Portfolio Choice, Military Protection, and Exorbitant Privilege*

Paolo Cavallino† Daniel Jimenez‡ Alessandro Rebucci§

June 22, 2026

Abstract

We develop a two-country model in which an Ally is vulnerable to an external aggression, while a military hegemon (the U.S.) has the capacity to prevent or mitigate the consequences of such aggression. We show that in this environment, the Ally may find it optimal to "buy military protection, or a security guarantee" from the United States by subsidizing U.S. foreign direct investments at home (FDIs) and domestic residents' purchases of U.S. bonds. The U.S. security guarantee comes at a price for the Ally: in the allocation under the Ally's optimal capital account policy, the United States earns an excess return on its international investment position, which strengthens the dollar and helps finance a U.S. trade deficit. This highlights why such an equilibrium is also optimal from the perspective of the hegemon and how it contributes to the U.S. exorbitant privilege and global imbalances. The paper also provides empirical evidence on the critical predictions of the model.

Keywords: Defense expenditure, Exorbitant privilege, FDIs, Global imbalances, Wars, Portfolio Choice.
JEL Classification: D74, F36, G11, H56.

*For comments and discussions on previous drafts of this paper, we are grateful to Jeff Frieden and Christoph Trebesch, as well as conference and seminar participants. For hospitality and financial support, Rebucci thanks the BIS, where part of the research for this paper was conducted. Cecilia Ma and Xin Tian provided excellent research assistance. The views expressed in this paper are those of the authors and do not necessarily coincide with the views of the BIS.

†Bank for International Settlements (paolo.cavallino@bis.org)
‡Université Catholique de Louvain (danieljimenez94@gmail.com)
§Johns Hopkins Carey Business School and NBER (arebucci@jhu.edu)

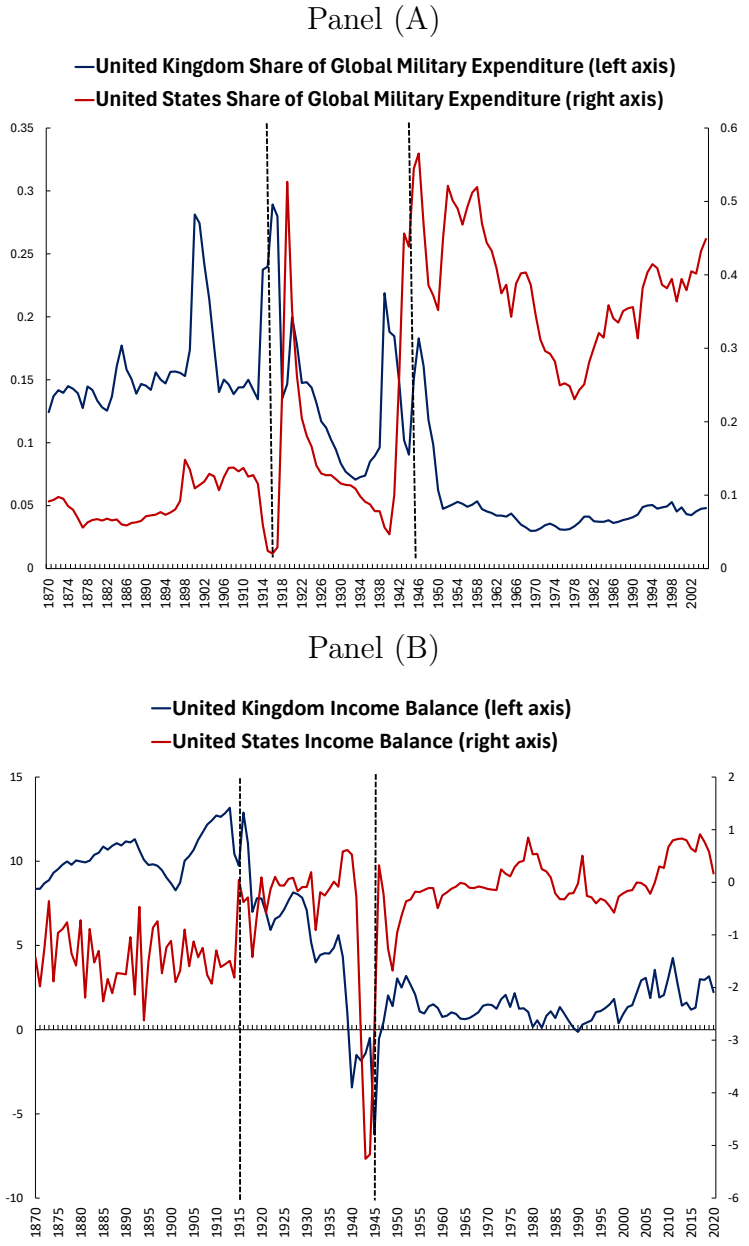
We should therefore expect a return to the Cold War logic in which economic relations more frequently align with security relations. With the United States at the bullseye of the largest security network in the world, the dollar stands to benefit from this shift. As during the Cold War, US security provision may induce allied dollar support." Carla Norrlöf, written testimony to the U.S. House Financial Services Subcommittee hearing "Dollar Dominance: Preserving the U.S. Dollar's Status as the Global Reserve Currency", June 7, 2023.

America provides a global defense shield to liberal democracies, and in exchange, America receives the benefits of reserve status—and, as we are grappling with today, the burdens." Stephen Miran, A User's Guide to Restructuring the Global Trading System, November 2024.

1 Introduction

The notion that military power, global security provision, and global reserve-currency status are mutually reinforcing has gained traction in policy and academic debates (e.g., Norrlöf, 2023, Miran, 2024). Three stylized facts are consistent with this perspective: (i) the military hegemon historically earns an excess return on its international investment position—the "exorbitant privilege"; (ii) it serves as the world's largest net exporter of physical capital; and (iii) it bears a disproportionate share of the collective defense burden, while its allies partially free ride on these efforts. In this paper, we develop a general equilibrium model that rationalizes these three facts as the outcome of an optimal arrangement between a military hegemon and an ally. When faced with a security threat, the ally effectively "buys" a security guarantee from the hegemon by subsidizing the hegemon's foreign direct investments (FDIs) within its borders and domestic residents' purchases of the hegemon's bond. We further provide empirical evidence demonstrating the link between FDIs and U.S. security provision, which is at the core of our model.

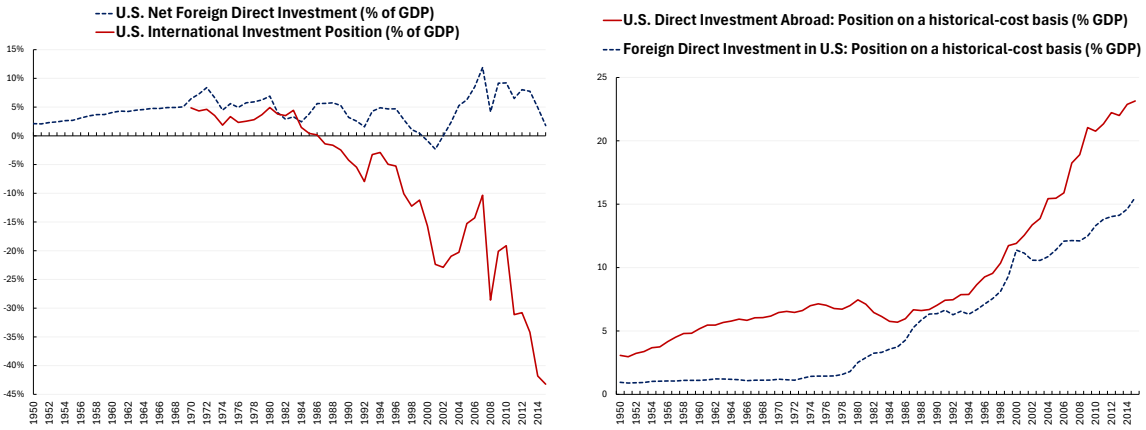
Figure 1 Military Hegemony and Exorbitant Privilege: The United Kingdom and The United States (1870-2005)



Note. The figure plots the British (dark, blue solid line) and American (red solid line) shares of world defense expenditure (Panel A) and income balance to GDP from 1970 to 2005 (Panel B). The income balance is the difference between the current account of the balance of payments and the trade balance in goods and services. The main data sources are the Global Military Spending Dataset (GMSD) of Barnum, Fariss, Markowitz and Morales (2024) and the Macrohistory Database of Jordà, Schularick and Taylor (2017). See Data Appendix for all variable definitions and more details on the sources. With respect to typical measures of exorbitant privilege, the income balance omits valuation effects, which are available only from 1970 onward.

Over the past century, military hegemony has shifted from the United Kingdom (U.K.) to the United States (U.S.). Figure 1 illustrates this transition, plotting the British and American shares of world defense expenditure from 1870 to 2005 (Panel A). During the interwar period (1915–1945), marked by the two vertical lines, the United States overtook the United Kingdom to emerge as the world's military hegemon. In 1915, the U.K.'s share of global military expenditures was approximately 1.5 times larger than that of the U.S.; by 2005, however, the U.S. share had grown to nearly ten times that of the U.K. At the same time, British income from foreign investments—including interest and dividends on its net foreign asset position—declined sharply during the interwar period, while the U.S. income balance rose significantly (Panel B). This provides compelling evidence that the military hegemon has historically earned an excess return on its international investment position—a phenomenon commonly referred to as the "exorbitant privilege".

Figure 2 Net and Gross U.S. FDI Positions (% of GDP, 1950-2015)



Source: U.S. BEA from 1950 to 1969, and Lane and Milesi-Ferretti (2018) from 1970 onward.

A significant source of this exorbitant privilege can be attributed to the concentration of the hegemon's foreign assets in equities and foreign direct investments (FDIs). Before 1914, the United Kingdom was the world's principal exporter of capital. British foreign outward investment stock (portfolio equity and FDI) was approximately five times larger than that of the United States. London financed infrastructure, utilities, and sovereign borrowing across the globe, to the tune of 130% of U.K. GDP (Wilkins (1970), Table X.1, page 201). By

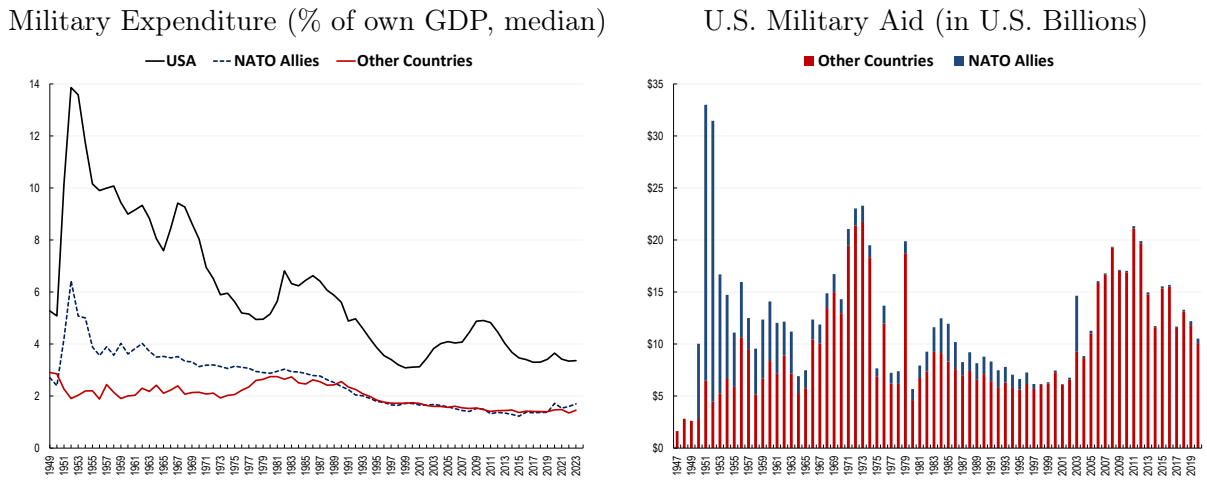
1970, however, U.S. outward FDI had grown to three times the size of the U.K.'s, reflecting the rise of U.S. multinational firms (Lane and Milesi-Ferretti (2018)).[1] Additionally, unlike its overall Net International Investment Position (NIIP), the U.S. Net FDI position has remained consistently positive between 1950 and 2015, with the exception of a brief dip into negative territory in 2000–2001 (Figure 2). For example, in 1991, at the end of the Cold War, the U.S. IIP excluding gold and official reserves stood at approximately $400 billion in deficit, consisting of about $160 billion in net FDI and $550 billion in net portfolio debt. Other investment categories, including net portfolio equity, recorded small negative positions relative to the overall IIP. Indeed, Curcuru, Dvorak and Warnock (2008) estimate that the U.S. cross-border returns differentials are largely explained by a composition effect, which is the concentration of U.S. foreign assets in equities and FDI.

The military hegemon also bears a disproportionate share of the collective defense burden, and the U.S. is a clear example of this dynamic. Figure 3 illustrates these stylized facts by showing annual military expenditures of various groups of countries scaled by domestic GDP (Panel A) and the amount of foreign military aid provided by the U.S. (Panel B) over the period 1950 to 2024. It is well known that the U.S. consistently outspends not only its NATO allies but also other nations globally on military expenditures. Beyond its own defense spending, the U.S. plays a significant role in supporting other countries by providing military resources such as weapons, equipment, and training. While this support was initially directed toward NATO allies in the aftermath of World War II, the focus has shifted over time, with much of the assistance now going to non-NATO countries.

In this paper, we present a framework that connects these three stylized facts. We propose a theory explaining how a vulnerable ally can leverage financial integration with a hegemonic power to secure military protection in the face of external threats. This is achieved by subsidizing foreign direct investments (FDIs) within the ally's borders and encouraging

[1] On another yardstick, in 1945, total U.S. investment abroad (government lending plus portfolio and direct investments) was almost twice the total foreign investment in the United States (Wilkins (2004), Table 10.1, page 564).

Figure 3 Military expenditure to GDP and U.S. foreign military aid (1950-2024)



domestic residents to purchase the hegemon's bonds. The resulting security guarantee is reflected in an asymmetric distribution of defense burdens: the hegemon assumes a disproportionately larger share, allowing the ally to reduce its military expenditures. In return, the hegemon benefits by earning an excess return on its international investment position. This arrangement is stable because it is Pareto-improving, with both the hegemon and the ally benefiting.

The environment consists of a world economy with three countries: a military hegemon referred to as the United States, an Ally, and an external threat referred to as the Enemy. Each country is endowed with Lucas trees that produce a nontradable good and a country-specific tradable good. The United States and its Ally are connected through trade and financial linkages, while the Enemy operates as a closed economy. The United States and the Ally trade shares of their respective tradable trees and a bond denominated in units of the U.S. nontradable good. The model unfolds over three periods: zero, one, and two. In period one, the Enemy may initiate a war by attacking the Ally with a given probability. The outcome of the war depends on the military effort exerted by both the Ally and the hegemon, which can decide how many military resources, if any, to deploy. Decisions regarding military resources and portfolio allocations are made in period zero.

