DISSERTATION

THREE ESSAYS ON U.S. FOREIGN ASSISTANCE SPENDING AND U.S. POLITICO-MILITARY INTEGRATION

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In partial fulfilment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring, 2021

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ABSTRACT

THREE ESSAYS ON U.S. FOREIGN ASSISTANCE SPENDING AND U.S. POLITICO-MILITARY INTEGRATION

Simulations show that recipient nations are directly impacted by U.S. foreign assistance spending (in the form of U.S. economic and military aid) in a manner similar to transfer payments, spurring growth, and easing liquidity constraints. U.S. foreign assistance spending is often accompanied by U.S. politico-military integration, which is defined by the presence of the: (1) receipt of U.S. economic aid, (2) receipt of U.S. military aid, and (3) integration into the U.S. security apparatus through hosting U.S. troops and/or bases or through military or political treaties. Using a new comprehensive RAND database of all U.S. security-related agreements since 1955, I create a new database showing which country-years have active (a) U.S. military treaties (b) U.S. political treaties. Also new is the inclusion of David Vine's Base Nation database, detailing the location and existence of all recognized, unrecognized, and U.S.-funded bases. Lastly, I update another of RAND's databases, one detailing U.S. troop deployment abroad to include the most recent years.

Empirical analysis shows a more complicated set of results than those derived in the simulations. Using deep lags and controlling for politico-military integration and U.S. military aid, I find limited evidence that U.S. economic aid is effective in development. This associated positive impact of U.S. economic aid is never large enough to overcome the associated negative impact of U.S. military aid and U.S. politico-military integration. While U.S. political treaties show a slight impact on economic growth, U.S. military aid, U.S. military bases, and U.S.

military treaties overwhelm any positive impact on growth and FDI, with a resulting net effect that is significantly negative for the recipient.

ACKNOWLEDGMENTS

To Ramaa, Steve, Elissa, and Stephen: I couldn’t have done this without any of you. Thank you so much!

DEDICATION

To Laura Elliott, who taught me to dream and laugh and accept.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1: A Two-Block, Stock-Flow Consistent Model of U.S. Foreign Assistance Spending with the Rest of the World

Stock-flow consistent (SFC) models rarely focus on the interaction between advanced market economies and developing or emerging countries. Specifically, this paper investigates the significant financial outlays made by advanced market economies and received by developing and emerging countries (also known as foreign assistance). In this paper, I adapt a well-known post-Keynesian SFC model to the U.S., one of the top contributors of foreign assistance. Federal governments, private, and state-owned-enterprises depend on this foreign assistance and payments that accompany United States foreign assistance spending. Recipient nations are directly impacted by these transfers as they ease liquidity constraints and spur economic growth. However, U.S. foreign assistance flows are sensitive to policies set by the recipient governments and recipient central banks. This paper explores how the policies set by recipient central banks, namely the choice between a managed or freely floating exchange rate regime, affect the impact of the transfers and how recipient authorities deploy U.S. foreign assistance. Simulations are performed to show how shocks originating from the U.S. impact the rest of the world. Separate closures show how fixed and flexible exchange rate regimes alter the hypothesized capital and trade flow consequences after receiving U.S. foreign assistance spending. Two scenarios are simulated: (A) where the U.S. diverts its own government spending to pay for foreign assistance spending, and (B) U.S. increasing its total government spending by the exact amount of foreign assistance spending so as to leave domestic government spending unchanged.

1.1 Introduction

This paper introduces a dynamic, two-country model of a world where a reserve-issuing economy, the United States (U.S.), spends significant resources abroad in the form of financial

assistance (economic aid & military aid) spending throughout the rest of the world. For simplicity, I treat economic and military aid as uniform in their impact and treat them as one aggregate flow (which I refer to as 'U.S. financial assistance spending'). For the purposes of this paper, I simplify the conglomerate of countries who receive foreign assistance spending (FAS) from the U.S. into one mega-economy which I refer to as the Rest of the World (ROW). Both the U.S. and ROW have their own currency, and both enjoy free trade with each other in both financial assets and merchandise. In line with Backus, Brainard, Smith and Tobin (1980), domestic and foreign assets are assumed to be imperfect substitutes.

Previous models exogenously fix open-market supplies of bonds, concentrating completely on the resolution between international asset supply and demand to determine exchange rates (Isard, 1978). Macedo (1982) was the first to fit Isard's (1978) exchange rate theoretical assumptions into a two-country portfolio balance model. Godley & Lavoie (2003) expanded upon insights from both Tobin (1978) and Macedo (1982) to construct a dynamic adjustment process. This adjustment process ensures that feedback effects on oneself and one's trading partner—particularly asset flows—are dynamically integrated. Then, under the Tobin/Isard premises, these asset flows impact relative prices, trade flows, incomes, and relative supply and demand of assets (impacting income flows, asset demands, etc.). Uninhibited, the change in trade flows would influence the relative demand and supply of assets and therefore income flows and then, once again, the exchange rate (or reserve accumulation/sale). To wit, other authors do not include alternative "closures" wherein the exchange rate is held fixed/exogenous, and another mechanism handles the imbalance (e.g., international reserve holdings, interest rate adjustments, etc.).

This paper draws heavily from the work of Godley and Lavoie (2003), models that were subsequently formalized and named Models OPENFIX and Models OPENFLEX in Chapter 12 of Monetary Economics (Godley and Lavoie, 2006), a seminal text of Stock-Flow Consistent Approaches (SFCA). As Godley and Lavoie (2003) "amplify the Tobin-Macedo insights by characterising some of the relevant dynamic adjustment processes," I intend to build upon and amplify the Godley-Lavoie insights by showing how U.S. foreign assistance is another means by which the global demand for U.S. dollars is artificially maintained.

U.S. foreign assistance spending generates increased economic activity within the recipient country. Greater activity catalyses greater economic interaction between the U.S. and the recipient country. This paper attempts to model the economic interaction between the Rest of the World (ROW)—the conglomerate of countries receiving hegemonic foreign assistance spending—and the U.S. The ROW is technically defined as all countries who receive U.S. economic and/or military aid. As of writing this paper (2020), U.S. economic aid amounts to $19 billion allocated to 107 countries and U.S. military aid to $20 billion allocated to 144 different countries (Security Assistance Monitor, 2020).

For the purposes of this paper, U.S. foreign assistance spending includes all economic and military aid provided as transfer payments from all relevant U.S. governmental agencies. U.S. economic and military aid is a significant portion of the ROW government budget. The economic and military aid spent from 1960-2018 translates to an average of 4.2% of recipient countries' yearly GDP. The top decile of U.S. aid recipients, on average, receives 8.3% of their governmental spending each year in U.S. economic and military aid, showing what an influence U.S. foreign assistance spending has on the ROW's economy. U.S. foreign assistance spending—

regardless of U.S. taxpayer awareness of size (either individually by country or in aggregate)—is not insignificant to the recipient countries.

This paper explores how U.S. foreign assistance reverberates between the recipient country and the U.S. through (1) capital flows, (2) monetary channels, and (3) trade. First, foreign households target higher levels of steady-state wealth accumulation and purchase more financial products from both the U.S. and ROW. Second, ROW central banks choose to accelerate their (existing pattern of) stockpiling of U.S. treasury bills so as to maintain their commitment to a managed exchange rate regime (in what are normal central banking operations procedures). Third, households within countries receiving U.S. foreign assistance experience an increase in their real income and opt to consume more, increasing both ROW consumption and ROW imports from U.S. For creditor countries[1] (e.g., China since Chinese imports are consistently much smaller than Chinese export flows). This asymmetry creates a situation where these creditor countries amass dollar reserves. Foreign consumers and businesses in both creditor and debtor countries earn and save in local currency but need dollars for large and/or contractual export purchases. The central banks are responsible for providing foreign currency to banks, who then exchange it with the consumer or business. Note that when a country perennially runs a negative trade balance, their dollar reserves are drawn down—perhaps to dangerously low levels. ROW foreign central bank reserves are drained as the USD supply abroad is, ultimately, backstopped by ROW central banks. Countries denoted as "debtor countries" benefit from U.S. transfer payments to a great degree, as injections of U.S. transfer payments replenish their waning dollar reserves. In addition, when bilateral trade agreements and status of forces

[1] Net importers run down dollar reserves.

agreements (contractual agreements regarding U.S. foreign military basing and troop deployment operations) are in place, various U.S. entities (OPIC, CIA, FED) provide explicit financial backstopping for foreign financial systems and institutions.

The models presented in this paper stem from stylized facts: the world is defined by only two countries, the U.S. and ROW, each of which has its own respective currency and financial products. These two countries freely trade services and financial assets with one another, with built-in asymmetries to represent the Post-Bretton Woods System. Non-U.S. financial assets (whether the assets are dollar-denominated or LCU-denominated) carry a higher risk premium and therefore the ROW country consistently maintains higher interest rates.

By characterizing the macroeconomic systems within a double-entry accounting framework and by using variables measured and published within the national product and income accounts and the flow-of-funds, all parties can be closely analysed—in both the real and financial sectors of each economy—to international transactions, like transfer payments (Godley and Lavoie, 2006). To better reflect how modern capitalist economies operate, the behaviour and repercussions in the real sector must influence and be influenced by behaviour in the financial sector.[2] In addition, it is important to consider how time interacts with and impacts system dynamics in the real world: financial balances of each sector have corresponding transactions in the relevant stock variables they impact. Flow variables determine the end-of-period stocks. In contrast, Mundell-Fleming-type models, for the most part, ignore the concept of stock equilibrium, instead exploring an "open" single economy with no recognition or account of how responses from the ROW may impact the originating economy.

[2] The main advantage of SFC models is also its defining characteristic: the integration of the real and financial sectors (Nikiforos and Zezza, 2017).

SFC models[3] successfully explained and predicted some of the policies and events leading up to the Great Recession (Nikiforos and Zezza, 2017). In addition, SFC models—by their explicit linkage of real economic activity and financial as well as stocks and flows—helped to explain the slow recovery that the U.S. has experienced in the decade-plus since.

SFC models are very similar to those detailed in *Reconstruction Macroeconomics: Structuralist Proposals and Critiques of the Mainstream*. In *Reconstruction,* Taylor (2002) analysed alternative closures, made different assumptions, and came to results generally consistent with those found in this paper. Unlike Taylor (2002), I assume that central banks target interest rates, and so interest rates do not adjust to clear asset markets. Accordingly, the closures used are post-Keynesian[4] in that they assume central banks explicitly target and participate in open market operations to maintain the targeted interest rate.

1.11 Literature Review—U.S. Foreign Assistance Spending (FAS)

The literature intersecting U.S. foreign aid and the U.S. military-industrial complex is scant, mostly focusing on either negotiation of basing arrangements or troop deployments, attempts to mitigate deleterious effects within their local populace, or the decision-making process of host nations when faced with the decision to base U.S. troops and/or grant access to the U.S. military (Calder, 2010). While the economic impact is positive, some authors argue that the social impact is negative—and, in some cases they have a good point (Vine, 2015).

