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FEB Research Institute (FEBRI)
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University of Groningen

Visiting address:
Nettelbosje 2
9747 AE Groningen
The Netherlands

Postal address:
P.O. Box 800
9700 AV Groningen
The Netherlands

T +31 50 363 9090/7068

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The Effect of the Global Financial Cycle on National Financial Cycles: Evidence from BRICS Countries

Xin Tian
University of Groningen, Faculty of Economics and Business, Department of Global Economics and Business
xin.tian@rug.nl

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Xin Tian*

Abstract

This paper examines whether a flexible exchange rate regime, capital controls, and foreign reserves are effective tools to reduce BRICS countries' exposure to global financial cycle (GFCy) shocks. Based on local projections in which we allow the response of national financial cycles (NFCys) to the GFCy to vary, we observe that flexible exchange rate regime absorbs GFCy shocks in BRICS countries, as do tighter capital controls and larger international reserves. We also find that the responses of NFCys to GFCy shocks are heterogeneous across countries, with stronger effects observed in countries with higher inflation and GDP growth.

Keywords: Global financial cycle; national financial cycle; dynamic factor analysis; local projections; BRICS countries

JEL classification: E44; F32; F36

*Correspondence to Xin Tian (xin.tian@rug.nl), Department of Global Economics and Management, Faculty of Economics and Business, University of Groningen. I thank Jakob de Haan and Jan Jacobs for their helpful comments. A previous version of this paper was presented at the 2022 SOM PhD Conference. I thank Tristan Kohl for his useful comments. I also thank participants in the IFABS 2023 Oxford Conference and the 22nd European Economics and Finance Society Conference for helpful suggestions.

1 Introduction

Several studies suggest the existence of a global financial cycle (GFCy), which is characterized by the co-movement of asset prices and/or capital flows around the globe (Aldasoro et al., 2020; Miranda-Agrippino and Rey, 2020; Potjagailo and Wolters, 2020; Scheubel et al., 2019b; Tian et al., 2023). The GFCy is largely driven by central countries' monetary policies, with the U.S. Federal Reserve playing the dominant role in driving the GFCy through the leverage of global banks and the significant role of the dollar in global markets (Bruno and Shin, 2015a,b). The European Central Bank also contributes to the GFCy, but to a lesser extent, mostly through driving trade and commodity prices (Ca'Zorzi et al., 2020). Hence, monetary surprises in the central countries lead to international capital flows that impact periphery economies, especially those emerging countries which liberalized their capital accounts (Forbes and Warnock, 2012; Miranda-Agrippino and Rey, 2020). Several studies have demonstrated that global factors, including advanced economy interest rates and global risk appetite, have an impact on small open economies (Ahmed and Zlate, 2014; Forbes and Warnock, 2012; Kaminsky et al., 2020). Therefore, it is crucial to understand how individual countries could affect domestic financial conditions under global financial integration.

This paper examines whether a flexible exchange rate regime, capital controls, and foreign reserves are effective tools to reduce countries' exposure to GFCy shocks. We do so by examining the effect of the GFCy on national financial cycles (NFCys) using local projections. NFCys can be defined as a self-reinforcing interaction between perceptions of value and risk in the medium-term component of credit, house prices, and equity prices (Borio, 2014; Claessens et al., 2012; Schüler et al., 2020)

Several previous studies suggest that the financial conditions of individual countries are highly driven by GFCy shocks, which impact capital flows. As a result, coun-

tries lose their monetary autonomy even under a floating exchange rate. This conclusion is particularly significant for emerging markets (Forbes and Warnock, 2012; Obstfeld et al., 2018).[1] This result would turn Mundell's trilemma, according to which countries have to choose between free capital flows or a floating exchange rate to maintain their monetary autonomy (Mundell, 1963), into a dilemma, as the GFCy drives capital flows independently of the exchange rate regime in place (Miranda-Agrippino and Rey, 2020). This leaves capital controls as the only option for countries to shield themselves from GFCy shocks. However, Aizenman et al. (2008, 2013) suggest that foreign reserves can also act as a buffer in response to global shocks and help preserve monetary policy autonomy. This transforms the trilemma into a quadrilemma, which includes reserves as an additional dimension.

Previous studies have analyzed the effect of the GFCy on NFCys (Bruno and Shin, 2015a; Miranda-Agrippino and Rey, 2020; Scheubel et al., 2019a; Obstfeld et al., 2018). However, there is no consensus on the importance of the GFCy for understanding NFCys in emerging markets. Some previous studies suggest that the effects of the GFCy on NFCys depend on country-specific characteristics (Dedola et al., 2017). In particular, some scholars have explained the role of the real economy in understanding financial fluctuations. They find that the expansion of the real economy could generate a wealth effect, which stimulates domestic and foreign credit growth, booming asset prices, and increases a country's exposure to global shocks (Calza et al., 2003; Bernanke and Blinder, 1988). Moreover, Ilzetzki et al. (2021) and Bonciani and Ricci (2020) pose that the vulnerability of a country can exacerbate financial frictions, which prevent intertemporal smoothing through foreign borrowing and lending and amplify the impact of global shocks for individual economies. We follow these studies

[1] In contrast, some scholars conclude that global factors are not that important for individual countries. For instance, Kamin (2011) argues that financial globalization does not lead to a loss of control over domestic monetary conditions for countries with floating exchange rate regimes. Similarly, De Winter et al. (2022) conclude that global financial factors are not significant drivers of country-specific financial cycles.

and measure countries' vulnerability using their GDP growth rate, current account deficit, and inflation rate. A higher vulnerability could magnify the impact of foreign shocks for countries that are integrated into the global market. For instance, a higher current account deficit may trigger a stop of capital flows, which could raise the severity of a crisis. A high inflation rate can indicate severe structural problems with respect to public finance and monetary conditions and could increase a country's borrowing costs.

The study that is most closely related to our work is by Prabheesh et al. (2021), who analyze the role of the GFCy in affecting the credit cycle in India and Indonesia. They find that GFCy booms cause an exchange rate appreciation, which further drives the boom of the NFCy in India, while the impact on Indonesia's domestic financial conditions is rather weak. However, their study has a limited scope by focusing on two specific countries. Furthermore, their paper does not consider the role of policy options and country characteristics in explaining the cross-country differences in the effects of the GFCy.

This paper first analyzes to what extent the BRICS' NFCys are synchronized with the GFCy. Then, we use the local projection (LP) methodology (Jordà, 2005) to examine how the countries' NFCYs respond to GFCy shocks. Third, we deploy the methodology of Iacoviello and Navarro (2019) and document whether the impact of GFCy shocks on NFCys is heterogeneous across BRICS countries and depends on policy options as well as country-specific characteristics.

The paper has several contributions. First, we extend previous research by Prabheesh et al. (2021) to the BRICS (Brazil, Russia, India, China, and South Africa) countries, as they are the largest emerging economies that are fast-growing in terms of economic and financial development. Moreover, these countries play an important role in international trade and are important recipients of capital flows (Mensi et al.,

2014; Swamy and Narayanamurthy, 2018). Therefore, they are exposed to changes in the GFCys. At the same time, their performance has profound implications globally.

The second contribution is to clarify the role of the GFCy in the dynamics of NFCys using the local projections (LP) methodology (Jordà, 2005). LP is a widespread alternative for Vector Autoregressions (VARs). LP and VARs both yield impulse responses (Plagborg-Møller and Wolf, 2021). We choose LP because it does not require additional restrictions and is generally more robust to misspecification than VARs. In addition, the LP method can be easily extended to study non-linearities and state-dependent responses. We conduct our LP analyses not only for individual countries but also for the panel of BRICS countries.[2]

The third contribution is to examine whether a GFCy shock is transmitted to the financial cycle of the BRICS countries depending on their exchange rate regime, capital controls, and foreign exchange reserves. And we further analyze whether the countries' sensitivity to the GFCy shock depends on country-specific characteristics: GDP growth, current account deficits, and the inflation rate.

Our findings suggest that the trilemma does not morph into a dilemma as a flexible exchange rate regime absorbs GFCy shocks in BRICS countries, as do tighter capital controls and larger international reserves. We also show that GFCy shocks are more significant for countries with higher GDP growth and higher inflation rates.

The remainder of the paper is organized as follows. Section 2 introduces our empirical strategy. Section 3 describes our dataset. Section 4 presents the results, while section 5 concludes.

[2]We also run estimates for the panel of BRICS countries as some countries have the same regime in place over the entire sample period.

2 Empirical strategy

In this section, we set up our empirical approaches used in the following sections, including the HP filter, synchronization measures, and local projections. We then explain how we estimate the local projections and analyze the GFCy shocks to the NFCys.

2.1 The GFCy and NFCy

Our GFCy measure is based on the study of Tian et al. (2023). They compute the GFCy by employing a dynamic latent factor model to estimate common components in a sample of 25 countries' sectoral equity indices.

Considering the limited data availability in BRICS countries, we follow Drehmann et al. (2012) and Oman (2019) and use credit to the non-financial private sector to measure the national financial cycle. Credit is seasonally adjusted and in log levels. The HP filter (Hodrick and Prescott, 1997) is applied to extract the cyclical components in Tian et al. (2023)'s global factor and annual credit growth rates to measure the GFCy and NFCy, respectively.

2.2 Synchronization

We first calculate synchronization ($SYNC1_{i,t}$) measure following Kalemli-Ozcan et al. (2013). It has been used to examine the international transmission of business cycles, see Kim and Pyun (2018). The synchronization index is defined as the absolute value of the difference between the financial cycle of country i and the GFCy in quarter t:

$$SYNC1_{i,t} = -|NFCy_{i,t} - GFCy_t|, \tag{1}$$

where $NFCy_{i,t}$ denotes the national financial cycle of each country. $GFCy_{i,t}$ denotes the common dynamic factor in sectoral equity indices of Tian et al. (2023). The maximum value of $SYNC1$ is 0, which indicates perfect synchronization. Intuitively, this synchronization index indicates how close two cycles are in any given quarter. The $SYNC1$ increases when a domestic financial cycle becomes closer to the GFCy. However, this measure does not reflect the direction of cycles.

