The Dollar in an Era of International Retrenchment*

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Abstract

Recent trends suggest the world economy may be tending towards an equilibrium with two distinct trading blocs, each internally integrated, but with significant isolation between the blocs. This paper uses a quantitative theory to explore how far this bifurcation would need to go to pose a threat to the special role of the dollar in international exchange. The theory emphasizes the joint determination of countries' portfolio choices and trading currency. We find that unilateral protectionism on the part of the US could modestly reinforce the dollar's dominant role, but that policies directly supporting the Chinese yuan's use in trade could end the dollar's continued dominance if implemented over a long-enough period. Tit-for-tat responses between just the US and China would likely leave the dollar's role essentially unchanged. If both countries coordinate protectionist policies within their trading blocs, however, a transition away from global dollar dominance becomes far more likely.

JEL classification: E44, F02, F33, F41, G15
Keywords: dollar dominance; trade finance; international fragmentation; exorbitant privilege; liquidity premium

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1 Introduction

A series of developments since the 2008 financial crises suggest that the post-War trend towards greater global trade openness and financial integration may have reached its peak and could reverse substantially in the coming years. An increased reliance on trade tariffs, initiated by the Trump administration in the United States but still very much in place, has contributed to a fall in global trade levels from around 60% before the financial crises to closer to 55% today. Brexit, the Russian War in Ukraine, and renewed Chinese capital controls have all introduced new limits on the mobility of international capital. Extrapolating from these recent changes, one possible outcome is a world economy fragmented into two main trading blocs, one centered around the US and Western Europe and another anchored in eastern Asia by China.

A change along these lines would have far ranging economic consequences, including potentially changing the special role that the US dollar plays in the international monetary system. On the other hand, previous predictions of the dollar's demise have all proven to be premature.[1] The goal of this paper is to explore the potential consequences of international retrenchment, especially in terms of trade relationships, for the dollar's dominance in the global scene. Could a retrenchment, and especially *fragmentation* along distinct trade blocks, actually 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 members of an emerging non-US bloc benefit from the change, if it allowed them to exchange in a currency issues by a member of that bloc?

To analyze these questions, we build on the theory of currency dominance introduced by Chahrour and Valchev (2021). That paper captures international currency competition by modeling the currency decisions of trading firms who face limited availability of trade financing. The model has several steady states, and different steady states and their attraction regions correspond to different currencies playing the dominant role in equilibrium. Parameters and initial conditions in turn jointly determine how stable a currency's dominance is likely to be over time. Most importantly, that paper's main goal was to analyze the historic rise and continued dominance of the dollar in the modern era. Consistent with this objective, that paper focused on the symmetric decisions of firms in a large number of identical small open economies, so that any dominant currency was a *globally* dominant currency.

In contrast to Chahrour and Valchev (2021), the current paper allows for potential fragmentation in the currency choices of firms situated in competing international trade blocs,

[1] See, for example, Krugman (2007)'s discussion of the likelihood of a "Wile E. Coyote moment."

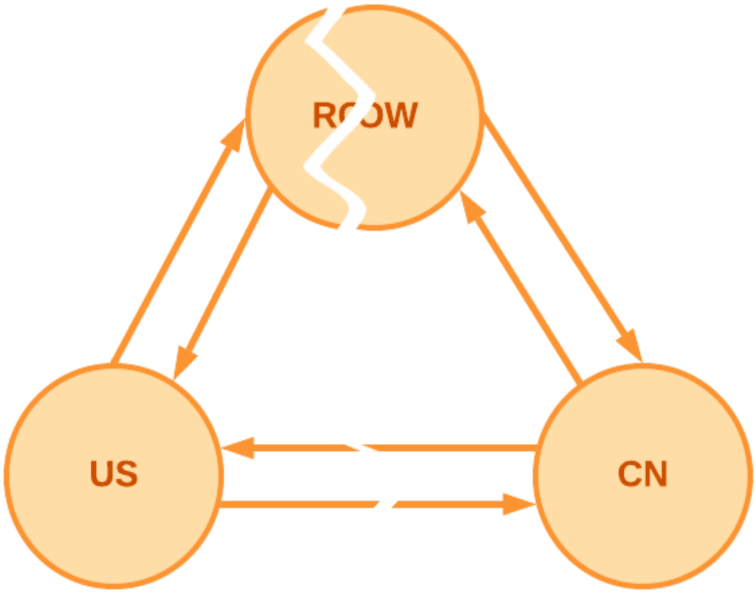

Figure 1: A stylized depiction of global retrenchment.

which are mapped for concreteness to a China-centric "eastern" bloc and a US-centric "western" bloc. This extensions creates the possibility that trading firms located in different blocs make different, regional, currency choices, so that we can explore if and when *global* dominance of a currency is no longer the most likely outcome. We use this environment to study the potential effects of increasing China-US isolation, and the corresponding pressure on smaller countries to "pick sides", on both trade and currency dominance. Figure 1 captures a stylized view of East-West fragmentation that we consider in this paper.

We use our theory to examine how the emergence of distinct trade blocs changes the incentives for coordinating on a common international currency. As the barriers to exchange or holding assets from the alternative bloc grow, firms will have increasing incentive to switch to using a currency from their home bloc for their international trade flows, even if this choice itself further reduces its trade with countries outside of the bloc. To understand the strength of these channels, we consider a variety of policy scenarios including unilateral tariffs, tariff coordination with trade blocs, and direct support for a currency's use in trade. These counterfactuals are meant to capture, among other things, the trade barriers and frictions that arise due to geopolitically motivated actions and sanctions, such as those which have

emerged since the start of the Russian War in Ukraine.

Our calibrated model implies that initial conditions are a powerful force for sustaining currency coordination despite increased barriers to trade, 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 generates 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, our results suggest that the dollar-dominant status quo in the international monetary system would likely survive substantially more trade retrenchment than we currently see in the data.

Nevertheless, the model suggests there are thresholds, which could plausibly be reached in the future, that could give rise to substantial change in the roles of the dollar and the yuan in international exchange. For example, a strengthening of China's policy of providing direct support (both implicit and explicit) for the internalization of the yuan could facilitate a transition to a new equilibrium in which the yuan plays a dominant role in international exchange across the world.[2] In a scenario with both direct support for domestic currency use and high barriers to trade across blocs, the model converges 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 is that it can account for the costs and benefits of the *transition* between different currency regimes. For example, we find that in steady state the US benefits rather little from the dollar's dominance. This occurs because the dominance is linked, in our theory, to the wide holding of US debt externally, around the world: the dominant country in equilibrium is also a major 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 yuan, for example, would cost the US 0.6% of permanent consumption and benefit China by 0.4%, if it was in place long enough to establish the yuan as a dominant currency. More generally, in any scenario where the US loses dominance the US also bears a non-trivial cost associated with lost dominance along the transition path to the new steady state.

[2]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.

Relation to existing literature

This paper is closely related to the literature on dominant international currencies, which is nicely surveyed in the recent paper by Gourinchas et al. (2019). While there are myriad theories and models of dominance, most frameworks can be classified as operating through one (or more) of the three traditional roles of money – as a store of value, unit of account, or medium of exchange. Examples in the first group are especially numerous, including 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).