Research on the economic impact of bases and U.S. military-related spending is overwhelmingly focused on domestically located U.S. bases. Tapp (2001) wrote a detailed

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[3] See Godley 1999a

[4] For additional support on the assumption of modeling the targeting of interest rates, I direct readers to the *New Consensus* models, an amalgam of a few New Keynesians (Romer, 2000) and central bank practitioners (Meyer, 2001; Evans, 2000)

master's thesis for the Air Force Academy analysing domestic base closures, showing that—after controlling for active missions—base closures do not, despite what was previously reported/believed, impact the U.S. Air Force budget significantly. Hooker (2001) uses a county-level dataset to estimate employment and income multipliers, concluding that there is little impact outside the direct employment loss and little change to per capita income before and after the closures. Poppert (2003) analyses the same county-level dataset for the impact of base closures, specifically on employment—but again, these findings hold only for domestic U.S. bases. Sorenson (2015) examines six (county) case studies of domestic U.S. base closures, further reinforcing the relatively new conclusion that base closures do not significantly impact indirect employment, arguing that base closures are relatively isolated in their impact, at least when we consider local employment. Ashley (2016) builds a systematic dataset and understanding of what happens to base closures, but only domestic base closures.

The impact of international U.S. bases on local (ROW) economies is limited. Cooley (2005) analyzes Kyrgyzstan--a relatively new base nation—but looks more at the political economy concerns (conditions necessary to maintain presence, analysis of the beneficiaries of U.S. presence, identification of opposition groups and mitigation strategies, etc.). Carter (2002) performs a similar political-economy analysis, though much larger in scope, concluding that U.S. basing efforts are complex and often outside of the control of the DOD—instead requiring coordination and communication between many institutions of the U.S. government, including the legislative and executive branches. Goure (2001) discusses the "tyranny of forward presence" as it relates to the (possibly unsustainable) burden placed on the U.S. navy to control the open oceans.

Zacheim et. Al (1996) conducts the most similar analysis to mine, wherein they compare the sum of categorical costs that maintain the global U.S. basing operation to the "cost of war," inferring a peacetime "insurance premium" of 1/8[5] the cost of war. However, Zacheim et al. (1996) fail to point out that the numerator of that ratio is a yearly flow while the denominator is a stock variable (the "total" bill for fighting in just one "medium regional contingency"). To interpret this peacetime "insurance premium" at its face value would be to assume that the U.S. would be at war perennially were it not conducting overseas basing activities, a stretch of the imagination to be sure. In addition, Zacheim et. Al (1996) is qualitative in nature and lacks the rigor of formal analytical modelling.

To date, there has been little to no research regarding the monetary consequences of U.S. foreign assistance spending. The existing literature—which focuses on growth or trade consequences—is heavily skewed towards base closures rather than new/sustaining operations (Vine (2015), Calder (2010)). Droff (2015) provides a comprehensive methods-based typology of the regional analyses of defence economics.

Of interest is Biglaiser (2007) which attempts to link troop deployment with U.S. Foreign Direct Investment (FDI) and concludes that U.S. investors—but not global investors—include U.S. military presence in their decision-making process. The presence of U.S. troop deployment impacts not only their decision to invest in that country but is also shown to impact the amount of FDI deployed (Biglaiser (2007).

[5] Zacheim et al (1996) came to this estimate by concluding that $12B was spent on overseas basing activities and comparing that to the requirement postulated by senior military officials that the U.S. army must be able to fight two "medium regional contingencies," concluding that the Gulf War (estimated cost of $48B) was a single "medium regional contingency and doubled it when calculating the peacetime "insurance premium".

The U.S. has experienced nearly three decades of government budget deficits and trade deficits. During this period, the U.S. dollar has served uninterrupted in the roles of international store of value and vehicle/denomination of international trade and financial transactions. This "dollar hegemony" is consistently and adequately explained by a combination of network effects and inertia (Dollar (2009)). There are observed asymmetrical ramifications of U.S. foreign assistance spending because of the "exorbitant privilege" enjoyed by the USD (Eichengreen (1987)). By combining monetary policy dynamics, multiplier effects, and the presence of foreign assistance spending, this paper explores the knock-on consequences of the exorbitant privilege of the USD—namely, unlimited spending abroad with little-to-no immediate repercussion.

There are other comprehensive models that exist to tackle questions of trade and financial imbalances (such as Computable General Equilibrium models). However, those models fail to account for the inter-temporal stock-flow dynamics necessary to capture the linkages between real economic activity and financial sectors of two separate economies.

For instance, traditional attempts to model exchange rate dynamics fail to account for the cascading nature of capital inflows. Economies don't adjust instantaneously to continuous new streams of income flowing into their economy. Instead, stock-flow consistent models assume that households gradually target and realize higher levels of wealth, a process which eventually tapers off as the rest of the economy acclimates to the new source of income. It is in this way that it's important for all stock-flow consistent models to be time-precise—time inherently matters (Caverzasi (2013)).

Two-country SFC models, like the ones explored in this paper, are especially useful when tackling complicated problems of international trade and monetary policy. By linking two countries in a matrix where everything goes somewhere, the possibility of explosive or convex

growth is limited. Because of the strict enforcing of zero-sum accounting (wherein every year, each column and row of the two-country transaction-flow matrix equals zero, indicating that every output is income within a country and every external purchase (import, asset purchase) corresponds to the corresponding country's external sale (export, asset sale). In this way, the normal double-entry accounting framework is doubled (because of the two countries), resulting in a quadruple-entry accounting framework (Godley (2006)).

Stock-flow consistent frameworks are, in fact, far better suited to tackle mercantilist development strategies as their impact is not limited to the tradeable goods sector; mercantilist strategies indirectly impact other sectors of the developing economy (specifically, the central banking sector and government sector). Stock-flow consistent models are appropriate because SFC models accurately reflect the required (and normal) actions of foreign central banks, and more importantly the repercussions of those actions.

I modify a previously published two-country stock flow consistent model, which depicts two independent countries linked together, each growing at a steady state rate before a perturbation is introduced: increasing one country's propensity to import (Godley (2003)). The perturbation then alters the course of each variable within the system, impacting the trade, current account, and government budget balances as well as consumption, income, and wealth accumulation (Godley (2003)).

As U.S. foreign assistance spending is, in effect, a "transfer payment," its inclusion (and subsequent positive shock) impacts the foreign economy in a manner similar to the impact depicted above (Godley (2003)). The main difference is that U.S. foreign assistance spending is, itself, "unrequited," in that there is no reciprocation; U.S. foreign assistance spending, while

perhaps "tied" to future obligations, does not itself involve the U.S. government (or its citizens) receiving goods or services for those payments.

For the purposes of this model, I am using a lower-bound with regards to the degree of U.S. involvement: the U.S. not only spends considerable resources abroad as FAS, but they also spend considerable resources abroad through simple U.S. government spending that takes place abroad. This model explores the impact of U.S. foreign assistance spending, where U.S. foreign assistance spending (FAS) is defined to be all economic and military aid through U.S. Agency for International Development.

By using stock-flow consistent accounting alongside social accounting matrices, the import, export, and international investment decisions of one country impact the other in equal and corresponding ways. Because of the quadruple-entry accounting framework in place, both countries' capital account balances must exactly offset their current account balance so as to zero their summation. Total inflows equal total outflows. Any current account deficit, by the nature of the set-up and the assumed behaviors of the different aggregate entities, is always accompanied by an equivalent capital account surplus. And any capital surplus is inevitably matched by an equivalent current account deficit.

While the expenditures of U.S. foreign assistance spending do not directly contribute to the trade or capital account balance, it does contribute to the current account balance (as a unilateral transfer, part of net factor payments component). As a result, I model U.S. foreign assistance spending to directly impact the Rest of World's current account on its way towards swelling the rest of the world's national income.

The rest of the paper is organized as follows. Section 2 provides an overview. Section 3 presents the theoretical background, and the two tables that comprise the accounting system

“with no black holes". Section 4 presents the equations defining general model and the two closures. It elaborates four models and the perturbation simulated in each of these models. Section 5 presents the results of the simulations for the four models and two closures. Section 6 concludes.

1.2 Overview

Within the larger model, sub-models of real and nominal trade flows drive the underlying dynamics, which is ultimately driven by trade prices. Trade prices are endogenously determined by domestic and foreign general price levels alongside the nominal exchange rate. Other sub-models drive other dynamics: the next section describes the income/expenditure sub-model, wherein households follow a consumption function that uses the lagged stock of real wealth as one of the variables. All sub-models are contained within the overarching model, as shown by the two matrix tables, one describing the stocks while the other describes periodic flows. Section 3 frames the analysis within those two matrix tables.

Section 1.4 describes the identities that determine how real and financial activity flows through the system. In addition, Section 4 also describes the behavioural assumptions that shape both U.S. and ROW’s decision-making processes. Other sub-models are integrated inside the main model, such as the income/expenditure model, which, following Haig-Simons, defines disposable income as lagged real wealth plus this period’s income not saved. Each of these sub-models must generate some sort of stable dynamic before and after a perturbation is introduced. And, in these models, new *quasi* stationary steady states (see Godley and Cripps, 1983:294) are reached when the wealth accumulation-to-income flow ratio is achieved and the change in stock of wealth is zero. This is only one of the conditions though, and the identity does not flow both ways.

Subsections 1.41 and 1.42 describe the many steps involved in defining nominal and real income and expenditure identities. These subsections are extensive due to the varying nature of prices within the model (prices of imports, exports, and domestic sales for both the U.S. and ROW) but are—in essence—little more than accounting relationships. Subsection 1.42 also details how certain behaviours, such as the determination of nominal and real trade flows, prices, and exchange rates are determined by variables relevant and reflecting real-world decision-making. Subsection 1.43 sets the accounting identities and behavioral assumptions for household income and expenditures.

Sub-section 1.44 details how and why wealth stocks are accumulated and allocated by the private sector: two-stage, Tobinesque decision-making processes wherein first savings flows are determined and are then allocated according to preferences, relative price levels, exchange rate expectations, and interest rate differentials.

Sub-section 1.45 then discusses asset supplies, importantly the mechanisms generating governmental deficits. Sub-section 4.6 concludes by introducing the main protagonist of the story, the source of our perturbation to the steady-state equilibrium: transfer payments, i.e., U.S. foreign assistance spending.

Section 1.4 speaks mostly to the General Model, the base model from which all four models are drawn. From the General Model, two unique models will be built and explored: Model A (Fixed Exchange Rate; reserves flexible) and Model B (Flexible Exchange Rate; reserves fixed).

Section 1.5 uses a numerical simulation to solve the model as a whole and observe how it responds to shocks. For example, (given exogenous monetary policy and fixed exchange rates) shocking the transfer payments of one country will result in an equivalent shock of transfer

receipts of the other. Resultantly, the foreign exchange reserves of the non-reserve country change (while reserve country's holdings of international reserves are assumed to be zero as U.S. central banks are assumed, for my purposes here, to hold no reserves outside U.S.-treasuries which, as they are held by the U.S. central bank, do not constitute *foreign / international* reserves). Simulations are presented for the main closure (fixed exchange rate parity; reserves adjust) as well as an alternative closure (flexible exchange rate parity; reserves fixed) to the scenario mentioned above

Historically, U.S. domestic government spending does not decrease because of increases in U.S. foreign assistance spending. To reflect this reality, I evaluate scenarios wherein U.S. domestic government spending is unchanged even after the shock (the increase in U.S. transfer payments from U.S. FAS) in Sections 1.6 and 1.8. In those sections, total U.S. government spending increases by the exact same amount diverted abroad (in the form of new U.S. foreign assistance), leaving U.S. domestic government spending completely unchanged. Section 1.7 presents a theoretical model—less realistic than that modelled in Section 1.8—wherein U.S. government spending is actually *diverted* abroad, rather than being spent abroad and compensated by increases in the total amount of U.S. government spending.