Therefore, we also use the synchronization measure proposed by Mink et al. (2012), which considers whether (positive or negative) phases of two cycles coincide. Denoting the measure of the GFCy and NFCy at time t, we calculate the $SYNC2$ between cycles in period t as:

$$SYNC2_{i,t} = (NFCy_{i,t} * GFCy_t)/|NFCy_{i,t} * GFCy_t|. \tag{2}$$

2.3 Local projections

Baseline local projections. To compute the response of NFCys, we first estimate the baseline LP by the following equation:

$$NFCy_{t+h} = \alpha_h + \beta_h GFCy_t + B_h(L)GFCy_{t-1} + C_h^{local}(L)Z_{t-1}^{local} + \epsilon_{t+h}, \tag{3}$$

where a forecast horizon of h=0, 1, 2,..., 12 quarters is considered. $NFCy_{t+h}$ is the national financial cycle in quarter t+h. $GFCy_t$ is the global financial cycle, and α_h is a country-specific fixed effect. Z_{t-1}^{local} is a vector of country-level controls, including lags of country i's inflation rate and economic growth. ϵ_{t+h} is the error term for time $t+h$. $B_h(L) = B_{h,1}L + B_{h,2}L^2 + B_{h,3}L^3$ is a lag polynomial of order three, where $L^p y_t = y_{t-p}$ for $p = 1, 2, 3$. Similarly, $C_h^{local}(L)$ is a lag polynomial of order four. All variables on the right-hand side are entered until $t-4$. The approach of Newey and West (1987) has been used to get consistent standard errors to address the issue

of heteroskedasticity and autocorrelation in a time-series setting. We project each country on the same $GFCy_t$. Therefore, the plot of β_h is the response of national financial cycles for each country to a shock in the $GFCy_t$. We also estimate Eq. (5) using the credit financial cycles and housing price cycles rate as $NFCy_t$ to compute its response to the identified $GFCy_t$.

Local projection with interaction terms Consider a set of variables $\vartheta \in v$ that measures the exposure of an economy to the GFCy, and let higher values of ϑ represent higher exposure. To estimate how exposure affects the economy's response to the global financial cycle, we follow the empirical strategy of Iacoviello and Navarro (2019) and extend the specification in Eq. (3) so that the identified global financial cycle interacts with the measures of exposure. In particular, for each characteristic, we estimate the following equation:

$$NFCy_{t+h} = \alpha_h + \beta_h GFCy_t + \sum_{\vartheta \in v} \beta_h^{\vartheta} (e_t^{\vartheta} GFCy_t)^* + B_h(L) GFCy_{t-1} + C_h^{local}(L) Z_t^{local} + \epsilon_{t+h}, \tag{4}$$

where e_t^{ϑ} is the exposure index for variable ϑ. The interaction term $(e_t^{\vartheta} GFCy_t)^*$ is constructed so that β_h captures the response to a shock when the exposure measures are at their median values, and β_h^{ϑ} represents the marginal response to the shock when exposure (e_t^{ϑ}) is high.

We construct the interaction term $(e_t^{\vartheta} GFCy_1)^*$ in five steps. First, we standardize each exposure variable ϑ_t, so that we can compare different measures. Second, we compute a logistic transformation of the standardized variable ϑ_{ts} as $l_t^{\vartheta} = \frac{exp\{\vartheta_t^s\}}{1+exp\{\vartheta_t^s\}}$, which converts the variable into distributional/probabilities between 0 and 1.[3] Third, we re-center l_t^{ϑ} in terms of its $50th$ and its $95th$ percentile: $e_t^{\vartheta} = \frac{l_t^{\vartheta} - l_{50}^{\vartheta}}{l_{95}^{\vartheta} - l_{50}^{\vartheta}}$. This step allows us to interpret the $\{\beta_h^{\vartheta}\}$ as the marginal effect when the variable is changing from its

[3]We use the logistic transformation to estimate the state-dependent effect of shocks, the same as Iacoviello and Navarro (2019) and Bonciani and Ricci (2020).

median to the end of the 95*th* percentile distribution. Fourth, we calculate the interaction term $e_t^{\vartheta} \times GFCy_t$. Finally, we orthogonalize $e_t^{\vartheta} \times GFCy_t$ using a recursive procedure. For the first exposure variable ϑ_1, we regress $e_t^{\vartheta} \times GFCy_t$ on $[GFCy_t, Z_t]$ and obtain the residual $(e_t^{\vartheta_1} \times GFCy_t)^*$. For the second variable $(e_t^{\vartheta_2} \times GFCy_t)$, we regress $[GFCy_t, Z_t, (e_t^{\vartheta_1} GFCy_t)^*]$ and obtain the residual $(e_t^{\vartheta_2} \times GFCy_t)^*$. In this step, the interaction terms are orthogonal to the shock $GFCy_t$. Therefore, the $\{\beta_h\}$ estimated in Eq. (6) is identical to the estimated coefficient in Eq. (5). We interpret $\{\beta_h\}$ as the response to the $GFCy_t$ shock. Furthermore, we can interpret $\{\beta_h^{\vartheta}\}$ as the marginal effect of variable ϑ on the pass-through of the GFCy to NFCy when ϑ moves from the 50^{th} to the 95^{th} percentile of its distribution.

The baseline panel LP and LP with interaction terms are similar to Eq. (3) and Eq. (4), respectively, and are displayed as follows:

$$NFCy_{i,t+h} = \alpha_{i,h} + \beta_h GFCy_t + B_h(L) GFCy_{t-1} + C_h^{local}(L) Z_{i,t}^{local} + \epsilon_{i,t+h}, \tag{5}$$

$$\begin{aligned} NFCy_{i,t+h} = &\alpha_{i,h} + \beta_h GFCy_t + B_h(L) GFCy_{t-1} + \sum_{\vartheta \in v} \beta_h^{\vartheta} (e_{i,t-1}^{\vartheta} GFCy_t)^* \\ &+ C_h^{local}(L) Z_{i,t}^{local} + \epsilon_{i,t+h}, \end{aligned} \tag{6}$$

where $NFCy_{i,t+h}$ is the NFCy for BRICS country i in period t. The $\epsilon_{i,t+h}$ is the disturbance term. The approach of Driscoll and Kraay (1998) has been used to get consistent standard errors to address the issue of heteroskedasticity and autocorrelation in a panel setting.

3 Data

This section provides details on data sources, including the measures for the GFCy, NFCys, and control variables. It is important to include long time series to reflect financial dynamics. The data availability fluctuates across indicators and across countries. We conducted our unbalanced panel regression analysis for the BRICS countries with quarterly information from 1980 through 2019. We collect explanatory variables following the empirical literature on the effects and determinants of the transmission of global financial shocks on national financial conditions. Table 1 summarizes the details. More specific information for each country is provided in Appendix A.

Table 1: Variable definitions and sources

Group	Variables	Definitions	Source
Financial cycles	Global financial cycle	Global financial factor	Author's calculation
	National financial cycles	Cyclical components	Author's calculation
Policy options	Financial openness	De-jure index	Fernández et al. (2016)
	Exchange rate regime	The fine classification	Ilzetzki et al. (2021) & Author's calculation
	International reserves	International reserves divided by GDP, excluding gold	IMF IFS
Country characteristics	Inflation	CPI Year-on-year changes, in %	IMF IFS
	GDP	Real GDP growth	Datastream
	Current account balance	Current account relative to GDP	Datastream
	REER	Real effective exchange rate	BIS

3.1 The GFCy and NFCy measures

Figure 1 displays the GFCy using data for the G20 countries. The GFCy decreased around 1997-2000, which may be associated with events like the Russian default crisis, the LTCM bailout, and the Asian financial crisis. The trough after 2000 may be related to the dot-com crash. The subprime market's collapse and the global financial

crisis around 2007-2008 are captured by the sharp decline associated with this crisis episode.

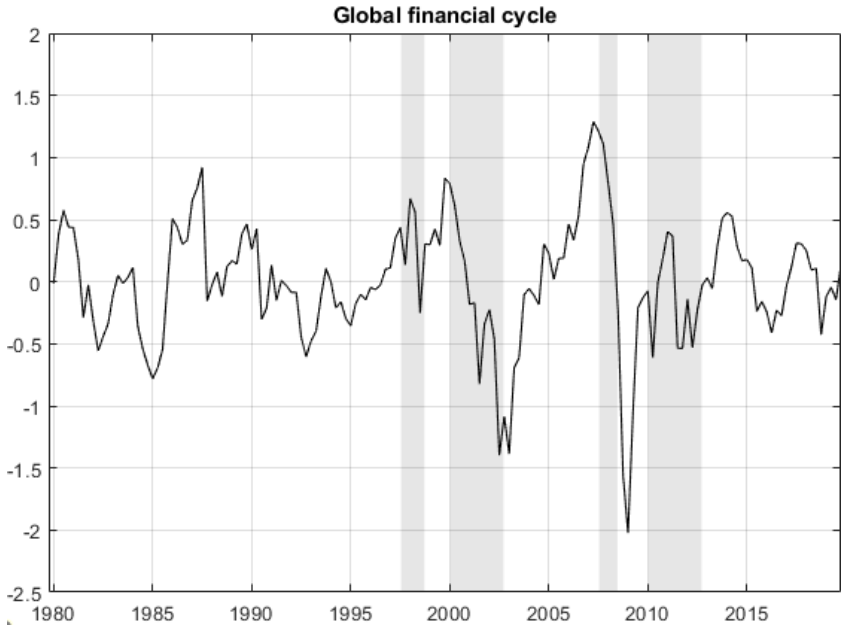

Figure 1: Global financial cycle

Notes: Figure 1 plots the global financial factor estimated from sectoral asset prices for the sample period of 1980Q1:2019Q4. We standardize the GFCy series with a zero mean and unit variance. Shaded areas denote the Asian financial crisis of 1997-1998, the dot-com crash of 2000-2002, the global financial crisis of 2007-2008, and the European debt crisis of 2010-2012, respectively.

We then estimate our national financial cycles for the BRICS countries with total credit sourced from the BIS database. The variable consists of the volume of credit to the private non-financial sector from all sectors in US dollars. Our sample period for the individual countries is dictated by data availability and varies across countries. The natural log of total credit is seasonally adjusted using the Census X–12 method.

Figure 2 presents the estimated financial cycles for each BRICS country. The figure suggests several observations. First, most of the NFCys have a similar amplitude, mostly ranging between $\pm 10\%$. This finding is similar to the results of previous studies, see Galati et al. (2016). Second, we find evidence of heterogeneity across countries. In particular, we find that Russia's financial cycle has a larger amplitude and longer duration compared to the cycles of other countries. This suggests that financial cycles in BRICS countries and their nexus with the GFCy may differ substantially. Third, the NFCy of each country varies over time. Downward phases are closely associated with the Asian financial crisis of 1997-1998, the dot-com crash of 2000-2002, and the global financial crisis of 2007-2008.

