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Borrowing in the Shadow of China[†]

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Abstract

China's rise as a major lender to emerging economies since the early 2000s has also introduced a unique form of lender power: borrowers cannot default on the subsidized loans they receive, but may still face sudden rollover demands outside their control. We argue this distinctive structure—bilateral rollover risk without default risk—disciplines recipient countries' borrowing on international markets. In a quantitative long-term sovereign debt model, we show that such rollover-prone nondefaultable Chinese loans expose market debt to dilution risk: governments may need to tap international lenders when repayment to China comes due, and therefore choose to deleverage from private markets when Chinese inflows arrive. Market debt and bond yield dynamics in the data are consistent with this *disciplining effect*. We then use the model to study two geopolitical scenarios: a bloc-formation exercise in which China offers take-it-or-leave-it loans to induce the borrower's exit from international debt markets, and an optimal-exposure to China problem under the risk of a permanent and sudden retrenchment of Chinese funding. Together, these results show how official finance à la China can simultaneously improve market borrowing conditions, and become a new destabilizing source to the global sovereign debt architecture as geopolitical alliances shift.

KEYWORDS: Sovereign Debt, Default, Chinese Overseas Lending, Geopolitical Risk.
JEL CLASSIFICATION CODES: F34, F41.

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1 Introduction

Over the past two decades, China has emerged as a major lender to governments across the world and has profoundly transformed the anatomy of sovereign debt globally. Chinese overseas lending now rivals in scale the lending by traditional official creditors and international capital markets, having reached over $1.5 trillion and extending to more than 100 countries (Horn, Reinhart, and Trebesch, 2021). Table 1 illustrates the surge in Chinese debt obligations between 2000 and 2017 across developing economies, underscoring the scale and breadth of China's new financial reach.

Table 1: Rising Chinese Debt Obligations

		Debt vis-à-vis China relative to					
		GDP (in pct.)		External Bond Debt		External Debt	
Year	Number of Countries with Positive China Debt	Mean	Median	Mean	Median	Mean	Median
2000	15	0.42	0.32	0.78	0.02	0.01	0.00
2005	59	1.01	0.36	1.14	0.06	0.03	0.01
2010	93	3.98	1.67	0.74	0.13	0.33	0.10
2015	100	8.47	5.08	1.99	0.69	0.69	0.27
2017	101	8.66	5.06	2.10	0.55	0.61	0.22

Note: We include countries with a positive debt stock vis-à-vis China using data from Horn et al. (2021) from 2000 to 2017, when their sample period ends.

China's overseas lending differs significantly from that of other official creditors. For instance, its debt contracts often feature exceptional seniority privileges, stringent confidentiality clauses, and lender-controlled debt acceleration or rollover provisions (Gelpern, Horn, and Trebesch, 2021). These terms give China substantial discretion over whether loans are renewed, while limiting the borrower's ability to default. In effect, Chinese loans embed *rollover risk without default risk*—a distinctive asymmetry that reflects China's leverage over its borrowers.

This asymmetry raises the central question we address in this paper: How do nondefaultable, rollover-prone official loans from China affect a country's market borrowing, sovereign spreads, and default risk? We argue these unique properties of Chinese lending operate as a form of *geopolitical rollover power* that can discipline the recipient's borrowing behavior vis-à-vis private credit markets but may also induce the debtor to opt out of debt markets altogether.

In our framework, China's creditor power manifests as sudden stops that could emanate from geopolitical forces. Because Chinese loans are nondefaultable but may be withdrawn exogenously, they are akin to a commitment device that forces governments to maintain

fiscal space against such rollover risk and more prudently manage their private market debt exposure. The geopolitical drivers of this rollover risk may have become more salient recently, as Horn, Reinhart, and Trebesch (2025) argue that China's lending boom has tapered and net flows have reversed toward China since 2019. China's power and discretion as a lender can also be deployed strategically, with important geopolitical implications for who has access to international bond markets and when. More broadly, these considerations apply when geopolitical hegemons increasingly lend via subsidized, nondefaultable loans that are potentially conditioned on retrenchment from capital markets aligned with rival blocs. Our analysis speaks to this emerging landscape of a fragmented global economy with official bilateral flows following geopolitical alliances (Bianchi, Horn, Rosso, and Sosa-Padilla, 2026).

This paper makes two contributions. First, we develop a quantitative sovereign debt model with *Chinese-style* loans: These are subsidized and nondefaultable but are subject to rollover risk determined by forces outside the debtor country's control (or influence). In this setup, China's lender power resides in its ability to enforce repayment and decide when loans are rolled over, while the sovereign takes this process as exogenous. The model uncovers a "market disciplining effect" of Chinese loans: When a country receives a loan inflow from China, it deleverages from the market, as it anticipates that a future Chinese outflow will require tapping private markets to help finance market debt servicing and smooth consumption. The intuition is that the government understands that planning to repay China through future new borrowing is costly, as it creates dilution risk for market lenders. To counteract this force, the government chooses to deleverage from the market upfront, that is, when it receives the inflow from China. This disciplining effect implies that inflows from China should be associated with lower market issuance and reduced spreads, a feature we confirm empirically, using extensive data on Chinese funding events, debt stocks, and bond prices from emerging economies.

Second, we use our quantitative model to run welfare experiments and analyze geopolitical risk scenarios in which we vary the value and risks of *Chinese-style* lending. Access to subsidized, nondefaultable Chinese loans generates state-dependent welfare gains by amplifying the model's market-disciplining channel, but it also exposes borrowers to sharper adjustment costs should these bilateral flows stop. To assess this geopolitical risk, we introduce the possibility of a sudden and permanent *Chinese retrenchment* and characterize the sovereign's optimal ex ante exposure to China: optimal borrowing from China rises with existing market indebtedness, reflecting substitution across funding sources, and falls with the probability of retrenchment, reflecting the cost of geopolitically driven rollover risk.

The model also clarifies how *geopolitical lender power* can operate strategically through

market access itself. In a bloc-formation counterfactual, China makes targeted take-it-or-leave-it offers of a loan inflow in exchange for the permanent cutting of ties with private international capital markets. We derive the threshold loan size required to induce financial alignment and show how it varies with country fundamentals and the income state, which implies that the "price" of attracting countries into a China-centered financing bloc is lowest in low-income periods and for countries with weaker fundamentals. Taken together, our results show how subsidized official finance can simultaneously discipline market borrowing in normal times and, when geopolitical ties weaken, become a source of destabilizing rollover risk in the global sovereign debt architecture.

Related literature. Building on Horn, Reinhart, and Trebesch (2021), which assembles a comprehensive dataset on China's global rise as an official lender, our paper contributes to the quantitative literature on sovereign defaults (Eaton and Gersovitz, 1981; Aguiar and Gopinath, 2006; Arellano, 2008). In particular, we extend the workhorse model of sovereign default with long-term debt (Hatchondo and Martinez, 2009) to allow for stochastic official, nondefaultable debt with China. Changes in the level of debt vis-à-vis China imply net flows that are sometimes positive (in which case the model behaves as if the country experienced a transitory windfall) and sometimes negative (in which case the economy faces adverse terms similar to sudden stops and rollover risk). With long-term debt, it is crucial to understand the debt dilution implications of Chinese loans (Hatchondo, Martinez, and Sosa-Padilla, 2016). We highlight the *disciplining effect* of Chinese lending: Borrowing governments adjust their market debt as windfalls from China sow the seeds of future sudden stops and create dilution risk for bondholders.[1] Gamboa-Arbelaez (2025) studies the debt sustainability and welfare implications of hidden Chinese debt in a model of sovereign default with asymmetric information, and Horn, Mihalyi, Nickol, and Sosa-Padilla (2024) study the *measurement* of hidden debt and its implications for debt pricing and default risk.[2]

Given the official nature of Chinese loans, our paper is related to the literature concerned with the interaction between official and private sovereign debt. Recent additions to this literature include Arellano and Barreto (2025), Liu, Liu, and Yue (2025), and Roldan and Sosa-Padilla (2025). We differ from these studies in our focus on Chinese debt and our emphasis on the interaction of nondefaultability and rollover risk as its key characteristic.[3]

[1] See Hur and Kondo, 2016, Johri, Khan, and Sosa-Padilla, 2022, Bianchi, Hatchondo, and Martinez, 2018, and Barbosa-Alves, Bianchi, and Sosa-Padilla, 2026, among many others on debt crises and rollover risk.

[2] Horn et al. (2021), Onjala (2018), Bandiera and Tsiropoulos (2020), Jiang (2025), and Hurley, Morris, and Portelance (2019) study how Chinese funding affects the risk of debt crises and defaults.

[3] Boz (2011) and Hatchondo, Martinez, and Onder (2017) also study the implications of debt nondefaultability in the standard sovereign debt model.

Finally, our analysis of Chinese retrenchment risk and China's effects on the attractiveness of international bond markets connects this work to the growing literature on geopolitical risks, geoeconomics, and fragmentation (e.g., Clayton, Maggiori, and Schreger, 2026, Moro and Landi, 2024, and Bianchi et al., 2026). We contribute by stressing novel channels and geopolitical implications of China's lending policies. Not only does official borrowing from China change a country's default risk and borrowing in international capital markets; China can also strategically reshape the global financial order by offering loans that induce a country to solely borrow from China.

2 Model

Our starting point is the canonical model of sovereign default with long-term debt (e.g., Hatchondo and Martinez, 2009, 2017). We introduce a process for Chinese net capital flows, which captures new lending and repayments. In our benchmark model, informed by the empirical evidence on Chinese debt contracts (Horn et al., 2021; Gelpern et al., 2021), these capital flows vis-à-vis China are subsidized, nondefaultable, and taken as given by the borrowing economy.

2.1 Environment

Preferences and income process. The representative agent in the borrowing economy has preferences given by

$$\mathbb{E}_t \sum_{j=t}^{\infty} \beta^{j-t} u\left(c_j\right) ,$$

where $\mathbb{E}$ denotes the expectation operator, β stands for the subjective discount factor, and c_t represents domestic consumption. The utility function is strictly increasing and concave. The economy's endowment of the single tradable good is denoted by $y \in Y \subset \mathbb{R}_{++}$ and follows a Markov process.

Capital flows vis-à-vis China. We assume the small open economy is a net borrower from China. We make the simplification that Chinese loans are zero-coupon bonds—that is, that they require no debt service until they are due.[4] Thus, the economy's Chinese debt position $b_{c,t}$ fluctuates exogenously between low (L) and high (H) values, that is: $b_{c,t} \in$

[4]The disciplining effect of Chinese loans on the recipient's market debt holds in the appendix exercise where we relax the zero-coupon assumption to allow for subsidized coupon payments.

$\{L, H\}$, with $L < H$. In our baseline model, Chinese debt obligations are nondefaultable, in line with the reported seniority of Chinese debt (Horn et al., 2021).

We capture the uncertainty and opacity of Chinese debt contracts (Gelpern et al., 2021) by making the Chinese debt inflows and due dates random. We assume the transition $a_t \equiv \mathbb{1}\{b_{c,t+1} \neq b_{c,t}\}$ is drawn independently such that $\Pr(a_t = 1) = \pi$ effectively governs both the maturity and rollover risk associated with the Chinese loans.[5]

Transitioning between low- and high-debt positions implies capital net flows vis-à-vis China of size $z_t = H - L > 0$ during inflows and $z_t = L - H < 0$ during outflows. In our model, the risks and rewards associated with these subsidized, stochastic, and nondefaultable capital flows to/from China ultimately influence the government's borrowing choices in international capital markets.

Market debt. The government borrows on capital markets using long-duration defaultable bonds. As in Hatchondo and Martinez (2009), we assume a bond issued in period t promises an infinite stream of coupons, which decrease at a constant rate δ. With this payment structure, all future obligations derived from past debt issuances map into a one-dimensional state variable: the face value of outstanding debt, b_t. Hence, debt dynamics can be represented as follows:

$$b_{t+1} = (1 - \delta)b_t + \ell_t,$$

where ℓ_t is the new issuance of long-term debt in period t. The government owes a coupon payment κb_t on the outstanding debt b_t at date t.

Market debt defaults. The government cannot commit to future market debt repayment or future market borrowing decisions.[6] When the government defaults, it does so on all current and future market debt obligations. This is consistent with the observed behavior

[5] Debt contract opacity and China's lender power may manifest as information frictions. Our model captures opacity in the form of uncertainty around the duration of the Chinese debt. Consider, for example, that Chinese debt is due in n periods and the markets know the size of the loan $b_c \in \{L, H\}$ but not n. The random nature of the implied repayment date is here captured by the a process. However, other types of information frictions are challenging to capture in a stylized framework. An example would be debt opacity modeled as an amount b_c not fully observed by market lenders. We conjecture that our insights about increased dilution risk and its disciplining effect would still apply. See Horn et al. (2024) and Gamboa-Arbelaez (2025) for related work on information frictions, hidden debt, and sovereign default.

[6] Thus, one may interpret this environment as a game in which the government making decisions in period t is a player who takes as given the (repayment and borrowing) strategies of other players (governments) who will decide after t.

of defaulting governments, and it is a standard assumption in the literature.[7]

A default event triggers exclusion from the debt market for a stochastic number of periods but does not disrupt capital flows to or from China. Furthermore, in every period in which the government is excluded from debt markets, income is lower and is given by $y - \phi(y)$. Starting in the first period after the default period, with a constant probability $\theta \in [0, 1]$, the government may regain access to debt markets and exit default without debt.

Timing. The timing of events within each period is as follows. First, the government learns the economy's income and the realization of a (which controls the *net flows* and positions vis-à-vis China). Then, the government chooses to default ($d = 1$) or not ($d = 0$) on its incoming market debt, b. Finally, the government chooses its new market debt positions, subject to the constraints imposed by its default decision.

2.2 Recursive formulation

There are four state variables: one endogenous and three exogenous. The endogenous state variable is the market debt level, b. The exogenous state variables are y (the income level), b_c (the Chinese debt level), and a (the random variable triggering nonzero Chinese net flow). Let us denote $s \equiv (a, y)$.

Value functions. Let V denote the government's value function at the beginning of a period—that is, before the default decision d is made—and V_d denote the value function of a sovereign choosing the default option $d \in \{0, 1\}$. For any bond price function q, the government value function V satisfies the following functional equation:

$$V(b, b_c, s) = \max_{d \in \{0,1\}} \Big\{ d\, V_1(b_c, s) + (1 - d)\, V_0(b, b_c, s) \Big\}, \tag{1}$$

where the value of default is

$$V_1(b_c, s) = u\big(y - \phi(y) + b'_c(b_c, a) - b_c\big) + \beta\, \mathbb{E}_{s'|s} \Big[\theta V(0, b'_c, s') + (1 - \theta) V_1(b'_c, s') \Big] \tag{2}$$

[7] Sovereign debt contracts often contain an acceleration clause and a cross-default clause. The first clause allows creditors to call the debt they hold in case the government defaults on a payment. The cross-default clause states that a default in any government obligation constitutes a default in the contract containing that clause. These clauses imply that after a default event, future debt obligations become current.

and the value of repayment satisfies

$$V_0(b, b_c, s) = \max_{b'} \left\{ u(c) + \beta \, \mathbb{E}_{s'|s} V(b', b'_c, s') \right\}, \tag{3}$$

subject to

$$c + \kappa b = y + q(b', b'_c, s)[b' - (1-\delta)b] + [b'_c(b_c, a) - b_c] \tag{4}$$

with the end-of-period Chinese debt level evolving according to

$$b'_c(b_c, a) = \mathbf{1}_{\{a=1 \, \cap \, b_c = L\}} \times H \; + \; \mathbf{1}_{\{a=1 \, \cap \, b_c = H\}} \times L \; + \mathbf{1}_{\{a=0\}} \, b_c \, . \tag{5}$$

Bond pricing. The small open economy also borrows from a large pool of risk-neutral foreign investors that discount future payoffs at the risk-free rate r. The bond price q satisfies the following functional equation:

$$q(b', b'_c, s) = \frac{1}{1+r} \, \mathbb{E}_{s'|s} \left[1 - \hat{d}\left(b', b'_c, s'\right) \right] \left[\kappa + (1-\delta) \, q\left(\hat{b}\left(b', b'_c, s'\right), b''_c, s' \right) \right] , \tag{6}$$

where $\hat{d}$ and $\hat{b}$ denote the future default and borrowing rules that lenders expect the government to follow. The first term on the right-hand side of equation (6) equals the expected value of the next-period coupon payment promised in a bond. The second term equals the expected value of all other future coupon payments, which is summarized by the expected price at which the bond could be sold next period.

2.3 Equilibrium definition

A *Markov Perfect Equilibrium* is characterized by (i) a default rule $\hat{d}$ and borrowing rule $\hat{b}$ and (ii) a bond price function q, such that (a) given $\hat{d}$ and $\hat{b}$, the bond price function q is given by equation (6) and (b) the default rule $\hat{d}$ and borrowing rule $\hat{b}$ solve the dynamic programming problem defined by equations (1)–(5), when the government can trade bonds at q.

3 Calibration

Functional forms and stochastic processes. The utility function displays a constant coefficient of relative risk aversion, i.e.,

$$u(c) = \frac{c^{1-\gamma}}{1-\gamma}, \text{ with } \gamma \neq 1.$$

The logarithm of the endowment follows an AR(1) process:

$$\log(y_t) = (1-\rho)\mu + \rho \log(y_{t-1}) + \varepsilon_t,$$

with $|\rho| < 1$, and $\varepsilon_t \sim N(0, \sigma_\varepsilon^2)$. We assume that $a \in \{0, 1\}$ follows an iid process such that $a = 1$ with probability π. As in Chatterjee and Eyigungor (2012), we assume a quadratic loss function for income during a default episode:

$$\phi(y) = \max\left\{y\left[\lambda_0 + \lambda_1[y - \mathbb{E}(y)]\right], 0\right\}.$$

Parameter values. We calibrate the model at an annual frequency, so that one period in the model corresponds to one year in the data. Table 2 presents the parameter values in our benchmark calibration. The parameters above the line are the ones that we set by simulating the model to match certain empirical moments. The income cost of defaulting is governed by λ_0 and λ_1: These are calibrated to match the mean market debt (30%) and the mean spread (3.55%) in our data.[8]

The coefficient of relative risk aversion, the risk-free interest rate, and the discount factor take standard values. We assume an average duration of sovereign default events of five years ($\theta = 0.20$), a number in the range of the estimates reported in Gelos, Sahay, and Sandleris (2011) and Uribe and Schmitt-Grohé (2017).

The parameters governing the endowment process are estimated using real GDP data for the countries used in our empirical analysis (see Section 5.2). We obtain the following averages for the persistence and innovation volatility parameters: $\rho = 0.784$ and $\sigma_\varepsilon = 3.3\%$. These values are in line with typical values for emerging economies and low-income countries.[9]

[8] Let $\text{YTM}(\cdot) = \frac{\kappa}{q(\cdot)} - \delta$ denote the yield to maturity implicit in the bond price $q(\cdot)$. Then, the spread (in percentage) is defined as $s(\cdot) = 100 \times (\text{YTM}(\cdot) - r)$.

[9] We estimate the persistence and the volatility of the residuals from detrended annual real GDP series using the Hodrick–Prescott filter. We use real GDP data from the Penn World Table version 10.01 (Feenstra, Inklaar, and Timmer, 2015) for the countries borrowing from both China and international capital markets.

