

Article

The adverse consequences of quantitative easing (QE): international capital flows and corporate debt growth in China

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Abstract

The economic institutionalist literature often suggests that sub-optimal institutional arrangements impart unique distortions in China, and excessive corporate debt is a symptom of this condition. However, lax monetary policies after the global financial crisis, and specifically, quantitative easing have led to concerns about debt bubbles under a wide range of institutional regimes. This study draws on data from Chinese listed firms, supplemented by numerous macroeconomic control variables, to isolate the effect of international capital flows from other drivers of firm leverage. We conclude that the rise in, and distribution of, Chinese corporate debt can partly be ascribed to the effects of monetary policy outside of China and that Chinese institutional features amplify these effects. Whilst Chinese firms are affected by developments in the global financial ecosystem, domestic institutional realities and distortions may unevenly add their own particular effects, providing further support for and extending the variegated capitalism literature.

Key words: variegated capitalism, debt bubbles, international capital flows, monetary policy, quantitative easing, fixed-effects regression, regulation

JEL classifications: E3, E5, F3

1. Introduction

After the global financial crisis, there has been a significant increase in academic interest in capital market frictions and how they might exacerbate or mitigate poor corporate governance, debt and financial crises (see [Gourinchas and Obstfeld, 2012](#)). Capital market frictions originating from Western countries (especially from the USA), including unconventional monetary policies (UMPs), have led to much debate at both the academic and scholarly levels (see e.g. [Obstfeld, 2019](#); [Gräbner *et al.*, 2020](#); [Barattieri *et al.*, 2021](#)). For example, the adverse effects of quantitative easing (QE) and other UMPs may not only be felt at home but also through spillovers to emerging markets, including asset price bubbles (notably) and their effects on credit, drastically increasing the risks of further global instability (see [Karwowski, 2019](#); [Obstfeld, 2021](#)).

There have been particular concerns over monetary policy spillovers and related risks in China, especially given the changing profile of corporate debt (c.f. [Maliszewski *et al.*, 2016](#)). Chinese private sector debt increased from 80% of its GDP in 2008 to 182% in 2020; this remains less than the US's 236% in the latter year but is still relatively high in world terms ([Trading Economics, 2021](#)). This raises the issue of how unique China is and the relative extent to which its domestic debt problems reflect tendencies in the global financial ecosystem, which poses challenges to economies worldwide rather than simply a product of national institutional shortfalls. There have recently been several high-profile recent bankruptcies, most notably the Evergrande Group, the latter of which could potentially disrupt the entire Chinese housing market.

The existing literature has blamed the extraordinary growth in Chinese corporate debt on endogenous factors, such as credit-based development in upstream industries such as steel and copper, rapid growth in domestic infrastructure ([Maliszewski *et al.*, 2016](#); [Song and Xiong, 2018](#)), inefficiencies in Chinese state-owned enterprises (SOEs) ([Chen *et al.*, 2015](#); [Gounopoulos *et al.*, 2020](#)), challenges in upgrading to higher value-added production and regional institutional barriers to firm exit ([Chang and Wu, 2014](#)). In other words, the standard view is that it was a crisis made at home. This phenomenon has received vast press, academic and policymakers attention since 2008 (see e.g. Reuters.com; FT.com; FT.com; [Ahmed *et al.*, 2017](#); [Bank for International Settlements, 2015](#); [Dedola *et al.*, 2017](#)); however, it has been argued that matters have been further exacerbated by the coronavirus disease 2019 (COVID-19) debt ([Liu, 2021](#)), adding a particular salience to this phenomenon. However, much of the literature focuses on corporate demand for debt, whether facilitated by the government or not; this article supplements this literature by exploring how increases in the global, as opposed to the domestic, supply of credit, can lead to adverse consequences for the recipient country. Although it is fair to say that lax monetary policy has contributed to excessive debt around the world ([Karwowski, 2019](#)), in China, institutionally imposed frictions may ameliorate or exacerbate such tendencies ([Dobuzinskis, 2019](#)).

Hence, this article explores how post-GFC financial spillovers from the advanced economies due to their loose monetary policies have exacerbated Chinese corporate debt. In doing so, it sheds light on the nature of China's insertion into the global financial ecosystem. In our analysis, we explore firms' demand for credit to scrutinize the effect of capital inflow (CIF) surges in China on firm-level access to external finance. Although it is commonly held that national-level institutions aim to provide the basis of growth and stability, as the

literature on Variegated Capitalism alerts us, trends in the global financial ecosystem may pose common challenges around the world, constraining the possibilities for national-level autonomy in regulation (Bonizzi *et al.*, 2021). Hence, rather than seeing national-level institutions simply as structures that enable or distort markets, it is held that efforts to stabilize them in one part of the world may play out in unexpected ways in another (Jessop, 2014; Nowacki *et al.*, 2021). Although not fully visible yet, the negative consequences of QE have become increasingly apparent at the time of writing. Hence, this article explores how a seemingly domestic crisis, the Chinese debt bubble, commonly ascribed to institutional failings within that country (Chang and Wu, 2014), was partially due to the effects of the QE.

Our empirical approach employs fixed-effects panel regression models à la Covas and Den Haan (2011) and quarterly consolidated data on 2968 Chinese listed firms between 2005 and 2016, supplemented by numerous macroeconomic control variables. This period coincides with the initial Chinese government effort to start opening the balance of payment, approximately the end of the crisis, but most importantly, the entire period of US government zero-interest rates monetary policies. These policies have been vastly blamed as the primary source of spillovers to EMEs (see e.g. Rey, 2013).

Our work yields three main findings. First, international CIF broadly expand Chinese corporate sector debt. Secondly, we document two important transmission channels through which global liquidity results in real economy vulnerabilities. We propose a risk-taking channel of banks, which leads not only to greater credit accumulation, as suggested by Rey (2013), Cerutti *et al.* (2019) and others, but also to more ‘toxic’ credit. Moreover, we observe the existence of a ‘leverage channel’ that results in industry-level asymmetries in international liquidity transmission. As a result of these channels, higher debt levels are reached by firms with lower profitability and net worth relative to their investment values; in other words, they become more fragile in financial terms (see Bernanke and Gertler, 1990). Finally, we find that institutions matter even when it comes to cross-country capital flows, as suggested by the varieties of capitalism literature. Given the large variety of institutional models characterizing the Chinese context, we testify that CIF, like institutions, are distributed unevenly along the regional lines in China. Likewise, financial stability deterioration and risk-taking are not homogeneous in China but are particularly elevated in provinces with more liberal institutional models. This suggests that state coordination in China alleviates foreign-driven (often speculative) debt bubbles.

These findings highlight the prominent role of advanced economies in causing financial vulnerabilities in China (ultimately resulting in China’s corporate debt crisis) when much of the existing literature on Chinese debt has seen it as largely a problem that is a product of domestic circumstances (Maliszewski *et al.*, 2016; Petry, 2020).

The rest of our article is structured as follows. Section 2 presents this study’s theory and hypotheses; Section 3 explains our identification strategy and the empirical model. Section 4 describes our dataset. In Section 5, we provide detailed summary statistics. Section 6 discloses the empirical findings. Section 7 concludes.

2. Theory and hypotheses

There is a large body of literature on China that draws on one or other strand of the undeniably heterogeneous institutional literature. The literature on variegated capitalism shares Varieties of Capitalism’s concerns with such property rights-centred approaches to

institutions; both argue that more than one institutional recipe can provide the conditions for stability and growth (Hall and Soskice, 2001; Jessop, 2011). However, the variegated capitalism literature critiques the focus of both economic institutionalism and Varieties of Capitalism (VoC) in terms of how they view national-level institutions, which, it is argued, downplays the effects of developments and changes in the global financial ecosystem (Peck and Theodore, 2007; Jessop, 2011). As Nowacki *et al.* (2021) note, the seemingly polarizing differences between liberal market and state capitalism are mitigated by concentrations of actors that support novel approaches to investment and, potentially, debt. One such development has been the decision by multiple reserve banks to engage in QE to mitigate the consequences of the 2008 economic crisis and, later, COVID-19. Contemporary QE represented both a novel form of state involvement and a means of sustaining many of the features of liberal market capitalism (c.f. Nowacki *et al.*, 2021; Muellerleile and French, 2022); as such, it serves to challenge the ideas underpinning the liberal market model, yet may also aid the dissemination of its features.

Even the most capable state is subject to trends and developments in world capitalism, whilst attempts at regulation or mediation have invariably spatially uneven effects within national institutional settings even if multiple national and supra-national institutions reach for, or support, the same policy instruments (Jessop, 2014; Nowacki *et al.*, 2021), and this is true in China (Lim, 2010; Zhang and Peck, 2016). Indeed, China has high levels of foreign CIF and a high degree of central government control over the balance of payments, which means that capital flow surges and their consequent amplification of credit may have distinct but uneven effects.

That said, in the past, it has been argued that China is slowly transitioning towards a liberal market economy; by 2012, private firms had already produced up to three-quarters of the national GDP (Pettis, 2015). However, the liberalization has been contested by vested interests and entails costs associated with the transition (Pettis, 2015). Other work is somewhat less sanguine as to the scale and scope of liberalization. For example, it has been argued that China's WTO accession did not deliver on early assumptions that it would bind China into the global market economy and restrain state involvement (Tan, 2021). Instead, it has been marked by a consolidation of state capitalism. Initial liberalizing drives were reversed through the consolidation of opposition. For example, the liberalization of financial policy in the 1980s was replaced by more restrictive measures in the 1990s. Again, a new statist turn took place following the 2008—economic crisis (Tan, 2021).