Among the papers in the unit-of-account or "currency-anchor" type of mechanism, Gopinath and Stein (2020) present a mechanism with some similarities to the one we use here. Chahrour and Valchev (2021) discuss some qualitative differences between these two models, including the implications of increases in the supply of a dominant asset. Other papers in this vein include Engel (2006); Gopinath et al. (2010); Gopinath (2016); Goldberg and Tille (2016); Mukhin (2022); Ilzetzki et al. (2019); Eren and Malamud (2021).

Finally, the literature on mediums of exchange or "global currencies" often centers on search-based theories of money. That work often 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. These externalities provide a deeper microfoundation for the complementarities across countries that we treat parametrically in this paper. That paper focuses on the clearing function of dominant currencies in financial transactions, however, leaving aside details regarding goods trade and, by extension, the potential for international fragmentation.

In our paper, as in Chahrour and Valchev (2021), dominance arises from the interaction of endogenous liquidity premia due to medium of exchange frictions and the demand for store-of-value assets. Because of this interaction, trade flows and patterns are very important in characterizing the emerging equilibrium in international currency choice. This makes this framework well-suited for studying the effect of trade fragmentation on the international monetary system.

The unique 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 that make a choice of which international currency to use are ex-ante symmetric, and thus the resulting equilibria are such that all countries make the same choices. Instead, the central question of our paper is what happens if, because of trade conflict, firms in different regions have different incentives and 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 focuses on a group of identical foreign investors who choose which international currencies to hold; again, a central innovation to our paper is to consider fragmentation and heterogeneity in the use of outside international currencies.

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. In our baseline calibration, we will assume that the size of the US and China are equal, so that their measures $\mu_{us} = \mu_{cn}$. 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. Their measures are μ_a and μ_b respectively, with $\mu_{us} + \mu_{cn} + \mu_a + \mu_b = 1$.

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 trading 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. For our purposes, the crucial choice of the trading firm is the currency in which it obtains its trade funding. We first summarize the problem of the household before turning to a more detailed description of the trading firm problem. The main theoretical difference, relative to Chahrour and Valchev (2021), it that we allow for two rest-of-world regions that may hold different portfolios and make different currency choices. We also 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. 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, as well as the bonds issued by the two large countries, the US and China. The household consumption aggregator is a CES function

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

Consumption originating from the rest-of-world is aggregated across all rest-of-world destinations, 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; when $a_j = 0$ then consumption weights in the CES function are equal to the country's size. The country j consumer price of a good originating in country j' is $P_{jt}^{j'}$. Due to frictions in trade, this price is generally different from the price of the good in its originating country, $P_{j',t}^{j'}$. Cost-minimization of the the household consumption basket implies the domestic price index,

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

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

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

$$\begin{aligned} P_{jt}C_{jt} + P_{us,t}^{us} Q_t^{\$} B_{jt}^{\$} + P_{ch,t}^{cn} Q_t^{¥} B_{jt}^{¥} + P_{us,t}^{us} Q_t^{\$} \frac{\tau}{2} \left(\frac{B_{jt}^{\$} - \underline{B}_{j,t-1}^{\$}}{\underline{B}_{j,t-1}^{\$}} \right)^2 + P_{¥,t}^{¥} Q_t^{¥} \frac{\tau}{2} \left(\frac{B_{jt}^{¥} - \underline{B}_{j,t-1}^{¥}}{\underline{B}_{j,t-1}^{¥}} \right)^2 \\ = P_{jt}^j Y_{jt} + P_{us,t}^{us} B_{jt-1}^{\$} + P_{ch,t}^{cn} B_{jt-1}^{¥} + \Delta_{jt}^{\$} P_{us,t}^{us} Q_t^{\$} B_{jt}^{\$} + \Delta_{jt}^{¥} P_{ch,t}^{cn} Q_t^{¥} B_{jt}^{¥} + \Pi_{jt} + T_{jt}, \quad (2) \end{aligned}$$

and a non-negativity constraint on bond-holdings. The left-hand side of (2) depicts the household's uses for funds, including purchasing the aggregate consumptions good and purchases of bonds denominated in either the US and Chinese currency. Bonds deliver one risk-free unit of the US and Chinese output good respectively, so that their prices in Q_t^c for $c \in \{\$, ¥\}$ are multiplied by the respective output good price. Lastly, 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 $\underline{B}^{¥}_{j,t-1}$. 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 household exogenous endowment of the domestic good, payments from 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 unique feature of our model: the household's bond holdings earn a country-specific liquidity premium of Δ^c_{jt}, which reflects country j's usage of currency c in international exchange. This premium is earned on current, time t holdings, and is an equilibrium object we detail below. The household takes it as given when it chooses it portfolio holdings, but higher Δ^c_{jt} make the bond denominated in currency c more attractive, *caeteris paribus.*

The first order conditions implied by the household problem consist of two Euler equations, one for each currency,

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

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

where $\tau^c_{jt} \equiv \tau \frac{B^c_{jt} - \underline{B}^c_{j,t-1}}{\underline{B}^c_{j,t-1}}$ reflects the marginal adjustment cost on bond portfolios of each type.

Trading Firms

International trade flows through specialized firms that conduct all imports and exports via frictional matching markets. Before entering trade markets, however, firms must first secure trade financing from domestic lenders, in a form that resembles a letter of credit. Once financed, firms are randomly assigned, according to probabilities optimally chosen ex ante, to import from or export to a counterparty country. If matched with a trading partner in the counterpart country, the exporter purchases its domestic good and resells it to the importer at a markup determined by a Nash bargain.

Upon paying a fixed cost ϕ in numeraire units, firms are free to enter the import/export market.[3] Firms only pay this cost if the expected profits from entering are weakly positive, so that the measure of firms m_{jt} in each country is determined by a zero-profit indifference

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

condition. Upon entering the market, 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. In equilibrium, these probabilities are adjusted so that firms are indifferent between operating as an importer or exporter in any direction.

After choosing to enter and the direction of their trade, firms must next choose the type of currency in which they will attempt to finance their trade activity. Financing is acquired via a domestic search and matching market, in which households offer their currency-specific assets as 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 trade. 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 $\nu P^{cn}_{ch,t} B^{¥}_{jt} Q^{¥}_t$ respectively. The parameter ν above captures a notion of "velocity" of the household asset holdings, i.e. the number of transactions the 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 USD 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. Equation (5) implicitly assumes that the matching function $M^F(u, v)$ is constant returns to scale; 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 $X_{ch,t}$, so that we can focus on the financing currency choices of the countries in the rest-of-world regions. In making their funding choice, the rest-of-world firms compare the expected profits of using dollar or yuan financing. If the firm does find financing, the profits it expects to earn are an average across the different potential trading outcomes it may experience. For example,

a firm funded in dollars has expected profit

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

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

$$\Pi^{\$}_{jt} = p^{\$}_{jt}(\tilde{\Pi}^{\$}_{jt} - r), \tag{6}$$

and an analogous expression describes the profit from financing the firm in yuan.

