2022. The country is also a major importer of certain commodities, such as oil and metals. Although capital controls remain in place, there has been a discernible easing of restrictions since 2012 and Chinese equities and bonds have been incorporated into benchmark indices of global markets such as the MSCI or JP Morgan's EMBI. China has also become an important international investor. China's foreign assets and liabilities amounted to 16 trillion dollars by the end of 2022, on par with countries like Japan or France, and exceeding the combined totals of a group of large emerging economies, such as Russia, Mexico, Brazil, Indonesia, Saudi Arabia, and Turkey.

The economic literature that studies the impact of shocks originating in China on the rest of the world includes the work by Miranda-Agrippino et al. (2020), who compare the global impact of US and Chinese monetary policy. They find that both countries have substantial spillovers on the global economy, but that the channels of transmission differ substantially. They argue that US monetary policy is mainly transmitted through financial markets, while Chinese monetary policy is mainly transmitted through trade and commodity prices. Barcelona et al. (2022) also find that China is a significant driver of the global business cycle, and that its impact is transmitted mainly through the effect on global GDP, trade and commodity prices, as do Copestake et al. (2023), who identify domestic demand and supply shocks in China and find that these shocks are transmitted to the global economy mainly through global value added chains and are higher for countries with stronger trade links with China. Finally, Lodge et al. (2023) conclude that shocks originating in China play a significant role in developments in global financial markets, although the effect is smaller than that of the US or global risk shocks. Nevertheless, for the global commodity markets China appears as a more significant driver than the US.

The fact that China's influence on the global economy is primarily exerted through its effect on global GDP and mediated by trade relationships raises a crucial question: Should spillovers from shocks originating in China affect other countries immediately, or should there be a delay? Given that trade flows take time to materialize, their impact on global economic activity may not be felt immediately. Consequently, relying solely on actual trade flows for identification might overlook the anticipatory aspects of these developments, which should instead be captured by financial market reactions.

In this paper, we examine stock markets in Emerging Asia, Emerging Europe, and Latin America, and measure the size of spillovers from China. Using daily data, we show that shocks from China are transmitted almost instantaneously to emerging markets through financial markets. We find that spillovers from China are strongest for stock markets in Latin America. A macro-financial shock in China that produces a one-percent stock market return in China leads to return of about 0.25 percent in Latin American stock markets on the same day, compared to only 0.15 percent in Developing Asia and Emerging Europe. At first glance, the stronger spillovers for Latin America may be surprising, given the geographical proximity and the stronger integration of the industrial sectors of countries in Emerging Asia with China. We show that the comparatively stronger impact on Latin American stock market returns can be rationalized by the stronger response of Latin American returns of firms linked to commodity markets, given that the Chinese economy is an important driver of commodity prices.

To derive these results, we first distinguish between shocks that originate in China and those that originate in the United States, or are more global in nature, using economic theory to tease apart the drivers of co-movement in global financial markets. To make our the analysis comparable with Lodge et al. (2023), we follow their identification strategy, and use sign restrictions and narrative restrictions to decompose the movement of financial variables into drivers associated with China, the United States, and a global risk factor. The identification strategy uses financial market data at daily frequency to estimate five structural shocks that drive global financial markets. It is related to the identification by Brandt et al. (2021), but is targeted to identifying shocks specific to China. In a second step we estimate the dynamic response of equity markets in individual emerging countries to the structural shocks related to China using local projections and aggregate the responses for the three regions of interest.

In addition to studying equity markets, we also quantify the impact that shocks originating in China have on other financial markets, such as sovereign and corporate spreads and exchange rates. We document that spillovers from China can be detected not only in equity markets but also in these other financial variables, suggesting that they may have important implications for business cycles and financial stability in emerging markets.

The paper is structured as follows. Section 2 presents a preliminary analysis of correlations between international stock markets. Our initial findings indicate that the co-movement of stock markets with China is most pronounced in Emerging Asia. Section 3 details the methodology employed to isolate

shocks specifically related to China from the overall financial market joint dynamics, and how these shocks are used to measure spillovers to other emerging markets. The results are discussed in Section 4, and our conclusions are summarized in Section 5.

2 The co-movement of stock market returns

To quantify to degree of co-movement in international stock market returns, we compute rolling correlation coefficients calculated over 5-year windows to assess the relationships between stock returns in three selected regions (Emerging Asia, Latin America, and Emerging Europe) and those of China and the United States. We use stock market indices expressed in local currency to calculate daily returns. Subsequently, we determine the correlation coefficient between the returns of each country and those of the stock markets in China and the United States. The primary equity indices used are the main stock exchange index of each country, as described in the methodology section. For China, we use the Shanghai ETF, which replicates the return of the Shanghai Composite Index, and for the United States, the S&P 500. The data ranges from 2010 to 2024, excluding observations from March 2020 to avoid a spike associated with the onset of the COVID-19 pandemic, which would obscure the long-term trends.[1]

The results are shown in Figure 1.[2] The analysis reveals that for Eastern Asia, the correlations of stock returns with both China and the United States exhibit similar magnitudes, with slightly higher correlations in the case of China for most countries. In the case of South Korea, the correlation with China is noticeably higher. Both correlations exhibit fluctuations over time, but there is no discernible trend.

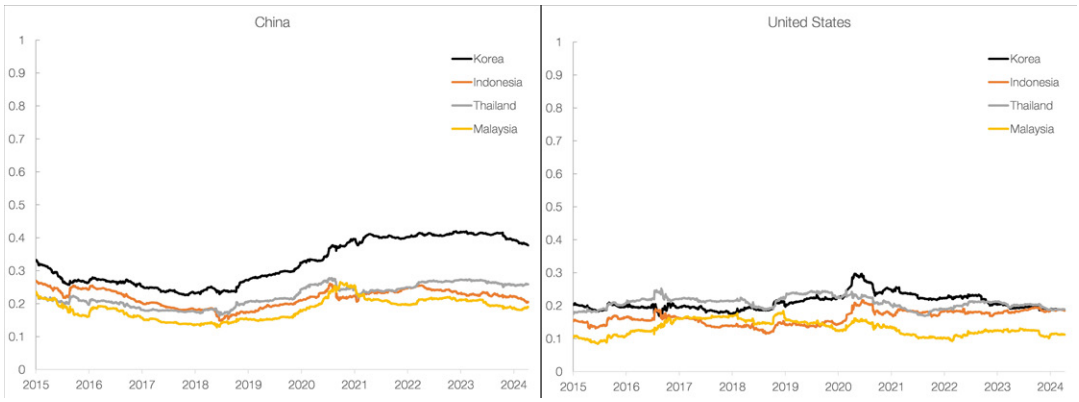
On the contrary, Latin America's stock markets exhibit higher correlations with the United States compared to China, as they have historically been more influenced by U.S. economic cycles and investment flows and as most of theses economies are linked or have been linked to the US dollar. However, a secular decline in this correlation over the examined time frames suggests a potential decoupling influenced by both domestic and global economic shifts. This decline is stronger in the case of the United States, although it can also be perceived for the correlation with China.

For markets in Emerging Europe, there is some heterogeneity. Correlations with China are similar and with the U.S. lower than those found for Latin America, since they are probably more closely linked to the evolution of the financial cycle in the Euro Area.

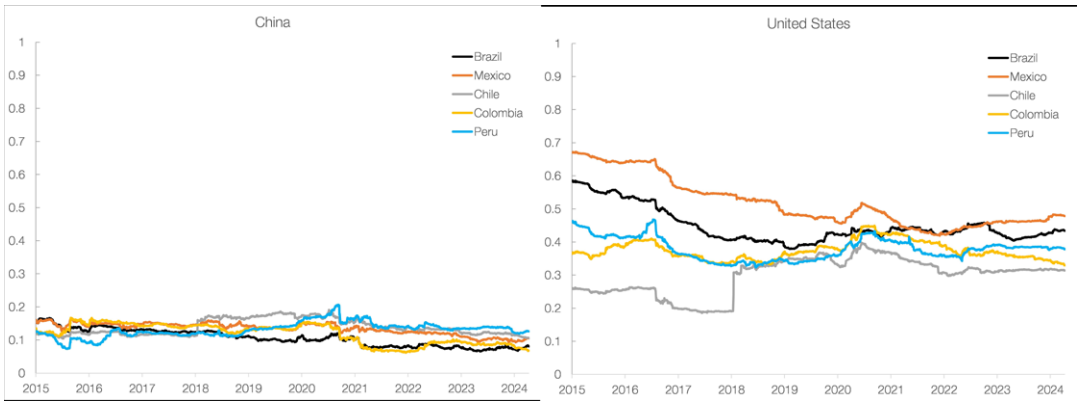
The comparison across panels in a vertical direction shows that the correlation with China of Emerging Asian markets exceeds that of Latin America and Emerging Europe. For the case of Emerging Asia

[1] We remove the data for March 2020 only from this preliminary exploratory analysis, but not from the rest of the paper.

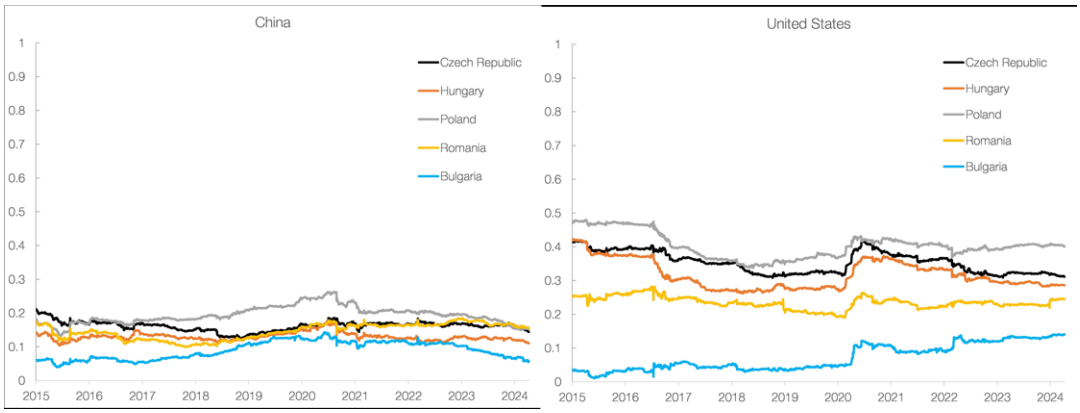
[2] In our analysis, Eastern Asia comprises South Korea, Indonesia, Thailand, and Malaysia, while Latin America comprises Brazil, Mexico, Chile, Colombia, and Peru. Emerging Europe encompasses the Czech Republic, Hungary, Poland, Romania, and Bulgaria



(a) East Asia



(b) Latin America



(c) Eastern Europe

Figure 1: 5 year rolling correlations of equity markets returns with China and the United States

it fluctuates in the range of 0.2–0.4 whereas in the cases of Latin America and Emerging Europe the correlations fall below 0.2 in the more recent period.

This initial analysis of unconditional correlations would seem to suggest a greater role for spillovers from China to stock markets in Emerging Asia. However, it is well known that correlations between stock market returns can arise from a variety of sources. Exposure to common external factors, such as interest rates set by major central banks (such as the Federal Reserve in the United States) or changes in global risk aversion, can have significant effects on multiple financial markets and create the illusion of strong spillovers between markets, while the real drivers may be unrelated to the specific economic realities of the countries under consideration.

As we will show in the remainder of the paper, despite lower unconditional correlations shocks that truly originate in China seem to have a stronger impact on Latin American financial markets than on financial markets in Emerging Asia or Emerging Europe.

3 Methodology

Identification of structural shocks. We estimate structural shocks that drive global financial markets following the methodology of Lodge et al. (2023) for the period from January 2017 to May 2023. Specifically, we estimate a vector autoregression (VAR) using Bayesian methods and daily data on interest rates and other financial variables in the United States and China. The identification uses sign restrictions, relative magnitude restrictions that imply that US shocks affect US variables more than Chinese variables, and vice versa, and narrative restrictions to obtain structural shocks that drive the joint co-movement of financial variables.

The identification strategy is in the spirit of Brandt et al. (2021) and has the advantage of avoiding the data quality problem in Chinese GDP identified by previous work and discussed by, among others, Holz (2014); Clark et al. (2020); Nakamura et al. (2016); Fernald et al. (2021). The variables included in the VAR are short-term and long-term interest rates in China, stock returns in China and the United States, the China-US 10-year yield spread, and the renminbi-dollar exchange rate.[3] The sign restrictions allow to identify five orthogonal structural shocks. Two of these shocks are specific to the China (our shocks of interest), two are specific to the United States, and the remaining shock represents a global risk shock.

The country-specific shocks emanating from China and the United States are separated into a monetary policy shock and a macro-financial shock. The key identifying assumption that separates a monetary policy from a macro-financial shock in China is that a monetary policy shock affects equity prices and interest rates in opposite directions, whereas a macro-financial shock moves them in the same direction. More precisely, a macroeconomic shock in China increases both the short term and the long term interest rate in China, pushes up equity prices in China, increases yield spread between China and the United States (because the yield in the Unite States is less affected) and appreciates the renminbi against the US dollar. A monetary policy shock, on the other hand, is defined as a shock that reduces the Chinese short term rate and leads to a depreciation of the currency. The long term interest rate increases because of the expansionary effect on the economy, and equity prices and the China-US yield spread also increases.

Shocks originating in the United States are distinguished from shocks emanating in China because they move the exchange rate of the renminbi and the long term rate in China in opposite directions. A fifth shock, related to global risk aversion, is associated with higher US equity prices, with a narrowing of the

[3]The estimation sample starts in January 2017. Starting in that month short-term interest rates are generally considered to reflect the evolution of Chinese monetary policy.

US-China yield differential, and with an appreciation of the renminbi as safe assets flow out of the US dollar assets as global risk sentiment improves. The sign restrictions are shown in Table 1. The reasoning behind these sign restrictions are discussed at length by Lodge et al. (2023).

In addition to sign restrictions, two narrative sign restrictions are imposed, one for China (the initial lockdown of Wuhan in the early days of the Covid outbreak, which is interpreted as a negative macroeconomic shock) and one for the United States (the day after the announcement of the scaling back of assets purchases in September 2021, which is interpreted as a tightening of US monetary policy).

Because the VAR in the first stage is estimated using Bayesian methods and because identification by sign restrictions implied set identification, the procedure described yields a distribution over structural shocks. As usual, we use the median of each structural shock as our proxy for those shocks.

Table 1: Identification assumptions: sign restrictions

Variables	**Identified shocks (a)**				
	China Accomm. Monetary Policy (MP)	China Positive Macro	US Accomm. Monetary Policy (MP)	US Positive Macro	Positive Global Risk Aversion (GRA)
China short term interest rate	-	+			
China long term interest rate	-	+	-	+	
China equity index	+	+ (*)			
US equity index			+ (*)	+	+
China-US yield spread	-	+	+	-	-
Renminbi-USD exchange rate (b)	+	-	-	+	-

Notes: The identification is taken from Lodge et al. (2023).
(*) Additional narrative restrictions imposed to identify the shock are described in the text.
(a) The signs are for expansionary macro shocks, accommodative monetary policy shocks, and a decrease of global risk aversion.
(b) A positive "+" sign implies a depreciation of the renminbi against the US dollar.