Equipped with this framework, we derive three main results. First, the hegemon intervenes in a war between the Enemy and the Ally if, and only if, it holds shares in the Ally's tradable tree. These holdings create a direct financial stake in the outcome of the conflict ("skin in the game"), incentivizing the United States to act in order to protect its financial interests by influencing the outcome in favor of the Ally. [2] Furthermore, the size of the U.S.'s military intervention at time one decreases with its net foreign asset position and, for a given net position, increases with its gross equity assets and liabilities. Larger gross positions amplify the U.S. portfolio's exposure to the war's outcome—on the asset side, through a greater direct financial stake in the Ally's economy, and on the liability side, through the foreign currency return of U.S. equities.

Second, the international investment position asymmetrically affects the defense incentives of the Ally and the hegemon. If the U.S. intervenes in the war, the Ally's military expenditure increases with the U.S. net foreign asset position but decreases with the gross equity assets and liabilities, for a given net position. Conversely, the U.S.'s military expenditure is increasing in its military effort at time one. This asymmetry suggests that, as financial integration between the two economies deepens, the U.S. assumes a larger share of the defense burden, allowing the Ally to reduce its own military spending and rely more heavily on the U.S.'s implicit commitment to intervene.

Third, the Ally's optimal capital account policy involves subsidizing the issuance of Ally shares to U.S. households and encouraging domestic holdings of U.S. bonds. This result is central to the paper, as it demonstrates how the Ally can strategically distort its international portfolio to secure a military guarantee from the United States. In doing so, it provides a rationale for the stylized facts described earlier. In the decentralized equilibrium, where

[2]Importantly, in our model, financial linkages are the sole channel through which the U.S. is exposed to the conflict's outcome. This is due to the assumption that international trade collapses entirely during a war, regardless of its outcome. Without this assumption, the U.S. would have an additional incentive to deploy military resources to protect trade flows, even in the absence of financial linkages. By abstracting from trade considerations, the model isolates and highlights the role of international portfolio positions in shaping the U.S.'s incentives to intervene. (A more general framework is provided in Online Appendix XX, where trade is disrupted but not entirely shut down.)

portfolio decisions are made independently, Ally households fail to internalize how their portfolio choices influence the outcome of a potential war. This misalignment creates a wedge between private and social incentives, offering a clear justification for government intervention. The optimal policy consists of two key components. First, the Ally subsidizes the issuance of its shares to U.S. households to increase U.S. financial exposure to the conflict, thereby strengthening U.S. incentives to intervene. However, to attract U.S. investors, the Ally must offer a higher expected return on its shares. This excess return compensates U.S. investors for the costs of investing abroad and represents the price the Ally pays to secure the U.S. security guarantee. Second, the Ally seeks to influence its net international investment position by encouraging domestic savings through a subsidy on U.S. bond holdings. This policy incentivizes domestic households to hold more U.S. bonds than they would otherwise choose, given the concurrent incentives to issue Ally shares. By reducing the U.S. net foreign asset position, the Ally reinforces the U.S.'s incentive to protect its foreign investments in the event of a conflict. However, this policy comes with a cost: it distorts the intertemporal allocation of consumption.

The Ally's optimal capital account policy has broader economic implications that extend beyond securing a military guarantee. Compared to the decentralized equilibrium, this policy leads to an appreciation of the dollar and a shift in the U.S. trade balance into deficit. Additionally, the Ally's military expenditure decreases, while U.S. military expenditure increases. Despite this asymmetry, both countries ultimately benefit. The Ally gains from the implicit security guarantee provided by financial integration with the U.S., while the United States benefits from the "exorbitant privilege" associated with providing this security guarantee.

Finally, we turn to the data to investigate the core mechanism of the model: the relationship between the U.S.'s financial stake in its allies and its provision of security. Our analysis reveals that higher U.S.'s FDI position in a country predicts higher U.S. troop deployments there, higher U.S. arms transfers (for OECD allies), and higher U.S. foreign military aid

(for non-OECD allies). Interestingly, these relationship do not hold within NATO countries. This suggests that the financial integration channel we identify acts as a substitute for a formal security commitment.

Related Literature Our paper relates to the literature along multiple dimensions. First, a growing body of research examines how military power and geopolitical competition shape international financial arrangements. Eichengreen, Mehl and Chiţu (2019) document that countries relying on the United States for their security hold a disproportionately larger share of foreign reserves in U.S. dollars. Pflueger and Yared (2024) develop a model in which military spending, geopolitical risk, and government bond prices are jointly determined, showing that hegemonic powers enjoy a funding advantage that rises with geopolitical tensions; their analysis focuses on bond markets and treats military hegemony as exogenous. Kim (2025) builds a general-equilibrium model in which the U.S. security umbrella—taken as an exogenous global public good—lowers geopolitical risk, generates a security-based convenience yield on dollar assets, and rationalizes persistent U.S. trade deficits. Clayton, Maggiori and Schreger (2026) examine how global imbalances translate into *power* imbalances, showing that a large foreign creditor's threat to dump U.S. bonds can extract geopolitical concessions when debt levels are high enough to create rollover risk—as illustrated by the 1956 Suez crisis. Our paper differs from the others in two critical respects. First, we *endogenize* the hegemon's military intervention as a function of its financial exposure: the ally's portfolio choice creates the incentives to intervene, so causality runs from FDI to military protection. Second, the relevant financial instrument is equity (e.g., FDI), not bonds or reserves—it is the hegemon's "skin in the game" through direct investment that triggers protection, generating predictions for portfolio composition that are absent from bond-market models.

The paper also adds a layer to the large and well-established literature on the U.S. exorbitant privilege. In particular, Gourinchas and Rey (2007) documents that the United States earns an excess return on its gross foreign assets relative to what it pays on its liabilities to foreigners. They attribute this differential to two factors: a return discount

(also called a convenience yield in other parts of this literature), whereby foreigners earn lower returns on their U.S. holdings than Americans earn on comparable assets abroad, and a composition effect, whereby the U.S. holds risky, high-return assets abroad—primarily equity and direct investment—while financing itself through safe, low-return liabilities such as Treasury bonds. Curcuru et al. (2008) later found that the within-class differential on portfolio securities is smaller than previously estimated, while the differential is driven by the composition tilt toward equity and FDI and a persistent income yield advantage on U.S. direct investment abroad as stressed in Figure 1. Our provides a structural explanation for both the composition effect and the FDI income differential. Our theory predicts that U.S. military protection lowers war risk in host countries, encouraging U.S. firms to make direct investments abroad while attracting foreign capital into safe U.S. assets. This security-driven mechanism generates the portfolio asymmetry that both papers document. Empirically, we focus on FDI positions as the driver of the exorbitant privilege tied to the U.S. security umbrella.

A long-standing tradition linked foreign direct investment and security. The relationship between FDI and military presence has traditionally been studied primarily as "flag leads trade": security commitments facilitate investment by reducing political risk. Biglaiser and DeRouen (2007) document that U.S. FDI flows to countries hosting U.S. troop deployments, a pattern specific to U.S. investors. More recently, Aiyar, Malacrino and Presbitero (2024) show that geopolitical alignment increasingly shapes bilateral FDI, with "friend-shoring" becoming more salient since 2018. While Alfaro and Chor (2024) document that U.S.–China tensions have reallocated FDI toward countries geopolitically aligned with the United States. Frieden (1994) provides an early analysis of how different types of cross-border investments attract different forms of political and military protection: site-specific investments with easily appropriable rents historically invited direct control (including colonialism), while portfolio and manufacturing investments relied on cooperative enforcement. Brooks (2005) extends this logic to modern production networks, arguing that multinational firms create

vested interests in stability, though without modeling portfolio incentives or deriving asset-pricing implications. We explore causation in the opposite direction from FDIs to security.

Third, the paper relates to the well-established literature on security burden sharing and free riding. Olson and Zeckhauser (1966) develop a theory of alliances, assuming that defense is a public good and that larger members disproportionately shoulder alliance costs and implying that security guarantees should induce lower military expenses. Nordhaus, Oneal and Russett (2012) examines how external security shapes national defense spending. They find that a one-percentage-point increase in the likelihood of a militarized dispute raises defense spending by about 3 percent. However, Allen, VanDusky-Allen and Flynn (2016) find that U.S. troop deployments influence host-state defense spending, with allies increasing their defense burden while non-allies tend to reduce it. Empirically, we find that faster growth in U.S. and foreign direct investments predicts lower defense expenditure, providing an additional economic rather than strategic reason why countries might free ride on the U.S. security guarantee.

A large body of finance literature focused on war risk, the equity premium, and portfolio choice. Pástor and Veronesi (2013) develop a general equilibrium model where political uncertainty commands a conditional risk premium that is stronger when macroeconomic conditions are poor. Cortes, Vossmeyer and Weidenmier (2022) find that higher defense spending stabilizes aggregate and sectoral volatility by securing demand for defense-related output, reducing uncertainty without directly altering the equity premium. Hirshleifer, Mai and Pukthuanthong (2025a) construct a war discourse index from 160 years of news data and show that increases in war-related news predict higher future excess returns, consistent with a priced war-risk premium. Hirshleifer, Mai and Pukthuanthong (2025b) shows that a war-related factor extracted from news explains the cross-section of stock returns, indicating that exposure to war risk is systematically priced. On the portfolio side, Jiao and Ng (2025) show that institutional investors overweight equities in allied countries with high defense spending while underweighting rivals undertaking similar military buildups. Converse and Mallucci

(2025) document that rising geopolitical risk leads bond fund managers to concentrate portfolios toward geopolitically aligned countries. Crosignani, Han and Macchiavelli (2025) provide micro evidence that U.S. export controls—a tool of geoeconomic competition—reduce the returns and increase the volatility of exposed mutual fund portfolios. We study war risk in an open-economy, general equilibrium setting and derive implications for both equity returns and country portfolios. Our paper differs from this literature in a fundamental respect: we *endogenize* the hegemon's military intervention as a function of its financial exposure. Rather than treating U.S. security provision as exogenous or studying how geopolitical risk affects portfolios, we show that the ally's portfolio choice *creates* the hegemon's incentive to intervene. In our analysis, the direction of causality runs from FDI positions to military protection, not the reverse.

Finally, the idea that commerce promotes peace traces back to Montesquieu, Kant, and Mill.[3] Martin, Mayer and Thoenig (2008) provides a nuanced theoretical and empirical treatment: bilateral trade reduces the probability of conflict between trading partners, but multilateral openness can increase it by lowering bilateral dependence. Huang, Li and Meissner (2025) use technological advances in air transport as an instrument for trade flows and find that trade causally reduces interstate military conflict. Our paper extends this classical logic from trade to financial integration: cross-border FDI positions create "skin in the game" that makes military protection incentive-compatible for the hegemon.

The rest of the paper is organized as follows. Section 2 develops the model and discusses its solution. It also presents the paper's main theoretical results. Section 3 provides evidence on the model implications. Section 4 concludes. An Online Appendix (referred to as "Appendix" for brevity throughout the paper) provides additional details.

[3]Montesquieu, *The Spirit of Laws* (1748): "Peace is the natural effect of trade." Kant, *Perpetual Peace* (1795): "The spirit of commerce, which is incompatible with war, sooner or later gains the upper hand in every state." Mill, *Principles of Political Economy* (1848): "It is commerce which is rapidly rendering war obsolete, by strengthening and multiplying the personal interests which are in natural opposition to it."

2 Model

In this section, we describe the model and discuss its properties. We begin by describing the environment and the structure of the two economies, including preferences, asset menu, and market structures. We then introduce war, model its effects, and incorporate military spending into the framework to draw testable implications in the data. The model's empirical implications are discussed and tested in the following section.

2.1 Setup

The world economy is populated by three countries: a military Hegemon, denoted by U for the United States, an Ally, denoted by A, and an Enemy, denoted by E.[4] Each country is populated by a unit measure of homogeneous households and is endowed with Lucas trees that produce a nontradable good and a country-specific tradable good. We focus on the interaction between the U.S. and the Ally. For simplicity, we assume that only the U.S. and the Ally have trade and financial linkages. The Enemy is effectively a closed economy.

Time is discrete, and there are three periods, $t = 0, 1, 2$. At time $t = 1$, the Enemy may attack the Ally, triggering a war between the two countries. War affects international trade and disrupts supply and demand in both the U.S. and the Ally. The outcome of the war, modeled as the degree of disruption in the Ally, depends on the Ally's military decisions and capabilities. The Hegemon can intervene to improve the outcome of the war for the Ally. The Hegemon also chooses the strength of the intervention.

2.1.1 The Hegemon

Households in the U.S. maximize

$$U_0 = \mathbb{E}_0 \sum_{t=0}^{2} \beta^t \mu_t \log c_t, \tag{1}$$

[4] In the rest of the paper, we use U and U.S. interchangeably.

where c_t is a consumption basket including the domestic nontradable good, $c_{NT,t}$, the U.S. tradable good, $c_{U,t}$, and the ally tradable good, $c_{A,t}$, given by $c_t \equiv [(c_{NT,t})^{\omega_t} (c_{U,t})^{\alpha_t} (c_{A,t})^{\gamma_t}]^{\frac{1}{\mu_t}}$. The preference parameters $\{\omega_t, \alpha_t, \gamma_t\}$ are nonnegative and potentially stochastic, with $\mu_t \equiv \omega_t + \alpha_t + \gamma_t$. We assume that the nontradable good is the numeraire in the U.S. and normalize its price to be 1 in domestic currency. Hence, $p_{NT,t} = 1$ for $t = 0, 1, 2$.

In each period, households receive an endowment of the domestic nontradable and tradable goods, denoted by $y_{NT,t}$ and $y_{U,t}$ respectively. They consume and choose a portfolio of assets to bring to the next period. Households can borrow or save in a one-period international bond, denoted by b_t, that pays one unit of the U.S. nontradable good.

They can also invest in shares of the Ally's tradable tree, denoted by $s_{A,t+1}$, or issue shares of their own tradable tree, denoted by $-s_{U,t+1}$. The U.S. households' budget constraint is

$$\begin{aligned} & p_t c_t + q_t b_{t+1} + q_{A,t} s_{A,t+1} + q_{U,t} s_{U,t+1} \\ & \quad = y_{NT,t} + p_{U,t} y_{U,t} + b_t + s_{A,t} \left(p_{A,t} y_{A,t} + q_{A,t} \right) + s_{U,t} \left(p_{U,t} y_{U,t} + q_{U,t} \right) - z_t, \end{aligned} \tag{2}$$

where $p_t c_t \equiv c_{NT,t} + p_{U,t} c_{U,t} + p_{A,t} c_{A,t}$ denotes total consumption expenditure, $p_{U,t}$ and $p_{A,t}$ are the dollar prices of the U.S. and Ally tradables, and $q_{U,t}$ and $q_{A,t}$ the dollar prices of their trees. The dollar price of the international bond is q_t, while z_t denotes a lump-sum component of U.S. households income, which includes taxes and other transfers.

U.S. households choose consumption components $\{c_{NT,t}, c_{U,t}, c_{A,t}\}_{t=0,1,2}$ and their portfolios, $\{b_t, s_{A,t}, s_{U,t}\}_{t=1,2}$, by maximizing (1) subject to (2). The households' optimization problem can be decomposed into two parts: a static, intratemporal allocation problem—in which, given total consumption expenditure in the period, households allocate spending across goods; and a dynamic, intertemporal problem—in which households choose their saving and borrowing strategies across various assets over time.