Given this, Tan (2021) argues it would be incorrect to cast China in absolute terms; rather, it is about a contested and dynamic terrain. Witt and Redding (2013) note that whilst China has a large informal banking sector (comprising one-third of the size of the financial system), access to (formal) bank credit is strongly influenced by the state. Again, Hsueh (2012) argues that the Chinese state has shifted towards more selective controls at the sectoral level; the Chinese approach is essentially bifurcated. This is shaped by how strategically valuable a sector is in both political and economic terms (Hsueh, 2016). It has been argued that China is less susceptible to the interests of a particular industry, and hence, there is more room for state agency autonomy in selecting goals (Hsueh, 2012). The latter means that the state's role is much more than that of a referee, but the effects of its interventions are uneven; hence, it has been described as a 'fragmented authoritarian', involving multiple actors (Steinberg and Shih, 2012). Hence, Peck and Zhang (2013) argue that it embodies multiple, rather than a single, types of capitalism.

It has been further argued that vested interests may contribute to excessive borrowing to preserve the status quo (Pettis, 2015). In other words, an ability to engage in borrowing may help prop up the status quo in sustaining inefficient enterprises, ultimately imparting greater volatility (Pettis, 2015); alternatively, it may help them secure greater competitiveness (c.f. Tan, 2021). It also means that a large proportion of growth is credit-intensive (Pettis, 2015). However, as this study will highlight, it is the ability to access private capital from abroad that contributed to the scale of China's debt crises.

Accordingly, from a starting point in the literature on variegated capitalism, it might be concluded that whatever the distorting effects of state-owned and politically connected firms' ability to access funding directly from China's government and its financial institutions, an extensive non-domestic-driven liquidity expansion would still result in a credit expansion. In other words, high levels of debt are not necessarily the fault of domestic institutional failures but also may, in part, be due to developments distortions within the global financial ecosystem, with domestic institutions only being capable of mitigating—or exacerbating—these effects. Focusing on China offers a unique setting to address these questions and observe a lower-bound effect of spillovers of global financial imbalances on host countries' credit growth and the real economy.

Access to international financial markets gives China numerous benefits (for instance, it facilitates the funding of its fast-developing corporate sector). However, it also brings significant challenges and new risks for its macroeconomic stability; greater insertion into the global financial ecosystem opens opportunities but also risks, most notably of recurrent bubbles. A vast body of literature on global capital flows suggests that these tend to amplify the effects of fluctuations in the business cycle (Araujo *et al.*, 2017; Disyatat and Runcharoenkitkul, 2017), particularly when passing through the banking sector (c.f. Shin, 2012; Cerutti *et al.*, 2019). In line with this literature, we hypothesize that

Hypothesis 1: State regulatory efforts notwithstanding, foreign CIF into China expand its corporate sector leverage.

Academic and policymaker work have often connected expansions of domestic liquidity with substantial, or, indeed, excessive risk-taking incentives of banks; this ranges from orthodox assumptions of moral hazard to variegated capitalist approaches that highlight the endemic instabilities of the present condition, challenges in finding temporary fixes thereto. The latter further highlights how money flows have been freed from 'spatial-temporal constraints' (Jessop, 2019). Indeed, with respect to the latter, interest-bearing capital has become globally integrated to a much greater extent than hitherto (Jessop, 2019). The variegated capitalism literature holds that coterminous with global capital flows are flows in ideas. Easy money has been tied to an ideology focused on releasing capital predicated on assumptions of appreciations in the worth of assets rather than on promoting sustainable outlets for investment (Muellerleile and French, 2022).

Previous studies on the risk-taking channel from Paligorova and Santos (2017), te Kaat (2016) and Dell'ariccia and Marquez (2006) also analyse banks' risk-taking incentives by comparing the volume of bank lending received by safe firms, as opposed to unsafe ones. They find that during periods of expanded domestic liquidity (e.g. because of loosening monetary policies), banks lend to firms with worse accounting fundamentals, taking a greater risk. Accordingly, our second hypothesis reads as follows:

Hypothesis 2: Higher CIF result in proportionately more debt in less creditworthy firms.

It has been argued that the Chinese state has sought to reconcile local interest groupings by putting regional against foreign interests; this tendency may also be accentuated through rent-seeking behaviour (Hsueh, 2016). Again, sectors deemed of low strategic importance may be left to largely fend for themselves should conditions become challenging, exacerbating crisis tendencies (Hsueh, 2016). This has led Hsueh (2016) to propose a *strategic value framework*; the governance of markets and responses to booms and busts reflect the necessarily subjective view on the strategic worth of a sector in terms of perceived national interests and the ability to serve developmental and technological objectives, as well as present and potential competitiveness. This leads to sector-specific institutional arrangements encompassing coordination and relative property rights (Hsueh, 2016).

Indeed, the existing literature on variegated capitalism in China points to high levels of internal institutional heterogeneity, reflecting not only regional variations but also variations in the regulation of different areas of industry and the relative insertion of the latter into the global economy (Lim, 2010; Zhang and Peck, 2016; Petry, 2020). In line with both this literature and the literature on cross-country capital flows (Shin, 2012; Rey, 2013; Ahmed *et al.*, 2017; Muellerleile and French, 2022), it may be argued that CIF positively correlate with domestic country credit growth, but credit growth tends to be very heterogeneous across industries. Capital-intensive industries and real estate are well known for their greater procyclicality and sensitivity to CIF patterns (Rey, 2013; Borio, 2014). In the case of China, the latter industry is known to be quite financialized, a process that at least has been partially facilitated or at least tolerated by the government (Petry, 2020). Because of their higher reliance on external funding and the higher associated risk of these industries (high debt-financed), their performance is highly correlated with the business cycle (Covas and Den Haan, 2011). As a result, we hypothesize that corporate debt in industries with greater procyclicality and capital intensity will experience a greater sensitivity to CIF if capital flows expand domestic credit.

Hypothesis 3: CIF expand corporate sector leverage in the case of firms in highly procyclical and capital-intensive industries.

As noted above, the literature on variegated capitalism in China points to much internal diversity on regional lines and how different types of firms respond to the effects of regulation (c.f. Lim, 2010; Zhang and Peck, 2016); financialization has progressed in a variegated manner owing in part to the uneven effects of state intervention (Petry, 2020). The variegated capitalism literature also highlights that ecosystemically dominant trends in the global economy have profoundly divergent effects on different types of firms (Van Loon, 2016); traditional asset-rich firms face pressures to downsize and distribute, and those that were previously considered poor credit risks became able to engage in borrowing to a greater extent than hitherto (Dixon, 2011; Ward *et al.*, 2019). As with capital-intensive industries, credit to small businesses is also significantly correlated with the domestic business cycle. Because of the lack of collateral of small firms (e.g. a start-up), the high uncertainty about their future cash flows, and, in many cases, the lower financial sophistication, these firms' financing ability highly depends on the state of the economy. In other words, small firms have their credit capacity significantly expanded (relative to normal times) in times of

economic boom and vice versa contracted in recessions. The variegated capitalism literature suggests that these procyclical tendencies have been exacerbated by policy choices in the developed liberal market economies and how they have enabled the flow of easy credit around the world (Muellerleile and French, 2022). Because of the expansionary effect of CIF, we assume that small firms will experience greater access to credit, i.e. greater leverage, in times of more significant CIF. In line with this argument, we formalize our last hypothesis as follows:

Hypothesis 4: CIF expand corporate sector leverage, particularly in the case of small firms.

As with the country at large, the ruling party is a heterogeneous body encompassing contending interests; again, sub-national governments have considerable power (Tan, 2021). Uneven regional economic development and institutional variety have yet to be recent. China's economic policy in the late 1940s had substantially strengthened its policy focus on regional autonomy (Donnithorne, 1972). Mao's early efforts in establishing a heavy industry-led economy, or policies such as the Third Front Project, as well as Deng's experimental liberalization and more recent attempts at reforms aimed at industrial development in the West of China (e.g. the 'Great Western Development') substantially reinforced regional specialization and institutional variety (Zhang and Peck, 2016). Whilst the Chinese property market is quite financialized, this has in itself been a variegated process, with uneven, and at times unpredictable, state mediation and direction (Petry, 2020). Other waves of reforms have led to fragmentation in political institutions and the normalization of regional experiments, even if the central state has retained close control over strategic industries such as telecommunications (Hsueh, 2016). In short, existing institutional configurations impact overall patterns of institutional development and change (Hsueh, 2016). Once more, Witt and Redding (2013) note that access to bank credit has a strong regional dimension. More broadly speaking, institutional innovations diffuse unevenly between regions, even if some regions end up out of kilter with national policy (Peck and Zhang, 2013).