Table 2: Benchmark calibration parameter values

Parameter	Symbol	Value	Source
Default income cost - Intercept	λ_0	0.109	Avg. market debt = 30%
Default income cost - Slope	λ_1	0.924	Avg. spread = 3.55%
Risk aversion coefficient	γ	2.00	Standard
Risk-free rate	r	0.04	Standard
Discount factor	β	0.90	Standard
Market re-entry probability	θ	0.20	$\mathbb{E}$(exclusion) = 5 years
Debt duration	δ	0.168	Debt duration = 5 years
Bond coupon	κ	$(r+\delta)\frac{1}{1+r}$	Risk-free bond price = $\frac{1}{1+r}$
Income process - autocorrelation	ρ	0.784	GDP fluctuations (PWT)
Income innovations - standard deviation	σ_ϵ	0.033	GDP fluctuations (PWT)
Income process - average	μ	$-\frac{\sigma_\epsilon^2}{2(1-\rho^2)}$	$\mathbb{E}(y) = 1$
Low China debt	L	0.00	Normalization
High China debt	H	0.05	Max. China debt flow = 5.0%
Rollover probability	π_a	0.10	China financing frequency

We set $\delta = 0.168$. With this value, the risk-free duration of the debt is 5 years, close to the average duration found in previous literature.[10] The coupon is normalized to $\kappa = (r+\delta)\frac{1}{1+r}$, which ensures that a default-free bond (with the same coupon structure as our sovereign bonds) trades at a price of $\frac{1}{1+r}$.

The capital flows vis-à-vis China are characterized by three parameters: L, H, and π.[11] Since we have only two levels of Chinese debt in our model, we normalize L to zero and set $H = .05$, the maximum annual change in Chinese debt stocks relative to GDP.[12] Looking at the Chinese funding and restructuring events in our dataset, we find a frequency of approximately 10% per year, and so we set $\pi = 0.10$.[13]

[10] We use the Macaulay definition of duration, which, with the coupon structure in this paper, is given by $D = (1+r)/(\delta+r)$, where r denotes the risk-free rate. Using a sample of 27 emerging economies, Cruces, Buscaglia, and Alonso (2002) find an average duration of 4.77 years, with a standard deviation of 1.52 years. Bai, Kim, and Mihalache (2017) report an average debt duration of 6.7 years in a panel of 11 emerging economies.

[11] In Appendix B.6, we include coupon payments on Chinese debt that are consistent with the bondholders' discount rate. This does not alter our benchmark results.

[12] $L = 0$ is a normalization in the sense that we can adjust the mean income y for the stream of payments associated with $L > 0$. We use two approaches to construct H: First, we compute the maximum of flows using changes in debt stocks reported in Horn et al. (2021). Second, we use the flows in Dreher, Fuchs, Parks, Strange, and Tierney (2021) constructed from microdata on Chinese projects. These measures yield maximum inflow values of 3.8% and 5.8% of annual GDP. We set H to 5%, close to their midpoint.

[13] Given the initial rise in Chinese loans disbursements, we focus on the period after 2005 to measure the frequency of inflow and restructuring events. Inflow events occur more often than restructuring events. Depending on how we define "large" inflows, we find inflow probabilities of between 5% and 15%, whereas the restructuring probabilities range between 3% and 6.5%. We set the symmetric probability π to 10% in the baseline calibration and perform a robustness test allowing Chinese outflows to be likelier than inflows (see Appendix B.5).

4 Quantitative Results: Simulations and Dynamics

We begin by presenting the simulated moments produced by the benchmark calibration of our model and show that it reasonably approximates data from low-income countries. We then show how a country's borrowing opportunities (as captured by spread–debt menus) are affected by the presence of Chinese lending. We close this section by studying the typical dynamics around these funding events.

4.1 Benchmark economy

Table 3: Simulated moments in the calibrated benchmark model

Statistic	Baseline	Inflow	Outflow	$b_c' = H$	$b_c' = L$	No China
Market Debt to GDP	30.12	31.09	29.13	29.34	30.91	30.22
Market Issuance to GDP	6.0	2.8	8.91	5.57	6.44	6.01
Consumption to GDP	98.97	101.11	96.52	99.29	98.64	98.97
Spread	3.55	3.07	4.02	3.35	3.76	3.54
S.D. Spread	2.22	1.84	2.48	2.07	2.35	2.19
Corr (Spread, GDP)	-0.64	-0.62	-0.67	-0.65	-0.63	-0.65
Prob (Default t+1)	2.94	2.1	3.76	2.54	3.35	2.94
Default Frequency	2.57	2.86	2.26	2.3	2.84	2.56
S.D. Consumption/S.D. GDP	1.14	0.99	1.29	1.12	1.16	1.13

Note: Moments are computed for nonexclusion periods, except for the default frequency, which uses all simulation periods. The first column shows unconditional moments, the second and third show periods when a China funding event occurs ($a = 1$), and the last two columns contrast states with and without Chinese debt at the end of the period. Units: percentage (except for the correlations and relative volatilities).

Simulated moments. The first column in Table 3 (labeled "Baseline") shows that our model approximates well the moments used as targets (average debt and spread levels) and is broadly consistent with nontargeted moments in the data. In both the model and data, consumption is more volatile than income, and the sovereign spreads (computed as the difference in yields between the sovereign bonds and comparable default-free bonds) are volatile and countercyclical. Since we have long-term debt, it is not surprising that spreads are higher than the default frequency (which is approximately 2.6%). Importantly for our discussion, the statistics reported on this column result from our averaging periods in which $a = 0$, so the net flows from China are zero, and periods with $a = 1$, implying nonzero Chinese flows.

Chinese loan inflow periods. The second column in Table 3 (labeled "Inflow") focuses on periods when the economy receives a Chinese capital inflow. In this case, the government chooses to rely less heavily on market debt, and we see a decline in market issuances to roughly 3% (compared to an average of 6%). However, the magnitude of this decline in market debt is not one-to-one with that of the inflow from China: This implies that part of the Chinese inflow (coupled with the optimal issuance policy) is translating into higher consumption in those inflow periods (see also Figure 2).

When the borrowing country receives an inflow from China, its one-period-ahead default probability falls substantially (to roughly 2%). The spread, however, prices in all future default probabilities, and market participants, understanding that those new funds the country obtained from China will need to be paid back later on, charge a spread 1% higher than the immediate default probability—this reflects the pricing of dilution risk over and above the decline in immediate default risk (Hatchondo et al., 2016). The level and volatility of the spreads are 50 and 40 basis points (bps) lower than average, respectively. The price impact of Chinese inflows is a model prediction that we later compare against the data (see section 5.2).

Repayment of Chinese debt or outflow periods. The third column in Table 3 (labeled "Outflow") contrasts the debt dynamics when the country undergoes a capital outflow vis-à-vis China. In this case, the government taps private markets more heavily to offset the outflow, albeit not fully. Market debt issuance is larger than in periods with no Chinese flows, but the increase does not fully compensate for the repayment of b_c. This, together with worse bond prices, contributes to a drop in consumption.

After the typical outflow, the country ends the period with a debt level of around 33% of GDP, which leaves it especially vulnerable to negative income realizations in the near future. An outflow event is accompanied by an increase in the one-period-ahead default probability of roughly 1 percentage point (compared to the "Baseline" column). Thus, Chinese outflow events are associated with higher and more volatile spreads than the average period.[14] This premium paid during outflow events is consistent with the positive and significant effect of Chinese debt restructuring on countries' bond yields documented in Kondo, Mkhitaryan, and Sosa-Padilla (2024).

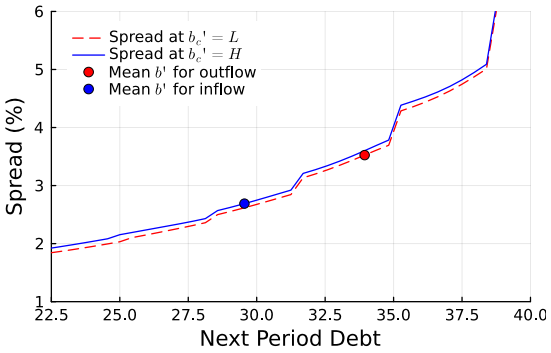
[14]Both consumption levels and their volatility fluctuate with Chinese flows: Inflows make consumption less volatile, while outflows make it more volatile than average.

4.2 China debt and market borrowing opportunities

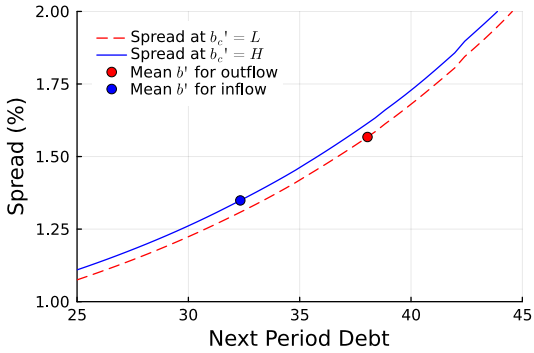
Here, we study how a country's position vis-à-vis China affects its market borrowing opportunities. Figure 1 presents the spread–debt *menus* for two different values of current income (mean and above mean) and for the two possible values of b_c'.[15]

Figure 1: Spread–debt menus

(a) Mean income



(b) High income



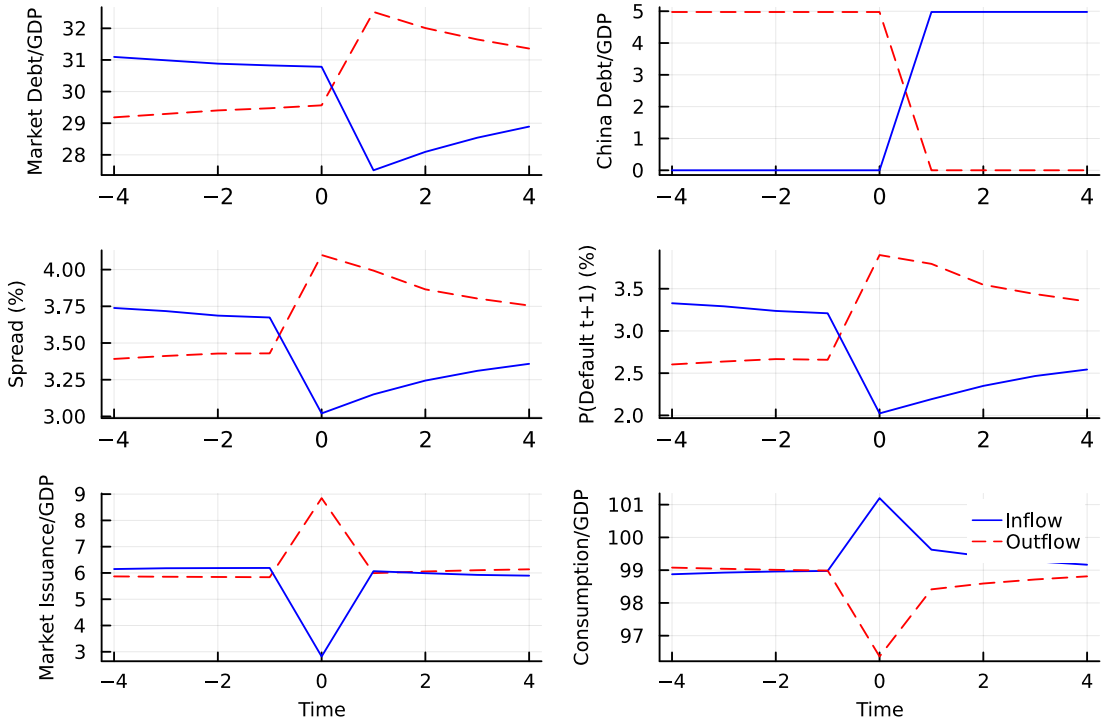
Note: Panel (a) shows the spread–debt menu available to the economy when current income is at its mean ($y = 1$), and panel (b) shows the menu when current income is 10% above its mean. The blue solid line indicates the case when end-of-period Chinese debt is high ($b_c' = H$), and the red dashed line indicates the case when it is low ($b_c' = L$). The dots denote the mean market debt chosen during an outflow (red) or an inflow (blue) in the simulations (during nonexclusion periods), conditional on the income level of the respective panel .

Figure 1 shows that when the country carries a high level of Chinese debt into the next period (i.e., when $b_c' = H$), it faces worse borrowing terms—that is, for the same level of next-period market debt b', the country needs to pay a higher spread. At the same time, the figure also shows that when the economy faces these less favorable price schedules, it endogenously chooses to rely less on market debt: The chosen portfolios (denoted with the dots in Figure 1) imply lower market debt issuances in these cases. This "deleveraging" is such that, in equilibrium, the economy pays lower spreads on market debt when the end-of-period Chinese debt is high. The last two columns of Table 3 show that this is indeed the case in the simulations.

[15]Note that what matters for the price schedules is neither the current level of Chinese debt b_c alone nor the current realization of flow transition a alone, but the resulting end-of-period level of Chinese debt, b_c'.

4.3 Dynamics around Chinese funding events

Figure 2: Dynamics around Chinese funding events



Note: The plots show the average dynamics for 4 years before and after a Chinese funding event (conditioning on no exclusion). Blue solid lines indicate inflow events ($L \to H$) and red dashed lines outflow events ($H \to L$).

Portfolio rebalancing on impact. Figure 2 shows the dynamics of our model around Chinese funding events, both inflows (b_c changing from L to H) and outflows (b_c switching from H to L). The clearest message comes from market debt: the economy rebalances its portfolio immediately after these events. Following an inflow, the country lowers its market debt (from roughly 31% to near 28% of mean GDP), and equilibrium spreads fall on impact by roughly 75 bps. Following an outflow, the economy increases its market debt (from around 29% to almost 32% of mean GDP) and ends up paying spreads roughly 50 bps higher.

Asymmetric consumption responses. Outflows and inflows of the same size do not affect consumption symmetrically: consumption falls more in absolute terms after an outflow than it rises after an inflow. The source of this asymmetry is the endogenous pricing of default risk. When the country borrows to finance the Chinese outflow, the bond price moves against it—each additional unit of market debt is more costly to issue than the last, which limits equilibrium borrowing and amplifies the consumption drop. No such adverse price movement

occurs during inflows, when the country is reducing its market exposure. This asymmetry is directly reflected in the equilibrium spreads: the spread increase following an outflow exceeds the spread compression following an inflow of the same size.

Post-event dynamics and spread persistence. After the initial portfolio rebalancing, market debt issuances and debt levels gradually revert to their means. Spreads, however, display an asymmetric persistence. After an outflow, the country carries a higher debt burden into subsequent periods, leaving it more vulnerable to bad income realizations—reflected in a higher one-period-ahead default probability—and spreads remain elevated for longer. After an inflow, spreads return to their mean more slowly as debt gradually builds back up and lenders price in the probability of a future outflow.[16]

Taken together, the simulated moments, price schedules, and event-study dynamics in this section document a consistent pattern: Chinese inflows are associated with market deleveraging and lower spreads, while outflows trigger the reverse. What drives this systematic portfolio rebalancing, and whether the data bear it out, is the focus of the next section.

5 Disciplining Effect

The dynamics documented in the previous section reflect a forward-looking behavioral channel: a government that cannot default on Chinese loans internalizes future repayment obligations when making current market borrowing decisions, and this is precisely why inflows trigger deleveraging from market debt. This section unpacks that mechanism and its implications in three steps. We begin by using debt choice probabilities and a welfare decomposition to isolate the disciplining channel from the pure subsidy value of Chinese loans. We then turn to empirical evidence: the model's central prediction—that Chinese inflows reduce market borrowing and lower sovereign yields—is tested against panel data from emerging economies. Finally, we confirm that nondefaultability of Chinese loans is a key ingredient: allowing the government to default on Chinese debt eliminates the disciplining effect and reverses the model's spread implications, rendering them inconsistent with the empirical evidence.

[16] In Appendix B.1, we contrast the effect of Chinese debt inflows and outflows with the effect of a one-time income shock of similar size. The income flows do not trigger the same portfolio rebalancing dynamics seen around the Chinese funding events.

5.1 Unpacking the disciplining effect channel

To unpack this channel, we use (i) the government's debt choice probabilities, which reveal how portfolio decisions shift systematically in the presence of nondefaultable Chinese debt, and (ii) a welfare decomposition that isolates the gains from disciplined borrowing from the direct *subsidy* value of Chinese loans.

Debt choice probabilities. We begin by using the government's debt choice probabilities at different levels of income to illustrate the disciplining effect.[17] Figure 3 displays these debt choice probabilities for three cases: (i) the benchmark economy facing an outflow to China ("Outflow"), (ii) the benchmark economy facing an inflow from China ("Inflow"), and (iii) an economy with no Chinese funding ("No-China").[18] In each of these cases, the government enters the period with a level of outstanding market debt equal to 30% of mean income.

As we move across panels (a)–(c), going from lower to higher income, a clear pattern emerges: When an outflow event happens, the economy raises its leverage (in many cases borrowing more than in the No-China scenario); after an inflow event, the economy reduces its market debt exposure.

A second clear pattern is that the average debt choice in the outflow state increases with income. This relates to how the price schedule reacts: For high-income states, the debt price is less sensitive to the indebtedness level, and so it is optimal to lever up more. In low-income states, however, prices move against the country and become very sensitive to higher debt.

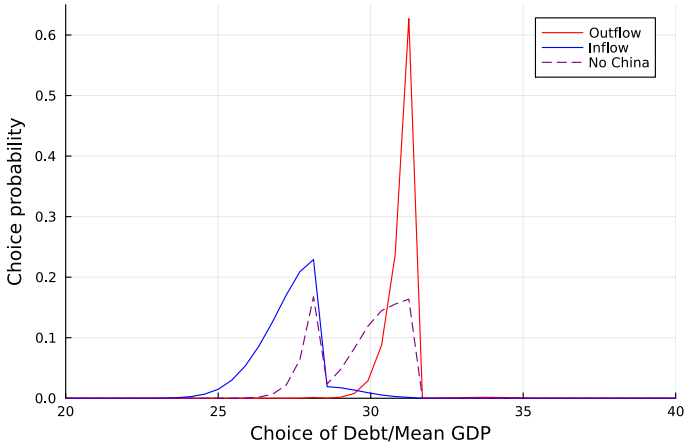
A third pattern is that the average debt choice in the inflow states remains largely unchanged as income increases. The fact that the country chooses to deleverage in low-income states (with high marginal utility) by roughly the same amount as in high-income states (with low marginal utility) is telling of the disciplining effect of Chinese debt: The government understands that there is a nondefaultable outflow coming after an inflow, and it chooses to create fiscal space (by reducing debt) to cope better with that. These debt choices are what explain the fact observed in the simulations: Even though after an inflow event the country exits the period with more Chinese debt, its market sovereign spreads are lower—this is because of the deleveraging.

[17] In our quantitative implementation, the government's choice of next-period market debt is made over a discrete grid and is subject to i.i.d. taste (preference) shocks across all debt grid levels. These shocks "smooth" the otherwise discrete borrowing rule and imply *debt choice probabilities* $\mathbb{P}^{b'}(b, b_c, s)$—i.e., the probability, prior to the realization of the taste shocks, that a government that repays selects each feasible debt level b' given the state (b, b_c, s). Appendix C presents the details of the model solution using taste shocks and shows how these choice probabilities enter equilibrium bond pricing.

