The Dollar in an Era of International Retrenchment*

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Abstract

This paper uses a quantitative theory to explore whether escalating geoeconomic conflict and protectionism could threaten the dominant role of the US dollar in the international monetary system. The theory emphasizes the joint determination of countries' portfolio choices and the currency used for financing international trade, and introduces the Chinese yuan as a potential competitor to the dollar. We find that even a substantial increase in trade tariffs and protectionism would not change the dollar's dominant role. However, policies directly supporting the yuan's international use could end the dollar's dominance if implemented for more than a decade. US economic sanctions on a substantial portion of dollar assets held abroad also pose a threat, but only if maintained for more than 15 years. If competing trading blocs substantively eliminated trade across blocs, a regime with bloc-specific dominant currencies becomes likely.

JEL classification: E44, F02, F33, F41, G15
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1 Introduction

The post-War trend towards ever greater trade openness and global financial integration has exhibited signs of reversal since the 2008 financial crisis. Deepening isolationism could have many economics consequences, including potentially changing the special role that the US dollar plays in the international monetary system. The goal of this paper is to explore the potential consequences of international retrenchment for the dollar's dominance in global trade. Could emerging geoeconomic conflict, and perhaps even *fragmentation* along distinct trade blocs, threaten the dollar's central position in international exchange? If so, how severe would the fragmentation have to be to affect the current equilibrium meaningfully? Would the members of an emerging non-US bloc benefit from transitioning to using a different currency to finance and facilitate their trade?

To analyze these questions, we build a theory of currency dominance based on Chahrour and Valchev (2021). The theory focuses on the trade financing decisions of firms who face limited contract enforceability across borders and therefore use safe assets to guarantee international transactions. A feedback loop between the choice to save in a particular currency and its use for trade financing gives rise to equilibria with a single dominant currency. Under reasonable calibrations, the model has several steady states corresponding to different dominant currency regimes. Parameters and initial conditions jointly determine how stable a currency's dominance is likely to be over time.

Our analysis of the theory explores how a new upstart currency, the Chinese yuan, might expand its international role in the context of geoeconomic conflict. We consider a variety of policies that could instigate a change in currency dominance, including rising trade barriers, US financial sanctions, and policies specifically designed to promote international adoption of the yuan. These counterfactuals are meant to capture, among other things, the trade barriers and frictions that arise due to geopolitically motivated actions, such as the recent US-China trade conflict and the sanctions imposed on Russia since the start of its war in Ukraine.

Unlike the preceding literature, our theory allows for potential fragmentation in the currency choices of firms in the rest-of-world along two potentially distinct trading blocs, a China-centric "eastern" bloc and a US-centric "western" bloc. This introduces the possibility that trading firms located in different blocs make different currency choices. Using the model, we can explore if and when a *single* globally dominant currency is no longer the most likely outcome, and whether the international monetary system might instead bifurcate into two regions, each with their own dominant asset. We use this environment to study the potential

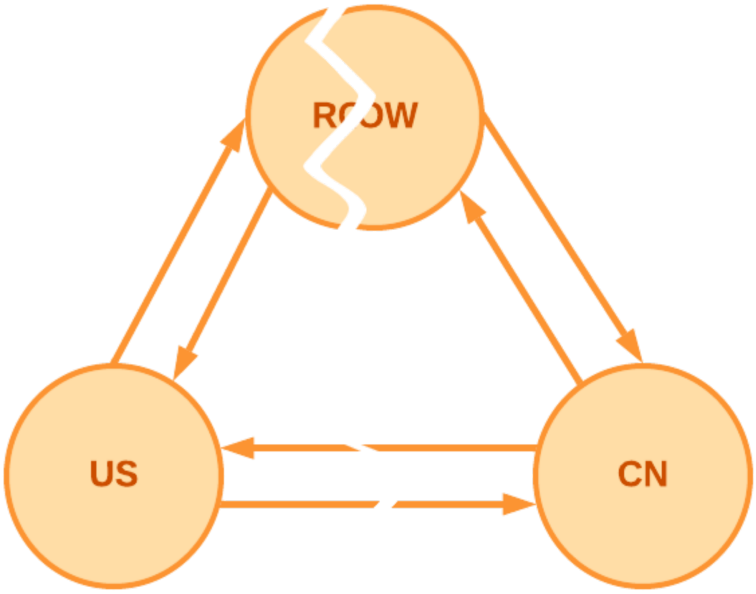

Figure 1: A stylized depiction of global retrenchment.

effects of increasing China-US isolation, and the corresponding pressure on smaller countries to "pick sides" in these geoeconomic conflicts. Figure 1 captures a stylized view of the potential east-west fragmentation that we consider in this paper.

A first result of our calibrated model is that unless China relaxes the significant capital controls it has historically imposed, other policy tools will be ineffective at shifting the international monetary system away from the US dollar. Moreover, even with full liberalization of the Chinese capital account, our model implies that initial conditions are a powerful force for sustaining currency coordination, and most of the scenarios we consider result in only marginal changes to the share of transactions financed and conducted using dollars. For example, unilateral tariffs by the US on Chinese imports generate a slight increase in dollar usage in international markets, but a tit-for-tat response by China almost perfectly negates this effect, while overall trade clearly falls. A broader US policy restricting trade with both China and its main economic allies would also be insufficient to substantially change the dollar's international role. Overall, these results suggest that the dollar-dominant status quo would likely survive substantially more international trade retrenchment than we currently see in the data.

On the other hand, policies that are more directly targeted towards spurring yuan usage internationally could have a greater impact. For example, we find that an expansion of China's recent policy of providing direct support for the internalization of the yuan could facilitate a transition to a new equilibrium in which the yuan plays the dominant role in international exchange across the world.[1] Similarly, if the US imposed financial sanctions beyond those currently imposed on Russia and Iran, the world could also transition away from dominant use of the dollar. Moreover, in a scenario with extremely restricted trade between the eastern and western blocs, the world would converge to a "bifurcated" equilibrium, in which each bloc conducts trade using a different currency. In short, our model implies that a transition away from dollar dominance is difficult but not impossible to achieve with the policy tools we introduce.

One advantage of our dynamic model relative to existing models of currency competition (which are predominantly static) is that we can explicitly take into account initial conditions. In the initial steady state of our calibrated economy, asset holdings in the rest-of-world are strong tilted towards dollars and these holdings generate a huge "moat" that protects dollar dominance across a range of scenarios.

Another advantage is that our model can distinguish the costs and benefits of dominance in steady state from those incurred by a *transition* between different currency regimes. We find that in steady state the US does not benefit from the dollar's dominance. This occurs because currency dominance is linked by our theory to being a net foreign debtor. Nevertheless, the *transition* to dominance previously brought benefits to the US and, conversely, our results show that a transition away would be costly. A temporary policy of supporting the conduct of trade finance using the yuan, for example, would cost the US 0.7% of permanent consumption and benefit China by 0.6%, if it was in place long enough to establish the yuan as a dominant currency. More generally, a transition away from dollar dominance always carries substantial welfare costs for the US, even when it leads to higher consumption in the long run. On the other hand, switches in the equilibrium of the international monetary system have negligible impact on the rest-of-world countries.

Relation to existing literature

This paper is closely related to the literature on dominant international currencies, which is nicely surveyed by Gourinchas et al. (2019). There are many theories dominance, most of which can be classified as operating through one (or more) of the three traditional roles of

[1] See Prasad (2016) for an overview of these existing efforts and Bahaj and Reis (2020) for a detailed exploration the consequences of introducing RMB central bank swap lines.

money – as a store of value, unit of account, or medium of exchange. Examples in the first group include Mendoza et al. (2009); Gourinchas et al. (2017); Bocola and Lorenzoni (2020); Maggiori (2017); Brunnermeier and Huang (2018); Bianchi et al. (2018); He et al. (2019).

There is a similarly long tradition of modeling specialness and dominance via a unit of account or "currency-anchor" type of mechanism (e.g. Engel (2006); Gopinath et al. (2010); Gopinath (2016); Goldberg and Tille (2016); Mukhin (2022); Ilzetzki et al. (2019); Eren and Malamud (2021)). Lastly, the literature on mediums of exchange or "global currencies" often centers on search-based theories of money and emphasizes the potential coexistence of multiple currencies (e.g. Matsuyama et al., 1993; Zhou, 1997; Wright and Trejos, 2001; Rey, 2001; Kannan, 2009; Devereux and Shi, 2013; Zhang, 2014; Doepke and Schneider, 2017), though the mechanisms that give rise to coexistence are generally not related to international segmentation. Recent work by Coppola et al. (2023) also uses a search friction to capture the liquidity externalities in firms' bond denomination choices.

This paper follows Chahrour and Valchev (2021) in interacting two of these mechanisms for specialness: the demand for store of value assets and the need for a medium of exchange in international trade. Because of this interaction, trade flows play a central role in determining international currency choice. Moreover, the model is fully dynamic, with (typically) determinant equilibrium paths; dominance is embodied by the existence of multiple steady states with distinct regions of attraction. These features make the framework well-suited for studying the effect of trade fragmentation on the international monetary system and taking into account the initial conditions that favor the dollar. By contrast, most of the related literature uses formally or effectively static models, including Gopinath and Stein (2020) who study the the interaction of the unit of account and store of value roles.

The unique modeling feature of the current paper relative to the literature, including Chahrour and Valchev (2021), is that it considers *heterogeneity* among the potential users of international currencies. The previous literature has focused on frameworks where the rest-of-world countries are ex-ante symmetric, so that all countries make the same currency choices. Instead, the central question of our paper is what happens if, due to trade conflict for example, firms in different regions make different choices regarding their use of international currencies.

The theme of our paper, currency competition between two potential national hegemons, is shared with Farhi and Maggiori (2017). In that paper, however, the international currency demand is due to safety premia, not liquidity premia based on trade flows as we have it. Along with the other papers cited above, the Farhi and Maggiori (2017) framework is a static model with a group of identical foreign investors who choose which international currencies to

hold, while a central innovation to our paper is to consider fragmentation and heterogeneity in the use of outside international currencies.

Recent events have also motivated renewed work investigating the effects of economic sanctions, including Itskhoki and Mukhin (2022); Lorenzoni and Werning (2023); Bianchi and Sosa-Padilla (2024); Becko (2024); de Souza et al. (2024). None of these papers explore the implications for the dollar's continued international role, however.

2 A Theory of Trade Blocs with Competing Currencies

The model world economy consists of two big economies, the United States (US) and China (CN), along with a continuum of small open economies making up the rest-of-the world. The relative sizes of the US and CN are captured by their measures, denoted μ_{us} and μ_{cn} respectively. In our baseline calibration, we assume that the US and China are of equal size, so that $\mu_{us} = \mu_{cn}$. The rest-of-the-world is divided into two subregions, A and B. These regions each contain many small countries, each of measure zero and *ex ante* symmetric, though trade policy will potentially lead to different outcomes in each region. The respective regions have measures μ_a and μ_b. We normalize $\mu_{us} + \mu_{cn} + \mu_a + \mu_b = 1$.

Countries are indexed by $j \in \{us, ch, [0, \mu_a + \mu_b]\}$. Each country j is populated by a representative consumer, a final-good aggregation sector, and continuum of risk-neutral international trade firms. Households earn an exogenous stream of domestic output, Y_{jt}, and allocate their income across different consumption and savings vehicles. Trading firms pay a fixed cost to enter the market, obtain financing for their activities and carry out either import or export trade with matched firms in a foreign country. The crucial choice of the trading firm is the currency in which it obtains its trade funding, and we consider a currency dominant when it is the primary source of trade financing around the globe.

We first summarize the problem of the household before turning to a more detailed description of the actions of the international trade firms. The main modeling difference, relative to Chahrour and Valchev (2021), is that we allow for two rest-of-world regions that may hold different portfolios and make different currency choices. We also introduce a set of new policy tools that allow us to conduct policy experiments and study their differential impact on currency choice across the two rest-of-world regions. Lastly, we introduce some minor extensions of the original framework to improve the quantitative realism of the model, including a more general CES structure for household preferences and rest-of-world safe assets. We review the different pieces of the model in detail below.