In order to decide which currency to seek, then, the firm needs to compare $\Pi^{\$}_{jt}$ and $\Pi^{¥}_{jt}$. In order 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, $\theta^{(l)}_{jt} \sim N(0, \sigma^2_\theta)$, which is specific to each firm (l) that operates in a country j. Thus, a firm l chooses to finance in dollars whenever $V_{it}(\theta^{(l)}_{jt})$ is positive, where

$$V_{jt}(\theta^{(l)}_{jt}) \equiv \Pi^{\$}_{jt} - \Pi^{¥}_{jt} + \theta^{(l)}_{it}.$$

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

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

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 also consider the possibility that firms in Region A and Region B might 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_{jit}^{im} and p_{jit}^{ex}.

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

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

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

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_{jt}^{j} and the importer then sells it to the country-i household at the prevailing market price in that location P_{it}^{j}. The transaction thus generates a gross surplus of $P_{it}^{j} - P_{jt}^{j}$. Lastly, there is a collateral mismatch cost κ which applies to all transactions where the two counterparties use different type of collateral (i.e. one side used USD, while the other uses yuan bonds). This cost can be micro-founded as the expected cost of default by one of the transaction counterparties, since mismatched collateral means the two promises may not be equivalent in all states of the world, but we abstract from such considerations in our perfect foresight model.

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 $P_{jit}^{whol} = P_{jt}^{j} + \alpha(P_{it}^{j} - P_{jt}^{j})$. The expected profit of a firm looking to export from country j to i is

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

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 expected default cost κ.

Lastly, the financing friction limits the overall value of the transaction to the value of the attached safe collateral. Since we assume each firm borrows one unit of safe assets, to obtain the net expected profit from the view point of a country-j exporter (who earns α fraction of the total surplus), the expected per-unit profit is then scaled by $\frac{\alpha}{P^{whol}_{jit}}$.

Government

We assume that government has no expenditure; the governments only play a role in the large countries, where they issue bonds in fixed supply $\bar{B} = B^{\$} = B^{¥}$ and set the level of lump-sum taxes so as to keep their stock of debt constant, so that $\bar{B} = T_{jt} + Q^j_t \bar{B}$. The small rest-of-world countries in Regions A and B do not issue debt and set $T_{jt} = 0$. In the tariff policy experiments we describe below, any tariff revenues are also reimbursed lump-sum to domestic households.

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:

$$\Delta^{\$}_{jt} = \frac{\nu m_{jt} X_{jt}}{\left[(m_{jt} X_{jt})^{1/\xi_F} + (\nu P^{us}_{us,t} B^{\$}_{jt} Q^{\$}_t)^{1/\xi_F} \right]^{\xi_F}} r \tag{9}$$

$$\Delta^{¥}_{jt} = \frac{\nu m_{jt} (1 - X_{jt})}{\left[(m_{jt}(1 - X_{jt}))^{1/\xi_F} + (\nu P^{ez}_{ez,t} B^{¥}_{jt} Q^{¥}_t)^{1/\xi_F} \right]^{\xi_F}} r \tag{10}$$

Model Intuition

Here, we briefly review some key intuitions 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 household hold a lot of a particular asset (dollars or yuan) that increases the asset's availability to firms who seek financing, and this

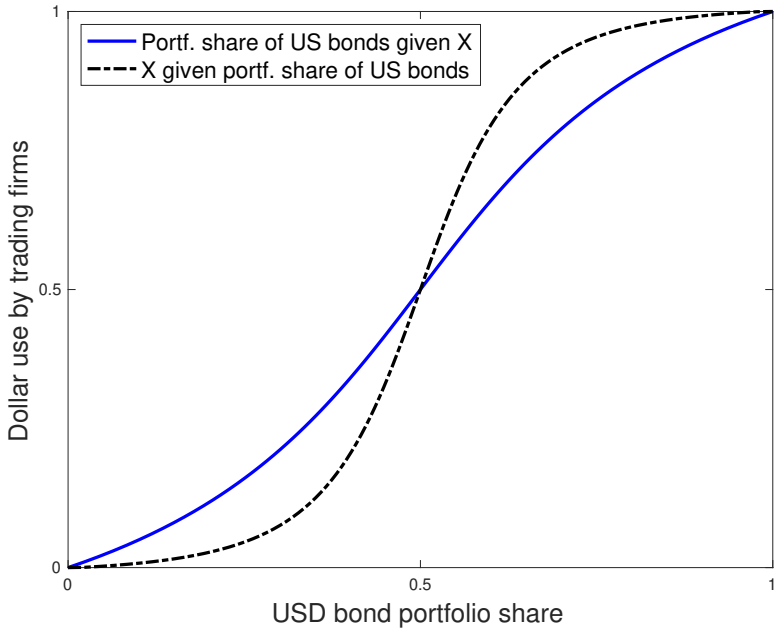

Figure 2: Intuition for multiple steady states in symmetric version of the model

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 effectively earn a liquidity premium. As a result, in the rest-of-world countries, high holdings of the (e.g.) dollar asset 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. The blue line depicts the optimal share of household portfolios held in dollar bonds, as a function of the fraction of firms (in their country) 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 responsive 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, but the coordinated steady states (the extremes) stable outcomes.

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	0.040
X_{us}	US dollar share	0.900
X_{cn}	CN dollar share	0.100
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

Table 1: Exogenously Fixed Parameters

From the perspective of Figure 2, the goal of this paper is to think about how different trade policies can change the level, slope, and shape of the black line. Particularly important for the policy experiments that we conduct in this paper is the role that large country's (exogenous) funding choices play in "anchoring" the choices of the rest-of-world countries (in both regions): a country in Region A, for example, that trades more often with the US encounters more trading partners using dollars and therefore shifts their own funding choices towards dollars. Whenever trade policy shifts trade flows, then, it also shifts currency choice incentives. In the limit of two regional blocs in (goods) autarky from each other, trading patterns will given firms a very strong fundamental reason to use the currency of their region's hegemon, and it would be hard to sustain an equilibrium with a single dominant asset worldwide.

3 Calibrating to the Status Quo

We choose a baseline calibration that is roughly designed to capture the economic size of the big countries, but is symmetric in all respects. We focus on the symmetric case as a baseline not because we think it is the best possible reflection of current reality, but because focusing on an initial symmetric world allows us to isolate the qualitative and quantitative impacts of particular policies. Nevertheless, it turns out that the US and China are remarkably similar in some of the key parameters that we need to calibrate, including in economic

output, total sovereign debt issuance (though the foreign-held shares are quite different), and to a lesser degree in total trade/GDP ratios. With a few exceptions noted below, we follow Chahrour and Valchev (2021) in our initial calibration.

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 set $\beta = 0.96$, consistent with an annual save interest rate close to 4%.[4] And we assume that $\sigma = 1$, i.e. that households have log preferences. We choose an elasticity of substitution among goods of $\eta = 4$, consistent with the evidence summarized in Costinot and Rodríguez-Clare (2014). (In this paper we opt for a "trade" calibration, while Chahrour and Valchev (2021) followed a "macro" calibration and set $\eta = 1$). We choose an elasticity of the trade matching function $\varepsilon_T = 0.01$, which is quite close to a Leontif matching function, so that the short side of the market matches with nearly 100% probability. We fix the parameter $\alpha = 0.5$ so that importers and exporters have equal bargaining power. Finally, we set the exogenous currency use the big countries (X_{us} and X_{cn}) so that 90% 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; we will later experiment with more realistic values for the initial currency usage of Chinese firms.