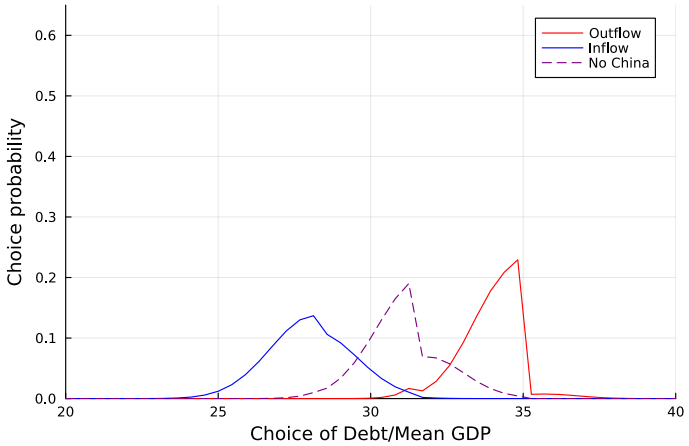
[18] The No-China economy is identical to the benchmark one, except that it is not possible to receive or pay funds from or to China: we set the values of b_c to $L = H = 0$.

Figure 3: Debt choice probabilities

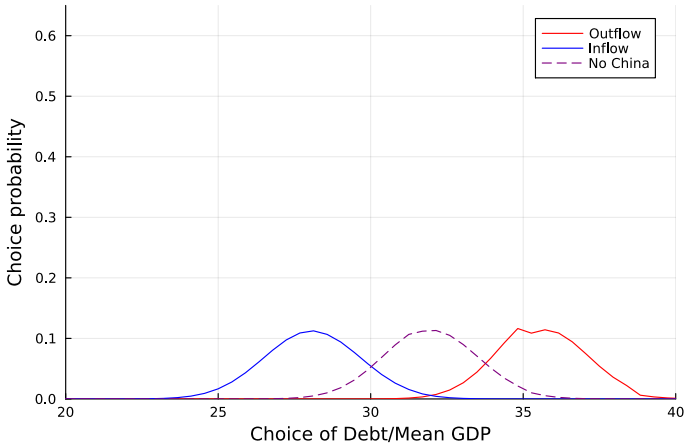
(a) Low income: $\approx 0.95 \times \bar{y}$



(b) Mean income: $\bar{y}$



(c) High income: $\approx 1.05 \times \bar{y}$



Note: Each panel varies the level of initial income and presents debt choice probabilities for inflow and outflow events in the benchmark economy (blue and red solid lines, respectively) and for the No-China economy (dashed line). The incoming market debt level is set at 30% of mean income.

Welfare. The disciplining effect that Chinese debt has on the borrowing country's behavior has implications for welfare. We define the consumption-equivalent welfare gain of having access to Chinese debt as:

$$\Delta w_{\text{TOT}} = \left(\frac{V^{\text{Bench}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1 \,,$$

where "TOT" refers to the total welfare gain, "Bench" indicates the benchmark economy, and "NC" denotes the No-China economy. There are two key factors that may cause a government to prefer living in a world with Chinese debt. The first is the higher net present value (NPV) of resources afforded by the Chinese loans (they are, after all, subsidized loans). The second factor is the disciplining effect of Chinese debt: The government's behavioral response to the Chinese debt flows results in different borrowing behavior and, therefore, different (more favorable) spreads.

To separate these two effects, we compute the lifetime utility of a government in the benchmark economy that does not benefit from the NPV of the Chinese debt flows. This government has τ units less of consumption every period, where the NPV of τ equals the NPV of the Chinese debt flow.[19] We denote the value attained in this case by $V^{\text{Bench.Net.NPV}}$. We can then rewrite the welfare gains from Chinese debt as:

$$\Delta w_{\text{TOT}} = \left(\frac{V^{\text{Bench}}}{V^{\text{Bench.Net.NPV}}} \right)^{\frac{1}{1-\gamma}} \left(\frac{V^{\text{Bench.Net.NPV}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1 \,.$$

After a simple manipulation, we obtain the following decomposition:[20]

$$\ln(1 + \Delta w_{\text{TOT}}) = \ln\left(1 + \Delta w_{\text{NPV}}\right) + \ln\left(1 + \Delta w_{\text{DISC}}\right).$$

We refer to Δw_{NPV} as the welfare gain resulting from the higher NPV of resources in the benchmark economy. Figure 4 below depicts these gains with the solid red line; they account for roughly half of the total welfare gains. The other term, Δw_{DISC}, is the welfare gain resulting from the disciplining effect of Chinese loans. It is denoted by the purple dashed

[19] The NPV is computed with the discount factor of the international lenders and from the perspective of a government that has zero initial outstanding Chinese debt.

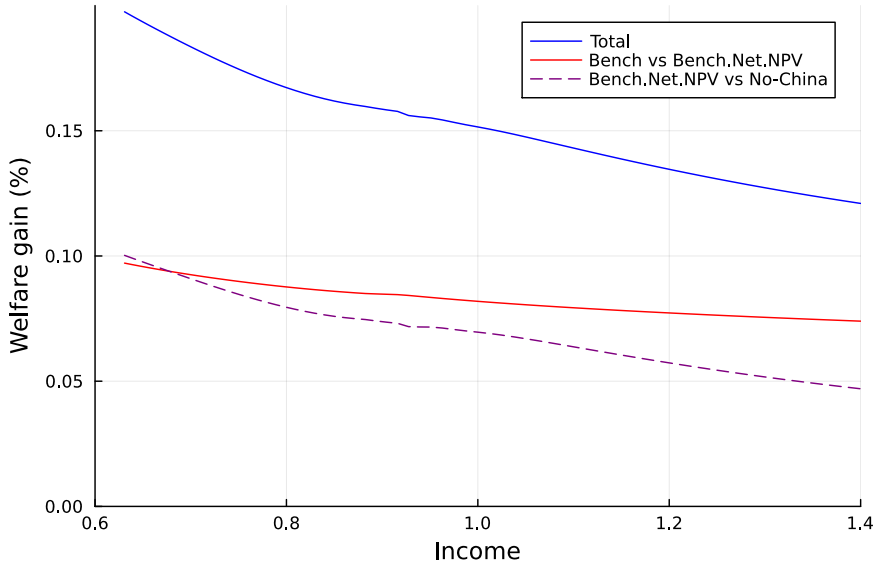
[20] Note that the total welfare gain can be written as:

$$1 + \Delta w_{\text{TOT}} = \left(1 + \left(\frac{V^{\text{Bench}}}{V^{\text{Bench.Net.NPV}}} \right)^{\frac{1}{1-\gamma}} - 1 \right) \cdot \left(1 + \left(\frac{V^{\text{Bench.Net.NPV}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1 \right).$$

Let's define $\Delta w_{\text{NPV}} \equiv \left(\frac{V^{\text{Bench}}}{V^{\text{Bench.Net.NPV}}} \right)^{\frac{1}{1-\gamma}} - 1$ and $\Delta w_{\text{DISC}} \equiv \left(\frac{V^{\text{Bench.Net.NPV}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1$. Taking logs, we obtain the decomposition in the text.

line in Figure 4.

Figure 4: Welfare decomposition: Disciplining effect and net present value of Chinese loans



Note: Welfare gains are computed assuming zero initial Chinese debt and an initial level of market debt equal to 30% of mean income.

Note that the welfare gain associated with the disciplining effect declines faster with income than the gains resulting from NPV differences. This is consistent with the fact that the NPV of Chinese loans is constant across income levels whereas the disciplining effect is less consequential as initial income grows: Those "good" states of nature are the ones in which the bond price is less sensitive to debt choices and therefore where the disciplined borrowing behavior accrues lower returns.

5.2 Empirical evidence on the disciplining effect

The portfolio rebalancing at the heart of the disciplining effect generates two testable predictions: Chinese inflows should reduce countries' external market debt and lower their sovereign bond yields. We now examine whether the data bear these out.

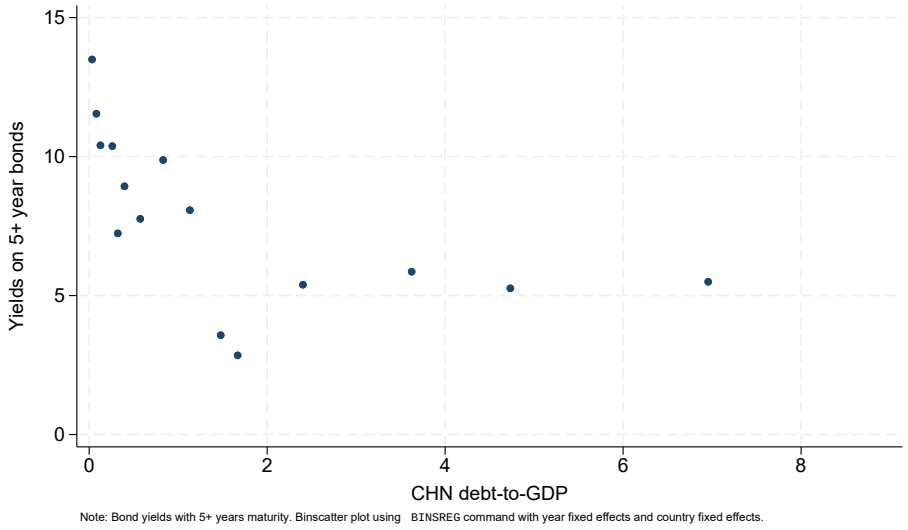
Data description. We now turn to the data for evidence of the disciplining effect of Chinese debt inflows.[21] Horn et al. (2021) note that China's lending terms and amounts are difficult to measure. They construct annual Chinese overseas lending stocks between 2000 and 2017 for more than 100 emerging and developing economies. For the subset of countries

[21] We focus on inflow events because documented restructuring events with China are rare in our data.

that issue debt in international capital markets, we construct bond yields on marketable international debt using bond-level data extracted from Bloomberg. We obtain annual measures of external public debt held by bondholders from the World Bank International Debt Statistics (IDS).

To illustrate our approach, we show a binscatter plot of bond yields and Chinese debt relative to GDP in Figure 5, as well as a binscatter plot of bond yields and positive Chinese debt relative to GDP in Figure 6.[22] These figures suggest that higher indebtedness vis-à-vis China are associated with lower sovereign bond yields. We explore this relationship—a potential sign of the disciplining effect—more systematically below.

Figure 5: Bond yields and Chinese debt position

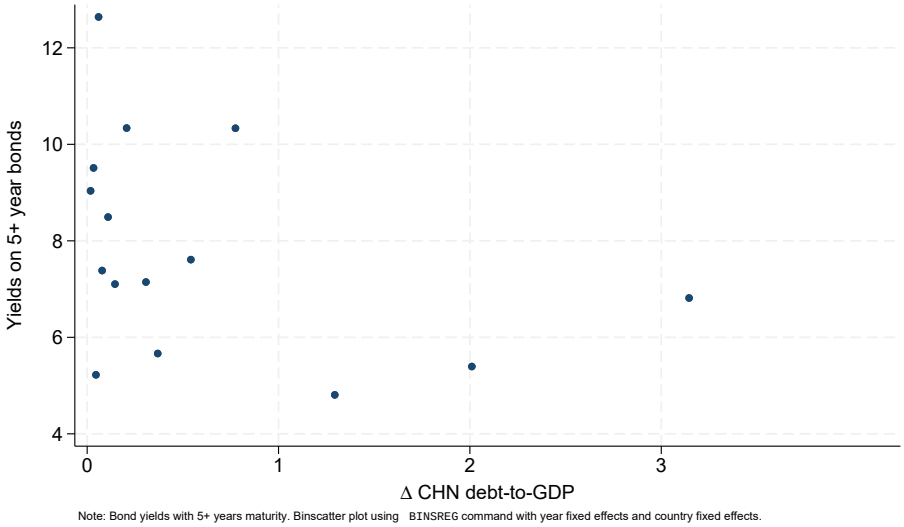


Chinese debt inflows and sovereign bond market outcomes. For each country, we construct Chinese funding events as relatively large increases in the flow of funding from China. Specifically, for a country–year pair (i, t), we set CHN funding$_{i,t} = 1$ if the change in reported debt vis-à-vis China in that year is above country i's median value of positive debt changes vis-à-vis China.[23] On average, in the cross section, we find that yields are 60 to 70 bps lower when there is a Chinese funding event.

[22] Figures A.1 and A.2 in the appendix show similar binscatter plots for longer maturity bond yields.

[23] See Appendix Figures A.3 and A.4 for debt vis-à-vis China and the implied Chinese funding events for each country in our sample. We also require the China debt flow during a China funding event to be above the 10th percentile of non negative China debt flows across years and countries; that is, 0.025 percent of GDP in our sample. The results are similar using the 5th percentile of non negative China debt flows across years and countries; that is, 0.008 percent of GDP in our sample.

Figure 6: Bond yields and positive Chinese debt flows



Using our (unbalanced) annual panel dataset, we estimate the effects of Chinese lending events on bond yields and external debt held by bondholders with the following regressions:

$$\log \text{external debt}_{i,t} = \alpha_b + \beta_b \text{ CHN funding}_{i,t} + \gamma_b \, X_{i,t} + \varepsilon^b_{i,t} \tag{7}$$

$$\text{sovereign yields}_{i,t} = \alpha_q + \beta_q \text{ CHN funding}_{i,t} + \gamma_q \, X_{i,t} + \varepsilon^q_{i,t} \,, \tag{8}$$

where $\log \text{external debt}_{i,t}$ is the log of the external debt held by bondholders, $\text{sovereign yields}_{i,t}$ denotes the yields on government bonds with 5+ years outstanding maturity, $\text{CHN funding}_{i,t}$ is as above, and $X_{i,t}$ denotes additional controls including the lagged outcome variable, lagged external market debt (for the bond yields regression 8), lagged real GDP and real GDP growth, and time fixed effects, in addition to country-specific time trends, or country fixed effects, depending on the specifications. To further isolate China-related sovereign bond dynamics, we control for other loan supply shifters using net aid flows and total external public debt. Specifically, we use the lagged net DAC aid flow relative to GDP received from the Organisation for Economic Cooperation and Development (OECD) Development Assistance Committee (DAC) member countries as well as the country's lagged total public external relative to GDP.[24] Finally, we include a binary variable that mirrors the China funding variable and symmetrically captures *non China non bond* funding events using external

[24]The OECD DAC includes the following member countries: Australia, Austria, Belgium, Canada, Czechia, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

non bond debt flows.

We report our estimates in Tables 4 and 5 below. For both tables, we consider the following specifications: Column (1) has year fixed effects, column (2) requires that China inflow events are separated by two years or more, column (3) adds country-specific linear time trends, column (4) includes both year and country fixed effects, and column (5) uses a country-specific *China funding era* variable that is equal to 1 at the onset of China loans defined as the country's first Chinese funding event.

Taken together, our results suggest that Chinese debt inflows may have a disciplining effect on market debt prices and quantities: Chinese lending events are associated with (i) lower external public debt (held by private bondholders) and (ii) lower sovereign bond yields faced by the borrowing countries.[25]

External debt reduction following Chinese lending events. Across specifications (1)–(4) in Table 4, we find that China funding events are associated with 6 to 8 log points reductions in the borrowing countries' external public debt held by private bondholders. Another way to capture this external debt reduction is to focus on the onset of Chinese lending events using a *China funding era* indicator variable, as in column (5). In this last specification, we find similar effects, roughly 14 log points lower external bond debt. Overall, Chinese lending events are associated with an overall reduction in the external debt of the recipient country vis-à-vis private bondholders.[26]

[25] We also construct an issuance indicator from the Bloomberg bond-level extract and estimate the following linear probability model:

$$\text{new bond issuance}_{i,t} = \alpha + \beta\ \text{CHN funding}_{i,t} + \theta\ \text{new bond issuance}_{i,t-1} + \gamma\ X_{i,t} + \varepsilon_{i,t}.$$

The new bond issuance estimates are noisy, probably because the bond data coverage is less complete.

[26] See Table A.5 in the appendix for the coefficients associated with additional covariates in the bond market debt estimation equation (7).

Table 4: External debt (log bonds) and Chinese inflows

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding	-0.070**	-0.082**	-0.066*	-0.065*	
	(0.034)	(0.039)	(0.038)	(0.038)	
CHN funding era					-0.143**
					(0.068)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.983	0.983	0.985	0.985	0.985
N	583	552	583	583	583

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond position estimation sample includes: AGO, ALB, ARG, ARM, AZE, BGR, BIH, BLR, BOL, BRA, CIV, CMR, COD, COG, COL, CRI, DMA, ECU, EGY, ETH, FJI, GAB, GHA, GUY, IDN, IND, JAM, JOR, KAZ, KEN, LAO, LBN, LKA, MAR, MEX, MKD, MNE, MNG, MOZ, NGA, PAK, PER, PHL, RUS, RWA, SEN, SRB, TUR, UGA, UKR, VEN, VNM, ZAF, ZMB, ZWE.

The Chinese funding discount: A sign of discipline? Table 5 more closely mirrors the data in Figure 6 on the correlation between sovereign bond yield dynamics and Chinese funding events. While the framework is similar to the one used for external debt dynamics, the sample size is smaller. This is because (i) few countries issue bonds in international capital markets and (ii) the bond-level coverage in Bloomberg is incomplete for emerging and frontier economies. We use the yield-to-maturity on long-term bonds with 5+ years of remaining maturity as our yield measure in equation (8).[27]

For specifications (1)–(4), the point estimates are negative, statistically significant, and robust to DAC aid flows. We find in column (4) that Chinese lending events are associated with a reduction of around 55 bps in the country's sovereign bond yields. When we estimate the effect of the advent of Chinese loans in specification (5), we find a larger effect: a

[27]See Table A.6 in the appendix for the coefficients associated with additional covariates in the bond yield estimation equation (8). See also Table A.7 in the appendix for similar results using longer maturity bond yields. Tables A.8 and A.9 in the appendix also show our results are robust to the inclusion of alternate Chinese lending series.

Table 5: Sovereign yields (5+ year bonds) and Chinese inflows

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.463**	-0.570**	-0.566**	-0.573**	
	(0.218)	(0.258)	(0.269)	(0.270)	
CHN funding era					-1.409**
					(0.570)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.836	0.841	0.844	0.844	0.846
N	382	357	382	382	382

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond yield estimation sample includes: AGO, ARG, ARM, AZE, BGR, BLR, BOL, BRA, CIV, CMR, COG, COL, CRI, ECU, EGY, ETH, GAB, GHA, IDN, JAM, JOR, KAZ, KEN, LAO, LBN, LKA, MAR, MEX, MKD, MNE, MNG, MOZ, NGA, PAK, PER, PHL, RUS, RWA, SEN, SRB, TUR, UKR, VEN, VNM, ZAF, ZMB.

reduction of around 140 bps as countries access to Chinese lending.[28]

We view these various estimates of a significant borrowing discount around Chinese lending events as potential evidence of the disciplining effect highlighted by our model. In the next section, using an extension of the model with the option to default on China, we confirm that such lower spreads and the disciplining effect are indeed a consequence of the recipient country's inability to default on its Chinese debt.

5.3 Disciplining effect and the no-default assumption

Our benchmark model does not allow the borrowing country to default on Chinese loans. This assumption reflects the significant geopolitical influence that China has over debtor countries. As it turns out, the nondefaultable nature of Chinese debt is indeed an important driver of the disciplining effect. Here, we show how this comes to be and study further implications of this assumption.

[28] Liu and Mosley (2025) use daily bond yield data to document that borrowing countries' bond spreads *rise* on news of new Chinese loans for "budget and liquidity" while "project" loans have no effect on bond prices. The two approaches likely capture different margins of Chinese lending. Announcement effects in Liu and Mosley (2025) may reflect adverse selection—countries seeking budget support are already under stress, so the news is bad regardless of the lender. Our annual regressions, by contrast, are not driven by distress-timed borrowing: Chinese inflows in our data are not more likely during economic downturns, and the global scale of China's lending boom points to supply-side factors rather than idiosyncratic demand (Horn et al., 2025). Beyond the adverse selection concern, the two approaches measure fundamentally different objects: announcement-day reactions to news of new loans versus the effect of accumulated debt stocks on annual yields. High-frequency announcement effects and the longer-run disciplining effect we document can therefore coexist and operate through distinct channels.