Households

Households must allocate their income from the domestic endowment among the goods of four countries/regions in the economy, the bonds issued by the two large countries, the US and China, and a set of perfectly substitutable bonds issues by the rest of world countries. The household consumption aggregator in a country j is a CES function

$$C_{jt} = \left((a_j)^{\frac{1}{\eta}} C_{jt}^{j\ \frac{\eta-1}{\eta}} + (1-a_j)^{\frac{1}{\eta}} \left(\mu_{us}^{\frac{1}{\eta}} C_{jt}^{us\ \frac{\eta-1}{\eta}} + \mu_{cn}^{\frac{1}{\eta}} C_{jt}^{cn\ \frac{\eta-1}{\eta}} + \mu_a^{\frac{1}{\eta}} C_{jt}^{a\ \frac{\eta-1}{\eta}} + \mu_b{}^{\frac{1}{\eta}} C_{jt}^{b\ \frac{\eta-1}{\eta}} \right) \right)^{\frac{\eta}{\eta-1}}. \tag{1}$$

Consumption originating from rest-of-world countries is aggregated according to the two regions A and B, i.e. $C_{jt}^a = \int_0^{\mu_a} C_{jt}^i di$ and $C_{jt}^b = \int_{\mu_a}^{\mu_a+\mu_b} C_{jt}^i di$. In equation (1), the parameter a_j captures the home bias in the domestic consumption basket of country j; when $a_j = 0$ then consumption weights in the CES function depend only on the countries' relative sizes. The country j consumer price of a good originating in country j' is $P_{jt}^{j'}$. Due to trade frictions, a good's local price is generally different from the price of the good in its originating country, $P_{j',t}^{j'} \neq P_{jt}^{j'}$. Our model is real and we select the Region A good as numeraire, setting $P_{at}^a = 1$. Cost-minimization of the household consumption basket implies the domestic price index,

$$P_{jt} = \left((a_j)\, P_{jt}^{j\ 1-\eta} + (1-a_j) \left(\mu_{us} P_{jt}^{us\,1-\eta} + \mu_{cn} P_{jt}^{cn\,1-\eta} + \mu_a P_{jt}^{a\ 1-\eta} + \mu_b P_{jt}^{b\ 1-\eta} \right) \right)^{\frac{1}{1-\eta}}.$$

Substituting in the cost-minimized consumption bundle, the household in country j solves the following optimization problem

$$\max_{C_{jt}, B_{jt}^{\$}, B_{jt}^{¥}} E_0 \sum_{t=0}^{\infty} \beta^t \frac{C_{jt}^{1-\sigma}}{1-\sigma} \qquad \text{subject to}$$

$$\begin{aligned} P_{jt}C_{jt} + P_{us,t}^{us} Q_t^{\$} B_{jt}^{\$} + P_{cn,t}^{cn} Q_t^{¥} B_{jt}^{¥} + Q_t^{row} B_{jt}^{row} + adjcosts_{jt} \\ = P_{jt}^j Y_{jt} + P_{us,t}^{us} B_{jt-1}^{\$} + P_{cn,t}^{cn} B_{jt-1}^{¥} + B_{jt-1}^{row} + lqprem_{jt} + \Pi_{jt} + T_{jt}, \end{aligned} \tag{2}$$

and a non-negativity constraint on bond-holdings. The left-hand side of (2) depicts the household's uses for funds, including aggregate consumption and purchases of bonds denominated either in US or Chinese currency, or in the world numeraire good (i.e. B_{jt}^{row}). Bonds of the first two types deliver one risk-free unit of the US and Chinese output good respectively, so that their prices $Q_t^{\$}$ and $Q_t^{¥}$ are also multiplied by the respective output good price.

Changing bond holdings is costly, with adjustment costs that are quadratic in terms

of percent deviations from the country-wide bond holdings entering the period, $\underline{B}^{\$}_{j,t-1}$ and $\underline{B}^{¥}_{j,t-1}$. The term $adjcosts_{jt}$ in (2) captures these adjustment costs and is given by

$$adjcosts_t \equiv P^{us}_{us,t} Q^{\$}_t \frac{\tau}{2} \left(\frac{B^{\$}_{jt} - \underline{B}^{\$}_{j,t-1}}{\underline{B}^{\$}_{j,t-1}} \right)^2 + P^{¥}_{¥,t} Q^{¥}_t \frac{\tau}{2} \left(\frac{B^{¥}_{jt} - \underline{B}^{¥}_{j,t-1}}{\underline{B}^{¥}_{j,t-1}} \right)^2 + Q^{row}_t \frac{\tau}{2} \left(\frac{B^{row}_{jt} - \underline{B}^{row}_{j,t-1}}{\underline{B}^{row}_{j,t-1}} \right)^2.$$

These adjustment costs are zero at (any) steady state, and thus have no effect on steady states, but serve to limit the volatility of capital flows outside of steady state.

The right-hand side of equation (2) reflects the household's sources of funds, which include the value of the exogenous endowment of the domestic good, return on past bond holdings, the profits earned by trading firms, and any lump-sum transfers from the government. The right-hand side of equation (2) also reflects a key feature of the model: the household's bond holdings each earn a country- and bond-specific liquidity premium, Δ^c_{jt}, which reflects country j's usage of currency c in international exchange. This premium is an *endogenous equilibrium* object, which the household takes as given when it chooses it portfolio holdings. The premium is proportional to bond holdings, so that

$$lqprem_t \equiv \Delta^{\$}_{jt} P^{us}_{us,t} Q^{\$}_t B^{\$}_{jt} + \Delta^{¥}_{jt} P^{cn}_{cn,t} Q^{¥}_t B^{¥}_{jt} + \Delta^{row}_{jt} Q^{row}_t B^{row}_{jt}.$$

and detail the determination of the Δ^c_{jt} below.

The first order conditions implied by the household problem consist of an Euler equation for dollars and yuan bond choices,

$$1 = \beta E_t \left[\left(\frac{C_{j,t+1}}{C_{j,t}} \right)^{-\sigma} \frac{P_{jt}}{P_{j,t+1}} \frac{P^{us}_{us,t+1}}{P^{us}_{us,t}} \frac{1}{Q^{\$}_t \left(1 - \Delta^{\$}_{j,t} + \tau \frac{B^{\$}_{jt} - \underline{B}^{\$}_{j,t-1}}{\underline{B}^{\$}_{j,t-1}} \right)} \right] \tag{3}$$

$$1 = \beta E_t \left[\left(\frac{C_{j,t+1}}{C_{j,t}} \right)^{-\sigma} \frac{P_{jt}}{P_{j,t+1}} \frac{P^{cn}_{cn,t+1}}{P^{cn}_{cn,t}} \frac{1}{Q^{¥}_t \left(1 - \Delta^{¥}_{j,t} + \tau \frac{B^{¥}_{jt} - \underline{B}^{¥}_{j,t-1}}{\underline{B}^{¥}_{j,t-1}} \right)} \right] \tag{4}$$

with a similar equation holding for rest-of-world bonds. Naturally, a higher liquidity premium Δ^c_{jt} makes the bond of type c more desirable, ceteris paribus.

Trading firms

International trade flows through specialized firms that conduct all imports and exports via frictional matching markets, where trade transactions must be collateralized in a manner

similar to a letter of credit instrument.

Upon paying a fixed cost ϕ in numeraire units, firms enter the import/export market.[2] Firms only pay this cost if the expected profits from entering are weakly positive, so that the measure of operational trade firms m_{jt} in each country is determined by a zero-profit indifference condition. Once operational, a firm in country j chooses the probabilities with which it will become an importer from country i or an exporter to country i, for any i. We denote these probabilities by p^{im}_{jit} and p^{ex}_{jit} respectively.

After choosing to enter and the probabilistic direction of their trade, firms must next choose the type of currency in which they will attempt to finance their trade activity. We assume that financing can only occur in dollars or yuan. Financing is acquired via a domestic search and matching market, in which households offer assets from their portfolios as intra-period loans to the firms in their own country, in order for the firms to then use them as a guarantee for their side of a potential international transaction. Thus, the total value of assets of each type being offered in the trade finance markets of country j in period t are $\nu P^{us}_{us,t} B^{\$}_{jt} Q^{\$}_t$ and $\nu P^{cn}_{cn,t} B^{¥}_{jt} Q^{¥}_t$ respectively. The parameter ν captures a notion of "velocity" of safe assets use and represents the number of transactions a unit of bond holdings can support per model period. Since our model will be calibrated at an annual frequency, and the typical letter of credit duration is around 6 - 8 weeks, we fix $\nu = 8$ throughout. A funded firm pays a fee r in return for the intraperiod loan of the asset.

The probability of success faced by a country-j trading firm seeking dollar financing is

$$p^{\$}_{jt} = \frac{M^F\left(m_{jt}X_{jt}, \nu P^{us}_{us,t} B^{\$}_{jt} Q^{\$}_t\right)}{m_{jt}X_{jt}} = M^F\left(1, \frac{\nu P^{us}_{us,t} B^{\$}_{jt} Q^{\$}_t}{m_{jt}X_{jt}}\right), \tag{5}$$

where X_{jt} is the fraction of country-j firms choosing to seeks dollar financing, and thus $m_{jt}X_{jt}$ is the mass of country-j firms applying for dollar funding. The matching function $M^F(u,v)$ is constant returns to scale and in our quantitative exercises we use the den Haan et al. (2000) matching function

$$M^F(u,v) = \frac{uv}{(u^{\frac{1}{\xi_F}} + v^{\frac{1}{\xi_F}})^{\xi_F}},$$

which allows for an elasticity parameter ξ_F. The probability with which a country-j trading firm seeking yuan-based financing finds a credit match, $p^{¥}_{jt}$, is analogous.

We exogenously fix the financing mix of the large countries, $X_{us,t}$ and $X_{cn,t}$, and focus

[2] The size of the firm is also normalized by the numeraire so that the choice of numeraire is irrelevant for allocations.

on the choice of financing currency of firms in the rest-of-world regions. In making their funding choice, these firms compare the expected profits of using dollar and yuan financing averaged across all potential destinations and trade directions according to the optimally chosen probabilities p_{jit}^{im} and p_{jit}^{ex}. For example, a firm funded in dollars has expected profit

$$\tilde{\Pi}_{jt}^{\$} = \sum_{i \neq j} p_{jit}^{im} \pi_{jit}^{\$,im} + \sum_{i \neq j} p_{jit}^{ex} \pi_{jit}^{\$,ex}.$$

where $\pi_{jit}^{c,im}$ and $\pi_{jit}^{c,ex}$ are the flow profits from importing from or exporting to country i while being funded with currency c. Lastly, since these profits are conditional on having found funding, the expected profit ex-ante, accounting for the probability of finding funding and the associated financing fees is

$$\Pi_{jt}^{\$} = p_{jt}^{\$}(\tilde{\Pi}_{jt}^{\$} - r). \tag{6}$$

An analogous expression describes the profit from financing the firm in yuan.

In order to decide which currency to seek, the firm needs to compare $\Pi_{jt}^{\$}$ and $\Pi_{jt}^{¥}$. To match the reality that not all firms in a given country make the same choice of currency for their trade, we introduce an i.i.d. idiosyncratic preference shock across these two funding options, $\theta_{jt}^{(l)} \sim N(0, \sigma_\theta^2)$, which is specific to each firm (l) that operates in a country j. Thus, a firm l in country j chooses to finance in dollars whenever $V_{jt}(\theta_{jt}^{(l)})$ is positive, where

$$V_{jt}(\theta_{jt}^{(l)}) \equiv \Pi_{jt}^{\$} - \Pi_{jt}^{¥} + \theta_{it}^{(l)}.$$

Since the fundamental payoff from choosing the currency is independent of (l), this implies that firms will seek dollar funding if their indiosyncratic preference shock exceeds a threshold $\bar{\theta}_{jt}$, defined by the condition $V_{it}(\bar{\theta}_{jt}) = 0$. Hence, the resulting fraction of country-j trading firms using dollars is

$$X_{jt} = \int_0^1 \mathbb{1}(\theta_{jt}^{(l)} >= \bar{\theta}_{jt}) dl = 1 - \Phi\left(\frac{\bar{\theta}_{jt}}{\sigma_\theta}\right), \tag{7}$$

where $\Phi(\cdot)$ denotes the standard normal CDF.

In Chahrour and Valchev (2021), we only considered equilibria where $\bar{\theta}_{jt}$ was the same for all trading firms in the rest of the world; in this paper, we allow firms in Region A and Region B to settle on different cutoff choices for $\bar{\theta}_{jt}$. This gives the rise to the possibility that different rest-of-world regions use the dollar and yuan with different intensities in their trade. Considering the conditions under which and the extent to which they do this is a

central goal of this paper.

The remaining steps in trade unfold without trading firms taking further decisions. Firms that obtain financing search for a foreign trading counterpart (i.e. export or import from country i) according to the optimally chosen probabilities p^{im}_{jit} and p^{ex}_{jit}. Given those trading direction choices, country-j exporters match with country-i importers according to the technology $M^T(u,v) = \frac{uv}{(u^{\frac{1}{\varepsilon_T}}+v^{\frac{1}{\varepsilon_T}})^{\varepsilon_T}}$, which is of the same functional form as the matching function in credit markets, but allows for a different elasticity parameter ε_T.