China's reform-driven economic boom was initially centered around the coastal areas in the South-East of China and the SAR of Hong Kong (Peck and Zhang, 2013). The success of these liberal regional models was then exported to other regions in China. One example of a provincial model that aligns with the Hong Kong (and Taiwan) models is that of Guangdong province. Facilitated by Deng's economic policy, the latter became the target of Hong Kong's finance and production infrastructure (Zhang and Peck, 2016) and now hosts China's two stock exchanges, with cities such as Shenzhen having the right to initiate local legislation. Likewise, economic developments in Beijing made the province the hub of China's knowledge capital (particularly in the high-tech industries) and a common place of incorporation of private (non-governmental controlled) enterprises, as well as China's venture capital and private equity firms (Zhang and Peck, 2016).

Although these examples suggest China's national model is shifting from a strong economic paradigm of state coordination to a neo-liberal one, these developments are not representative of all provinces in China. Many provinces' economies are heavily influenced by the state and dominated by SOEs. In provinces such as Gansu (and especially Sunan), Guanxi and Xinjiang, the presence of government-owned enterprises is so prominent that, over the years, it has substantially reduced the scope for the private entrepreneurial ethos

and network ties between these provinces and other provinces or countries (Peck and Zhang, 2013; Zhang and Peck, 2016; Liu *et al.*, 2020). The province of Chongqing is also well known for its government-driven economy. This province experienced an almost entirely state-driven economic development under Mao's leadership, and even though it was recently included in the government's effort to revamp the West of China, like many other provinces, its economy remains heavily state-driven, much more closed and less attractive to foreign investors than other previously mentioned liberal (coastal) provinces in the east (*ibid.*). In any event, even seemingly liberalized areas remain subject to state scrutiny and may be reigned in by the authorities if they are seen as counterproductive in social terms (Petry, 2020).

Given the variety of regional models in China and the strong contrast between more liberal provincial models—with a strong financial market development and a large reliance on cross-border networks (particularly with Singapore and the USA)—and provinces with limited foreign activity and a large involvement of the central government in the local economy, we propose that provincial institutional settings will likely affect both CIF and the resulting leverage growth. In particular, in line with the work of Shih *et al.* (2007) and Muellerleile and French (2022), we hypothesize that liberal market provinces (LMPs) will more likely experience large CIF, but also be more prone to overheating and risky debt than provinces heavily controlled and influenced by the state [*i.e.* coordinated market provinces (CMPs)].

Hypothesis 5: CIF increase the leverage ratio of the companies incorporated in LMPs and do not affect companies in CMPs.

3. Empirical identification

3.1 The Chinese context

Whilst many studies showed the relevance of CIF in stimulating credit growth (e.g. Rey, 2013; Cerutti *et al.*, 2019; Banti and Bose, 2021) and their aggregate macroeconomics transmission and effects on asset prices (Horn *et al.*, 2020), we know much less of their transmission to the real economy, hence about the micro-transmission of CIF. Moreover, Song and Xiong (2018) suggest that commonly used multi-country approaches for assessing Western countries' financial risk might not apply to the Chinese context because of the peculiar role of the central government and China's uneven regional economic development and institutional variety (Gounopoulos *et al.*, 2020), but most importantly because of the differences in Chinese provinces' economic specialization leading to a 'split' between provinces whose economy largely rely on financial markets and cross-border relationship with the 'West' and provinces fully dominated by SOEs (Zhang and Peck, 2016).

In terms of credit, four state-owned banks (the Big Four) vastly dominate the Chinese financial sector (Allen *et al.*, 2005; Gounopoulos *et al.*, 2020) and alone account for more than 80% of total industrial and commercial loans in 2018 (Song and Xiong, 2018). Together, the bond and equity markets contributed to only a fifth of the credit to non-financial firms in 2018 (Song and Xiong, 2018). Moreover, in the analysis period, the balance of payment is only partially liberalized; in particular, only 'Qualified Institutional Investors' (eligibility criteria tightly defined by the central government) are allowed to invest

in Chinese financial markets. Therefore, other than foreign direct investment (FDI), financial inflows in China almost entirely pass through state-owned banks. These banks enjoy explicit and implicit government guarantees on their lending (or borrowing) that induce significant misallocations (credit mispricing). That is because when either of these parties suffers substantial losses, domestic and international creditors expect that the government would bail them out and, hence, are willing to keep lending to these firms without increasing the price of these funds. That might cause the build-up of further leverage, further inefficiencies, and greater risk in the Chinese financial system, which we test in this article.

Despite the statist turn, many SOEs were forced by rising international competition to become more like their private sector counterparts (Tan, 2021). Again, a high level of foreign participation may lead to more rather than less state coordination (Hsueh, 2016). Likewise, the complexities of the existing national institutional infrastructure might lead to changes in its ability to attract foreign capital (Kellard *et al.*, 2022) or to an uneven distribution of such capital within the national borders. Hence, it has been argued that how actors behave is not a matter of state ownership or not; rather, it encompasses the form of ownership and the methods used to regulate the market, which vary on regional lines (Shih *et al.*, 2007; Hsueh, 2016).

3.1.1 A foreign-driven risk-taking channel

To study the link between domestic liquidity expansions and bank risk-taking incentives, we follow the relevant literature, connecting this phenomenon with financial institutions adjusting portfolios to meet return targets (Bonizzi, 2017), underestimations of borrowers' risk during low-interest rates (Ioannidou *et al.*, 2014), intensified agency problems (Acharya and Naqvi, 2012; te Kaat and Dinger, 2015) and exploring this risk-taking trend during expanded liquidity periods (Paligorova and Santos, 2017; te Kaat, 2016).

This article mirrors these papers' approach to analysing increased corporate leverage via heightened implicit bank risk-taking. In particular, it focuses on the quantity, rather than the price, of loans, analysing if firms with higher risk receive more significant lending during expanded liquidity periods. We argue for the existence of a risk-taking channel if worse-performing firms gain more lending and vice versa.

We utilize the BIS International Banking Statistics to have an initial qualitative assessment of the link between foreign capital flows and bank loans in China. These data allow isolation of foreign bank claims against Chinese banks and domestic bank loans to the Chinese private sector in our analysis period (see Figure 1). Notably, unconventional monetary policy triggered substantial cross-country inflows in China, evidently intermediated by its banking sector (see Figure 1 (a)'s sharp increase in foreign bank claims against Chinese banks). These inflows coincided with a sharp increase in bank loans to the Chinese private sector [Figure 1 (b)]. Both inflows and domestic bank loans correlated with the stance of advanced economies' monetary policies, increasing during loosening and decreasing during reversals in 2016 and 2018. This supports Blanchard *et al.* (2017) theory on the expansionary effects of such flows. Later, we will evaluate loan quality by analysing borrower characteristics to see if safer or riskier firms experienced larger leverage increases during CIF surges.

Moreover, we argue against Chinese domestic monetary policy as the driving force behind these effects. Our analysis, including a monetary policy index ('mpi') and a vector autoregressive model (VAR), shows that bank credit responds to a larger and more

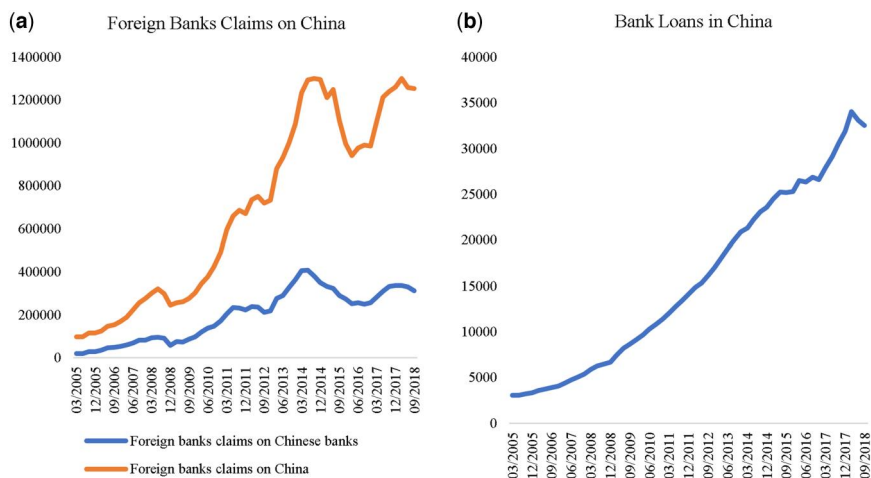


Figure 1 (a) Foreign bank's claim on China. (b) Bank loans in China.

Notes. **Figure 1** represents global cross-country positions of the World vis-à-vis China taking place in the form of foreign banks' claims on China—left-hand side graph [**Figure 1 (a)**—and Chinese financial institutions credit—on the right-hand side [**Figure 1 (b)**].

Source. BIS Consolidated Banking Statistics (**Figure 1 (a)**, LHS graph), BIS Credit to the non-financial sector [**Figure 1 (b)**, RHS graph]. Units: millions of US dollars (LHS graph), billions of RMB (RHS graph).

significant extent to CIF (**Figure 1**) than to changes in the 'mpi' (see [Supplementary Appendices A5 and A6](#)).

Finally, centralized Chinese economic structures aid in identifying capital flow transmissions despite data availability and opacity challenges. Unlike studies exploring these questions for the US and European contexts, characterized by a liberalized BoP, China's state-owned banks play a monopoly role in transmitting foreign liquidity. This allows us to rule out heterogeneities in the diffusion of foreign capital to China's private sector and minimize the bias of our analysis.