Introduction of default on market and Chinese debt. In this section, we assume that if the government defaults, it does so on all of its outstanding debt (b and b_c) in a nondiscriminatory way.[29] This implies that a country in default pays no coupons and receives no funding from China. In other words, the government is excluded from both funding sources for as long as it is in the default state.[30]

In this setting, the level of Chinese debt and the flows within a period significantly alter the incentives to default. When a government has outstanding Chinese debt at the beginning of a period, its incentives to default are higher than in the benchmark economy. These higher default incentives come from two sources. The primary benefit is that the government can consume more from its income, given that (i) it does not need to repay b_c and (ii) the income costs of default are independent of the "size" of the default. A second, less obvious benefit is that the government no longer faces the risk of an outflow when it lacks market access, being in the default state. The reduced volatility of consumption in default makes this option more attractive. Overall, we should see more frequent defaults when $b_c = H$ relative to the benchmark economy. By the same token, when the country does not default in period t and carries high Chinese debt into the next period (i.e., $b_c' = H$), the spreads should be higher in period t, other things equal.

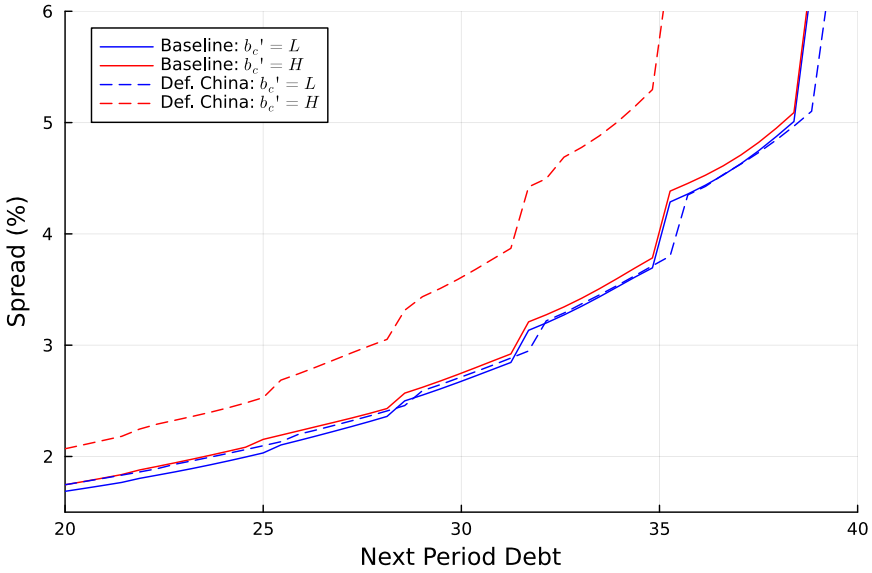
In contrast, default is costlier than in the benchmark model when the government has no outstanding Chinese debt at the beginning of the period. This is because defaulting results in a temporary exclusion from Chinese loans: It delays a new Chinese inflow until (at least) financial exclusion ends. Since Chinese loans are subsidized and the government is relatively impatient, this is costly. Therefore, we expect a lower default frequency in periods with $b_c = L$.

Default on Chinese debt and spreads. Figure 7 displays the spread–debt menu in this new environment (dashed lines) in comparison to the menu in the baseline model (solid lines). Spreads are higher for $b_c' = H$ at every level of debt, driven by the larger incentive to default in the subsequent period. The other notable change is that the gap in the spread menus between $b_c' = H$ and $b_c' = L$ has now widened: Carrying high Chinese debt into $t+1$ increases the default risk substantially more than in the baseline economy. The ability to

[29] The assumption that the sovereign cannot discriminate across lenders at the time of default is common in the sovereign debt literature (e.g., Broner, Martin, and Ventura, 2010 and Gennaioli, Martin, and Rossi, 2014). Relatedly, Bianchi et al. (2026) test the nondiscriminatory default assumption using bilateral official debt data on missed principal and interest payments during sovereign default episodes over the past fifty years; they find no systematic evidence that sovereigns discriminate against *geopolitical rivals* when accumulating arrears.

[30] The recursive formulation of this modified environment is in Appendix B.2.

Figure 7: Spreads: Defaulting on market and Chinese debt



default on b_c delivers a sure short-run gain (not paying back b_c), which increases the default probability substantially, and this translates into higher spreads.

Table 6: Simulated statistics: Defaulting on market and Chinese debt

Statistics	Unconditional	Inflow	Outflow
Market Debt to GDP	29.04	29.17	28.93
Market Issuance to GDP	5.81	2.41	9.18
China Debt to GDP	2.12	0.0	4.94
Net Flow from China to GDP	0.08	4.99	-4.94
Consumption to GDP	99.1	101.13	96.92
Spread	3.72	4.2	3.44
S.D. Spread	2.39	3.77	1.55
Corr(Spread, GDP)	-0.64	-0.56	-0.8
P(Default t+1)	3.06	4.27	2.21
Default Frequency	2.66	–	–
S.D. Consumption/S.D. GDP	1.13	1.0	1.26

Note: Moments are computed for nonexclusion periods, except for the default frequency, which uses all simulation periods. Inflow and Outflow moments are conditional *realized* Chinese flows (i.e., $a = 1$ and no default).

Table 6 displays the simulated statistics from this modified economy, highlighting key differences in outcomes from those in the baseline model. First, note that across all simulation periods, market debt-to-GDP is lower and average spreads higher than in the benchmark economy. Lower borrowing and higher spreads reflect a higher probability of default—in other words, the economy has a reduced debt-carrying capacity (or, in the terminology of Reinhart, Rogoff, and Savastano, 2003, *debt tolerance*). Comparing the "Inflow" and

"Outflow" columns with those in Table 3, we observe that both of our predictions related to spreads are confirmed.[31] In the baseline economy, the average spread during inflow periods is 3%. When Chinese debt is defaultable, the mean spread during inflows is 4.2%. This significant difference in spreads can be explained by the larger incentive to default in $t+1$ (since market *and* Chinese debt would be discharged in a default event). Conversely, outflow periods are associated with lower spreads when Chinese debt is defaultable; the corresponding numbers are 3.4% in this environment and 4% in the baseline economy.

In terms of market debt issuance, we see a behavior similar to the benchmark economy's: The country engages in debt substitution, deleveraging from the market when receiving a Chinese inflow and leaning on the market when it is time to pay China back. However, the effect on equilibrium spreads, as previewed above, is the *opposite* of the benchmark: The country ends up paying higher spreads on inflows. This is inconsistent with the empirical findings we presented in section 5.2. In other words, the disciplining effect of Chinese debt is gone.[32]

The data are consistent with the disciplining effect; the model counterfactual pins down nondefaultability as its operative source. We next ask how this lending structure shapes broader geopolitical outcomes.

6 Chinese Lending and Geopolitical Counterfactuals

In this section, we use our model to study how Chinese official lending can operate as not only a purely passive source of external finance but also a geopolitical instrument. We consider two related but distinct counterfactual exercises.

In the first one, we think of China as making targeted take-it-or-leave-it loan offers to sovereign borrowers to induce financial and geopolitical alignment. This exercise delivers threshold conditions under which countries optimally join a China-centered financing bloc and permanently forgo access to international capital markets. In the second exercise, we focus on the borrowing country and ask how much Chinese debt is optimal, from an ex ante perspective, when there is a risk of sudden and permanent Chinese retrenchment.

[31] Note that in this extension, the estimates in the "Inflow" and "Outflow" columns are conditioned on periods with *realized* inflows or outflows—i.e., periods where default did not occur.

[32] Appendix B.2 presents a welfare decomposition analysis confirming that there is evidence of positive welfare gains stemming from the disciplining effect of nondefaultable Chinese debt.

6.1 Geopolitical bloc formation: China or market access

We consider a counterfactual scenario in which China strategically deploys its lending capacity to expand its sphere of financial influence. Suppose, for instance, that China allocated its lending capacity by making take-it-or-leave-it loan offers that forced the borrowing governments to forgo debt issuance on international capital markets in exchange for the Chinese funding.

We characterize how country fundamentals—such as impatience, default costs, and income level and volatility—shape the threshold loan size China would need to offer to secure the borrowing country's financial allegiance. This exercise also informs China's optimal lending portfolio calculus since different countries are unequally expensive to attract to its bloc.[33]

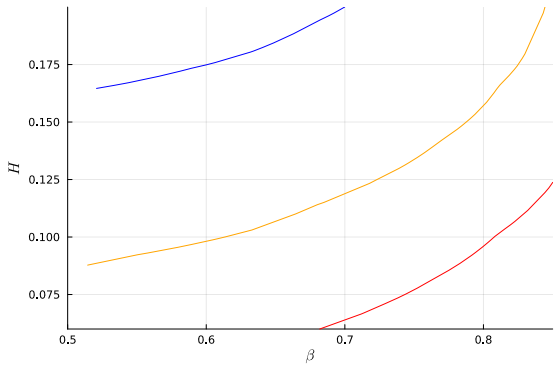
In particular, we assume that acceptance of the debt offer would secure the country a Chinese loan of size H but would also permanently eliminate its ability to issue market debt. On the other hand, rejecting the offer would imply permanent exclusion from future Chinese lending and, de facto, continuation in the No-China economy scenario. We assume China can credibly extract and enforce this commitment from the borrower. The borrower, therefore, must compare the value of these two regimes to decide whether to align with China: market access without China or autarky with China.[34]

Figure 8 shows the threshold value for H beyond which the country would prefer to align with China, with the conditions above. With all other parameters fixed and starting from a point on any of the thresholds, a higher H makes the country strictly better off from accepting China's take-it-or-leave-it offer. We plot these threshold values for different income levels ($y \in \{0.8, 0.9, 1.0\}$) as we vary one of the parameters characterizing the borrowing government.

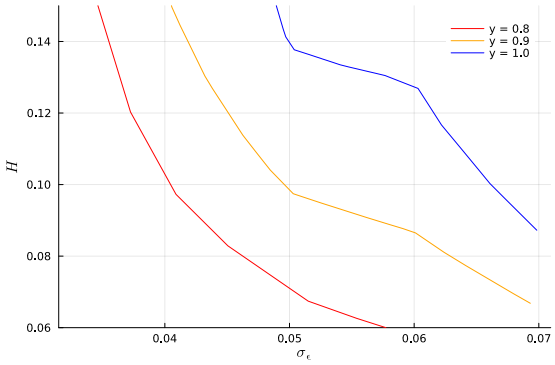
Discount factor (β). As panel (a) shows, the minimum loan threshold is increasing in β. That is, the more patient the borrowing government, the larger is the loan needed to make that country align with China. This is intuitive: Other things equal, higher-β economies face better borrowing terms, so it takes a larger Chinese loan to entice these countries to permanently give up a more favorable funding source. Note, however, that higher discount factors affect the values of both the China-only regime and the No-China

[33]Note that we study only the effect of local factors in this section but that similar tradeoffs emerge if we consider global factors, such as the risk-free rate (see Johri et al., 2022 for a study of how time-varying interest rates affect the borrowing opportunities and welfare of a small open economy with default risk).

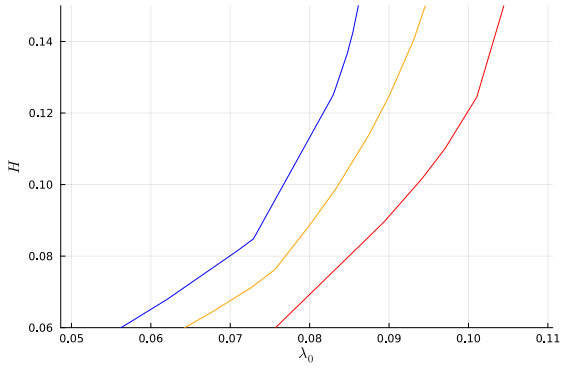
[34]Appendix B.3 formally presents how the government computes these two values and decides on its alignment with China.



(a) Discount factor, β



(b) Standard deviation of income innovations, σ_ε



(c) Cost of default, λ_0

Figure 8: Threshold values for H

regime. In the China-only case, the H inflow is guaranteed in period t, and the repayment follows the stochastic process described in section 2. Therefore, a less patient government puts a disproportionately high weight on the period-t consumption gains and a lower weight on the future adjustments needed to repay that debt. At the same time, a lower β makes the No-China option less attractive: The country is likeler to default, markets understand and price this in, and therefore the borrowing terms are less favorable. Both of these forces go in the same direction, implying that China can entice a lower-β country with fewer resources.

Income volatility (σ_ε). In panel (b), we vary the volatility of the income process, σ_ε. Other things equal, lower income volatility leads the economy to less frequent defaults and higher debt capacity. We find that the thresholds are decreasing in the volatility: Consistent with the intuition above, a larger loan is needed to attract a stabler economy.

Default cost (λ_0). Panel (c) illustrates how the cost of default affects the thresholds. Note that in this case, default costs shift the value of the No-China regime but do not change the

value of the regime with only Chinese lending. An economy with higher costs of default can sustain higher levels of market debt, other things equal. Thus, the higher the market debt capacity of the country, the higher is the H needed to convince the government to opt for the China-only regime.

Income gradient (y). Finally, across all panels, we observe an *income gradient* in the Chinese loan amount thresholds: The "generosity" of the loan needed to align a country with China increases with the country's current income. In other words, it is cost-minimizing for China to engage in *bloc building* when the borrowing countries are in low-income periods.

6.2 Optimal Chinese debt under Chinese retrenchment risk

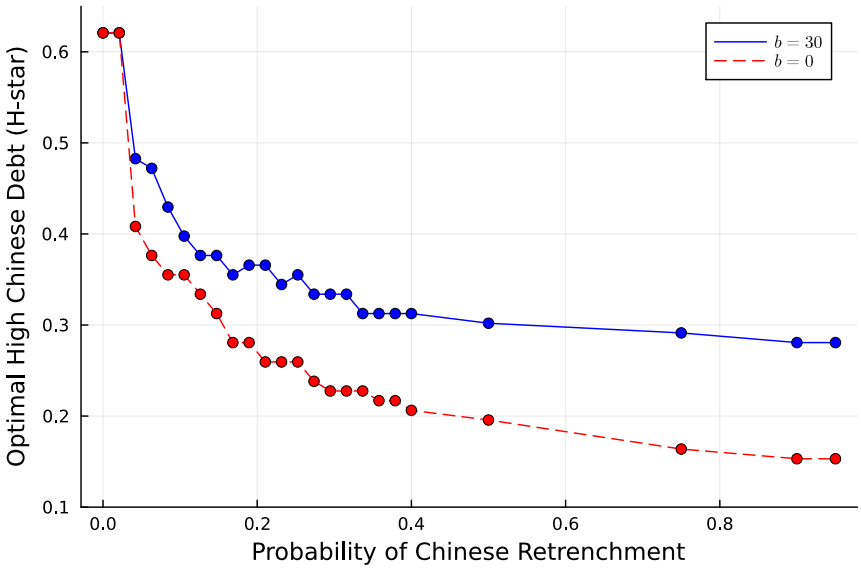
We now study a different geopolitical risk scenario that has recently become a salient policy concern as China's lending boom has slowed. In a world with shifting geopolitical alliances, countries borrowing heavily from China could face the risk of a sudden and permanent Chinese retrenchment, i.e., an abrupt reversal in financial ties that leaves the sovereign excluded from Chinese funding and forced to repay outstanding obligations. Such an abrupt adjustment may prove costly for the borrower and the pricing of its market debt.

The possibility of Chinese retrenchment introduces a fundamental trade-off for borrowers: Subsidized financing from China can provide insulation from market conditions but also introduces an additional source of *geopolitically driven* rollover risk that can sharply worsen debt market outcomes should the funding stop. We ask how much Chinese debt a country would optimally choose given its existing market indebtedness and the likelihood that China may sever ties and end its financial largesse. We focus on the resulting ex ante optimal exposure to Chinese funding, while our analysis of the dynamic responses to retrenchment shocks is relegated to Appendix B.4.[35]

We define $H^*(b, p_{SS})$, the ex ante optimal level of high Chinese debt a country would choose, as a function of its market debt (b) and the probability of a Chinese retrenchment (p_{SS}). Figure 9 tells a clear story: (i) Other things equal, if a country has a higher level of market debt, it prefers a higher level of Chinese loans, pointing to the importance of the substitution between these two funding sources; and (ii) regardless of the market debt level, the higher p_{SS} is, the lower is the optimal exposure to China, pointing to the undesirability of this additional source of rollover risk.

[35]The appendix also presents the formal model description and the recursive formulation when we introduce the risk of retrenchment.

Figure 9: Optimal Chinese debt by market debt level



Note: This figure shows H^* given the sovereign has outstanding debt of 30% (blue) and 0% (red/dotted) of outstanding debt as a percentage of mean income.

Overall, the findings in this section (and Appendix B.4) suggest that exposure to Chinese lending can display boom–bust patterns as geopolitical conditions evolve. Because the ex ante optimal exposure $H^*(b, p_{SS})$ is decreasing in the probability of a permanent retrenchment, shifts in p_{SS}—interpretable as changes in the perceived stability of financial ties with China—can induce sharp reoptimizations of the desired debt position vis-à-vis China. This mechanism implies that economies with volatile political environments may accumulate substantial exposure when retrenchment risk is perceived to be low, only to face abrupt and costly adjustment when domestic or international political events raise the perceived hazard of retrenchment.

7 Conclusion

This paper studies how Chinese official lending shapes sovereign borrowing from private international capital markets. The defining features of Chinese loans—subsidized, nondefaultable, and subject to rollover risk outside the borrower's control—generate a market disciplining effect: following a positive Chinese capital inflow, the sovereign reduces its issuance of defaultable market debt, leading to lower spreads and lower consumption volatility. The reverse holds when repayments to China come due. A model-based falsification test confirms that nondefaultability is the operative source of this channel: when we allow the government

to default on Chinese debt, spreads move in the opposite direction, inconsistent with the data and with the disciplining mechanism. Panel data from emerging economies corroborate the model's central predictions, with Chinese lending events associated with a 6–8 log-point reduction in external bond debt and roughly 55 basis points lower sovereign yields.

The welfare gains from Chinese lending are substantial, and their composition is informative. Roughly half of these gains stem from the endogenous reduction in market indebtedness induced by future repayment obligations to China. The benefits of Chinese lending, therefore, operate not only through cheaper funding but also through the discipline it imposes on the sovereign's own borrowing behavior.

We use the model to study two geopolitical risk scenarios. In a bloc-formation counterfactual, China offers take-it-or-leave-it loans in exchange for a country's permanent exit from private capital markets. The threshold loan required to induce alignment is lowest for countries in low-income periods or with weaker fundamentals, implying that geopolitical bloc-building is cheapest precisely when borrowing countries are most vulnerable. In a retrenchment counterfactual, we characterize the sovereign's optimal ex ante exposure to China: optimal borrowing from China rises with existing market indebtedness and falls with the probability of a sudden severance of financial ties. Countries that underestimate retrenchment risk accumulate excessive debt and face sharper adjustment when ties are severed.

Taken together, these results illuminate the central tension of borrowing in the shadow of China. Nondefaultable official lending disciplines market borrowing in normal times, but the same features that make Chinese loans disciplining amplify vulnerability when geopolitical ties weaken.