The first-order conditions of the static consumption expenditure allocation problem are

$$\frac{\omega_t}{c_{NT,t}} = \frac{\mu_t}{p_t c_t}, \quad \frac{\alpha_t}{p_{U,t} c_{U,t}} = \frac{\mu_t}{p_t c_t}, \quad \frac{\gamma_t}{p_{A,t} c_{A,t}} = \frac{\mu_t}{p_t c_t},$$

where $\frac{\mu_t}{p_t c_t}$ is the Lagrange multiplier associated with (2) which, in equilibrium, is equal to the marginal utility of consumption expenditures. For simplicity, following Gabaix and Maggiori (2015), in our analysis, we assume that the endowment process for nontradable goods follows $y_{NT,t} = \omega_t$. This assumption, combined with the market clearing condition $y_{NT,t} = c_{NT,t}$, implies that consumption expenditures are $p_t c_t = \mu_t$, and U.S. households' demands for U.S. and Ally tradables goods take the simple form $p_{U,t} c_{U,t} = \alpha_t$ and $p_{A,t} c_{A,t} = \gamma_t$. Thus, γ_t is the dollar value of U.S. imports from the Ally.

The intertemporal consumption-savings decision yields the Euler equations

$$\begin{aligned}
q_t &= \beta \mathbb{E}_t \left[\Lambda_{t|t+1} \frac{p_t}{p_{t+1}} \right], \\
q_{U,t} &= \beta \mathbb{E}_t \left[\Lambda_{t|t+1} \frac{p_t}{p_{t+1}} \left(p_{U,t+1} y_{U,t+1} + q_{U,t+1} \right) \right], \\
q_{A,t} &= \beta \mathbb{E}_t \left[\Lambda_{t|t+1} \frac{p_t}{p_{t+1}} \left(p_{A,t+1} y_{A,t+1} + q_{A,t+1} \right) \right],
\end{aligned}$$

where $\Lambda_{t|t+1} = \frac{\mu_{t+1}/c_{t+1}}{\mu_t/c_t}$ is the U.S. households' stochastic discount. Our assumption for the nontradable endowment process implies that $\Lambda_{t|t+1} \frac{p_t}{p_{t+1}} = 1$, rendering risk-averse households effectively risk-neutral with respect to claims on nontradable goods. While this assumption is admittedly strong, it simplifies the analysis by neutralizing variations in households' marginal utility that are not key for the economic insights of the paper. This happens because any variation in marginal utility is offset by a proportional change in the price of the consumption basket. For example, an unexpected windfall worth one unit of nontradable goods raises consumption (lowering its marginal utility) and simultaneously lowers its price (raising the purchasing power of that unit). These effects exactly offset each other in equilibrium, keeping households' marginal utility of nontradable goods constant. Thus, the asset

pricing conditions simplify to

$$\begin{aligned} q_t &= \beta, \\ q_{U,t} &= \beta \mathbb{E}_t \left[p_{U,t+1} y_{U,t+1} + q_{U,t+1} \right], \\ q_{A,t} &= \beta \mathbb{E}_t \left[p_{A,t+1} y_{A,t+1} + q_{A,t+1} \right]. \end{aligned} \tag{3}$$

It is important to emphasize that this assumption is made purely for analytical convenience and is not critical to the results of the paper. For completeness, more general results that relax this assumption are provided in Online Appendix XX.

2.1.2 The Ally

Household preferences and budget constraint in the Ally are the mirror image of those in the Hegemon. Ally's households maximize

$$U_0^* = \mathbb{E}_0 \sum_{t=0}^{2} \beta^t \mu_t \log c_t^*$$

where $c_t^* \equiv \left[\left(c_{NT,t}^* \right)^{\omega_t^*} \left(c_{A,t}^* \right)^{\alpha_t^*} \left(c_{U,t}^* \right)^{\gamma_t^*} \right]^{\frac{1}{\mu_t^*}}$, with $\mu_t^* \equiv \omega_t^* + \alpha_t^* + \gamma_t^*$. The nontradable good is the numeraire also in the Ally, and we normalize its price to be 1 in domestic currency. That is, $p_{NT,t}^* = 1$ for $t = 0, 1, 2$. The exchange rate, denoted by e_t, is defined as the price of U.S. nontradables in terms of Ally nontradables, such that an increase in e_t is an appreciation of the dollar. In the absence of a nominal side to the model, we intentionally abuse the word exchange rate to mean the real exchange rate. Similarly, we abuse the word dollar to mean a claim to the numeraire of the U.S.

The Ally households' budget constraint is

$$\begin{aligned} &p_t^* c_t^* + q_t^* b_{t+1}^* + q_{U,t}^* s_{U,t+1}^* + q_{A,t}^* s_{A,t+1}^* \\ &\quad = y_{NT,t}^* + p_{A,t}^* y_{A,t} + e_t b_t^* + s_{U,t}^* \left(p_{U,t}^* y_{U,t} + q_{U,t}^* \right) + s_{A,t}^* \left(p_{A,t}^* y_{A,t} + q_{A,t}^* \right) - z_t^*, \end{aligned}$$

where $p_t^* c_t^* \equiv c_{NT,t}^* + p_{A,t}^* c_{A,t}^* + p_{U,t}^* c_{U,t}^*$ and all prices are expressed in local currency. As for the U.S., we assume that the endowment process for the Ally nontradable good follows $y_{NT,t}^* = \omega_t^*$, which yields

$$p_{U,t}^* c_{U,t}^* = \gamma_t^* \quad \text{and} \quad p_{A,t}^* c_{A,t}^* = \alpha_t^*,$$

where α_t^* is the Ally households' demand for domestic tradable goods and γ_t^* is the local currency value of the Ally's imports from the U.S. The asset pricing equations derived from the Ally households' intertemporal problem are

$$\begin{aligned} q_t^* &= \beta \mathbb{E}_t \left[e_{t+1} \right], \\ q_{U,t}^* &= \beta \mathbb{E}_t \left[p_{U,t+1}^* y_{U,t+1} + q_{U,t+1}^* \right], \\ q_{A,t}^* &= \beta \mathbb{E}_t \left[p_{A,t+1}^* y_{A,t+1} + q_{A,t+1}^* \right]. \end{aligned} \tag{4}$$

Again, as in the case of U.S. households, Ally households are risk-neutral with respect to claims denominated in domestic nontradable goods.

2.1.3 Trade and Financial Linkages and Market Clearing

We conclude this section by describing trade and financial linkages between the two countries. The U.S. and Ally households can exchange tradable goods in international markets in which the law of one price holds. Hence, $p_{U,t}^* = e_t p_{U,t}$ and $p_{A,t} = \frac{p_{A,t}^*}{e_t}$. Markets clearing require

$$p_{U,t} y_{U,t} = \alpha_t + \frac{\gamma_t^*}{e_t} \quad \text{and} \quad p_{A,t}^* y_{A,t} = \alpha_t^* + e_t \gamma_t.$$

Regarding the asset markets, we assume that international bond trading is frictionless, while trading in stocks is subject to some costs. The first assumption implies that the price of the bond in the Ally currency is $q_t^* = e_t q_t$. This, and the fact that the real interest rates in the two countries are equals, and equal to the inverse of their time discount factor β, implies

that, in the competitive equilibrium of the model, the exchange rate follows a random walk. Using (3) and (4) yields $e_t = \mathbb{E}_t [e_{t+1}]$. Unlike bonds, buying and selling shares of the foreign tree is subject to an iceberg cost that is proportional to the changes in aggregate holdings. This implies that the prices of the Ally tree in the U.S. and the U.S. tree in the Ally are

$$q_{A,t} = \frac{q^*_{A,t}}{e_t} \left(1 + \psi \Delta \bar{s}_{A,t+1}\right)$$
$$q^*_{U,t} = e_t q_{U,t} \left(1 + \psi^* \Delta \bar{s}^*_{U,t+1}\right)$$

with $\psi, \psi^* > 0$, where $\Delta \bar{s}_{A,t+1} \equiv \bar{s}_{A,t+1} - \bar{s}_{A,t}$ denote changes in U.S. holdings of Ally shares and $\Delta \bar{s}^*_{U,t+1} \equiv \bar{s}^*_{U,t+1} - \bar{s}^*_{U,t}$ denote changes in Ally holdings of U.S. shares. These assumptions reflect the relatively higher liquidity and lower transaction costs on short-term bonds and the higher informational and institutional, and regulatory frictions associated with equities. Markets clearing in the international assets markets require $0 = b_t + b^*_t$, $0 = s_{U,t} + s^*_{U,t}$, and $0 = s_{A,t} + s^*_{A,t}$.

2.2 War, military efforts and military expenditures

In this section, we introduce the concept of war and the military dynamics within the model. At $t = 2$, the world is at peace. However, at $t = 1$, there is a probability $\rho \in (0, 1)$ that war could break out between the Enemy and the Ally. The outcome of this war, which influences the extent of economic disruption in the Ally, is determined by the military efforts of both the Ally and the U.S. At $t = 0$, the U.S. and the Ally make strategic decisions regarding their respective military expenditures in preparation for potential conflict.

We model the disruption caused by war through two distinct channels. The first channel operates through the disruption of trade flows. We assume that during a war, non-military trade in goods between the U.S. and the Ally collapses entirely:

$$\gamma^*_1 (war) = \gamma_1 (war) = 0.$$

This assumption reflects the physical disruption of supply chains caused by conflicts. For instance, the destruction of critical infrastructure—such as ports, railways, highways, and airports—significantly hinders the international exchange of goods. By assuming that trade collapses completely, the impact of war on U.S. households' utility is transmitted solely through its effect on their financial wealth. This simplification allows us to focus on how international portfolio positions shape the U.S.'s incentives to influence the outcome of the war. It is important to note that the assumption of a complete trade collapse is made purely for expositional purposes. It simplifies the algebra and facilitates the derivation of closed-form results. For completeness, a more general framework is provided in Online Appendix XX, where trade is disrupted but not entirely shut down.

The second channel through which war affects equilibrium is its impact on the Ally's economy. We model this as a proportional negative shock to both the aggregate demand and supply of the Ally's goods. Specifically, we assume that war reduces the aggregate demand and supply of both tradable and nontradable goods by a fraction $1-\theta_1$, where $\theta_1 \in [\theta, 1)$ represents the outcome of the war. A higher θ_1 corresponds to a more positive outcome for the Ally, with less severe economic consequences. Formally, this assumption has the following implications:

$$\begin{aligned} y^*_{NT,1}(war) &= \theta_1 y^*_{NT,1}(peace) \quad \text{and} \quad \omega^*_1(war) = \theta_1 \omega^*_1(peace), \\ y_{A,1}(war) &= \theta_1 y_{A,1}(peace) \quad \text{and} \quad \alpha^*_1(war) = \theta_1 \alpha^*_1(peace). \end{aligned}$$

These equations capture the direct economic consequences of war on the Ally's production capacity and the diminished consumer spending, resulting in weaker economic activity. Once again, the assumption that war affects the demand and supply of tradable and nontradable goods in the same way is made purely to simplify the notation and keep the model tractable. This simplification does not alter the core insights of the analysis. In the more general framework presented in Online Appendix XX, we relax this assumption and allow for asymmetric

effects of war on demand and supply and/or on tradable versus nontradable goods.

The outcome of the war, θ_1, is endogenous and is determined by the military efforts of both the Ally and the U.S. We use the term military effort in a broad sense to refer to all the activities performed by a country to achieve specific military objectives. It encompasses activities with different intensity levels, which can range from routine patrols or training exercises, to providing resources or equipment to a combatant country, to a full scale military intervention. We model military effort as the level of resources that a country allocates to military activities. Formally, denoting with $m_1 \geq 0$ and $m_1^* \geq 0$ the Ally and U.S. military efforts, respectively, we assume that the outcome of the war is determined as:

$$\theta_1 = f\left(m_1, m_1^*\right) \tag{5}$$

where $f : \mathbb{R}_0^+ \times \mathbb{R}_0^+ \to [\underline{\theta}, 1)$ is increasing in both arguments, the parameter $\underline{\theta} \geq 0$ represents the worst possible outcome of the war, and the upper limit 1 represents the best possible outcome.[5] In what follows, we assume the following functional form for f:

$$f\left(m_1, m_1^*\right) = \underline{\theta} + (1 - \underline{\theta}) \frac{1 - e^{-\kappa m_1 - \kappa^* m_1^*}}{1 + e^{-\kappa m_1 - \kappa^* m_1^*}},$$

where the parameters $\kappa \geq 0$ and $\kappa^* \geq 0$ represent the effectiveness of the U.S.'s and the Ally's military efforts, respectively. The functional form has several important properties that provide flexibility and realism in analyzing the impact of military efforts on a war outcome. First, it accounts for differences in the quality or efficiency of the military resources deployed by the U.S. and the Ally. For instance, $\kappa > \kappa^*$ implies that the U.S.'s military effort has a greater impact on the war outcome than the Ally's military effort. This captures asymmetries in military capabilities between the two countries. Second, the functional form features a nonlinear relationship between military efforts and the war outcome. Specifically,

[5] We assume that $\underline{\theta} > \tilde{\theta}$, where $\tilde{\theta}$ solves $\tilde{\theta}\left(y_{NT}^*\right)^{\frac{\omega^*}{\omega^*+\alpha^*}}\left(y_A\right)^{\frac{\alpha^*}{\omega^*+\alpha^*}} = e^{\frac{\beta}{\theta+\beta}\frac{\alpha^*+\gamma^*}{\alpha^*+\omega^*}-1}$, to ensure that the utility of the Ally's households is strictly increasing in θ_1. See the proof of Lemma 1 for further details.

the exponential terms ensure diminishing marginal returns to military efforts. As m_1 or m_1^* increase, their incremental impact on θ_1 diminishes, reflecting the fact that additional military resources become less effective at higher levels of deployment. Third, the functional form features strategic substitutability between the military efforts of the U.S. and the Ally. Specifically, as m_1 increases, the marginal benefit of m_1^* decreases, and vice versa. This means that an increase in one country's military effort reduces the relative effectiveness of the other country's effort in improving the war outcome.

Military effort is costly because it depletes the stock of military resources (e.g., the size of its army, equipment, or other military assets) of the country. Let $a_1 \geq 0$ represent the stock of military resources available to the U.S. at the beginning of time 1 (e.g., the size of its army, equipment, or other military assets). Each unit of military effort m_1 requires $h(m_1)$ units of military resources, where $h : \mathbb{R}_0^+ \to \mathbb{R}_0^+$ is an increasing and strictly convex function with $h(0) = \frac{\partial h(0)}{\partial m_1} = 0$. Therefore, a_1 represents the maximum military effort that the U.S. can exert at time 1, meaning $m_1 \in [0, a_1]$. To produce a_1 military resources, the U.S. must invest $x(a_1)$ units of its tradable goods at time 0, where $x : \mathbb{R}_+ \to \mathbb{R}_+$ is an increasing and strictly convex function with $x(0) = \frac{\partial x(0)}{\partial a_1} = 0$. Military expenditures $p_{U,0}x(a_1)$ are financed through lump-sum taxes, therefore they do not impact the budget constraint of U.S. households. At time 2, unused military resources $a_2 = a_1 - m_1$ can be transformed into δa_2 tradable goods and consumed, where $\delta \in [0, 1]$. Similarly, at time 0 the Ally produces a_1^* military resources by investing $x^*(a_1^*)$ units of its tradable goods, where x^* is increasing and strictly convex with $x^*(0) = \frac{\partial x^*(0)}{\partial a_1^*} = 0$. At time 1, the Ally chooses its optimal military effort $m_1^* \in [0, a_1^*]$, and at time 2 it transforms unused military resources into $\delta^* a_2^*$ units of tradable goods and consume them. In what follows, we operate under the reasonable assumption that, in the event of war, the Ally exerts its maximum military effort ($m_1^* = a_1^*$), whereas the U.S. does not ($m_1 < a_1$). Lemma 1 in the appendix establishes the existence of parameters δ and δ^* that ensure this condition holds.