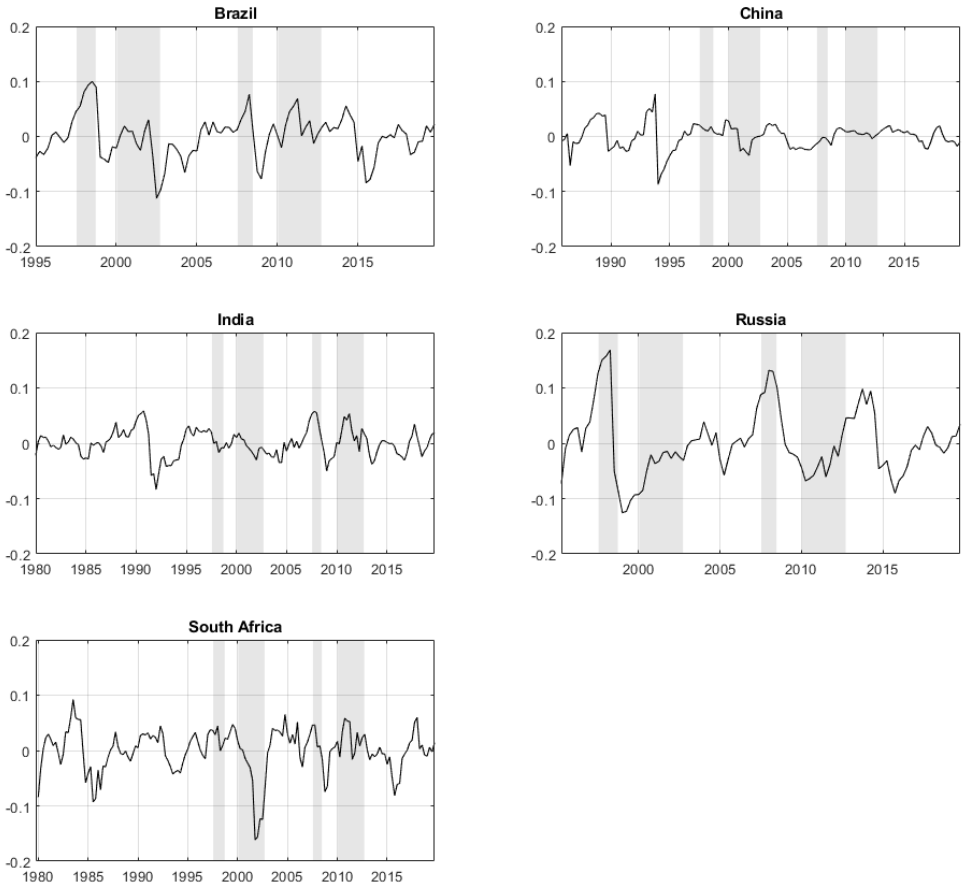

Figure 2: National financial cycles

Notes: Figure 2 plots national financial cycles estimated for each BRICS country for the sample period of 1980Q1:2019Q4. Shaded areas denote the Asian financial crisis of 1997-1998, the dot-com crash of 2000-2002, the global financial crisis of 2007-2008, and the European debt crisis of 2010-2012, respectively.

3.2 Synchronization measures

Figure 3 presents two synchronization measures. The $SYNC1$ synchronization measure is significantly associated with extreme economic events, which peaks around the 2000 internet bubble, the 2010-2012 European debt crisis, and the 2008 global financial crisis. The Mink et al. (2012) synchronization measure suggests that the GFCy and the NFCys exhibit a consistent direction for the majority of time periods of each country. However, there are also some time periods where they move in opposite directions. The overall evidence indicates that the synchronization of the GFCy and the NFCys evolves both temporally and directionally. These findings suggest that further analysis is needed to examine the dynamic relationship between NFCy and GFCy over time. Besides, it is also important to investigate whether the responses of NFCys to GFCy shocks are conditioned by policy options and country-specific additional characteristics.

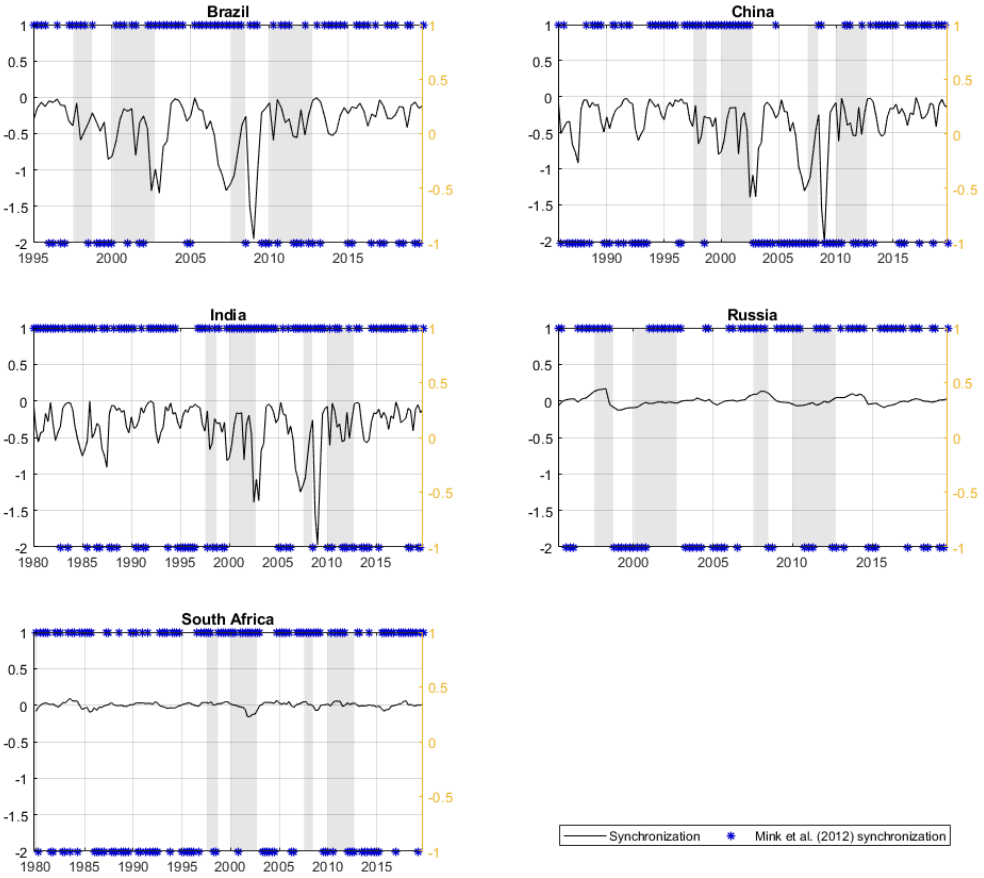

Figure 3: Synchronization measures

Notes: Figure 3 plots the synchronization of national financial cycles and the GFCy for each BRICS country for the sample period of 1980Q1:2019Q4. Shaded areas denote the Asian financial crisis of 1997-1998, the dot-com crash of 2000-2002, the global financial crisis of 2007-2008, and the European debt crisis of 2010-2012, respectively. The black line is the continuous synchronization measure, and the blue stars are the Mink et al. (2012) synchronization measures.

3.3 Explanatory variables

We collected the following explanatory variables. Details are summarized in Table 1.

Policy options. We choose three policy variables that could be used to reduce the impact of GFCy shocks.

The ***Exchange Rate Regime*** classification draws on the study of Ilzetzki et al. (2021). Their exchange rate regimes classification uses monthly data on market determined parallel exchange rates. It has two levels of aggregation: the fine classification includes 15 categories, and the coarse classification includes 6 categories. Our study is based on the fine classification. Only categories 1–14 are used in our empirical analysis, as the last category indicates that observations are missing. We use quarterly classification, which is based on the end-of-quarter values. We follow Iacoviello and Navarro (2019) and construct an index ranging from 0 to 1 to measure the exchange rate regime of each country during each period.

The constructed index of 0 indicates that country i at time t is under a flexible exchange rate regime, and 1 indicates that the country's currency is rigidly pegged to the U.S. dollar or pegged in a narrow band of less than or equal to +/-2%. The index is equal to 0.5 if the country's exchange rate regime is managed to float within a large band of less than or equal to +/-5%. Under this setting, a higher value of this index signals a more fixed exchange rate regime. The median observation in our sample for BRICS countries is pegged or floating with a close band to the dollar, which applies to 52.25% of the country-quarter observations. [4]

To measure ***Capital controls***, we use a de jure capital control index from Fernández et al. (2016), which is based on the IMF's Annual Report on Exchange Arrange-

[4] As an alternative, we use the continuous measure of exchange rate stability (ERS), which comes from Aizenman et al. (2008). They calculate the annual standard deviations of the monthly exchange rate between the home country and the base country. Higher values of this indicator signal a more stable exchange rate against their base country. If the ERS index takes the value of one, we consider the exchange rate as "fixed".

ments and Restrictions (AREAR), which documents changes in laws and regulations to international financial transactions for IMF member countries. It is calculated by taking the average of the number of international transaction categories with any restrictions for a given year and country. Thus, the index ranges from zero when there are no capital controls on any category, to one when a country has capital controls on every category. This index is available from 1995.

International reserves are expressed as a ratio of reserves excluding gold to GDP, which is commonly used in previous studies as an indicator to signal countries' safety. Countries are influenced by global shocks and have a growing risk due to sudden stops of capital inflows and capital flight, especially during the financial crisis. Managing international reserves could help countries to increase their financial stability and improve their capacity to run independent macroeconomic policies (Aizenman et al., 2013). Therefore, we expect that higher international reserves weaken the effect from GFCy shocks on NFCys, especially in trough periods.

Country characteristics. The first country characteristic that we consider is the ***Real GDP growth rate***. In addition, we take into account some indicators of country-level vulnerabilities. Specifically, we consider the ***Current account deficit-to-GDP ratio*** and ***Inflation*** (measured as the year-on-year changes in the consumer price index). We also consider the ***Real effective exchange rate*** that is measured as the geometric weighted averages of bilateral exchange rates adjusted by relative consumer prices sourced from the BIS.