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A Empirical Appendix

A.1 Data description

We assemble an annual dataset to study the effects of Chinese lending on the amount and the pricing on marketable external public debt. We build on the extensive work in Horn et al. (2021) and supplement it with data sources on the amount and the timing of Chinese lending relationships from Acker, Bräutigam, and Huang (2020), Kratz, Feng, and Wright (2019), and Hurley et al. (2019).

For each country, using these data sources, we add to the yearly debt stock positions with China, indicators of events related to the Chinese loans such as new funding round or restructuring events. We define Chinese funding events as relatively large surges in the flow of funding from China. Specifically, for a country-year pair (i, t), we set CHN funding$_{i,t} = 1$ if the change in reported debt vis-à-vis China in that year is above country i's median value of zero or positive debt changes vis-à-vis China.[36]

We then construct measures of yields on marketable international debt using bond-level data extracted from Bloomberg. We also collect annual measures of external public debt held by bondholders from the World Bank International Debt Statistics (IDS) along with standard macroeconomic variables such as output and net aid flows from OECD DAC countries. These variables constitute our annual country-level dataset on China funding events, Chinese debt stocks, sovereign bond prices.

Country list. The annual total public external debt dataset includes data on the following countries: Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahamas, Bangladesh, Barbados, Belarus, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, Colombia, Comoros, Congo Democratic Republic, Congo Republic, Costa Rica, Côte d'Ivoire, Djibouti, Dominica, Ecuador, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Ghana, Guinea, Guyana, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, Laos, Lebanon, Lesotho, Liberia, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Niger, Nigeria, Oman, Pakistan, Papua New Guinea, Peru, Philippines, Romania, Russia, Rwanda, Samoa, Senegal, Serbia, Seychelles, Sierra Leone, South Africa, South Sudan, Sri Lanka, Sudan, Suriname, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

[36] We also restrict inflows to higher than the 10th percentile of zero or positive Chine debt flows across countries and years. Our results are very similar using a lower cutoff at the 5th percentile.

Table A.1: Bond Yields (5Y+)

	Year																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
AGO															10.14	10.44	8.46	9.68
ALB										8.81					5.23			7.02
ARG	20.8	44.97	39.18	36.01	33.21	27.68	24.82	30.43	37.18	19.75	13.41	19.16	14.66	10.36	6.46	5.48	5.49	22.88
ARM													6.31	5.4	6.94	6.89	5.58	6.22
AZE														4.51	5.03	5.03	4.6	4.79
BGR	7.01	7.47	6.31	5.42	4.58	5.11	5.14	6.11	6.67	4.25		2.63		2.94	2.88	2.23	1.46	4.68
BLR										8.2	12.06	10.18	8.62				5.98	9.01
BOL												5.06	5.98	4.89	4.99	3.38	4.01	4.72
BRA	12.18	19.51	11.62	8.99	7.73	9.19	6.21	7.34	6.12	5	4.68	3.49	4.41	4.56	5.71	5.58	4.94	7.49
CIV												9.79	7.09	6.21	6.79	6.6	5.82	7.05
CMR															10.28	9.36	6.93	8.86
COG									11.63	9.82	8.66	7.4	6.7	6.49	7.32	10.11	9.53	8.63
COL	10.77	11.48	8.74	8.03	7.36	6.65	6.24	6.51	6.62	4.95	4.53	3.27	4.09	4.14	4.7	4.52	4.07	6.27
CRI	8.52	7.94	6.81	7.48	7.01	6.56	6.2	6.46	6.42	5.28	4.97	4.67	4.88	5.73	6.44	6.29	5.77	6.32
ECU					10.45	9.13	10.46	16.28	18.41	10.74					14.05			12.79
EGY	8.64	8.57	5.91	5.24	4.89	5.68				5.58	7	6.98	8.22	6.2	6.49	7.82	6.52	6.7
ETH														6.89	7.24	7.91	6.71	7.19
GAB							7.74	9.69	10.13	6.07	5.63	4.18	6.41	5.68	8.12	8.84	6.94	7.22
GHA														8.37	9.85	10.27	7.44	8.98
IDN	11.28			7.3	7.27	6.88	6.45	8.05	7.44	4.89	4.61	3.89	4.8	4.69	4.52	3.93	3.54	5.97
JAM	11.76	9.92	11.65	9.61	8.21	7.51	7.47	9.41	11.63	8.51	7.84	8.29	8.05	7.34	7.02	6.64	5.83	8.63
JOR										4.72					5.93	5.67	5.99	5.58
KAZ	7.37	5.07												4.83	5.74	4.97	4.44	5.4
KEN														5.58	7.18	7.85	6.5	6.78
LAO																4.03	3.54	3.79
LBN	10.39	13.94	9.02	7.8	8.08	7.93	8.52	9.06	7.31	5.47	5.59	5.62	6.22	5.83	6.16	6.86	6.8	7.68
LKA							9.13		6.51	5.75	6.27	5.58	6.16	5.16	6.16	6.42	5.4	6.25
MAR			5.38				5.4			4.59	5.52	4.42	5.57	4.77	4	4.03	3.64	4.73
MEX	8	7.23	5.66	5.59	5.49	5.71	5.54	6.1	5.87	4.69	4.43	3.33	3.85	3.31	3.38	3.22	3.22	4.98
MKD					4.53	4.82	5.14	7.91	9.24	6.81				3.82	4.43	4.6	3.87	5.52
MNE										7.26	8.27			4.19	5.07	5.08		5.97
MNG												4.82	6.12	7.36	8.01	9.18	6.19	6.95
MOZ																18.81	17.5	18.15
NGA	10.71	10.44	8.8								6.4	5.16	5.1	5.38	6.96	7.27	6.18	7.24
PAK				6.42		8.12	8.42	14.44	14.04	9.69	12.28	12.61	10.64	7.6	7.88	7.18	6.58	9.68
PER		10.39	7.67	7.71	6.56	6.45	5.79	6.71	6.04	4.74	4.78	3.69	4.27	4.15	4.38	3.54	3.19	5.63
PHL	10.89	8.74	8.32	8.59	8.01	6.99	6.41	7.04	6.5	4.87	4.46	3.54	3.89	3.68	3.3	2.97	3.39	5.97
RUS	14.23	8.98	6.52	6.79	5.98	5.93	5.84	6.59	6.56	4.98	4.84	3.6	3.97	4.96	5.28	4.19	3.96	6.07
RWA														6.16	6.83	7.04	6.07	6.53
SEN									9.62		8.43	6.97	6.9	6.23	6.84	6.58	5.65	7.15
SRB											7.06	6.66	6.27	5.52	5.16	5.36	6.45	6.07
TUR	12.27	11.62	9.36	7.3	6.29	6.53	6.46	7.51	6.59	5.2	5.18	4.26	4.42	4.26	4.06	4.29	4.78	6.49
UKR	15.96	10.45	7.62	7	6.02	6.36	6.31	11.76	15.56	7.75	7.94	8.81	9.13	11.13	17.21	8.91	7.78	9.75
VEN	10.97	13.79	12.06	8.8	7.07	6.41	7.85	12.37	16.01	13.32	13.45	10.79	10.73	14.53	20.16	18.82	20.99	12.83
VNM					6.4	6.38	6.04	7.43	6.76	5.58	6.16	5.25	4.9	4.31	4.44	4.49	4.07	5.56
ZAF	7.34	12.78	5.39	5.41	4.96	5.38	5.43	7.11	5.9	4.5	4.38	3.63	4.4	4.29	4.39	4.64	4.71	5.57
ZMB												5.16	6.53	6.55	9.1	10.23	6.99	7.43
Total	11.06	12.4	9.78	8.86	8.01	7.69	7.52	9.73	10.2	6.96	6.99	6.22	6.43	5.85	6.87	6.76	6.08	7.62

Table A.2: Bond Yields (10Y+)

	Year																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
AGO															10.14			10.14
ARG	19.64	42.39	34.56	32.15	29.41	22.08	19.1	22.61	28.29	14.12	9.04	13.51	12.83	9	6.46	5.5	5.63	19.19
ARM															7.42			7.42
AZE														4.51			4.91	4.71
BGR		7.87	6.31	5.66	5.09									2.94	3.41	2.81	2.15	4.53
BLR																	6.39	6.39
BOL												5.06	6.35				4.82	5.41
BRA	13.03	18.48	12.16	9.71	8.48	11.08	6.45	7.97	6.47	5.47	5.17	4.21	4.98	5.2	6.26	6.08	5.49	8.04
CIV												9.79	7.09	6.21	6.93	6.77	6.22	7.17
CMR															10.28			10.28
COG									11.63	9.82	8.66	7.4	6.7	6.49	7.32	10.11	9.53	8.63
COL	11.52	12.05	9.52	9.05	8.11	7.04	6.43	7.08	7.72	5.75	5.13	4.1	4.62	4.75	5.5	4.99	4.82	6.95
CRI	8.79	8.14	8.27	8.47	7.85	7.03	6.44	7.02	7.05	5.28		4.21	5.05	6.25	7.05	7.34	6.7	6.93
ECU					10.45													10.45
EGY	9.4									5.58	7.62	7.91	8.76	7.09	7.44	8.13	7.11	7.67
ETH														6.89				6.89
GAB							7.74						6.41	5.68	8.98			7.2
GHA														8.41	9.89	10.33	7.64	9.06
IDN				7.3	7.54	6.98	6.75	8.48	8.18	5.78	5.52	4.55	5.68	5.51	5.28	4.81	4.36	6.2
JAM	11.37	10.45	12.39	10.59	9.09	8.49	7.78	9.92	11.76	9.01	8.24	8.84	9.26	7.92	7.06	6.85	6.07	9.12
JOR															5.93	5.67	6.17	5.92
KAZ														4.83	6.12	5.55	4.99	5.38
KEN														6.01				6.01
LBN	11.62	14.94	10.49	9.42	8.91	8.38	8.26	9.91	8.15	6.36	6.35	6.32	6.71	6.44	6.53	7.07	7.13	8.41
LKA											6.28	5.11			7.48	6.3	5.67	6.17
MAR							5.4			4.92		4.77	6.37	5.14	5.27	5.07	4.81	5.22
MEX	8.73	7.85	6.51	6.46	5.88	6.01	5.81	6.55	6.49	5.36	5.29	4.07	4.72	4.28	4.25	3.95	4.04	5.66
MKD					4.53													4.53
MNG												5.5						5.5
NGA	10.71	10.44	8.8								6.4						6.8	8.63
PAK						8.12	8.42	9.31	11.52	10.57	12.12	12.73	10.64	8.47	8.34	8.56	7.48	9.69
PER		10.46	8.26	8	7.09	6.91	6.24	6.93	6.46	5.6	5.43	4.03	4.67	4.57	4.38	3.61	3.57	6.01
PHL	11.97	9.47	8.88	9.06	8.54	7.12	6.6	7.42	6.87	5.61	5.16	4.06	4.35	4.09	3.63	3.26	3.68	6.46
RUS	13.84	9.73	7.24	7.25	5.97	5.99	5.84	6.59	7.31	5.46	5.19	4.11	4.71	5.64	5.75	4.41	4.22	6.43
SEN											8.43			6.33			5.96	6.91
SRB											7.06	7.07	6.89	6.64				6.91
TUR	14.11	12.29	10.13	7.78	7.15	6.92	6.8	7.87	7.13	5.84	5.6	4.8	5.52	5.28	5.3	5.46	5.8	7.28
UKR			7.62		5.1	6.57	6.9			7.87	8.35	7.67	9.45		9.24	8.93	7.93	7.78
VEN	10.12	9.43	9.97	7.95	6.72	6.87		16.49	14.71	12.95	12.85	10.42	10.38	12.52	20.16	18.82	20.99	12.58
VNM					6.4	6.38				5.99				4.5				5.82
ZAF	9.2	7.49	6.14	6.01	5.53	5.48	5.84	7.36	6.15	4.86	5.03	4.04	5.07	4.66	4.66	4.84	5.35	5.75
ZMB												5.16		6.55	10.77	10.62	7.58	8.14
Total	11.72	12.76	10.45	9.66	8.31	8.09	7.46	9.43	9.74	7.11	7.09	6.38	6.84	6.09	7.24	6.76	6.26	7.90

A.2 Pairwise correlations

Table A.3: Correlation matrix

	CHN funding	Δ log RGDP (real)	Other funding (non CHN, non bond)	Δ DAC aid (rel. to GDP, lag)	Δ yields (10Y+)	Δ yields (5Y+)
CHN funding	–					
Δ log GDP (real)	0.050 (0.367)	–				
Other funding (non CHN, non bond)	0.031 (0.579)	-0.134 (0.015)	–			
Δ DAC aid (rel. to GDP, lag)	0.025 (0.665)	-0.043 (0.456)	-0.039 (0.491)	–		
Δ yields (10Y+)	-0.179 (0.009)	-0.291 (0.000)	-0.089 (0.196)	0.017 (0.807)	–	
Δ yields (5Y+)	-0.127 (0.038)	-0.271 (0.000)	-0.012 (0.848)	-0.041 (0.514)	0.848 (0.000)	–

A.3 China funding events and China flows

Table A.4: China funding events and change in CHN debt relative to GDP

China funding event	Median	Mean	Max	N
0	0.00	0.01	1.80	270
1	0.56	1.07	5.10	61
Total	0.00	0.20	5.10	331

A.4 China funding events and external bond debt

Table A.5: Table: External Debt (log Bonds) and China Inflows

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.070**	-0.082**	-0.066*	-0.065*	
	(0.034)	(0.039)	(0.038)	(0.038)	
CHN funding era					-0.143**
					(0.068)
Other funding event	-0.003	-0.017	-0.001	-0.000	0.001
	(0.048)	(0.052)	(0.053)	(0.053)	(0.054)
Log CHN debt stock, lag	0.006*	0.007*	0.011**	0.011**	0.010**
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
DAC aid to GDP, lag	-0.004	-0.005	-0.004	-0.004	-0.004
	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)
Log external bond debt, lag	0.996***	0.996***	0.843***	0.843***	0.838***
	(0.006)	(0.007)	(0.069)	(0.069)	(0.070)
External debt to GDP, lag	-0.004*	-0.004*	-0.003	-0.003	-0.002
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
Real GDP growth	-0.005	-0.041	0.182	0.180	0.144
	(0.377)	(0.388)	(0.328)	(0.330)	(0.333)
Log real GDP, lag	0.002	0.002	0.399	0.408	0.427*
	(0.012)	(0.012)	(0.250)	(0.248)	(0.244)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.983	0.983	0.985	0.985	0.985
N	583	552	583	583	583

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond position estimation sample includes: AGO, ALB, ARG, ARM, AZE, BGR, BIH, BLR, BOL, BRA, CIV, CMR, COD, COG, COL, CRI, DMA, ECU, EGY, ETH, FJI, GAB, GHA, GUY, IDN, IND, JAM, JOR, KAZ, KEN, LAO, LBN, LKA, MAR, MEX, MKD, MNE, MNG, MOZ, NGA, PAK, PER, PHL, RUS, RWA, SEN, SRB, TUR, UGA, UKR, VEN, VNM, ZAF, ZMB, ZWE. "Other funding event" is constructed like the China funding event using external non bond flows, that is the change in external public debt excluding debt to bondholders.

A.5 China funding events and sovereign bond yields

Figure A.1: Bond yields and Chinese debt position

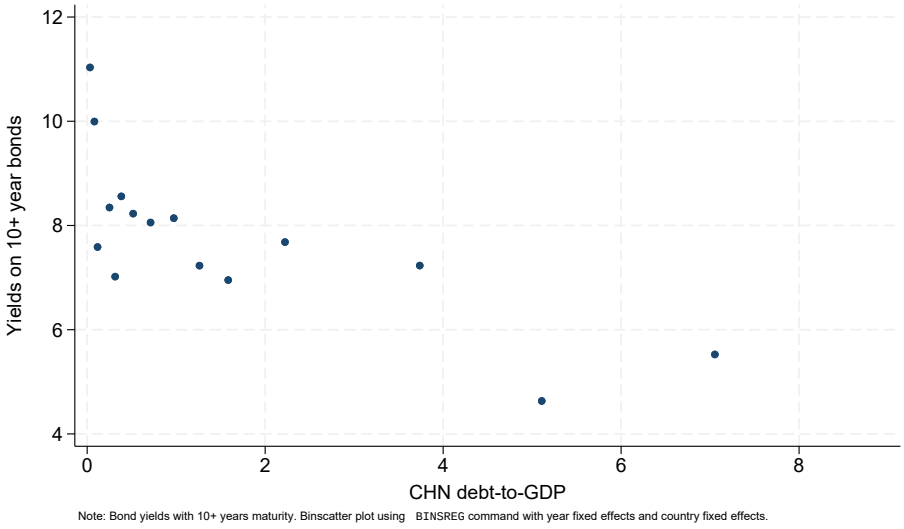


Figure A.2: Bond yields and positive Chinese debt flows

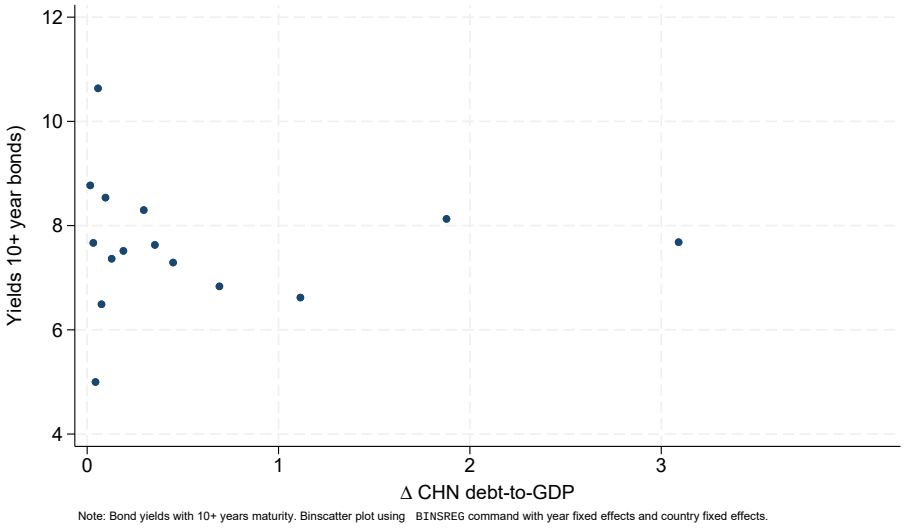


Table A.6: Sovereign yields (5+ year bonds) and Chinese inflows

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.463**	-0.570**	-0.566**	-0.573**	
	(0.218)	(0.258)	(0.269)	(0.270)	
CHN funding era					-1.409**
					(0.570)
Other funding event	0.060	0.086	0.250	0.253	0.285
	(0.223)	(0.229)	(0.283)	(0.283)	(0.286)
Log CHN debt stock, lag	0.002	0.002	-0.026	-0.027	-0.034
	(0.014)	(0.014)	(0.026)	(0.026)	(0.027)
DAC aid to GDP, lag	0.064	0.044	-0.010	-0.014	-0.029
	(0.091)	(0.089)	(0.091)	(0.090)	(0.079)
Bond yields (5+ years), lag	0.877***	0.875***	0.651***	0.650***	0.651***
	(0.053)	(0.052)	(0.103)	(0.104)	(0.100)
Log external bond debt, lag	0.036	0.030	0.909*	0.914*	0.856*
	(0.068)	(0.073)	(0.515)	(0.513)	(0.504)
World debt to GDP, lag	0.000	0.004	0.038	0.037	0.042*
	(0.007)	(0.007)	(0.025)	(0.025)	(0.024)
Real GDP growth	-18.881***	-19.892***	-25.248***	-25.292***	-25.610***
	(6.553)	(6.638)	(8.831)	(8.818)	(8.760)
Log real GDP, lag	-0.083	-0.057	1.980	1.806	1.886
	(0.093)	(0.104)	(1.801)	(1.791)	(1.722)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.836	0.841	0.844	0.844	0.846
N	382	357	382	382	382

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond yield estimation sample includes: AGO, ARG, ARM, AZE, BGR, BLR, BOL, BRA, CIV, CMR, COG, COL, CRI, ECU, EGY, ETH, GAB, GHA, IDN, JAM, JOR, KAZ, KEN, LAO, LBN, LKA, MAR, MEX, MKD, MNE, MNG, MOZ, NGA, PAK, PER, PHL, RUS, RWA, SEN, SRB, TUR, UKR, VEN, VNM, ZAF, ZMB. "Other funding event" is constructed like the China funding event using external non bond flows, that is the change in external public debt excluding debt to bondholders.