It should be noted that the modifications to the model, the chosen closures--all these decisions, and assumptions—greatly determine the behaviour of the two-block macroeconomic models within. There are 90+ total equations, many of which are pure accounting identities. As a result, the system is under-determined without making certain assumptions. The closures used—managed exchange rate or freely floating exchange rate—are extremes from which I abstract actual central bank behaviour. Most central banks and monetary authorities allow sufficient flexibility within the exchange rate (even while maintaining a 'managed' exchange rate regime).

In addition, those central banks and monetary authorities may simultaneously also allow foreign exchange reserves to adjust as they see fit. Therefore, the results are interpretable as the limit cases for analysing the trade, monetary, and fiscal consequences of U.S. foreign assistance spending.

1.3 An Accounting System with No Black Holes

Table 1.1 and Table 1.2 show the framework for both the stock and flow variables, and how they interact with one another. The balance sheet is detailed in Table 1.1 and encompasses both economies, the U.S. and the Rest of the World (ROW). Due to the simplifying assumptions detailed above, every private asset is financial, and each financial asset has a corresponding liability (in this way, there are no 'black holes'). Households are limited as well: they hold wealth as cash (denominated in their home country's currency—LCUs for ROW households, U.S. Dollars (USD) for U.S. households), foreign treasury bills, and domestic treasury bills.

The first term of the subscript details the country where the asset is currently being held while the latter suffix details the location of issuance. So $B_{US,ROW}$ refers to a bill owned by a U.S. household but issued by the ROW block.

Table 1.1 shows that the model is not as realistic as would be desirable: firms hold no assets nor liabilities; there is no banking sector; all labor supplied is assumed to be demanded, etc. The lack of assets and liabilities in Table 1 precludes the analysis of financial fragility and other discussions of solvency/liquidity. Similarly, with regards to the banking sector. We also abstract from labor-market dynamics and the consideration unemployment for the present.

Table 1.1 shows the clear segregation between households, firms, central banks, and the government. ROW Treasury bills are issued by the ROW government and not the central bank/monetary authority. Similarly, only the U.S. Treasury issues U.S. Treasury bills. Central banks issue cash money and have assets comprising of foreign and domestic bills.

Table 1.2 (the flow matrix) also uses the double-entry format to describe transactions between the U.S. and ROW. All nominal variables are defined in Table 1.2 and, as before, the sum of all rows and columns must equal zero by identity after exchange rate conversion (see the middle column). The left-hand side represents the ROW (LCUs), while the right-hand side represents the U.S. (USDs). The flow matrix is arranged as follows: National income and product account-type entries at the top, interest payments in the middle, and flow-of-funds accounting in the lower third.

U.S. households are assumed to only hold USD; ROW households are assumed to only hold LCU. Therefore, it follows that all payments/receipts between the U.S. and ROW are exactly and simultaneously exchanged into the respective countries' own currency by the central bank. Consequently, the overall outcome of the model is largely determined to how the government and central banks respond to changes in reserves that result from everyday central bank processes.

While there is some conjecture that large amounts of USD are hoarded abroad by foreign citizens, existing models have not integrated this mixed reality or explored the impact when foreign consumers are allowed to hold both LCUs and USD. Future research will explore this "dollarization" in simulated scenarios.

Table 1: Balance Sheets

		Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
		Households	Firms	Govt.	Central Bank		Households	Firms	Govt.	Central Bank	
		ROW (LCU)				Exch. Rate	U.S. ($)				Sum
BALANCE SHEETS											
B1	Cash	$+H_{LCU}$			$-H_{LCU}$		$+H_{\$}$			$-H_{\$}$	0
B2	LCU Bills	$+B_{LCU,LCU}$		$-B_{LCU}$	$+B_{cb:LCU}$	$* xr_{LCU}$	$+B_{\$,LCU} * xr_{LCU}$				0
B3	$ Bills	$B_{LCU,\$} * xr_{\$}$			$+B_{cb:ROW,\$} * xr_{\$}$	$* xr_{LCU}$	$+B_{\$,\$}$		$-B_{\$}$	$+B_{cb:\$}$	0

B4	Balance	$-V_{LCU}$		$NW_{g:ROW} \equiv B_{LCU}$	$NW_{cb:LCU}$	$* xr_{LCU}$	$-V_{\$}$		$NW_{g:\$} \equiv B_{\$}$	0	0
B5	Sum	0		0	0	$* xr_{LCU}$	0		0	0	0

Table 2: Transaction-Flow Matrix

	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Households	Firms	Govt.	Central Bank		Households	Firms	Govt.	Central Bank	
	ROW (LCU)				Exch. Rate	U.S. ($)				Sum
	INCOME - EXPENDITURE TRANSACTIONS									
Consumption	$-C_{LCU}$	$+C_{LCU}$				$-C_{\$}$	$+C_{\$}$			0
Govt. Exp		$+G_{LCU}$	$-G_{LCU}$				$+G_{\$}$	$-G_{\$}$		0
Transfer Payments		$+TP_{LCU}$			$* xr_{LCU}$		$-TP_{\$}$			0
Trade		$-IM_{LCU}$			$* xr_{LCU}$		$+X_{\$}$			0
		$+X_{LCU}$			$* xr_{LCU}$		$-IM_{\$}$			0
GDP	$+Y_{LCU}$	$-Y_{LCU}$				$+Y_{\$}$	$-Y_{\$}$			0
Taxes	$-T_{LCU}$		$+T_{LCU}$			$-T_{\$}$		$+T_{\$}$		0
Interest Payments	$+r_{ROW;\,t-1} * B_{ROW,ROW;t-1}$		$+r_{ROW;t-1} * B_{LCU;t-1}$	$-r_{ROW;t-1} * B_{cb:ROW;t-1}$	$* xr_{LCU}$	$+r_{ROW;t-1} * B_{U.S.,ROW;t-1} * xr_{LCU}$				0
	$+r_{U.S.;t-1} * B_{ROW,U.S.;t-1} * xr_{\$}$			$+r_{U.S.,t-1} * B_{cb:ROW,U.S.;t-1} * xr_{\$}$	$* xr_{LCU}$	$+r_{U.S.;t-1} * B_{U.S.,U.S.;t-1}$		$-r_{U.S.;t-1} * B_{U.S.;t-1}$	$+r_{U.S.;t-1} * B_{cb:U.S.;t-1}$	0
CB Profits			$+Fb_{LCU}$	$-Fb_{LCU}$				$+Fb_{\$}$	$-Fb_{\$}$	0
Changes in	FLOW OF FUNDS TRANSACTIONS									0
Cash	$-\Delta H_{LCU}$			$+\Delta H_{LCU}$		$-\Delta H_{\$}$			$+\Delta H_{\$}$	0
ROW Bills	$-\Delta B_{ROW,ROW}$		$+\Delta B_{LCU}$	$-\Delta B_{cb:ROW}$	$* xr_{LCU}$	$-\Delta B_{U.S.,ROW} * xr_{LCU}$				0
$ Bills	$-\Delta B_{ROW,U.S.} * xr_{\$}$			$-\Delta B_{cb:ROW,U.S.} * xr_{\$}$	$* xr_{LCU}$	$-\Delta B_{U.S.,U.S.}$		$+\Delta B_{\$}$	$-\Delta B_{cb,U.S.}$	0
Sum	0	0	0	0		0	0	0	0	0

The tables above are shown both for the reference of the reader and to elucidate how the two economies are intertwined. Table 1 represents the balance sheets of the "World", which—greatly simplified—is modelled to be only the "the U.S". and "ROW". Following (Godley, 2006) and (Godley, 2003), no physical assets exist.

Departing from (Godley, 2006) and (Godley, 2003), there is no inclusion of foreign exchange reserves held in the form of gold. All foreign exchange reserves are held in the form of U.S. Treasuries. As a result of the assumptions above, every transaction has a corresponding transaction somewhere else in table: a private asset held by the U.S. is a private liability held by ROW.

1.4 Equations Defining the Model

1.41 Identities describing arterial flows

All values described are nominal, unless stated otherwise. All capitalised variables are nominal (YD) and lower-case variables are real (yd). There is no inventory adjustment or investment, and no endogenous (real) supplies to fret over (including no endogenous supply of labor). Asset demands and supplies are a main driver of the systems within. Specifically, the ways in which asset demands are brought into equivalence with asset supplies drives how the system resolves. Businesses and central banks are assumed to hold no assets/wealth, leaving households and governments as the only actors in the asset demand market.

Private wealth is accumulated at the rate that income (a la Haig-Simons) exceeds taxes and consumption. The nominal Haig-Simons personal income function includes capital gains as well as personal income[6] and is defined as follows:

[6] In the model, all capital gains result from exchange rate fluctuations only. A modified Haig-Simons income function therefore influences only Model FASFLEX, the model where exchange rates are

$$\Delta V_{lcu} \equiv Y_{lcu} + r_{lcu,t-1}.B_{lcu,lcu,t-1} + r_{\$,t-1}.B_{lcu,\$,t-1}.xr\$ + \Delta xr_{\$}.B_{lcu,\$,t-1} - T_{lcu} - C_{LCU} \quad (1)$$

$$\Delta V_{lcu} \equiv YD^{h-s}{}_{lcu} - C_{LCU} \quad (2)$$

where V is wealth, Y is total factor income, r is the bill rate of interest, B is Treasury bills, xr is the exchange rate, T is taxes, and C is consumption. Equation (2) abbreviates Equation (1). Equation (1) represents the wealth accumulation of the ROW denominated in "LCU", necessitating the conversion of USD-denominated interest payments on U.S. bills into LCUs (through multiplying $r_{\$,t-1}.B_{lcu,\$,t-1}$ by the exchange rate).

The fourth term in Equation (1) ($\Delta xr_{\$}.B_{lcu,\$,t-1}$) represents the capital gains of the ROW citizens, where (since interest rates and bill discounts are constant) exchange rate fluctuations are the sole cause of capital gains/losses. Since capital gains are not transactions, this fourth term is omitted and does not appear in col 1 row 6 in Table 1.

U.S. wealth accumulation is defined in a symmetrical manner. Equations (3) and (4) provide symmetrical identities for the U.S.

$$\Delta V_{\$} \equiv Y_{\$} + r_{\$,t-1}.B_{\$,\$,t-1} + r_{LCU,t-1}.B_{\$,LCU,t-1}.xr_{\$} + \Delta xr_{\$}.B_{\$,LCU,t-1} - T_{\$} - C_{\$} \quad (3)$$

$$\Delta V_{\$} \equiv YD_{\$} - C_{\$} \quad (4)$$

National income at current prices is described by columns 2 and 6 of Table 1:

$$Y_{LCU} \equiv C_{LCU} + G_{LCU} + X_{LCU} - IM_{LCU} \quad (5)$$

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allowed to adjust. Interest rates are exogenously fixed, and so bond prices are unchanged despite additional demand pressures. It is the ROW central banks' actions that keep both the U.S. and ROW interest rate constant.

$$Y_{\$} \equiv C_{\$} + G_{\$} + X_{\$} - IM_{\$} \quad (6)$$

where G is government expenditures, X represents exports and IM: imports.