Table 2 provides the descriptive statistics of the main variables that we are using for our analysis. The GFCy ranges from -2.023 to 1.289. The national financial cycle has the same average as the GFCy, but the maximum and minimum indicate that NFCys vary over time or across countries and fluctuate within a $\pm$20% band. There is quite some variation in CPI inflation and the REER. Similarly, there is variability in

capital controls, exchange rate regimes, reserves, and GDP growth across countries and over time.

Table 2: Descriptive statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Global financial cycle	800	0	-0.014	0.493	-2.023	1.289
National financial cycle	661	0	0.002	0.0392	-0.189	0.169
Capital controls index	500	0.764	0.758	0.206	0.2	1.108
Exchange rate stability	752	0.411	0.328	0.27	0.017	1
Exchange rate regime	714	0.583	0.5	0.415	0	1
International reserves	584	0.49	0.437	0.363	0.014	1.462
Current account	760	0.127	-0.48	4.14	-20.17	19.97
CPI inflation	668	26.64	6.516	149.5	-2.1	2500
GDP growth	571	-0.273	1.060	7.393	-61.53	28.12
REER	520	89.13	90.86	16.01	45.29	130.3

4 Empirical results

After identifying the main variables used in this paper, we next aim to detect the role of the GFCy in driving NFCys of BRICS countries. More specifically, we will examine whether each BRICS country responds to GFCy shocks differently and whether the effect of GFCy on NFCy is non-linear. To do so, we run the local projections in a country-specific setting (Eq. (3)) and a panel setting (Eq. (5)), respectively. [5]

4.1 Local projection estimations

We are interested in examining the NFCy's response to a GFCy shock. As a baseline exercise, we first estimate the LPs based on the country-specific time series described in Eq. (3).

[5]We also estimated the country-specific time series and fixed-effect panel regressions. Our regression outcomes show similar outcomes as the LP. That is, national financial cycles are significantly affected by the global financial cycle, and the effect is positive. Results are shown in Appendix B.

Figure 4 displays the local projection impulse responses of the national credit cycle to a global financial cycle shock. The shaded light grey and light blue areas denote 90% and 68% confidence intervals based on robust standard errors in the presence of heteroskedasticity and autocorrelation. Take Brazil as an example: a shock that increases the GFCy by 1 percentage point leads to a sustained increase in the NFCy, which expands Brazil's credit cycle by around 3% after one quarter, and the effect shrinks thereafter. The dynamic response of national credit cycles in other BRICS economies follows a similar pattern but with minor differences in magnitude and duration. The effects of GFCy shocks on national financial cycles in Russia and South Africa are shorter (around 3 quarters), while the effect in India is smaller but lasts longer (around 5-7 quarters). China is an exception, as we do not find a significant effect of the GFCy on China's financial conditions.

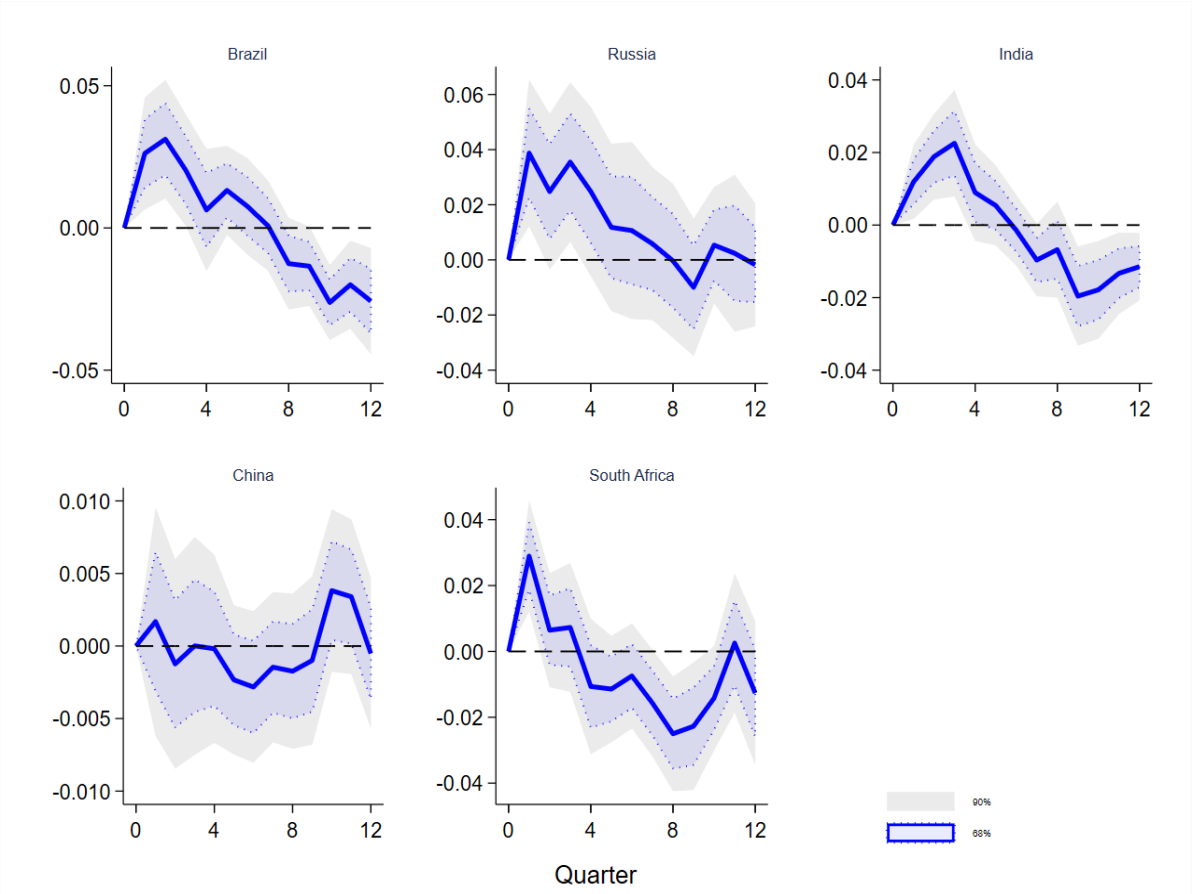

Figure 4: Local projection impulse response for each BRCIS country

Notes: Figure 4 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycle for each BRICS country. The light grey area indicates the 90% confidence interval, and the light blue area indicates the 68% confidence interval. The confidence intervals are computed using Newey and West (1987) standard errors.

As we want to investigate the transmission of the GFCy to NFCy under different exchange rate regimes, levels of capital controls, and international reserves and also want to explore how countries' characteristics are related to the sensitivity to the GFCy, we estimate a panel model as this allows us to have enough variation in these variables. Figure 5 presents the response of NFCys to a GFCy shock in a panel setting. The outcome indicates that a shock to the GFCy has a positive effect on national credit cycles. And the effect is persistent for up to one year. On average, the responses are similar to the country-specific outcomes as we found in the previous analysis. This outcome suggests a significant positive impact of the GFCy on NFCys in the BRICS countries.

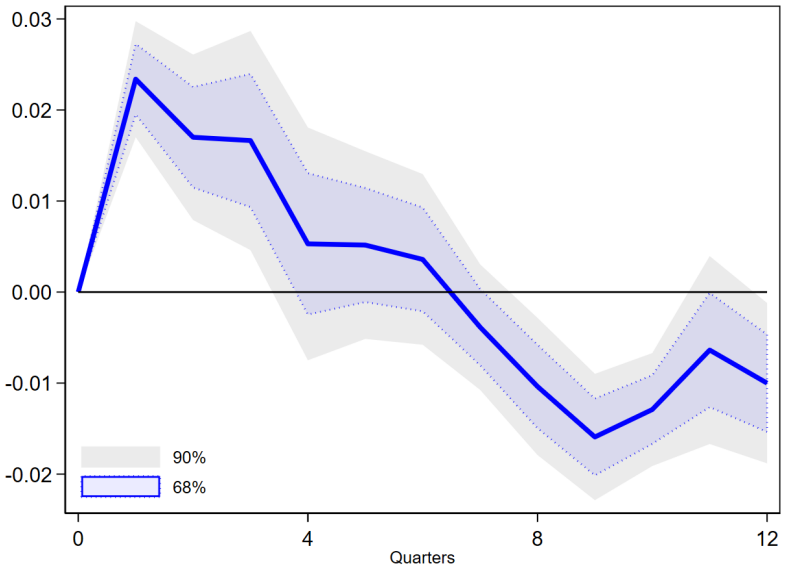

Figure 5: Local projection impulse response for all BRCIS countries

Notes: Figure 5 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycles of all BRICS countries. The light grey area indicates the 90% confidence interval, and the light blue area indicates the 68% confidence interval. The confidence intervals are computed using Driscoll and Kraay (1998) standard errors.

4.2 The role of exchange rate regimes, capital controls, and reserves

We now explore whether the transmission of the GFCy depends on the exchange rate regime, capital controls, and foreign exchange reserves, and whether the countries' response depends on their GDP growth, inflation, and current account deficits.

We find that the policy options considered mitigate the countries' exposure to GFCy shocks. Figure 6 shows the average NFCy response to a GFCy shock (the blue dashed line), as well as the marginal effects for the policy variables increasing from the median to the 95^{th} percentile value represented (the red line).

The top-left panel shows how the exchange rate regime affects the responses of national credit cycles. For BRICS economies, the exchange rate regime changes from median to the value of the 95^{th} percentile (i.e., the exchange rate regime changes from managed floating exchange rate regime to anchored to the U.S. dollar). Our outcomes indicate that there is a larger effect of a GFCy shock when the exchange rate regime is at the high end of the distribution. That is, a pegged exchange rate regime to the U.S. dollar is associated with a stronger connection of domestic financial cycles to the GFCy dynamics. Meanwhile, the more flexible the exchange rate regime, the less global financial booms are transmitted to domestic financial markets and the NFCys drop faster after 2-3 quarters. The smaller impact and significant fall in NFCys in countries with flexible exchange rate regimes are consistent with Di Giovanni and Shambaugh (2008) and Jordà et al. (2019), who provide evidence for the stabilizing effect of floating exchange rate regimes on financial and real variables.