Table A.7: Sovereign yields (10+ year bonds) and Chinese inflows

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.481*	-0.571**	-0.598*	-0.604*	
	(0.260)	(0.285)	(0.328)	(0.328)	
CHN funding era					-1.628**
					(0.699)
Other funding event	-0.078	-0.063	0.198	0.198	0.246
	(0.258)	(0.256)	(0.323)	(0.323)	(0.330)
Log CHN debt stock, lag	0.000	0.001	-0.027	-0.028	-0.039
	(0.016)	(0.016)	(0.032)	(0.032)	(0.035)
DAC aid to GDP, lag	0.018	-0.003	0.032	0.028	0.021
	(0.099)	(0.085)	(0.105)	(0.103)	(0.095)
Bond yields (10+ years), lag	0.864***	0.858***	0.654***	0.654***	0.656***
	(0.056)	(0.055)	(0.100)	(0.101)	(0.096)
Log external bond debt, lag	-0.060	-0.044	1.070	1.087	1.101
	(0.091)	(0.100)	(0.825)	(0.827)	(0.830)
World debt to GDP, lag	0.005	0.009	0.041	0.039	0.043
	(0.007)	(0.008)	(0.030)	(0.030)	(0.029)
Real GDP growth	-20.391**	-21.872**	-27.230**	-27.216**	-28.262**
	(8.199)	(8.507)	(10.896)	(10.859)	(10.925)
Log real GDP, lag	0.035	0.067	1.031	0.766	0.847
	(0.137)	(0.154)	(2.108)	(2.118)	(2.086)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.817	0.823	0.826	0.826	0.830
N	273	261	273	273	273

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond yield estimation sample includes: ARG, BGR, BOL, BRA, CIV, COG, COL, CRI, EGY, GAB, GHA, IDN, JAM, JOR, KAZ, LBN, LKA, MAR, MEX, NGA, PAK, PER, PHL, RUS, SRB, TUR, UKR, VEN, VNM, ZAF, ZMB. "Other funding event" is constructed like the China funding event using external non bond flows, that is the change in external public debt excluding debt to bondholders.

Table A.8: Sovereign yields (5+ year bonds) and Chinese inflows – Robustness

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.562**	-0.636**	-0.597**	-0.603**	
	(0.230)	(0.267)	(0.279)	(0.279)	
CHN funding event, alternate	0.428*	0.331	0.161	0.161	
	(0.227)	(0.222)	(0.224)	(0.224)	
CHN funding era					-1.531***
					(0.588)
CHN funding era, alternate					0.599
					(0.394)
Other funding event	0.038	0.066	0.238	0.240	0.305
	(0.224)	(0.232)	(0.286)	(0.286)	(0.285)
Log CHN debt stock, lag	-0.000	0.001	-0.027	-0.028	-0.037
	(0.015)	(0.015)	(0.026)	(0.026)	(0.027)
DAC aid to GDP, lag	0.058	0.042	-0.016	-0.020	-0.027
	(0.092)	(0.091)	(0.093)	(0.091)	(0.079)
Bond yields (5+ years), lag	0.877***	0.875***	0.654***	0.654***	0.653***
	(0.052)	(0.052)	(0.102)	(0.103)	(0.099)
Log external bond debt, lag	0.050	0.042	0.912*	0.917*	0.845*
	(0.068)	(0.073)	(0.516)	(0.514)	(0.505)
World debt to GDP, lag	0.001	0.004	0.037	0.036	0.043*
	(0.007)	(0.007)	(0.024)	(0.024)	(0.024)
Real GDP growth	-19.043***	-20.011***	-25.274***	-25.318***	-25.582***
	(6.530)	(6.620)	(8.834)	(8.821)	(8.756)
Log real GDP, lag	-0.084	-0.059	1.953	1.780	1.920
	(0.091)	(0.103)	(1.801)	(1.791)	(1.725)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.836	0.841	0.844	0.844	0.847
N	382	357	382	382	382

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond yield estimation sample includes: AGO, ARG, ARM, AZE, BGR, BLR, BOL, BRA, CIV, CMR, COG, COL, CRI, ECU, EGY, ETH, GAB, GHA, IDN, JAM, JOR, KAZ, KEN, LAO, LBN, LKA, MAR, MEX, MKD, MNE, MNG, MOZ, NGA, PAK, PER, PHL, RUS, RWA, SEN, SRB, TUR, UKR, VEN, VNM, ZAF, ZMB. "Other funding event" is constructed like the China funding event using external non bond flows, that is the change in external public debt excluding debt to bondholders. The alternate CHN funding variables are similar in construction to the baseline CHN funding variables but use alternate China lending series released by Horn et al. (2021) in November 2025.

Table A.9: Sovereign yields (10+ year bonds) and Chinese inflows – Robustness

	(1)	(2) using Long Spells	(3) with Country Trends	(4) with Country FE	(5) with Country FE
CHN funding event	-0.535*	-0.604**	-0.578*	-0.585*	
	(0.281)	(0.303)	(0.343)	(0.343)	
CHN funding event, alternate	0.211	0.139	-0.092	-0.088	
	(0.235)	(0.225)	(0.248)	(0.248)	
CHN funding era					-1.699**
					(0.749)
CHN funding era, alternate					0.241
					(0.403)
Other funding event	-0.093	-0.074	0.205	0.205	0.253
	(0.262)	(0.260)	(0.324)	(0.325)	(0.331)
Log CHN debt stock, lag	-0.001	-0.000	-0.027	-0.027	-0.040
	(0.017)	(0.016)	(0.032)	(0.032)	(0.035)
DAC aid to GDP, lag	0.012	-0.007	0.036	0.031	0.021
	(0.097)	(0.085)	(0.106)	(0.105)	(0.095)
Bond yields (10+ years), lag	0.863***	0.858***	0.651***	0.651***	0.658***
	(0.055)	(0.055)	(0.100)	(0.101)	(0.096)
Log external bond debt, lag	-0.052	-0.039	1.065	1.083	1.109
	(0.091)	(0.100)	(0.825)	(0.827)	(0.833)
World debt to GDP, lag	0.005	0.009	0.042	0.040	0.042
	(0.007)	(0.008)	(0.030)	(0.030)	(0.029)
Real GDP growth	-20.426**	-21.903**	-27.248**	-27.234**	-28.154**
	(8.201)	(8.520)	(10.929)	(10.893)	(10.939)
Log real GDP, lag	0.033	0.066	1.096	0.829	0.813
	(0.136)	(0.154)	(2.149)	(2.157)	(2.086)
Year FE	✓	✓	✓	✓	✓
adj. R^2	0.817	0.823	0.825	0.825	0.829
N	273	261	273	273	273

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The bond yield estimation sample includes: ARG, BGR, BOL, BRA, CIV, COG, COL, CRI, EGY, GAB, GHA, IDN, JAM, JOR, KAZ, LBN, LKA, MAR, MEX, NGA, PAK, PER, PHL, RUS, SRB, TUR, UKR, VEN, VNM, ZAF, ZMB. "Other funding event" is constructed like the China funding event using external non bond flows, that is the change in external public debt excluding debt to bondholders.The alternate CHN funding variables are similar in construction to the baseline CHN funding variables but use alternate China lending series released by Horn et al. (2021) in November 2025.

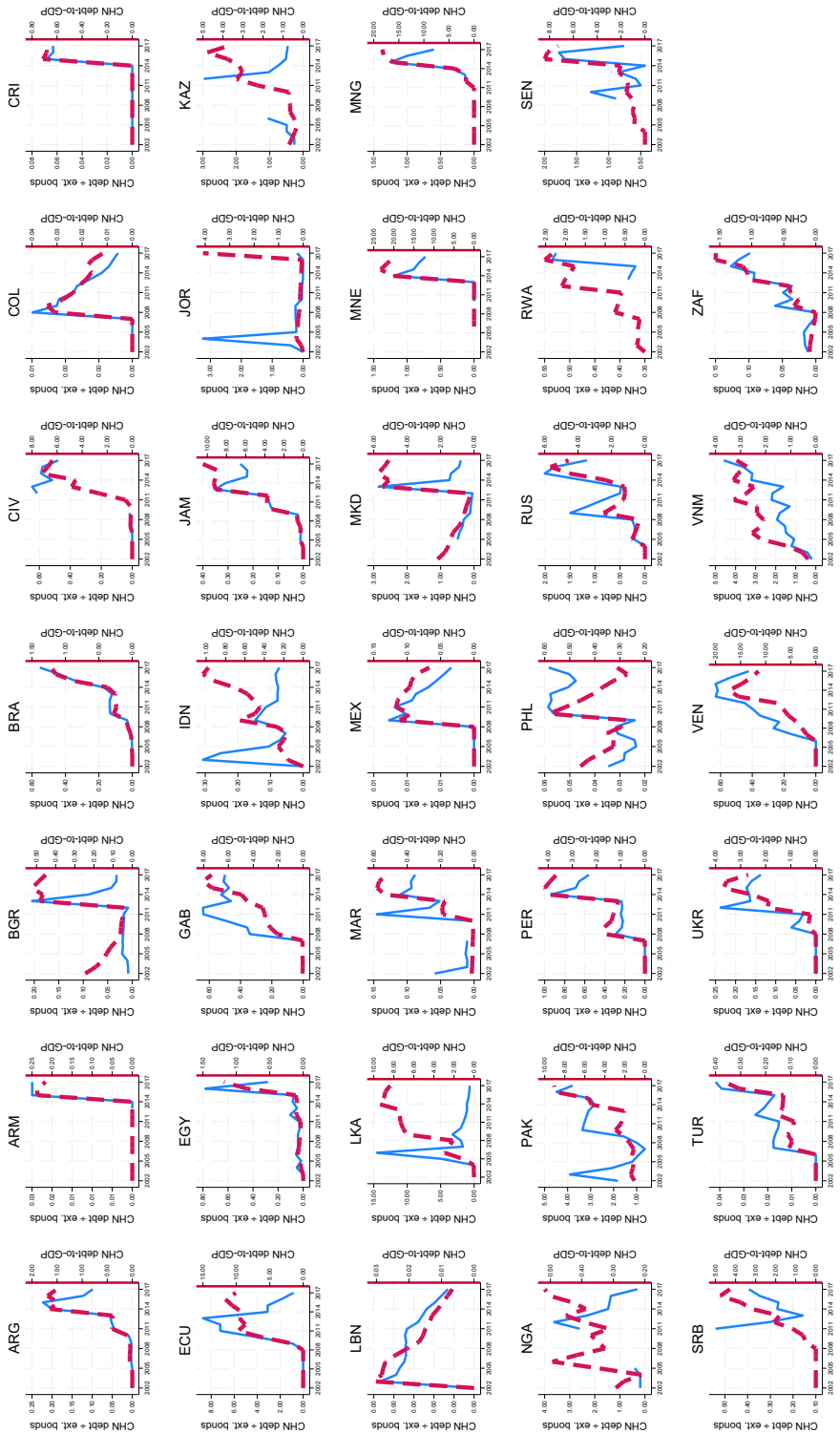
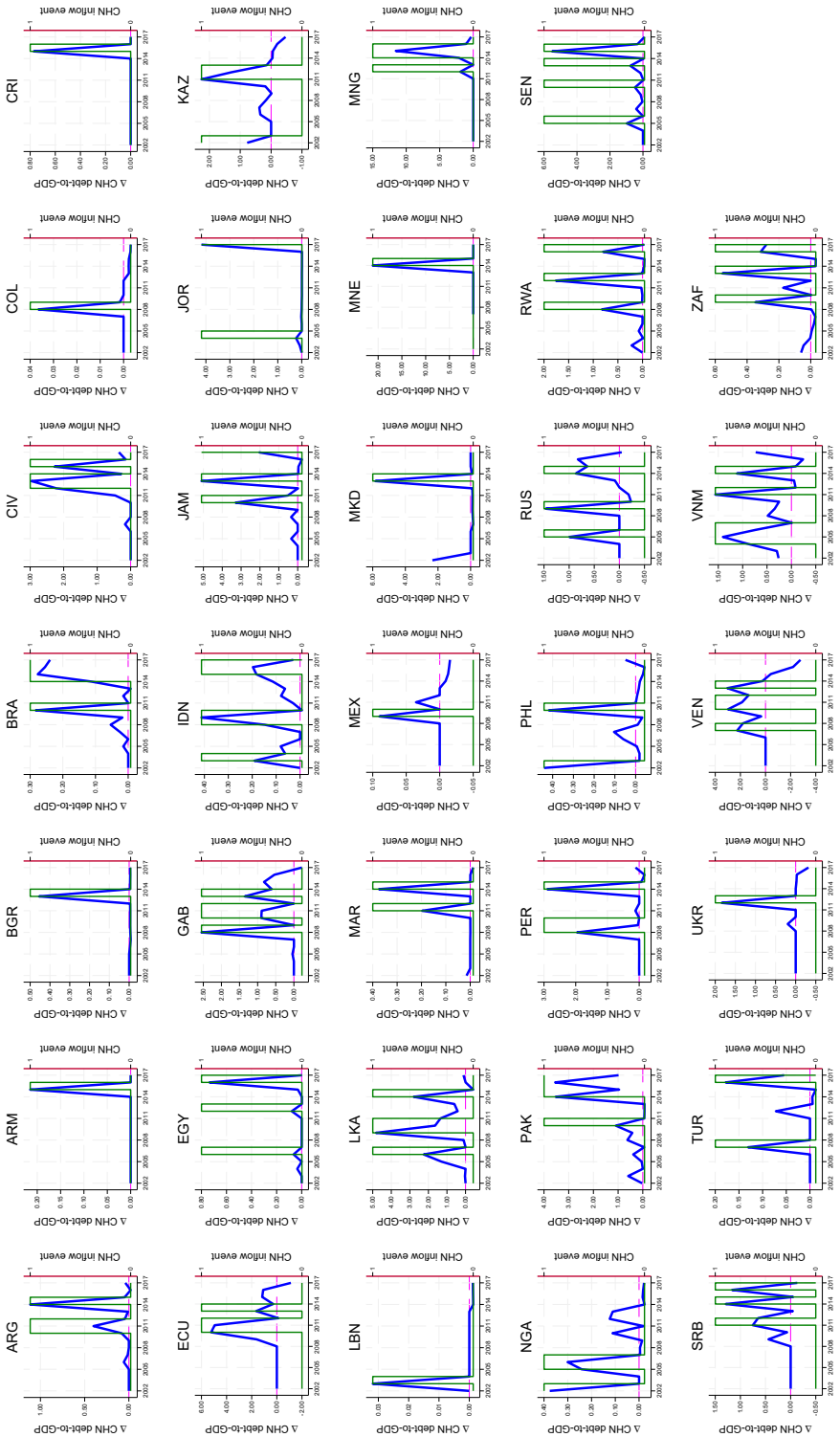


Figure A.3: Chinese debt flows vs GDP and market debt

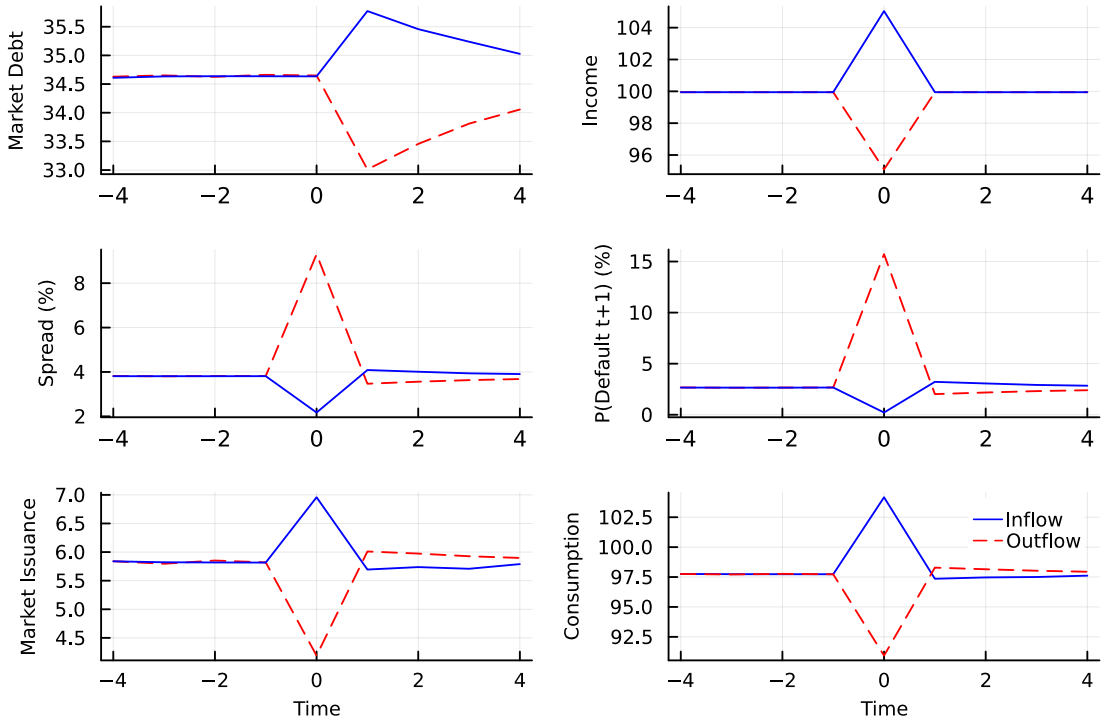
Figure A.4: Chinese debt flows and inflow events



B Extensions and Robustness

B.1 Dynamics around income flows

Figure B.1: Dynamics around income flows



Note: The plots show the average dynamics for 4 years before and after an income flow of comparable size to Chinese inflows/outflows (conditioning on no exclusion). Blue solid lines indicate a one-time increase in income, and red dashed lines indicate a one-time decrease in income.

B.2 Default on market and Chinese debt

We modify the baseline model to allow for the possibility of default on outstanding Chinese debt, in addition to market debt. An important feature of this extension is that the government cannot experience Chinese inflows or outflows while in default. Upon exiting default, the government reenters with no market debt and no Chinese debt.

B.2.1 Recursive formulation

As in the baseline model, there are four state variables. The market debt level b is the sole endogenous state variable. The other state variables are the income level y, the Chinese debt level b_c, and the realization of a Chinese net flow a (conditional on the country not defaulting). To simplify notation, let $s \equiv (a, y)$. For this extension, the only modification to

the recursive formulation relative to the baseline is the value function for a government in default.