Central bank profits (Fb) are simplified as there are no interest-paying liabilities (the Government is modelled to issue/hold/make good on their country's T-bills). Therefore, the central bank profits for the U.S. are equal to the total interest receipts from any domestically issued bills held by the central bank while the central bank profits for the ROW are equal to interest receipts on domestically issued bills held and also any foreign treasury bills. Column 4 and 9 of Table 1 can be simplified to represent the central bank profits for the ROW and the U.S.:

$$Fb_{LCU} \equiv r_{LCU,t-1}.Bcb_{LCU,t-1} + r_{\$,t-1}.Bcb_{LCU,\$,t-1}.xr_{\$} \quad (7)$$

$$Fb_{\$} \equiv r_{\$,t-1}.Bcb_{\$,t-1} \quad (8)$$

The government budget constraint is incredibly simplified since the central bank remits all profits back to the government and is represented (using columns 3 and 8) as:

$$\Delta B_{LCU} \equiv G_{LCU} - T_{LCU} + r_{LCU,t-1}.B_{LCU,t-1} - Fb_{LCU} \quad (9)$$

$$\Delta B_{\$} \equiv G_{\$} - T_{\$} + r_{\$,t-1}.B_{\$,t-1} - Fb_{\$} \quad (10)$$

As can be seen, the bills (B) are the sole liability of the government sector and have nothing to do with the central bank. Accordingly, payments on U.S. Treasury bills held by ROW are accounted for by the third term in Equation (10) in the term $r_{\$}^{-1}.B_{\$}^{-1}$. As a result, our first bit of asymmetry emerges between the U.S. and ROW: interest payments by the U.S. are a credit to the ROW central bank but do not debit the U.S. central banks' balance sheet.

A main strength of SFC models is that there are no black holes. Therefore, total outflows from the U.S. to ROW are exactly accounted for as inflows for the ROW. This identity holds regardless of whether the flows are trade- or capital-related. Lines 3 and 4 of Table 2 (the transaction-flow matrix) account for trade flows while Lines 7 and 8 describe the balance of payments. Linking transactions described in Table 2 with the balance sheet in Table 1 requires us to take capital gains into account. Balance of payment identities (not shown in Tables 1 and 2) are as follows:

$$CAB_{LCU} \equiv X_{LCU} - IM_{LCU} + r_{\$,t-1}.B_{LCU,\$,t-1}.xr_{\$} + r_{LCU,t-1}.B_{\$,LCU,t-1} + r_{\$,t-1}.Bcb_{LCU,\$,t-1}.xr_{\$} \quad (11)$$

$$CAB_{LCU} \equiv -KAB_{LCU} \equiv \Delta.B^{S}_{LCU,\$}.xr_{\$} - \Delta B^{S}_{\$,LCU} + \Delta.Bcb^{S}_{\$,LCU}.xr_{\$} + (1-\gamma)G^{FAS}_{US} \quad (12)$$

$$CAB_{\$} \equiv X_{\$} - IM_{\$} + r_{LCU,t-1}.B_{\$,LCU,t-1}.xr_{LCU} + r_{\$,t-1}.B_{LCU,\$,t-1} - r_{\$,t-1}.Bcb_{LCU,\$,t-1}.xr_{LCU} \quad (13)$$

$$CAB_{\$} \equiv -KAB_{\$} \equiv \Delta.B^{S}_{\$,LCU}.xr_{LCU} - \Delta B^{S}_{LCU,\$} - \Delta Bcb^{S}_{LCU,\$} - (1-\gamma)G^{FAS}_{US} \quad (14)$$

Where CAB is the current account balance and KAB is the capital account balance and $CAB + KAB \equiv 0$. KAB, therefore, includes the valuation of the change in official reserves by the ROW central bank.

As can be seen in Equations (12) and (14), the KAB of each country is impacted by U.S. Foreign Assistance Spending (FAS). Since FAS is a transfer payment, it appears in the capital account balance equation.

1.42 Trade

Prices are allowed to adjust, and trade prices are allowed to adjust independently of domestic prices. Trade prices are determined as follows:

$$\log(pm_{LCU}) = \mu_0 - \mu_1.\log(xr_{LCU}) + (1-\mu_1).\log(py_{LCU}) + \mu_1.\log(py_{\$}) \quad (15)$$

$$\log(px_{lcu}) = v_0 - v_1.\log(xr_{LCU}) + (1-v_1).\log(py_{LCU}) + v_1.\log(py_{\$}) \quad (16)$$

where all logarithmic transformations are natural logarithmic transformations, and $0 < v_1 < 1$ and $0 < \mu_1 < 1$. The elasticities[7] reflect stylized observations so that certain situations unfold plausibly and intuitively within the model. Prices of imports and exports are determined in such a way that trade price-domestic price elasticities for the U.S. and ROW sum to one. This allows for a realistic outcome if both economies experience inflation simultaneously: import and export prices increase by the identical amount and the exchange rate does not change.

The other two elasticities are constructed in similar fashions, such that particular situations deliver intuitive results with respect to what has historically been seen with regard to import and export price behaviour. For instance, currency depreciation is matched one-for-one by domestic inflation while other terms-of-trade dynamics are preserved.

Price symmetry is imposed such that export prices for U.S. consumers are import prices for foreign consumers and import prices for U.S. consumers are export prices for foreign firms:

$$px_{\$} = pm_{LCU}.xr_{LCU} \quad (17)$$

$$pm_{\$} = pm_{LCU}.xr_{LCU} \quad (18)$$

[7] See Godley (2006) for explanation and clarification

The export volume for the ROW is determined entirely as the whole of U.S. import volume, which is determined by the ratio of lagged import prices (in U.S. economy) and lagged domestic prices (in U.S. economy), in addition to the usual current income. Note the positive impact income has on exports, just like as with imports, and how it is immediate and modelled to be elastic, similar to imports. The coefficients, ($\varepsilon_1$and ε_2), are price-import volume and own-country income-import volume elasticities for U.S. households, and bold variables denote logs:

$$\boldsymbol{x_{LCU}} = \varepsilon_0 - \varepsilon_1.\left(\boldsymbol{pm_{\$,t-1}} - \boldsymbol{py_{\$,t-1}}\right) + \varepsilon_2.\boldsymbol{y_{\$}} \tag{19}$$

$$\boldsymbol{im_{LCU}} = \eta_0 - \eta_1.\left(\boldsymbol{pm_{LCU,t-1}} - \boldsymbol{py_{LCU,t-1}}\right) + \eta_2.\boldsymbol{y_{LCU}} \tag{20}$$

As the exports of one country are, in a two-country world, the imports of the other country, U.S. export and import volumes must equate:

$$x_{\$} \equiv im_{LCU} \tag{21}$$

$$im_{\$} \equiv x_{LCU} \tag{22}$$

Aggregate trade flows valued in own currencies are given by the next four identities:

$$X_{LCU} \equiv x_{LCU}.px_{LCU} \tag{23}$$

$$X_{\$} \equiv x_{\$}.px_{\$} \tag{24}$$

$$IM_{LCU} \equiv im_{LCU}.pm_{LCU} \tag{25}$$

$$IM_{\$} \equiv im_{\$}.pm_{\$} \tag{26}$$

1.43 Income and expenditures

Domestic prices and trade prices are separately and endogenously determined, which, in turn, play a large role in the determination of the disposable income for each country. However, the SFCA literature seems to mostly utilize a modified Haig-Simons disposable income function: an (real) income function that takes into account *both* households' disposable income as well as any capital gains stemming from either exchange rate valuation effects or simply increasing household investment flows. Wealth is previously defined in Equations (1) and (2), as well as (3) and (4) for the ROW and the U.S., respectively. Rearranging Equations (2) and (4) provide us with a useful definition of Haig-Simons disposable income (YD):

$$YD_{lcu} \equiv C_{LCU} + \Delta V_{lcu} \tag{2hg}$$

$$YD_{\$} \equiv C_{\$} + \Delta V_{\$} \tag{4hg}$$

The price of domestic sales (pds) is used to calculate the change in the *real* stock of wealth: $\Delta v \equiv \frac{V}{pds} - \frac{V_{t-1}}{pds_{t-1}}$.

Similarly (but slightly different), the Haig-Simons disposable income function is inflation-adjusted:

$$yd_{lcu} \equiv \frac{YD_{lcu}}{pds_{lcu}} - v_{lcu,\mathrm{t-1}}.\Delta pds_{lcu}/pds_{lcu} \tag{27}$$

$$yd_{\$} \equiv \frac{YD_{\$}}{pds_{\$}} - v_{\$,\mathrm{t-1}}.\Delta pds_{\$}/pds_{\$} \tag{28}$$

Like the wealth change determinations modelled in Equations (2) and (4), the change in the real stock of wealth is determined by the difference of real spending and real consumption:

$$\Delta v_{lcu} \equiv \mathrm{yd}_{\mathrm{lcu}} - c_{lcu} \tag{29}$$

$$\Delta v_{\$} \equiv \mathrm{yd}_{\$} - c_{\$} \tag{30}$$

where real consumption (c) is based not only on the real disposable income available to the households but also their initial stock of real wealth:

$$c_{lcu} = \alpha_{1,lcu}.\, yd^{e}_{lcu} + \alpha_{2,lcu}.\, v_{lcu,t-1} \tag{31}$$

$$c_{\$} = \alpha_{1,\$}.\, yd^{e}_{\$} + \alpha_{2,\$}.\, v_{\$,t-1} \tag{32}$$

where a superscript (e) denotes an expected value. More information on the consumption function will follow later[8].

Expectation functions are simple things within this model, which take into account past mistakes and positively inform future decision-making processes. To illustrate that the expectation functions within are harmless, let us rearrange Equations (29 – 32)[9] and isolate the change in expected wealth to examine

$$\Delta v_{lcu} = \alpha_{2,lcu}.\, (\alpha_{3,lcu}.\, yd^{e}_{lcu} - v_{lcu,\mathrm{t-1}})$$

---

[8] The consumption function is a two-stage decision-making process *a la* Keynes 1936 wherein households decide initial savings flows first, and wealth allocation decisions second. (Keynes 1936: 166)

[9] Substituting equation (31) into Equation (29) yields
$\Delta v_{lcu} = yd_{lcu} - \alpha_{1,lcu}.\, yd^{e}_{lcu} - \alpha_{2,lcu}.\, v_{lcu,t-1}$
$\Delta v_{lcu} = \left(1 - \alpha_{1,lcu}\right).\, yd^{e}_{lcu} - \alpha_{2,lcu}.\, v_{lcu,t-1}$. Multiply the first term on the RHS by $\frac{\alpha_{2,lcu}}{\alpha_{2,lcu}}$:
$\Delta v_{lcu} = \alpha_{2,lcu}.\, \frac{(1-\alpha_{1,lcu})}{\alpha_{2,lcu}}.\, yd^{e}_{lcu} - \alpha_{2,lcu}.\, v_{lcu,t-1}$ and let $\alpha_{3,lcu} = \frac{(1-\alpha_{1,lcu})}{\alpha_{2,lcu}}$ to get
$\Delta v_{lcu} = \alpha_{2,lcu}.\, (\alpha_{3}.\, yd^{e}_{lcu} - v_{lcu,t-1})$

where $\alpha_{3,lcu} = \frac{(1-\alpha_{1,lcu})}{\alpha_{2,lcu}}$. If changes in real wealth are zero (the LHS = 0), then the above becomes $yd^{e}_{lcu} = \alpha_3 * v_{lcu,\mathrm{t}-1}$, implying a quasi-steady state and the achievement of an implicit optimal wealth target (v^*) and a corresponding wealth-to-income ratio ($\alpha_{3,lcu}; i.e. v^{*}_{lcu} = \alpha_3 . yd_{lcu}$).