In each country, military decisions—both expenditures at time 0 and effort at time 1—are

made by a centralized authority that maximizes the utility of domestic households. This is in contrast with consumption and savings decisions which are made by atomistic households.

2.3 Decentralized equilibrium

In this section, we solve for the decentralized equilibrium of the model by working backward, starting from time 2. At time 2, all countries are at peace, and there are no shocks. We drop the time index on variables to denote their peacetime realizations. For example, y_U and y_A represent the peacetime supply of U.S. and Ally tradable goods, respectively. Similarly, α and γ (α^* and γ^*) denote U.S. (Ally) households' demands for domestic and foreign goods, respectively. To streamline the algebra, and focus on the key economic mechanism of the model, in the main body of the paper we assume $\beta = \alpha = \alpha^* = \gamma = \gamma^* = \delta = 1$ and $\delta^* = \omega = \omega^* \downarrow 0$. The propositions at the end of each subsection generalize our results for a generic set of parameters.

Equilibrium at t=2 Let $w_2 = b_2 + s_{A,2}p_{A,2}y_A + s_{U,2}p_{U,2}y_U$ represent U.S. financial wealth—i.e., the return on its portfolio of international assets—at the beginning of time 2. Since time 2 is the final period, U.S. households consume their accumulated wealth entirely, with no savings carried forward. Combining their budget constraint with the goods market clearing conditions, $p_{A,2}y_A = \frac{1}{e_2} + 1$ and $p_{U,2}y_U = 1 + \frac{1}{e_2}$, yields the value of the exchange rate that clears the markets:

$$e_2 = \frac{1}{1 - w_2}. \tag{6}$$

As common in this class of models, an increase in U.S. wealth leads to a stronger dollar.

Equilibrium at t=1 Between time 1 and time 2, U.S. wealth evolves according to the law of motion:

$$w_2 = \frac{\gamma_1^*}{e_1} - \gamma_1 + w_1, \tag{7}$$

where $\frac{\gamma_1^*}{e_1} - \gamma_1$ is the time-1 U.S. trade balance, denominated in dollars.[6] Using the goods markets clearing conditions, $p_{A,1}y_{A,1} = \frac{\alpha_1^*}{e_1} + \gamma_1$ and $p_{U,1}y_{U,1} = \alpha_1 + \frac{\gamma_1^*}{e_1}$, and the asset pricing equations, $q_{A,1} = \frac{1}{e_2} + 1$ and $q_{U,1} = 1 + \frac{1}{e_2}$, we can express w_1 as a function of the time-1 and time-2 exchange rate, as follows:

$$w_1 = b_1 + s_{A,1}\left(\frac{\alpha_1^*}{e_1} + \gamma_1 + \frac{1}{e_2} + 1\right) - s_{U,1}^*\left(1 + \frac{\gamma_1^*}{e_1} + 1 + \frac{1}{e_2}\right). \tag{8}$$

Recall now that the exchange rate follows a random walk and, therefore, it is constant between time 1 and time 2, so that $e_1 = e_2$. Armed with this, we combine (6), (7), and (8) to solve for w_1 as a function of international portfolios $\left\{b_1, s_{A,1}, s_{U,1}^*\right\}$:

$$w_1 = \frac{b_1 + s_{A,1}\left(\frac{\alpha_1^*+1}{\gamma_1^*+1} + 1\right)(\gamma_1 + 1) - s_{U,1}^*(3 + \gamma_1)}{1 + s_{A,1}\frac{\alpha_1^*+1}{\gamma_1^*+1} - s_{U,1}^*}, \tag{9}$$

The exchange rate that clears the markets at time 1 is then given by: $e_1 = \frac{\gamma_1^*+1}{\gamma_1+1-w_1}$. In the event of war, $\gamma_1(war) = \gamma_1^*(war) = 0$, and $\alpha_1^*(war) = \theta_1$. Therefore, the gross return on the U.S. portfolio of international assets is:

$$w_1(war) = \frac{b_1 + (2 + \theta_1)s_{A,1} - 3s_{U,1}^*}{1 + (1 + \theta_1)s_{A,1} - s_{U,1}^*}.$$

Armed with this result, we are now ready to analyze the incentives for the U.S. to intervene in the war. U.S. households' utility in case of war is

$$U_1(war) = \log(1 + a_2) - 2\log\left(1 + \frac{1}{e_1(war)}\right)$$

[6] Since there are no shocks at time 2, all assets are risk-free and and yield the same rate of return. This also implies that households do not adjust their holdings of foreign shares due to the portfolio adjustment costs ψ and ψ^*, maintaining their positions unchanged: $s_{U,2}^* = s_{U,1}^*$ and $s_{A,2} = s_{A,1}$. The assumption of no shocks at time 2 simplifies the analysis of the model, as it eliminates the need to account for the portfolio rebalancing in the final period. The assumption can be made without any loss of generality because the main goal of the analysis is to investigate the determinants of international portfolio positions at $t = 0$, before the possible onset of war, rather than the portfolio's evolution or adjustments in subsequent periods.

with $a_2 = a_1 - h(m_1)$ and $e_1(war) = \frac{1}{1-w_1(war)}$. The first order condition with respect to m_1 is

$$\underbrace{\frac{s_{A,1}}{1 - s^*_{U,1} + s_{A,1}(1+\theta_1)}}_{\frac{\partial e_1/e_1}{\partial \theta_1}} \underbrace{\frac{2}{1+e_1(war)}}_{\frac{\partial U_1(war)}{\partial e_1/e_1}} \frac{\partial \theta_1}{\partial m_1} = \frac{1}{1+a_2} \frac{\partial h(m_1)}{\partial m_1} \tag{10}$$

The first term on the left-hand side of this equation, which is the semi-elasticity of the exchange rate with respect to θ_1, measures the sensitivity of the U.S. portfolio to the outcome of the conflict. If U.S. wealth is positively correlated with θ_1, then a more favorable war outcome appreciates the exchange rate. The second term, measures the change in utility induced by a 1% appreciation of the dollar. Overall, these two terms capture the marginal benefit of steering the outcome of the war in favor of the Ally, while the right-hand side captures the marginal cost of effort.

It is immediate from (10) that the U.S. is motivated to deploy military resources if and only if it holds shares in the Ally's tradable assets, i.e. $s_{A,1} > 0$. These holdings create a direct financial stake in the conflict's outcome for the U.S. ("skin in the game"), prompting it to act in order to protect its financial interests by influencing the outcome in favor of the Ally. If $s_{A,1} = 0$, then it is optimal for the U.S. not to intervene in the war at all, that is $m_1 = 0$. It is important to emphasize that, in our model, financial linkages are the only channel through which the U.S. is exposed to the conflict's outcome. This is due to our assumption of a complete collapse of international trade during a war, regardless of its outcome. Without this assumption, the U.S. would have an additional incentive to deploy military resources to protect international trade, even in the absence of financial linkages. By abstracting from trade considerations, however, the model allows us to more clearly isolate and analyze the role of international portfolio positions in shaping the U.S.'s incentives to influence the outcome of the conflict.

While the U.S. intervenes in the war if and only if it holds shares in the Ally's tradable tree, the relationship between its holdings and the level of military effort is non-monotonic. On the one hand, a higher $s_{A,1}$ increases the exposure of the U.S. portfolio to the conflict,

raising the semi-elasticity of the exchange rate and the marginal benefit of each unit of military effort. On the other hand, a higher $s_{A,1}$ also raises U.S. wealth ex ante; when the U.S. enters the war with greater financial wealth, the marginal benefit of intervening to prevent further losses diminishes. This lowers the marginal utility of additional wealth—the second term on the left-hand side of (10). The relative strength of the two channels depends on the U.S. holdings of the Ally's tradable tree. When $s_{A,1}$ is low, the exposure channel dominates, making optimal U.S. military effort increasing in U.S. holdings of Ally shares. When $s_{A,1}$ is high, the wealth channel may dominate, making optimal U.S. military effort decreasing in those holdings.

The U.S.'s incentive to deploy military resources depends not only on its own exposure to the Ally's economy, but also on the Ally's exposure to the U.S. economy. In particular, conditional on $s_{A,1} > 0$, the U.S.'s optimal military effort is increasing in the Ally's holdings of shares in the U.S.'s tradable tree, $s^*_{U,1}$. A higher $s^*_{U,1}$ not only raises the marginal utility of a stronger dollar, by reducing U.S.'s wealth ex ante, but it also increases its sensitivity to the outcome of the conflict. When the U.S. intervenes and the dollar strengthens, the Ally's expenditure on U.S. goods falls, reducing the return on the U.S.'s tradable tree. If the Ally holds U.S. shares ($s^*_{U,1} > 0$), this lower return reduces the value of U.S. liabilities, which in turn raises U.S. wealth further (see equation (8)). This increases the marginal benefit of the U.S.'s military effort, prompting the U.S. to allocate additional military resources.[7]

These results highlight the distinct roles of *gross* vs *net* international asset positions in shaping the U.S. incentives to intervene. Let $\bar{b}_1 \equiv q_0 b_1 + q_{A,0} s_{A,1} + q_{U,0} s_{U,1}$ denote the net foreign asset position of the U.S. at the end of time 0. Then, U.S. financial wealth at time

[7]This mechanism, which links asset returns to the U.S.'s military effort, also impacts the return on the Ally's tradable tree. As the dollar strengthens, the dollar-denominated return on the Ally's tradable tree declines. This, in turn, negatively affects U.S. wealth, reducing its sensitivity to θ_1. However, the direct effect of U.S. intervention on the return of the Ally's tradable tree—operating through the conflict's outcome (θ_1)—remains the dominant factor. As a result, the U.S.'s wealth exposure to the outcome of the conflict is increasing in its holdings of the Ally's tradable tree.

1 in the two states of the world, *war* and *peace*, can be expressed as

$$w_1\left(war\right) = \bar{b}_1 + \left(1-\rho\right)\Delta w_1$$

$$w_1\left(peace\right) = \bar{b}_1 - \rho\Delta w_1$$

where $\Delta w_1 \equiv \frac{s^*_{U,1} - s_{A,1}\left(2-\theta_1+\theta_1\bar{b}_1\right)}{1-s^*_{U,1}+s_{A,1}\left(1+\theta_1-\rho\theta_1\right)}$ represents the wealth transfer that occurs between the two states of the world.[8] This representation allows us to isolate the impact of the gross assets ($s_{A,1}$) and liabilities ($s^*_{U,1}$) positions of the U.S. in shaping its incentives to deploy military resources, as any change in gross positions is offset by an equivalent increase or decline in the U.S. holding of bonds, such that its net foreign asset position remains constant.

Consistent with the discussion above, the gross positions affects the U.S. incentives to intervene mostly by changing the sensitivity of the U.S. portfolio to the outcome of the conflict (ie, the first term on the right-hand side of equation (10)). A larger gross foreign assets/liabilities position increases the marginal benefit of the intervention by increasing the U.S. exposure to the conflict's outcome. In contrast, the net foreign assets position affects the U.S. incentives to deploy military resources mostly by changing the marginal utility of wealth (ie, the second term on the right-hand side of equation (10)). A higher U.S. net international asset position reduces the marginal benefit to intervene by lowering the marginal utility of wealth. The following proposition summarizes and generalizes these results.

Proposition 1 (U.S. military effort)**.** *The U.S. intervenes in the war if and only if it holds a positive amount of shares of the Ally's tradable tree. If* $s_{A,1} > 0$*, the level of the U.S. military effort is decreasing in its net foreign asset position, and, for a given net position—increasing in its gross equity assets* ($s_{A,1}$) *and liabilities* ($s^*_{U,1}$) *positions.*

Equilibrium at t=0 At time 0, households choose their portfolios of international assets, and the government decides how much to invest in developing military resources. We begin

[8] Notice that for an equilibrium to be well defined we must have $\bar{b}_1 < 2-\rho$ and $\Delta w_1 \in \left(-\frac{2-\bar{b}_1}{\rho}, \frac{1-\bar{b}_1}{1-\rho}\right)$.

with the government's problem, taking international portfolios as given, because military investment affects the outcome of a potential conflict and thus the returns on assets. We then solve for households' portfolio choices and derive the decentralized equilibrium of the model.

Consider the Ally household's utility, as a function of a_1^*:

$$U_0^* = \log\left(1 - x^*\left(a_1^*\right)\right) - 2\log\left(1 + e_0\right) + \rho\left[2\log\left(\theta_1\right) - 2\log\left(1 + e_1\left(war\right)\right)\right],$$

where $e_0 = \mathbb{E}_0\left[e_1\right]$. Now, recall that in the event of a conflict the Ally deploys all its military resources, that is $m_1^* = a_1^*$. The first order condition with respect to a_1^* equates the marginal benefit at time 1 of additional military resources in case of a conflict, to the marginal cost at time 0 of committing those resources: :

$$2\rho\left[\frac{1}{\theta_1} - \frac{s_{A,1}}{1 - s_{U,1}^* + s_{A,1}\left(1 + \theta_1\right)}\left(\frac{e_1\left(war\right)}{1 + e_1\left(war\right)} + \frac{e_1\left(war\right)}{1 + e_0}\right)\right]\frac{\partial\theta_1}{\partial m_1^*} = \frac{1}{1 - x^*\left(a_1^*\right)}\frac{\partial x^*\left(a_1^*\right)}{\partial a_1^*}, \tag{11}$$

The terms in parenthesis on the left-hand side is the marginal benefit for the Ally of improving the outcome of the conflict. It has two parts. The first is a direct stabilization benefit, $1/\theta_1$, which captures the value of mitigating wartime disruptions to tradable and nontradable goods supply. The second is a transfer component that reflects how a higher θ_1 shifts wealth toward the U.S. when the U.S. is financially exposed to the war outcome. From the Ally's perspective this term is negative, as those gains accrue to U.S. households. If $s_{A,1} = 0$, the U.S. bears no exposure and the transfer channel vanishes.

International portfolio positions affect the Ally's incentives to invest in military resources both directly—by changing how war outcomes are shared across countries—and indirectly—by shaping the U.S. incentives to deploy military resources in the event of war. When $s_{A,1} > 0$, larger gross foreign asset/liability positions increase the sensitivity of U.S. wealth to the war outcome. An improvement in θ_1 then induces a larger wealth transfer to the U.S., reducing the Ally's net marginal benefit from improving the outcome of the conflict.

In addition, larger gross foreign asset/liability positions increase the U.S. military effort at time 1, improving the expected outcome of the conflict. As θ_1 increases, both the direct marginal benefit of the Ally's military effort, $1/\theta_1$, and its marginal effectiveness, $\partial\theta_1/\partial m_1^*$, decline, further weakening the Ally's incentive to invest in military resources. The next proposition formalizes these results.