Finally, we follow Chahrour and Valchev (2021) in fixing very small values for the currency preference shock and the adjustment cost elasticity, $\sigma_\theta^2 = 1e^{-6}$ 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. Our parameter choice implies that that 10% change in portfolio position incurs just 2 basis point of cost on the household.

Targeted Moments

We calibrate the remaining five parameters to match five unconditional data moments. Since the data we are using (since 1970s) is from a world where the USD has been dominant, we match the empirical moments to those at the dollar-dominant steady state implied by the model. Panel (a) of Table 2 summarizes the targeted moments: (1) government debt of 60% of GDP, consistent with the US average; (2) rest-of-world trade share ($\frac{\text{Imports + Exports}}{\text{GDP}}$) of 55%, consistent with smaller country trade shares in the data from the World Bank; (3) a big country trade share of 35%, consistent with the current trade share of China; (4) dollar share

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

Concept	Target Value
Gross debt/GDP	0.60
US & CN trade/GDP	0.35
RW trade/GDP	0.55
RW USD use	0.80
Import markup	1.20

(a) Calibration Targets

Parameter	Concept	Value
$\bar{B}$	US/CH asset supply	1.475
$a_{us} = a_{cn}$	Home bias big countries	0.331
a_j	Home bias RW	0.298
ε^f	Funding match. elas.	0.292
ϕ	Fixed cost of entry	0.083

(b) Implied Parameter Values

Table 2: Calibration Strategy

in trade financing used by rest-of-world trading firms of 80%, consistent with the evidence on the fraction of letters of credit and trade finance loans denominated in dollars BIS (2014); and (5) import price markups of 20%, which is on the lower end of empirical estimates of trade costs.[5]

The model 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 steady state moments. Since the rest-of-world countries primarily use dollars for trade finance ($X_a = X_b = 0.8$), the US bond earns a higher equilibrium liquidity premium: $\Delta^{\$} > \Delta^{¥}$, which in turn results in an interest parity violation

$$\frac{1}{Q^{¥}} - \frac{1}{Q^{\$}} = \frac{\Delta^{\$} - \Delta^{¥}}{\beta} = 1.08\%,$$

which implies the US earns a significant "exorbitant privilege". The size of this excess return is consistent with the Gourinchas and Rey (2007) evidence on exorbitant privilege and the US Treasury convenience yield estimated by Jiang et al. (2020).

In the third line of the table, we compute a common measure of the effective seignorage the US earns from the "privilege" of this interest differential. We compute it as the counterfactual additional interest payments the US would face if it actually paid an interest rate equal to

[5]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 a lower (or higher) number here.

Moments	USD Coord. US	CN	A	B	Symmetric* US	CN	A	B	CNY Coord. US	CN	A	B
Dollar Share	0.90	0.10	0.80	0.80	0.90	0.10	0.50	0.50	0.90	0.10	0.20	0.20
$100\times(i^{¥} - i^{\$})$	1.08	-	-	-	0.00	-	-	-	-1.08	-	-	-
100×Implied rev./GDP	0.88	0.22	-	-	0.55	0.55	-	-	0.22	0.88	-	-
NFA/GDP	-0.48	-0.34	0.21	0.21	-0.45	-0.45	0.23	0.23	-0.34	-0.48	0.21	0.21
Gross For. Assets/GDP	0.03	0.01	0.21	0.21	0.02	0.02	0.23	0.23	0.01	0.03	0.21	0.21
100×Trade bal./GDP	1.12	1.20	-0.61	-0.61	1.31	1.31	-0.69	-0.69	1.20	1.12	-0.61	-0.61

Table 3: Steady-state values for baseline model.

the inverse of the time discount. At 0.88% of GDP, this is a substantial benefit to the US economy at the benchmark calibration.

These interest rate premia are not a complete characterization of the *welfare benefit* of the USD's dominance to the US economy, however. Widespread foreign holdings of a country's assets are necessary to support its dominant status, and this strong external asset demand necessarily 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 has a significant negative net foreign asset position equal to -48% of GDP, while the other big country (China) has a better net foreign asset position of -34% of GDP.[6] This implication is in line with the data, and when we compute consumption levels in both US and China, we find that the net welfare benefit, *at the steady state*, of being dominant is a relatively modest 0.14% of permanent consumption. Hence, in the baseline steady state, the effects of exorbitant privilege and servicing the NFA position roughly cancel each other out.

Table 3 also shows that the dollar-dominant steady state is not the only steady state consistent with our baseline parameters. The model also admits a "symmetric" steady state, in which dollar and yuan each intermediate exactly half of rest-of-world trade. In this scenario both the US and China earn a (smaller) implied interest rate premium on their debt, which is supported by large negative NFA positions. The table also shows there exists a mirror image yuan-dominant steady-state, in which China earns exactly the same benefits as the US does in our baseline scenario.

[6] A richer model could include an asset or assets issued by the rest-of-world countries. Chahrour and Valchev (2021) show that this helps the model better match gross asset positions in steady state. Because it introduces additional state variables, however, this extension complicates the procedure for solving for dynamic transition paths and we have not attempted this here.

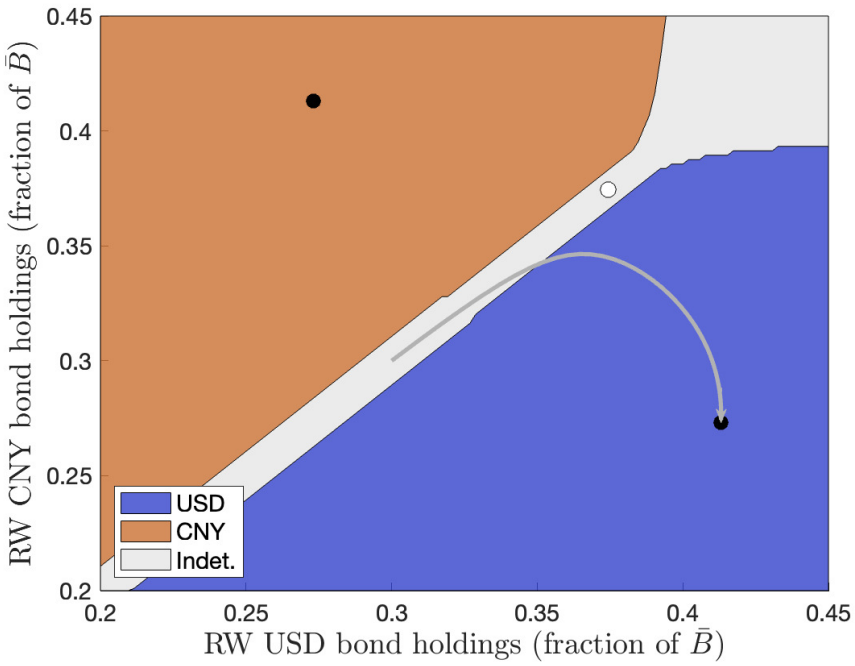

Figure 3: Attraction regions in baseline scenario

The existence of several steady states in our model raises the question of which of these outcomes would we expect to see in practice. As a partial answer to this question, we can ask wether the steady states we identify are locally stable, meaning that economy would return that point after a small perturbation to initial asset holdings. The * notation on the symmetric steady state in Table 3 indicates that this outcome turns out to not be locally stable in this calibration. A more complete answer to this question requires exploring the global dynamics of the model equilibria, and we turn to this question now.