In Table 2 we show that the shocks obtained as medians of the shocks that satisfy the sign restrictions have the properties that are expected of a random shock. They are mean zero, orthogonal, and uncorrelated with economic surprise indicators. Figure 7 in the appendix shows the ACF and PACF of the five shocks estimated, and their respective confidence bands.

Measurement of spillovers. To measure the spillovers from China to emerging markets, we use the two structural shocks previously identified for China and estimate how financial variables in emerging markets respond to these shocks.

Our underlying assumption is that the countries within our sample are relatively small, exerting a negligible influence on the identification of these structural shocks individually. Therefore, we posit that

Table 2: Statistical properties of estimated shocks

	CN Macro	CN Monetary	US Monetary	US Macro	GRA
Mean	0.00	0.00	0.00	0.00	0.00
Standard deviation	0.82	0.80	0.80	0.74	0.74
Pairwise correlations between shocks					
China Monetary Policy	1.00				
China Macro	-0.13	1.00			
US Monetary Policy	0.03	-0.04	1.00		
US Macro	0.03	0.01	-0.18	1.00	
Global Risk Aversion	0.06	0.08	0.04	0.04	1.00
Pairwise correlations with lagged control variables					
Economic surprises (US)	-0.03	0.06	-0.12	0.08	0.05
Economic surprises (World)	0.01	0.01	-0.11	0.04	0.03
Standard and Poor's VIX	-0.16	-0.09	-0.38	-0.46	-0.42
Portmanteau test for white noise					
Portmanteau Q statistic	57.10	47.45	65.91	77.11	54.62
Prob $> \chi^2$ (40 lags)	0.04	0.20	0.01	0.00	0.06

causality runs from the structural shock to domestic financial variables. We estimate a separate local projection (Jordà, 2005) for each country and financial variable. The baseline specification is given by:

$$(y_{t+h} - y_t) = \alpha_h + \beta_h \text{Shock}_t + \sum_{j=1}^{3} \rho_{jh}(y_{t-j} - y_{t-j-1}) + \gamma_h' \mathbf{X}_t + \varepsilon_{t+h}, \quad h = 1, 2, \ldots, 20, \qquad (1)$$

where y_t denotes the dependent variable at time t and $\mathbf{X}_t$ is a vector of controls. The coefficients of interest are the collection $\{\beta_h\}$, which trace out the response of the dependent variable y to a shock at different horizons.

For comparability across shocks, we scale the shocks from China in terms of their impact on equity prices in that country. Specifically, both the macroeconomic shock and the monetary policy shock originating in China are adjusted to result in a 1% increase in the Chinese stock market upon impact. Because our focus in this paper is on spillovers from China, we do not study the impact of the two shocks from the United States, or the global risk aversion shock, although we perform a comparison of the magnitude of the effects of all five shocks in Appendix D.

Variables and data sources. Our main dependent variables are stock returns. For each country we use the main stock market index: Bovespa in Brazil, IPC in Mexico, the selective Chile 65 index, MSCI in Colombia, the General Index of Lima in Peru, Kospi for South Korea, FTSE for Malaysia, SET Bangkok in Thailand, the Jakarta Composite for Indonesia, Prague index in the Czech Republic, the BUX for Hungary, Warsaw General Index for Poland, SOFIX for Bulgaria and the BET index for Romania. Stock market returns are measured in local currency.

We also estimate the effects of Chinese shocks on other variables, such as bilateral exchange rates with the dollar, sovereign spreads and corporate spreads.[4] Exchange rates versus the US dollar are those obtained from Reuters. Sovereign spreads are measured in basis points and are calculated using the Emerging Market Bond Index (EMBI) from JP Morgan. We use the EMBI global variation of this index. For the Czech Republic, Korea and Thailand we use the spread implied by the sovereign CDS, as these countries do not have an EMBI Global measure. CEMBI is a similar interest rate spread, but for the external debt issued by each country's firms.

Our control variables in the local projections consist of the VIX (a measure of constant, 30-day expected volatility of the US stock market, derived from real-time, mid-quote prices call and put options on Standard and Poor's 500) as a proxy for global financial volatility, and two economic surprise indices, one for the US and one for the global economy, produced by Citigroup, to proxy for daily surprises (the difference between the expected data and the published data) in economic activity in the US and the world economy.

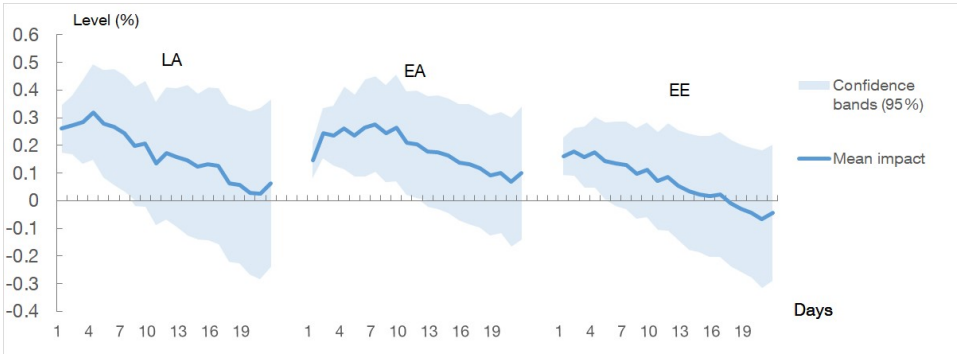
4 Results

Strength of spillovers from China by region. Figure 2 shows the impulse response of equity prices to a macro-shock and a monetary shock originating in China. Both shocks are normalized so that they lead to a a 1% increase in equity prices in China. We average the country-level results for each of the three different regions: Latin America (LA), East Asia (EA), and Eastern Europe (EE). The figure shows that a macroeconomic shock that corresponds to a 1% increase in equity prices in China leads to an immediate increase in equity prices of between 0.12% and 0.26% in emerging markets, and up to 0.32% at the peak. These changes occur on the same day that the shock is realized, and seem to be relatively long-lasted: in some cases the reaction can still be seen after up to 13 working-days. The responses to a monetary policy shock in China are shown in the lower panel of the figure. In this case the point estimates show lower responses on impact. These lower responses are generally also not significantly different from zero.[5]

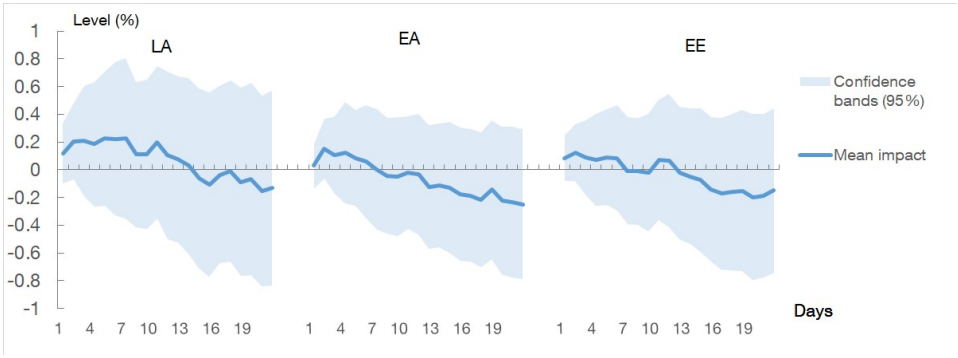
Interestingly, given their strong economic and commercial ties with China, one might reasonably expect Asian economies to be more vulnerable to macroeconomic shocks originating in China. However, results in Figure 2 reveal an intriguing divergence from this expectation. Specifically, the equity markets in Latin America exhibit greater responsiveness to positive macroeconomic shocks in China compared to

[4] We also analyze long-term yields in local currency and, just for Latin America, the effects on a financial conditions index. See Appendix C

[5] For the China macro shock all responses in all countries are positive and significant at least in the five first days after the shock, but responses are higher for Latin American markets, especially Brazil, Colombia and Peru. The response in Korea are the most persistent. For a China monetary policy shock, all responses in all countries are statistically not different from zero. Individual countries's IRF are posted in Appendix B



(a) Impulse responses of a China macro shock



(b) Impulse responses of a China monetary shock

Figure 2: Impulse responses of shocks from China on stock prices

Notes: The figures show averages for each region of impulse response function of equity prices to a positive macroeconomic shock in China (panel a) and to a monetary policy shock in China (panel b). Both shocks are scaled so that they raise the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. EA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

those in Asia or Eastern Europe. The equity index in Latin America experiences an immediate increase 0.26%, which is around twice the estimated effect observed in Asia (0.15%) and Eastern Europe (0.16%).

Among Latin American economies, these effects seem particularly pronounced for Brazil, Colombia and Peru (see the Appendix B for the individual countries' IRFs). The fact that spillovers in Brazil are larger is consistent with previous research on the impact of spillovers from other countries and regions. Because that country has relatively deeper financial markets, previous work has found that shocks originating in the US tend to have more pronounced effects on its financial variables, which may apply also to shocks from other regions. For example, Eichengreen and Gupta (2015) highlights the substantial volatility that financial markets in Brazil (and Mexico) experienced during the taper tantrum episode in May 2013 and attribute it to this fact. On the other hand, Colombia and Peru are highly dependent on commodities exports revenues (fuel and mining products amount 51% of export revenues in Colombia, meanwhile 70% of Peruvian exports are minerals). In East Asia the highest response is estimated for Korea, as it is the country with closer links with China in the global value added chains, meanwhile the response of Eastern Europe stock markets is more muted, and the uncertainty of the estimation is higher.

The lack of evidence for spillovers of monetary policy shocks from China to emerging markets suggests that China's capital controls continue to act as a barrier to the direct transmission of such shocks globally. Additionally, it highlights that China's monetary policy is often implemented using tools other than short-term interest rates, such as reserve requirements for banks or compulsory investment coefficients. In other words, interest rate markets appear unable to unravel monetary policy signals from China.

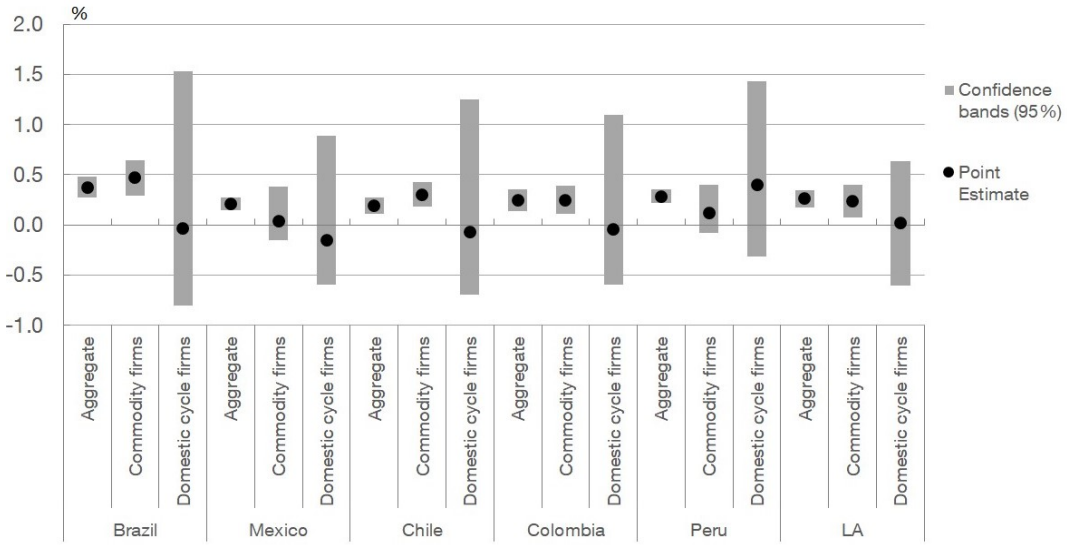
Commodity prices as a conduit for spillovers from China. Why are Latin American equity markets disproportionately affected by macro shocks from China? One possible explanation is the importance of commodity prices for the region's equity markets. According to Lodge et al. (2023), macroeconomic shocks emanating from China have a significant impact on international commodity prices, especially oil and metals, which are relevant exports for many Latin American countries. Colombia, for example, is a major oil exporter, while Chile and Peru are among the world's top metal exporters. To further investigate the role of commodity prices, we perform an exercise in which we estimate the impact of the Chinese macroeconomic shock on the stock market prices of commodity-related companies and on companies that are more related to the domestic business cycle of these countries. For the commodity-related index, we use the Datastream aggregate for companies belonging to the "Basic Resources" sector, which mainly includes mining and industrial metals companies. For the stock index related with the domestic business cycle, we use a simple average of the Datastream aggregates for real estate, automotive, consumer staples, chemicals, telecommunications, health care, retail, and banks.

In Figure 3 we show the response of a macro shock in China on a stock market index of equities linked to commodity-producing companies and a stock index of equities linked to domestic markets. We show the response on impact, i.e., the first element of the impulse response function. Our results indicate that the point estimates for equities linked to commodity-producing companies are larger (and significantly different from zero) when compared to those for non-commodity companies and also than the aggregate domestic stock index. This finding suggests that the strong spillovers of macroeconomic shocks from China on stock prices in Latin America is explained by the revaluation of stock prices of commodity-related companies.

We conduct a second exercise in which we add commodity prices as an additional control in the local projection specification. We use two indices, one for metal prices and one for oil prices, both sourced from Refinitiv. As shown in Figure 4, the impact on Latin America is more muted once the impact of commodity prices is controlled for. In fact, conditional on commodity prices staying constant, the magnitude of spillovers from China to Latin America is similar to that estimated for the sample of countries in Emerging Asia and Emerging Europe.

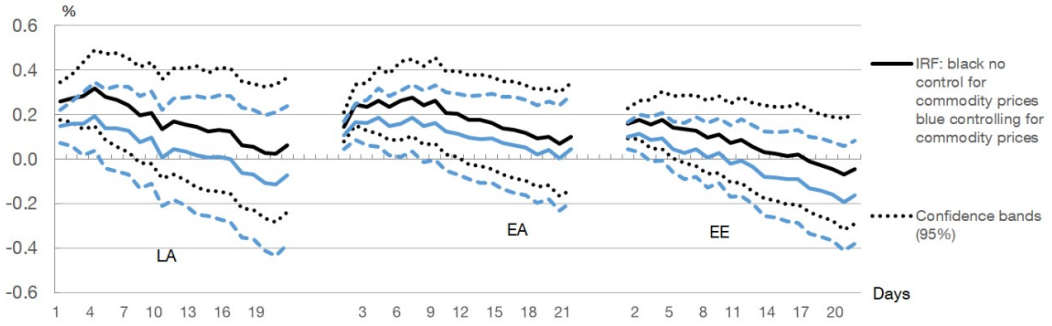
Summing up, both exercises suggest that the spillovers of a macro shock from China is largely explained by the news these shocks have for commodity prices and equities related to commodity markets. The significant role of Latin American countries as commodity exporters, along with the presence of commodity-related stocks, largely explains why the impact on this region is disproportionately high.