Proposition 2 (Ally military expenditure)**.** *If $s_{A,1} > 0$, the Ally's military expenditure is increasing in the U.S. net foreign asset position, and, for a given net position—decreasing in the gross equity assets and liabilities positions.*

Turning to the U.S., the government chooses m_1 at time 1 to equate its marginal benefit and marginal cost. Hence, by the envelope theorem, its decision to invest in military resources does not depend on the marginal benefit of its military effort. However, the level of military effort deployed in a conflict affects the stock of resources available at time 2 and therefore their marginal value. When the U.S. anticipates deploying more resources in the event of war—for example, because financial exposure to the war outcome is higher, as described in Proposition 1—the shadow value of additional military capacity rises, increasing optimal investment at time 0.

Proposition 3 (U.S. military expenditure)**.** *The U.S.'s military expenditure is increasing in its military effort.*

These comparative statics highlight the asymmetric impact of international positions on defense investment incentives. As gross financial integration between the two economies increases, the U.S.'s incentives to invest in military resources strengthen, while the Ally's incentives weaken. Consequently, the U.S. tends to bear a larger share of the defense burden as financial interdependence deepens, and the Ally reduces its own spending, relying more on the implicit security guarantee provided by financial integration with the U.S.

We are now ready to characterize the decentralized equilibrium of the model. The U.S.'s

and the Ally's households' asset-pricing conditions for shares of the Ally's tradable tree are:

$$q^*_{A,0} = \mathbb{E}_0\left[e_1\left(\gamma_1+1\right)+\alpha^*_1+1\right],$$
$$q_{A,0} = \mathbb{E}_0\left[\frac{e_1\left(\gamma_1+1\right)+\alpha^*_1+1}{e_1}\right],$$

where we used $p^*_{A,1}y_{A,1}+q^*_{A,1} = e_1\left(\gamma_1+1\right)+\alpha^*_1+1$, while their asset pricing conditions for shares of the U.S.'s tradable tree are

$$q_{U,0} = \mathbb{E}_0\left[2+\frac{\gamma^*_1+1}{e_1}\right],$$
$$q^*_{U,0} = \mathbb{E}_0\left[e_1\left(2+\frac{\gamma^*_1+1}{e_1}\right)\right].$$

where we used $p_{U,1}y_{U,1}+q_{U,1} = 2+\frac{\gamma^*_1+1}{e_1}$. Using $q_{A,0} = \frac{q^*_{A,0}}{e_0}\left(1+\psi_A s_{A,1}\right)$, $q^*_{U,0} = e_0 q_{U,0}\left(1+\psi_U s^*_{U,1}\right)$, and $e_0 = \mathbb{E}_0\left[e_1\right]$, we can combine the asset pricing equations to obtain two conditions that the equilibrium portfolios $s_{A,1}$ and $s^*_{U,1}$ must satisfy:

$$\frac{1}{1+\psi_A s_{A,1}} = 1+\frac{cov\left(e_1,\gamma_1+1+\frac{\alpha^*_1+1}{e_1}\right)}{\mathbb{E}_0\left[e_1\right]\mathbb{E}_0\left[\gamma_1+1+\frac{\alpha^*_1+1}{e_1}\right]}, \tag{12}$$

$$1+\psi_U s^*_{U,1} = 1+\frac{cov\left(e_1,2+\frac{\gamma^*_1+1}{e_1}\right)}{\mathbb{E}_0\left[e_1\right]\mathbb{E}_0\left[2+\frac{\gamma^*_1+1}{e_1}\right]}. \tag{13}$$

Finally, b_1 is determined by the U.S. time-0 budget constraint as follows:

$$b_1+\frac{q^*_{A,0}}{e_0}s_{A,1}-\frac{q^*_{U,0}}{e_0}s^*_{U,1} = \frac{1}{e_0}-1. \tag{14}$$

The decentralized portfolio allocation can be obtained with a guess-and-verify approach. Suppose that $b_1 = s_{A,1} = s^*_{U,1} = 0$. Then, the exchange rate at time 1 is constant across states, $e_1\left(war\right) = e_1\left(peace\right) = 1$. It follows that the covariance terms in (12) and (13) are zero, which confirms that $s_{A,1} = s^*_{U,1} = 0$. Since $e_0 = \mathbb{E}_0\left[e_1\right] = 1$, equation (14) then yields

$b_1 = 0$.

Proposition 4 (Decentralized equilibrium)**.** *In the decentralized equilibrium the U.S. and the Ally are in financial autarky, that is* $b_1 = s_{A,1} = s^*_{U,1} = 0$.

While stark, this result provides a useful benchmark for the optimal policies analyzed in the next section. In the decentralized equilibrium, Ally households do not internalize how their portfolio choices affect the outcome of war, creating a wedge between private and social incentives. This externality provides a clear rationale for government intervention to realign private decisions with social objectives. In the next section we show how the Ally's planner has an incentive to distort the decentralized portfolio allocation in order to elicit a security guarantee from the U.S.

2.4 Optimal international portfolios policies

In this section, we derive the Ally's optimal international portfolio choice. We assume the planner chooses the country's portfolio, $\left\{b_1, s_{A,1}, s^*_{U,1}\right\}$, and implements this allocation via taxes and subsidies on asset holdings that are rebated lump-sum to domestic households. Let τ^*_b denote a tax (subsidy if negative) on Ally households' holdings of U.S. bonds. Similarly, let τ^*_U be a tax on Ally holdings of U.S. shares, and let τ^*_A denote a subsidy on the issuance of Ally shares to U.S. households. The taxes and subsidies that implement the chosen portfolio satisfy

$$
\begin{aligned}
1 + \tau^*_b &= \frac{\mathbb{E}_0\left[e_1\right]}{e_0}, \\
1 + \tau^*_A &= \frac{e_0}{\mathbb{E}_0\left[e_1\right]} \frac{\mathbb{E}_0\left[e_1\left(\gamma_1 + 1 + \frac{\alpha^*_1+1}{e_1}\right)\right]}{q^*_{A,0}}, \\
1 + \tau^*_U &= \frac{e_0}{\mathbb{E}_0\left[e_1\right]} \frac{\mathbb{E}_0\left[e_1\left(2 + \frac{\gamma^*_1+1}{e_1}\right)\right]}{q^*_{U,0}},
\end{aligned}
$$

where e_0 is determined by the U.S. time-0 budget constraint:

$$\frac{1}{e_0} = 1 + b_1 + \frac{q^*_{A,0}}{e_0} s_{A,1} - q_{U,0} s^*_{U,1}.$$

We begin with a simplified case in which Ally households cannot invest in U.S. shares ($\psi^* \uparrow \infty$), and the planner chooses only b_1 and $s_{A,1}$.

Proposition 5 (Ally optimal policy)**.** *When the Ally faces a security threat ($\rho > 0$), the optimal capital account policy subsidizes the issuance of Ally shares to U.S. households ($\tau^*_A > 0$) and subsidizes domestic holdings of U.S. bonds ($\tau^*_b < 0$). In the absence of a security threat ($\rho = 0$), the decentralized equilibrium is efficient and requires no intervention ($\tau^*_b = \tau^*_A = 0$).*

This proposition is a central result of the paper and shows how the Ally strategically distorts its international portfolio to secure a military guarantee from the United States. The policy has two components. First, the Ally subsidizes the issuance of its shares to U.S. households to increase U.S. exposure to the potential conflict, thereby strengthening U.S. incentives to intervene. While the benefits are clear, there is an associated cost: to induce U.S. households to hold Ally shares, the Ally must offer a higher expected return. This excess return compensates U.S. investors for the costs of investing abroad ψand represents the price the Ally pays to secure the U.S. security guarantee. The optimal subsidy balances the cost of this a wealth transfer cost against the benefit of the security guarantee.

Second, the Ally seeks to influence its net international investment position by encouraging domestic saving through a subsidy on U.S. bond holdings. This policy pushes domestic bond holdings beyond the level that households would otherwise choose, given the concurrent incentives to issue Ally shares. By reducing the U.S. net foreign asset position, the Ally raises the United States' marginal utility of wealth at time 1 and thus reinforces its incentive to protect its foreign investments in a conflict. The cost of this policy arises from distorting the intertemporal allocation of consumption: by subsidizing bond holdings, the planner effectively raises the real return faced by domestic households, shifting their consumption–saving

choices away from the efficient allocation. The optimal policy equates this distortionary cost with the attendant security benefits.

The Ally's optimal capital account policy in the presence of a security threat has economic implications that extend beyond procuring a security guarantee. The following corollary summarizes these implications.

Corollary 6 (Economic implications)**.** *Relative to the decentralized equilibrium, under the Ally's optimal capital account policy:*

i) The U.S. earns an excess return on its foreign portfolio;

ii) The U.S. dollar appreciates, while the U.S. trade balance shifts into a deficit;

iii) The Ally's military expenditure decreases, while the U.S.'s military expenditure increases;

iv) Both U.S. and Ally households are better off.

The higher expected return offered by the Ally on its equity, together with the saving incentives embedded in the optimal capital account policy, rationalizes both the appreciation of the dollar and the emergence of a U.S. trade deficit at time 0. As explained in Proposition 3 and 4, greater prospective U.S. engagement in the event of war enables the Ally to reduce its own military spending, while the United States correspondingly increases its expenditure. Despite this reallocation, both countries are better off: the Ally gains from the security guarantee, which strengthens its position in the event of conflict, and the United States benefits from the wealth transfer engineered by the Ally's policy.

3 Empirical Evidence

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4 Conclusions

We develop a general equilibrium model linking international portfolio decisions and military security provision between a hegemon and its allies. A country facing an external security threat finds it optimal to subsidize inward FDI from the hegemon and to accumulate the hegemon's bonds, effectively purchasing a security guarantee through financial integration. The hegemon, in turn, finds it optimal to intervene militarily in proportion to its financial exposure. This implicit contract is mutually beneficial: allies reduce their defense burden while the hegemon earns excess returns on its foreign portfolio—the "exorbitant privilege"—as the equilibrium price of protection.

The model rationalizes the three stylized facts documented in the introduction within a single unified framework. First, the hegemon earns an excess return on its international investment position—the exorbitant privilege—because this return differential is the equilibrium price allies pay for the implicit security guarantee embedded in financial integration. Second, the hegemon is the world's largest net exporter of physical capital because the ally's optimal capital account policy subsidizes inward FDI from the hegemon and accumulates hegemon bonds, generating the observed portfolio asymmetry. Third, allies bear a disproportionately low share of the collective defense burden because burden-sharing asymmetry is the equilibrium outcome of these optimal portfolio policies: allies reduce own military effort as the hegemon's financial exposure commits it to intervene.

We test the model's critical predictions using bilateral data on FDI positions, troop deployments, and military spending during the Cold War era. Consistent with the model, we find that larger gross foreign direct investment positions predict greater U.S. troop deployments in that country, with the effect robust to country and year fixed effects and to sample splits by alliance status. The evidence on allied military expenditure is more mixed: higher U.S. direct investment abroad is associated with lower allied defense spending in specifications with country fixed effects, but this relationship is not robust to the inclusion of year fixed effects, suggesting that common postwar trends in FDI growth and declining defense

burdens may account for part of the covariation.

Several extensions are still work in progress. On the theoretical front, we are exploring the U.S.'s optimal capital account policy and working to characterize the Nash equilibrium of the strategic interaction between the U.S. and the Ally, as well as the globally optimal equilibrium. On the empirical side, we are broadening the sample to cover the globalization era (1990–2016) and pursuing causal identification through a shift-share exposure design that exploits predetermined legal-origin and linguistic determinants of the geographic distribution of FDI to construct instruments for bilateral investment positions as in the gravity literature on international portfolios.

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Online Appendix

'Portfolio Choice, Military Protection, and Exorbitant Privilege'

by P. Cavallino, D. Jimenez, and A. Rebucci

June 22, 2026

A1 Variable Definitions, Data Sources, and Summary Statistics

This Appendix defines all variables used in the empirical analysis and provides their sources. It also reports a complete set of summary statistics.

Historical defense expenditure data are from the Global Military Spending Dataset (GMSD) of Barnum et al. (2024) available here. The income balance of the balance of payments is the difference between the current account and the trade balance from the Macrohistory Database of Jordà et al. (2017) available here.

A1.1 Data

TBC

A2 Theoretical Proofs and Extensions

Proofs

Lemma 7. *There exist δ^* and δ such that:*
1) The Ally deploys all its military resources in case of war at time 1.
2) The U.S. does not deploy all its military resources in case of war at time 1.

Proof. Ally households' utility in case of war is

$$U_1^*(war) = t.i.p. + \omega^* \log(\theta_1 y_{NT}^*) + \alpha^* \log(\theta_1 y_A) + \beta \left[\alpha^* \log \frac{y_A + \delta^* a_1^*}{\alpha^* + \gamma e_1(war)} + \gamma^* \log \frac{1}{\gamma^* + \alpha e_1(war)} \right],$$

with $a_1^* = a_0^* - h^*(m_1^*)$, $e_1(war) = \frac{\beta\gamma^*}{\beta\gamma - w_1(war)}$, and $w_1(war) = \beta\gamma - \frac{\beta\gamma\left(1-s_{A,1}\right)+s_{U,1}^*\alpha(1+\beta)-b_1}{1-s_{U,1}^*+s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}}$.
The first order condition with respect to m_1^* is

$$\frac{\partial U_1^*(war)}{\partial \theta_1}\frac{\partial \theta_1}{\partial m_1^*} - \frac{\beta\alpha^*\delta^*}{y_A + \delta^* a_1^*}\frac{\partial h^*(m_1^*)}{\partial m_1^*} \geq 0,$$

and $a_1^* \geq 0$, with

$$\frac{\partial U_1^*(war)}{\partial \theta_1} = \frac{\omega^* + \alpha^*}{\theta_1} - \beta \left[\frac{\alpha^* e_1(war)^2}{e_1(war) + \frac{\alpha^*}{\gamma}} + \frac{\gamma^* e_1(war)^2}{e_1(war) + \frac{\gamma^*}{\alpha}} \right] \frac{1}{\beta\gamma^*}\frac{\partial w_1(war)}{\partial \theta_1},$$

$$\frac{\partial w_1(war)}{\partial \theta_1} = \frac{\frac{s_{A,1}\alpha^*}{e_1(war)}}{1 - s_{U,1}^* + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}}$$

Notice that the negative term in the expression for $\frac{\partial U_1^*(war)}{\partial \theta_1}$ is at its maximum when $s_{A,1} = s_{U,1}^* = 1$, $\rho \downarrow 0$ and $n_0 \uparrow \gamma\beta(1+\beta)$ (such that $e_1(war) \uparrow \infty$). Therefore, to ensure that

$\frac{\partial U_1^*(war)}{\partial \theta_1} > 0$ we just need to ensure that

$$\omega^* \log(\theta_1 y_{NT}^*) + \omega^* + \alpha^* \log(\theta_1 y_A) + \alpha^* - \beta \frac{\alpha^* + \gamma^*}{\beta + \theta_1} > 0$$

Since the left-hand side is increasing in θ_1, the inequality is satisfied for all $\theta_1 > \tilde{\theta}$ where $\tilde{\theta}$ solves $\tilde{\theta} (y_{NT}^*)^{\frac{\omega^*}{\omega^*+\alpha^*}} (y_A)^{\frac{\alpha^*}{\omega^*+\alpha^*}} = e^{\frac{\beta}{\tilde{\theta}+\beta} \frac{\alpha^*+\gamma^*}{\alpha^*+\omega^*} - 1}$. Since $\frac{\partial U_1^*(war)}{\partial \theta_1} \frac{\partial \theta_1}{\partial m_1^*} > 0$, then $\exists \bar{\delta}^* > 0$ such that the first order condition holds with a strict inequality when evaluated at $m_1^* = a_0^*$, for all $\delta^* \in [0, \bar{\delta}^*)$.