The probability of a country-j exporter matching with a country-i importer is

$$p^{ei}_{jit} = \frac{M^T\left(\tilde{m}^{ex}_{jit}, \tilde{m}^{im}_{ijt}\right)}{\tilde{m}^{ex}_{jit}} = \left(1 + \left(\tilde{m}^{ex}_{jit}/\tilde{m}^{im}_{ijt}\right)^{1/\varepsilon_T}\right)^{-\varepsilon_T}.$$

The term $\tilde{m}^{ex}_{jit} \equiv p^{ex}_{jit} m_{it}(p^{\$}_{it}X_{it} + p^{¥}_{it}(1-X_{it}))$ in the above is the mass of *funded* firms in country-j seeking to export to country i, while $\tilde{m}^{im}_{ijt} \equiv p^{im}_{ijt} m_{it}(p^{\$}_{it}X_{it} + p^{¥}_{it}(1-X_{it}))$ is the mass firms in country i seeking to import from country-j. The corresponding probability of a country-j importer matching with a country-i exporter is $p^{ie}_{jit} = \left(1 + \left(\tilde{m}^{im}_{jit}/\tilde{m}^{ex}_{ijt}\right)^{1/\varepsilon_T}\right)^{-\varepsilon_T}$.

In a successful match between a country-j exporter and a country-i importer, the exporter buys the j good at its domestic market price P^j_{jt} and the importer then sells it to the country-i household at the prevailing market price in that location P^j_{it}. The transaction thus generates a gross surplus of $P^j_{it} - P^j_{jt}$.

Lastly, we introduce a collateral mismatch cost, κ, that applies to transactions where the counterparties use different types of collateral (e.g. one side uses dollars, while the other uses yuan). This cost can be micro-founded as the expected cost of default by one of the trade counterparties vis-a-vis its cross-border trading partner. Specifically, while we do not model stochastic shocks explicitly, real-world contracts are impacted by unexpected exchange rate fluctuations. This can result in situations where the collateral originally promised by one counterparty may not be enough, ex-post, to cover the debt owed to the other firm. The reduced-form parameter κ captures these and other types of expected costs of mismatched collateral across trading counterparties.[3]

The importer and exporter in a trading match split the surplus of their transaction via Nash bargaining, with the exporter having a Nash bargaining share of α. The effective "wholesale" price at which a country-j exporter sells to a country-i importer is thus $P^{whol}_{jit} = P^j_{jt} + \alpha(P^j_{it} - P^j_{jt})$. Thus, the expected profit of a dollar-funded firm looking to export from

[3]Other reasons to desire coordinated financing include contract complexity and the costs of converting and/or hedging cash flows in multiple currencies, which can be substantial (Bonetti, 2018).

country j to i is

$$\pi_{jit}^{\$,ex} = p_{jit}^{ei} \frac{\alpha}{P_{jit}^{whol}} \left[P_{it}^{j} - P_{jt}^{j} - \kappa P_{jit}^{whol} (1 - \tilde{X}_{it}) \right]. \tag{8}$$

First, the profit is realized only with the probability of successfully matching with a country i importer which is given by p_{jit}^{ei}. The term in square brackets in (8) is the net expected surplus per unit of goods traded, which is given by the gross markup on the imported good, net of the expected currency mismatch cost $\kappa P_{ji,t}^{whol}(1 - \tilde{X}_{it})$. In this expression,

$$\tilde{X}_{it} \equiv \frac{p_{it}^{\$} X_{it}}{p_{it}^{\$} X_{it} + p_{it}^{¥}(1 - X_{it})}$$

is the average use of dollar trade financing among the funded country-i firms (which are thus actively searching for trade counterparts), hence $1 - \tilde{X}_{i,t}$ is the probability of matching with a yuan-funded country-i importer, and thus having to incur the mismatch cost κ.

Lastly, the financing friction limits the overall value of the transaction to the value of the attached safe collateral, and since we assume firms borrow 1 unit of safe assets, the exporter earns α times the markup (the terms in square brackets) on $\frac{1}{P_{jit}^{whol}}$ units traded.

Government

The governments issue bonds in fixed supply, $\bar{B}^{\$}$ or $\bar{B}^{¥}$ in the large countries and $\bar{B}^{row}$ in the small. Lump-sum transfers by the government fund the interest expenditure on debt and after accounting for any net revenue from the tax instruments described below, so that $T_{us,t} = revenue_t + Q_t^{\$} \bar{B}^{\$} - \bar{B}^{\$}$.

Market clearing and equilibrium

In equilibrium, the liquidity premia a country-j household can earn on lending US and Chinese bonds respectively are equal to the frequency with which the household successfully lends that type of asset in its respective credit market, multiplied by the funding fee r:

$$\Delta_{jt}^{\$} = \frac{\nu m_{jt} X_{jt}}{\left[(m_{jt} X_{jt})^{1/\xi_F} + (\nu P_{us,t}^{us} B_{jt}^{\$} Q_t^{\$})^{1/\xi_F} \right]^{\xi_F}} r \tag{9}$$

$$\Delta_{jt}^{¥} = \frac{\nu m_{jt} (1 - X_{jt})}{\left[(m_{jt}(1 - X_{jt}))^{1/\xi_F} + (\nu P_{cn,t}^{cn} B_{jt}^{¥} Q_t^{¥})^{1/\xi_F} \right]^{\xi_F}} r \tag{10}$$

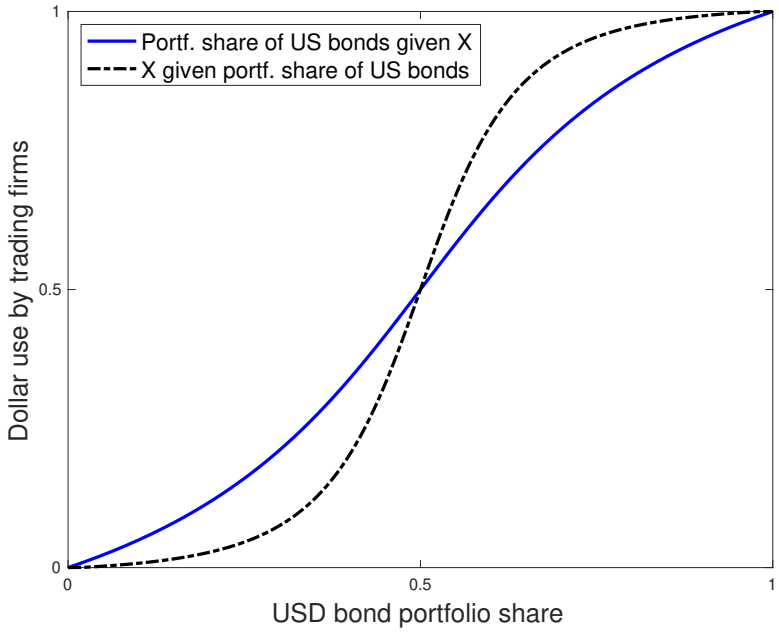

Figure 2: Intuition for multiple steady states in symmetric version of the model

A nice feature of (9) and (10) is that endogenous fluctuations of the liquidity premia make the deterministic steady-state portfolio allocations in dollar and yuan bonds determinate. For the rest-of-world asset, we need some additional assumptions to pin down steady-state holdings. For convenience, we introduce a small exogenous demand for the services rest-of-world bonds, z^{row}, in each country so that $\Delta_{jt}^{row} = \frac{\nu z^{row}}{\left[(z^{row})^{1/\xi_F} + (\nu B_{jt}^{row} Q_t^{row})\right]^{1/\xi_F}}$, which works in a manner very similar to the small adjustment costs strategy suggested by Schmitt-Grohé and Uribe (2003).

Intuition for multiple steady states

Here, we briefly review the intuition for the model mechanics. A deeper discussion of intuition alongside a simplified, analytical version of the model can be found in Chahrour and Valchev (2021).

The key mechanism in the model is a feedback between household portfolio choices and the financing choices of firms. In particular, when households hold a lot of a particular asset (dollars or yuan) that increases the asset's availability to firms who seek financing, and this encourages firms to seek that type of funding, other things equal. Household, in turn, are motivated to hold assets which can easily be lent out into the trade finance market, and thus earn a higher liquidity premium. As a result, high household holdings of dollar assets encourage firms to use that asset for trade, and visa versa.

Figure 2, reproduced from the appendix of Chahrour and Valchev (2021), captures these reinforcing effects in a stylized version of the model which assumes all rest-of-world firms make the same currency choices. The blue line depicts the optimal share of household portfolios held in dollar bonds, as a function of the fraction of firms opting to seek dollar financing. In turn, the black line depicts the firms' choice to use dollars as a function of the share of dollar assets in the portfolios of local households. The key observation is that both of these lines are upward sloping, potentially giving rise to multiple intersections, which correspond to multiple steady states with different asset positions and different equilibrium use of the dollar asset in trade.

The shape of the black line in Figure 2 is influenced, among other factors, by the presence of cross-country complementarities parametrized by the κ mismatch cost. Complementarities are stronger when κ is larger, which increases firms responsiveness to the financing choice of other firms, all else equal. For intermediate values of κ – a specific threshold is derived in Chahrour and Valchev (2021) – the cross-country complementarities are sufficiently strong to make the middle steady state (middle crossing) unstable, while the coordinated steady states (the extremes) are stable.

From the perspective of Figure 2, the goal of this paper is to think about how different trade and financial policies can change the level, slope, and shape of either of these lines.

3 Calibrating to the Status Quo

A calibration where the US and China are symmetric in many respects is useful for emphasizing the role of policy in driving asymmetry in adoption of the respective currencies. However, while the economic size, trade openness and the supply of safe assets across US and China are all roughly comparable, China imposes strict capital controls of foreign holdings of its bonds. Our approach is to calibrate the two economies to be perfectly symmetric, except for initial capital controls from China that discourage foreign households from holding Chinese debt. We find that with these capital controls in place, the yuan cannot play a large international role and the only steady state is a dollar-dominant one. In most of our subsequent policy experiments, we then assume that China relaxes capital controls prior to pursing other policies that might influence the global balance of currencies.[4]

To introduce a notion of capital controls, we assume the issuer of the asset — in this case, China — charges foreign buyers a proportional tax on the price of purchasing the asset.

[4]This calibration strategy contrasts with Chahrour and Valchev (2021), where the big countries are modeled after the US and Eurozone and are symmetric in all respects.

Parameter	Concept	Value
β	Time preference	0.960
$\mu_{us} = \mu_{cn}$	Big country measure	0.200
κ	Mismatch cost	0.010
r	Funding fee	0.005
ν	Exog. velocity	8.000
X_{us}	US dollar share	0.950
X_{cn}	CN dollar share	0.050
α	Exporters bargaining parameter	0.500
σ	Risk aversion	1.000
η	CES elasticity of substitution	4.000
ε_T	Elasticity of trade matching function	0.010
σ_θ^2	Variance of idio. shock	1e-06
τ	Portfolio adj. costs	0.040
$\tau^{H,¥}$	China capital controls (%)	0.750

Table 1: Exogenously Fixed Parameters

The tax is denoted $\tau_{jt}^{H,¥}$ and the household intertemporal Euler equation (4) for the yuan asset becomes,

$$1 = \beta E_t \left[\left(\frac{C_{j,t+1}}{C_{j,t}} \right)^{-\sigma} \frac{P_{jt}}{P_{j,t+1}} \frac{P_{cn,t+1}^{cn}}{P_{cn,t}^{cn}} \frac{1}{Q_t^{¥}(1+\tau_{jt}^{H,¥}) \left(1 - \Delta_{j,t}^{¥} + \frac{B_{jt}^{¥} - \underline{B}_{j,t-1}^{¥}}{\underline{B}_{j,t-1}^{¥}} \right)} \right]$$

Tax revenues are transferred in lump sum to Chinese households and all other equations are unchanged. In this asymmetric baseline calibration we fix $\tau_{jt}^{H,¥} = 0.0075$ (75 basis points) for all $j \neq cn$, to match the substantial positive net foreign asset position of China.

We choose all remaining parameters to be symmetric, which is convenient for the reasons stated above

Fixed parameters

Table 1 lists the exogenously specified parameters. We choose $\mu_{us} = \mu_{cn} = 0.2$, consistent with the sizes of the US and Chinese economies in World GDP. We assume log preferences, $\sigma = 1$, and set $\beta = 0.96$, consistent with an annual safe interest rate of 4%.[5] We choose an elasticity of substitution among goods of $\eta = 4$, consistent with the evidence summarized

[5]Liquidity premia will mean that safe interest rates will generally be somewhat below 4%.

in Costinot and Rodríguez-Clare (2014).[6] We choose an elasticity of the trade matching function $\varepsilon_T = 0.01$, which is quite close to a Leontief matching function, so that the short side of the market matches with nearly 100% probability, minimizing the search frictions in trade. We fix the parameter $\alpha = 0.5$ so that importers and exporters have equal bargaining power. Finally, we set the exogenous currency use in the big countries (X_{us} and X_{cn}) so that 95% of the big country firms finance their trade with the domestic asset. This is consistent with the evidence on US firms, but is an over-estimate with respect to Chinese firms in the status quo. Still, it is useful for expositional purposes to keep things symmetric, and in any case the Chinese usage of its own currency for trade has grown substantially in the last decade (Perez-Saiz and Zhang, 2023; Ito and Chinn, 2015).