Figure 3: Spillovers of positive macroeconomic shocks in China on equity index by sector



Notes: Black dots represent the point estimate of the estimated response of a variable to a positive macroeconomic shock in China scaled so that it increases Chinese equities by 1%. This response is calculated on impact (i.e., the first element of the impulse response function). The impulse response functions are estimated using Local Projections. Gray areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. Commodity related firms are defined as mining and industrial metals companies. Domestic cycle firms belong to sectors comprising real estate, automobile, consumer staples, chemicals, telecommunications, health care, retailers, and banks.

Figure 4: Spillovers of positive macroeconomic shocks in China by region and controlling for commodity prices

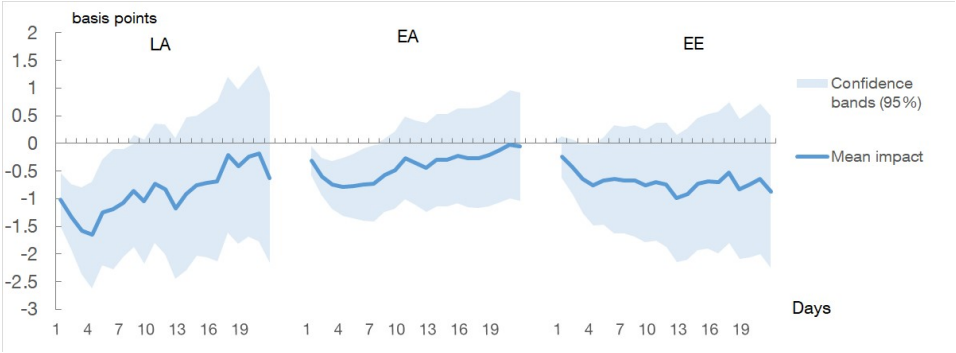


Notes: The figures show averages for each region of impulse response function of equity prices to a positive macroeconomic shock in China. The shocks is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. EA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Dotted and dashed lines are averages by region of the boundaries of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

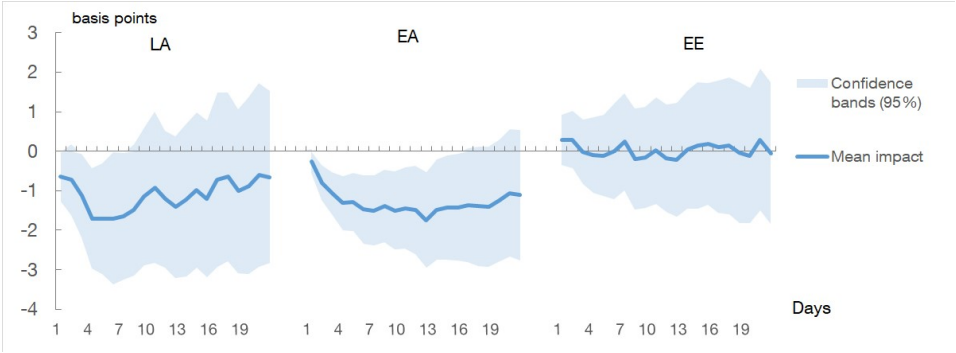
Indeed, Latin American stock markets have a higher proportion of companies primarily engaged in commodity-related businesses compared to other emerging regions. Moreover, as argued by Cheng and Xiong (2014), commodity markets have experienced an increasing "financialization" over recent decades, meaning that they became a popular asset class for portfolio investors, just like stocks and bonds. This implies that macroeconomic news are transmitted very quickly to these markets. For Asian countries, which have closer trade ties with China, there are no "financial assets" that play the same role as commodities with Latin America.

Impact on other financial variables. The evidence reviewed so far indicates that macroeconomic shocks from China have a significant impact on equity prices in emerging economies. The spillovers of these shocks are not limited to equities, however, and extend to other financial variables, such as sovereign and corporate bond spreads, which proxy the cost of external financing for emerging economies, and exchange rates. We illustrate this by introducing sovereign spreads, corporate bond spreads, and exchange rates as dependent variables in our local projections set up.

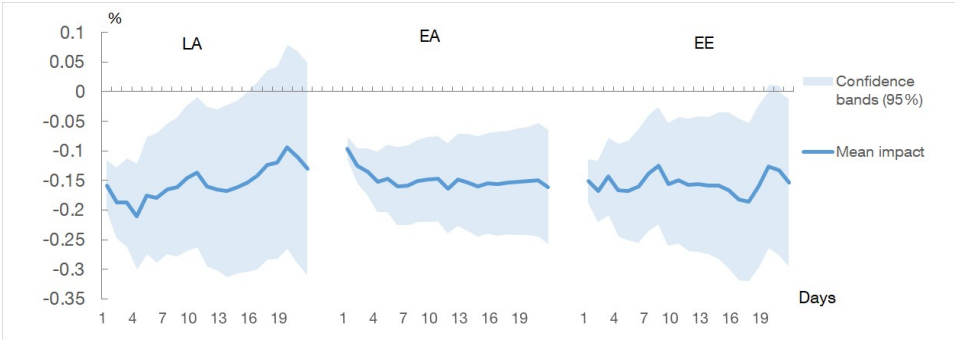
As shown in Figure 5, a macro shock in China calibrated to induce a 1% increase in the Chinese stock market is associated with an immediate decline in the sovereign and corporate spreads, and an



(a) Impact on sovereign spreads



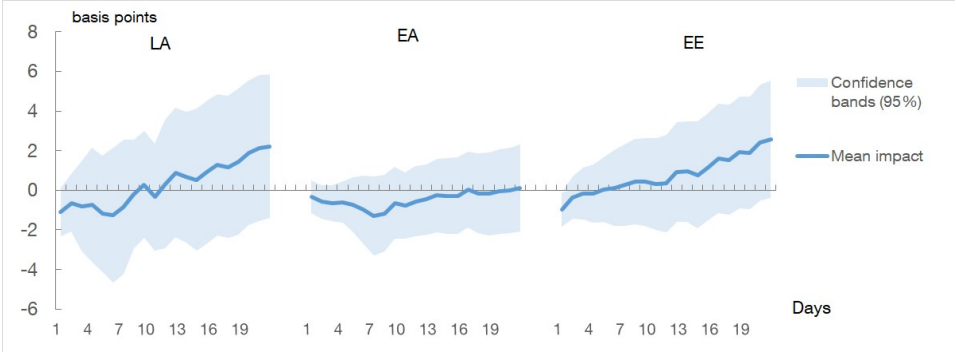
(b) Impact on corporate spreads



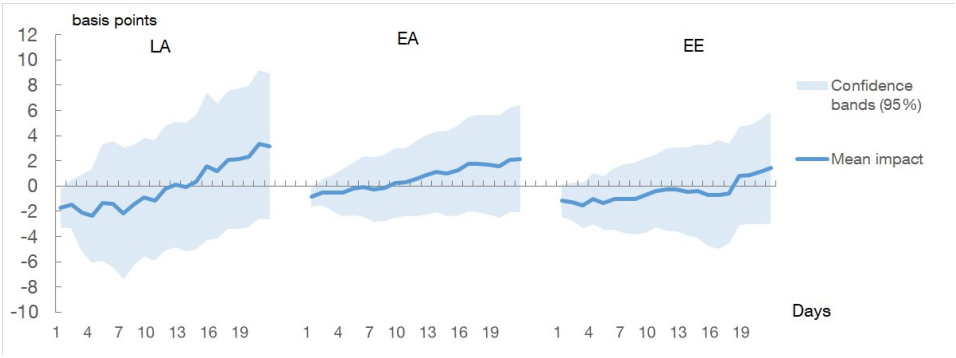
(c) Impact on exchange rates

Figure 5: Impulse responses of a macro shock from China on various variables

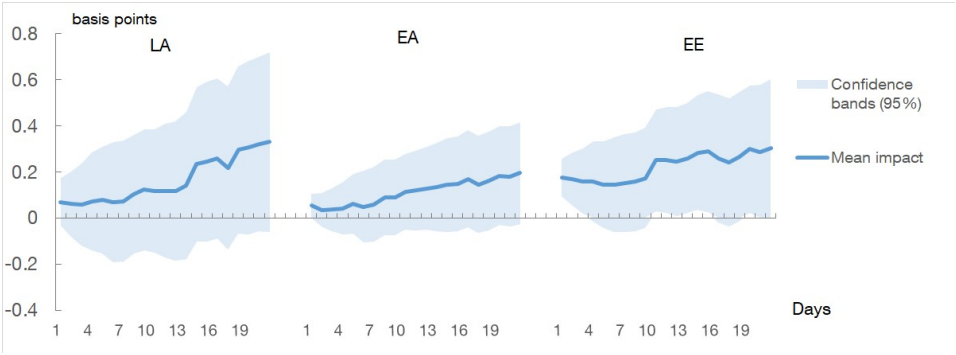
Notes: The figures show averages for each region of impulse response function of sovereign and corporate spreads and the exchange rate versus the USD to a positive macroeconomic shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. EA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Impact on sovereign spreads



(b) Impact on corporate spreads



(c) Impact on exchange rates

Figure 6: Impulse responses of a monetary policy shock from China on various variables

Notes: The figures show averages for each region of impulse response function of sovereign and corporate spreads, and exchange rates versus the USD, to a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. EA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

appreciation of local currencies. As is the case with the equity returns, these responses are not only significant, but also notably persistent, lasting for one month in some cases.

We find that the compression of Latin American sovereign and corporate spreads is slightly higher than in Emerging Asia, and Emerging Europe. For exchange rates results are on par in all three regions. The result for Latin America could be striking but recall that these economies obtain a high part of their fiscal revenues from commodity production and exports, and that their bigger firms business -those capable of issuing bonds in international markets- are related to commodities. Monetary policy shocks

in China, on the other hand, have a weaker influence on the financial variables considered, as shown in Figure 6.

This distinction highlights again the divergent impacts of different types of economic disturbances emanating from China, with macroeconomic shocks affecting broader financial variables, while monetary policy adjustments appear to have limited or no observable effects on financial variables.

5 Conclusion

Our analysis reveals that macroeconomic shocks from China significantly influence emerging markets. In general, a positive macroeconomic shock in China leads to an increase in stock prices, a compression of sovereign and corporate external debt spreads, and an appreciation of local currencies. In contrast, financial spillovers from a monetary policy shock in China are found to be weak or nonexistent.

Moreover, when compared to Asian countries that have closer ties with China, and Eastern European economies, the macroeconomic shocks from China have a more substantial effect on Latin America. This greater impact appears to be driven by fluctuations in commodity prices. When controlling for the influence of commodity prices in the local projections, the effect of the Chinese macro shock is greatly reduced, and comparable to that of other regions. We also find that the differential impact on Latin American equities is circumscribed to stocks that belong to companies whose business is related to commodities.

Our research has revealed the presence of significant financial spillovers from China to other emerging markets, indicating a connection that is commonly not taken into account in discussions analyzing the repercussions of Chinese events on emerging economies. Quantitative multi-country models employed by central banks do frequently not model financial spillovers from China to other emerging economies. In addition, the financial spillovers to Latin America appear to be mediated by commodity prices. This raises the question of whether the apparent effects of commodity prices on real activity in emerging economies, and in particular in Latin America, may, in fact, be channeled also through financial markets instead of only through trade linkages. Future research on this relationship can gain a better understanding of the mechanisms at play and ensure that our economic models accurately reflect the interconnections between China and other emerging economies.

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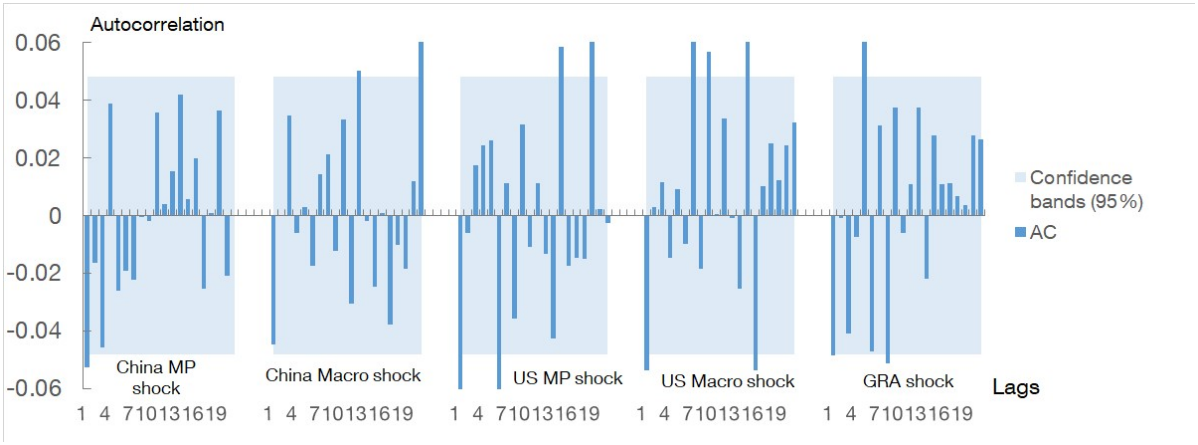
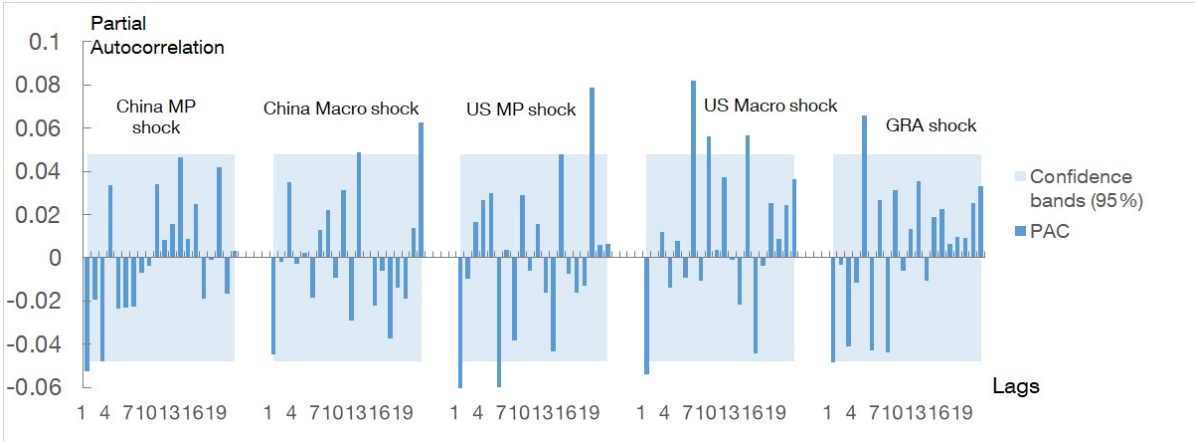
Appendices