The top-right panel shows the role of capital controls. We find there is a smaller response in NFCy to a GFCy shock when the level of capital controls changes from the median to the 95^{th} percentile. This result is in line with what we would expect: tighter capital controls, which correspond to reduced financial openness, tend to be associated with the lower susceptibility of domestic financial conditions to GFCy shocks.

Our outcomes suggest that tighter capital controls play a similar role as exchange rate flexibility in affecting the spillovers of the GFCy on NFCys of the BRICS economies.

The medium-left panel shows the effect of international reserves. The response of BRICS that have higher levels of reserves only exhibits a marginal increase, compared with countries that have median-level reserves. Moreover, a delayed increasing response in the national credit cycles alleviates the harmful effect, particularly after one year of the GFCy shocks. This might be because higher international reserves make a larger pool of funds available within a country for borrowing, which could cause upward financial cycle fluctuations and make countries immune from global shocks (Arslan and Cantú, 2019).

The medium-right panel shows the importance of GDP growth. We find that when GDP growth rate is moving from its median value to the high end of the distribution, the impact on NFCy following a positive shock in the GFCy increases. This effect is significant for the first three quarters. Nevertheless, the response of the NFCy after four quarters is less sensitive to global shocks whether they have a higher GDP growth rate or not.

The bottom-left panel displays the role of CPI inflation. We find that the NFCys of countries with low inflation respond to the GFCy more strongly in the first four quarters, while the responses are more negative and persistent in countries with high inflation rates after the first four quarters, approximately doubling the negative response after six quarters.

The bottom-right panel shows how the current account deficit affects the response of the NFCy. For BRICS, there is a marginal difference in affecting the GFCy transmission when the current account deficit moves from its median to the higher end of the distribution. In general, countries with higher current account deficits are marginally susceptible to the impacts of GFCy shocks. [6]

[6]The higher current account ratio means a lower current account deficit.

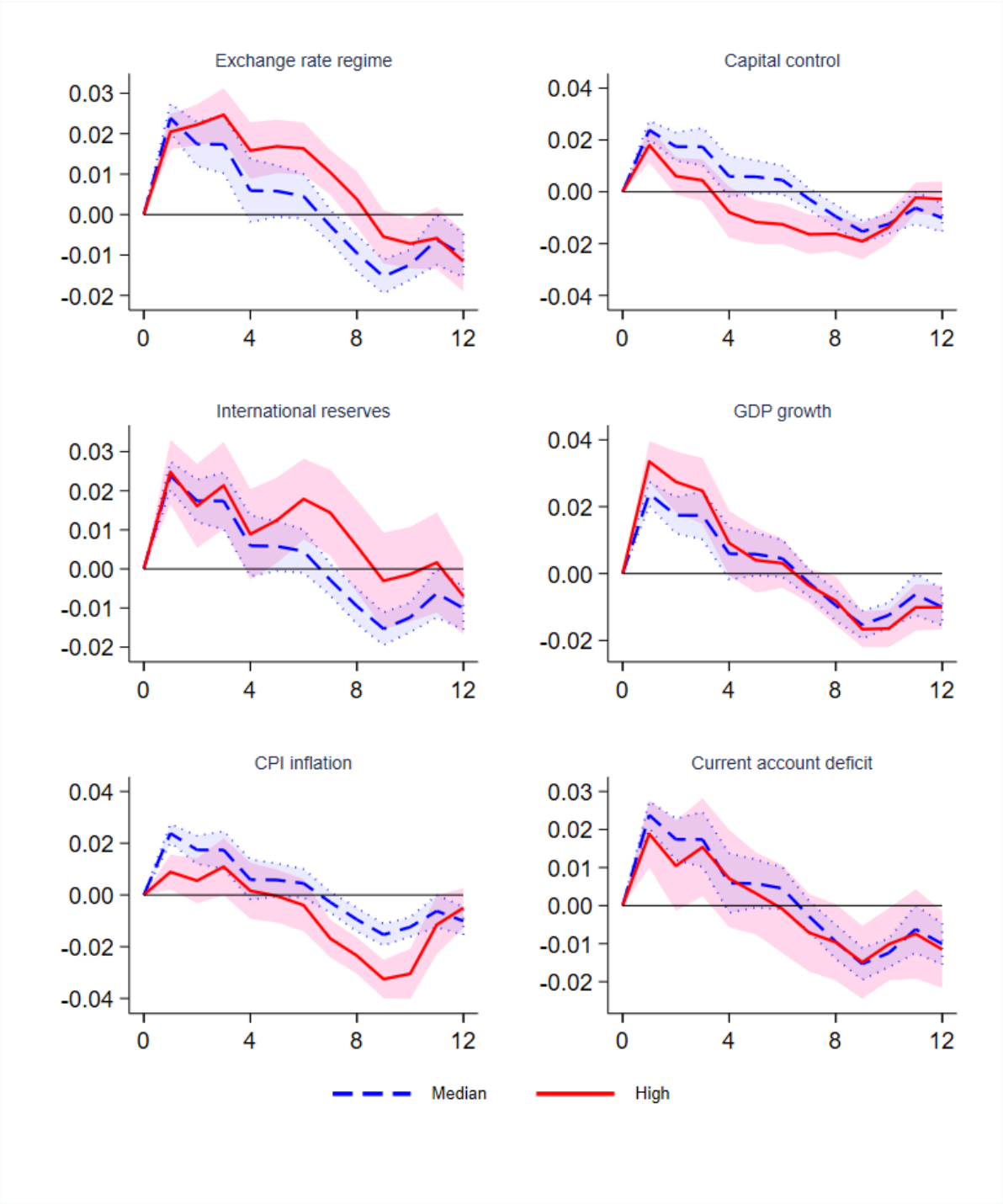

Figure 6: Local projection impulse response: different conditioning variables

Notes: Figure 6 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycles for all BRICS countries. The "median" response is the national credit financial cycle response of an economy with values for each index equal to the median value. The "high" response is the response of the national credit financial cycle with values for each index equal to the 95^{th} percentile. The shaded areas denote 68% confidence intervals. The confidence interval is computed using Driscoll and Kraay (1998) standard errors.

5 Robustness checks

In this section, we run sensitivity analyses to assess how our results about the effect of GFCy shocks on NFCys vary when we apply alternative filters, alternative financial cycles, or alternative methodologies.

5.1 Alternative GFCy and filter

We analyze the robustness of our main findings regarding the effect of GFCy shocks on NFCys. Figure 6 is used as our reference point for comparison.

The GFCy has been calculated as a significant dynamic factor in asset prices or capital flows (Miranda-Agrippino and Rey, 2020; Tian et al., 2023). We use the GFCy derived from asset prices in the aforementioned analysis. In order to examine the robustness of our results, we replace this measure using the GFCy estimated based on capital flows. Besides, we employed the standard HP filter with a turning parameter $\lambda = 1600$. However, the choice of this turning parameter may not be adequate in removing trends, especially the stochastic trends in economic data. We, therefore, apply the boosted HP (bHP) filter as proposed by Phillips and Shi (2021) to extract the cyclical component. [7] The estimated cyclical components are displayed in Appendix A.

By applying this alternative measure and filter, we find evidence that is in line with the results shown in Figure 6. Figure 7 shows the impulse responses when a shock originates from the GFCy in capital flows rather than a shock from the GFCy in asset prices. We estimate the GFCy in capital flows as the dynamic factor in inward and outward FDI, equity and debt flows, and other investments as a percentage of GDP. The results indicate that more flexible exchange rate regimes and tighter capital

[7] The cyclical component is estimated by the bHP filter using the ADF, BIC, or nonstop procedure to select the tuning parameter. Nonstop means it iterates until the maximum number of iterations is reached.

controls behave as a cushion for GFCy shocks. In countries characterized by a median level of international reserves, the positive spillover of a GFCy shock is offset by negative spillovers within around one and a half years. This offset occurs faster when compared to countries with a high level of reserves. We find that a positive GFCy shock causes a larger effect in NFCys for countries with higher GDP growth rates. Additionally, a larger decline in NFCys is associated with higher inflation levels. And capital account deficit has shown limited explanatory power in the responses of NFCys when it increases from its median to the 95^{th} percentile of its distribution.