U.S. households' utility in case of war is

$$U_1(war) = t.i.p. + \beta \left[\alpha \log \frac{y_U + \delta a_1}{1 + \frac{\gamma^*}{\alpha e_1(war)}} + \gamma \log \left(\frac{1}{1 + \frac{\alpha^*}{\gamma e_1(war)}} \right) \right]$$

with $a_1 = a_0 - h(m_1)$, $e_1(war) = \frac{\beta\gamma^*}{\beta\gamma - w_1(war)}$, and $w_1(war) = \beta\gamma - \frac{\beta\gamma\left(1 - s_{A,1}\right) + s_{U,1}^* \alpha(1+\beta) - b_1}{1 - s_{U,1}^* + s_{A,1} \frac{\alpha^*}{\gamma^*} \frac{\theta_1 + \beta}{\beta}}$. The first order condition with respect to m_1 is

$$\left[\frac{\gamma^* e_1(war)}{e_1(war) + \frac{\gamma^*}{\alpha}} + \frac{\alpha^* e_1(war)}{e_1(war) + \frac{\alpha^*}{\gamma}} \right] \frac{1}{\beta\gamma^*} \frac{\partial w_1(war)}{\partial \theta_1} \frac{\partial \theta_1}{\partial m_1} - \frac{\alpha\delta}{y_U + \delta a_1} \frac{\partial h(m_1)}{\partial m_1} \geq 0,$$

and $a_1 \geq 0$, $m_1 \geq 0$. Assume $h(m_1) = m_1 - \varepsilon \ln\left(1 + \frac{m_1}{\varepsilon}\right)$, with $\varepsilon > 0$. This implies $\frac{\partial h(0)}{\partial m_1} = \frac{m_1}{\varepsilon + m_1} = 0$, ensuring that $m_1 \geq 0$ is never a binding constraint. Furthermore, $\exists \bar{\delta} > 0$ such that the first order condition is negative when evaluated at $m_1 = a_0$, for all $\delta \geq \bar{\delta}$. Hence, the U.S. does not exhaust all its military resources. □

Proof of Proposition 1. From the proof of Lemma 1, the optimality condition for the choice of m_1 is

$$s_{A,1} \frac{\alpha^*}{\beta\gamma^*} \frac{\frac{\gamma^*}{e_1(war) + \frac{\gamma^*}{\alpha}} + \frac{\alpha^*}{e_1(war) + \frac{\alpha^*}{\gamma}}}{1 - s_{U,1}^* + s_{A,1} \frac{\alpha^*}{\gamma^*} \frac{\theta_1 + \beta}{\beta}} \frac{\partial \theta_1}{\partial m_1} = \frac{\alpha\delta}{y_U + \delta a_1(war)} \frac{\partial h(m_1)}{\partial m_1}.$$

It is immediately evident that the left-hand side is positive if and only if $s_{A,1} > 0$. To prove the second part of the proposition, let

$$\Theta \equiv s_{A,1} \frac{\alpha^*}{\beta\gamma^*} \frac{\frac{\gamma^*}{e_1(war) + \frac{\gamma^*}{\alpha}} + \frac{\alpha^*}{e_1(war) + \frac{\alpha^*}{\gamma}}}{1 - s_{U,1}^* + s_{A,1} \frac{\alpha^*}{\gamma^*} \frac{\theta_1 + \beta}{\beta}}$$

denote the marginal utility of improving the conflict's outcome, θ_1. We can use the implicit function theorem to show:

$$\frac{\partial m_1}{\partial z} = \frac{\frac{\partial \Theta}{\partial z} \frac{\partial \theta_1}{\partial m_1} + \left(\frac{\partial \Theta}{\partial \theta_1} \frac{\partial \theta_1}{\partial m_1^*} \frac{\partial \theta_1}{\partial m_1} + \Theta \frac{\partial^2 \theta_1}{\partial m_1 \partial m_1^*} \right) \frac{\partial a_0^*}{\partial z} + \alpha \left(\frac{\delta}{y_U + \delta a_1(war)} \right)^2 \frac{m_1}{\varepsilon + m_1} \frac{\partial a_0}{\partial z}}{-\Theta \frac{\partial^2 \theta_1}{(\partial m_1)^2} - \frac{\partial \Theta}{\partial \theta_1} \left(\frac{\partial \theta_1}{\partial m_1} \right)^2 + \alpha \left(\frac{\delta}{y_U + \delta a_1(war)} \frac{m_1}{\varepsilon + m_1} \right)^2 + \frac{\alpha\delta}{y_U + \delta a_1(war)} \frac{\varepsilon}{\varepsilon + m_1}}$$

for $z = b_1, s_{A,1}, s^*_{U,1}$. It's easy to show that $\Theta \frac{\partial^2 \theta_1}{(\partial m_1)^2} \leq 0$ and $\frac{\partial \Theta}{\partial \theta_1}\left(\frac{\partial \theta_1}{\partial m_1}\right)^2 \leq 0$. Therefore, the denominator is positive and the sign of $\frac{\partial m_1}{\partial z}$ is determined by the numerator. Notice that since b_1, $s_{A,1}$, and $s^*_{U,1}$ are chosen at time 0, they might also affect the choice of a_0 and a^*_0, either directly or through their impact on θ_1, through m_1 and m^*_1. Hence, the additional terms at the numerator. In this proof we take a_0 and a^*_0 as given and focus on the sign of $\frac{\partial \Theta}{\partial z}$ (noting that $\frac{\partial \theta_1}{\partial m_1} > 0$). The next proposition shows that these additional terms have the same sign of $\frac{\partial \Theta}{\partial z}$.

Now we have

$$\frac{\partial \Theta}{\partial b_1} = -s_{A,1}\alpha^* \frac{\gamma^* \left(\frac{e_1(war)}{e_1(war)+\frac{\gamma^*}{\alpha}}\right)^2 + \alpha^* \left(\frac{e_1(war)}{e_1(war)+\frac{\alpha^*}{\gamma}}\right)^2}{\left[\beta\gamma^*\left(1 - s^*_{U,1} + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right)\right]^2}$$

Therefore, $\frac{\partial m_1}{\partial b_1} < 0$ if $s_{A,1} > 0$. Then

$$\begin{aligned}\frac{\partial \Theta}{\partial s_{A,1}} = {} & \alpha^* \frac{\left(1 - s^*_{U,1}\right)\left(\frac{\gamma^*}{e_1(war)+\frac{\gamma^*}{\alpha}} + \frac{\alpha^*}{e_1(war)+\frac{\alpha^*}{\gamma}}\right)}{\beta\gamma^*\left(1 - s^*_{U,1} + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right)^2} \\ & - \alpha^* s_{A,1} \frac{\left[\gamma^*\left(\frac{e_1(war)}{e_1(war)+\frac{\gamma^*}{\alpha}}\right)^2 + \alpha^*\left(\frac{e_1(war)}{e_1(war)+\frac{\alpha^*}{\gamma}}\right)^2\right]\left[\frac{\gamma}{\gamma^*} + \frac{1}{e_1(war)}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right]}{\beta\gamma^*\left(1 - s^*_{U,1} + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right)^2}\end{aligned}$$

Therefore, $\frac{\partial m_1}{\partial s_{A,1}} > 0$. Finally,

$$\begin{aligned}\frac{\partial \Theta}{\partial s^*_{U,1}} &= s_{A,1}\alpha^* \frac{\frac{\gamma^*}{e_1(war)+\frac{\gamma^*}{\alpha}} + \frac{\alpha^*}{e_1(war)+\frac{\alpha^*}{\gamma}}}{\beta\gamma^*\left(1 - s^*_{U,1} + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right)^2} \\ &= s_{A,1}\alpha^* \frac{\left[\gamma^*\left(\frac{e_1(war)}{e_1(war)+\frac{\gamma^*}{\alpha}}\right)^2 + \alpha^*\left(\frac{e_1(war)}{e_1(war)+\frac{\alpha^*}{\gamma}}\right)^2\right]\left(\frac{\alpha}{\gamma^*}\frac{1+\beta}{\beta} + \frac{1}{e_1(war)}\right)}{\beta\gamma^*\left(1 - s^*_{U,1} + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}\right)^2}\end{aligned}$$

Therefore, $\frac{\partial m_1}{\partial s^*_{U,1}} > 0$. □

Proof of Proposition 2. The Ally household's utility, as a function of a^*_0, is

$$\begin{aligned}U^*_0 = {} & tip + \alpha^* \log \frac{y_A - x^*\left(a^*_0\right)}{\alpha^* + \gamma e_0} + \rho\beta\left[\omega^* \log\left(\theta_1 y^*_{NT}\right) + \alpha^* \log\left(\theta_1 y_A\right)\right] \\ & + \beta^2 \mathbb{E}_0\left[\alpha^* \log \frac{y_A + \delta^* a^*_1}{\alpha^* + \gamma e_1} + \gamma^* \log \frac{1}{\gamma^* + \alpha e_1}\right]\end{aligned}$$

The first order condition yields

$$0 = -\frac{\alpha^*}{y_A - x^*\left(a_0^*\right)}\frac{\partial x^*\left(a_0^*\right)}{\partial a_0^*} + \beta^2\mathbb{E}_0\left[\frac{\alpha^*\delta^*}{y_A + \delta^* a_1^*}\right] - \frac{\alpha^*\gamma}{\alpha^* + \gamma e_0}\frac{\partial e_0}{\partial a_0^*} + \rho\beta FOC_{m_1^*}$$

where

$$FOC_{m_1^*} \equiv \frac{\partial U_1^*\left(war\right)}{\partial \theta_1}\frac{\partial \theta_1}{\partial m_1^*} - \frac{\beta\alpha^*\delta^*}{y_A + \delta^* a_1^*}\frac{\partial h^*\left(m_1^*\right)}{\partial m_1^*} > 0$$

with

$$\frac{\partial U_1^*\left(war\right)}{\partial \theta_1} = \frac{\omega^* + \alpha^*}{\theta_1} - s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\frac{\alpha^*}{1+\frac{\alpha^*}{\gamma e_1(war)}} + \frac{\gamma^*}{1+\frac{\gamma^*}{\alpha e_1(war)}}}{1 - s_{U,1}^* + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}}$$

Then...(TBC) □

Proof of Proposition 3. The U.S. households' utility as a function of a_0 is

$$U_0 = t.i.p + \alpha\log\frac{y_U - x\left(a_0\right)}{\alpha + \frac{\gamma^*}{e_0}} + \beta^2\mathbb{E}_0\left[\alpha\log\left(\frac{y_U + \delta a_1}{1 + \frac{\gamma^*}{\alpha e_1}}\right) + \gamma\log\left(\frac{1}{1 + \frac{\alpha^*}{\gamma e_1}}\right)\right]$$

with $a_1 = a_0 - h\left(m_1\right)$. The first order condition is

$$\begin{aligned} 0 = &-\frac{\alpha}{y_U - x\left(a_0\right)}\frac{\partial x\left(a_0\right)}{\partial a_0} + \beta^2\mathbb{E}_0\left[\frac{\alpha\delta}{y_U + \delta a_1}\right] + \frac{\alpha\frac{\gamma^*}{e_0}}{\alpha e_0 + \gamma^*}\frac{\partial e_0}{\partial a_0} \\ &+ \rho\beta^2\left[\underbrace{s_{A,1}\frac{\alpha^*}{\beta\gamma^*}\frac{\frac{\gamma^*}{e_1(war)+\frac{\gamma^*}{\alpha}} + \frac{\alpha^*}{e_1(war)+\frac{\alpha^*}{\gamma}}}{1 - s_{U,1}^* + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}}\frac{\partial\theta_1}{\partial m_1} - \frac{\alpha\delta}{y_U + \delta a_1\left(war\right)}\frac{\partial h\left(m_1\right)}{\partial m_1}}_{FOC=0}\right]\frac{\partial m_1}{\partial a_0} \end{aligned}$$

where $\frac{\partial e_0}{\partial a_0} = \mathbb{E}_0\left[\frac{\partial e_1}{\partial a_0}\right] = \rho\frac{e_1(war)^2}{\beta\gamma^*}\frac{\partial w_1(war)}{\partial\theta_1}\frac{\partial\theta_1}{\partial m_1}\frac{\partial m_1}{\partial a_0}$. Notice that the last part of the first order condition is equal to zero because it coincides with the first order condition for the choice of m_1 (see the previous Proposition). Therefore, the first order condition simplifies to:

$$\begin{aligned} 0 = &-\frac{\alpha}{y_U - x\left(a_0\right)}\frac{\partial x\left(a_0\right)}{\partial a_0} + \beta^2\mathbb{E}_0\left[\frac{\alpha\delta}{y_U + \delta a_1}\right] \\ &+ \frac{\frac{\alpha\gamma^*}{e_0}}{\alpha e_0 + \gamma^*}\rho\frac{e_1\left(war\right)^2}{\beta\gamma^*}\frac{\frac{s_{A,1}\alpha^*}{e_1(war)}}{1 - s_{U,1}^* + s_{A,1}\frac{\alpha^*}{\gamma^*}\frac{\theta_1+\beta}{\beta}}\frac{\partial\theta_1}{\partial m_1}\frac{\partial m_1}{\partial a_0} \end{aligned}$$

Since $\frac{\partial x(0)}{\partial a_0} = 0$, then the problem has an interior solution, ie $a_0 > 0$. Now, use the implicit function theorem to show

$$\frac{\partial a_0}{\partial m_1} = \frac{\beta^2\rho\left(\frac{\delta}{y_U+\delta a_1}\right)^2}{\alpha\left(\frac{1}{y_U - x(a_0)}\frac{\partial x(a_0)}{\partial a_0}\right)^2 + \frac{\alpha}{y_U - x(a_0)}\frac{\partial^2 x(a_0)}{(\partial a_0)^2} + \beta^2\mathbb{E}_0\left[\alpha\left(\frac{\delta}{y_U+\delta a_1}\right)^2\right]}$$

where we ignored the last term in the first order condition because around the competitive equilibrium we have $\frac{\partial m_1}{\partial a_0} = 0$. Therefore $\frac{\partial a_0}{\partial m_1} > 0$ and a_0 has the same comparative static properties of m_1 (see Proposition 2). □

Proof of Proposition 4. The exchange rate at time 1 is

$$e_1 = \frac{\left(1 - s^*_{U,1}\right)\left(\gamma^*_1 + \beta\gamma^*\right) + s_{A,1}\left(\alpha^*_1 + \beta\alpha^*\right)}{s^*_{U,1}\left(\alpha_1 + \beta\alpha\right) + \left(1 - s_{A,1}\right)\left(\gamma_1 + \beta\gamma\right) - b_1}$$

If $s_{A,1} = s^*_{U,1} = b_1 = 0$, then $e_1 = \frac{\gamma^*_1 + \beta\gamma^*}{\gamma_1 + \beta\gamma} = \frac{\gamma^*}{\gamma}$ is constant. This implies that

$$cov\left(e_1, \gamma_1 + \beta\gamma + \frac{\alpha^*_1 + \beta\alpha^*}{e_1}\right) = 0$$
$$cov\left(e_1, \alpha_1 + \beta\alpha + \frac{\gamma^*_1 + \beta\gamma^*}{e_1}\right) = 0$$

verifying that $s_{A,1} = s^*_{U,1} = 0$. It also implies

$$q_0 b_1 = \frac{\gamma^*}{e_0} - \gamma = \gamma - \gamma = 0,$$

verifying that $b_1 = 0$. □

Proof of Proposition 5. TBC □

Proof of Corollary 6. TBC □

Portfolio Choice, Military Protection, and Exorbitant Privilege

Paolo Cavallino
BIS

Daniel Jimenez
Université Catholique de Louvain

Alessandro Rebucci
JHU

IMF Economic Review Conference:
Power, Markets, and Strategy in a Changing Global Order

June 11-12, 2026

The views expressed here are those of the authors and do not necessarily reflect those of the BIS

Motivation

- The coming of age of the second globalization era has brought to the forefront of the policy debate the idea that military power and global reserve-currency status are mutually reinforcing:

  "We should therefore expect a return to the Cold War logic in which economic relations more frequently align with security relations. With the United States at the bullseye of the largest security network in the world, the dollar stands to benefit from this shift. As during the Cold War, US security provision may induce allied dollar support." (Carla Norrlöf, written testimony to the U.S. House Financial Services Subcommittee hearing, June 7, 2023.)