Lastly, we select κ, the strength of currency complementarities and r, the cost of trade finance, following Chahrour and Valchev (2021). The value of $\kappa = 0.01$ corresponds to a loss of just 1% of revenue in the case of mismatched financing currencies, which is lower than exchange rate hedging costs for example. Our choice of $r = 0.005$ corresponds to the empirical cost of letter of credit financing, and we discuss this choice more below.

Finally, we follow Chahrour and Valchev (2021) in fixing very small values for the currency preference shock and the bond adjustment cost parameter, setting $\sigma_\theta^2 = 1e^{-6}$ and $\tau = 0.04$. As discussed above, the first parameter helps to avoid corner solutions and a very small amount ex ante heterogeneity in currency preferences is all that is required to achieve this goal. The adjustment costs are only needed to rule out very large jumps in portfolio compositions, so a small τ is sufficient. This parameter choice implies that a 10% change in a portfolio position incurs a cost of just 2 basis points.

Targeted moments

We calibrate the remaining seven parameters to match seven target values that describe a dollar-dominant steady state, similar to conditions circa 2018. Our goal is to capture recent "normal" conditions, but exclude the large fluctuations that occurred during the COVID pandemic.

Panel (a) of Table 2 summarizes the targeted moments: (1) big country government debt of 60% of GDP, consistent with the US average of *debt held outside of the Federal Government and Federal Reserve*; (2) small country debt of 40% of GDP, consistent with debt shares outside of the G8 and China; (3) rest-of-world trade share ($\frac{\text{Imports + Exports}}{\text{GDP}}$) of 65%, consistent with World Bank data; (4) a big country trade share of 35%, consistent with

[6] In this paper we opt for a "trade" calibration, while Chahrour and Valchev (2021) followed a "macro" calibration and set $\eta = 1$

Concept	Target Value
US/CH Gross debt/GDP	0.60
A/B Gross debt/GDP	0.40
US & CN trade/GDP	0.35
RW trade/GDP	0.65
RW USD use	0.95
Import markup	1.20
$\Delta^{row}/\Delta^{¥}$	1.00

(a) Calibration Targets

Parameter	Concept	Value
$\bar{B}$	US/CH asset supply	1.475
$\bar{B}^{row}$	A/B asset supply	1.682
$a_{us/cn}$	Home bias big countries	0.760
a_j	Home bias RW	0.505
ε_F	Funding match. elas.	0.312
ϕ	Fixed cost of entry	0.083
z^{row}	Demand for RW assets	0.302

(b) Implied Parameter Values

Table 2: Calibration Strategy

the recent trade share of China; (5) a dollar share in trade financing used by rest-of-world trading firms of 95%, consistent with the evidence that globally most trade finance loans are denominated in dollars and very little in yuan (BIS, 2014); and (6) import price markups of 20%, which is on the lower end of empirical estimates of trade costs.[7] The final target, the relative Δ's between the ROW asset and the yuan asset, is chosen so that ROW assets provide the same low convenience yield as the yuan under the status quo.[8]

Using a numerical search, we find parameters such that the dollar-dominant steady state exactly matches the targeted moments, and the implied parameter values are summarized in Panel (b) of Table 2.

Implications of baseline calibration

Table 3 summarizes several key moments implied by our calibration. An important first observation is that the dollar-dominant steady state is the only possible steady state, a contrast with Chahrour and Valchev (2021). Intuitively, with the Chinese capital controls of $\tau^{H,¥} = 0.0075$, yuan holdings are too expensive for rest-of-world savers to hold in large quantities, *even if trading firms use them for trade.* However, without large international holdings, the yuan can not play an important role in financing trade. Therefore, the only

[7] In our model with zero expected profits, this markup is a sufficient statistic for the total costs (transport, administrative, time cost) of international trade. Depending on the context and type of costs under consideration, the range of estimates for this cost is large. Our value here is roughly on par with the narrow definition and measurement in Irarrazabal et al. (2015), but far smaller than the more inclusive estimates of e.g. Anderson and Van Wincoop (2004). We believe this value is more realistic than the 10% calibration target we used in Chahrour and Valchev (2021), though our results are qualitatively unchanged if we use either a lower or higher number here.

[8] The choice of this target does not matter for steady states, but lower values create near random walk behavior of foreign asset holdings that make dynamic solutions more expensive to compute numerically.

Moments	US	USD Coord. CN	A	B
Dollar Share	0.95	0.05	0.95	0.95
$100\times(i^{¥}-i^{\$})$	1.44	-	-	-
100×Implied rev./GDP	0.88	0.02	-	-
NFA/GDP	-0.31	0.13	0.07	0.07
Gross For. Assets/GDP	0.18	0.18	0.52	0.52
100×Trade bal./GDP	0.49	-0.52	0.01	0.01

Table 3: Steady-state values for baseline model.

possible steady state is dollar-dominant.

Since the rest-of-world countries primarily use dollars for trade finance in our unique steady state, the yuan liquidity premium is near zero and US bonds earn a substantially higher premium: $\Delta^{\$} > \Delta^{¥} \approx 0$, which in turn results in a permanent interest parity violation. Defining $i^c \equiv \frac{1}{Q^c}$, our calibration implies

$$i^{¥} - i^{\$} = \frac{\Delta^{\$} - \Delta^{¥}}{\beta} = 1.44\%,$$

which generates a substantial "exorbitant privilege" for the US.

In the model, this interest rate differential is the direct consequence of the dollar's outsized role in financing a large portion of world trade. In practice, interest differentials between assets can emerge for many reasons, and it is difficult to assess how realistic this number is. Different approaches to measuring interest differentials yield different conclusions. Gourinchas and Rey (2007) suggesting a large exorbitant privilege on the US foreign asset position on the order of up to 2-3%. On the other hand, narrower estimates of US Treasury convenience yield based on covered interest parity deviations vis-a-vis other G7 countries range from one-fifth to one-half of the 144 basis points implies by the model.[9]

In our US-China context, however, estimates based on comparisons to government debt denominated in other traditional reserve currencies are less relevant. Since other reserve currencies, such as the euro, probably offer their own non-zero liquidity benefit, long run differences between the dollar and yuan interest rated should be larger. For example, since 2000, the real interest rate differential on 90 day government bonds between China and the US has averaged 1.85%, consistent with the implication of the model.[10]

[9]See for example Du et al. (2018); Krishnamurthy and Vissing-Jorgensen (2012); Jiang et al. (2023)

[10]We compute realized real interest rate using the CPI inflation for both countries. Chinese interest

A different perspective on this number comes from asking whether the market for international trade finance is plausibly large enough to drive a significant interest rate differential. The key calibration targets that determine the premium in the model are (i) the size of world trade relative to GDP (ii) the share of world trade denominated in dollars (iii) the size of US debt relative to world trade and (iv) the cost of attaining trade finance. While our calibration is meant to capture a stylized view of the world circa 2018, the values we choose for each of these is on target with reality.

Regarding (i), the size of world trade relative to world GDP is 53% in our calibration, slightly smaller than the world trade to GDP in 2018 of 58%.[11] On the other hand, the Asian Development Bank estimates that 80% of trade requires direct financing support,[12] while our model assumes that all trade does. Netting these effects leaves the share of *financed trade* very close to the data.

Regarding (ii), the share of world trade denominated in dollars in our calibration is about 80% on average. This is in line with the average in Gopinath (2016)'s and Boz et al. (2020)'s data, if Europe is excluded. Our calibration of 95% for the RoW regions is meant to capture the fact that very little of trade not with China is denominated in yuan. The Euro does play a meaningful role internationally, but its omission is partially offset by the fact that we assume a very low share of China's trade is conducted with dollars. Regarding (iii), we aim to capture the share of US debt held in private hands (not intragovernmental or the Federal Reserve), and in 2018, this number was 63% of US GDP, very close to our target of 60%.[13]

There is perhaps most room for debate about our calibration of (iv), the cost of trade finance.[14] Fortunately, most of the positive implications of the model remain the same if we change r to be even half as large as 0.005. In particular, changing just this parameter leaves the dominance of the dollar and the asymmetry in asset holdings almost completely unchanged. The only things that change are the size of the liquidity premia earned by dollars, and the implied revenue that this brings to the US.

In the third line of the table, we compute a simple measure of the effective seignorage the US earns from the "privilege" of this interest differential. We compute it as the counterfactual

data come from the OECD Main Economic Indicators database, https://dx.doi.org/10.1787/data-00052-en (Accessed via FRED on December 23, 2023).

[11] Data source: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS. (Accessed December 23, 2023)

[12] Asia Development Bank (2023): http://dx.doi.org/10.22617/BRF230334-2 (Accessed December 23, 2023)

[13] Data from this FRED series: https://fred.stlouisfed.org/series/HBPIGDQ188S. (Accessed on December 23, 2023)

[14] Our choice is consistent with the cost of trade finance described by the US Commerce Dept.: acetool.commerce.gov/cost-risk-topic/trade-financing-costs. (Accessed on December 23, 2023)

additional interest the US would pay on its foreign debts if it paid an interest rate equal to the inverse of the time discount (hence without the benefit of a liquidity premium). At 0.88% of GDP, this suggest a substantial benefit to the US economy.

The interest rate differentials and the implied revenue, however, are not a complete characterization of the *welfare benefit* of the dollar's dominance to the US economy. In equilibrium, widespread foreign holdings of a country's assets are necessary to support its dominant status, and this strong external asset demand leads to a negative steady-state net foreign asset position for the central country. Hence, the seignorage benefits of being dominant are at least partially offset in steady state by the need to service the resulting negative net foreign asset position.

Indeed, the fourth line in the table shows that the dominant country (the US) has a significant negative net foreign asset position equal to -31% of GDP, while China has a substantially positive position of 13% of GDP. Both of these implications are in line with the data. When we compute consumption levels in both the US and China, we find that *at the steady state*, US consumption is actually about 1% lower than China's. Hence, once the economy has converged, the ongoing benefit of the exorbitant privilege is more than offset by the costs of servicing the large NFA position. If issuing the dominant currency offers any welfare benefits, they must accrue during the transition to dominance.

Model dynamics: from symmetric allocation to the steady state

We can compute prefect foresight transition paths to the steady state from any initial set of bond holdings. As an illustration, Figure 3 depicts the transition from an initial portfolio in which both Region A and Region B have holdings that are perfectly balanced between dollar and yuan assets. At these initial conditions, rest-of-world firms find both types of financing readily available, and do not coordinate very strongly on just one currency in their trade financing choices, with a near 50% split in initial usage (top right panel).

Over time, however, household portfolios adjust since the capital control tax on holding yuan assets pushes households to rebalance their portfolios towards dollar assets. This rebalancing, however, means that dollar financing becomes more broadly available, encouraging more firms to seek dollar financing, both because it is more readily available and because potential trading partners are also switching to dollars. This dynamic drives a series of self-reinforcing shifts towards dollars in the rest-of-world. By the end of 10 years, Region A and B portfolios are heavily tilted towards dollars and most trade finance usage is as well.

Figure 3 is also useful because it demonstrates an important point about the welfare

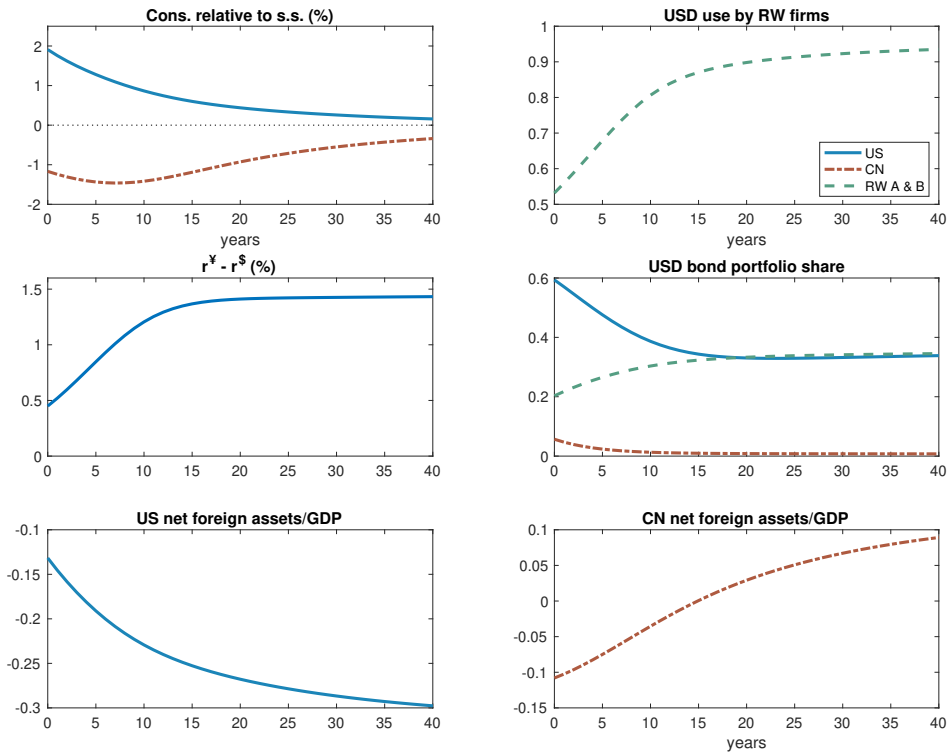

Figure 3: Transition to dollar-dominant steady state under baseline scenario.

consequences of issuing the dominant asset: the benefits of being dominant come during the transition. The figure shows that, over the transition period, a large quantity of dollar assets leave the US to enter the portfolio of the rest-of-world, while large quantities of yuan assets return onshore to China. As a result, the US runs a persistent trade deficit and enjoys higher consumption throughout the transition, while China experiences the reverse. In this example, US consumption remains elevated due to these transition dynamics even after 40 years.