Model Dynamics

The only state variables in our economy are bond holdings and, as suggested by the intuition in Section 2, these holdings serve to "tie down" the equilibrium choice of currency. In particular, from a given set of initial portfolios, the economy may converge to several, one, or possibly none of the steady-states describes in Table 3. Any initial stock of bonds from which the economy converges uniquely to a particular steady state is said to lie in the region of attraction of that steady state.

Figure 3 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

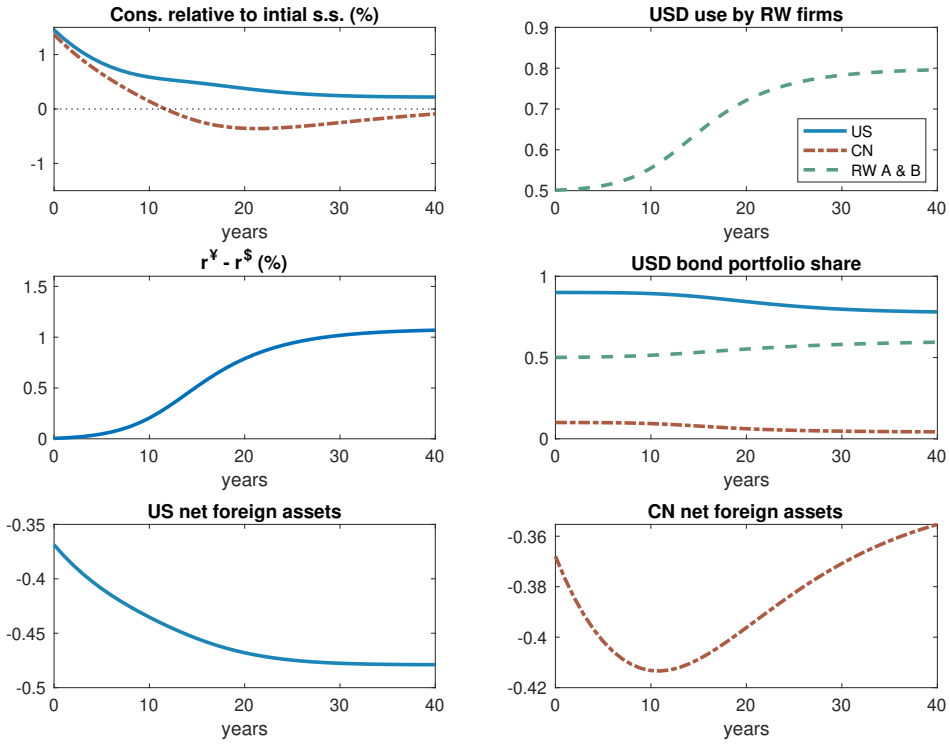

Figure 4: Transition to USD dominant steady-state under baseline scenario.

which Regions A and B each initially hold the same amounts of each type of bond, while the large countries hold proportionally home-biased portfolios of the remaining shares. As we move up in the figure, the rest-of-world countries (in both region 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 black dot (if unstable.)

The color regions of Figure 3 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, while allocation in the orange region can only transition to the yuan-dominant steady state. In these cases, the equilibrium is dynamically unique.[7] In the gray region, by contrast, we find the economy could converge to either steady state, 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.

[7]This is a numerical statement, not a theoretical one. We a 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 path if the solver cannot find one regardless of our initial guess.

Finally, the darker gray line emanating from the center of Figure 3 follows the evolution of the economy from an initial bond allocation in which the Regions A and B hold bond proportional to their economic size to the dollar dominant steady state. Figure 4 shows the evolution of several endogenous variables over the course of this transition. In particular, as the dollar becomes dominant, the US enjoys a period of higher consumption, supported by the outflow of assets to the rest of the world, which in turn serves to bolster the use of the dollar in trade finance. China also experiences a short term consumption boom as rest-of-world economies initially accumulate both types of assets. But as the dollar begins to dominate, both RW regions relinquish their assets and China experiences a second period of consumption decline.

Figure 4 is useful because it demonstrates some important dynamic properties of the model. First, when initial asset allocation don't favor one asset over the other very strongly, transitions to a new steady state can move slowly. Indeed, during the first five years of this transition, it would hard to distinguish on the basis of the data to which steady state the economy is headed. However, once an imbalance in asset holdings emerges, the transition speeds up substantially, with the bulk of the change in dollar use occurring over 10 years. This ten year period serves as a useful benchmark for the size and timescale of the effects that we will find in the various scenarios below.

4 Implications of trade conflict

We begin by considering several scenarios of trade conflict that occurs through the use of import tariffs on foreign goods. These scenarios are interesting to consider, first, because they appear to be a major policy tool in current trade disputes and, second, because there is large trade literature that already studies the effects of tariffs on trade flows and welfare. Since tariffs change the direction of trade flows across the world, they also change the likely trade partners faced by trading firms and, therefore, those firms's incentives to use one currency or the other.

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 the somewhat counterintuitive results that protectionism aimed at a competing large country can potentially be helpful in reinforcing the dominance of one's own currency in international trade. 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

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	1.08	0.80	0.80	*0.00*	*0.50*	*0.50*	-1.08	0.20	0.20
unil. US tariff on CN	1.25	0.85	0.85	*-0.25*	*0.44*	*0.44*	-0.98	0.24	0.24
unil. US tariff on RW B	1.43	0.94	0.93	0.01	0.57	0.47	-1.47	0.14	0.06
coord. US & Region A tariffs on CN	1.53	0.96	0.90	-	-	-	-	-	-
tit-for-tat tariff between US & CN	1.20	0.83	0.83	*0.00*	*0.50*	*0.50*	-1.20	0.17	0.17
perm. support for yuan	-	-	-	-	-	-	-1.15	0.19	0.17
strong bloc-based 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.

of currency dominance, a large country who can secure coordinated tariff policy with a substantial bloc of foreign countries does the most to protect an existing dominant currency. A tit-for-tat tariff war between the US and China, by contrast, has only a very marginal effect on the strength and stability of the dollar's dominant role.

Unilateral Protectionism

We first consider a scenario in which one large country, in this case the US, institutes a 40% tariff on imports from the other big country, in this case China. This scenario is meant to capture a situation where one country attempts to reduce trade with the other, 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 second 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. Meanwhile, the "middle" equilibrium remains unstable. The table shows that the steady-state interest premium earned by the US (in the USD-dominant steady state) is about 20 basis point higher than under the baseline scenario, while consumption (not reported) is modestly lower. Lower steady-state consumption despite higher premia is a result of the larger negative foreign asset position faced by the US in this case, and this highlights the importance of considering the joint equilibrium in external asset positions and interest rates.