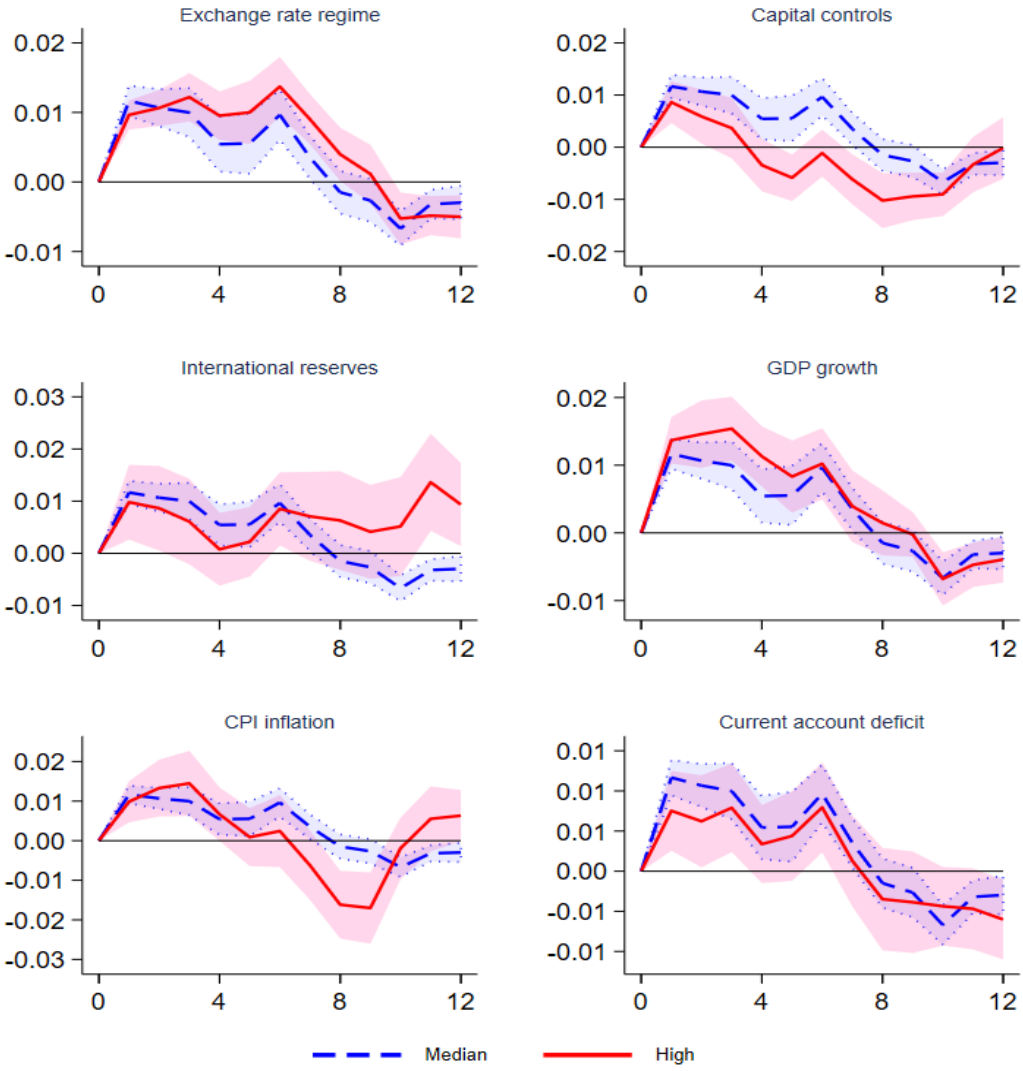

Figure 7: Local projection impulse response: alternative cycle measures

Notes: Figure 7 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycles for all BRICS countries. The "median" response is the national credit financial cycle response of an economy with values for each index equal to the median value. The "high" response is the response of the national credit financial cycle with values for each index equal to the 95^{th} percentile. The shaded areas denote 68% confidence intervals. The confidence intervals are computed using Driscoll and Kraay (1998) standard errors.

5.2 Alternative local projections

Our outcomes have shown that the NFCys response to a GFCy shock depends on variations of each policy option and country characteristic (e_t^{ϑ}). In doing so, we interact each characteristic with GFCy shocks and interpret the coefficients β_h and $\beta_h + \beta_h^{\vartheta}$ shown in Eq. (6) as the effect of the GFCy when each e_t^{ϑ} is at its median or the 95^{th} percentile of its distribution. This methodology examines the effect of the high- and low states of each characteristic by allowing the coefficient of interaction term to change along with its distribution. However, other corresponding control variables included in the model are not selected based on the periods of high- or low states accordingly. For instance, when countries for some periods are characterized by high e_t^{ϑ}, other control variables are included for all time periods instead of focusing on the observations in the same periods associated with high e_t^{ϑ}. To solve this, we apply the regime-switching local projection from Ramey and Zubairy (2018), which examines the impact of GFCy under different characteristics by allowing all coefficients to change according to the state/regime of the characteristics, as shown in Eq. (7). To proceed with the estimation, we first define the high states of each policy variable following Alpanda et al. (2021) by using the value above its 75^{th} percentile. Then we examine if the response of NCFys to the GFCy shocks switches between the high- and low states of each characteristic allowing for the coefficients of control variables to depend on the state. We estimate the following equation for horizon 0,1,2,...,h:

$$\begin{aligned} NFCy_{i,t+h} =& I_{i,t-1}[\alpha_h^A + \beta_h^A GFCy_t + C_h^{A_{local}}(L) Z_{i,t}^{A_{local}}] \\ &+ (1 - I_{i,t-1})[\alpha_h^B + \beta_h^B GFCy_t + C_h^{B_{local}}(L) Z_{i,t}^{B_{local}}] + \epsilon_{i,t+h}, \end{aligned} \tag{7}$$

where $I_{i,t-1} \in 0, 1$ represents the state of a policy option or country characteristic in the country i when the shock hits. $I_{i,t-1}$ takes the value of 1 corresponding to the

high state, and 0 otherwise. Specifically, we consider the GFCy as the shock variable and include the same contemporaneous and lagged variables as we described in Eq. (6). β_h^A and β_h^B represent the state-dependent responses of NFCy to a GFCy shock at horizon h. $C_h^{A_{local}}(L)$ and $C_h^{B_{local}}(L)$ are lag polynomials of order four.

Figure 8 displays the responses of NFCys to a GFCy shock across different states of each policy variable, in which the response for high (low) states is represented by a red solid (blue dashed) line. The state-dependent responses confirm our findings presented in Figure 6. We find that responses of peggers to GFCys shocks are larger than countries with flexible exchange rate regimes after 2 quarters. After that, a larger decline in NFCys when countries have flexible exchange rate regimes and soft capital controls. For countries with higher international reserves, the larger increase in GFCy does not cause a significant change in NFCys. We also find that countries with relatively high inflation and current account deficit (blue dashed line), tend to be hit negatively by GFCy shocks, as their responses drop more significantly.

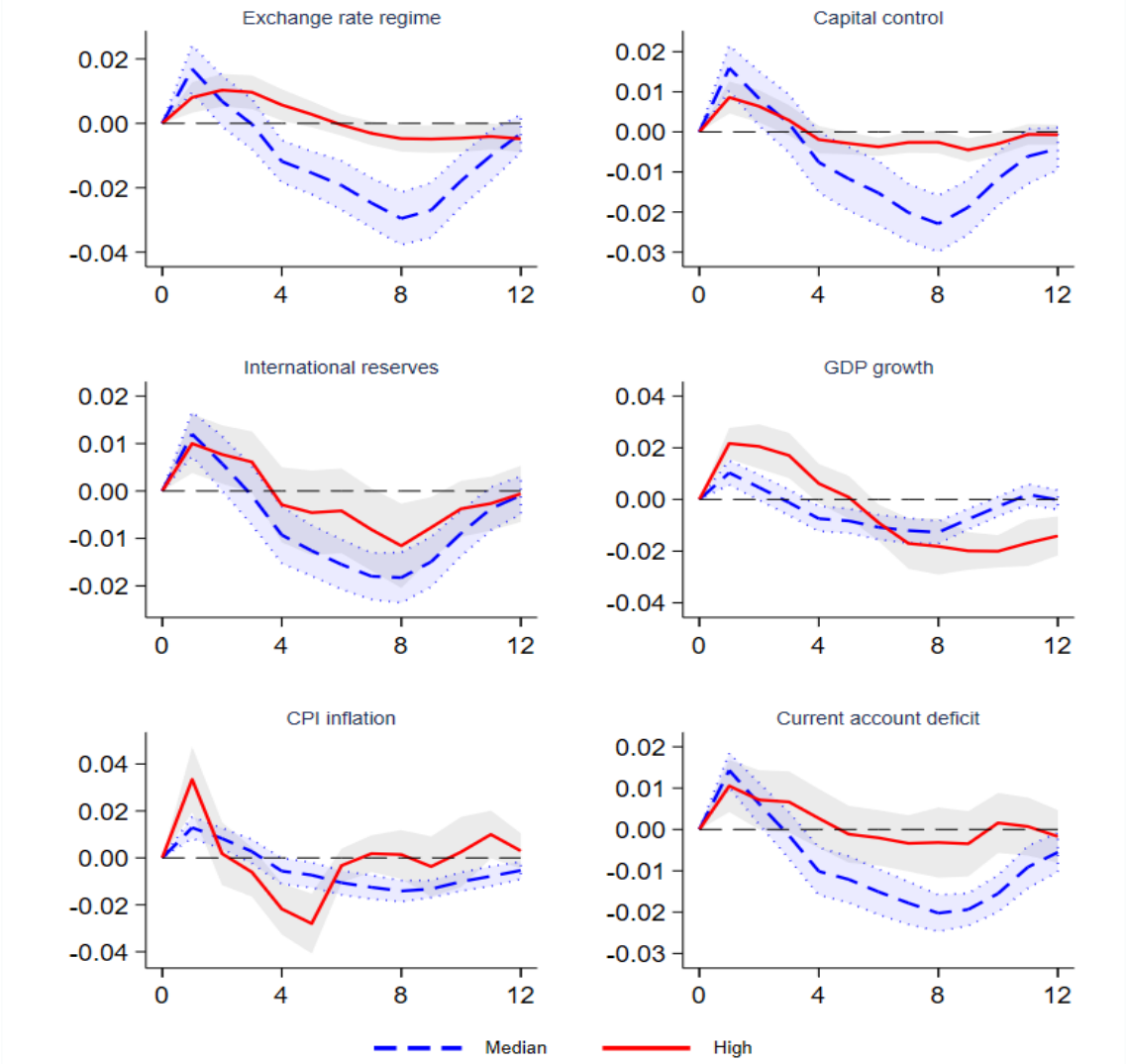

Figure 8: Local projection impulse response: state-dependent

Notes: Figure 8 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycles for all BRICS countries. The "high" response is the response of the NFCy to GFCy shocks with exposure variable at its high-state corresponding to the 75^{th} percentile. The "median" response is the NFCy to GFCy shocks with exposure variable at its low-state corresponding to the value below its 75^{th} percentile. The shaded areas denote 68% confidence intervals. The confidence intervals are computed using Driscoll and Kraay (1998) standard errors.

6 Conclusion

This paper analyses the role of the global financial cycle in determining domestic financial cycles. To this end, we first identify the global financial cycle as a latent dynamic factor in sectoral equity indices using a dynamic factor model and build the domestic financial cycle of each BRICS country by using filtered time series for credit to the non-financial private sector. Then we calculate two synchronization measures to examine the co-movement of national financial cycles and the GFCy. Our outcomes indicate that synchronization evolves in terms of time and direction. Therefore, we further examine how this dynamic relationship changes and whether the response of NFCys to GFCy shocks depends on policy options and country characteristics. We construct an unbalanced panel dataset including three policy options, namely exchange rate regime, capital controls, and international reserve, along with relevant country characteristics, namely GDP growth, current account deficits, and the inflation rate. In our empirical exercise, we consider BRICS economies covering the period from 1980Q1 to 2019Q4 and estimate local projections based on panel regressions with fixed effects. We find that the trilemma theory does not morph into a dilemma in BRICS countries, as the flexible exchange rate regime and capital controls play a role in responding to the GFCy shocks. The association between international reserves and the NFCy indicates that using sizable international reserves as a buffer may also be capable of insulating countries' financial conditions from GFCy dynamics, especially after a year. Furthermore, we identify three characteristics that make BRICS countries more sensitive to the GFCy shocks. In particular, we show that countries with higher GDP growth rates, higher inflation, and current account deficits tend to be hit more by GFCy shocks.