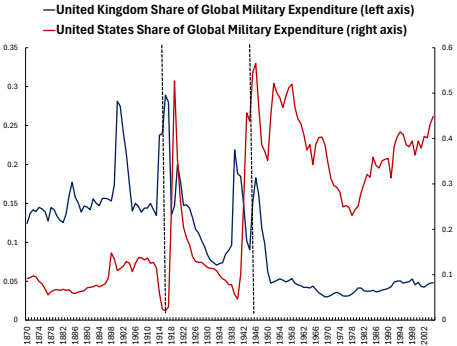
  "America provides a global defense shield to liberal democracies, and in exchange, America receives the benefits of reserve status—and, as we are grappling with today, the burdens." (Stephen Miran, November 2024)

- Three facts are consistent with this perspective:

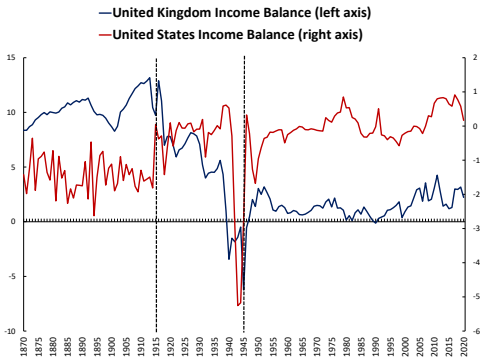
Military power and "exorbitant privilege" go hand-in-hand

UK (Blue lines) and US (Red lines), 1870-2000 (US red line, right axis)

Shares of Global Military Expenditure

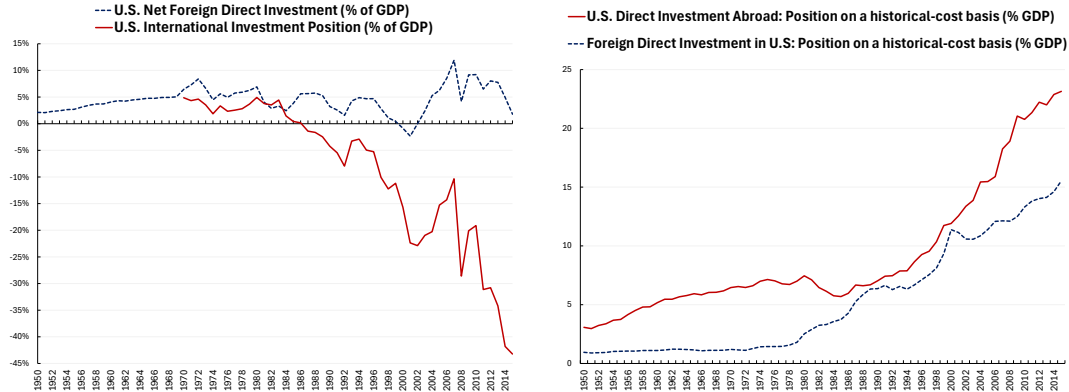


BoP Income Balances



The hegemon serves as the world's largest net exporter of physical capital

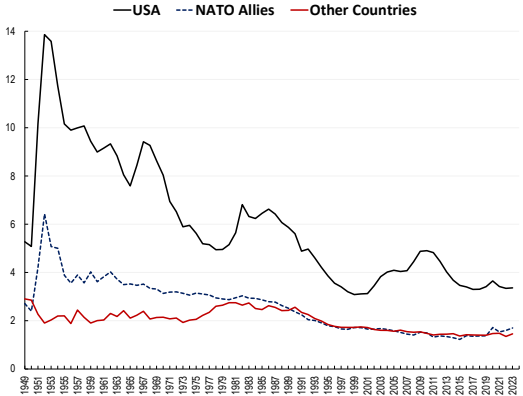
NET AND GROSS U.S. FDI POSITIONS (% OF GDP, 1950-2015)



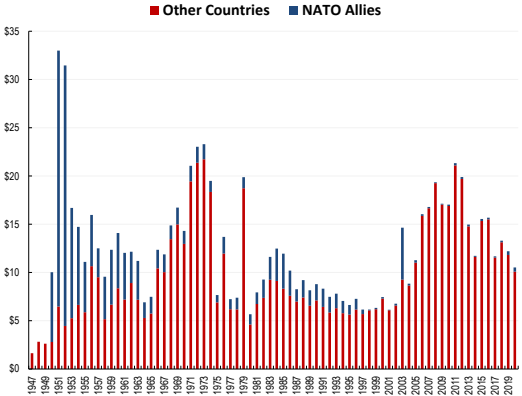
SOURCE: U.S. BEA from 1950 to 1969, and Lane and Milesi-Ferretti (2018) from 1970 onward.

The U.S. bears a disproportionate share of the collective defense burden,

Military Expenditure (% of own GDP, median)



U.S. Military Aid (in U.S. Billions)



Contribution and Results

- We develop a GE model that links **international portfolios decisions and security provision**.
- An Ally facing a security threat finds it optimal to **"buy a security guarantee"**, by subsidizing
  - US residents purchases of Ally equities
  - and Ally residents' accumulation of US bonds and equities
- The model rationalizes simultaneously:
  1. Why the US provides military protection to allies → **skin in the game**
  2. Why the US earns excess returns on its foreign portfolio → **the exorbitant privilege**
  3. Why there is asymmetric security burden-sharing → **"free-riding" on US defense**
  4. Why this arrangement persists → **it's mutually optimal**
- We test the critical model mechanism empirically, finding that:
  - Higher US FDI predicts higher U.S. **troop deployment** outside NATO allies
  - Higher US FDI predicts higher U.S. **arms transfers** within non-NATO OECD allies
  - Higher US FDI predicts higher U.S. **foreign military aid** within non-OECD allies

Related Literature

- Trade and War
- **FDI & Security** (Biglaiser & DeRouen 2007; Aiyar et al. 2024)
  - ⇒ They show FDI follows military presence ("flag leads trade")
  - ⇒ **We show REVERSE also holds:** FDI creates flag's incentive to deploy
- **Alliance Theory** (Olson & Zeckhauser 1966; Nordhaus et al. 2012)
  - ⇒ They document burden-sharing asymmetries
  - ⇒ **We explain WHY:** Financial integration creates the incentive structure
- **Exorbitant Privilege** (Gourinchas & Rey 2007; Eichengreen 2011)
  - ⇒ They document US earns excess returns
  - ⇒ **We explain WHY:** It's the equilibrium price of security guarantee
- **War Risk & Asset Pricing** (Barro 2006; Pástor & Veronesi 2013)
  - ⇒ They show geopolitical risk affects returns
  - ⇒ **We show MECHANISM:** Countries use portfolios to *manage* war risk

Outline

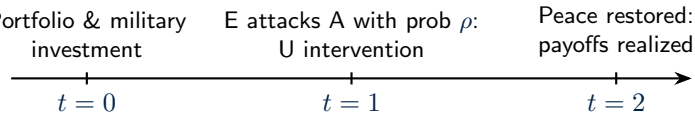
1. Introduction
2. Model
3. Empirical Evidence
4. Conclusions

Model

Model Environment

- **Three countries**:
  - Hegemon (U): military superiority
  - Ally (A): trade and financial linkages with U
  - Enemy (E): closed economy, potential aggressor to A

- **Timeline:**



The Hegemon and the Ally

- **Endowments:** Lucas trees producing a non-tradable good ($y_{NT,t}$) and a US tradable good ($y_{U,t}$).
- **Preferences:** Log utility over a basket of non-tradable, U.S. tradable, and Ally tradable goods:

$$U_0 = \mathbb{E}_0 \sum_{t=0}^{2} \beta^t \mu_t \log c_t, \qquad c_t \equiv \left[c_{NT,t}^{\omega_t} \, c_{U,t}^{\alpha_t} \, c_{A,t}^{\gamma_t} \right]^{1/\mu_t}$$

- **The Ally** is the mirror image of the Hegemon:
  - Endowments of non-tradable good ($y^*_{NT,t}$) and tradable good ($y^*_{A,t}$).
  - Log-preferences over basket $c_t^* \equiv [(c^*_{NT,t})^{\omega_t^*} (c^*_{A,t})^{\alpha_t^*} (c^*_{U,t})^{\gamma_t^*}]^{1/\mu_t^*}$
- **Tradable goods markets:**

$$p_{U,t} y_{U,t} = \alpha_t + \frac{\gamma_t^*}{e_t}, \qquad p^*_{A,t} y_{A,t} = \alpha_t^* + e_t \gamma_t$$

where e_t is the exchange rate (price of U.S. NT in terms of Ally NT, eg strength of the dollar).

Financial Markets

- **Financial assets:**
  - **International bond**: one-period claim on U.S. non-tradables ($b_t + b_t^* = 0$)
  - **U.S. equity**: shares of the U.S. tradable tree ($s_{A,t} + s_{A,t}^* = 0$)
  - **Ally equity**: shares of the Ally's tradable tree ($s_{U,t} + s_{U,t}^* = 0$)

- **Assets markets:** equity trading is subject to proportional iceberg costs

$$q_{A,t} = \frac{q_{A,t}^*}{e_t}\left(1 + \psi \Delta \bar{s}_{A,t+1}\right), \qquad q_{U,t}^* = e_t q_{U,t}\left(1 + \psi^* \Delta \bar{s}_{U,t+1}^*\right)$$

  while bond market is frictionless $\implies e_t = \mathbb{E}_t[e_{t+1}]$

- **Risk-neutrality:** non-tradable endowment $y_{NT,t} = \omega_t$ and $y_{NT,t}^* = \omega_t^* \Rightarrow$ risk-neutrality over claims denominated in domestic tradable good.

Modeling War: Economic disruption

War occurs at $t = 1$ with probability $\rho \in (0, 1)$.

1. **Trade collapse:**
   - War shuts down bilateral trade between U and A entirely:

$$\gamma_1^* (war) = \gamma_1 (war) = 0$$

   - U.S. households bear the war cost *solely through their financial wealth*

2. **Economic disruption in the Ally:**
   - War reduces Ally supply *and* demand by factor $(1 - \theta_1)$:

$$y_{NT,1}^* (war) = \theta_1 y_{NT,1}^* (peace) \quad \text{and } \omega_1^* (war) = \theta_1 \omega_1^* (peace)$$
$$y_{A,1} (war) = \theta_1 y_{A,1} (peace) \quad \text{and } \alpha_1^* (war) = \theta_1 \alpha_1^* (peace)$$

   - $\theta_1 \in [\underline{\theta}, 1)$ proxies the **war outcome** (higher θ_1 means better outcome for the Ally)

Modeling War: Military Technology

- The outcome of the war is determined by US and Ally **military efforts**:

$$\theta_1 = \underline{\theta} + (1 - \underline{\theta}) \frac{1 - e^{-\kappa m_1 - \kappa^* m_1^*}}{1 + e^{-\kappa m_1 - \kappa^* m_1^*}}$$

  where $m_1 \geq 0$ (U.S. effort), $m_1^* \geq 0$ (Ally effort), and $\kappa > \kappa^*$ (asymmetric effectiveness).

- Military effort (intervention) requires investing in **military resources** ex ante:
  - At $t = 0$: **governments invest in capability** (military resources) a_1, a_1^* at cost $x(a_1)$, $x^*(a_1^*)$
  - At $t = 1$: **governments choose effort** $m_1 \in [0, a_1]$, $m_1^* \in [0, a_1^*]$
  - At $t = 2$: unused military resources are **consumed** $\delta\,(a_1 - m_1)$, $\delta^*\,(a_1^* - m_1^*)$

U.S. Intervention at $t = 1$

Proposition 1 (U.S. military effort)

1. *The U.S. intervenes in the war if and only if it holds shares of the Ally's tradable tree (ie $s_{A,1} > 0$).*
2. *If $s_{A,1} > 0$, U.S. military effort is:*
   - 2a. **Decreasing** *in its net foreign asset position*
   - 2b. **Increasing** *in its gross equity assets ($s_{A,1}$) and liabilities ($s^*_{U,1}$) positions, for a given net position*

Intuition:

1. Holding Ally equity gives the U.S. a direct stake in the conflict ("skin in the game")
2a. Decreasing marginal utility of U.S. wealth reduces incentives to intervene when NFA is high
2b. Gross positions increase the U.S. exposure to the outcome of the conflict:
   - Assets ($s_{A,1}$): the return on Ally equity rises with a better war outcome
   - Liabilities ($s^*_{U,1}$): the return on US equity falls with a better war outcome via dollar appreciation

Remark: $s_{A,1}$ has a first order impact on the US military effort, while $s^*_{U,1}$ and the net foreign asset position have second order effects

Ally and U.S. Military Investment at $t = 0$

Proposition 2 (Ally military expenditure)

If $s_{A,1} > 0$, the Ally's military expenditure is **increasing** *in the U.S. net foreign asset position, and, for a given net position,* **decreasing** *in the U.S. gross equity assets ($s_{A,1}$) and liabilities ($s^*_{U,1}$) positions.*

Proposition 3 (U.S. military expenditure)

U.S. military expenditure at $t = 0$ is **increasing** *in its military effort at $t = 1$ in the event of war*

Burden-sharing implication:
As gross financial interdependence deepens:

$$\underbrace{\text{U.S. defense spending} \uparrow}_{\text{Prop. 3}} \qquad \underbrace{\downarrow \text{Ally defense spending}}_{\text{Prop. 2}}$$

The U.S. bears a larger share of the defense burden, while the Ally "free-rides" on the **implicit security guarantee** embedded in financial integration with the U.S.

Decentralized Equilibrium

Proposition 4 (Financial autarky)

In the decentralized equilibrium, the U.S. and the Ally are in financial autarky: $b_1 = s_{A,1} = s^*_{U,1} = 0$.