3.2 Identification

To assess the impact of CIF in China on the creation of firms' leverage and the build-up of the previously mentioned inefficiencies, we start with a recent study by [Blanchard *et al.* \(2017\)](#). The authors theoretically modelled the transmission of CIF to Emerging Markets' bond market and 'non-bonds' assets and showed that in Emerging Markets, non-bond flows (mainly constituted by interbank lending) have a more noticeable impact on the recipient economy than the bond counterparts because of 'the relatively primitive financial system' ([Blanchard *et al.*, 2017](#), p. 8) of these economies. Specifically, [Blanchard *et al.* \(2017\)](#) find that CIF have an expansionary effect on EMEs. They decrease the cost of credit for a given central bank rate and could lead to credit booms and expanded domestic output.

Therefore, in a similar spirit to [Blanchard *et al.* \(2017\)](#), we start from existing evidence on the expansionary features of capital inflows, and subsequently, we resort to the banking

literature to identify their transmission. We argue that significant CIF in banks' balance sheets, similar to an expansive monetary policy, reduce the cost of loanable funds, improving banks' profit opportunities and risk-taking. Ultimately, we extend the work of [Blanchard et al. \(2017\)](#) and of the previous literature by analysing the 'real outcomes' (i.e. the transmission to the Chinese corporate sector) of this foreign-induced (increase) reduction in the cost (quantity) of loanable funds.

3.3 Methodology

As baseline models for our study, we use two fixed-effects regression models à la [Covas and Den Haan \(2011\)](#).

We regress gross CIF on the log change in external debt financing (scaled by total assets) to test their association with the change in banks' lending to the private sector. More specifically, we assess whether larger inflows improve lending to more profitable firms, solvent, and with a higher Tobin's q than their industry (or size) peers. To benchmark individual firms (i) variables with those of firms with similar characteristics, we first computed the industry and size (j) median profitability (cash flows), solvency (z -score) and Tobin's q . We defined highly profitable, highly solvent, or high Tobin's q companies (at each given quarter) as those entities with, respectively, cash flow, z -score or Tobin's q exceeding the industry median. Finally, we interact the calculated industry or size dummy variables with CIF to observe whether, during CIF surges, companies receiving more loans are also those with high profitability (or vice versa if they are less profitable). This analysis enables us to argue whether international CIFs affect the growth in private sector leverage and whether this can be associated with higher risk-taking of banks. The use of dummies and lags rather than explanatory variables in the levels at time t helps us minimize endogeneity issues arising from the relationship between profitability, solvency, and Tobin's q and firms' capital structure choices (e.g. firms' debt financing choices). [Equation \(1\)](#) shows our main estimation setup to test our hypothesis.

$$\begin{aligned} \Delta \log \left(\frac{D_{i,t}}{A_{i,t-1}} \right) = & \alpha_i + \alpha_j + \beta_1 \log \left(\frac{CIF}{GDP} \right)_{t-1} + \beta_2 dZ_{i,t-1} + \beta_3 dProf_{i,t-1} + \beta_4 dQ_{i,t-1} \\ & + \beta_5 dZ_{i,t-1} \times \log \left(\frac{CIF}{GDP} \right)_{t-1} + \beta_6 dProf_{i,t-1} \times \log \left(\frac{CIF}{GDP} \right)_{t-1} \\ & + \beta_7 dQ_{i,t-1} \times \log \left(\frac{CIF}{GDP} \right)_{t-1} + \beta_8 MP_t + \beta_n \log(X)_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

In our panel data setting, i identifies individual firms included in our sample, and t instead is our (quarterly) time identifier. $\Delta \log \left(\frac{D_{i,t}}{A_{i,t-1}} \right)$ stands for the log-change in Chinese firms' debt financing, where D is the level of total debt and A is the book value of assets of firm i at time t (or $t - 1$, respectively). $\log \left(\frac{CIF}{GDP} \right)_{t-1}$ represents instead the first lag of CIF scaled by GDP and is our main explanatory variable. Therefore, looking at the coefficient β_1 , we can assess whether CIF regimes are associated with the dramatic increase in Chinese firms' debt, as hypothesized in Hypothesis 1. Afterwards, we include several controls for firms' profitability, solvency and Tobin's q (respectively, $dProf_{i,t-1}$, $dZ_{i,t-1}$ and $dQ_{i,t-1}$) and for the domestic monetary policy (MP_t) (see [Supplementary Appendices A5 and A6](#) for details on its computation). Since we contrapose individual firms' risk against that of comparable firms, having analogous industry and size characteristics, we use $dProf_{i,t-1}$, $dZ_{i,t-1}$ and $dQ_{i,t-1}$; dummy variables taking a value of 1 if firm i at a given time exceed the industry (or size

group) median profitability, solvency, or Tobin's q, and zero otherwise. Put differently, our 'excess profitability' dummy takes value of one if a firm display above the median profitability (i.e. $dProf_{i,t-1} = 1$ if $\frac{CF_{i,t-1}}{A_{i,t-2}} - \frac{CF_{j,t-1}}{A_{j,t-2}} > 0$). The 'excess solvency' dummy shows firms with above the median z-scores (i.e. $dZ_{i,t-1} = 1$ if $z_{i,t-1} - z_{j,t-1} > 0$). The 'excess investment opportunities' dummy identifies instead firms with above the median Tobin's q (i.e. $dQ_{i,t} = 1$ if $Q_{i,t-1} - Q_{j,t-1} > 0$). All three variables take the value of zero otherwise (for a below-the-median profitability, solvency and Tobin's q). Depending on the regression specification, j either identifies the industry or size peers of firm i .

In order to assess whether, during CIF surges, lending is more (or less) dependent on firms' balance sheet fundamentals, we interacted the three previously mentioned dummies with our CIF variable. Therefore, looking at the sign and magnitude of β_5 , β_6 and β_7 , we can observe whether having a healthier balance sheet increases (or decreases) firms' likelihood of receiving a loan during periods of greater CIF, as opposed to overall. Hence, we can conclude whether CIF, expanding domestic liquidity, enhance banks' risk-taking and lead to a misallocation of loans to less creditworthy firms (as hypothesized in Hypothesis 2) and whether this effect is acerbated by industry features such as procyclicality and capital intensity (see Hypothesis 3) or firms' credit constraints (see Hypothesis 4). Lastly, $\log(X)_t$ is the log of our bank-level and macroeconomic control variables, $\varepsilon_{i,t}$ is instead the white-noise error term of the fixed effect regression.

Secondly, and in line with the variegated capitalism literature, we hypothesize that the transmission of CIF on firms' leverage in the Chinese context is inevitably mediated by the diversity of the institutions and social structures of its provinces (Hypothesis 5). Therefore, following the guidance of the relevant literature, we first split provinces based on the institutional regime that represents them best. Thus, we define LMPs and CMPs and include these categories in the dummy variable $Inst_i$. {LMP; CMP}. We then draw Equation (2), interacting our core explanatory variables described above with countries' institutional settings. Finally, we separately perform Equation (2) for LMPs and CMEs (see Section 6). In accordance with our fifth hypothesis, we predict that provinces with a more liberal style of coordination, also more open to foreign investors, will experience greater expansions of firms' leverage ratios than the counterparts characterized by an economic infrastructure more reliant on the central state. Below, we present our second regression model:

$$\begin{aligned} \Delta \log \left(\frac{D_{i,t}}{A_{i,t-1}} \right) = & \alpha + \alpha_j \\ & + \beta_1 \log \left(\frac{CIF}{GDP} \right)_{t-1} + \beta_2 Inst_i \\ & + \beta_3 \log \left(\frac{CIF}{GDP} \right)_{t-1} \times Inst_i + \vartheta V_{i,t-1} \\ & + \gamma V_{i,t-1} \times \log \left(\frac{CIF}{GDP} \right)_{t-1} + \omega Inst_i \times V_{i,t-1} \\ & + \rho Inst_i \times V_{i,t-1} \times \log \left(\frac{CIF}{GDP} \right)_{t-1} + \beta_4 MP_t + \beta_n \log(X)_t + \varepsilon_{i,t} \quad (2) \end{aligned}$$

In Equation (2), $Inst_i$ {LMP; CMP} represents the institutional setup of the province of incorporation of firm i . When assessing the leverage ratio characteristics of LMPs, $Inst_i$ takes a value of 1 if the province of incorporation is an LMP, zero otherwise. In a similar fashion, when doing this analysis for CMPs, $Inst_i$ takes value of 1 if the province of incorporation is

a CMP, zero otherwise. Given the large increase in the number of regression parameters when interacting our institutional dummy ($Inst_i$) with our explanatory variables, we express Equation (2) in a more compact format. We do so by exploiting $V_{i,t-1} \{dProf_{i,t-1}; dZ_{i,t-1}; dQ_{i,t-1}\}$, a vector containing our core accounting variables, and the coefficients ϑ , γ , ω and ρ corresponding to the vector of coefficients of $V_{i,t-1}$ (i.e. ϑ) and three matrixes of regression coefficients belonging to the interaction of our accounting variables with $\log\left(\frac{CIF}{GDP}\right)_{t-1}$ (i.e. γ), with our institutional dummy (i.e. ω), and the triple interaction of institutional dummy, accounting variables, and $\log\left(\frac{CIF}{GDP}\right)_{t-1}$ (i.e. ρ) (see Table 9). Ultimately, $\epsilon_{i,t}$ is a white-noise error term.