4 Policy Experiments

We are interested in how various policies undertaken by the US or China, potentially coordinated with their allied region, might threaten or eliminate the special role of the dollar. A first result of the model is that the yuan simply cannot compete with the dollar so long as the Chinese capital controls are in place: none of the yuan-dominant steady states described below would exist if these controls stay in place. It is an important point – the only way for the US dollar to lose dominance is for the Chinese capital account to be liberalized first.

Scenario	USD Coord. $i^{¥} - i^{\$}$	X_a	X_b	Middle $i^{¥} - i^{\$}$	X_a	X_b	CNY Coord. $i^{¥} - i^{\$}$	X_a	X_b
baseline	1.44	0.95	0.95	-	-	-	-	-	-
baseline no cap ctrl.	1.13	0.87	0.87	*0.00*	*0.50*	*0.50*	-1.13	0.13	0.13
unil. US tariff on CN	1.22	0.91	0.91	*-0.17*	*0.45*	*0.45*	-1.09	0.15	0.15
unil. US tariff on RW B	1.25	0.95	0.94	0.06	0.60	0.49	-1.35	0.09	0.03
coord. US & Region A tariffs on CN	1.38	0.98	0.94	-	-	-	-	-	-
tit-for-tat tariff between US & CN	1.21	0.89	0.89	0.00	0.50	0.50	-1.21	0.11	0.11
perm support for ¥ holdings	0.97	0.86	0.86	-0.00	0.56	0.56	-1.47	0.09	0.09
trade bloc fragmentation	-	-	-	-0.00	1.00	0.00	-	-	-

Note: Dashes (-) indicate that no such steady state exists; italics indicate a steady state that is dynamically unstable.

Table 4: Steady-state interest premia and dollar usage for various scenarios.

4.1 Removing Capital Controls

Since our model implies removing capital controls is a necessary condition for a permanent change in currency dominance, we first examine the effects of removing these capital controls in isolation. We do this by setting $\tau^{H,¥} = 0$. The second row of the Table 4 shows that, after removing capital controls, the dollar-dominant steady state is not the only steady state consistent with our baseline parameters. The model also admits a "balanced" steady state, in which dollar and yuan each intermediate exactly half of rest-of-world trade, and a yuan-dominant steady state in which the yuan takes on the role of dominant currency.

The economy with no capital controls is symmetric in all parameters, but it still generates very strongly coordinated asymmetric steady states: the dominant currency now backs around 87% of international trade. However, now this coordination is purely the result of the mutually reinforcing effects of portfolio positions and trading firm coordination incentives (as illustrated in Figure 2). Furthermore, the two coordinated steady states are the only dynamically stable ones – the 50-50 balanced steady state is unstable, meaning that any initial imbalance in portfolios will lead the economy to converge to either the dollar- or yuan- dominant steady states (the instability of the middle steady state is indicated in the Table with italics).

The existence of more than one stable steady state raises the question of which of these two outcomes would we expect to see in practice. To answer this question, for any possible initial configuration of bond holdings (the state variable in our model) we search for perfect foresight paths that converge to each of the steady-states described in Table 4. We then define

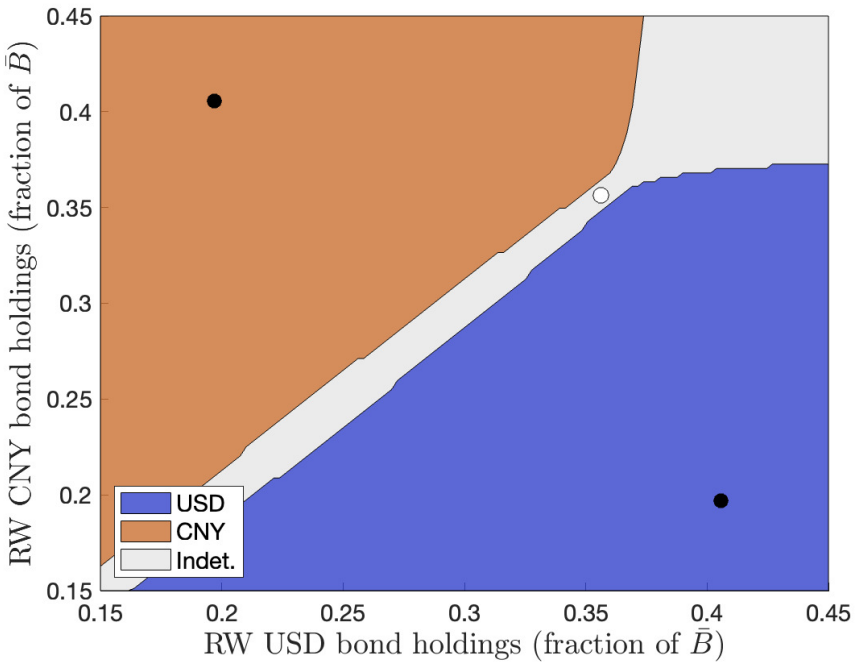

Figure 4: Attraction regions in symmetric baseline scenario

the region of attraction of each steady state as the collection of all initial bond allocations for which the economy converges *uniquely* to that particular steady state. As we will see, there is also a region of indeterminacy from which the economy can go either way.

Figure 4 summarizes these regions of attraction, as a color-coded map of potential initial conditions. In order to visualize these regions in two dimensions, we consider scenarios in which Regions A and B hold identical portfolios, while the large countries hold proportionally home-biased portfolios of the remaining shares. As we move up in the figure, the rest-of-world regions (both A and B) hold a larger share of outstanding yuan assets, and as we move right, they hold a larger share of the supply of dollar assets. The portfolios associated with the steady states described in Table 3 are depicted by solid black dots (if stable) and a open dot (if unstable.)

The color regions of Figure 4 describe the destination of feasible *perfect-foresight* paths leading away from any given initial bond allocation. Initial allocations in the blue region can only transition to the dollar-dominant steady state (the black dot in the blue region), while initial allocations in the orange region can only transition to the yuan-dominant steady state. In these cases, the equilibrium is dynamically unique.[15] In the gray region, by contrast, we

[15]This is a numerical statement, not a theoretical one. We use a nonlinear solver and a shooting algorithm with many initial guesses, to search for feasible paths to each steady-state, and conclude there is no such

find the economy could converge to either of the dominant-currency steady states, provided agents anticipate the economy goes in that direction. Thus, in the gray region, the model exhibits a dynamic multiplicity, and initial bond stocks are not sufficient to determine which asset type will dominate in the long run.

The key takeaway from Figure 4 is that the dollar-dominant steady state lies well within a large region of blue. Moreover, initial bond allocations that are even slightly biased towards towards dollars will converge uniquely back to the dollar dominant-steady state. In this sense, dollar dominance is likely to be quite durable once established.

The importance of initial conditions explains why, starting from the unique steady state of the benchmark calibration, removing capital controls by itself has very little impact on dollar dominance. The bond positions that correspond to the steady state of the economy with capital controls are already heavily tilted towards US bonds and deep within the blue region of Figure 4. Thus, when China removes capital controls, the economy transitions from baseline steady state to a new, but qualitatively similar, dollar-dominant steady state, in which the dollar backs 87%, rather than 95%, of world trade.

To sum up, China removing its capital controls is necessary, but not sufficient, for the yuan to threaten the special role of the dollar. We next examine what additional policies could potentially shift the equilibrium towards yuan usage, assuming the Chinese capital account remains liberalized. To better isolate the effects of each policy tool, in the subsequent policy experiments we initialize the economy at the dollar-dominant steady state of the baseline calibration, but without capital controls, as summarized in the second row of Table 4.

4.2 Trade Conflict Scenarios

We begin by considering several scenarios of trade conflict, modeled as import tariffs on foreign goods. These scenarios are interesting to consider, first, because tariffs appear to be a major policy tool in current trade disputes and, second, because there is a large trade literature that already studies the effects of tariffs on trade flows and welfare. In contrast, our framework introduces a new channel through which tariffs affect the economy – since tariffs change the direction of trade flows across the world, they also change firms' incentive to use one currency or the other.

We model tariffs by assuming the consumer pays an additional cost after the good is imported by the importing firm. In terms of model equations, this adds a proportional

path if the solver cannot find one regardless of our initial guess.

wedge so that the effective cost of purchasing a country-i good in country j becomes $\tilde{P}^i_{jt} \equiv P^i_{jt}(1+\tau^{I,i}_{jt})$. The price index in country j must be modified to replace each price with its effective price, and the optimal consumption demand for good i becomes

$$\frac{P^i_{jt}(1+\tau^{I,i}_{jt})}{P^j_{jt}} = \frac{(1-a_j)\mu_i}{\mu_j}\left(\frac{C^j_{jt}}{C^j_{jt}}\right)^{\frac{1}{\eta}}.$$

Tariff revenue is returned to household via the lump-sum taxes T_{jt}. All other equations are unchanged.

We initially consider four main scenarios. In the first three, the US (and potentially region A) unilaterally impose tariffs on China or Region B. In the final scenario, we assume that China responds to US tariffs in kind. Our findings suggest that protectionism aimed at a competing large country can be helpful in reinforcing the dominance of one's own currency in international trade, but only modestly so. On the other hand, protectionism aimed towards other foreign economies, whether they initially use dollars or not, is harmful for the dominance of the protectionist country. From the perspective of currency dominance, a large country who can secure coordinated tariff policy with a substantial bloc of foreign countries does the most to bolster an existing dominant currency. A tit-for-tat tariff war between the US and China, by contrast, has a very small effect on the dollar's dominant role.

Unilateral protectionism

We first consider a scenario in which one large country, in this case the US, institutes a large, 30% tariff on imports from the other big country, China. This scenario is meant to capture a situation where one country engages in trade protectionism, but the other country refrains from implementing any retaliatory trade policy. This may not be the most realistic scenario in practice, but it serves to illustrate some important features of our mechanism.

The third row of Table 4 summarizes features of the steady-state economy in this scenario. First, notice that world economy continues to have three steady-states. In both the dollar-dominant equilibrium and the yuan-dominant equilibrium, the reliance of regions A and B on the dollar is somewhat stronger than in the corresponding equilibrium in the baseline calibration without capital controls. Meanwhile, the "middle" equilibrium remains unstable. The Table shows that the steady-state interest premium earned by the US (in the dollar-dominant steady state) is about 10 basis point higher than under the baseline scenario.

The stronger reliance on the dollar in both the dollar- and yuan-dominant steady states

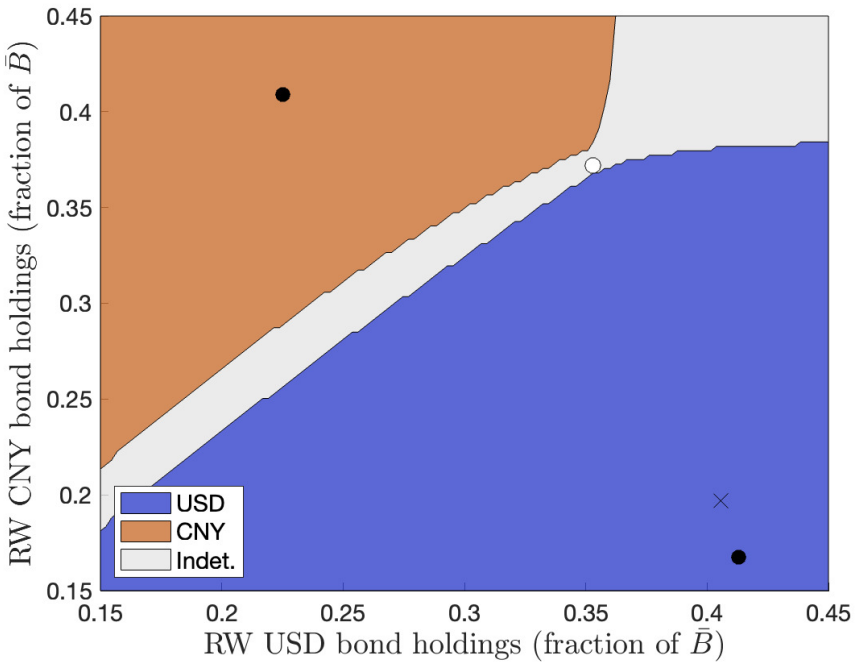

Figure 5: Attraction regions if US puts unilateral tariff on imports from China.

reflects the important anchoring force generated by having strong domestic use of the currency in the home country. When the US restricts imports from China, it redirects its own trading firms towards Regions A and B (as now there is less demand for Chinese imports, ceteris paribus). Since US firms largely use dollars in trade, the partial equilibrium effect of this policy is an increase in the share of firms in international markets who trade in dollars. In turn, in general equilibrium the firms' incentive to coordinate their currency choice with trading partners means that firms in the rest of world also have an incentive to increase their own reliance on dollars.