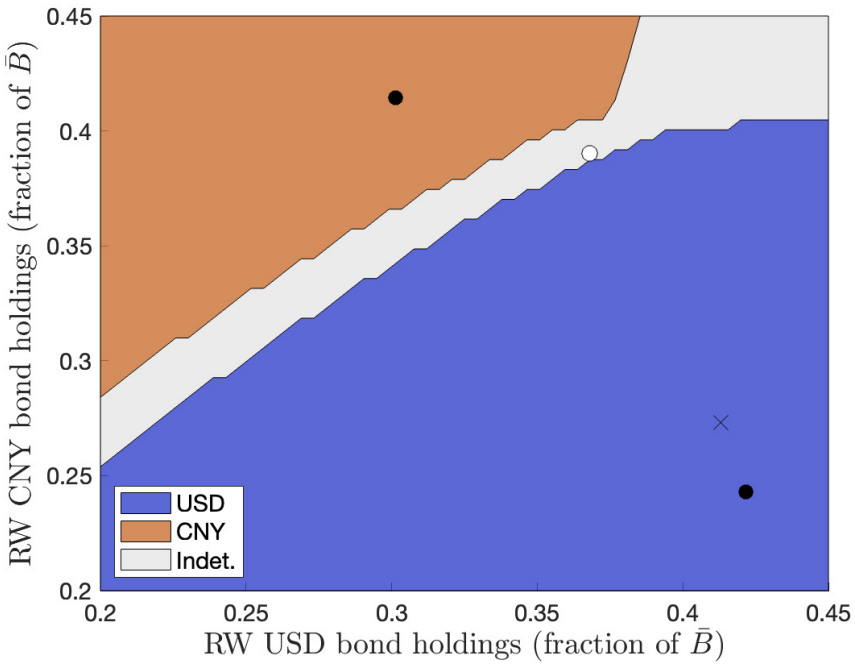

Figure 5: Attraction regions if US puts unilateral tariff on imports from China.

The stronger reliance on the dollar in both the dollar- and yuan-dominant steady states reflects the important anchoring force generated by having strong domestic use of the currency in the home country. When the US restricts imports from the China, it redirects its trading firms to the external markets in Regions A and B (since 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 general equilibrium, however, firm's 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, 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. Together with the observation that dollar use is even higher in this 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.

Finally, the first row of Table 5 reports the welfare implication of this policy for each

	US	CN	RW A	RW B
unilateral 40% US tariff on CN	-0.21	-0.58	0.03	0.03
unilateral 40% US tariff on RW B	-0.48	-0.09	0.11	-0.67
coordinated 40% US and RW A tariffs on CN	-0.08	-2.25	-0.23	0.16
tit-for-tat 40% tariff between US and CN	-0.70	-0.76	0.03	0.03

Table 5: Gain/loss as percentage of initial dollar dominant steady-state consumption in scenarios where the dollar remains dominant.

country/region. Values are reported in consumption equivalent units, but they are not equivalent to steady-state consumption differences because these values take into account the dynamic effects of transitions to the new, post-tariff steady state.

In this unilateral tariff case, the welfare calculation suggests that tariffs are somewhat less harmful to the US and somewhat more harmful to China than one might conclude based only on steady state comparisons. This occurs because the transition to the new steady state requires an outflow of US assets to the rest of the world, and an inflow of Chinese assets to China, corresponding to temporarily higher US consumptions and lower Chinese consumption. In this case, asset positions move only modestly and so steady state consumption differences, though generally different, are a good approximation for the full welfare calculation in this particular case.

Isolation of Region B

In this scenario, we suppose that the US levies a 40% tariff on imports from the rest-of-world Region B (but not China). This scenario is meant to capture a portion of the economic effects (and nothing else!) of the recent attempt by the US to isolate Russia and its most closely-linked trading partners, from world markets.

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 an additional 18 basis points of interest premium relative to the case of a unilateral tariff on China. The table suggests, however, that the effects for 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, is now stable. Moreover, the yuan-dominant equilibrium remains stable and exhibits even lower dollar usage than under the baseline.

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 dynamic implications of this change in policy for regions of attraction of the various steady state. The figure shows that the region of indeterminacy (gray) grows under this policy, implying the smaller shocks could potentially threaten the dominance of the dollar. Moreover, the figure shows a new region, in black, 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 grey, orange and black regions of attraction for the alternative steady states. Thus, while this policy in isolation will not change dominance of the dollar, it does appear to introduce a larger risk that other shocks (or potentially policy responses by China) could more easily dislodge the dollar from its special role.

The second row of Table 5 summarizes the welfare implications of this scenario. Both the US and region B lose around half a percent in permanent consumption units. China loses only about 0.1 percent in consumptions terms, while Region A – which experiences an increased global demand for its goods – actually benefits.

Coordinated isolation

The next scenario, assumes that the US is able to convince its geopolitically-aligned Region A to jointly impose 40% 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 in roughly the last 5 plus years, in which it attempts to "break off" allies from their reliance on trade with the China, and instead to trade more within the US-led bloc.

The fourth row of Table 4 shows that this coordinated policy eliminates the yuan-dominant and middle steady states, implying that this policy is 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 stronger. The table also demonstrates the anchoring effects of domestic currency usage: Region B, which itself has not implemented

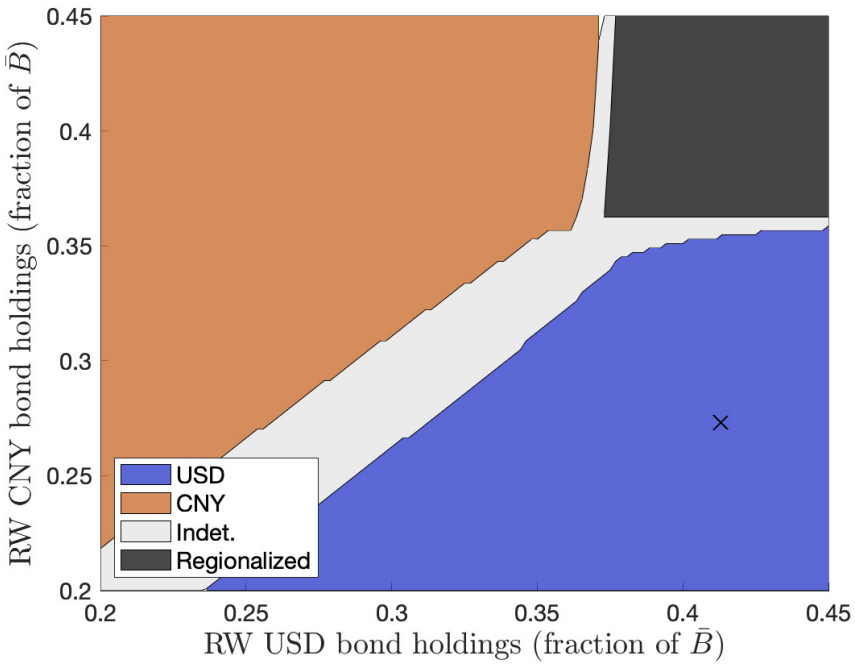

Figure 6: Attraction regions if US put unilateral tariffs on imports from Region B.

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 less that 0.1% of consumption, while Region A suffers roughly twice as much lost welfare. China experience a very substantial fall in welfare, however, more than two percent of permanent consumption, while Region B actually gains modestly. These welfare results, as well common sense, suggest that China is unlikely to accept these consequences without considering a policy response, and the subsequent scenarios suggest some possible forms that response might take.