4. Data

4.1 Dependent variable

We obtained quarterly consolidated accounting data on Chinese listed firms between 2005 and 2016, exploiting the database Wind.

The dependent variable in our article is the log-change in debt financing of a sample of 2968 Chinese listed firms that we compute subtracting from firms' book value of liabilities, their account payables and deferred tax liabilities. As in [Covas and Den Haan \(2011\)](#), we scale firms' debt by the first lag of their book value assets to avoid endogeneity issues. As previously discussed, we assume that changes in Chinese firms' debt-to-assets ratio are directly connected to variations in banks' credit supply (see Section 2.3, or [te Kaat \(2016\)](#) for a similar analysis performed in the European context).

4.2 Independent variables

4.2.1 CIF

As standard in the literature on international capital flows, we build our CIF variable using quarterly data gathered from the International Monetary Fund's International Financial Statistics (IMF IFS). Moreover, we assume them to be exogenous, as they are mainly driven by push factors independent of China's economic condition (see [Rey, 2015](#); [Ahmed et al., 2017](#); [Girardin et al., 2017](#)).

Data from the IMF IFS consist of three types of international capital flows, such as Direct Investment (assets and liability), Portfolio Investment (assets and liability) and other Investments (assets and liabilities). These measures identify different types of international investment, with several features of risk, duration and objectives (see [Supplementary Appendix A1](#)).

About these flow variables, the IMF IFS disclose flow data comprehensive of new transactions, revaluations and changes in outstanding volumes of assets and liabilities. Therefore, each of the CIF observations represents a quarter-to-quarter variation in outstanding liability volumes of China against the rest of the world at a given point in time, which later in the article we scale by the GDP of China in each relevant quarter (stock amount). This feature of our data comes in very handy for country intertemporal comparison. Our measure indeed already comes adjusted for exchange rate and valuation effects arising from changes in assets' market values.

We compute gross CIF from foreign countries in China as the sum of gross: Portfolio Investment liabilities (both in the form of debt securities and equities), other investment liabilities (mainly including bank loans, trade credit and deposits) and FDI (see [Figure 2](#)).

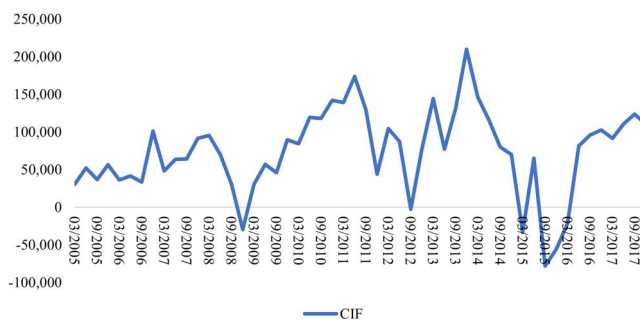


Figure 2 Capital Inflows in China.

Notes. Figure 2 pictures international capital inflows in Mainland China. In the graph, the blue line represents Capital Inflows (liabilities of China) denominated in millions of USD. Note that since CIF are quarter-to-quarter changes, negative values for this measure correspond to a decrease in the total stock amount.

Source. IMF IFS and author's own calculations.

Note that the relevant literature has adopted different measures of cross-country capital flows. The technique we chose to construct this variable is the most commonly used by recent work studying this phenomenon. However, we test the validity of our regression results to other capital flow measures and provide ample discussion about the pros and cons of each methodology (see [Supplementary Appendix A7](#)).

4.2.2 Firm control variables

Following [Covas and Den Haan \(2011\)](#) and [Begenau and Salomao \(2018\)](#), we added several control variables, accounting for firms' profitability, solvency and Tobin's q , as well as for size and industry. We identify firms' profitability using their cash flows, which we compute as the difference between gross profit, interest expense and corporate taxes. Moreover, we control for firms' insolvency using the Altman z -score, which we compute following the relevant literature (see [Supplementary Appendix A3](#)). These profitability and solvency measures have been used as identifiers of firms' creditworthiness to test whether a surge in CIF results in higher risk-taking, hence in lending to less creditworthy customers. Eventually, since firms could borrow to finance investment and growth, we add firms' Tobin's q as a proxy for firms' investment opportunities, which we compute following [Huang and Mazouz \(2018\)](#) (see [Supplementary Appendix A3](#)).

4.2.2.1 The creation of size portfolios

In line with well-known literature on external financing over the business cycle ([Covas and Den Haan, 2011](#); [Begenau and Salomao, 2018](#)) and different liquidity regimes. We use a percentile approach to split Chinese firms into seven-size portfolios according to their book value of assets ($BV Assets_{i,t}$). That is a crucial step, as firms' size impacts their financing ability both in capital flows' surge and retrenchment periods. For instance, the greater access to bank financing of large firms than small ones (typically deemed riskier) makes the latter much more sensitive to variations in banks' lending constraints. Therefore, everything

else being constant, less risk-averse banks would proportionally lend more to small firms than to large ones because of the greater earning potential.

4.2.2.2 The creation of industry portfolios

We also divide our sample firms according to their industry (see [Supplementary Appendix A2](#) for details on the Chinese industrial classification). That is also an important step, as the industry determines firms' reliance on external debt and their likelihood of receiving a loan during periods of expanded liquidity. In particular, several scholars, such as [Rey \(2013\)](#) and [Shin \(2012\)](#), found evidence of a boost in asset prices during CIF surges. That could decrease the risk of some procyclical industries and increase their profitability, raising their likelihood of receiving bank lending. We also collect industry data from Wind for all the firms in our sample.

4.2.3 Financial and macroeconomic control variables

We also included several financial and macroeconomic control variables that could affect bank lending, hence explaining the variation in debt financing not explained by CIF and accounting variables. In particular, we include variables that enable us to control for the domestic monetary policy stance (MP_t), hence addressing endogeneity concerns that could arise from its impact on banks' credit growth. Since China uses a mix of price- and quantity-based monetary policies, we followed [Girardin et al. \(2017\)](#) and created an indicator of Chinese monetary policy reflecting these characteristics (see [Supplementary Appendices A5 and A6](#)). Financial control variables help us control the cost of direct financing in equity markets (Shanghai and Shenzhen Stock Exchanges). Variables of bank performance instead provide a 'litmus test' for our story since the lower the aggregate profitability of the Chinese banking sector, the higher is banks' incentive to exploit greater foreign liquidity for profit maximization (if banks increase their risk-taking).

As banking and financial sectors' specific control variables, we use measures such as Chinese banks' profitability (ROA), Chinese stock market capitalization (computed as the sum in Shanghai and Shenzhen end-of-quarter stock market capitalizations) and volatility (standard deviation of end-of-the-day stock market capitalization in each quarter) (all available from CEIC). Ultimately, we add the Consumer Price Index (CPI) and the 10-year sovereign bond yields (which we collected from CEIC). We argue that higher sovereign risk will harm bank lending since higher yields directly transmit to the banking sector through the collateral channel, which feeds back to the private sector through lower loans.

4.2.4 Provincial institutional models

To further explain the channelling of CIF to the real economy, we consider the effects of foreign capital flows on firms' leverage within the context of (mediated by) different forms of regional capitalism available in China.

Using firms' ZIP codes available from Wind, we identify the Chinese province in which each firm is incorporated and the corresponding geographical region ('East', 'Middle', 'North-East', 'West' of China), as clearly outlined in our [Supplementary Appendix A7](#).

Using [Zhang and Peck \(2016\)](#), and [Liu et al. \(2020\)](#) findings on the evolution of these Chinese provinces' dependence on financial markets and credit vs government support, we then outline which of the provinces have an economic nature that is more coordinated by the central government (i.e. is more 'CMP' in style) and which instead is more susceptible to

a foreign-driven overheating because of its greater liberality and financial market-oriented coordination (i.e. ‘LMP’).

Defining provinces’ institutional regimes and including them as an additional interaction term with the CIF and firms’ accounting stability variables allows the understanding of whether recent debt crises in China can be blamed on internal systemic distortions or whether these, to a large part, are due to its insertion into the global economy.

5. Summary statistics

In this section, we provide a detailed overview of the data adopted in our study. To assess the relationship between CIF and debt financing growth, we start by performing a correlation analysis of debt financing, CIF and our key control variables (see [Table 1](#)). Afterwards, we analyse the pairwise correlation between debt financing and CIF in China, splitting our sample into seven-size portfolios and ten industry groups (see [Supplementary Tables 2.2 and 2.3](#)). We also provide standard summary statistics on the variables adopted in our study, which we display in [Supplementary Appendix A4](#).

In [Table 1](#), we observe a positive correlation between CIF and domestic monetary policy and a negative correlation between CIF and stock market indicators, both capitalization and volatility. This is in line with the findings of the relevant literature suggesting that cheap stocks and low financial market volatility incentivize foreign investment (see e.g. [Kellard *et al.*, 2022](#)). As predicted by the capital flows’ literature, inflows are positively correlated with both Bank ROA and coherently with a risk-taking channel whilst negatively correlated with Chinese economic fundamentals and inflation. We observe a negative correlation between our monetary policy variable and stock market measures and inflation, as well as with Chinese companies’ fundamentals. Ultimately, the remaining correlation coefficients were revealed to be significant and with the expected signs.