- **Why?** In autarky, exchange rate is constant across war/peace states (no U.S. intervention) $\Rightarrow$ covariance terms in asset-pricing equations vanish $\Rightarrow$ no incentive to trade assets.
- Not realistic, but **useful benchmark** for optimal policy
- **The externality:** Ally households do not internalize financial interdependence $\Longrightarrow$ war outcome
  - Private and social incentives diverge $\Rightarrow$ wedge between decentralized and socially optimal portfolios

Ally's Optimal Policy

The Ally chooses portfolios, $\{b_1, s_{A,1}, s^*_{U,1}\}$, implemented via lump-sum taxes/subsidies $\{\tau^*_b, \tau^*_A, \tau^*_U\}$

Proposition 5 (Ally's Optimal Capital Account Policy)

When the Ally faces a security threat ($\rho > 0$), the optimal capital account policy:

- *Subsidizes the issuance of Ally equities to U.S. households*
- *Subsidizes domestic holdings of U.S. bonds and equities*

In the absence of a security threat ($\rho = 0$), the decentralized equilibrium is efficient: $\tau^*_b = \tau^*_A = \tau^*_U = 0$.

1. **Subsidizing cross-border equity holdings**
   - **Benefit:** Aligns U.S. interests with the Ally's security needs.
   - **Cost:** Higher expected returns to U.S. investors (compensating for investment costs, ψ and ψ^*).
2. **Subsidizing Ally's holdings of U.S. bonds**
   - **Benefit:** Raises U.S. marginal utility of wealth at time of conflict, reinforcing intervention incentives.
   - **Cost:** Distorts domestic households' consumption–saving allocation.

Implications for Exorbitant Privilege, the Dollar, and Global Imbalances

Corollary 1 (Optimal Policy Implications)

Relative to the decentralized equilibrium, under the Ally's optimal capital account policy:

1. *The U.S. earns an* **excess return** *on its international investment position*
2. *The U.S. holds a* **positive net equity position**
3. *The Ally's military expenditure* **decreases**, *while the U.S.'s military expenditure* **increases**
4. *Ex ante, the U.S. dollar is relatively* **appreciated**, *while the U.S. trade balance shifts more into a* **deficit**
5. **Both** *U.S. and Ally households are* **better off**

- Military power $\implies$ economic power (exorbitant privilege and dollar strength)
- Despite the asymmetric defense burden the allocation is Pareto-improving

Empirical Evidence

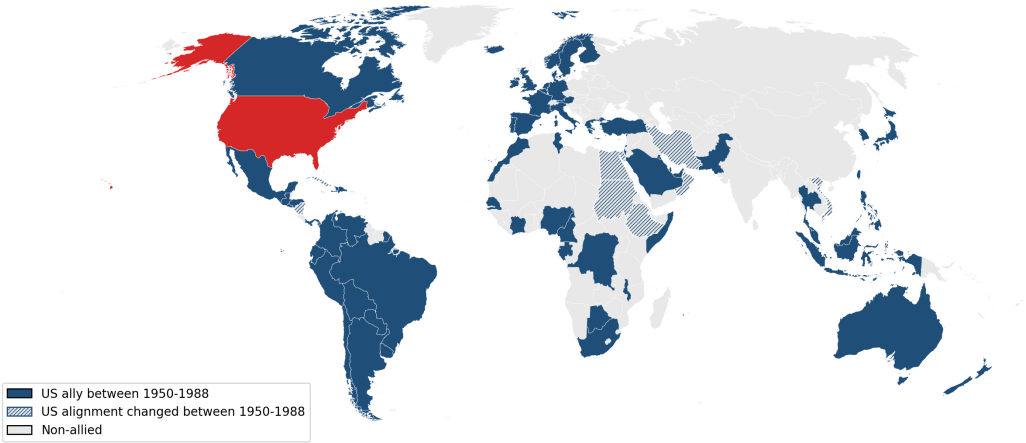
Strategy

- The model has a rich set of empirical implications
- We focus on Propositions 1
  - Proposition 1 (**U.S. security provision**): U.S. provides security if it has a financial stake
    - ⋆ This is the core mechanism of the model

Data

- Proxy for U.S. financial stake: **U.S. foreign direct investment in country** i scaled by US GDP
  - From the Bureau of Economic Analysis, combining historical and current data
  - Scaled by U.S. GDP, measures U.S.'s stake in country i
- Proxy for U.S. security provision:
  1. **Active-duty U.S. military personnel stationed in country** i
     - ⋆ From the Heritage Foundation "Global U.S. Troop Deployment" compilation
     - ⋆ Counts active-duty personnel stationed in i at year end (excludes reserves, DoD civilians, and contractors)
  2. **U.S. arms transfers to country** i (year of order)
     - ⋆ From the SIPRI Arms Transfers Database
     - ⋆ Record orders and deliveries of major conventional arms and components
     - ⋆ Trend-Indicator Values (TIV): measures transfers of military capability rather than financial values
  3. **U.S. foreign military aid to country** i
     - ⋆ From U.S. Overseas Loans and Grants report (aka Greenbook)
     - ⋆ We use obligations whose foreign assistance objective is recorded as "military"

U.S. "Allies" during Cold War (1950-1988)



- Allies := formal allies (eg NATO, Rio Treaty) + de-facto allies (eg EGY, ISR) + geopolitically close (eg ETH, IDN) - Financial centers (eg CHE, PAN) = 59 Countries

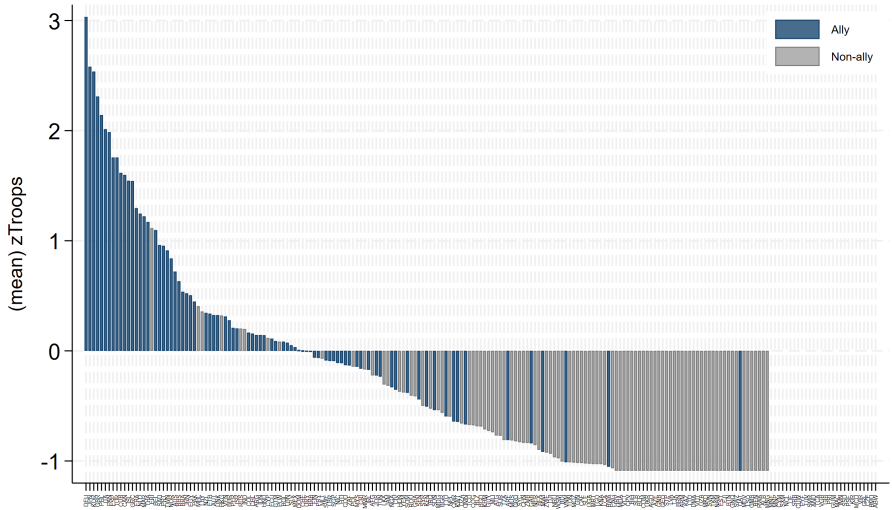
Empirical Specification

Testing Proposition 1

$$Z^x_{i,t} = \alpha_i + \delta_t + \beta_1 \,\text{USDIA}_{i,t-1} + \beta_2 \,\text{USDIA}_{i,t-1} \times \text{NATO}_{i,t} + \beta_3 \,\text{NATO}_{i,t} + \gamma_E \,\text{Exp}_{i,t-1} + \gamma_I \,\text{Imp}_{i,t-1} + \varepsilon_{i,t}$$

- **Time interval** t: 5-year averages
- **Dependent variable**: Security proxy $X_{i,t}$ logged and stnd. $x_{i,t} \equiv \log(1 + X_{i,t}) \rightarrow Z^x_{i,t} \equiv \frac{x_{i,t} - \mu_x}{\sigma_x}$
- **USDIA**$_{i,t-1}$: U.S. foreign direct investment abroad (% of U.S. GDP)
- **NATO**$_{i,t}$: Time-varying dummy ($= 1$ from accession)
- Trade variables: U.S. export to and import from country i (% of U.S. GDP)
- Country + Time FE; SE clustered by country

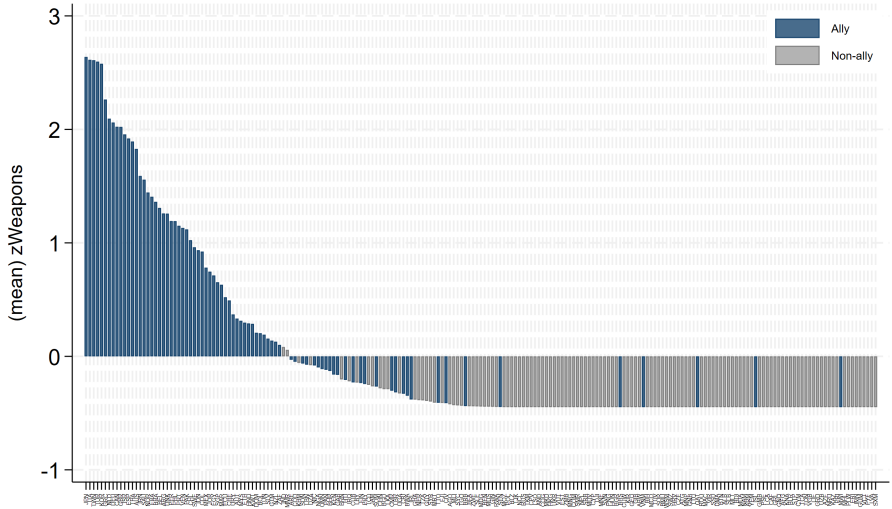
U.S. Troops Deployment by Country, Average (1950-1988)



U.S. FDI Predict Troop Deployment Within non-NATO Countries

	(1) All	(2) All (with NATO inter.)	(3) OECD	(4) Non-OECD
USDIA$_{i,t-1}$	**0.304**	**1.020****	**2.542*****	**0.674****
	(0.312)	**(0.446)**	**(0.748)**	**(0.306)**
USDIA$_{i,t-1}$ × NATO$_{i,t}$		-0.926*	-2.176**	
		(0.535)	(0.901)	
NATO$_{i,t}$		0.060	0.156	
		(0.075)	(0.110)	
Exp$_{i,t-1}$	-0.005	-0.156	1.535	-4.521**
	(1.163)	(1.126)	(1.444)	(1.867)
Imp$_{i,t-1}$	-0.323	-0.348	-1.116*	1.563*
	(0.565)	(0.554)	(0.621)	(0.785)
Total effect in NATO countries		**0.094**	**0.435**	
		(0.411)	**(0.313)**	
Observations	285	285	144	141
R-squared (within)	0.136	0.144	0.325	0.078
Countries	59	59	24	35
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

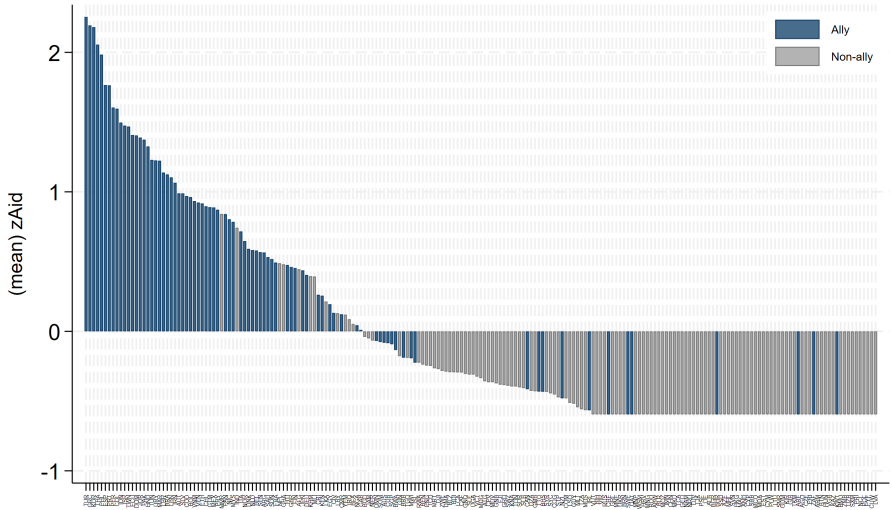
U.S. Arms Transfers by Country, Average (1950-1988)



U.S. FDI Predict Arms Transfers Within non-NATO OECD Countries

	(1) All	(2) All (with NATO inter.)	(3) OECD	(4) Non-OECD
$\mathbf{USDIA_{i,t-1}}$	**-0.294**	**1.377**	**6.195*****	**0.215**
	(0.742)	**(1.696)**	**(1.162)**	**(1.010)**
$USDIA_{i,t-1} \times NATO_{i,t}$		-2.165	-6.454***	
		(1.900)	(1.608)	
$NATO_{i,t}$		0.295**	0.390***	
		(0.130)	(0.111)	
$Exp_{i,t-1}$	3.238	2.831	5.360*	-7.168*
	(2.636)	(2.547)	(3.012)	(4.061)
$Imp_{i,t-1}$	-1.207	-1.235	-2.777*	2.159
	(1.299)	(1.262)	(1.423)	(1.279)
Total effect in NATO countries		**-0.788**	**-0.260**	
		(0.991)	**(0.780)**	
Observations	286	286	144	142
R-squared (within)	0.042	0.057	0.199	0.094
Countries	59	59	24	35
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

U.S.Military Aid by Country, Average (1950-1988)



U.S. FDI Predict Military Aid Within non-OECD Countries

	(1) All	(2) All (with NATO inter.)	(3) OECD	(4) Non-OECD
$\mathbf{USDIA_{i,t-1}}$	**-1.732****	**1.274**	**3.233**	**2.064****
	(0.804)	**(1.618)**	**(3.285)**	**(0.967)**
$USDIA_{i,t-1} \times NATO_{i,t}$		-3.903*	-4.690	
		(2.274)	(3.745)	
$NATO_{i,t}$		0.700***	0.947***	
		(0.183)	(0.219)	
$Exp_{i,t-1}$	0.742	-0.056	3.736	-11.488*
	(2.782)	(2.763)	(2.607)	(6.558)
$Imp_{i,t-1}$	-1.241	-1.254	-2.401	-0.895
	(1.338)	(1.333)	(1.584)	(1.101)
Total effect in NATO countries		**-2.629****	**-1.458**	
		(1.256)	**(1.043)**	
Observations	286	286	144	142
R-squared (within)	0.306	0.332	0.587	0.175
Countries	59	59	24	35
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Conclusions

- We develop a GE model that links **international portfolios decisions and security provision**.
- An Ally facing a security threat finds it optimal to **"buy a security guarantee"**, by subsidizing
  - US residents purchases of Ally equities
  - and Ally residents' accumulation of US bonds and equities
- The model rationalizes simultaneously:
  1. Why the US provides military protection to allies → **skin in the game**
  2. Why the US earns excess returns on its foreign portfolio → **the exorbitant privilege**
  3. Why there is asymmetric security burden-sharing → **"free-riding" on US defense**
  4. Why this arrangement persists → **it's mutually optimal**
- We test the critical model mechanism empirically, finding that:
  - Higher US FDI predicts higher U.S. **troop deployment** outside NATO allies
  - Higher US FDI predicts higher U.S. **arms transfers** within non-NATO OECD allies
  - Higher US FDI predicts higher U.S. **foreign military aid** within non-OECD allies

THANK YOU!