Tit-for-tat

The fifth row of Table 4 describes the scenario in which China responds to US tariffs by putting a symmetric 40% 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 in the baseline scenario. 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 slight larger. Finally, Table 5 shows that the tit-for-tat scenario

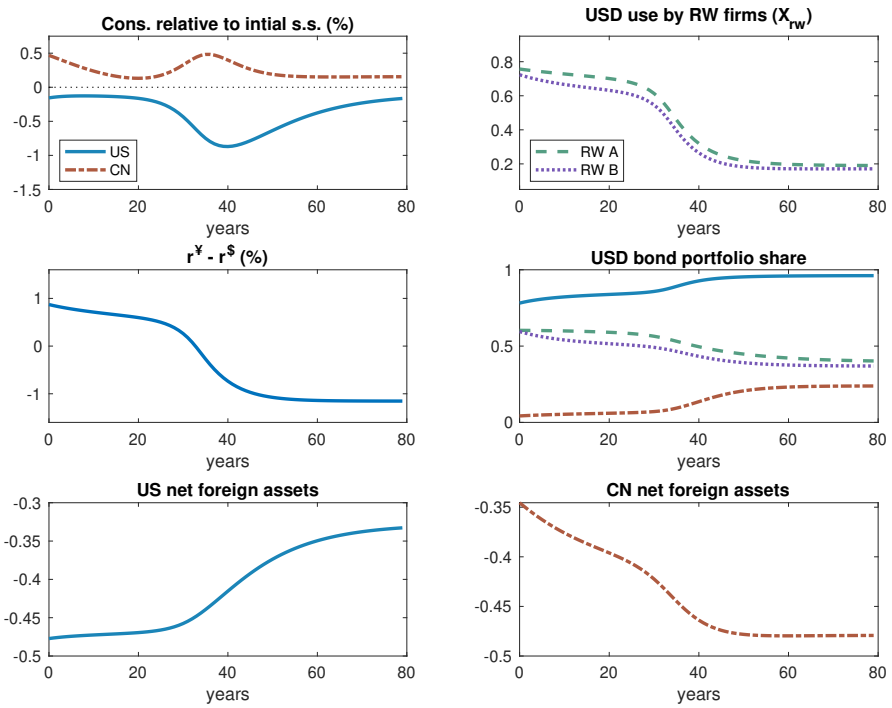

Figure 7: Dynamic responses to institution of permanent support for the yuan at $z_b^{¥} = 0.10$.

implies that both the US and China experience a fall consumption equivalent loss of 75 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.

5 Currency Supports

Permanent support

In this section, we consider scenarios in which China provides explicit support for the use of its currency in international exchange. This scenario is motivated by recent policy experiments engaged by Chinese policymakers to support the international role of the yuan (Eichengreen and Kawai, 2015; Prasad, 2016; Bahaj and Reis, 2020)

To capture this suite of policies in a simple way, we assume that China induces an exogenous fraction, $z_b^{¥}$, of firms in Region B choose to use yuan regardless of trading partner currency choices, so that equation (7) becomes

$$X_b = \left(1 - z_b^{¥}\right)\left(1 - \Phi\left(\frac{\bar{\theta}_{bj}}{\sigma_\theta}\right)\right).$$

	US	CN	RW A	RW B
permanent support for yuan at 10%	-0.27	0.27	0.00	0.00
temporary (20 yrs) support for yuan at 20%	-0.61	0.43	-0.03	-0.03
strong bloc-based fragmentation	-2.91	-2.20	-2.90	-2.87
strong bloc-based fragmentation (counterfactual X)	-2.65	-2.43	-2.88	-2.87

Table 6: Gain/loss as percentage of initial dollar dominant steady-state consumption in scenarios where the dollar loses dominance to the yuan world-wide (rows 1 and 2) or just in region B (row 3). The counterfactual scenario is one in which the same tariff policies are in place, but X_a and X_b are exogenous fixed at their dollar-dominant steady state scenarios.

With this specification, yuan usage is bounded below by $z_b^{¥}$ regardless of the cutoff $\bar{\theta}_b$ chosen by firms in Region B. We consider scenarios where $z_b^{¥}$ is changed permanently, and where it is changed only temporarily.

In the first scenario, we assume that China implements a permanent policy of supporting the yuan, so that $z_b^{¥} = 0.10$ forever. The sixth row of Table 4 shows that, in this scenario, the model economy has only a single, yuan dominant steady state. In most respects, this steady state looks very much like the yuan-dominant steady state in the baseline economy, with the similar yuan usage and interest rate premia.

Figure 7 shows, however, that steady-state analysis provides an incomplete assessment at how effective the policy is in practice. Although the economy has only a single steady state, it takes roughly forty years for the world to transition to this new yuan-dominant equilibrium. For the first thirty years or so, the dollar remains the chief currency used for trade, and the US continues to earn an interest premium on its borrowing. The figure also shows that during the period of fastest transition, the US experiences a substantial loss of consumption, approaching nearly 1% for some years, while China experiences a mini-boom in consumption.

The first line of Table 6 shows that, overall, the US loses about 25 basis points in permanent consumption, while China gains about the same amount. This US loss may seem small, given that US consumption falls as much as 1% during the transition. However, notice that the big consumption losses in Figure 7 come after 30 years, while a substantial portion the increased consumption in China happens right away. These patterns emphasize why it can be important to look at dynamics in order to assess potential policies related to currency dominance. Meanwhile, the rest-of-world is virtually indifferent to this transition, as it essentially amount to exchanging only the "brand name" of the currency they use for

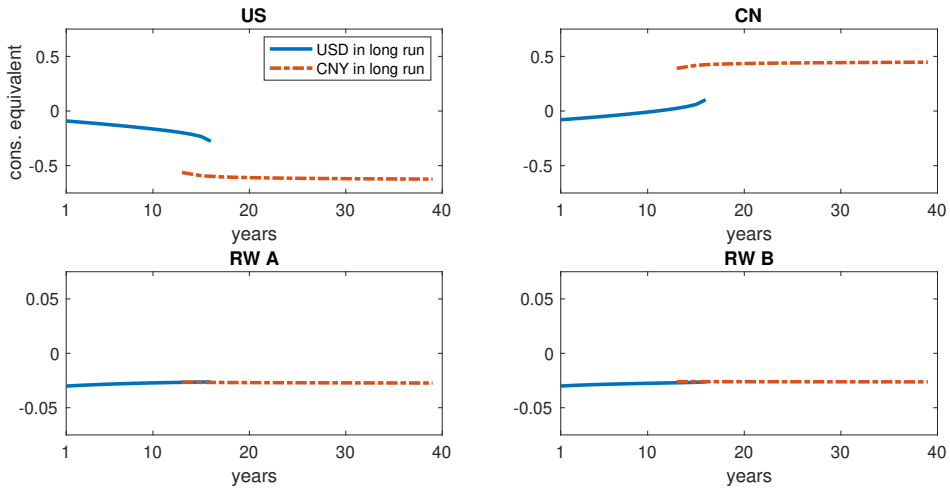

Figure 8: Welfare consequences of providing temporary support, $z_b^{¥} = 0.2$, for the CNY's use in international trade.

exchange.