In assuming that interest rates positively impact $\alpha_{3,lcu}$, I also assume that higher interest rates do not (in the short run, at least) negatively impact aggregate demand. In order to ensure that this does not happen, I assume that α_3 is also defined to be $\alpha_3 \equiv \alpha_{30} + \alpha_4 . r$[10]. Putting this all together yields the quasi-steady state conditions of:

$$\alpha_{2,lcu} = (1 - \alpha_{1,lcu})/(\alpha_{30,lcu} + \alpha_{4,lcu} . r_{lcu}) \quad (33)$$

$$\alpha_{2,\$} = (1 - \alpha_{1,\$})/(\alpha_{30,\$} + \alpha_{4,\$} . r_{\$}) \quad (34)$$

The remaining equations have been relegated to Appendix B and are largely identity related.

1.44 Asset demands

Asset demand originates from household wealth allocation decisions. In a stationary steady state, households accumulate a certain percentage of their wealth, allocated between U.S. and foreign treasuries. Households undergo a two-stage decision: their saving rate to determine the total amount of wealth, and then the allocation of wealth between the two generalized categories: U.S. and foreign treasuries.

[10] As assumed in (Godley & Lavoie, 2003)

Bonds are not addressed within this paper, nor are they particularly addressed within the literature. There are papers that focus on the stock-flow dynamics of the financial markets, specifically a few exploring "kindleberger dynamics" or "minskyian dynamics" (Dos Santos, 2005; Miess & Schmelzer, 2016; Passarella, 2012); however, inclusion of such complications would further complicate an already abstruse model with near a hundred equations in total. Additional endogenous variables would require further closures and this paper would depart to, perhaps, too great a degree from the existing literature. This paper focuses on the trade and financial flow dynamics that result in perennial U.S. transfer payments. The type of those financial flows (whether portfolio investment, FDI, corporate, or sovereign debt) matters little for this analysis. This paper seeks to establish a baseline dynamic to study the impact of U.S. military aid and other U.S. transfer payments abroad. Empirical analysis is needed to see whether the trade and financial flows do, in reality, increase as a result of U.S. transfer payments.

The household decision-making process is influenced not just by the interest rate differential (reflecting ROW's higher risk premium) but also by the exchange rate expectations. The models in this paper assume a simple exchange rate expectation function, in that the exchange rate is expected to be the same as the exchange rate in the last period. Integrating the two-stage decision making process yields asset demand functions for the U.S. and ROW households as follows:

$$B^d_{lcu,lcu} = V^e_{lcu}.(\lambda_{10} + \lambda_{11}.r_{lcu} - \lambda_{12}.\left(r_{\$} + dxr^e_{\$}\right) - \lambda_{13}.YD^e_{lcu}/V^e_{lcu}) \quad (35)$$

$$B^d_{lcu,\$} = V^e_{lcu}.(\lambda_{20} - \lambda_{21}.r_{lcu} + \lambda_{22}.\left(r_{\$} + dxr^e_{\$}\right) - \lambda_{23}.YD^e_{lcu}/V^e_{lcu}) \quad (36)$$

$$H^d_{lcu} = V^e_{lcu}.(\lambda_{30} - \lambda_{31}.r_{lcu} - \lambda_{32}.\left(r_{\$} + dxr^e_{\$}\right) + \lambda_{33}.YD^e_{lcu}/V^e_{lcu}) \quad (37)$$

$$B^d_{\$,\$} = V^e_{\$}.(\lambda_{40} + \lambda_{41}.r_{\$} - \lambda_{42}.(r_{lcu} + dxr^e_{lcu}) - \lambda_{43}.YD^e_{\$}/V^e_{\$}) \qquad (38)$$

$$B^d_{\$,lcu} = V^e_{\$}.(\lambda_{50} - \lambda_{51}.r_{\$} + \lambda_{52}.(r_{lcu} + dxr^e_{lcu}) - \lambda_{53}.YD^e_{\$}/V^e_{\$}) \qquad (39)$$

$$H^d_{\$} = V^e_{\$}.(\lambda_{60} - \lambda_{61}.r_{\$} - \lambda_{62}.(r_{lcu} + dxr^e_{lcu}) + \lambda_{63}.YD^e_{\$}/V^e_{\$}) \qquad (40)$$

where the sum of coefficients in each column ($\lambda_{10}, \lambda_{20}, \ldots$) is equal to zero and the sum of constants in each equations is equal to one ($\lambda_{10} + \lambda_{11} + \lambda_{12} = 1$), a superscript of (^{e}) denotes expectations, and appending d to the beginning of any variable denotes the proportional rate of change (so dxr^e reads as the expected change in the exchange rate).

To understand how asset demands are determined, let's look at (35). Looking at (35), it is easily seen that the own-interest rate coefficient would be positive in determining demand for ROW treasuries by ROW households. Similarly, the U.S. interest rate coefficient is negative in (35) as higher U.S. interest rates would make U.S. treasuries more appealing and ROW treasuries less appealing to ROW households. Lastly, λ_{13} is negative to reflect that expectations of lower future disposable income-to-wealth ratios negatively impacts asset purchases. As you can see by the negative inclusion of λ_{23} in (36), lower expectations negatively impact U.S. treasury purchases as well as ROW treasury purchases. The positive inclusion of λ_{33} and λ_{63} in the equations determining the cash[11] holdings ($H^d_{\$} and\ H^d_{lcu}$; Equations (37) and (40), resp.) show

[11] Because of the over-determined nature of the model, I follow previous authors by omitting the equations explicitly detailing the demand for money and instead assume that anything not invested in the other two assets is held as money (Godley, 2003; Godley, 2006). By omitting the redundant equations and re-defining the stock of cash held by foreign and domestic households to be the remainder of wealth not allocated to domestic and foreign treasuries, we avoid over-identification issues.

that lower expectations lead to cash hoarding. Equations (35) through (40) aim to reflect Tobin's principles of imperfect assets (Tobin, 1980; Backus, 1980; Brainard, 1992; Godley, 2006)

Rather than looking at exchange rate changes themselves; it is more helpful to use relative changes (gross changes divided by initial values):

$$dxr^{e}_{lcu} = \Delta xr^{e}_{lcu}/xr_{lcu} \tag{41}$$

$$dxr^{e}_{\$} = \Delta xr^{e}_{\$}/xr_{\$} \tag{42}$$

And, by doing so, we can better understand the intuition behind the middle term in Equations (35) through (40). The middle term in Equation (35) is $-\lambda_{12}.\left(r_{\$} + dxr^{e}_{\$}\right)$, negative because Equation (35) determines the ROW household demand for ROW treasuries ($B^{d}_{lcu,lcu}$); with U.S. interest rates ($r_{\$}$) and the expected proportional change in exchange rate ($dxr^{e}_{\$}$) combining to represent the expected rate or return on bills issued abroad at the end of the period.

An expected exchange rate is assumed to exist. Exchange rate expectations are simply designed to reflect the existence/belief in a fundamental exchange rate around which reflect households' expectations vacillate. Simple expectations are excusable so long as past mistakes are integrated and proactively inform future decision-making processes. Then, decisions will, over time, correct for undesirable outcomes their decision-making as they arise.

In the first set of the simulations within (Model FASFIX and cFASFIX), the treatment of exchange rates or expected exchange rates is of no concern, as the exchange rate is assumed exogenously fixed / defended by the central banking authorities. In the second set (Models FASFLEX and cFASFLEX), exchange rate expectations will be impacted by realized changes in exchange rates. To tie up the model, the ephemeral, so-called fundamental exchange rate is endogenized such that expected and real exchange rates equate in the (very) long-run:

$$xr^{e}_{lcu} = xr^{e}_{lcu,\mathrm{t}-1} + \beta.\,(xr_{lcu} - xr^{e}_{lcu,\mathrm{t}-1}) \tag{43}$$

$$xr^{e}_{\$} = xr^{e}_{\$,\mathrm{t}-1} + \beta.\,(xr_{\$} - xr^{e}_{\$,\mathrm{t}-1}) \tag{44}$$

Cash is seen as a buffer that individuals hold in case of emergency situations and the actual determination of the cash holdings (rather than the planned cash allowance) is as follows, where the superscript (d) indicates demand:

$$H^{d}_{lcu} = V_{lcu} - B^{d}_{lcu,lcu} - B^{d}_{lcu,\$} \tag{45}$$

$$H^{d}_{\$} = V_{\$} \; - B^{d}_{\$,\$} - B^{d}_{\$,lcu} \tag{46}$$

Remembering the naming convention, $B^{d}_{\$,lcu}$is an LCU-denominated (ROW-issued) bond that is demanded and held by a U.S. household.

1.45 Asset supplies

When governments actively set tax rates and public expenditure commitments, they run government budget deficits, which are accompanied with new bond issuance. Government surpluses diminish their own national debt (by Treasury buy-backs). That asset is then obviated once the government purchases back a debt to itself (naturally). Governments have limited control over the amount of newly issued Treasuries, as the government sets both taxes and government spending, and so indirectly determines the amount of newly issued Treasuries. The issuance of this debt may emerge on the other side of the balance sheet as a wealth holding for a U.S. citizen, ROW citizen, ROW central bank, or even the U.S. central bank. Central banks are assumed to, when possible, accommodate both domestic and foreign purchases and sales of bills (at a given interest and exchange rate combination). In this way, the private-sector supply of U.S. and ROW Treasuries passively matches demand.

As is Post-Keynesian tradition[12], money supply is also modelled to be demand-led, just as is the supply of bills. The U.S. money and bill market equations are:

$$H_{\$}^{s} = H_{\$}^{h} \tag{47}$$

$$B_{lcu,\$}^{s} = B_{lcu,\$}^{d}.xr_{lcu} \tag{48}$$

$$B_{\$,\$}^{s} = B_{\$,\$}^{d} \tag{49}$$

And ROW assets, acquired domestically or from abroad, are defined to be:

$$H_{lcu}^{s} = H_{lcu}^{d} \tag{50}$$

$$B_{\$,lcu}^{s} = B_{\$,lcu}^{d}.xr_{\$} \tag{51}$$

$$B_{lcu,lcu}^{s} = B_{lcu,lcu}^{d} \tag{52}$$

Where a superscript s (^{s}) denotes supply and (^{d}) denotes demanded and actual holdings of cash rather than planned holdings. Cash is not—strictly speaking—supply-led, since the constraints/determinants of national cash supplies (the asset side of the central bank balance sheet) are all endogenously-determined themselves, making cash endogenously determined, ultimately. To see this, column 9 of Table 1 (which, when summed together must equal zero, by identity) yields the following identity:

[12] Central Banks are modelled to set or steer interest rates rather than target money supply levels or some target supply of bond issuance. In this way, I follow Post-Keynesians in an attempt to more accurately model central bank behaviour within well-defined, rigorous models that include both the real and financial side of one or more economies.

$$H^s_\$ = Bcb^d_\$ \tag{53}$$

As Treasury demand is supply-led, ROW central banks are free to purchase as many U.S. Treasuries as they like:

$$Bcb^s_{lcu,\$} = Bcb^d_{lcu,\$}.xr_{lcu} \tag{54}$$

To keep interest rates at the targeted level, U.S. central banks absorb the supply of U.S. bills after ROW households, U.S. households, and the ROW central bank supplies are accounted for:

$$Bcb^d_\$ = Bcb^s_\$ \tag{55}$$

$$Bcb^s_\$ = B^s_\$ - B^s_{lcu,\$} - B^s_{\$,\$} - Bcb^s_{lcu,\$} \tag{56}$$

ROW central bank demand/supplies are similarly determined as a residual:

$$Bcb^d_{lcu} = Bcb^s_{lcu} \tag{57}$$

$$Bcb^s_{lcu} = B^s_{lcu} - B^s_{lcu,lcu} - B^s_{\$,lcu} \tag{58}$$

As we can see by comparing Equations (56) and (58), this is an important exception to the symmetry in the representation of the U.S. and ROW.