[Table 2](#) analyses the pairwise correlation between debt growth and CIF at the industry level. Coherently with the literature on cross-country capital flows ([Shin, 2012](#); [Rey, 2013](#); [Ahmed *et al.*, 2017](#); [Banti and Bose, 2021](#)), CIF are positively correlated with domestic

Table 1 Correlation analysis.

	CIF	mpi	Stock Mkt Cap	Mkt vol	Banks ROA	Sov. Yields	$\Delta\log(\text{CPI})$
CIF	1						
mpi	0.090***	1					
Stock Mkt Cap	-0.344***	-0.338***	1				
Mkt vol	-0.634***	-0.001**	0.503***	1			
Banks ROA	0.211***	0.070***	-0.207***	-0.244***	1		
Sov. Yields	0.106***	-0.541***	-0.052***	-0.183***	-0.551***	1	
$\Delta\log(\text{CPI})$	-0.176***	-0.290***	0.773***	0.209***	0.259***	-0.322***	1

Notes. This table presents the correlations matrix containing our key country-level explanatory variables: CIF-over-GDP, stock market capitalization and volatility, Banks ROA, Inflation, Sovereign Bond Yields and our key explanatory and control variables. Coefficients have been marked with ***, ** and * when significant at 10, 5 and 1% levels, respectively.

Table 2 Pair-wise correlation between leverage growth and capital inflows (split by industry)

Industry	1	2	3	4	5	6	7	8	9	10
corr (CIF, Lev. ratio)	0.05	0.08**	0.08**	0.08**	0.08**	0.05	0.06**	0.08**	0.08**	0.06

Notes. This table reports pair-wise correlations between the debt financing of firms and the first lag of capital inflows over GDP. In the table, we split firms according to their industry to observe the correlation between the two variables, taking into account the impact of firms' industry on their received lending. Finally, we marked correlation coefficients that are significant at a 5% level with **.

Table 3 Pair-wise correlation between leverage growth and CIF (split by size)

Size	0–0.25	0.25–0.5	0.5–0.75	0.75–0.9	0.9–0.95	0.95–0.99	0.99–1
corr (CIF, Lev. ratio)	0.129**	0.076**	0.044**	0.016	0.006	–0.001	0.026

Notes. This table reports pair-wise correlation coefficients between firms' debt financing and the first lag of CIF over GDP. Using a percentile approach, we allocated firms to one of the seven-size groups reported in the table at each point in time. Splitting firms according to their size, we observe the correlation between the two variables considering the impact of firm size on debt financing. Finally, we marked correlation coefficients that are significant at a 5% level with **.

country credit growth, but credit growth tends to be very heterogeneous across industries. In our study, we do not find a significant correlation (at a 5% level) between debt financing growth and CIF for 'agriculture, forestry and fishing' ('1'), 'finance and insurance activities' ('6') and other service activities' ('10'). On the contrary, more cyclical industries (e.g. mining, construction, manufacturing, IT, and real estate) have higher correlation coefficients, which appears consistent with the hypothesized greater 'risk-taking channel'. The remaining industries react to CIF surges by increasing their debt, but their correlation coefficients are smaller (about 8%).

We also assess the correlation between debt financing and CIF controlling for firms' size (see [Table 3](#)). We observe positive and significant correlation coefficients across all size percentiles except the top one, which implies a considerable heterogeneity in financing across size groups. In particular, we observe that the lowest quartile has the highest correlation coefficient (about 13%), hence three times higher than the average (4%). Eventually, correlation coefficients are not significant in the largest-size portfolios. Similar works have also pointed to a relatively higher synchronization of small firms' external debt financing with domestic liquidity and the business cycle (see [Covas and Den Haan, 2011](#); [Begenau and Salomao, 2018](#)).

6. Regression results

6.1 Baseline regression

In [Table 4](#), we present the results obtained by estimating [Equation \(1\)](#), exploiting industry-level and size differences in median performance. As conjectured in Hypothesis 1, we find that growth in debt financing (scaled by assets) is positively associated with CIF-over-GDP with a coefficient of about 2.3% in all our regressions [see [Table 4](#) columns (1)–(6)]. This

Table 4 Baseline regression results

	Ind. benchmark			Size benchmark		
	(1)	(2)	(3)	(4)	(5)	(6)
	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio
CIF	2.334***	2.335***	2.298***	2.334***	2.335***	2.297***
<i>Core firm fundamentals:</i>						
d_prof		-0.324***	-0.314***		-0.339***	-0.319***
d_prof * CIF		-0.043***	-0.041***		-0.047***	-0.043***
d_Z		-0.024	-0.010		0.013	0.025
d_Z * CIF		-0.004	-0.001		0.005	0.007
d_Q		-0.016	-0.014		-0.032	-0.011
d_Q * CIF		-0.004	-0.003		-0.008	-0.003
<i>Financial market fundamentals:</i>						
MP			-0.247***			-0.247***
log(Bank ROA)			-6.764***			-6.838***
log(Mkt Cap)			-0.035			-0.048
log(Mkt vol)			0.013			0.016
<i>Macroeconomic fundamentals:</i>						
log(Sov. Yields)			-5.986***			-6.097***
$\Delta\log(\text{CPI})$			0.027			0.028
Constant	9.398***	9.495***	18.141	9.398***	9.489***	18.507
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	No	No	Yes	No	No	Yes
Obs	78 469	78 469	64 607	78 469	78 469	64 607
R ²	0.208	0.215	0.091	0.208	0.214	0.090

Note. This table reports Equation (1) results, which we present decomposed into six columns. In columns (3) and (6), we display the estimation results, including all control variables and fixed effects in the regression. d_prof, d_Z and d_Q are calculated respectively as the difference between a firm profitability, solvency and investment opportunities and the corresponding industry [columns (1)–(3)] and size [columns (4)–(6)] medians. In this regression, we add to our variables of interest several financial markets and macroeconomic control variables and fixed effects. In Supplementary Appendix A3, we describe all the variables displayed in this table and their calculation. Finally, coefficients have been marked with ***, ** and * when significant at 10, 5 and 1% levels.

coefficient is statistically but also economically significant, particularly in light of the size and volatility of cross-country CIF in China, having more than a two-fold effect on firms' leverage ratio (i.e. debt-to-assets growth). Comparing firms' financing decisions with their accounting fundamentals, we find that firms with lower profitability (expressed in terms of lower cash flows-over-assets) receive higher credit over the whole period than their industry peers. In particular, by switching from non-profitable to profitable firms, we can observe a decrease in the geometric mean of debt financing (scaled by assets) of about 32% [see Table 4, columns (2) and (3)]. Using firms' size instead of the industry as a benchmark, the results are almost identical [see Table 4, columns (5) and (6)]. Looking at the interaction term between CIF and firms' fundamentals, that analysing whether, during CIF surges, firms with more robust accounting fundamentals receive more credit, we find a negative marginal effect (of about -4%). That implies that less profitable firms are even more likely

to receive credit during CIF surges [see [Table 4](#), columns (2)–(3) and (5)–(6)]. These results are in line with what we anticipated in the correlation analysis (Section 2.3.3) and our Hypothesis 2. The remaining control variables measuring solvency or investment opportunities are insignificant. These results provide evidence of a link between foreign CIF in China and its build-up of corporate sector debt. As hypothesized, during CIF surges, riskier companies receive more credit than their safer industry and size peers.

In columns (3) and (6), we supplement our baseline regression with several macroeconomic, financial and banking sector control variables. The macroeconomic control variables help address concerns about endogeneity caused by the impact of PBOC monetary policy on banks' credit growth. Financial control variables manage the cost of direct financing in Shanghai and Shenzhen Stock Exchanges. Bank performance variables act as a gauge, indicating that lower profitability in the Chinese banking sector motivates banks to seek higher profits by leveraging foreign liquidity. The signs and significance of our core explanatory variables remain unaffected. Also, the coefficients of our macroeconomic, financial and bank-related control variables (see Section 4.2.3 for a detailed description) appear statistically significant and have the expected signs.

Most control variables' coefficients show statistical significance and expected signs. PBOC monetary policy is negatively associated with debt financing, with a coefficient of -25% in columns (3) and (6). We do not observe a shift between debt and equity financing, as indicated by non-significant coefficients of the stock market capitalization variable in columns (3) and (6). Similarly, stock market volatility shows non-significance in both columns. These results are not rare in periods of expanded liquidity, as both bank credit and risk appetite contemporaneously grow and share prices boom. Finally, we included 10-year government bond yields (representing Chinese credit risk), which inversely move with Chinese bonds' prices, directly affecting banks' collateral values, hence their central bank loans or loans from other banks in the interbank market. Therefore, as expected, this measure has a negative and significant sign, as higher yields imply lower loanable capital and vice versa.

6.2 CIF and leverage developments in procyclical and Capital - intensive industries

We start this analysis by defining procyclicality as the average correlation between the average leverage of firms in each industry and China's GDP growth. We consider procyclical industries with a correlation between leverage and business cycle in the top quartile ([75, 100]%). Afterwards, we re-estimate [Equation \(1\)](#) for this group of firms. As in all our baseline regressions, when looking at firms' leverage, we benchmark it to the median leverage of firms in the same industry [[Table 5](#), columns (1)–(4)] or the same size [[Table 5](#), columns (5)–(8)] of those in consideration.