Temporary support

We now consider a scenario where China implements $z_b^{¥} = 0.20$, but only for a finite period of time known in advance. This scenario is meant to capture the idea that a country might be interested in "jumpstarting" an international role for their currency, via a variety of temporary measures (Bahaj and Reis, 2020). Because the policy is temporary, the economy must eventually return to one of the two stable steady states from Table 3. However, it might not necessarily be the same steady state from which the economy started.

Figure 8 considers possible outcomes for the economy when the policy is in place for anywhere from 1 to 40 years (x-axis), assuming the economy starts from the dollar-dominant steady state. When the policy is active for less than 13 years, the economy always converges back to the dollar steady state. On the other hand, when policy is active for more than 17 years, the economy can only converge to the yuan-dominant steady state. In between, in the range from 13-17 years, the model demonstrates a dynamic multiplicity: the economy can converge to either steady state depending on what agents anticipate will happen in the future. The figure shows that for both the US and China, the ultimate welfare implications depend much more on where the economy ends up in the long run than on the duration of the policy per se.

The second row of Table 6 shows the welfare implications of a 20 year version of this policy, which is sufficient to guarantee a transition to the yuan-dominant equilibrium. The

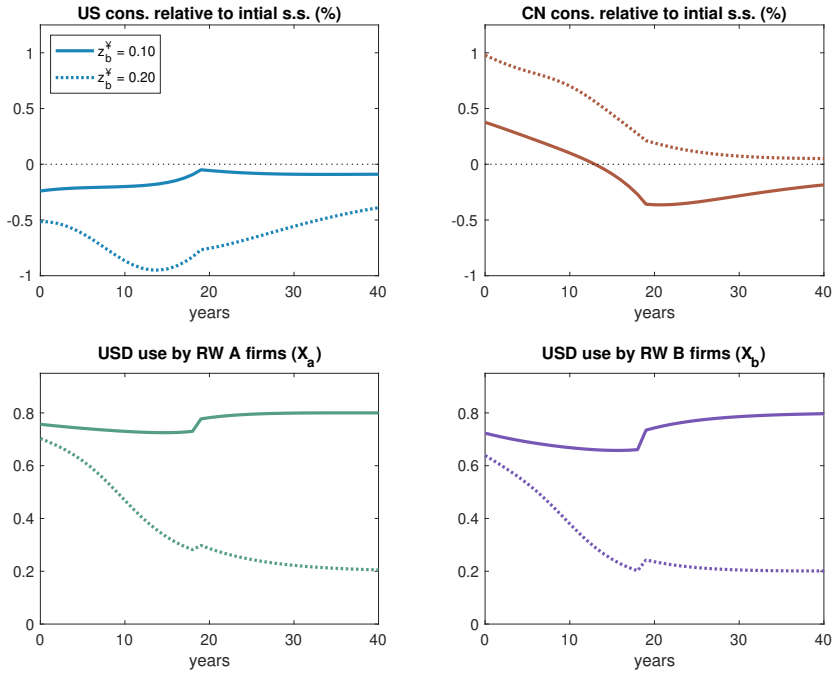

Figure 9: Path of dollar usage under 20 years of support for the yuan.

Note: solid line represents case where $z_b^¥ = 0.1$, and the economy can only converge back to a dollar-dominant steady state. Dashed line represents the case where $z_b^¥ = 0.2$, and the economy must transition to the yuan-dominant steady state.

table shows that the loss of dominance costs the US about 0.6 percentage points of permanent consumption, a rather large number, especially considering that the policy involves no direct tariff-based distortions. Meanwhile, China gains about 0.4 percentage points of consumption, consistent with the idea that both countries have reasonably large interests in defending/establishing an international role for their currencies. The main reasons that these numbers are higher than for the case of temporary support is not that the steady states to which the economy converges are different in the two cases, but again the speed of transition, which is faster in this case of a larger but temporary support for the yuan.

In this way, our model is one that rationalizes an analogue to the "infant industry" argument from development, now applied to currency usage. In the case of this policy, a rather lengthy period of intervention is needed, however, in order to precipitate a change.

Finally, Figure 9 compares the dynamic paths of consumption and dollar use across the scenario where $z_b^¥ = 0.20$ for 20 years and the scenario where $z_b^¥ = 0.10$ for 20 years . The former is sufficient to change the long-run dominant currency, the latter is not. The figure shows that in the $z_b^¥ = 0.20$, both Region A and Region B experience a gradual fall in dollar usage, such that the economy is nearing its new steady state by the end of the policy. In the case $z_b^¥ = 0.10$, agents do not anticipate a transition in the future, and so

their use of currency (and associated portfolios) hardly budges for the entire 20 year period. This contrast again highlights the importance of long-run expectations in determining how currency usage responds to short and medium-run policy changes.

6 Worldwide Bifurcation

Of course, it is unlikely that either bloc could implement the policies explored above without a response from the other. Therefore, we conclude with a scenario in which each country implements all of the policies considered above at once. Specifically, we assume that the US and Region A impose 40 tariffs on imports from the China and Region B, and that they implement a currency support scheme equivalent to $z_a^{\$} = 0.20$ permanently. Meanwhile, China and Region B implement the same policies on the US and Region A. This scenario is meant to capture a complete rupture of cooperative trade relations between the eastern and western economic blocs.

The only feasible steady state in this context is depicted in the final row of Table 4. The table shows that dollars are used essentially exclusively 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 a strong international segmentation, reducing cross-bloc trade by nearly 70% and creating more modest amounts of trade within blocs, and leads to a substantial welfare loss in steady state.

The third row of Table 6 shows that the transition away from the dollar dominant steady state is especially painful for the US, whose welfare falls by 2.9 percent measured in consumption equivalent units, while China loses "only" 2.2 percent. Since the US and China have essentially identical consumption before the transition and exactly identical consumption after, the 0.7 percent difference in the losses experienced by two countries can be attributed to the cost to the US of transitioning away from the dollar, as assets that had previously been help by the Region B flow back into the hands of US consumers, temporarily lowering US consumption. Meanwhile, the loss for the rest-of-world countries are high as well, around 2.9 percent, 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 6 presents the welfare calculations for the same scenario, but assuming (counterfactually) that 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 2 of table. This measure of the cost of lost dominance is lower in this high tariff scenario both because the dollar loses dominance in only one of two regions and because the overall amount of trade, and the corresponding liquidity premia awarded to the issuer of the dominant currency, are lower.

7 Conclusions

Our results suggests that, so long as it remains essentially symmetric, a modest trade war between Eastern and Western trade blocs is unlikely to substantially change the special international role of the US dollar. In terms of the status of the dollar, gains to the US of implementing tariffs are modest and Chinese tariffs on the US are not likely to shift the economy away from the current dollar-dominant paradigm. Stronger policy coordination within blocs, combined with direct support for the use of a currency, could lead to a change in the dominance of the dollar. Undertaken unilaterally by the US, these policies would solidify the role of the dollar by eliminating a yuan-dominant steady state; undertaken unilaterally by China they would precipitate a change in the world currency regime.

In a context of unrestrained policy competition, however, these policies would be enough to lead to a strong bifurcation of international exchange and currency choices. While the model generally suggests that transitions take a long a time, on the order of a decade, in this case the transition could be much faster, taking only a matter of several years. 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 a transition are likely to be a lower bound on the practical costs of such an unrestrained trade conflict.

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