A ACF and PACF for estimated structural shocks



(a) Autocorrelation Functions



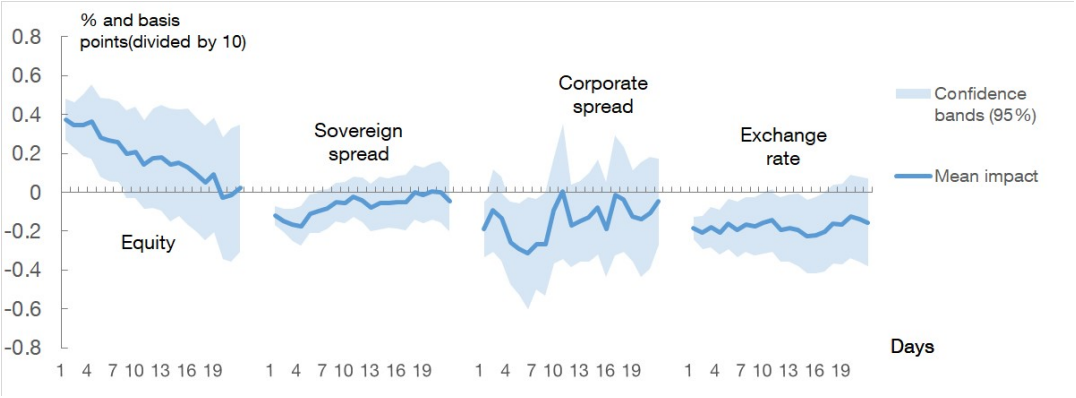
(b) Partial Autocorrelation Functions

Figure 7: ACF and PACF for the shocks estimated in the BVAR

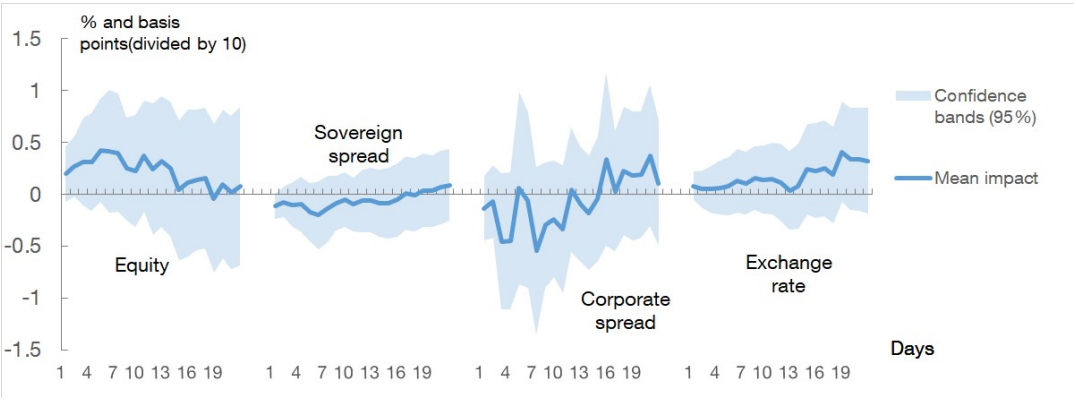
Notes: The figures show the autocorrelation and partial autocorrelation functions for the five structural shocks estimated in the BVAR set up.

B Individual countries' IRF to Chinese shocks

B.1 Latin American markets



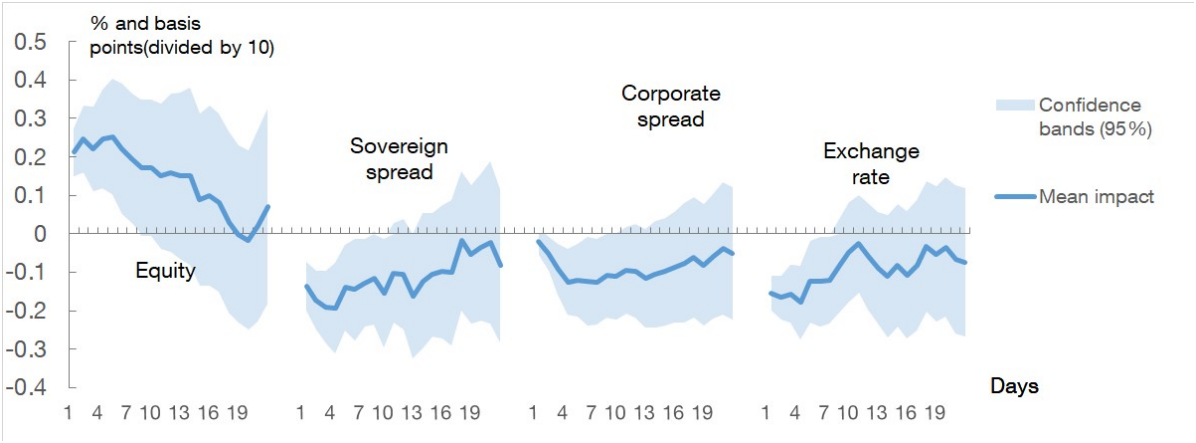
(a) Response of Brazilian financial variables to a Chinese macro shock



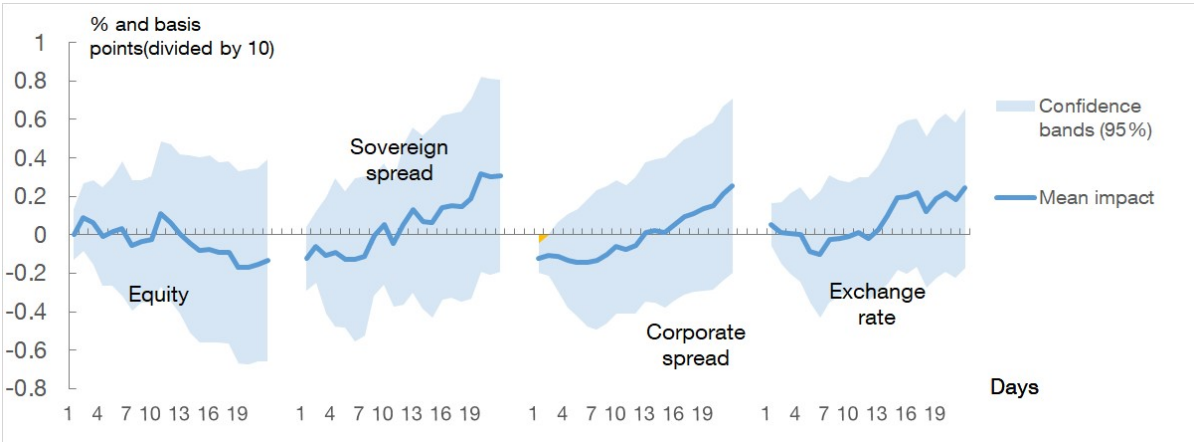
(b) Response of Brazilian financial variables to a Chinese monetary policy shock

Figure 8: Brazil: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



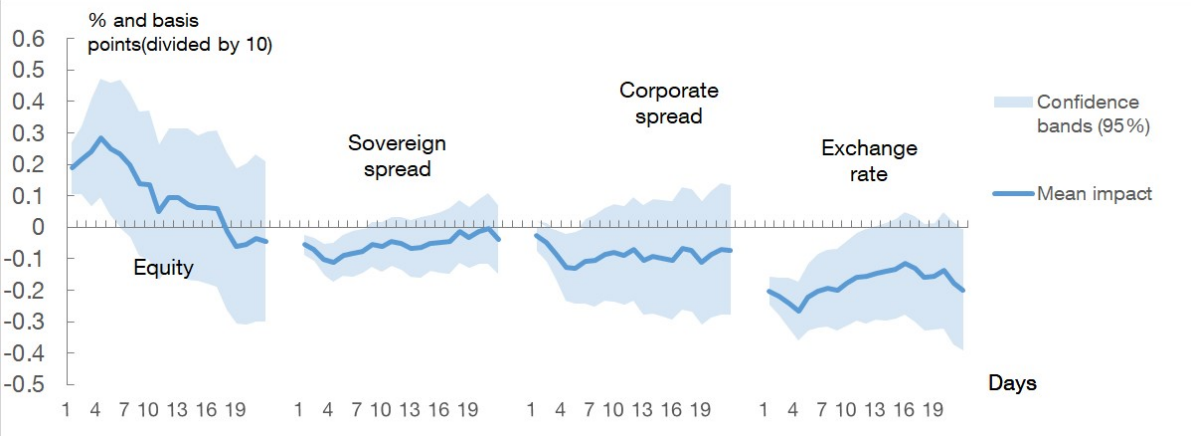
(a) Response of Mexican financial variables to a Chinese macro shock



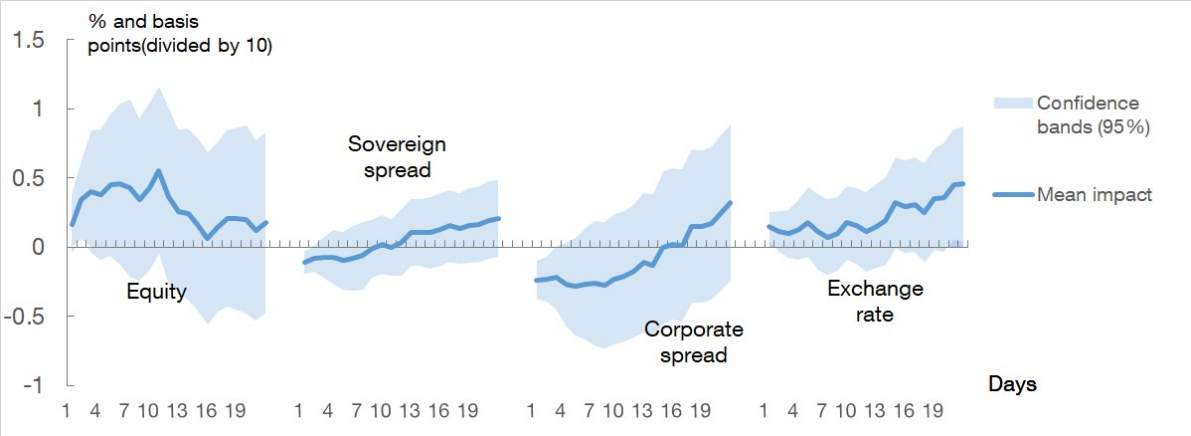
(b) Response of Mexican financial variables to a Chinese monetary policy shock

Figure 9: Mexico: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



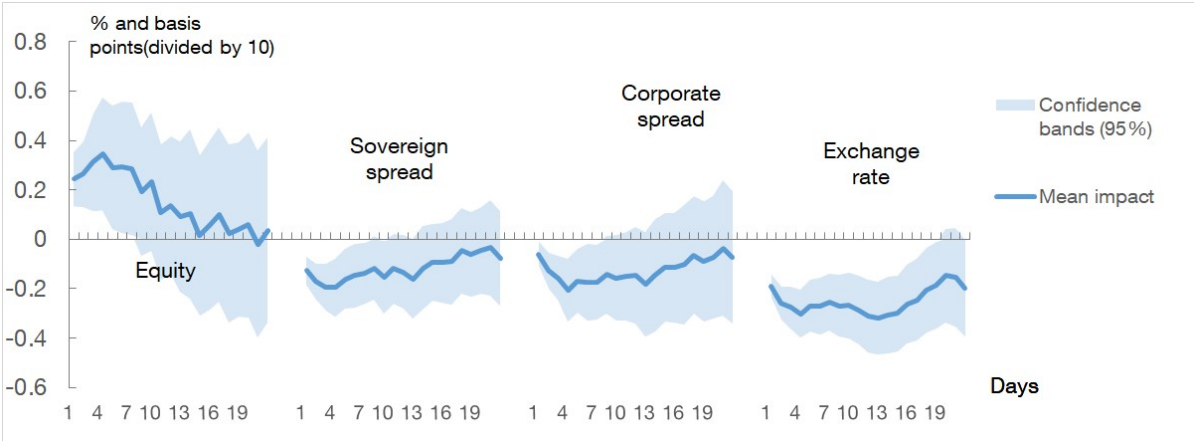
(a) Response of Chilean financial variables to a Chinese macro shock



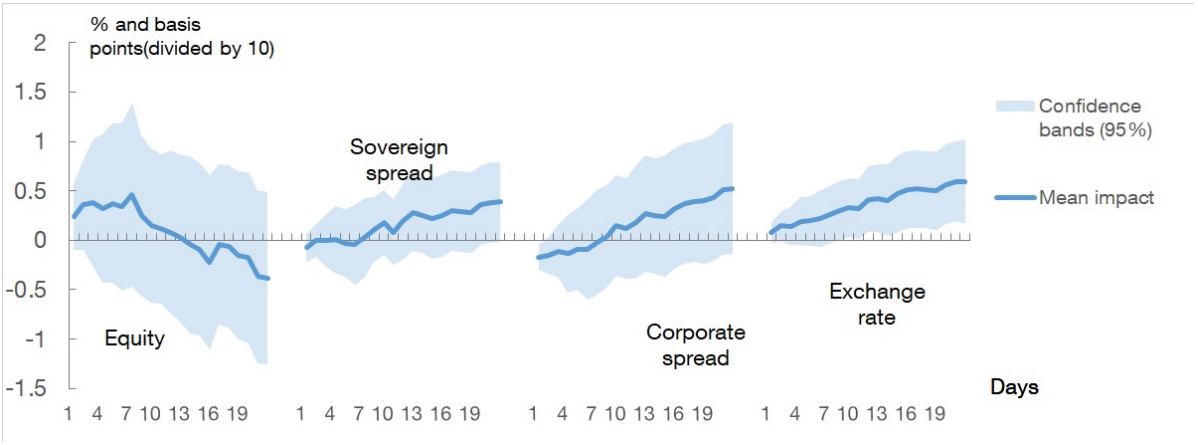
(b) Response of Chilean financial variables to a Chinese monetary policy shock

Figure 10: Chile: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



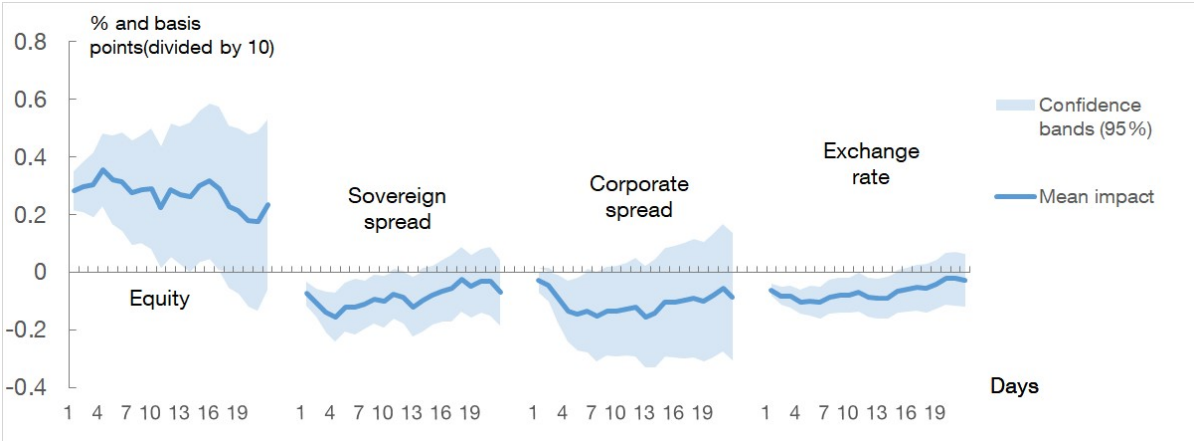
(a) Response of Colombian financial variables to a Chinese macro shock