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A Appendix: Data

Table A.1: Data source

Variables	Brazil	China	India	Russia	South Africa
Coarse exchange rate regime					
	1980M1-2019M12	1980M1-2019M12	1980M1-2019M12	1992M3-2019M12	1995M1-2019M12
Exchange Rate Stability Index					
	1964-2019	1961-2019	1961-2019	1992-2019	1961-2019
Financial openess Kaopen					
	1980-2019	1984-2019	1980-2019	1996-2019	1980-2019
Capital control, Fernández, Klein, Rebucci, Schindler and Uribe (2016)					
	1995-2019	1995-2019	1995-2019	1995-2019	1995-2019
Total reserves excluding Gold, Source General government gross debt, US Dollars, IMF, IFS					
	1980M1-2019M4	1980M6-2019M4	1980M1-2019M4	1995M1-2019M4	1980M1-2019M4
Credit to Private non-financial sector from All sectors at Market value, BIS					
	1995Q1-2019Q4	1985Q4-2019Q4	1980Q1-2019Q4	1995Q2-2019Q4	1980Q1-2019Q4
Credit-to-GDP ratios, credit from All sectors to Private non-financial sector, BIS					
	1996Q1-2019Q4	1985Q4-2019Q4	1980Q1-2019Q4	1995Q2-2019Q4	1980Q1-2019Q4
Residential property prices selected, 2010 = 100, BIS					
	2001Q1-2019Q4	2005Q2-2019Q4	2009Q1-2019Q4	2001Q1-2019Q4	1980Q1-2019Q4
Financial development index, IMF					
	1988-2020	1980-2020	1980-2020	1980-2020	1980-2020
REER, BIS					
	1994M1-2019M4	1994M1-2019M4	1994M1-2019M4	1994M1-2019M4	1994M1-2019M4
Quality of governance: worldwide Governance Indicators					
	1996,1998,2000,2002-2019	1996,1998,2000,2002-2019	1996,1998,2000,2002-2019	1996,1998,2000,2002-2019	1996,1998,2000,2002-2019
GDP, OECD					
	1996Q1-2019Q4	1991Q1-2019Q4	1993Q1-2019Q4	1994Q1-2019Q4	1980-2019Q4
CPI, Y/Y , %					
	1980M3-2019M4 BIS; 1980M3-2080M12 Eikon	1986M1-2019M4 BIS; 1986M1-1995M12 Eikon	1980M1-2019M4 BIS	1992M1-2019M4 BIS; 1992M1-2001M12 Eikon	1980M1-2019M4 BIS

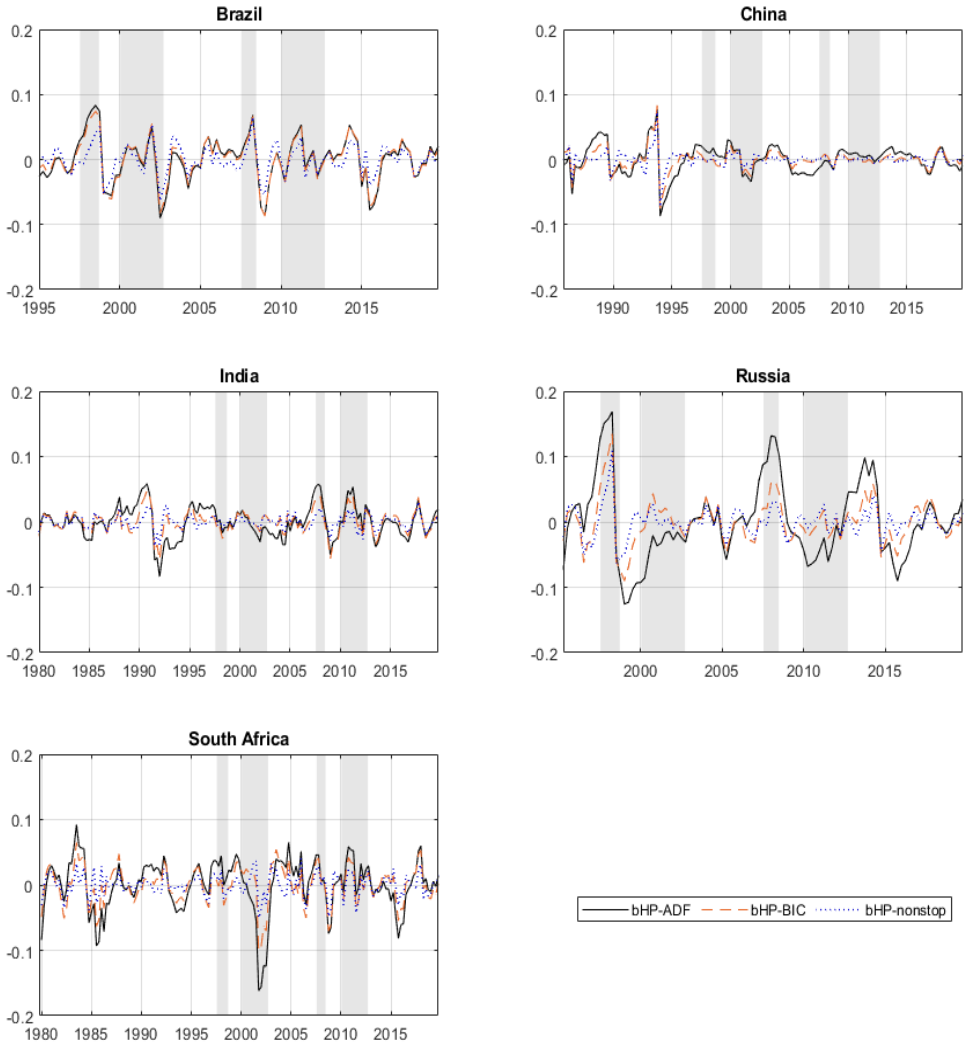

Figure A.1: National financial cycles estimated by boosted HP filter

Notes: Figure A.1 plots the national financial cycles estimated from real credit for the sample period of 1980Q1:2019Q4. The black line denotes the national financial cycles estimated by boosted HP filter using ADF test-based selection. The orange dashed line denotes the national financial cycles estimated by boosted HP filter using BIC test-based selection. The blue dotted line denotes the national financial cycles estimated by boosted HP no-stop filtering. Shaded areas denote the Asian financial crisis of 1997-1998, the dot-com crash of 2000-2002, the global financial crisis of 2007-2008, and the European debt crisis of 2010-2012, respectively.

B Regression

Baseline regressions. In order to detect the role of the GFCy in driving NFCys for each BRICS country. We first run the regressions in the country-specific setting (Eq. (8)) as well as the panel setting (Eq. (9)) respectively:

$$NFCy_t = \alpha + \beta GFCy_{t-1} + \phi Z_{t-1} + \mu_t, \tag{8}$$

$$NFCy_{i,t} = \alpha_i + \beta GFCy_{i,t-1} + \phi Z_{i,t-1} + \mu_{i,t}, \tag{9}$$

where $NFCy_t$ is the NFCys in period t, $NFCy_{i,t}$ is the NFCys for each country i belongs to BRICS in period t. The GFCy is included with a one-period lag.[8] Other explanatory variables are also included with a one-period lag. The μ_t and $\mu_{i,t}$ are disturbance terms. The approach of Newey and West (1987) has been used to get consistent standard errors to address the issue of heteroskedasticity and autocorrelation in a time-series setting, and the approach of Driscoll and Kraay (1998) is applied in the panel regression.

B.1 Regression outcomes

As a baseline exercise, we first estimate the following country-specific time series regressions described in Eq. (7). Table B.1 presents the estimation results. Columns (1) to (5) display the time series regressions for each BRICS country. Column (6) reports a panel regression for all BRICS countries. These outcomes clearly indicate that the GFCy is significant in Brazil, India, Russia, and South Africa. The GFCy is significant at the 1% significance level in column (6), the panel regression. The positive coefficients indicate that 1% increase in GFCy leads to a 1.4% change in NFCys.

Additionally, we consider three policy options for a country to manage global

[8]The sign and significance are similar if we include the GFCy without a lag in the regression.

Table B.1: Regressions with controls for BRICS countries

DV: Credit cycle	(1) Brazil	(2) China	(3) India	(4) Russia	(5) South Africa	(6) Panel
GFCy(t-1)	0.0113**	-0.00014	0.0165***	0.0177*	0.0138**	0.0143***
	(0.00529)	(0.00284)	(0.00328)	(0.00971)	(0.00671)	(0.00424)
REER(t-1)	0.00139***	0.000547**	0.00199***	0.00222***	0.00236***	0.00123***
	(0.000213)	(0.000251)	(0.000511)	(0.000506)	(0.000566)	(0.000223)
CPI inflation(t-1)	-0.00104	-0.00118***	0.00112	-0.000152	0.000323	-0.00008
	(0.00124)	(0.000379)	(0.000873)	(0.000158)	(0.00184)	(0.00016)
GDP growth(t-1)	0.00130***	0.00125***	0.000142	0.000453	0.00104*	0.00103***
	(0.000287)	(0.000217)	(0.000462)	(0.000437)	(0.00061)	(0.00024)
Quarter	-0.000206	-0.000269**	-0.000227**	-0.000808***	0.0007***	-0.00019*
	(0.000145)	(0.000124)	(0.00012)	(0.000299)	(0.000247)	(0.00011)
Constant	-0.0810***	-0.0241	-0.168***	-0.0886**	-0.291***	-0.0887***
	(0.0265)	(0.0166)	(0.0438)	(0.0398)	(0.0849)	(0.0198)
Observations	94	103	103	99	103	502

Notes: The dependent variable is the NFCy for all columns. The independent variables are included with a one-quarter lag. Columns (1) to (5) show time-series regressions for each BRICS country. The Newey-West standard errors are in parentheses. Column (7) reports the fixed-effect panel regression with Driscoll-Kraay standard errors in parenthesis for all BRICS countries. *** *p<0.01*, ** *p<0.05*, * *p<0.1.*

risks: exchange rate regime, capital controls, and foreign exchange reserves. We examine whether the transmission of the GFCy is different via these policy options. Moreover, we explore how the various countries' characteristics in the sensitivity to the GFCy by considering the indicators GDP growth rate, current account deficits, and inflation rate. In Table B.2, we find the supportive outcomes for Table B.1. The effect of the GFCy on NFCys is significant at the 5% level when considering BRICS countries as a whole. The coefficients for Brazil and India are still significant, but it is insignificant for other countries, especially for China and Russia.