In [Table 5](#) [columns (1) and (2)], we find that a 1% increase in CIF lead to an almost double increase in leverage (i.e. in procyclical industries, the coefficient of 'CIF' is slightly smaller than the corresponding for the whole sample). Nevertheless, for these industries, we find an average negative correlation between profitability, solvency and leverage. In particular, greater CIF lead to more credit to less solvent firms (the interaction between profitability and CIFs is not significant in this setting).

The effect appears much stronger than that observed for the whole sample when considering capital-intensive industries, characterized by firms with an average PPE-to-asset ratio in the top quartile. In [Table 5](#) [columns (3) and (4)], CIF affecting these firms lead to an

Table 5 CIF and leverage in procyclical and capital-intensive industries in China.

	Ind. benchmark				Size benchmark			
	Procyclical industries leverage		Capital-intensive industries leverage		Procyclical industries leverage		Capital-intensive industries leverage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio
CIF	1.743***	1.077***	2.397***	2.424***	1.743***	1.095***	2.397***	2.450***
<i>Core firm fundamentals:</i>								
d_prof		-0.255*		-0.761***		-0.288**		-0.831***
d_prof * CIF		-0.035		-0.115***		-0.044		-0.133***
d_Z		-0.196		0.056		-0.235*		-0.014
d_Z * CIF		-0.041†		0.013		-0.050		-0.004
d_Q		0.191		-0.031		0.249*		0.056
d_Q * CIF		0.043		-0.007		0.053*		0.013
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	No	Yes	No	Yes	No	Yes	No	Yes
Fin. markets fundamentals controls	No	Yes	No	Yes	No	Yes	No	Yes
Macroeconomic fundamentals controls	No	Yes	No	Yes	No	Yes	No	Yes
Obs	10 417	8256	27 501	21 497	10 417	8256	27 501	21 497
R ²	0.189	0.038	0.172	0.141	0.189	0.034	0.172	0.140

Table 5 reports Equation (1) results estimated for procyclical and capital-intensive industries. In columns 4 and 8, we display the estimation results, including all control variables and fixed effects in the regression. In this Table, for graphical reasons, we chose to present only the coefficients of our main explanatory variables and not those of our control variables and fixed effects. d_prof, d_Z and d_Q are calculated respectively as the difference between a firm profitability, solvency and investment opportunities and the corresponding industry [in columns (1)–(4)] and size [in columns (5)–(8)] medians. In this regression, we add to our variables of interest several financial markets and macroeconomic control variables and fixed effects. In [Supplementary Appendix A3](#), we describe all the variables displayed in this Table and their calculation. Finally, coefficients have been marked with †, ***, ** and * when significant at 20, 10, 5 and 1% levels, respectively.

average of about two and a half times more leverage growth in firms operating in capital-intensive industries. A 1% increase in CIF lead to an eleven and a half percent more debt to less profitable firms. That provides strong evidence of credit misallocation, which is remarkably stronger in firms operating in capital-intensive industries (as stated in Hypothesis 3).

Our results are unchanged in both statistical and economic significance if we benchmark firms' accounting fundamentals to the firms' size peers rather than industry ones [see Table 5, columns (5)–(8)]. We find support for a positive effect of international capital flows on corporate sector debt leverage within both procyclical and capital-intensive industries. The result, though, is substantially less strong for procyclical industries than for capital-intensive ones. Insolvent firms and firms with higher investment opportunities in procyclical industries receive more credit than their more solvent size peers (profitability is not significant) when CIF increase. In capital-intensive industries, greater CIF lead less profitable firms to receive substantially more credit than profitable ones of similar size (as by Hypothesis 2). Also, in this case, we find support for greater credit to more capital-intensive industries (as hypothesized in Hypothesis 3). We find less conclusive evidence for a stronger transmission of CIF to procyclical industries instead.

6.3 CIF and leverage of small and large firms

In Table 6, we separately estimate Equation (1) for each size percentile available in our dataset. As hypothesized in Hypothesis 4, we find that the expansive effect of CIF lead to significantly higher corporate debt growth in small firms (except for firms in the [90–95] percentile). Firms in the bottom 25% group experience the most remarkable increase in leverage in response to CIF. Except for the firms in the [90–95] percentile, we observe that CIFs are associated with much smaller increases in leverage as the firm size increases. That culminates with a negative and economically significant coefficient of -2.4% increase in leverage associated with a 1% CIF growth that we observe for the top 1% size portfolio. That indicates that different from what we observe for small firms, the external financing behaviour of the largest firms displays a counter-cyclical behaviour. That provides strong support for our hypothesized greater transmission of CIF to the smaller firms and is consistent with previous evidence on the pro- (counter-) cyclicity of debt financing of small (large) firms (Covas and Den Haan, 2011; Begenau and Salomao, 2018).

6.4. The regional dynamics of capital flows and corporate sector debt

Ultimately, to capture the heterogeneous transmission of CIF on firms' leverage, conditional on the institutional aspects of the 31 Chinese provinces, we supplement Covas and Den Haan's (2011) regression model with a regional interaction term [see Equation (2)].

We follow Zhang and Peck (2016), Hu *et al.* (2019) and Liu *et al.* (2021) to define coordinated market provinces CMPs and LMPs (see the Supplementary Appendix A7 for further details on the classification) and add a triple interaction ($Inst_i$) to our core baseline regression variables [see Equation (2)]. We display the results in Table 7.

We find that foreign CIF increase Chinese corporate sector leverage. The increase is typically experienced by firms that are less profitable than their industry and size peers, particularly in times of elevated CIF. As suggested by the relevant literature and as Hypothesis 5, regional dynamics and institutions matter a lot when explaining the transmission of a foreign-driven credit expansion to the Chinese corporate sector. Regions with laxer control of the central government (i.e. also fewer SOEs) and greater financial market development,

Table 6 The asymmetric effect of CIF on firms' leverage growth

Size groups	[0–25%]	[25–50%]	[50–75%]	[75–90%]	[90–95%]	[95–99%]	[99–100%]
	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio
CIF	3.271***	2.125***	1.872***	0.313**	3.078***	-0.154	-0.386***
<i>Core firm fundamentals:</i>							
d_prof	-0.438***	-0.424***	-0.137*	-0.301***	-0.270*	-0.291	-0.051
d_prof * CIF	-0.044	-0.065***	-0.009	-0.045*	-0.036	-0.048	-0.010
d_Z	-0.041	-0.135	-0.010	-0.006	-0.158	-0.021	0.118
d_Z * CIF	-0.005	-0.033*	-0.003	-0.003	-0.035	-0.005	0.024
d_Q	0.154	-0.083	0.112	-0.018	0.065	-0.120	0.274
d_Q * CIF	0.032	-0.017	0.025	0.001	0.013	-0.027	0.066
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fin. markets fundamentals controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic fundamentals controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	14 905	15 996	16 227	10 171	3463	2741	1104
R ²	0.194	0.094	0.053	0.018	0.189	0.033	0.352

The effect of firms' size.

Notes. This table reports Equation (1) results, which we estimate separately for each of the defined size percentiles. Each regression includes all control variables and fixed effects. In this table, for graphical reasons, we chose to present only the coefficients of our main explanatory variables and not those of our control variables and fixed effects. d_prof, d_Z and d_Q are calculated, respectively, as the difference between a firm's profitability, solvency and investment opportunities and the corresponding industry median. In Supplementary Appendix A3, we describe all the variables displayed in this table and their calculation. Finally, coefficients have been marked with †, ***, **, * and * when significant at 15, 10, 5 and 1% levels, respectively.

Table 7 CIF and leverage growth in CMPs versus LMPs.

	Ind. benchmark		Size benchmark	
	LMP	CMP	LMP	CMP
	(1)	(2)	(3)	(4)
	Lev. ratio	Lev. ratio	Lev. ratio	Lev. ratio
CIF	2.586***	2.628***	2.571***	2.628***
<i>Core regression variables:</i>				
d_prof	-0.607***	-1.077***	-0.572***	-1.149***
Inst.	0.254	-0.254	0.316	-0.316
d_prof * Inst.	-0.471**	0.471**	-0.576***	0.576***
d_prof * CIF	-0.111***	-0.209***	-0.105***	-0.226***
Inst. * CIF	0.042	-0.042	0.057	-0.057
d_prof * Inst. * CIF	-0.098**	0.098**	-0.122***	0.122***
d_Z	0.109	0.398**	0.113	0.352**
d_Z * Inst.	0.289	-0.289	0.239	-0.239
d_Z * CIF	0.014	0.085**	0.015	0.076**
d_Z * Inst. * CIF	0.070	-0.070	0.061	-0.061
d_Q	-0.059	0.099	0.005	0.171
d_Q * Inst.	0.158	-0.158	0.166	-0.166
d_Q * CIF	-0.014	0.025	0.000	0.040
d_Q * Inst. * CIF	0.039	-0.039	0.040	-0.040
Constant	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Fin. markets fundamentals controls	No	No	Yes	Yes
Macroeconomic fundamentals controls	No	No	No	Yes
Obs	12 180	12 180	12 180	12 180
R ²	0.123	0.123	0.122	0.122