Table 2 ensures that all assets equal the sum of private sector, as is seen by vertically summing column 4 to get the U.S. treasury bills held by ROW central banks, denominated in LCU:

$$\Delta Bcb^d_{lcu,\$} = \Delta H^s_{lcu} - \Delta Bcb^d_{lcu} + \Delta xr_\$.Bcb^s_{lcu,\$,t-1} \tag{59}$$

where the last term on the RHS of (59) measures the capital gains/losses experienced by ROW when the exchange rate is allowed to adjust. In Models FASFIX and cFASFIX, exchange rates are assumed exogenous and so this last term is annihilated. Rearranging (59) allows us to see how, absent an exchange rate adjustment mechanism, ROW holdings of U.S. Treasuries are the only central bank policy lever available to resolve the inevitable discrepancies that arise between the ROW current account and the ROW net accumulation of foreign-issued assets (NAFA). For debtor countries (of which most FAS recipients are), this more often than not means purchases of U.S. Treasuries to prevent an unwanted exchange rate appreciation.

To complete the model, I simply need to define that the exchange rates are reciprocal to one another:

$$\mathrm{xr}_{\$} = 1/xr_{lcu} \tag{60}$$

1.46 Transfer payments

Until this point, the model outlined within follows Models OPENFLEX/OPENFIX very closely (Godley, 2006). I keep most, if not all, of the assumptions made within Models OPENFLEX/OPENFIX[13] in creating Models FASFIX/FASFLEX:

- Pure service economy
- Instantaneous production of physical/productive capital without cost, to be exhausted within the same period
- Every financial asset has a corresponding liability
- Two aggregate financial assets: U.S. Treasuries and ROW Treasuries

[13] Whose results are reproduced in Appendix C for easy comparison purposes

- ROW and U.S. households trade goods in addition to purchasing U.S. Treasuries, & ROW treasuries
- Fiat, transactional money (no credit money)
- No commercial banks
- Full employment (both U.S. and ROW)
- Unlimited, instantaneous capital mobility
- Households/governments only purchase services from firms
- Services are instantaneously provided and consumed
- Identical endowments for both countries and identical parameters (same initial GDP, G, wealth, debt, CAB, KAB, interest rate, etc)
- No physical property assets

The models within do not differ from Models OPENFIX/OPENFLEX in the structure or the (fundamental) initial set-up/steady states; the models within differ in that they allow for large transfer payments to occur from the U.S. to ROW. As with all entries on the RHS of Table 2, these transfer payments are denominated in USD and must be converted (by the foreign central bank) to LCU in order to be absorbed into the local economy (whether it's by government purchases, programs, cash hand-outs, or any other means).

To reflect the transfer payments (known as Foreign Assistance Spending, or FAS, for short), row 3 of Table 2 was inserted which splits U.S. government spending into a domestic portion, $(1-\gamma).G_{\$}$ and a foreign portion, $\gamma.G_{\$}$ and allocates the foreign portion to the ROW economy (after converting the funds from USD to LCU), making ROW government spending equal to $G_{lcu}+\gamma.G_{\$}.xr_{lcu}$. γ is assumed to be 10%, and both U.S. and ROW government

spending ($G_\$, G_{LCU}$) are exogenously fixed at 16. For completeness, (11) and (13) are augmented to include this additional transfer payment and become:

$$CAB_{LCU} \equiv X_{LCU} - IM_{LCU} + r_{\$,t-1}.B_{LCU,\$,t-1}.xr_\$ + r_{LCU,t-1}.B_{\$,LCU,t-1} + r_{\$,t-1}.Bcb_{LCU,\$,t-1}.xr_\$ + \gamma.G_\$.xr_{lcu} \quad (11b)$$

$$CAB_\$ \equiv X_\$ - IM_\$ + r_{LCU,t-1}.B_{\$,LCU,t-1}.xr_{LCU} + r_{\$,t-1}.B_{LCU,\$,t-1} - r_{\$,t-1}.Bcb_{LCU,\$,t-1}.xr_{LCU} - \gamma.G_\$ \quad (13b)$$

1.5 Solutions to the Main Model

1.51 Practical implications

Simulations start from full stationary steady states, then the introduction a perturbation, and last an evaluation of the sequence of events. Specifically, I am looking to identify new stationary or quasi-stationary states, or at the very least interpret the resulting instability in a clear and coherent fashion.

While no economy is ever (or will ever) be observed in steady state, positing the existence of this particular hypothetical is helpful when looking at the resulting behavior as it helps us see the impact of a perturbation on a "healthy" economy, ceteris paribus. Baseline scenarios function as a benchmark to facilitate drawing cogent conclusions from our simulation or model. In all scenarios, each country is modelled to be at a steady state for the first five periods. At period 5, there is a shock to the variable denoting U.S. foreign assistance spending, γ, representing the U.S. starting its transfer payment spending abroad, which continues with the same amount each year thereafter.

In the first model explored, Model FASFIX, the ROW experiences a transfer payment from the U.S. (the perturbation), which is sustained indefinitely. Figure 1 shows how this transfer payment impacts the ROW CAB, GDP, and budget deficit:

Since—in addition to a fixed exchange rate regime—monetary and fiscal policy are held exogenous as well, U.S. FAS can’t help but increase the ROW current account balance (CAB). The impact on ROW CAB is the direct impact of U.S. FAS: by definition as transfer payments are positive entries in the CAB. As can be expected, the ROW government budget balance increases (meaning lower government deficits) as greater economic activity translates to greater tax receipts with no greater outlay of government spending (as it is held constant for ROW).

Indirectly, U.S. FAS increases both ROW purchases of foreign assets (net accumulation of financial assets—net of official reserve accumulations, especially) and ROW purchases of foreign services (imports). Both of these are due to the positive ROW income elasticities with respect to imports and financial assets (U.S. Treasuries and ROW Treasuries both). While the demand for imports settles to a new level and remains there (with a negative trade balance as a result), the net accumulation of financial assets increases every period up until the ROW household wealth target is achieved and then settles back to zero halfway through the simulation.

Figure 2 shows how the process can continue indefinitely: the current account balance for ROW can and will increase in so long as U.S. FAS keeps coming. Unlike monetarist models, there is a definitive lack of an automatic adjustment mechanism. Initially, the CAB closely follows the trade balance (plus the direct U.S. FAS injection, a perennial constant). However, once a significant amount of U.S. Treasuries are accumulated by the ROW (see the green dotted line in Figure 3), the interest payments on those holdings (while small, in the order of 2-3%) add up, generating

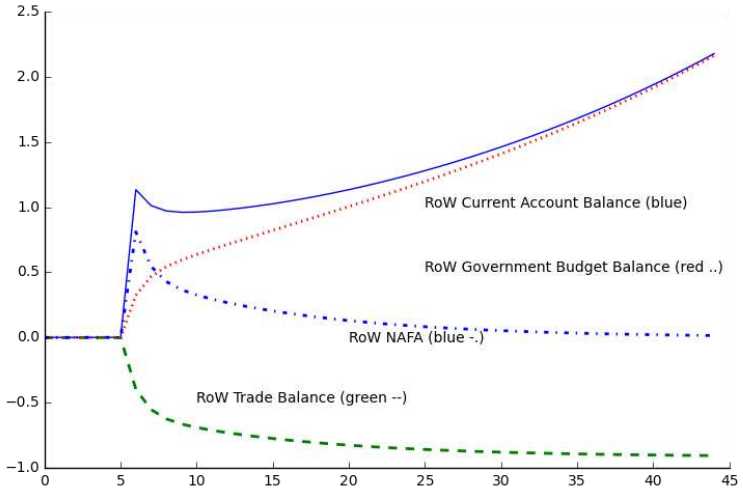
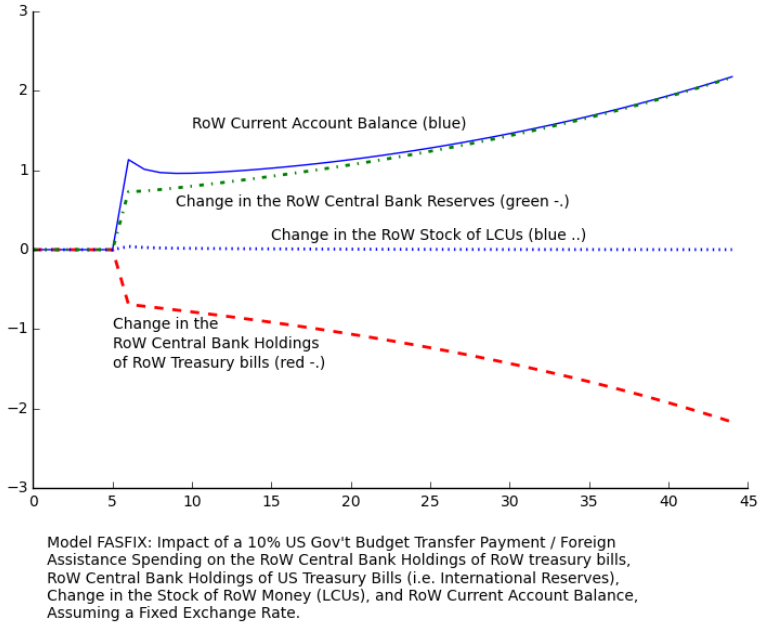


Figure 1: Impact of FAS on ROW External Variables, Fixed Exchange Rate

larger and larger payment flows from the U.S. to ROW and resulting in something akin to a



Model FASFIX: Impact of a 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending on the RoW Central Bank Holdings of RoW treasury bills, RoW Central Bank Holdings of US Treasury Bills (i.e. International Reserves), Change in the Stock of RoW Money (LCUs), and RoW Current Account Balance, Assuming a Fixed Exchange Rate.

Figure 2: Impact of FAS on ROW Monetary Variables, Fixed Exchange Rate

'Nike' style swoosh curve.

The shape of the ROW current account balance is because the positive ROW net accumulation of financial assets negatively impacts the ROW current account balance immediately and offsets some of the accumulating interest receipts from ROW holdings of U.S. Treasuries. Once changes in ROW household wealth revert to zero, ROW net financial accumulation of assets also reverts to zero, and the ROW CAB starts to grow exponentially. Once NAFA is zero, the current account tracks the governmental (central bank included) accumulation of foreign assets exactly. Governments accumulate assets in the form of foreign reserves, or U.S. Treasuries.