Figure 5 depicts the resulting attraction regions under this unilateral tariff scenario. Black dots again correspond to the two stable steady-states (with the import tariffs implemented), while the black $\times$ marks the portfolio allocation under the dollar-dominant steady state without tariffs. The figure shows that the attraction region of the dollar is somewhat larger, while rest-of-world asset allocations are tilted even further towards dollar assets. The initial asset position (the $\times$) of the no-tariff steady state is well within the blue region, hence there is no transition to another type of steady state. Together with the observation that dollar use is even higher in the new dollar-dominant steady state, the clear conclusion is that dollar dominance is reinforced by this unilateral policy, albeit mildly: there still exists a yuan-dominant equilibrium, and the change in steady-state dollar usage is relatively small.

	US	CN	RW A	RW B
Dollar keeps dominance:				
unilateral 30% US tariff on CN	-0.17	-0.57	0.04	0.04
unilateral 30% US tariff on RW B	-0.30	0.00	0.13	-0.79
coordinated 30% US and RW A tariffs on CN	-0.05	-1.87	-0.16	0.16
tit-for-tat 30% tariff between US and CN	-0.68	-0.71	0.05	0.05
Transition to bifurcated currency use:				
trade bloc fragmentation	-4.11	-3.27	-5.15	-5.01
trade bloc fragmentation (counterfactual X)	-3.84	-3.50	-5.12	-5.04

Note: Computed in permanent consumption equivalent units, as percentage relative to the dollar-dominant steady state of the baseline calibration without capital controls. In the trade bloc fragmentation case, the US and Region A impose 70% import tariffs on goods from CN and Region B, and visa-versa. The counterfactual scenario imposes the same tariffs, but fixes X_a and X_b at their dollar-dominant steady state values.

Table 5: Gains (losses) in tariff scenarios.

Finally, the first row of Table 5 reports the welfare implication of this policy for each country/region, initializing the economy at the dollar-dominant steady state of the baseline calibration without capital controls and computing the perfect foresight transition to the new steady state. Values are reported in consumption equivalent units as a percent of consumption at the initial no-tariff steady state. These values are not equal to steady-state consumption differences because the welfare calculations take into account the transitional dynamics.

We find there is a unique transition path, which converges to the new dollar dominant steady state. The unilateral tariff hurts both the US and China, but the effects are somewhat less harmful to the US which experiences a loss of 0.17% of permanent consumption, compared to a loss of 0.57% for China. Still, the main takeaway is that the US is worse off, despite the increased dollar use in international markets. The reason is that the dollar was already highly dominant initially, and the tariffs can generate only a small further increase in dominance, a benefit that is more than offset by the tariff's distortionary impact on prices and consumption choices.

Isolation of Region B

In this scenario, we suppose that the US levies a 30% tariff on imports from the rest-of-world Region B (but not China). The third row of Table 4 summarizes the steady-state implications of this policy. The table shows that the dollar dominant equilibrium in this case actually features stronger coordination on dollar usage, and a few additional basis points of interest premium relative to the case of a unilateral tariff on China. The table suggests, however, that the effects on the stability of the dollar equilibrium are less obvious than before. In particular, the "middle" steady state, which features both lower dollar use altogether and asymmetry in currency choices between the two rest-of-world regions (a weak form of "currency bifurcation"), is now stable. Moreover, the yuan-dominant equilibrium remains stable and exhibits even lower dollar usage than under the baseline calibration.

To understand the reasons behind these mixed results, consider the differential impact of the policy on Regions A and B. Facing tariffs in its trade with the US, region B will reallocate some of that trading activity to China, whose firms use yuan. Hence, other things equal, those firms will tend to shift their currency usage towards the yuan. On the other hand, US trading firms will be more likely to exchange with firms in Region A, encouraging firms in those countries to increase their dollar usage. The effect of the policy then, is to put a wedge between the currency choice of the two rest-of-world regions.

Figure 6 summarizes the implications of this policy for the regions of attraction of the various steady states. The figure shows that the region of indeterminacy (gray) grows under this policy, implying that smaller shocks could now threaten the dominance of the dollar. Moreover, the figure shows a new region, in purple, in which the economy can potentially converge to the "fragmented" middle steady state, in which Region B uses more yuan and Region A more dollars. The bond allocation of the original steady state, denoted with an $\times$ in the figure, remains outside of the gray, orange and purple regions of attraction for the alternative steady states, and thus the policy does not trigger a transition away from the dollar-dominant steady state. Still, the policy does appear to introduce a larger risk that other shocks (or a policy response by China) could now more easily dislodge the dollar.

The second row of Table 5 summarizes the welfare implications of this scenario. Again, we initialize the economy at the dollar-dominant steady state of the baseline calibration without capital controls and find that it converges uniquely to the new dollar dominant steady state. With these distorting tariffs, the US loses about 30 basis points and region B loses about twice as much in permanent consumption. China experiences essentially zero effect on welfare, while Region A – which experiences an increase in global demand for its

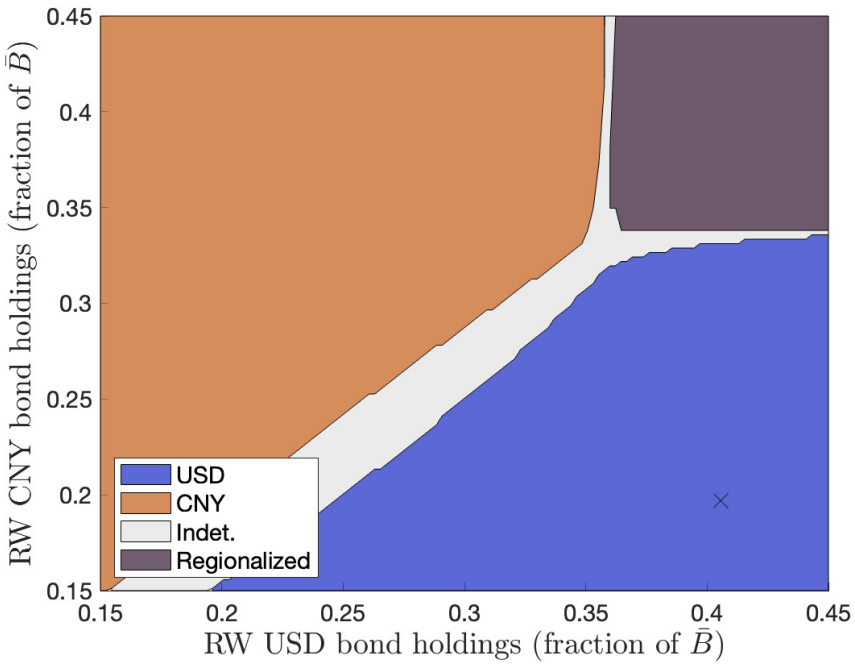

Figure 6: Attraction regions if US put unilateral tariffs on imports from Region B.

goods – actually benefits.

Coordinated isolation

The next scenario imagines region A is geopolitically-aligned with the US, and that the US is able to convince it to jointly impose 30% tariffs on imports from China. The idea of this scenario is to consider the type of trade policy that the US has sought to implement over the most recent half decade, in which it attempts to "break off" its allies from their reliance on trade with the China, and instead to trade more within the US-led bloc.

The fifth row of Table 4 shows that this coordinated policy eliminates the yuan-dominant and middle steady states, implying that this policy is highly effective at protecting the special role of the dollar. The implications of this policy for dollar usage are qualitatively similar to that of the unilateral scenario above, but much stronger. The table also demonstrates the anchoring effects of domestic currency usage: Region B, which itself has not implemented any restrictions on trade with China, follows Region A in increasing its dollar usage, but increases it by less than Region A.

The third row of Table 5 shows the disparate welfare implications of this policy. In permanent consumption terms, the US loses only 0.05% of consumption, while Region A

suffers a loss of 0.16%. China, however, experiences a very substantial fall in welfare of almost two percent of permanent consumption, while Region B actually gains modestly.

Tit-for-tat

Historically, countries facing new tariffs from one country often respond by imposing retaliatory tariffs of their own. To evaluate such a "trade war", the sixth row of Table 4 describes a scenario in which China responds to US tariffs by putting a symmetric 30% tariff on its imports from the US. The table shows that, in this case, there continue to be three steady-states, each with almost identical currency usage as with no tariffs. Interest rate premia and implied revenue are also almost unchanged. Moreover the basins of attraction for the two steady states are largely unchanged, though the region of multiplicity is slightly larger. Finally, Table 5 shows that the tit-for-tat scenario implies that both the US and China experience a fall consumption equivalent loss of roughly 70 basis points, while the rest of the world is actually slight better off. Apparently, an isolated trade war between the two large countries does not threaten the status of the dominant currency, and it also does not create large negative externalities for the rest of the world.

Summary

In this subsection, we have found that even reasonably large trade conflict does not threaten the dominance of the dollar in international markets. Since these policies leave dollar usage relatively unchanged, the welfare impacts described above are driven almost entirely by the classic distortionary effects of tariffs, leading to (weakly) lower welfare for both the US and China.

4.3 The Effects of Financial Policies

Recently, China has taken a variety of different steps, often operating through financial markets, which the literature describes as attempts to "jumpstart" the international use of the yuan (Eichengreen and Kawai, 2015; Prasad, 2016). The impact of these policies is not always easy to identify, but preliminary evidence suggests that some – like the introduction of currency swap lines with selected central banks – has generated a small boost for yuan usage in trade financing and invoicing (Bahaj and Reis, 2020; Georgiadis et al., 2021.) However, it remains hard to predict how persistent the small effects we are seeing would be, and hence in this section, we use our model to consider a set of financial policies and explore how effective they could be at reducing the global role of the dollar.

We conclude the section by exploring another tool of rising importance, financial sanctions, and analyze the potential negative impacts that US financial sanctions on the rest-of-world could have on the durability of the dollar. In all cases, we again assume that China has removed its capital controls, as otherwise it is not a viable alternative to the dollar.

Yuan holding subsidies

The first policy we consider is the Chinese government offering a direct subsidy to foreign holdings of yuan bonds. We model this by setting $\tau_{jt}^{H,¥} = -0.0025$, with this negative tax being effectively a 25 basis points *subsidy* to all rest-of-world holders of yuan assets. We view this experiment as a stylized version of the swap line agreements that China has recently been signing and promoting in reality. The similarity lies in the fact that the swap agreements are meant to make accessing yuan safe assets much easier outside of China, and in our model the subsidy indeed leads to a significant increase in the holding of yuan bonds outside of China.

The seventh row of Table 4 shows the steady-state implications of this policy. What is most remarkable about the results is how little this policy affects dollar dominance, despite successfully engineering a substantial 35% increase in foreign holdings of yuan bonds relative to the initial no-subsidy dollar-dominant steady state. Specifically, there is no transition to a different type of steady state, the dollar remains dominant and usage of dollars in the new steady state falls marginally to 86%.

The key intuition is that despite the increase in the availability of yuan trade financing (driven by the increase in foreign holdings of yuan bonds), there already exists sufficient dollar liquidity to support coordination on dollar usage in trade. Hence, the increased availability of yuan is not enough to significantly alter the dollar-dominant steady state, or lead to a shift away from it. Indeed, we find that even subsidies that are an order of magnitude larger in size than the one we consider do not eliminate the dollar-dominant steady state.

Trade finance subsidies

We next consider subsidies aimed instead at directly altering the trade financing incentives of firms, rather than just the availability of yuan. For example, both the US and China currently have some version of an "export-import bank", which can implement policies to support trade and trade finance in their respective currencies. We find that even when trade finance subsidies are only temporary, they can have a significant impact on long-term currency dominance.