Table 7 reports [Equation \(2\)](#) results, which we present decomposed into four columns. In columns (1) and (3), we display the estimation results, including all control variables in the regression for LMPs. In columns (2) and (4), we display the same results, but for CMPs. *d_prof*, *d_Z* and *d_Q* are calculated respectively as the difference between a firm profitability, solvency and investment opportunities and the corresponding median of firms in the same industry [in columns (1) and (2)] or size percentile [in columns (3) and (4)]. *Inst.* represents the province's institutional regime (i.e. LMPs vs CMPs). In [Supplementary Appendix A3](#), we describe all the variables displayed in this table and their calculation. Finally, ***, ** and * represent significance at 10, 5 and 1% levels, respectively.

i.e. more liberal in nature, are more prone to overheating and experience substantial leverage growth. Looking at the interaction between *d_prof* and *Inst* (dummy representing the considered institutional regime), we observe that in LMPs, more profitable companies have about 50% less debt than the less profitable ones. The opposite is true for CMPs, where greater debt is held by more profitable companies. Finally, the triple interaction between *d_prof*, *Inst* and $\log\left(\frac{CIF}{GDP}\right)_{t-1}$ reveals that a 1% increase in CIF in LMPs increases non-profitable firms' leverage by about 10% more than that of profitable companies in LMPs, the opposite is true for CMPs (either benchmarking firms' profitability to their industry [columns (1) and (2)] or size peers [columns (3) and (4)]. In a similar fashion, we also find in columns (2) and (4) of [Table 7](#), presenting the results of the estimation of [Equation \(2\)](#)

for CMPs, that leverage increases in these provinces in times of substantial CIF, but only in solvent firms. The same coefficient is not statistically significant for LMPs.

Overall, our results suggest that CIF in China had a deteriorating effect, as also suggested in Sections 6.1–6.3. Once again, even including our institutional dummies, we observe that greater cross-countries inflows in China have increased the country's macroeconomic risk by increasing its corporate sector leverage (and particularly so in more fragile firms). However, as suggested by the variegated and VoC literature, institutional structures matter and play a crucial role—even when it comes to cross-country spillovers—in taming vs amplifying such effects and risks. We find that provinces with coordination of the central government suffer less from the negative effects of CIF than those with lower state control. These findings are also in line with much of the literature on international capital flows (see e.g. [Bruff and Horn, 2012](#); [Ahmed *et al.*, 2017](#); [Araujo *et al.*, 2017](#)).

6.5 Robustness checks

We also performed several robustness checks to validate our baseline results.

We tested the robustness of our findings to an alternative measure of CIF, that is current account imbalances (see [Supplementary Appendix A8.1](#)).

Secondly, we followed [Iosifidi and Kokas \(2015\)](#) and added several different profitability and risk variables to our baseline regression to confirm the validity of 'risk-taking' results (see [Supplementary Appendix A8.2](#)).

Thirdly, to further assess whether the rise in Chinese corporate sector debt is supply-driven, we re-run our baseline regressions instrumenting CIF-over-GDP with Chinese banks' loans to the non-financial sector (see [Supplementary Appendix A8.3](#)). Then, we test whether the hypothesized risk-taking channel is more present during episodes of procyclicality of cross-country CIF to the business cycle. Several scholars and policymakers, including [Shin \(2012\)](#), found gross CIF to ease domestic lending standards in the host country, especially when capital flows are procyclical, and if this is the case for China, the effect should be reflected in the magnitude of our regression coefficients (see [Supplementary Appendix A8.4](#)).

We robustify our results of Section 6.4. by replacing the variable *Inst.* with the geographical area of the provinces in question (East, Centre, West, North-East). We do this because, as presented by [Hu *et al.* \(2019\)](#), economic growth in provinces in the East versus Centre and West is driven by very different factors. The same is true also for provinces in North China that, in the aftermath of the GFC, have suffered the weakest growth. In particular, the East is vastly dominated by the service and financial sectors and, hence, should be more affected by financial spillovers and possible consequent overheating. The West is instead more sensitive to other economic shocks, such as supply and demand shock or overcapacity (*ibid.*). Hence, we expect that consistent with our baseline findings and fifth hypothesis, most of the effect of CIF on leverage growth is driven by firms located in provinces in the East of China. We find support for this result and conclude that our findings are robust (see [Supplementary Appendix A8.7](#)).

We also perform several additional robustness checks that, for space reasons, we do not display in the manuscript. These include (a) estimations using variations in the fixed-effects structure (using firms' age rather than size or sectors rather than industries); (b) considering 'stock' rather than 'flow' measures of CIF; (c) using net capital flows (calculated as CIF minus outflows); (d) including the RMB/USD foreign exchange rate to capture any omitted effect driven by changes in FX regimes and possible effects on monetary policy; (e) adding the

cyclical component of GDP growth as explanatory variables to control for cyclical factors that might drive the explanatory variable CIF/GDP and the dependent variable; or (f) adding fixed effects for the previously mentioned 31 Chinese provinces to Equation (1) and re-running that regression. The results are in all specifications unaffected.

7. Conclusion

The literature on variegated capitalism highlights the tensions between distinct national economic systems and developments in the global financial ecosystem. It is held that not only do certain policy recipes take hold in the realm of ideas, but that changes in the relative availability and flow of capital are associated with the adoption of specific practices (Dixon, 2011; Ward *et al.*, 2019). With easy money comes a tendency to engage in greater short-termism and a focus on returns rather than sustainable investment (Dixon, 2011; Ward *et al.*, 2019). The variegated capitalism literature suggests that QE embodied a central contradiction in that it both represented an extensive and novel form of state intervention, and an attempt to revitalize markets (Alami *et al.*, 2022). Although there is little doubt that China follows a very distinct institutional receipt to that followed in the West, it is likely that QE may have had similar effects around the world in inflating asset price bubbles, ultimately leading to less, rather than more stability (c.f. Langley, 2020). Using an extensive firm-level panel dataset, this article analyses international capital flows in China between 2005 and 2016. Starting from previous evidence on the relationship between CIF, expanded domestic liquidity and risk-taking, our main contribution lies in empirically assessing the impact of foreign CIF on corporate sector debt and the robustness of the Chinese institutional settings to foreign-driven shocks.

It can be argued that the case of China, where debt is almost entirely intermediated by publicly owned banks, lends itself to the deployment of a variegated capitalist approach to institutions; the latter provides a framework for understanding the coexistence of mitigating and aggravating effects of intertwined institutional domains on the real economy. On the one hand, greater government control over the liquidity provision to the real economy (via banks) can prove itself as a superior institutional model (compared to more liberal ones) by improving and facilitating the achievement of socially optimal goals (c.f., Maliszewski *et al.*, 2016; Song and Xiong, 2018). On the other hand, in a prolonged low-interest rate environment, the combination of greater banks' capital availability and government bailout insurance of Chinese state-owned banks may lead to greater banks' moral hazard incentives. The latter would include a decline in prudence and the provision of more credit to less creditworthy borrowers.

Our results overall indicate that CIF surges increase banks' moral hazard incentives and, as a result, aggravate both the instability of the already elevated corporate debt levels and worsen the quality of banks' credit. In other words, whilst Chinese firms are affected directly by developments in other areas of the global financial ecosystem, domestic institutional realities and distortions may add their own effects in an uneven manner, as would be suggested by the literature on variegated capitalism.

In applying the literature on variegated capitalism, the study highlights the extent to which, whilst it is easy to blame problems on national institutional shortfalls, the latter should be seen in the context of an interconnected global financial ecosystem (c.f. Jessop, 2014). Again, diverse outcomes illustrate the effects of sub-national institutional realities and associated arrangements within the Chinese context (Zhang and Peck, 2016). This study illustrates this process: a far-

reaching example of state intervention to stabilize and revive key liberal markets—and, indeed, other advanced economies—spilt over to profoundly affect key areas of the Chinese economy, most notably in the form of an excessive propensity to risky borrowing, long seen as a weakness of the liberal market model (see [Langley, 2020](#)).

The literature on variegated capitalism suggests that capitalist development is regionally uneven and leads to multiple, but interwoven trajectories, and hence, crises ([Bruff and Horn, 2012](#)). Moreover, different institutional levels cannot be understood in isolation; such levels do not only comprise the national and sub-national but also the transnational ([Bruff and Horn, 2012](#)). Hence, the literature on variegated capitalism is explicitly multiscaler ([Peck and Zhang, 2013](#)). This study seeks to deepen understanding of this by exploring how foreign institutional responses to a crisis through UMP not only had national-level implications in China but also percolated through in an uneven manner on regional lines. More specifically, our study finds that it is among the most liberal provincial institutional models that the expansionary effect of international capital flows leads to the most deteriorating effects. In these provinces, increases in cross-country CIF lead to a widening of firms' leverage that is especially high for firms with lower profitability and higher insolvency risk. This effect is not evident for provinces with greater coordination of the Chinese central government.

We also acknowledge the limitations of our methodology. As a matter of fact, despite the many robustness tests, the lack of loan-level data for China does not allow this study (or any other study) to identify the networks of banks and firms involved precisely. Unfortunately, the vast under-reporting and opacity of Chinese state-owned entities make this data impossible to obtain for China. Greater data transparency is quintessential for a further understanding of this phenomenon.

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Supplementary material

[Supplementary material](#) is available at *Socio-Economic Review Journal* online.

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