Contrary to alternative models and frameworks, this process can and does continue indefinitely. ROW central banks fulfil their goals of monetary stability, absorbing excess liquidity in their economies. To check that ROW central bank is doing its job, Figure 2 shows the evolution of the

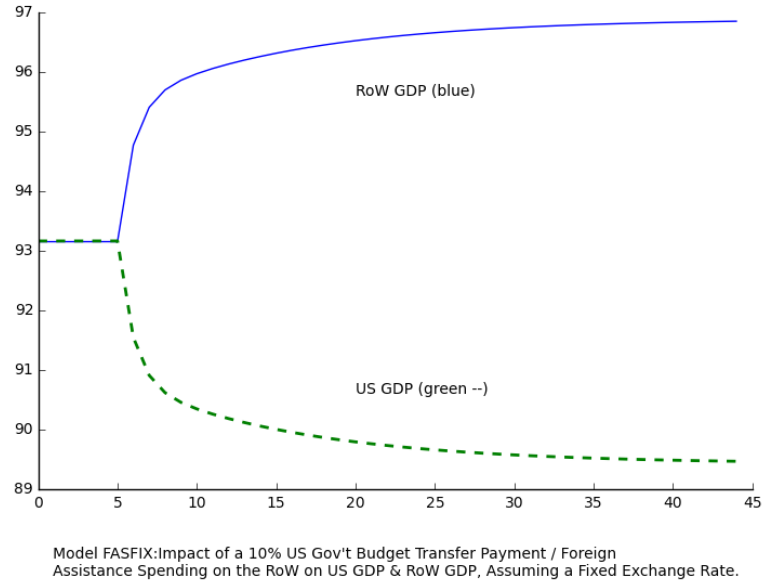


Figure 3: Impact of FAS on ROW rGDP and U.S. rGDP, Fixed Exchange Rate.

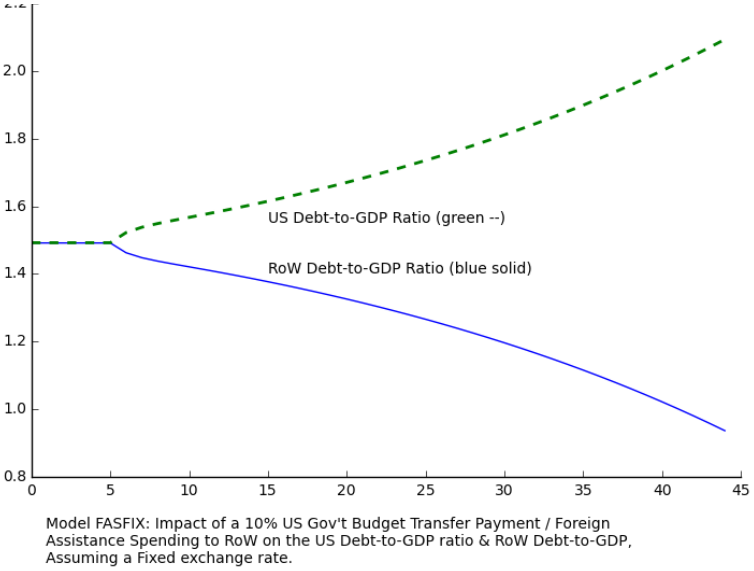


Figure 4: Impact FAS on ROW and U.S. Debt-to-GDP, Fixed Exchange Rate..

ROW stock of money (LCUs) in the blue dotted line. After some very slight positive changes to the issuance of LCUs, the change in ROW money supply reverts to zero and stays there indefinitely. The ROW government is experiencing a current account surplus, a governmental surplus, and accumulating international reserves at an exponential basis—all the while holding money supply constant. The constant money supply is made possible through the

"compensation" undertaken by the ROW central bank when they decrease their own holdings of ROW Treasuries. As Figure 2 shows, this compensation matches the reserve accumulation dollar-for-dollar.

Figure 3 shows the direct impact on ROW GDP: a ~3% increase immediately felt (within 3-5 periods) and a ~4% level increase in the LR. In Model FASFIX, the U.S. decreases government spending domestically retained. So too, GDP decreases.

Figures 3 and 4 show the negatives in this dynamic: U.S. GDP decreases and is at a lower steady state (3% lower), with increasing U.S. debt-to-GDP ratios, growing exponentially. This path is sustainable only because the USD is internationalized and the U.S. Treasury is seen as one of the safest and most liquid assets.

To sum up, U.S. FAS transfer payments increase ROW disposable income, increasing consumption and output through the multiplier effect. Increased ROW income leads to increased imports (U.S. exports) to the ROW from the U.S., as well as increased wealth targets by ROW households and increasing wealth accumulation behaviour. The mechanisms here are similar to those that would cascade from a tax break, large government program, natural resource windfall, or any other positive income shock event.

1.52 Theoretical implications

As more U.S. FAS flows into the ROW government, additional dollars are exchanged by the ROW central government for LCUs. ROW central banks find themselves with a rising stockpile of dollars, which they use to purchase U.S. Treasuries. The U.S. is not financing its deficit through luring ROW central bankers to purchase U.S. Treasuries, nor does the ROW central bank "intervene" in any undue way. The ROW central bank undertakes normal monetary operations (exchanging USD to LCU and purchasing U.S. Treasuries with excess USD), and the

result is that the U.S. Treasuries are purchased by ROW central banks and the (official) U.S. capital account surplus then offsets the U.S. current account deficit.

The ROW central bank, like its U.S. counterpart, is in charge of keeping interest rates constant, which is exactly what it's doing by selling ROW Treasuries as they purchase U.S. Treasuries on the open market. As the ROW governmental budget balance increases (and budget deficit is eliminated), the ROW central bank draws down on its holdings of domestic bills (since less are created every period). As excess foreign currency is sold to central banks, central banks use it to purchase foreign reserves. In this way, this model exemplifies the compensation thesis (Berger 1972; Lavoie 2001), wherein any excess liquidity created by rising reserves is immediately offset by decreased claims on the domestic economy.

The reverse is true about the U.S. economy: the decrease in GDP causes a temporary and slight dip in the U.S. money supply and U.S. central bank holdings of U.S. Treasuries. However, these revert to zero after the new equilibrium level of GDP is found (about 3% lower). The USD's status as international currency means that the U.S. central bank (Fed) doesn't need to intervene/sterilize/compensate in order to keep money supply constant. The U.S. Treasury provides the counterpart to the current account deficit—there's no need for holding or drawing down reserve holdings.

The FAS flows do not directly impact private wealth flows at all. Private disposable income of both U.S. and ROW households is not influenced by ROW's receipt of U.S. FAS. If the U.S. were to relax fiscal policy sufficiently such that GDP does not decrease (the only plausible scenario, explored in Model cFASFIX below), the main impact would be that U.S. trade and governmental deficits would be even greater than they already become within this

paradigm. However, what would be the impact for the households and businesses in the U.S. and ROW?

U.S. households, still producing the same amount, will be consuming domestically (absorbing) more than they produce. ROW households, with their twin surpluses (trade & government), will be absorbing less than they produce, *but still consume more than before*. All the while, ROW governments' budget balances decrease and foreign reserves stockpile. The process can and seems to be continuing indefinitely: many countries experience a raft of benefits (greater consumption, greater imports, greater private wealth accumulation, higher foreign reserve stockpile, lower government deficits); U.S. citizens enjoy greater consumption today at the expense of increasingly higher debt-to-GDP ratios and its corresponding mountainous pile of debt; the U.S. government experiences greater influence abroad to advance U.S. interests (a stated strategic aim of the U.S. State Department); U.S. trade balance is artificially propped up (still in deficit, but not near what it would be without U.S. FAS); and there is greater demand for, therefore lower yields on, U.S. Treasuries (greater valuation of U.S. Treasuries).

1.6 Compensated Foreign Assistance Spending

Let us now assume that the U.S. decides not to lower its domestic government spending as a way to finance their foreign assistance spending (FAS), but instead increases government spending by exactly the amount of the FAS. This is the more probable story.

To set-up Model cFASFIX (compensated Foreign Assistance Spending under a FIXed exchange rate regime), I simply change the perturbation so that it is now two perturbations: one increasing U.S. transfer payments to ROW and one augmenting of U.S. government spending by the exact amount of those U.S. transfer payments (FAS). This would amount to the new *Compensated* FAS(CFAS), so that $CFAS = (1 + \gamma).G_{\$}$ now.

As was the case before, this can go on forever. The yearly U.S. debt-to-GDP ratio may increase but, at the same time, both U.S. and ROW GDP increase, U.S. trade balance increases, ROW's wealth increases (for households and the governments), and ROW's foreign reserve stockpile increases. The (compensated) FAS (CFAS) shock will result in a higher steady state level of income for both the U.S. and ROW in a dynamic which can continue indefinitely with little-to-no immediate negative consequence to either party.

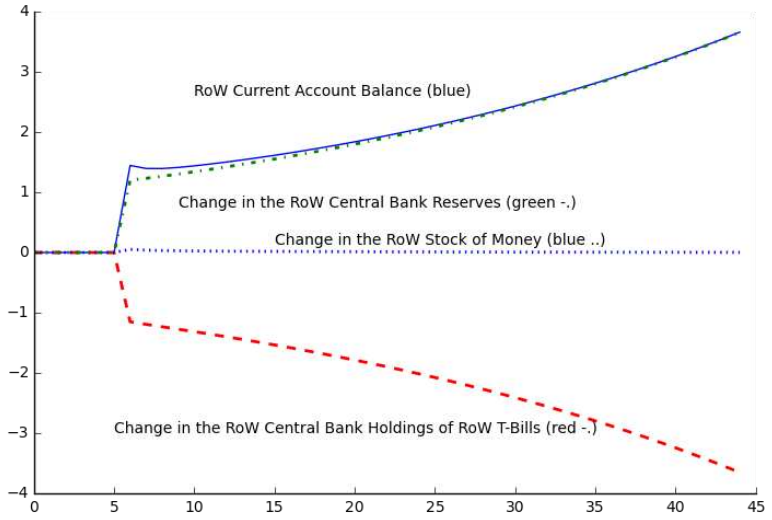
1.61 Practical implications

As before, simulations start from a full stationary steady. Afterward the perturbation, the sequence of events is analysed. In this second exhibit, ROW experiences a transfer payment from the U.S. which is maintained indefinitely. Fiscal policy for the U.S. is exogenously shocked so that U.S. domestic government spending—and U.S. output—is no longer directly impacted only—by U.S. FAS.

Figure 5 shows the consequences of U.S. FAS on ROW CAB, ROW central bank reserve holdings, ROW central bank holdings of ROW treasuries, and the ROW money supply. Figure 5 also shows a similar story as Figure 2, wherein excess USDs are traded to the central bank, who stores them as U.S. Treasuries. Excess liquidity is absorbed by ROW central bank through the sale of ROW Treasuries, keeping interest rates constant. The supply of (Local Currency Units) LCUs increases slightly (as new wealth targets are set and achieved) but then returns to zero and stays there for the remainder of the simulation—as before, the supply of LCUs does not change, the indirect consequence of the central bank's interest rate stabilization policies.