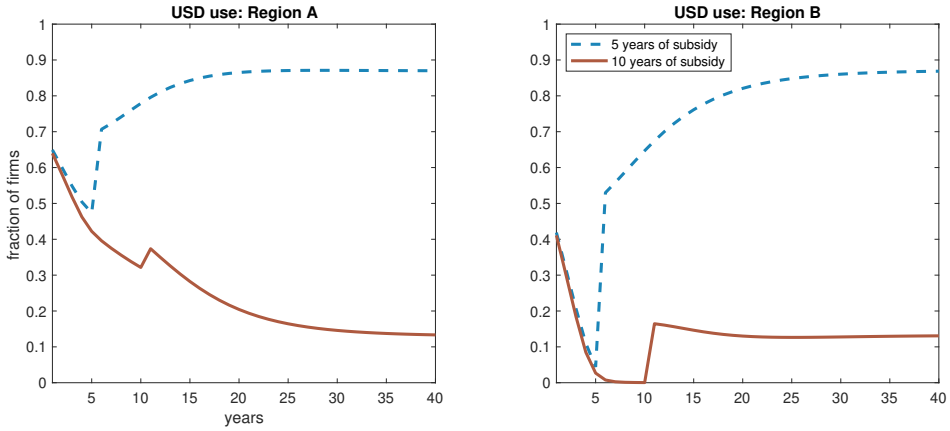

Figure 7: Dollar use paths under CNY trade financing subsidy scenarios of different durations.

We implement a subsidy for using yuan trade financing by assuming that China pays a proportion of the trade finance costs the firms would otherwise bear. This modifies the profits of operating with yuan trade financing, and the analogue to equation (6) becomes

$$\Pi_{jt}^{¥} = p_{jt}^{¥}(\tilde{\Pi}_{jt}^{¥} - r(1 - \tau_{jt}^{X,¥})).$$

In line with the observation that observed Chinese economic policies are targeted in a regional fashion (i.e. swap lines, Belt and Road initiative and etc.), we assume that the subsidy targets only region B firms. Specifically, we set $\tau_{bt}^{X,¥} = 0.5$, meaning that China offers to pay for half the cost of yuan-based trade financing, paid for by lump sum taxes on Chinese households. This is a non-trivial subsidy and thus it is unlikely to be kept indefinitely, so for our counterfactuals we consider temporary subsidies of this size that last for up to 10 years.

Figure 7 depicts some key dynamic implications of this policy, when it lasts for either 5 or 10 years. The blue line in the Figure shows that 5-year policy can have a significant short-run impact on yuan usage, especially in Region B that is directly affected, but the economy still reverts back to the original dollar-dominant steady state after the policy is removed. While in place, the policy induces nearly all Region B firms take advantage of the subsidy. Yet, usage and asset allocation in Region A do not adjust enough to pull the economy out of the attraction region of the dollar steady state, and the economy reverts quickly back to dollar dominance once the subsidy is rolled back.

The red line in Figure 7 shows, however, that when the subsidy lasts 10 years it can induce a permanent change away from dollar dominance, despite the fact that the subsidy

	US	CN	RW A	RW B
Dollar keeps dominance:				
permanent support for yuan holdings	-0.01	-0.01	0.01	0.01
temporary support for yuan financing (5 yrs)	-0.13	0.08	0.01	0.04
temporary sanctions against Region B (5 yrs)	-0.02	0.03	-0.00	-0.01
Dollar loses dominance:				
temporary support for yuan financing (10 yrs)	-0.67	0.57	0.01	0.07
temporary sanctions against Region B (20 yrs)	-0.48	0.51	0.00	-0.03

Note: Computed in permanent consumption equivalent units, as percentage relative to the dollar-dominant steady state of the baseline calibration without capital controls.

Table 6: Gains (losses) in financial policy scenarios.

is eventually repealed. In this case, the high usage of yuan in Region B gradually pushes Region A usage and portfolios to favor the yuan, which is eventually enough to shift the economy to the attraction region of the the yuan-dominant steady state, and thus engineer a transition to yuan dominance in the long-run even though the subsidy is temporary.

The second and fourth rows of Table 6 show the disparate welfare implications of these two durations. If the policy last for 5 years, the US experiences a loss of 13 basis points and China a smaller gain. But the longer 10 year policy leads the US to lose roughly 70 basis points in permanent consumption and China to gain by about 60 basis points: a policy of twice the duration has about a five times larger welfare impact.

Financial sanctions

Next, we use our model to consider the impact of financial sanctions. We model this by assuming that a certain amount of country j's (e.g.) dollar holdings are frozen, and cannot be either liquidated or used for trade finance. These bonds are rolled over and we assume that interest payments continue to accrue to the sanctioned owner of the bond (they are frozen, but not expropriated). Thus, the holdings of dollar bonds in country j can be expressed as

$$B^{\$}_{jt} = \hat{B}^{\$}_{jt} + \tilde{B}^{\$}_{jt},$$

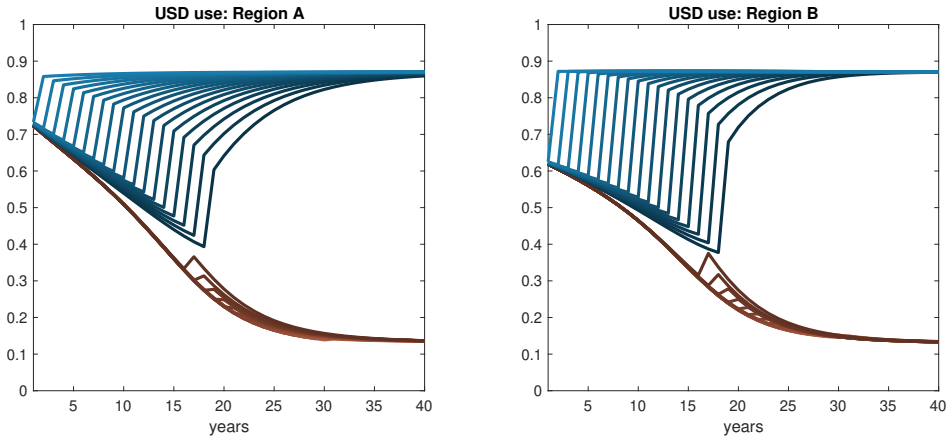

Figure 8: Dollar usage in sanctions scenarios of different durations.

where $\tilde{B}^{\$}_{jt}$ is exogenously fixed by the sanctions policy. Only the remaining $\hat{B}^{\$}_{jt}$ bonds are useable for liquidity services, so (5) becomes

$$p^{\$}_{jt} = \frac{M^F\left(m_{jt}X_{jt}, \nu P^{us}_{us,t}\hat{B}^{\$}_{jt}Q^{\$}_t\right)}{m_{jt}X_{jt}} = M^F\left(1, \frac{\nu P^{us}_{us,t}\hat{B}^{\$}_{jt}Q^{\$}_t}{m_{jt}X_{jt}}\right),$$

which implies that (9) is

$$\Delta^{\$}_{jt} = \frac{\nu m_{jt}X_{jt}}{\left[(m_{jt}X_{jt})^{1/\xi_F} + (\nu P^{us}_{us,t}\hat{B}^{\$}_{jt}Q^{\$}_t)^{1/\xi_F}\right]^{\xi_F}} r.$$

The budget constraint (2) reflects the loss of the liquidity premia paid by the bonds as well,

$$lqprem_{jt} \equiv \Delta^{\$}_{jt}P^{us}_{us,t}Q^{\$}_t \underbrace{\hat{B}^{\$}_{jt}}_{\text{change}} + \Delta^{¥}_{jt}P^{cn}_{cn,t}Q^{¥}_t B^{¥}_{jt} + \Delta^{row}_{jt}Q^{row}_t B^{row}_{jt}.$$

We imagine that the US imposes financial sanction on Region B. We set the size of the sanctioned assets $\tilde{B}^{\$}_{bt}$ to be 30% of Region B's initial US bond holdings, and then we study scenarios where we keep the policy in place for durations between 1 and 30 years. Figure 8 depicts the implications of the sanctions for dollar usage for each of the durations. For sanctions that are sufficiently short, 15 years or less, the economy always eventually returns to the original dollar-dominant steady state (blue lines). However, if the sanctions last 20 years or more, the economy always converges to the yuan steady state. For intermediate durations, the economy can converge to either steady state, thus such policies generate indeterminacy and still threaten dollar dominance.

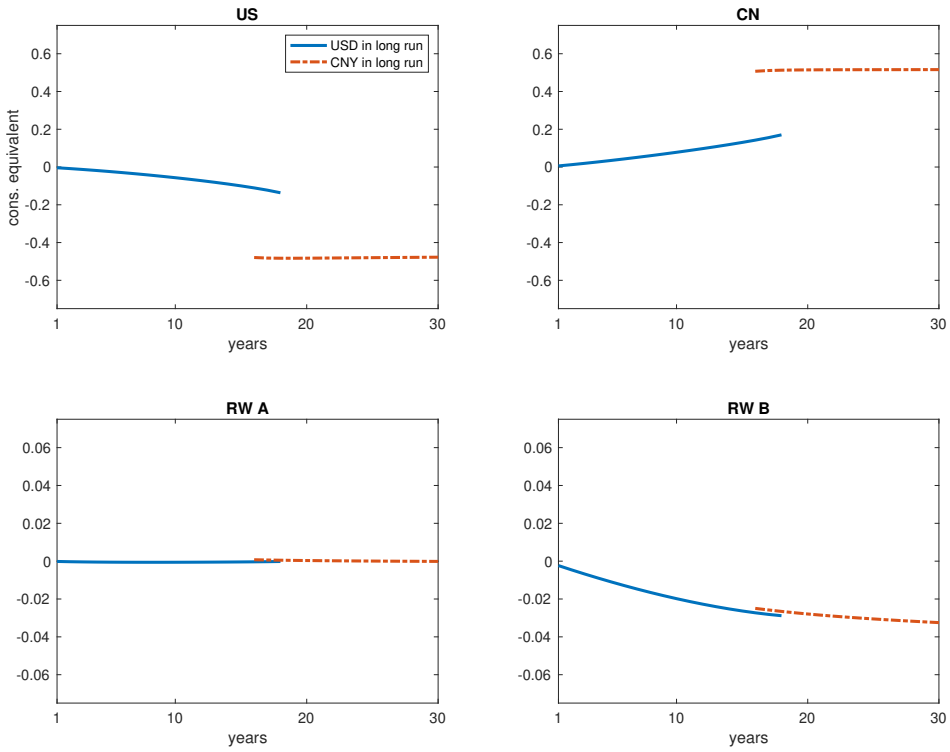

Figure 9: Consumption equivalent welfare in sanctions scenarios of different durations.

Figure 9 presents the consumption equivalent gains or losses of this policy for each potential duration. The blue line reflects cases where the economy returns to the dollar dominant steady state, the red line cases where the economy switches to the yuan in the long run. The figure shows the welfare implications depend almost entirely on which steady state the economy converges to, with a transition to the yuan costing the US about 50 basis point in permanent consumption, and benefiting China by a very similar amount.

Overall, we find that financial sanctions can indeed threaten dollar dominance, if they are imposed for a sufficiently long period of time.

5 Extreme Scenarios

Historically, geoeconomic conflicts have occasionally escalated to extremes beyond the scenarios contemplated above. In this section we consider two such extreme scenarios. In the first, we consider a situation where competing trading blocs impose extremely high tariffs on one another, meant to capture a complete rupture of cooperative trade relations between blocs. In the second scenario, we consider a set of coordinated sanction policies designed to capture the very strong sanctions imposed on Russia since its invasion of Ukraine.

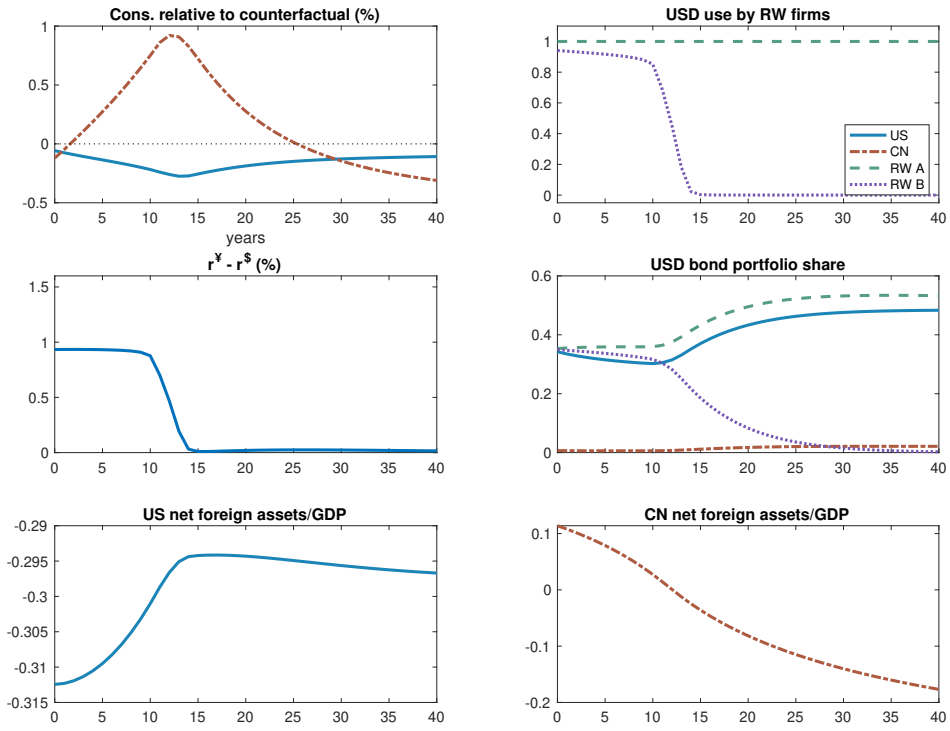

Figure 10: Transition path under the strong trade bloc fragmentation scenario, starting from the current status-quo.