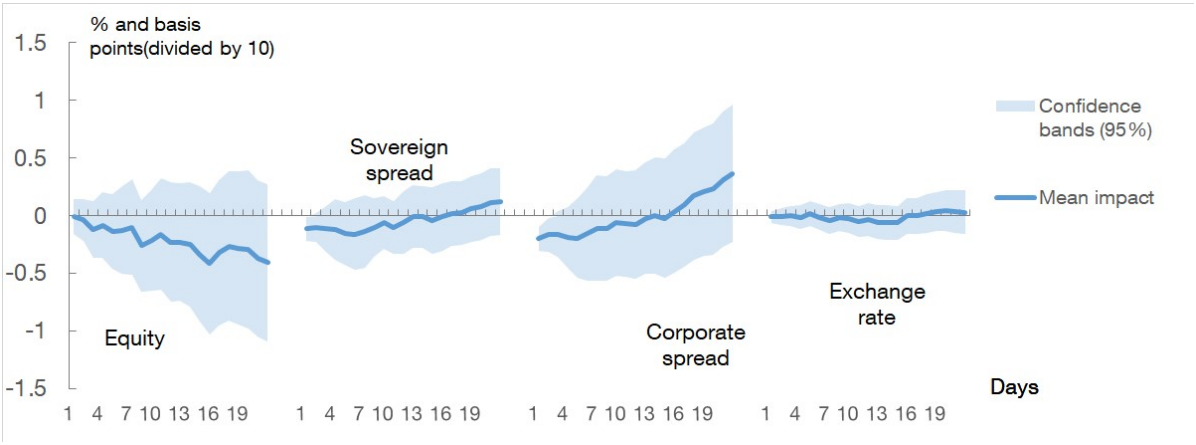
(b) Response of Colombian financial variables to a Chinese monetary policy shock

Figure 11: Colombia: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Response of Peruvian financial variables to a Chinese macro shock

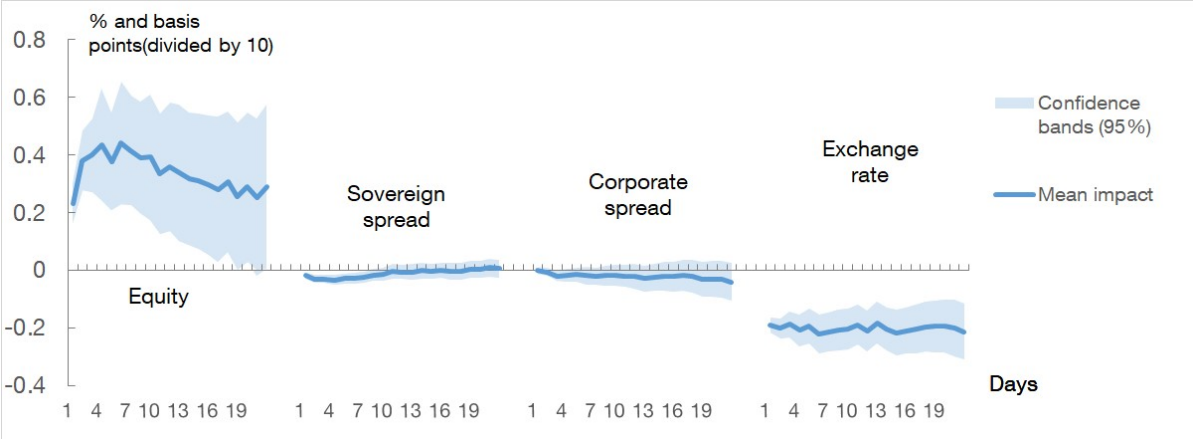


(b) Response of Peruvian financial variables to a Chinese monetary policy shock

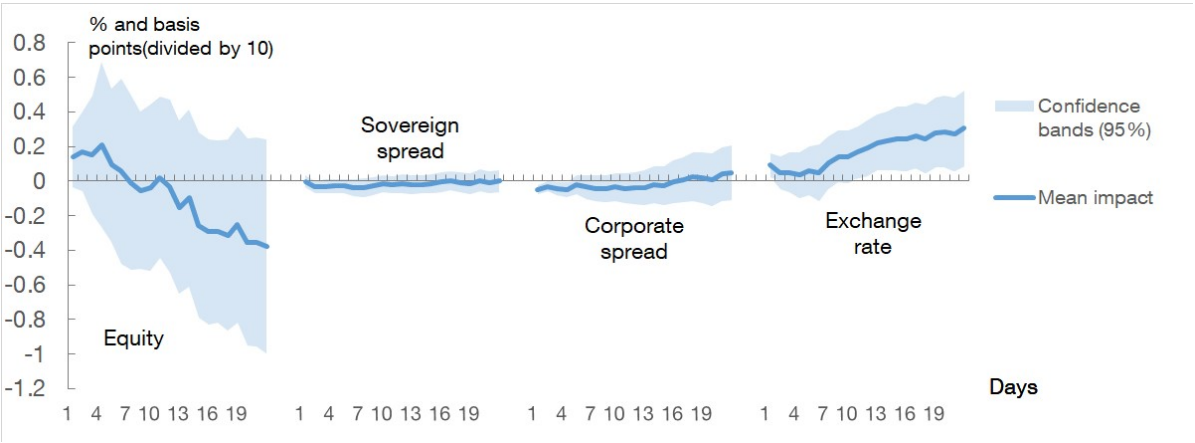
Figure 12: Peru: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

B.2 Asian markets



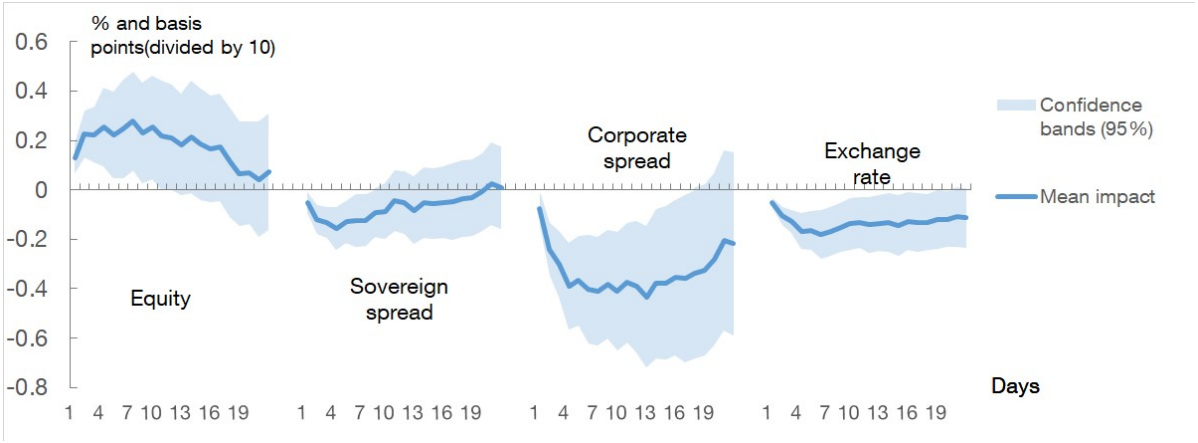
(a) Response of Korean financial variables to a Chinese macro shock



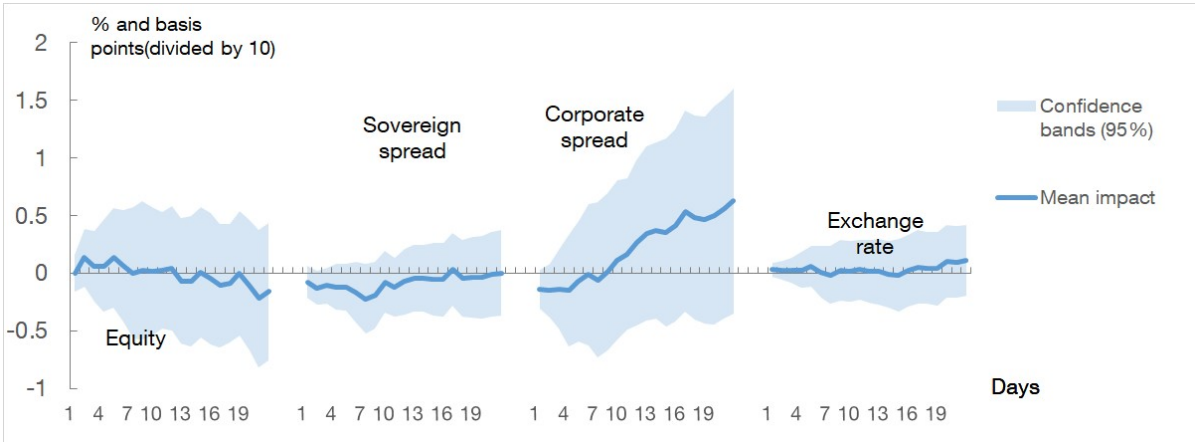
(b) Response of Korean financial variables to a Chinese monetary policy shock

Figure 13: Korea: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



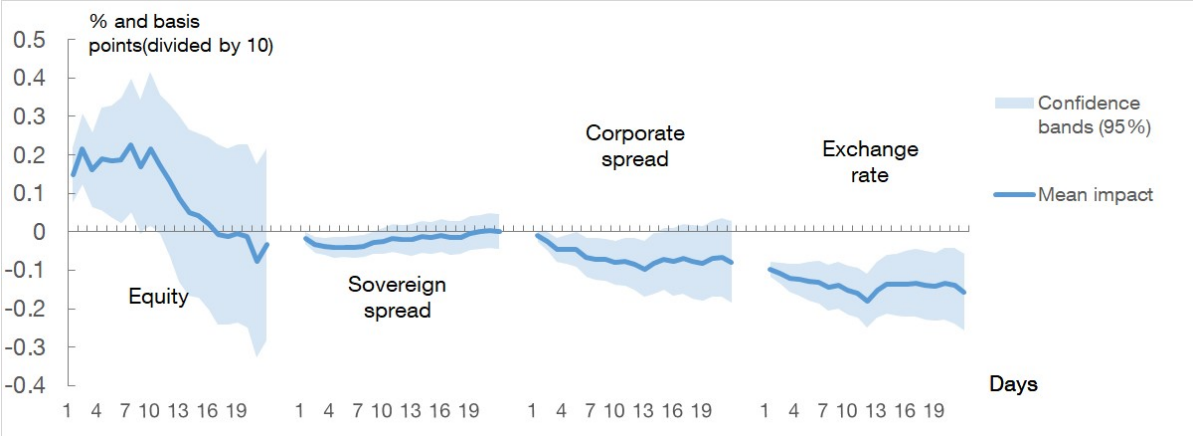
(a) Response of Indonesian financial variables to a Chinese macro shock



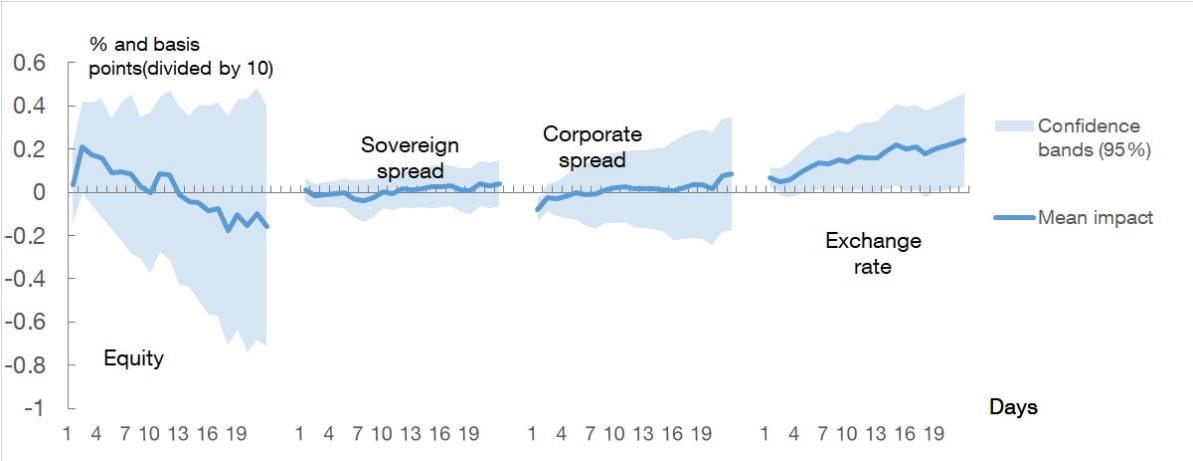
(b) Response of Indonesian financial variables to a Chinese monetary policy shock

Figure 14: Indonesia: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



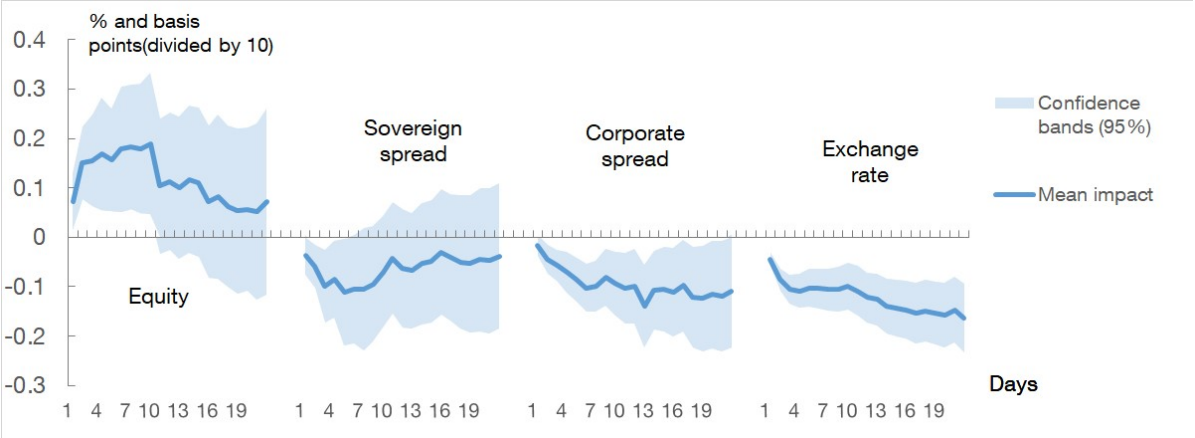
(a) Response of Thai financial variables to a Chinese macro shock



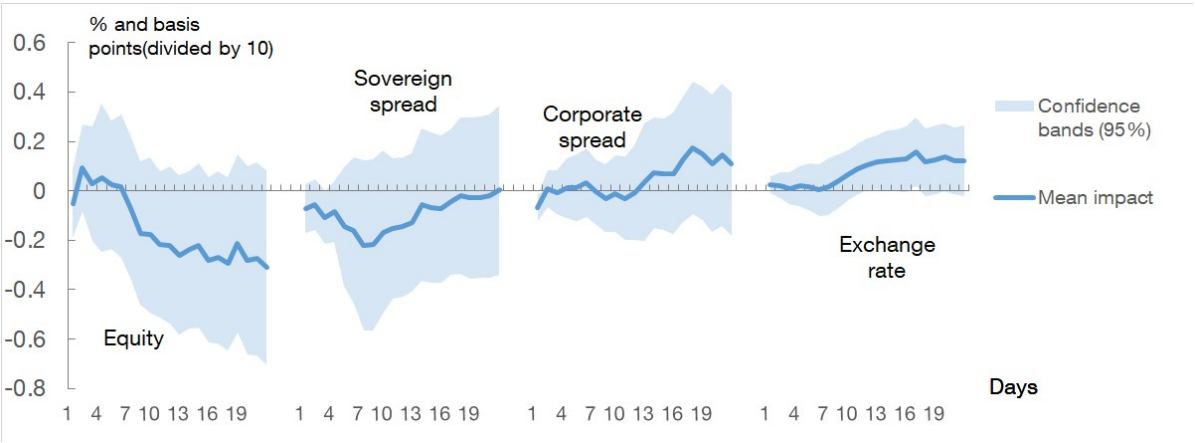
(b) Response of Thai financial variables to a Chinese monetary policy shock