Denote as $d \in \{0,1\}$ the government's default decision in the current period. Let $V_1(y)$ denote the value of defaulting and $V_0(b, b_c, s)$ the value of repaying. The government's value function at the beginning of a period is:

$$V\left(b, b_c, s\right) = \max_{d \in \{0,1\}} \Big\{ dV_1(y) + (1-d)V_0(b, b_c, s) \Big\}, \tag{B.1}$$

where the value of default satisfies

$$V_1(y) = u\big(y - \phi(y)\big) + \beta\, \mathbb{E}_{s'|s} \Big[\theta V(0, L, s') + (1-\theta) V_1(y') \Big], \tag{B.2}$$

where θ is the reentry probability. Note that b_c' is already set to L since a government exits the default state with no outstanding Chinese debt.

The recursive formulations for the value of repayment and the pricing functions are unchanged relative to the baseline model. Refer to section 2.2 for these functional equations.

B.2.2 Welfare decomposition

Figure B.2 displays a welfare decomposition comparing three versions of our model: the benchmark model, the No-China economy, and the present extension (in which default on Chinese debt is possible). In the body of the paper, we defined the consumption-equivalent *total* welfare gain from access to Chinese debt as:

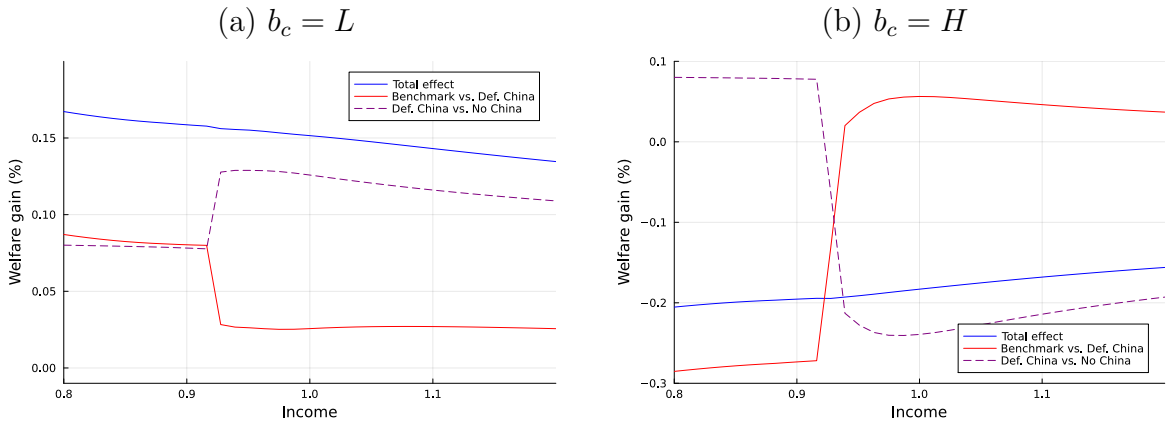
$$\Delta w_{\text{TOT}} = \left(\frac{V^{\text{Bench}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1\,. \tag{B.3}$$

Two key factors cause the government to prefer living in a world with Chinese debt. The first is the higher NPV of resources (given the subsidized nature of Chinese debt). The second factor is the disciplining effect of Chinese debt: The government's behavioral response to the debt flows results in different borrowing policies and, therefore, different spreads. We attempt to isolate the welfare gains that come from the disciplining effect. To do this, we consider the following decomposition of the total welfare gain:

$$\Delta w_{\text{TOT}} = \left(\frac{V^{\text{Bench}}}{V^{\text{Def.China}}} \right)^{\frac{1}{1-\gamma}} \cdot \left(\frac{V^{\text{Def.China}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1\,.$$

We think of $\left(\frac{V^{\text{Bench}}}{V^{\text{Def.China}}} \right)^{\frac{1}{1-\gamma}} - 1$ as the welfare gain from the disciplining effect of Chinese debt. It is represented by the solid red line in Figure B.2. $\left(\frac{V^{\text{Def.China}}}{V^{\text{NC}}} \right)^{\frac{1}{1-\gamma}} - 1$ is the welfare gain resulting from other factors and is represented by the dashed purple line.

Figure B.2: Welfare decomposition: Default on market and Chinese debt



Note: The left (right) panel shows the case in which the initial level of Chinese debt is low (high). The solid blue line depicts the total welfare gain, the solid red line is the welfare gain coming from the disciplining effect, and the dashed purple line captures the welfare gain from all other factors. All lines assume initial income at the mean and market debt at 30% of mean income.

First, consider panel (a) in Figure B.2. This figure displays the welfare decomposition when the government starts with low outstanding Chinese debt ($b_c = L = 0$) and does not receive an inflow this period ($a = 0$). Thus, the government is expecting to receive an inflow in the (near) future. The discontinuity around the 0.9 income level is related to the binary default decision. Below that level, the government prefers to default in all three economies. The red line is positive (and "high") because the government in the baseline economy can still receive inflows while excluded (but this is not possible in the default-on-chinese-debt extension). This effect masks the true value of the disciplining effect for low income levels. For values of income above the discontinuity, the disciplining effect accounts for around 15% of the total welfare gain. The total welfare gain is positive for all values of income, indicating that the government prefers to reside in the benchmark economy.

Panel (b) in Figure B.2 displays the welfare decomposition when the government begins the period with a high level of Chinese debt ($b_c = H > 0$) and does not have an outflow in the current period ($a = 0$). As expected, the solid blue line, which portrays our main welfare measure (equation (B.3)), is negative for all values of income. Thus, a government would rather occupy an economy with no Chinese debt than an economy where it immediately holds positive outstanding Chinese debt. The solid red and dashed purple lines, on the other hand, both take positive and negative values. As in panel (a), there is a sharp discontinuity just above 90% of mean income. For the lowest values of income, as before, default incentives are high. Since the costs of defaulting are independent of the size of the default, it is natural that in these states the government would prefer to have the ability to default on China—this is what a negative red solid line captures. The purple dashed line is positive; the government would rather default on Chinese debt today and still have the positive NPV of future flows than live in an economy with no Chinese debt. For income values above the discontinuity, default is not optimal in any of the three economies. At these income levels, the government would prefer to reside in the benchmark economy over the economy with defaultable Chinese debt. This is substantial evidence for the welfare gains stemming from the disciplining effect

of nondefaultable Chinese debt. The source of the welfare gains is clearly reflected in Figure 7. Conditional on $b'_c = H$, spreads are significantly higher when Chinese debt is defaultable.

B.3 Bloc formation via strategic lending: China or market access?

In section 6.1, we study how differences in a country's characteristics impact the appeal of borrowing from China. We also produce predictions about the characteristics of the countries likeliest to borrow from China. In this appendix, we describe the theory underlying the geopolitical bloc formation exercise.

A country with permanent characteristics $\mathbf{p}$, current income y, and zero market debt is offered a loan by China. The country understands that this is a take-it-or-leave-it offer. If the country agrees, it immediately receives a financial inflow of value H. After this, the process for capital flows vis-à-vis China is identical to that in the benchmark model. However, the terms of the offer preclude the country from ever borrowing from other sources. Consequently, agreeing to China's offer results in permanent autarky from international financial markets.

A country that accepts the Chinese loan offer effectively becomes hand-to-mouth;

it has no means to insure against stochastic income/debt fluctuations. The value for a country that accepted the loan offer in the past is

$$V_{\text{CHN-Only}}(y, a, b_c, \mathbf{p}) = u(c) + \beta \mathbb{E}\, V_{\text{CHN-Only}}(y', a', b'_c, \mathbf{p})\,, \tag{B.4}$$

with consumption equaling the sum of current period income and the net financial flows from China

$$c = y \;\; + (b'_c(b_c, a) - b_c)\,, \tag{B.5}$$

and where b'_c is defined as in the main body of the paper:

$$b'_c(b_c, a) = \;\mathbf{1}\{a = 1 \cap b_c = L\}\; H + \mathbf{1}\{a = 1 \cap b_c = H\}\; L \;+\; \mathbf{1}\{a = 0\} b_c\,. \tag{B.6}$$

Let $V_{\text{MKT-Only}}(y, b, \mathbf{p})$ denote the market-only value function. Observe that b_c and a do not enter this function (as discussed above). In the period that China makes the take-it-or-leave-it offer, the Bellman equation is

$$\widehat{V}(y, \mathbf{p}) = \max\{V_{\text{MKT-Only}}(y, \bar{b}, \mathbf{p}), V_{\text{CHN-Only}}(y, \bar{a}, \bar{b}_c, \mathbf{p})\}\,, \tag{B.7}$$

where $\bar{b}_c = L$, $\bar{a} = 1$, and $\bar{b} = 0$.

At the benchmark parameter values and in the vicinity of mean income, retaining international financial market access is the country's preferred option. To study how changes in parameter values and income transmit to changes in preference ordering, we solve for $\mathbf{p}$ and values of y such that the country is indifferent between accepting and declining China's offer. That is, we find parameter and income values such that $V_{\text{MKT-Only}}(y, \bar{b}, \mathbf{p}) = V_{\text{CHN-Only}}(y, \bar{a}, \bar{b}_c, \mathbf{p})$. These indifference points are the ones plotted in Figure 8.

B.4 Adding Retrenchment Risk

B.4.1 Recursive formulation

We augment the baseline model with the possibility that the country has to repay the debt (if any) owed to China and permanently loses access to Chinese flows. We denote by p_{SS} the probability of this sudden and permanent stop.

There are four state variables: one endogenous and three exogenous. The endogenous state variable is the market debt level, b. The exogenous debt variables are y (the income level), b_c (the Chinese debt level), and a (the realization of a Chinese net flow). Let us denote $s \equiv (a, y)$. The recursive representation of this problem follows:

Let d denote the current-period default decision prior to a Chinese retrenchment. We assume that d is equal to 1 if the government defaulted in the current period and to 0 if it did not. Below, we denote with $\tilde{d}$ the default decision after the retrenchment has occurred.

$$V\left(b, b_c, s\right) = \max_{d \in \{0,1\}} \Big\{ dV_1(b_c, s) + (1-d)V_0(b, b_c, s) \Big\}, \tag{B.8}$$

where

$$V_0(b, b_c, s) = \max_{b'} \Big\{ u(c) + \beta(1-p_{SS})\, \mathbb{E}_{s'|s} V(b', b'_c, s') + \beta p_{SS}\, \mathbb{E}_{y'|y} W(b', b'_c, y') \Big\}, \tag{B.9}$$

subject to

$$c + \kappa b = y + q(b', b'_c, s)(b' - (1-\delta)b) + b'_c(b_c, a) - b_c. \tag{B.10}$$

The value of default prior to retrenchment is

$$\begin{aligned} V_1(b_c, s) = u\big(y - \phi(y) + b'_c(b_c, a) - b_c\big) \\ + \beta(1-p_{SS})\mathbb{E}_{s'|s}\Big[\theta V(0, b'_c, s') + (1-\theta)V_1(b'_c, s')\Big] \\ + \beta p_{SS}\mathbb{E}_{y'|y}\Big[\theta W(0, b'_c, y') + (1-\theta)W_1(b'_c, y')\Big]. \end{aligned} \tag{B.11}$$

In both of these *preretrenchment* cases, repayment and default, b'_c follows the same law of motion as in the benchmark model, given by (5) in the main body of the paper.

The value functions W, W_0, W_1 satisfy:

$$W\left(b, b_c, y\right) = \max_{\tilde{d} \in \{0,1\}} \Big\{ \tilde{d}W_1(b_c, y) + (1-\tilde{d})W_0(b, b_c, y) \Big\}, \tag{B.12}$$

where

$$W_0(b, b_c, y) = \max_{b'} \Big\{ u(c) + \beta\, \mathbb{E}_{y'|y} W(b', 0, y') \Big\}, \tag{B.13}$$

subject to

$$c + \kappa b = y + \tilde{q}(b', y)(b' - (1-\delta)b) - b_c. \tag{B.14}$$

The value of default is:

$$W_1(b_c, y) = u\big(y - \phi(y) - b_c\big) + \beta \mathbb{E}_{y'|y}\Big[\theta W(0, 0, y') + (1-\theta) W_1(0, y')\Big]. \tag{B.15}$$

The bond prices q and $\tilde{q}$ are jointly given by the following functional equations:

$$\begin{aligned} q(b', b'_c, s) = \frac{1}{1+r}(1 - p_{SS})\, \mathbb{E}_{s'|s}\left[1 - \hat{d}\left(b', b'_c, s'\right)\right]\left[\kappa + (1-\delta)\, q\left(\hat{b}\left(b', b'_c, s'\right), b''_c, s'\right)\right] \\ + \quad \frac{1}{1+r} p_{SS}\, \mathbb{E}_{y'|y}\left[1 - \hat{\tilde{d}}\left(b', b'_c, y'\right)\right]\left[\kappa + (1-\delta)\, \tilde{q}\left(\hat{\tilde{b}}\left(b', b'_c, y'\right), y'\right)\right], \end{aligned} \tag{B.16}$$

and

$$\tilde{q}(b', y) = \frac{1}{1+r}\, \mathbb{E}_{y'|y}\left[1 - \hat{\tilde{d}}\left(b', 0, y'\right)\right]\left[\kappa + (1-\delta)\, \tilde{q}\left(\hat{\tilde{b}}\left(b', 0, y'\right), y'\right)\right], \tag{B.17}$$

where $\{\hat{d}, \hat{\tilde{d}}\}$ and $\{\hat{b}, \hat{\tilde{b}}\}$ denote the future default and borrowing rules that lenders expect the government to follow. The price in (B.17) is equivalent to the one observed in a standard sovereign model with long-term debt: This is because the retrenchment shock induces a permanent loss of Chinese funding.

B.4.2 Simulation results

Table B.10 shows the main moments of interest when the economy faces the risk of a Chinese retrenchment. We find that for a (modest) 1% probability of China exogenously cutting ties with the borrowing country, the moments before the retrenchment resemble those of the baseline economy. The period of the retrenchment is turbulent, characterized by repayment of the Chinese debt (by construction), lower consumption, higher issuance of market debt, and higher spreads than in the median year before or after the retrenchment.

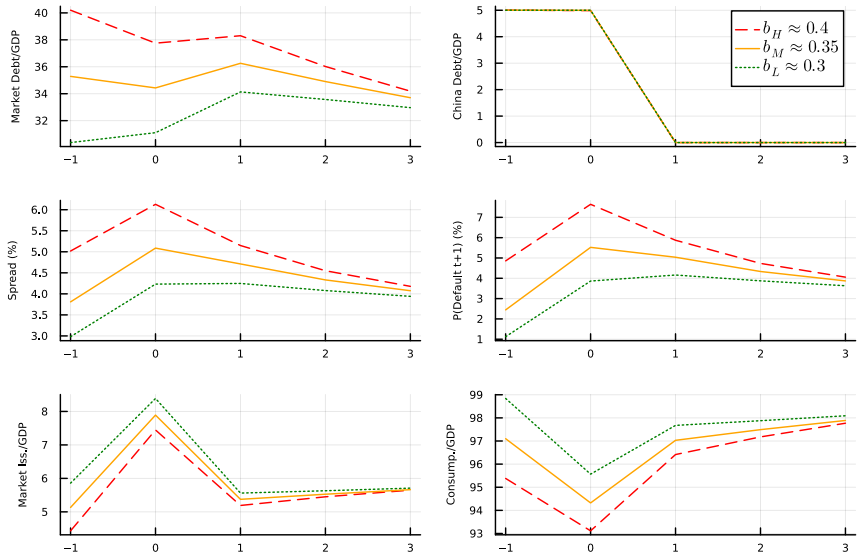
Table B.10: Simulated moments for the Chinese retrenchment risk model: $p_{SS} = 0.01$

Statistic	Pre-Retrenchment			Retrench.	Post
	Average	Inflow	Outflow	Period	Retrench.
Market Debt to GDP	30.09	31.11	29.1	30.11	30.22
Market Issuance to GDP	5.99	2.76	8.91	7.32	6.01
Consumption to GDP	98.97	101.08	96.53	97.52	98.97
Spread	3.54	3.05	4.02	3.84	3.54
S.D. Spread	2.22	1.82	2.48	2.39	2.19
Corr(Spread, GDP)	-0.64	-0.63	-0.67	-0.65	-0.64
P(Default t+1)	2.93	2.08	3.76	3.44	2.94
Default Frequency	2.56	2.88	2.21	2.62	2.57
S.D. Consumption/S.D. GDP	1.14	0.99	1.29	1.23	1.13

Note: Moments are computed for nonexclusion periods, except for the default frequency, which uses all simulation periods.

Figure B.3 displays the heterogeneous responses to a retrenchment shock. Each line corresponds to the simulated moments of a sample of governments that at $t = -1$ possess market debt of $b \in \{0.3, 0.35, 0.4\}$, earn mean income ($y = \bar{y}$), have outstanding Chinese debt ($b_c = H$), and experience no Chinese funding flows ($a = 0$). At $t = 0$, the retrenchment shock is realized. Governments respond to retrenchment similarly across initial market debt levels. Market issuance spikes as a means of financing the Chinese debt outflow. Spreads spike, driving up the cost of the newly issued debt. The required repayment of the Chinese loan, paired with higher spreads, induces significant declines in consumption. These patterns suggest that Chinese retrenchment can be exceedingly costly, especially for highly indebted governments.

Figure B.3: Dynamics around outflow-inducing retrenchment shock



Note: Moments are computed for nonexclusion periods.

B.5 Asymmetric Chinese debt flows

In the baseline model, the probability of a Chinese debt flow is the same whether the government has low or high debt. In this robustness exercise, we make the debt flow probabilities asymmetric. That is, the probability of a Chinese outflow is higher when the government has outstanding Chinese debt. Specifically, when the government enters the period with outstanding Chinese debt, the probability of an outflow is now 0.25 (compared to 0.1 in the baseline model). Conditional on the country entering the period with low Chinese debt, the probability of inflow remains the same as in the baseline model. Simulated statistics from this economy are in Table B.11.[37]

Table B.11: Simulated moments: Asymmetric Chinese debt flows

Statistics	Unconditional	Inflow	Outflow	No Flow:	
				$b_c = L$	$b_c = H$
Market Debt to GDP	30.06	30.93	27.94	30.93	27.94
Market Issuance to GDP	5.98	2.42	9.06	6.14	5.65
China Debt to GDP	1.45	0.0	4.98	0.0	4.98
Net Flow from China to GDP	-0.01	4.97	-4.98	0.0	0.0
Consumption to GDP	98.97	100.83	96.94	98.92	99.18
Spread	3.52	3.0	3.77	3.66	3.18
S.D. Spread	2.2	1.75	2.32	2.29	1.91
Corr(Spread, GDP)	-0.64	-0.63	-0.68	-0.64	-0.67
P(Default t+1)	2.92	1.92	3.36	3.24	2.17
Default Frequency	2.55	2.82	1.88	2.83	1.85
S.D. Consumption/S.D. GDP	1.15	0.98	1.29	1.14	1.12

Note: Moments are computed for nonexclusion periods, except for the default frequency, which uses all simulation periods. Units: percentage (except for the correlations and relative volatilities).

[37] Note that by changing the rollover probabilities, we change the aggregate resources in the economy.

B.6 Coupon payment on Chinese debt

In this section, we show that adding a small coupon payment to outstanding Chinese debt does not materially alter our results. The coupon payment is $r \times H$, where r is the risk-free rate and H is the amount of outstanding Chinese debt. The government pays the coupon only if Chinese debt is outstanding at the end of the period. Table B.12 displays the simulated statistics from this extension. The moments are virtually unchanged relative to those in the benchmark model. This is primarily because of the magnitude of the coupon payment—it amounts to 0.2% of mean GDP.