5.1 Worldwide Bifurcation

In this experiment, we next consider a counterfactual where both trading blocs impose 70% tariffs on imports from the other bloc – i.e. the US and Region A impose 70% tariffs on imports from the China and Region B and visa-versa. This scenario presumes the tariffs are permanent.

The only feasible steady state in this context is a bifurcated equilibrium in currency use. As shown in the final row of Table 4, dollars are essentially exclusively used within Region A, and the yuan exclusively within Region B. Given that other parameters are symmetric, both dollar and yuan debt earn the same interest rates. Overall, this scenario corresponds to a very strong international segmentation, reducing cross-bloc trade by 85% and reducing overall world trade-to-GDP by about 20 percentage points.

Figure 10 shows the transition to this new steady state, starting in this case from the status quo bond allocations of our baseline asymmetric steady state. The figure shows that, given the scarcity of yuan assets in the rest-of-world initially, the transition away from dollar dominance is not instantaneous. Instead, dollar holdings (and therefore usage) remain high around the world for roughly ten years after the impositions of these heavy cross-tariffs.

Over time, however, Region B's increased trade with China encourages their firms to choose yuan financing, which in turn encourages household to hold more yuan assets. Around 10 years into the transition, these forces overwhelm the initial Region B portfolio bias towards dollars, and the remaining transition to a bifurcated world of Regional dominant currencies then happens quickly. The picture emphasizes that an initiated transition to a new steady state and currency regime could be hard to detect for many years

The fifth row of Table 5 shows that this scenario, with its transition away from the dollar dominant steady state, is especially painful for the US, whose welfare falls by 4.11% of permanent consumption, while China loses "only" 3.27 percent. The roughly 75 basis point difference in the losses experienced by two countries can be attributed to the transition dynamics during which the fall in external demand for US assets necessitates lower US consumption to fund the repatriation of these assets back to the US. Meanwhile, the loss for the rest-of-world countries are high as well, over 5 percent of consumption, primarily because these countries have a larger degree of trade openness and therefore experience a greater loss from the reduction in world trade volumes.

The final row of Table 5 presents the welfare calculations for the same scenario, but assuming (counterfactually) that the increase in tariffs does not change the currency choice of firms in any country. The figure shows that, relative to the model with endogenous choice of currency, the US loses about 25 basis points less in permanent consumption units, and China loses about 25 basis points more. Notice this total difference in relative welfare (0.5 percent) is about half the difference from the scenario in row 4 of Table 6, which is another scenario where the dollar loses dominance. However, in this bifurcation outcome, the dollar stops being the main international trade currency in only one of the two rest-of-world regions.

5.2 International Isolation of Russia

We conclude the paper with an exploration of the specific combination of financial and economic sanctions imposed on Russia, since the start of its war in Ukraine. This is an interesting exercise for several reasons. First, this event represents perhaps the starkest example of geoeconomic conflict since the end of the Cold War. Second, both pundits and economists have speculated that the imposition of such unprecedented financial sanctions on Russia, and those who would continue doing business with it, could provide a spark for shifting the world away from its current dollar dominant equilibrium. Finally, this experiment provides a useful test of the quantitative realism of the model.

We consider three scenarios meant to capture two of the main policy tools that the US-

aligned bloc has used against Russia. In the first scenario, we consider the imposition of simultaneous import and export tariffs vis-a-vis Russia. We assume that both the US and Region A impose tariffs $\tau_{jt}^{I,b} = \tau_{bt}^{E,j}$, the size of which is calibrated so that Russia's total trade falls by 30% as was observed in the data. In the second scenario, we assume that the US freezes 50% of Russia's initial stock of US assets. This fraction corresponds to the roughly $300 billion of Russian foreign assets that have been frozen since the start of the war. In the final scenario, we assume that both policies are imposed at the same time, as they have been in practice.

Since we do not know how long the real world sanctions will last, we assume these sanction policies will be temporary and implement them for a period of 5 years in the model. To be consistent with the relative size of the Russian economy, in this section only we recalibrate the size of Regions A and B to $\mu_a = 0.55$ and $\mu_b = 0.05$, so that Region B corresponds roughly to the size of Russia. Consistent with recent history, we assume throughout that China does *not* remove its capital controls.

Figure 11 presents the implications of these experiments for dollar usage in Region A and in Russia, as well as Russia's share of trade with China, and the share of US bonds it its portfolio. The top-right panel of Figure 11, which plots the use of dollars by Russian trading firms over time, shows that any of the sanctions policies would substantially reduce the use of dollars by Russian firms. Yet, each policy has this effect for somewhat different reasons.

The tariffs-only policy — depicted by the dotted lines in Figure 11 — reduces dollar usage initially by increasing Russia's trade with China. This increased trade with China is plotted in lower-left panel, in which Russian trade with China roughly doubles during the tariff period. This increased trade with China increases Russian firms' incentive to use yuan. The dotted line in the top-right panel shows the immediate effect of the policy on dollar usage by firms is relatively small. Over time however, this small reduction in demand for dollar financing leads Russian households' to shift their portfolios towards holding more yuan, which is captured by the gradual decline of the dotted line in the bottom-right panel of the Figure. This falling supply of dollar savings further discourages firms from using dollars, leading to the gradual decline in dollar usage for trade.

By contrast, the financial sanctions policy — depicted by the dashed lines in Figure 11 — leads to a large immediate fall in trading firms' dollar usage: freezing financial assets immediately and severely restricts the availability of dollar trade financing in Russia. The dashed line in the top-right panel shows, however, that the effects of this policy on dollar usage actually diminish slightly over time. The reason is that financial sanctions make the availability of dollar financing in Russia "too low", while the share of Russian trade with

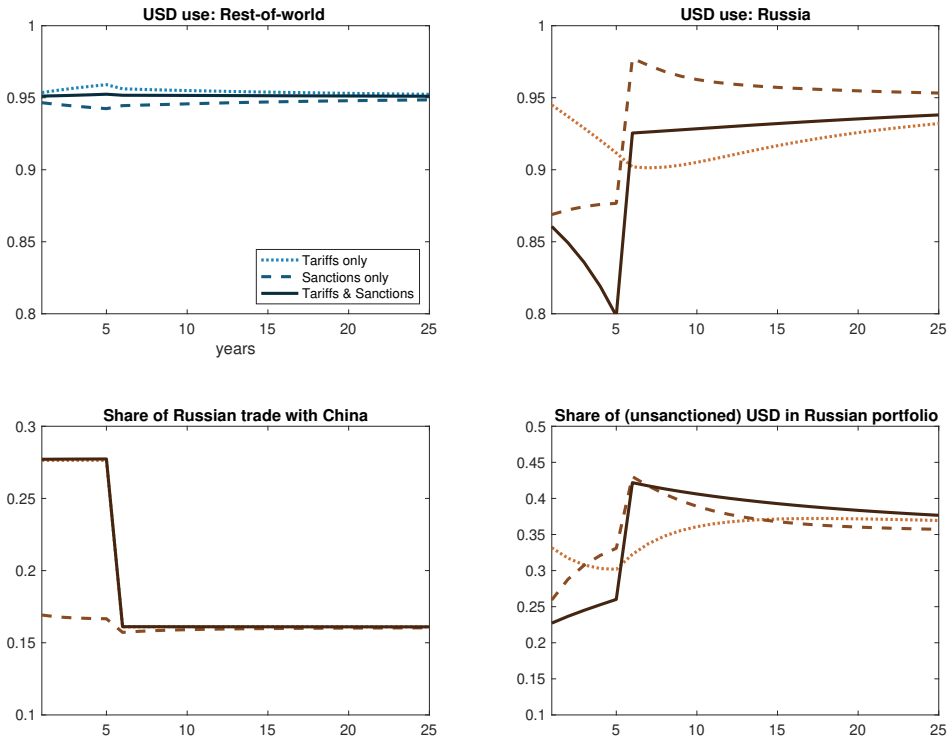

Figure 11: Path of dollar usage and trade in under different Russia sanctions scenarios.

China (and therefore the rest-of-the-world) are not changed by much (dashed line, lower-left panel). Because of this dollar shortage, the liquidity premium on dollars in Russia rises, which gives households a strong incentive to shift savings towards dollar assets. The short-run effect of sanctions is to drive Russia to acquire more US assets, reflected in the rising profile of the dashed line in the bottom right panel of the Figure.[16] This adjustment in portfolios partially offsets the initial drop in dollar liquidity, which explains why dollar usage actually grows slightly over time in the top-right panel.

The combination of these policies — depicted by the solid lines in Figure 11 — is more powerful then either is alone. This is especially true as time passes. The solid line in the top-right panel shows that, by year 5, yuan usage has fallen by 15 percentage points relative to its initial level, while implementing each policy individually would decrease yuan usage by only 4% and 7% respectively. The additional effect is explained by the interaction of the policies, as tariffs reduce the incentive for Russian households to restock dollar assets, which neutralizes the effects of increased dollar savings in the financial sanctions-only case.

The patterns depicted in Figure 11 are not only qualitatively reasonable, but in line with

[16]This might be thought of as a "best-case scenario" for dollar holdings in Russia, since either Russian or US policy makers might also attempt to prevent Russian household from acquiring new dollar assets.

	US	CN	Russia	RW excl. Russia
sanctions only	0.00	0.00	-0.04	0.00
tariffs only	-0.01	0.01	-1.32	0.00
sanctions + tariffs	-0.00	0.01	-1.34	-0.00

Note: Computed in permanent consumption equivalent units, as percentage relative to the unique dollar-dominant steady state of the baseline calibration.

Table 7: Gains (losses) in scenarios with sanctions and/or import+export tariffs on Russia only.

emerging data from Russia. In particular, Chupilkin et al. (2023) document that the share of yuan denominated Russian trade has increase from roughly 2% before the war to just under 18% at the end of 2022. This untargeted moment is very much in line with the 15 percentage point increase in yuan usage implied by our model.

Finally, Table 7 shows the welfare implications of these policies. The first thing to note is that none of these policies has a substantial impact on the US or China, reflecting Russia's small share of world GDP and trade. Moreover, although the financial sanctions create a substantial shift in dollar usage within Russia, financial sanctions alone still imply a negligible welfare impact on Russia itself. On the other hand, the trade sanctions have stronger bite, with Russian experiencing a fall of 1.32% of permanent consumption. This finding about welfare reinforces our earlier results that rest-of-world countries are mostly indifferent to the currency in which they fund their trade, and will rebalance portfolios in order to best match the liquidity used by trading partners.

6 Conclusions

According to our model, a moderate and essentially symmetric trade war between eastern and western trade blocs is unlikely to substantially change the special international role of the US dollar. Unilateral trade protectionist policies, on the other hand, can help a big country entrench its dominant status, but the effects are modest and come with negative welfare consequences. A more extreme trade conflict between the western and eastern trading blocs, however, could be enough to lead to a bifurcated currency equilibrium where both blocs trade in a different currency. Such a transition would be a period of dislocation not only in trade, but also in the institutions for trade financing and in international asset positions. The model is designed to capture many of these forces, but the already substantial welfare

losses we compute for such a transition are likely to be a lower bound on the practical costs of such an intense trade conflict.

In contrast to the case of trade conflict, we find that financial policies pose a significantly larger threat to dollar dominance. US financial sanctions on rest-of-world countries could spark a transition away from the current dollar dominant regime, if the sanctions last more than 15 years. Or, China could "jumpstart" the international use of the yuan if it offers direct subsidies to firms for using yuan to finance their trade. On the other hand, Chinese policies that merely increase the international availability of yuan liquidity (such as swap agreements) will not substantially change the status quo.

Lastly, we have limited our attention in this paper to the role the US dollar plays in international trade of goods and services. Of course, in practice, the dollar holds a similar special role in the trade of *financial assets*. The dominance of the dollar in offshore financial transactions and lending is also underscored by the broad *private* provision of dollar-denominated assets. We think that an extended version of our framework could be a fruitful laboratory for studying trade in financial assets and the private provision of safe assets, since the interaction between incentives to save in an asset and the incentives to coordinate on a medium of exchange seems to be applicable in these domains as well. The main challenge in extending the model in this direction lies in relaxing the perfect foresight assumption we make in this paper, since a complete treatment of financial asset trade requires uncertainty. We believe this would be an impactful direction for future research.

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