Figure 15: Thailand: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Response of Malaysian financial variables to a Chinese macro shock

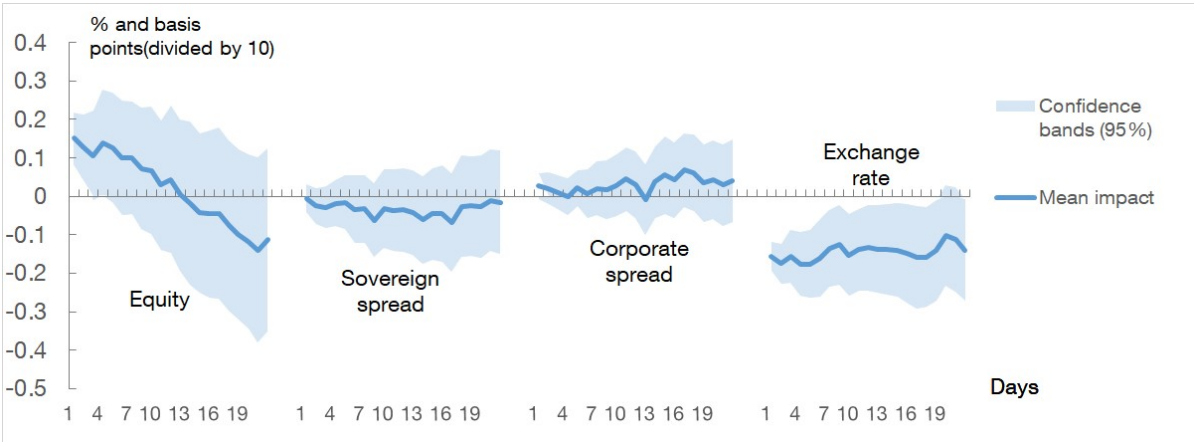


(b) Response of Malaysian financial variables to a Chinese monetary policy shock

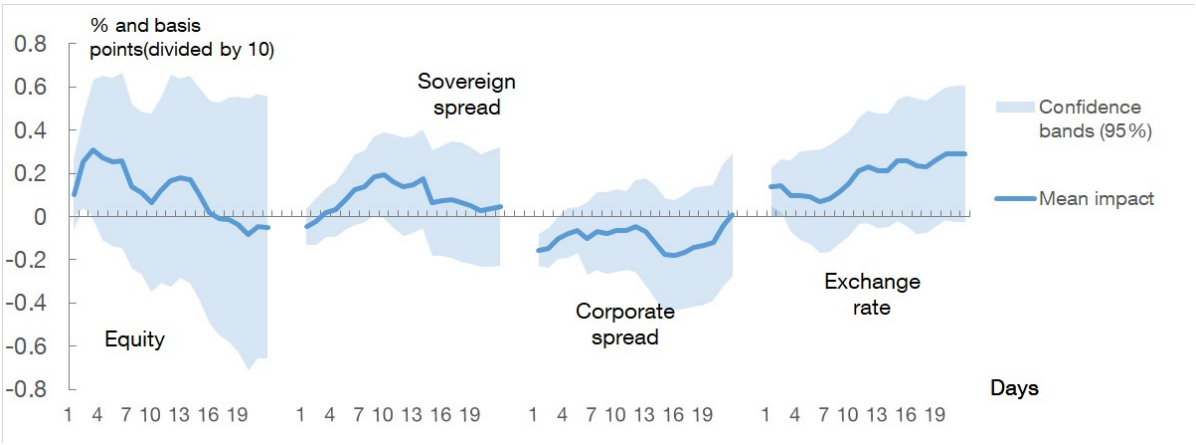
Figure 16: Malaysia: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

B.3 Eastern Europe markets



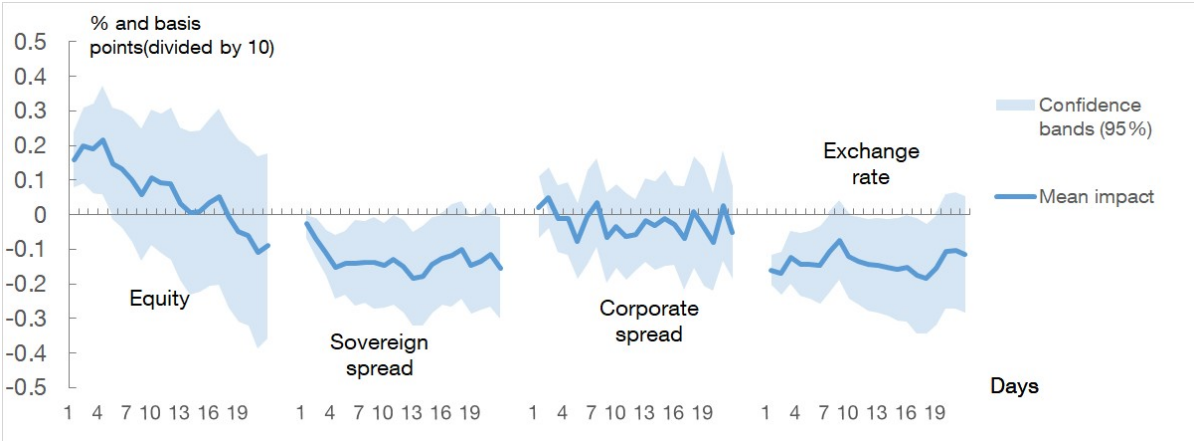
(a) Response of Czech financial variables to a Chinese macro shock



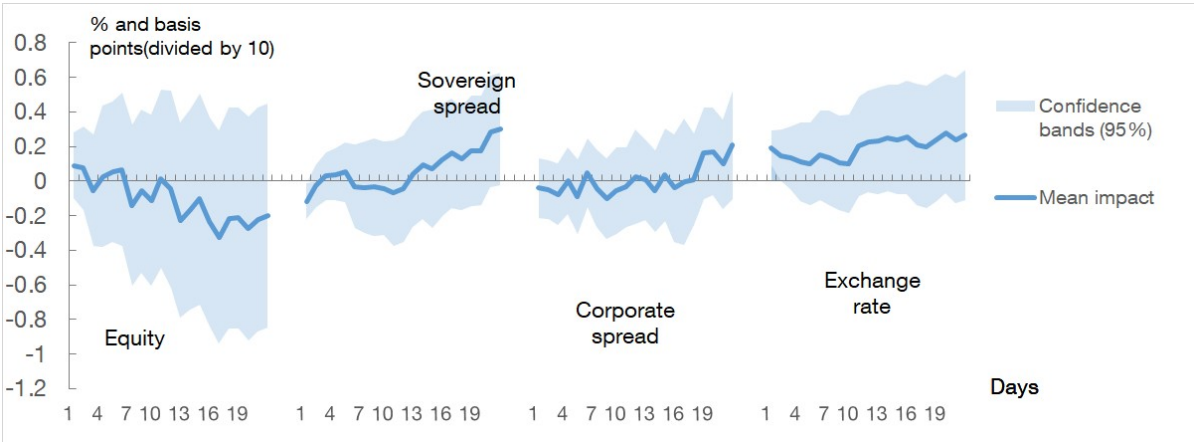
(b) Response of Czech financial variables to a Chinese monetary policy shock

Figure 17: Czech Republic: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



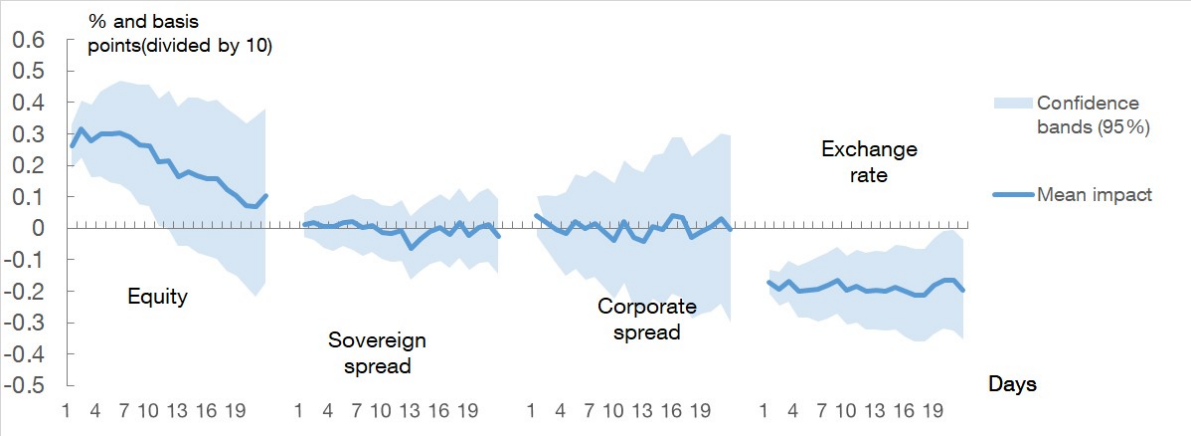
(a) Response of Hungarian financial variables to a Chinese macro shock



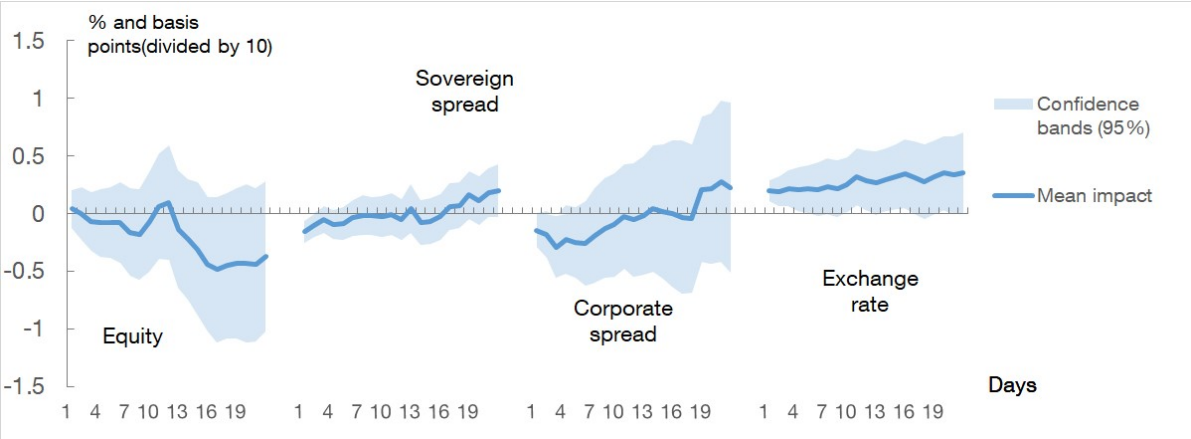
(b) Response of Hungarian financial variables to a Chinese monetary policy shock

Figure 18: Hungary: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



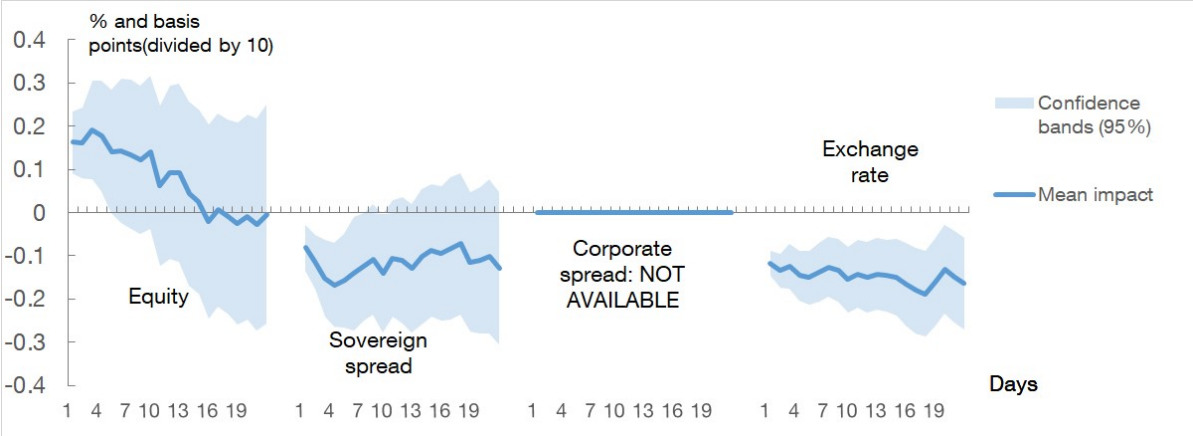
(a) Response of Polish financial variables to a Chinese macro shock



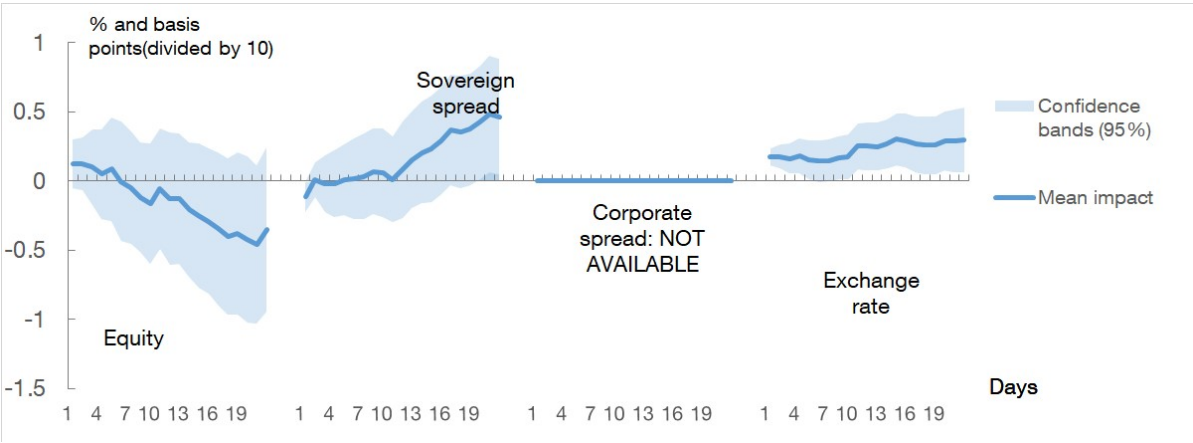
(b) Response of Polish financial variables to a Chinese monetary policy shock