Table B.12: Simulated moments: Coupon payment on Chinese debt

Statistic	Baseline	Inflow	Outflow	b'_c High	b'_c Low
Market Debt to GDP	30.11	31.08	29.13	29.34	30.9
Market Issuance to GDP	6.0	2.69	8.9	5.58	6.43
China Debt to GDP	2.51	0.0	4.98	4.49	0.51
Net Flow from China to GDP	-0.01	4.97	-4.98	0.49	-0.51
Consumption to GDP	98.88	101.02	96.52	99.11	98.64
Spread	3.55	3.05	4.02	3.36	3.75
S.D. Spread	2.22	1.82	2.5	2.07	2.35
Corr(Spread, GDP)	-0.64	-0.62	-0.66	-0.65	-0.63
P(Default t+1)	2.94	2.06	3.78	2.54	3.35
Default Frequency	2.57	2.88	2.24	2.3	2.84
S.D. Consumption/S.D. GDP	1.14	0.99	1.29	1.12	1.16

C Computational Appendix

C.1 Baseline model with preference shocks

We utilize i.i.d. type-1 extreme value preference shocks to ensure convergence of the pricing schedule and value functions, similarly to Dvorkin, Sánchez, Sapriza, and Yurdagul (2021) and the authors of several other quantitative sovereign default papers. The basic computational strategy is described in Mihalache (2025).

Conditional on choosing to repay its outstanding debt, the sovereign receives an additive preference shock $\epsilon(b')$ for every possible value of debt b'.[38] Let $\mathbb{B} \equiv \{\underline{b}, b_1, ..., b_{N-1}, \overline{b}\}$ where $\underline{b} < b_1 < ... < b_{N-1} < \overline{b}$, the nodes are equally spaced, and positive values indicate borrowing. This grid represents all debt positions the sovereign could take on.

The cumulative density function of the vector of preference shocks, ϵ, is distributed according to the type-1 extreme value distribution:

$$F(\epsilon) = \exp\left[-\sum_{b' \in \mathbb{B}} \exp\left(-\frac{\epsilon(b') - \mu_\eta}{\rho_\eta}\right)\right],$$

where μ_η is the location parameter, ρ_η is the scale parameter, and $\tilde{\gamma}$ is the Euler–Mascheroni constant. We choose ρ_η so that it is small enough to maintain the economic content of the sovereign's borrowing decision but large enough to ensure that computation of the value and price functions occurs in a timely manner.[39] We fix $\rho_\eta = 0.0005$ and $\mu_\eta = -\tilde{\gamma}\rho_\eta$.[40]

The sovereign's problem in the baseline model is given by:

$$V(b, b_c, s) = \max_{d \in \{0,1\}} \Big\{ dV_1(b_c, s) + (1-d)EV_0(b, b_c, s) \Big\}, \tag{C.1}$$

where the ex ante value of not defaulting is

$$EV_0(b, b_c, s) = \int V_0(b, b_c, s, \epsilon) dF(\epsilon) \tag{C.2}$$

with ϵ representing a vector of i.i.d. preference shocks—one for each value of $b' \in \mathbb{B}$. That is, $\epsilon \equiv (\epsilon(\underline{b}), \epsilon(b_1), ..., \epsilon(b_{N-1}), \epsilon(\overline{b}))$. The value function conditional on a particular realization of the preference shock vector ϵ is

$$V_0(b, b_c, s, \epsilon) = \max_{b' \in \mathbb{B}} v_0^{b'}(b, b_c, s) + \epsilon(b') \tag{C.3}$$

with

$$v_0^{b'}(b, b_c, s) = u(c^{b'}(b, b_c, s)) + \beta \, \mathbb{E}_{s'|s} V(b', b_c', s'), \tag{C.4}$$

[38] Note that the default/repayment choice is not subject to preference shocks. It would be straightforward to extend the model to include default choice shocks, but it is not necessary to achieve convergence.

[39] All else equal, increasing the scale parameter makes the pricing function better behaved, which aids in computation. However, this comes at the cost of infusing more noise into the sovereign's borrowing decision.

[40] This implies that the expectation of an individual $\epsilon(b')$ is equal to 0.

where $c^{b'}(b, b_c, s)$ denotes current-period consumption given the incoming state (b, b_c, s) and a particular value of b'. Thus, $c^{b'}(b, b_c, s)$ equals

$$c^{b'}(b, b_c, s) = y + q(b', b'_c, s)(b' - (1-\delta)b) - \kappa b + b'_c(b_c, a) - b_c \tag{C.5}$$

with

$$b'_c(b_c, a) = \mathbf{1}_{\{a=1 \,\cap\, b_c=L\}} \times H \;+\; \mathbf{1}_{\{a=1 \,\cap\, b_c=H\}} \times L \;+ \mathbf{1}_{\{a=0\}}\, b_c\,, \tag{C.6}$$

where κ represents the coupon, $b'_c(b_c, a) - b_c$ represents the *net flows* vis-à-vis China, and $b'_c(b_c, a)$ indicates how the debt level with China evolves.

With $v_0^{b'}(b, b_c, s)$ in hand, we know the analytic solution for the ex ante[41] choice probabilities and ex ante value of not defaulting. For states where $d(b, b_c, s) = 0$, the probability the sovereign chooses debt position $b' \in \mathbb{B}$ is:

$$\mathbb{P}^{b'}(b, b_c, s) = \frac{\exp\left(\frac{v_0^{b'}(b,b_c,s)}{\rho_\eta}\right)}{\sum_{b' \in \mathbb{B}} \exp\left(\frac{v_0^{b'}(b,b_c,s)}{\rho_\eta}\right)}. \tag{C.7}$$

In other words, conditional on the sovereign choosing not to default, $\mathbb{P}^{b'}(b, b_c, s)$ is the probability that the sovereign chooses b' given state (b, b_c, s). The lenders take these choice probabilities as given and use them to price the bonds.

We can calculate the ex ante value of not defaulting as:

$$EV_0(b, b_c, s) = \mu_\eta + \tilde{\gamma}\rho_\eta + \rho_\eta \log\left(\sum_{b' \in \mathbb{B}} \exp\left(\frac{v_0^{b'}(b, b_c, s)}{\rho_\eta}\right)\right). \tag{C.8}$$

The functional form of the value of default is unchanged relative to that shown in the main body of the paper:

$$V_1(b_c, s) = u\big(y - \phi(y) + b'_c(b_c, a) - b_c\big) + \beta \mathbb{E}_{s'|s}\Big[\theta V(0, b'_c, s') + (1-\theta)V_1(b'_c, s')\Big], \tag{C.9}$$

subject to (C.6).

Let $\hat{d}(b', b'_c, s')$ denote the period-ahead default policy and $\hat{b}(b', b'_c, s', \epsilon')$ the period-ahead borrowing policy. Note that while $\hat{b}(\cdot)$ depends on the realization of the preference shock vector ϵ', the period-ahead default policy $\hat{d}(\cdot)$ does not. This is because the preference shocks are realized only if the sovereign chooses not to default—that is, $\hat{d}(b', b'_c, s') = 0$. The equilibrium pricing function then follows:

$$q(b', b'_c, s) = \frac{1}{1+r}\, \mathbb{E}_{s'|s}\left[1 - \hat{d}\,(b', b'_c, s')\right]\left[\kappa + (1-\delta)\int_{\epsilon'} q\left(\hat{b}\,(b', b'_c, s', \epsilon')\,, b''_c, s'\right) dF(\epsilon')\right]. \tag{C.10}$$

Let $\mathbb{P}^{b'}(b, b_c, s)$ denote the probability a borrower will choose b' given that it entered the period with states (b, b_c, s) *and* chose to repay its current-period debt. We can replace the

[41] Prior to the realization of ϵ.

integral in the second bracketed term with a summation because of the type-1 extreme value shocks:

$$q(b', b'_c, s) = \frac{1}{1+r}\, \mathbb{E}_{s'|s} \left[1 - \hat{d}\,(b', b'_c, s')\right] \left[\kappa + (1-\delta) \sum_{\hat{b}'' \in \mathbb{B}} q\left(\hat{b}'', b''_c, s'\right) \times \mathbb{P}^{\hat{b}''}(b', b'_c, s')\right]. \tag{C.11}$$

C.2 Chinese retrenchment risk model with preference shocks

To incorporate preference shocks, the retrenchment risk model needs to be amended in a manner similar to the baseline model.

The government's value function at the beginning of the period is:

$$V\,(b, b_c, s) = \max_{d\,\in\,\{0,1\}} \Big\{ dV_1(b_c, s) + (1-d) EV_0(b, b_c, s) \Big\}. \tag{C.12}$$

The value of not defaulting, prior to the realization of ϵ, is:

$$EV_0(b, b_c, s) = \int V_0(b, b_c, s, \epsilon) dF(\epsilon). \tag{C.13}$$

After ϵ is realized, the ex post no-default value function is:

$$V_0(b, b_c, s, \epsilon) = \max_{b' \in \mathbb{B}} v_0^{b'}(b, b_c, s) + \epsilon(b'), \tag{C.14}$$

where

$$v_0^{b'}(b, b_c, s) = u(c^{b'}(b, b_c, s)) + (1 - p_{SS}) \beta \mathbb{E}_{s'|s} V(b', b'_c, s') + p_{SS} \beta \mathbb{E}_{y'|y} W(b', b'_c, y'), \tag{C.15}$$

where $c^{b'}(b, b_c, s)$ equals

$$c^{b'}(b, b_c, s) = y + q(b', b'_c, s)(b' - (1-\delta)b) - \kappa b + b'_c(b_c, a) - b_c. \tag{C.16}$$

The choice probabilities are denoted by $\mathbb{P}_V^{b'}(b, b_c, s)$.

The value of default is:

$$\begin{aligned} V_1(b_c, s) = u\big(y - \phi(y) + b'_c(b_c, a) - b_c\big) \\ + \beta(1 - p_{SS}) \mathbb{E}_{s'|s} \Big[\theta V(0, b'_c, s') + (1-\theta) V_1(b'_c, s')\Big] \\ + \beta p_{SS} \mathbb{E}_{y'|y} \Big[\theta W(0, b'_c, y') + (1-\theta) W_1(b'_c, y')\Big]. \end{aligned} \tag{C.17}$$

A new set of value functions and pricing schedules are required for the periods on and after

a retrenchment shock realization. The value functions W, EW_0, W_0, W_1 satisfy:

$$W\left(b, b_c, y\right) = \max_{\tilde{d} \in \{0,1\}} \left\{ \tilde{d} W_1(b_c, y) + (1 - \tilde{d}) EW_0(b, b_c, y) \right\}, \tag{C.18}$$

where

$$EW_0(b, b_c, y) = \int W_0(b, b_c, y, \epsilon) dF(\epsilon) \tag{C.19}$$

with

$$W_0(b, b_c, y, \epsilon) = \max_{b' \in \mathbb{B}} w_0^{b'}(b, b_c, y) + \epsilon(b'), \tag{C.20}$$

where

$$w_0^{b'}(b, b_c, y) = u(c(b', b_c, y)) + \beta \, \mathbb{E}_{y'|y} W(b', 0, y'), \tag{C.21}$$

subject to

$$c(b', b_c, y) = y + \tilde{q}(b', y)(b' - (1 - \delta)b) - \kappa b - b_c. \tag{C.22}$$

The b' choice probabilities are denoted by $\mathbb{P}_W^{b'}(b, b_c, y)$.
The value of default is:

$$W_1(b_c, y) = u\big(y - \phi(y) - b_c\big) + \beta \mathbb{E}_{y'|y} \Big[\theta W(0, 0, y') + (1 - \theta) W_1(0, y') \Big]. \tag{C.23}$$

The bond prices q and $\tilde{q}$ are jointly given by the following functional equations:

$$q(b', b_c', s) = \frac{1}{1+r}(1 - p_{SS}) \, \mathbb{E}_{s'|s} \left[1 - \hat{d}\left(b', b_c', s'\right) \right] \left[\kappa + (1 - \delta) \sum_{\hat{b} \in \mathbb{B}} q\left(\hat{b}, b_c'', s'\right) \times \mathbb{P}_V^{\hat{b}}(b', b_c', s') \right] \tag{C.24}$$

$$+ \quad \frac{1}{1+r} p_{SS} \, \mathbb{E}_{y'|y} \left[1 - \hat{\tilde{d}}\left(b', b_c', y'\right) \right] \left[\kappa + (1 - \delta) \sum_{\hat{\tilde{b}} \in \mathbb{B}} \tilde{q}\left(\hat{\tilde{b}}, y'\right) \times \mathbb{P}_W^{\hat{\tilde{b}}}(b', b_c', y') \right],$$

and

$$\tilde{q}(b', y) = \frac{1}{1+r} \, \mathbb{E}_{y'|y} \left[1 - \hat{\tilde{d}}\left(b', 0, y'\right) \right] \left[\kappa + (1 - \delta) \sum_{\hat{\tilde{b}} \in \mathbb{B}} \tilde{q}\left(\hat{\tilde{b}}, y'\right) \times \mathbb{P}_W^{\hat{\tilde{b}}}(b', 0, y') \right], \tag{C.25}$$

where $b_c'' = b_c'(b_c', a')$ (with $b_c'(\cdot)$ defined by (C.6)) and where $\{\hat{d}, \hat{\tilde{d}}\}$ denote the period-ahead default rules the lenders expect the government to follow.

C.3 Computational strategy

We discretize both the bond grid and the income grid. The bond grid has 225 equally spaced nodes between 0 and 1. We use the Rouwenhorst method to approximate the log income

process, and the income grid has 75 nodes. To compute the Markov Perfect Equilibrium, we utilize a strategy similar to the method outlined in Mihalache (2025).

C.4 Computation of the baseline model

We describe the solution method starting from an arbitrary iteration $k \geq 1$. For $k = 0$ (i.e., at the beginning of the algorithm), we set the initial values of the pricing, value, and policy functions as follows:[42]

$$\begin{aligned}
V_1^0(b_c, s) &= \frac{u(y - \phi(y) + b_c'(b_c, a) - b_c)}{1 - \beta} \\
\mathbb{P}^{0,b'=0}(b, b_c, s) &= 1 \\
q^0(b', b_c', s) &= 0 \\
EV_0^0(b, b_c, s) &= \frac{u(y - \kappa b + b_c'(b_c, a) - b_c)}{1 - \beta} \\
V^0(b, b_c, s) &= \max\{V_1^0(b_c, s), EV_0^0(b, b_c, s)\} \\
d^0(b, b_c, s) &= \mathbf{1}_{\{V_1^0(\cdot) > EV_0^0(\cdot)\}}.
\end{aligned}$$

At the start of an iteration, we enter with pricing schedule $q^k(\cdot)$, choice probabilities $\mathbb{P}^k(\cdot)$, default policy $d^k(\cdot)$, and value functions $V_1^k(\cdot)$, $EV_0^k(\cdot)$, $V^k(\cdot)$.

1. Use the choice probability $\mathbb{P}^k(\cdot)$ and default policy $d^k(\cdot)$ to calculate $q^{k+1}(\cdot)$ according to:

$$q^{k+1}(b', b_c', s) = \frac{1}{1 + r} \mathbb{E}_{s'|s} \left[1 - d^k\left(b', b_c', s'\right)\right] \left[\kappa + (1 - \delta) \sum_{\hat{b}'' \in \mathbb{B}} q^k\left(\hat{b}'', b_c'', s'\right) \times \mathbb{P}^{k,\hat{b}''}(b', b_c', s')\right]. \tag{C.26}$$

2. Use $q^{k+1}(\cdot)$ and the iteration k value functions to compute $EV_0^{k+1}(\cdot)$, $\mathbb{P}^{k+1,b'}(\cdot)$, and $V_1^{k+1}(\cdot)$.

$$\begin{aligned}
v_0^{b',k+1}(b, b_c, s) &= u(c^{b',k+1}(b, b_c, s)) + \beta \, \mathbb{E}_{s'|s} V^k(b', b_c', s') \\
&\text{s.t } c^{b',k+1}(b, b_c, s) = y + q^{k+1}(b', b_c', s)(b' - (1 - \delta)b) - \kappa b + b_c'(b_c, a) - b_c
\end{aligned}$$

$$EV_0^{k+1}(b, b_c, s) = \rho_\eta \log\left(\sum_{b' \in \mathbb{B}} \exp\left(\frac{v_0^{b',k+1}(b, b_c, s)}{\rho_\eta}\right)\right)$$

[42] Models of long-term debt are known to suffer from multiple equilibria. Different initial guesses may lead to different equilibrium objects.

$$\mathbb{P}^{k+1,b'}(b,b_c,s)=\frac{\exp\left(\frac{v_0^{b',k+1}(b,b_c,s)}{\rho_\eta}\right)}{\sum_{b'\in\mathbb{B}}\exp\left(\frac{v_0^{b',k+1}(b,b_c,s)}{\rho_\eta}\right)}$$

$$V_1^{k+1}(b_c,s)=u\big(y-\phi(y)+b_c'(b_c,a)-b_c\big)+\beta\mathbb{E}_{s'|s}\Big[\theta V^k(0,b_c',s')+(1-\theta)V_1^k(b_c',s')\Big].$$

3. Use $EV_0^{k+1}(\cdot)$ and $V_1^{k+1}(\cdot)$ to calculate $V^{k+1}(\cdot)$ and $d^{k+1}(\cdot)$.

$$V^{k+1}(b,b_c,s)=\max\{V_1^{k+1}(b_c,s),EV_0^{k+1}(b,b_c,s)\}$$

$$d^{k+1}(b,b_c,s)=\mathbf{1}_{\{V_1^{k+1}(b_c,s)>EV_0^{k+1}(b,b_c,s)\}}.$$

4. Check for convergence: If $\max|q^{k+1}(\cdot)-q^k(\cdot)|<10^{-9}$ and $\max|V^{k+1}(\cdot)-V^k(\cdot)|<10^{-9}$, convergence is achieved. If not, return to step 1 with the updated functions.

C.5 Computation of the retrenchment risk model

In the version of the model with retrenchment risk, the sovereign can be in one of three stages: (i) prior to the retrenchment shock, (ii) the period of the retrenchment shock, (iii) all periods after the retrenchment shock (post-retrenchment). To compute the Markov Perfect Equilibrium, we start with the last stage. We first compute the post-retrenchment equilibrium objects (stage (iii)). We then use these post-retrenchment functions to compute the retrenchment shock period objects (stage (ii)). Finally, we use the compute functions from stages (ii) and (iii) to compute the equilibrium objects prior to the shock.

We compute the retrenchment risk version of the Markov Perfect Equilibrium as follows:

1. Follow the steps described in section C.4 to compute the post-retrenchment (i.e., $b_c=0$ for the rest of time) equilibrium objects: $W_1(0,y)$, $EW_0(b,0,y)$, $W(b,0,y)$, $\tilde{d}(b,0,y)$, $\mathbb{P}_W^{b'}(b,0,y)$, and $\tilde{q}(b',y)$.

2. Use the post-retrenchment equilibrium objects from step (1) to compute $W_1(b_c,y)$, $EW_0(b,b_c,y)$ $W(b,b_c,y)$, $\tilde{d}(b,b_c,y)$. This amounts to accounting for positive values of b_c in the current period utility and using the expectation of $W(b',0,y')$ as the continuation value.

3. Given $W_1(b_c,y)$, $EW_0(b,b_c,y)$ $W(b,b_c,y)$, $\tilde{d}(b,b_c,y)$, $\mathbb{P}_W^{b'}(b,b_c,y)$, and $\tilde{q}(b',y)$, use the strategy described in section C.4 to compute the pre-retrenchment equilibrium objects $V(\cdot)$, $EV_0(\cdot)$, $V_1(\cdot)$, $d(\cdot)$, and $\mathbb{P}_V^{b'}(\cdot)$.