Table B.2: Regressions for BRICS countries

DV: credit cycle	(1) Brazil	(2) China	(3) China2	(4) India	(5) Russia	(6) South Africa	(7) Panel
GFCy(t-1)	0.0140**	0.000603	0.000631	0.0184***	0.0109	0.0129	0.0131**
	(0.00583)	(0.00289)	(0.00298)	(0.00388)	(0.00730)	(0.00863)	(0.00514)
Capital control(t-1)	-0.0140	-0.0205	-0.0215	-0.0351	0.269***	-0.128	0.0819***
	(0.0312)	(0.0552)	(0.0630)	(0.256)	(0.0485)	(0.131)	(0.0297)
Exchange rate regime(t-1)	0.0313	0.0307		-0.0313**	0.0274	0.0485	-0.0133
	(0.0240)	(0.0853)		(0.0123)	(0.0190)	(0.0304)	(0.0122)
International reserves(t-1)	-0.0652	0.0236***	0.0239**	-0.0137	0.00427	-0.235**	-0.00198
	(0.0567)	(0.00657)	(0.00993)	(0.0244)	(0.0306)	(0.108)	(0.0119)
Current account(t-1)	0.000487	-0.00180***	-0.00183***	-0.00142	-0.00515***	-0.00212	-0.00254***
	(0.00243)	(0.000549)	(0.000687)	(0.00119)	(0.00127)	(0.00250)	(0.000647)
CPI inflation(t-1)	-0.000598	-0.00110**	-0.00113*	0.000559	-0.000315*	0.00138	-0.000329**
	(0.00140)	(0.000508)	(0.000651)	(0.000827)	(0.000177)	(0.00184)	(0.000161)
GDP growth(t-1)	0.00119***	0.000947	0.000957	0.00009	0.000262	0.000627	0.00132***
	(0.000377)	(0.00116)	(0.00116)	(0.000542)	(0.000417)	(0.000582)	(0.000235)
REER(t-1)	0.00115***	0.000352	0.000338	0.00214***	0.00247***	0.00205***	0.00136***
	(0.000320)	(0.000466)	(0.000532)	(0.000430)	(0.000427)	(0.000591)	(0.000206)
Exchange rate stability(t-1)			-0.00160				
			(0.0229)				
Quarter	0.000331	-0.000526***	-0.000535**	-0.000314**	0.000516*	0.00217***	-0.000204*
	(0.000483)	(0.000160)	(0.000235)	(0.000122)	(0.000289)	(0.000729)	-0.000112
Constant	-0.0984**		0.0353	-0.100	-0.408***	-0.281***	-0.148***
	(0.0440)		(0.125)	(0.285)	(0.0690)	(0.107)	(0.0270)
Observations	94	99	99	99	99	99	490

Notes: Exchange rate stability (ERS) is used as the alternative measure for the exchange rate regime. This index is normalized between zero and one. The authors define the exchange rate as "fixed" and assign a value of one for the ERS index. Higher values of the index indicates greater exchange rate stability against the currency of the base country. The panel regression in column (7) reports the fixed-effect panel regression with Driscoll and Kraay (1998) standard errors in parenthesis for all BRICS countries. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B.3: Regressions for BRICS countries

DV: Credit cycle	(1) Brazil	(2) China	(3) China2	(4) India	(5) Russia	(6) South Africa	(7) Panel
GFCy(t)	0.0246***	0.000979	0.00121	0.0233***	0.0131	0.0238***	0.0181***
	(0.00543)	(0.00323)	(0.00288)	(0.00381)	(0.00837)	(0.00537)	(0.00471)
Capital control(t-1)	-0.0166	-0.00684	0.0256	0.514**	0.249***	0.186**	0.0942***
	(0.0251)	(0.0526)	(0.0557)	(0.216)	(0.0543)	(0.0894)	(0.0292)
Exchange rate regime(t-1)	0.0235	0.0035		-0.0208**	-0.0142	-0.00967	-0.0196
	(0.0180)	(0.0782)		(0.00881)	(0.0187)	(0.0253)	(0.0122)
International reserve(t-1)	-0.0208	-0.00143	0.00215	0.0201	0.0254	0.0674	-0.0164*
	(0.0165)	(0.00672)	(0.00605)	(0.0251)	(0.0273)	(0.0420)	(0.00930)
REER(t-1)	0.00115***	6.34E-05	0.000707	0.00195***	0.00307***	0.00263***	0.00159***
	(0.000232)	(0.000336)	(0.000448)	(0.000478)	(0.000483)	(0.000576)	(0.000235)
CPI(t-1)	-0.000293	-0.000855*	-0.00004	0.00225***	-0.000395**	0.00203	-0.000354**
	(0.00131)	(0.000490)	(0.000556)	(0.000636)	(0.000188)	(0.00172)	(0.000178)
GDP growth(t-1)	0.105***	0.0539	0.0291	0.0255	0.0321	0.122**	0.102***
	(0.0256)	(0.108)	(0.0970)	(0.0455)	(0.0407)	(0.0489)	(0.0275)
Exchange rate stability(t-1)			0.0499***				
			(0.0143)				
Constant	-0.0806***		-0.138	-0.684***	-0.406***	-0.387***	-0.189***
	(0.0240)		(0.103)	(0.253)	(0.0554)	(0.109)	(0.0266)
Observations	94	99	99	99	99	99	490

To sum up, these outcomes from time series and panel regressions suggest that the global financial cycle has a significant impact on the national financial cycle for BRICS countries overall, and the coefficient is positive. That is, the increase in GFCy tends to lead to upward national financial cycle fluctuations. In addition, we find that tighter capital controls, more floating exchange rate regimes, and higher international reserves reduce the impact of GFCy shocks on national credit cycles both in the country and panel estimations.

C Local projection

We have additionally estimated Eq. (6) and presented the corresponding outcomes along with 90% confidence intervals. The main results are not affected by this change.

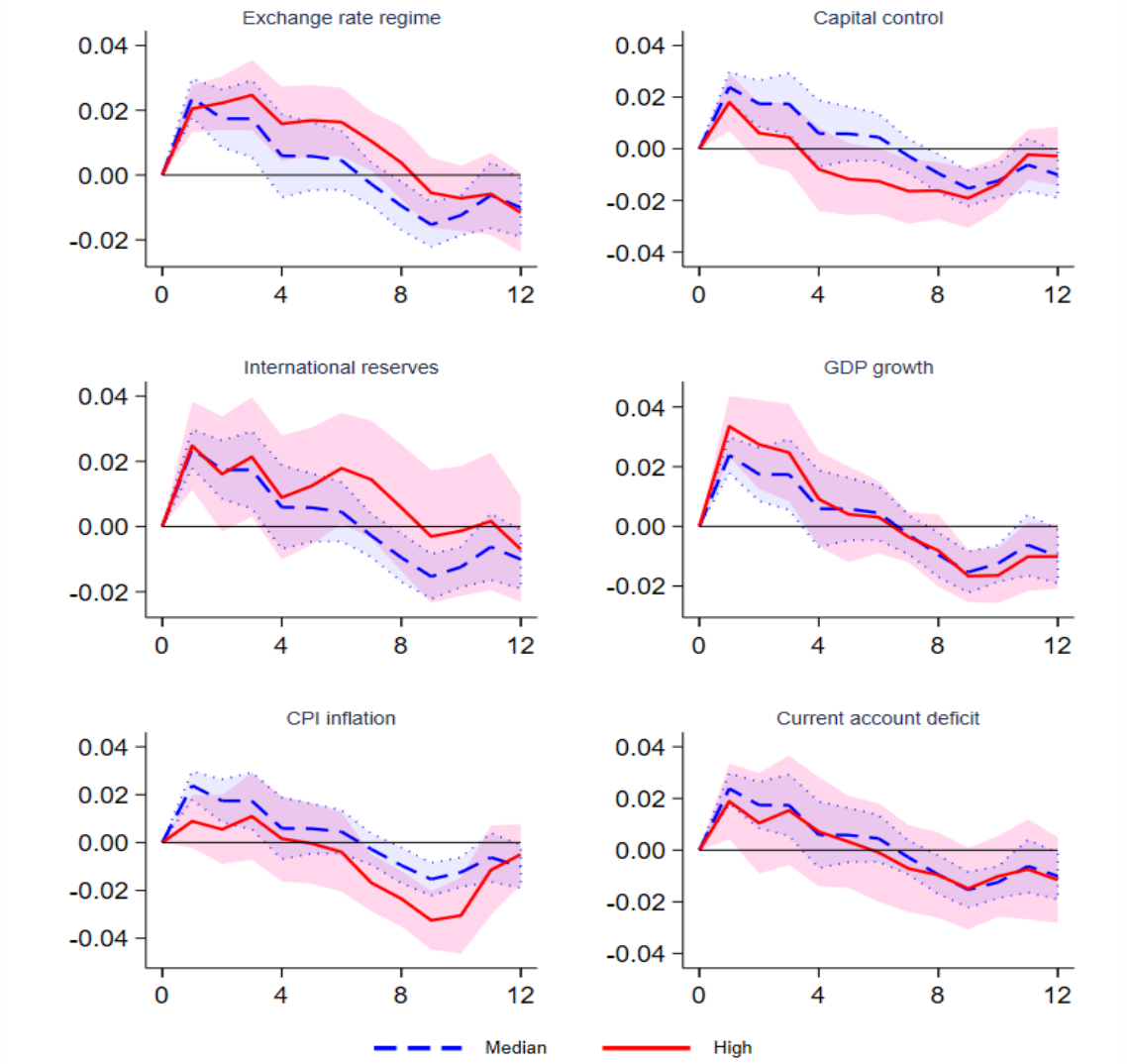

Figure C.1: Local projection impulse response: 90% confidence intervals

Notes: Figure C.1 shows the impulse responses of the national financial cycle to a global financial cycle shock. The impulse variable is the global financial cycle. The response variable is the national financial cycles for all BRICS countries. The "median" response is the national credit financial cycle response of an economy with values for each index equal to the median value. The "high" response is the response of the national credit financial cycle with values for each index equal to the 95^{th} percentile. The shaded areas denote 90% confidence intervals. The confidence interval is computed using Driscoll and Kraay (1998) standard errors.

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