Figure 19: Poland: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



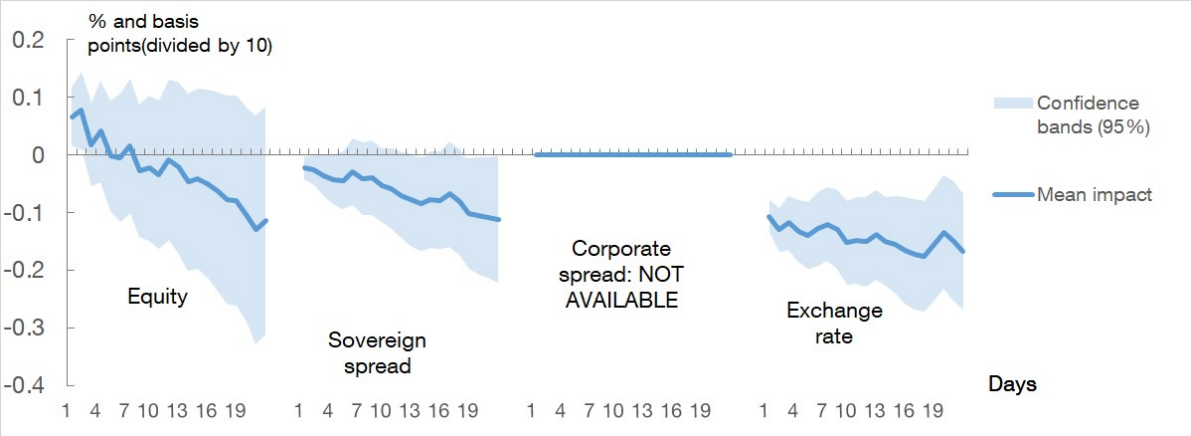
(a) Response of Romanian financial variables to a Chinese macro shock



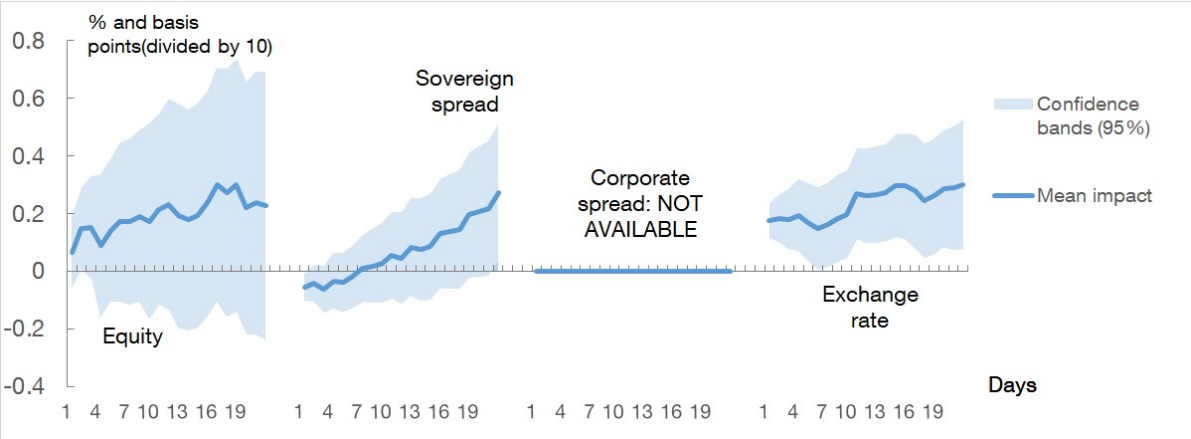
(b) Response of Romanian financial variables to a Chinese monetary policy shock

Figure 20: Romania: IRF to Chinese shocks

Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Response of Bulgarian financial variables to a Chinese macro shock



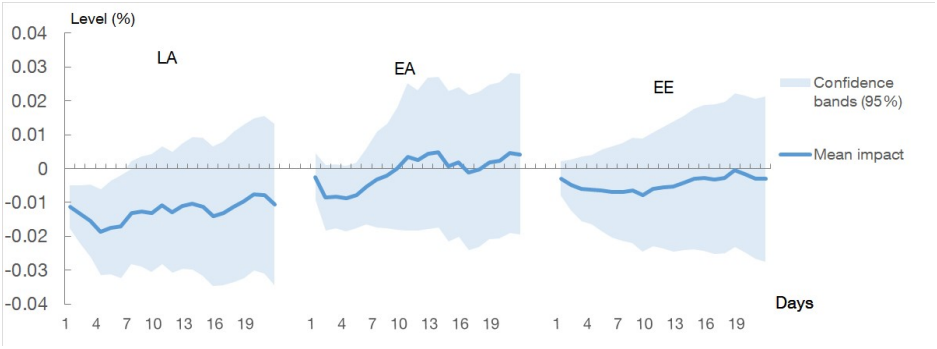
(b) Response of Bulgarian financial variables to a Chinese monetary policy shock

Figure 21: Bulgaria: IRF to Chinese shocks

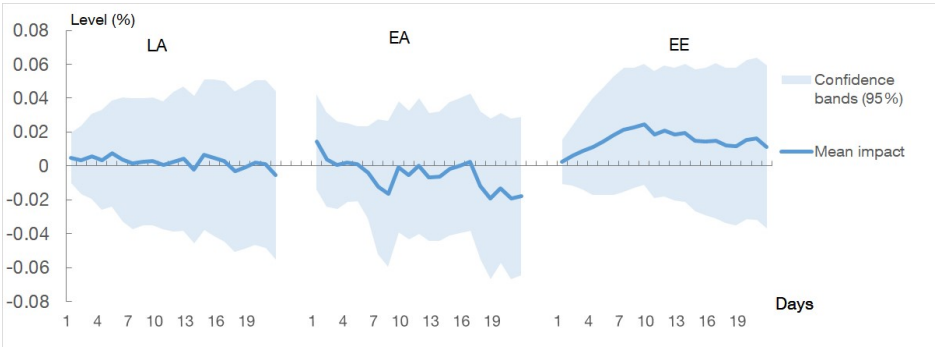
Notes: The figures show impulse response function of each financial variable to a positive macroeconomic or a positive monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

C Financial spillovers are also observed in long-term interest rates and financial conditions

Another very relevant variable for financial stability that could be affected by shocks emanating from China would be the cost of government financing in local markets, that is, long-term interest rates in local currency. Local currency long term yields refer to the interest rate of 10-year bonds quoted in domestic markets and denominated in domestic currency. In the case of Peru, the maturity is 20 years. For long term yields in local currency, the impacts of the macro shocks in China are much smaller and are subject to greater uncertainty. Again, the monetary policy disturbances do not have significant effects and the greatest impacts for macro innovations are observed for Latin America.



(a) Impact of a positive macro shock in China

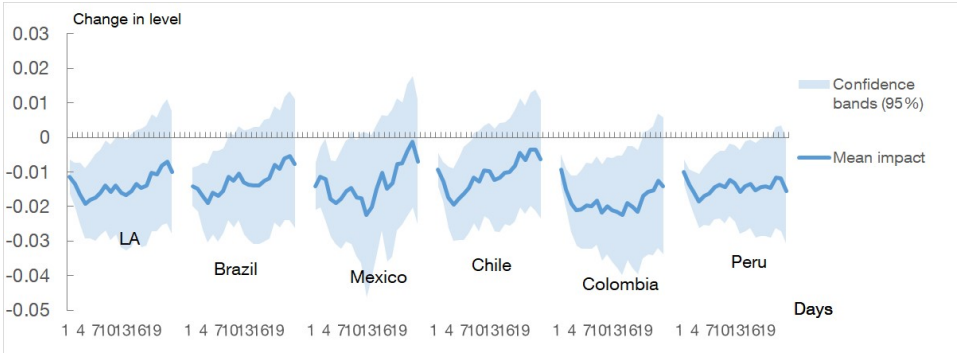


(b) Impact of a positive monetary policy shock in China

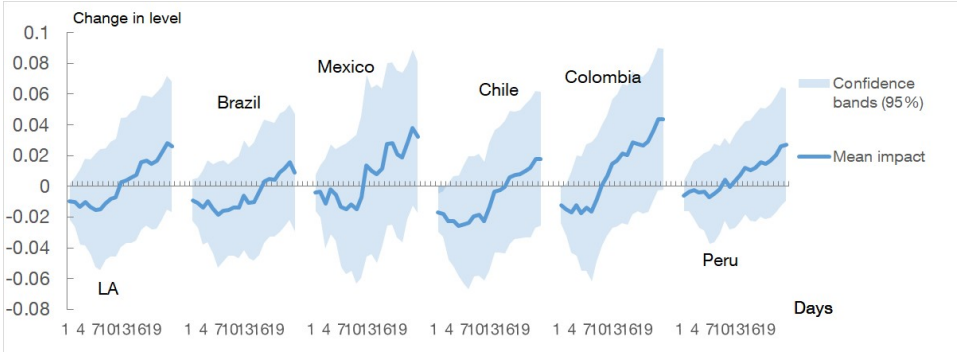
Figure 22: Impulse responses of long term yields in local currency to positive Chinese shocks

Notes: The figures show averages for each region of impulse response function of long term yields in local currency to a positive macro and monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. EA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

Finally, for Latin American countries, we also study the impact on a financial Conditions Index (FCI), constructed using a principal component methodology, as described by Andres-Escayola et al. (2024). This index is based on six to ten financial market variables that capture the ease with which agents can secure financing in each country, and it is designed so that a fall represents loosening financial conditions. Again, macro shocks emanating from China loosen significantly financial conditions in Latin America, but monetary policy shocks do not.



(a) Impact of a positive macro shock in China



(b) Impact of a positive monetary policy shock in China

Figure 23: Impulse responses of financial conditions index to positive Chinese shocks

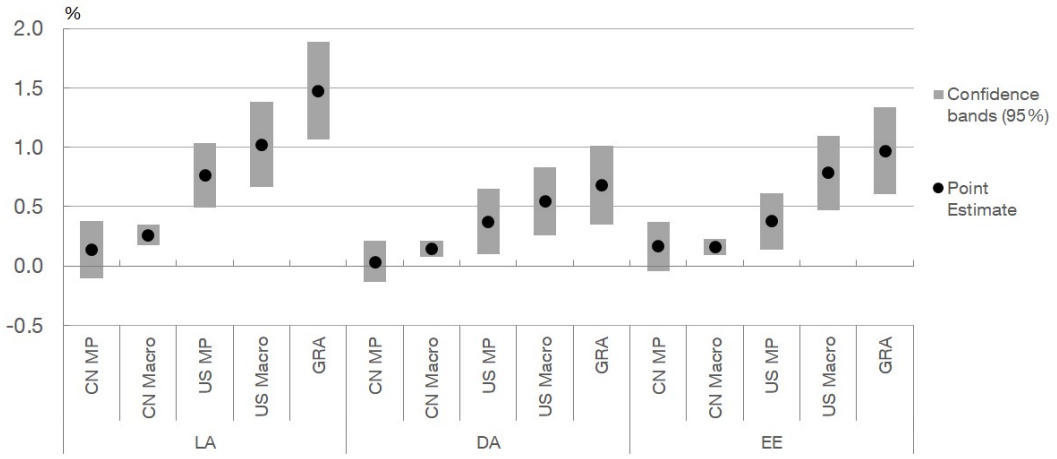
Notes: The figures show impulse response function of financial conditions index to a positive macro and monetary policy shock in China. This shock is scaled so that it raises the equity price in China by 1%. Impulse responses are estimated with Local Projections for each country. Blue areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

D Financial spillovers from China are weaker than those from the United States

Our research has shown that Chinese macro shocks have a significant, immediate and persistent impact on emerging markets equity indices, more pronounced in the case of Latin America, and that some impact could also be seen in other relevant variables like the cost of external debt and the exchange rate. Nevertheless, our simple correlation calculations (1) resulted in a strong coefficient between emerging economies and the US.

To complement our analysis with a comparison with shocks emanating from other regions, we estimate the impact of the other three computed shocks obtained via the BVAR, using the same local projections framework. Figure 24 summarizes the response functions of equity prices to all five shocks -normalized to represent an increase of 1% in Chinese stock exchange -the factors of normalization are simply the standard deviation of each shock- at their initial impact (i.e., the first element of the impulse response function). This figure shows a clear ordering. Both shocks originating in China have less impact than those originating in the United States or the global risk aversion shock. US macro and global risks shocks tend to show largest effects than US monetary policy shocks for all regions. For East Asia and Eastern Europe, US macro-financial shock and the global risk aversion shock generate similar responses, while in Latin American countries global risks seem to dominate over macro-financial shocks. Moreover, our analysis consistently shows that Latin American countries exhibit the most substantial responses to these shocks. This heightened sensitivity can be attributed to the strong trade and economic connections with the US, enhanced linkages with the US dollar as the currency of denomination of the bulk of their external debt and also of their export revenues, and a greater level of financial openness to foreign capital compared to other regions.

Figure 24: Spillovers of positive shocks in China, the US and global risk aversion, by region: equity index



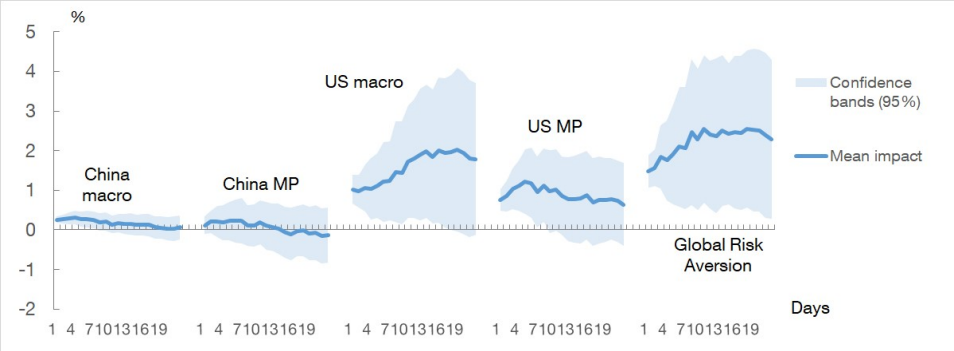
Notes: **Notes**: Black dots represent the point estimate of the estimated response of a variable to positive shocks in China, the US and global risk aversion that increases Chinese equities by 1%, by region. Scale factors are the standard deviation of each shock. This response is calculated on impact (i.e., the first element of the impulse response function). The impulse response functions are estimated using Local Projections. Gray areas show 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. LA is the average for Brazil, Chile, Colombia, Mexico and Peru. AS is the average for Korea, Malaysia, Indonesia and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland and Romania.

Figures 25a, 25b and 25c show the impulse response of equity prices to Chinese and US macro and monetary policy shocks, and a global risk shock, respectively, over an extended horizon, for the three regions analyzed. As shown, the effects of global risk and US macro shocks tend to be quite persistent. They typically reach their peak around day 10 for global risk shocks and day 15 for US macro shocks, and they do quickly converge to their original levels. The reaction can still be seen after a month.

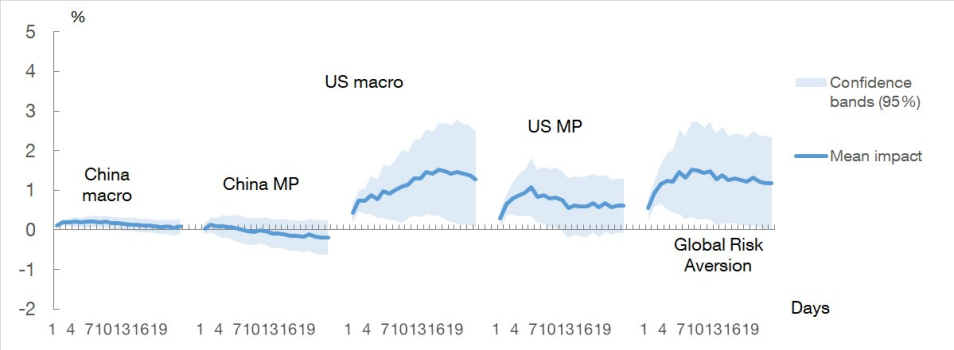
However, in some cases, the effects of Chinese macro shocks are at par or even larger with the ones observed for US macro and monetary policy shocks. Regarding exchange rates, US macro shocks show no significant effects, while US monetary policy shocks are not very different in size the impacts of Chinese

macro shocks (26). Additionally, corporate spreads are not found to react to US monetary policy shocks (27, although Latin American sovereign spreads do react (28).

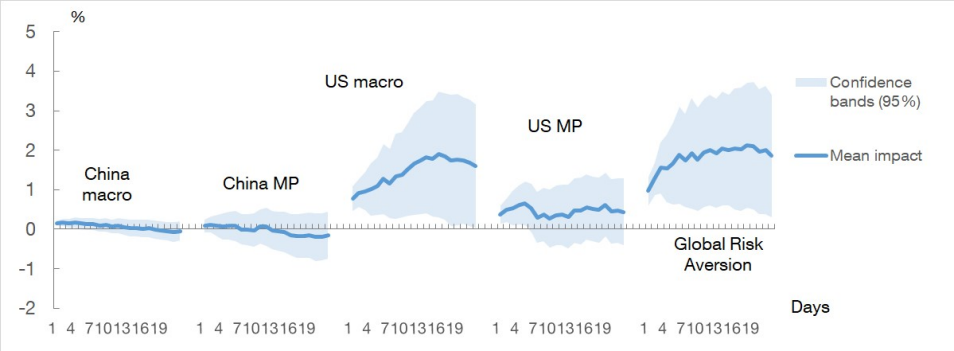
In a nutshell, our results suggest that shocks in China show significant effects on financial variables other than stock prices, and provide evidence that they are also important in explaining sovereign and corporate spreads, as well as movements in exchange rates. This suggests that the phenomenon is not unique to equity markets. China's economic fluctuations influence financing conditions in emerging markets through alterations in bond spreads and can impact external demand via exchange rate adjustments. These dynamics can critically affect business cycles in emerging markets, potentially influencing investment decisions, price stability, and growth trajectories in these regions. Furthermore, these conditions may pose risks to financial stability. The tightening of financial conditions may reduce borrowers' profitability and liquidity and, as a result, their capacity to meet their financial commitments with credit institutions. A downturn in equity markets, coupled with widening sovereign and corporate spreads, might exacerbate financial spillovers by eroding household wealth through adverse impacts on asset prices. Such depreciation can additionally lead to noticeable deterioration in the balance sheets of financial institutions holding these assets, thereby amplifying sovereign-bank risk and potentially triggering broader financial instability. Finally, significant currency fluctuations can further compound these issues, intensifying financial distress of firms and financial institutions that hold substantial amounts of debt denominated in foreign currencies.



(a) Latin America



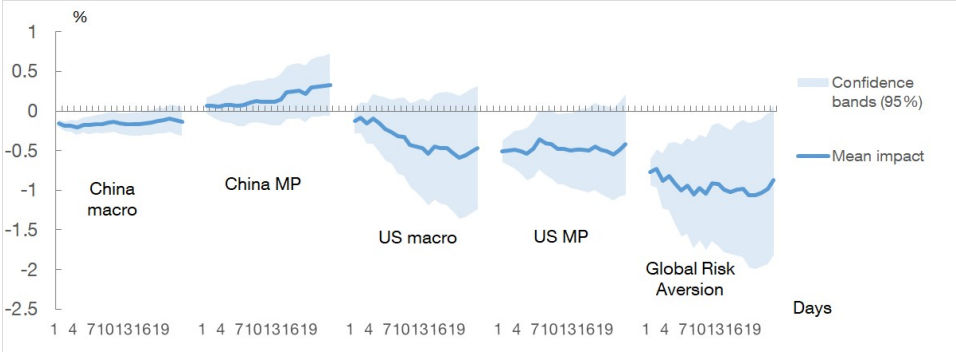
(b) Emerging Asia



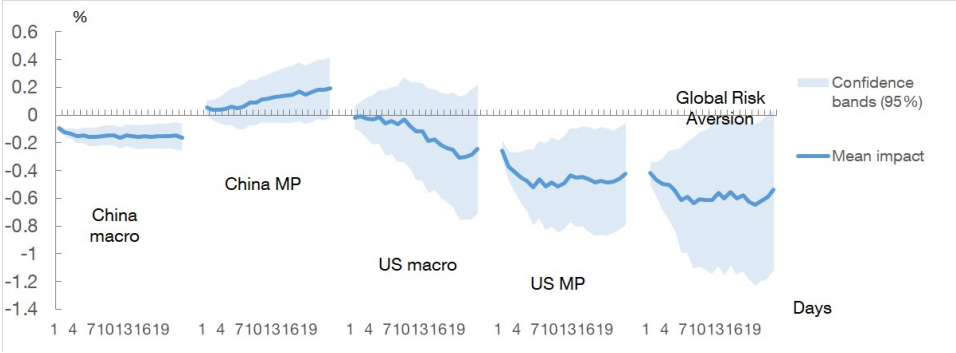
(c) Emerging Europe

Figure 25: Impulse responses of all five shocks on equity prices

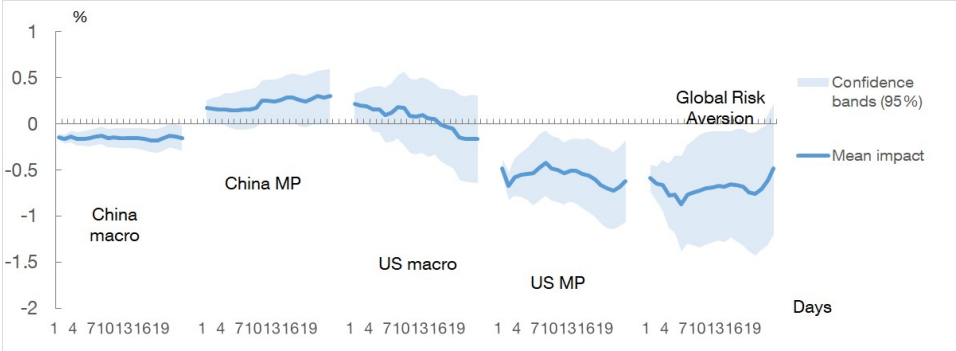
Notes: The figures show averages for each region of impulse response function of equity prices to all five shocks. The shocks are scaled so that it raises the equity price in China by 1%. Scale factors are the standard deviation of each shock. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. DA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Latin America



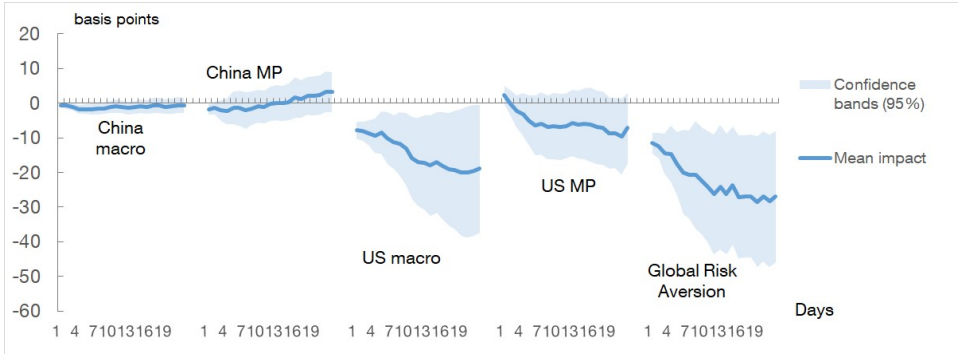
(b) Emerging Asia



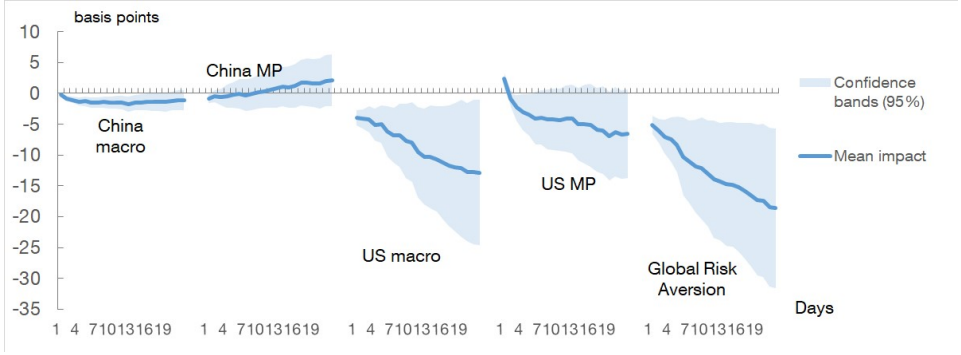
(c) Emerging Europe

Figure 26: Impulse responses of all five shocks on exchange rate versus the USD

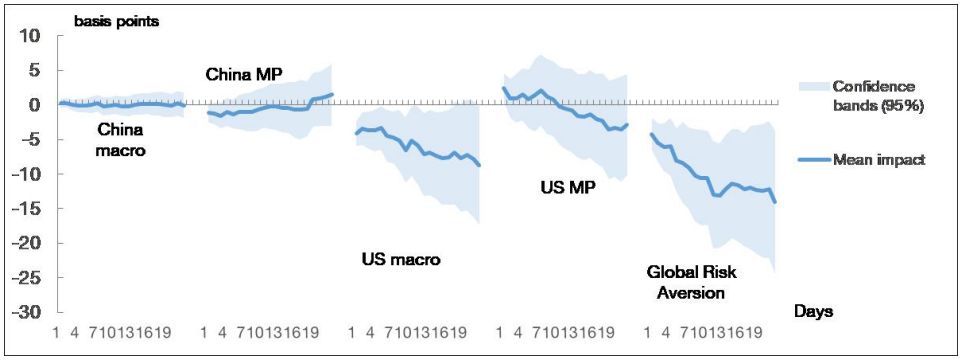
Notes: The figures show averages for each region of impulse response function of the exchange rate versus the USD to all five shocks. The shocks are scaled so that it raises the equity price in China by 1%. Scale factors are the standard deviation of each shock. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. DA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Latin America



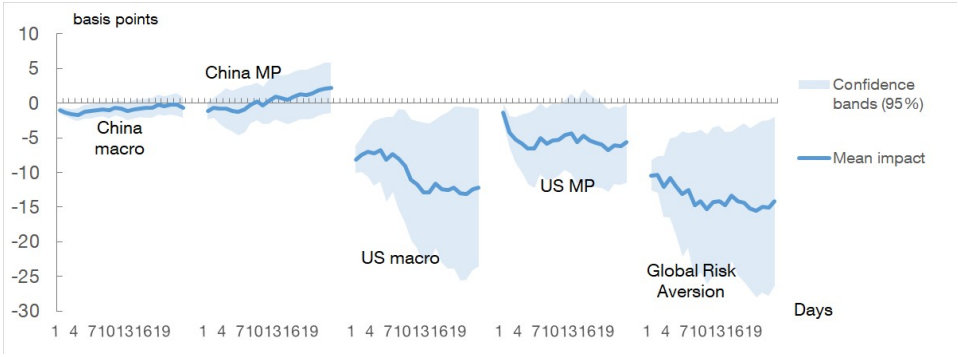
(b) Emerging Asia



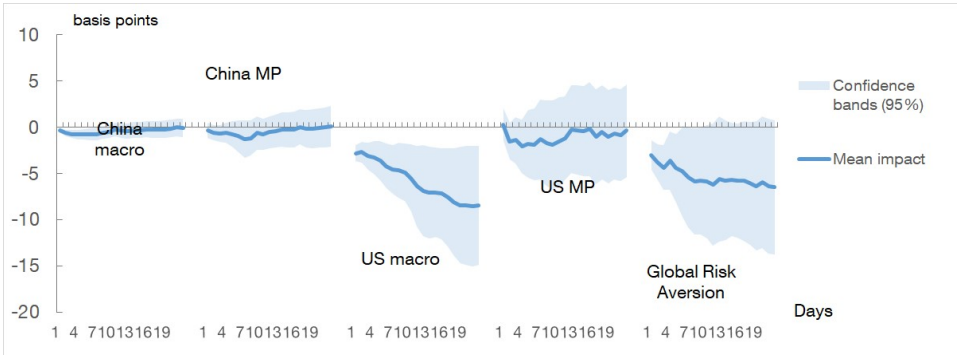
(c) Emerging Europe

Figure 27: Impulse responses of all five shocks on the corporate spread

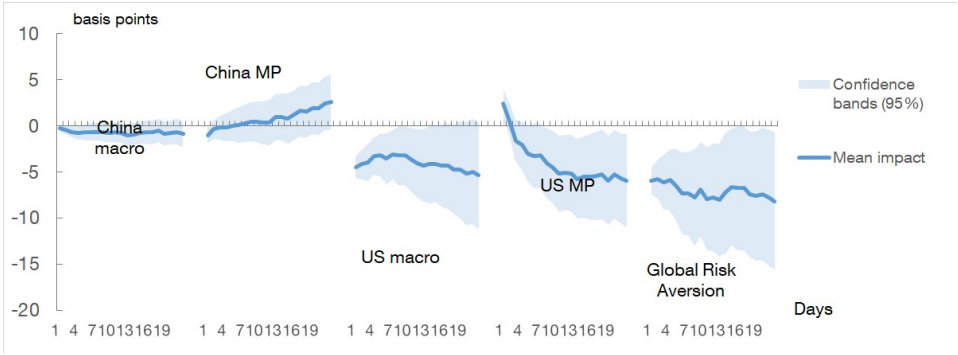
Notes: The figures show averages for each region of impulse response function of the corporate spread to all five shocks. The shocks are scaled so that it raises the equity price in China by 1%. Scale factors are the standard deviation of each shock. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. DA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.



(a) Latin America



(b) Emerging Asia



(c) Emerging Europe

Figure 28: Impulse responses of all five shocks on the sovereign spread

Notes: The figures show averages for each region of impulse response function of the sovereign spread to all five shocks. The shocks are scaled so that it raises the equity price in China by 1%. Scale factors are the standard deviation of each shock. Impulse responses are estimated with Local Projections for each country and averaged by region. LA is the average for Brazil, Chile, Colombia, Mexico, and Peru. DA is the average for Korea, Malaysia, Indonesia, and Thailand. EE is the average for the Czech Republic, Bulgaria, Hungary, Poland, and Romania. Blue areas show averages by region of 95%-confidence bands with standard errors adjusted for serial correlation using the Newey-West adjustment. These areas are not proper confidence intervals, but give a rough indication of the uncertainty around the point estimates.

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