Figure 5 shows a 'swoosh-like' ROW CAB, in that there's an immediate shock to the CAB (which is identity-related) followed by a small dip, and then a convex function. This is because the positive shock to ROW net accumulation of foreign assets (see the red line in Figure 6) is not

only larger in magnitude but longer in duration. This is because there is no longer depressed economic activity within the U.S. as a result of U.S. FAS. U.S. CFAS allows for $G_{\$}$ and $YD_{\$}$ to stay the same, which translates to the same import volume (as opposed to smaller import volumes in Model FASFIX), but this time with even higher wealth targets for the ROW citizens and, therefore, a longer period of accelerating household wealth accumulation until they reach

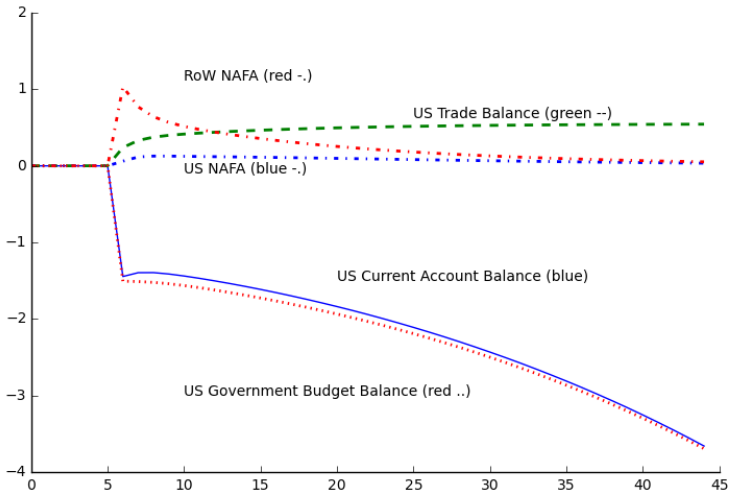


Model CFASFIX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on the RoW Central Bank Holdings of RoW Treasury bills (T-Bills), I of US Treasury bills (i.e. International Reserves), Change in the Stock of RoW Money (LCUs), and RoW Current Account Balance, Assuming a Fixed Exchange Rate.

Figure 5: Impact of CFAS on ROW External Vars, Fixed Exchange Rate

their higher wealth-to-income ratio target.

Figure 6 also shows the persistently positive U.S. trade balance that results from U.S. FAS year after year. The U.S. experiences a twin deficit—current account and government budget deficits—while U.S. net accumulation of foreign assets (household wealth accumulation) increases slightly then returns to zero. The increase in U.S. NAFA is due to the larger U.S.



Model CFASFIX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on the US Trade Balance, Current Account Balance, Gov't Budget Balance, and Net Accumulation of Financial Assets, Assuming a Fixed Exchange Rate.

Figure 6: Impact of CFAS on U.S. External Indicators, Fixed Exchange Rate

export volume, which targets temporarily increasing U.S. GDP, incomes, and U.S. household wealth-to-income ratio. The U.S. current account balance remains in deficit, while the overall government sector keeps selling assets on an equivalent scale, which is why U.S. CAB comes to match U.S. government budget balance exactly, once ROW NAFA goes back to zero.

1.62 Theoretical implications

As before, ROW central banks, now awash with USD, see a small opportunity: they can either store the USD as cash reserves, earning no interest, or they can purchase U.S. treasuries and earn interest. While the interest paid on U.S. treasuries is small, when applied to large stockpiles of millions, billions, or even trillions of U.S. treasuries, interest payments can add up to something significant. So, ROW central banks store all excess USD as U.S. treasuries. Purchasing U.S. treasuries increases the demand for U.S. treasury market, and seeing as all treasuries (both U.S. and ROW) are settled relative to one another, excess demand on the U.S. treasury market results in depreciated (Local Currency Units) LCUs / appreciated USDs. ROW central banks decide: (a) do nothing, allowing exchange rate to depreciate, or (b) sell their own

(ROW) treasuries. It is in this way that exchange rate management guides the impact of U.S. FAS receipt.

Given a spending influx and a fixed exchange rate, the regular mechanisms of wealth accumulation and standard central banking operations result in foreign households' increased import appetite as well as increased rates of net foreign asset accumulation. To preserve a fixed exchange, the foreign central banks must intervene. Were ROW central banks to abandon their defence of their exchange rate and refuse to accelerate their accumulation of foreign reserves, the LCU exchange rate would adjust to a level where a quasi-stationary state may emerge.

ROW households do require a few periods before the full impact of the U.S. spending takes effect. The U.S. aid and foreign assistance spending will impact government initially, then firms, then households. Larger incomes lead to greater consumption as well as higher wealth targets. Larger ROW household consumption is what drives the multiplier process: extra income translating to extra consumption resulting in, unsurprisingly, extra income in turn. Typical of any Keynesian multiplier, this process continues indefinitely but we can approximate its effect. ROW central bank purchases LCU treasuries, alleviating demand pressures internationally, depressing their currency—and also accumulate foreign reserves with excess USD on-hand due to the direct and indirect consequences of U.S. FAS.

All economies are assumed to be overdraft economies, the status quo for most modern central banks. Overdraft economies explicitly have no control over high powered money but influence control over the credit markets and target interest rates, a reflection of how central banks operate in reality.

1.7 Flexible Exchange Rate Closure

Let us now assume that the ROW central bank is unwilling to defend their fixed exchange rate (for whatever reason) and makes no reserve transactions. As U.S. spending in ROW increases, U.S. net financial asset purchases increase. Changing demand for U.S. treasuries will impact the exchange rate.

To make this change, equation (59) is altered such that the LHS is now 0 (no reserve transactions means $\Delta Bcb^{d}_{lcu,\$} = 0$); changes in ROW money supply match exactly changes in ROW Treasuries. The last item on the RHS of equation (59) is also zeroed, as $Bcb^{s,-1}_{lcu,\$}$ (the supply of U.S. treasuries to ROW) is unchanged each period. Therefore equation (59), reproduced below,

$$\Delta Bcb^{d}_{lcu,\$} = \Delta H^{s}_{lcu} - \Delta Bcb^{d}_{lcu} + \Delta xr_{\$}.B^{s}_{lcu,\$,\mathrm{t-1}} \tag{59}$$

becomes

$$\Delta Bcb^{d}_{lcu} = \Delta H^{s}_{lcu} \tag{59f}$$

A new issue emerges: Bcb_{lcu} appears on the LHS of our system of equations more than once and needs further restriction. Without the room to drop an equation (and under-identify the model), we simply invert the troublesome equation (55):

$$Bcb^{d}_{lcu} = Bcb^{s}_{lcu} \tag{55}$$

to

$$Bcb^{s}_{lcu} = Bcb^{d}_{lcu} \tag{55f}$$

Now, we are not out of the woods—Bcb^s_{lcu} now appears on the LHS of two equations. The equation determining the supply of ROW Treasuries is defined by equation (58),

$$Bcb^s_{lcu} = B^s_{lcu} - B^s_{lcu,lcu} - B^s_{\$,lcu} \tag{58}$$

which must now be changed to equation (58f) by moving Bcb^s_{lcu} to the RHS:

$$B^s_{\$,lcu} = B^s_{lcu} - B^s_{lcu,lcu} - Bcb^s_{lcu} \tag{58f}$$

Lastly, we must rewrite equation (51) to (51f) to move $B^s_{\$,lcu}$to the RHS:

$$B^s_{\$,lcu} = B^d_{\$,lcu}.xr_\$ \tag{51}$$

$$xr_\$ = B^d_{\$,lcu}/B^s_{\$,lcu} \tag{51f}$$

1.71 Practical implications

Simulations start from a full stationary steady. After the perturbation, the sequence of events is analysed. In Model FASFLEX, ROW once again experiences a transfer payment from the U.S. which is maintained indefinitely. Fiscal policy for the U.S. is held constant, meaning U.S. output is directly and negatively impacted by U.S. FAS. With ROW government spending, ROW interest rates, and ROW reserve holdings all held fixed, the added pressure of foreign net accumulation of foreign assets is reflected in the adjustment of the exchange rate, as detailed above.

After the spontaneous rise in U.S. FAS, ROW income and CAB increase as U.S. FAS is a transfer payment. Immediately, private income and official budget flows are impacted. Figure 7 shows the consequences of U.S. FAS on ROW CAB, ROW central bank reserve holdings, Local Currency Unit (LCU) exchange rate (one LCU in USDs), and the ROW money supply. ROW

government experiences a higher budget surplus, while ROW imports increase (due to larger ROW income), depressing the ROW trade balance. Higher incomes for ROW households translate to higher wealth-to-income target ratios and faster accumulation of assets by ROW households (as well as both ROW Treasuries and U.S. Treasuries). The net change in demand for foreign assets causes the LCU to appreciate in order to clear all asset markets simultaneously.

The LCU will continue to appreciate until the ROW balance of payments finds its way back to zero (its initial steady state value). If the ROW balance of payments is non-zero, the balance of payments generates changes in net demand of LCU treasuries in each country and—barring foreign reserves, ROW government spending, or ROW interest rate changes—the LCU must appreciate to equilibrate the asset markets.

Keep in mind that the LCU is not the only thing to change; absolute and relative prices of imports and exports change, impacting trade volumes, impacting income flows, influencing wealth allocation decisions, which, in turn, influence the CAB. For this process to stop: *the change of all stock variables must equal zero.*

Figure 7 illustrates the processes described above: an exponentially increasing ROW government surplus, a new quasi-steady state ROW trade balance, a short-lived ROW CAB spike and an appreciating LCU. The LCU reflects the ROW CAB, so a decreasing CAB at a decreasing rate means an increasing LCU exchange rate also at a decreasing rate. Once the ROW CAB finds its way back to zero, the LCU stops appreciating, but only after a hefty 30% appreciation, enough to destabilize any export-oriented economy[14].

[14] Future research will better calibrate the ROW economy to reflect greater economic reliance on exports as is often the case of emerging countries.

Figure 8 shows the impact of U.S. FAS on both the U.S. and ROW real GDP. U.S. GDP

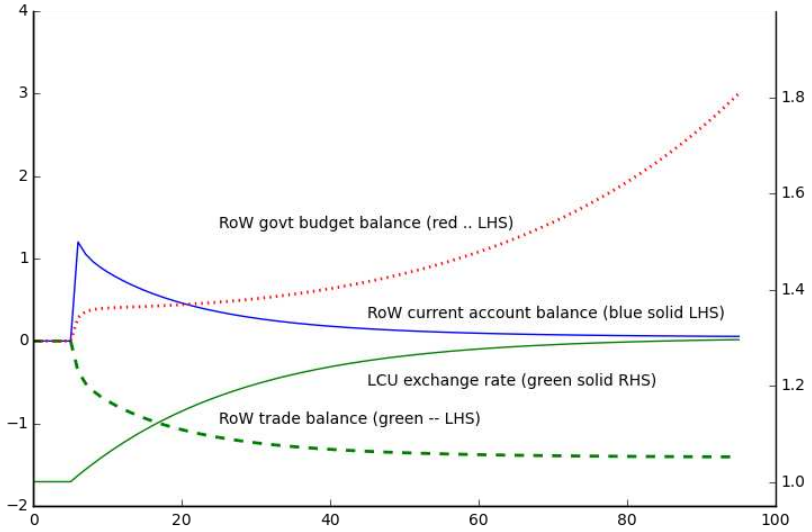


Figure 7: Impact of FAS on ROW External Vars, Flexible Exchange Rate

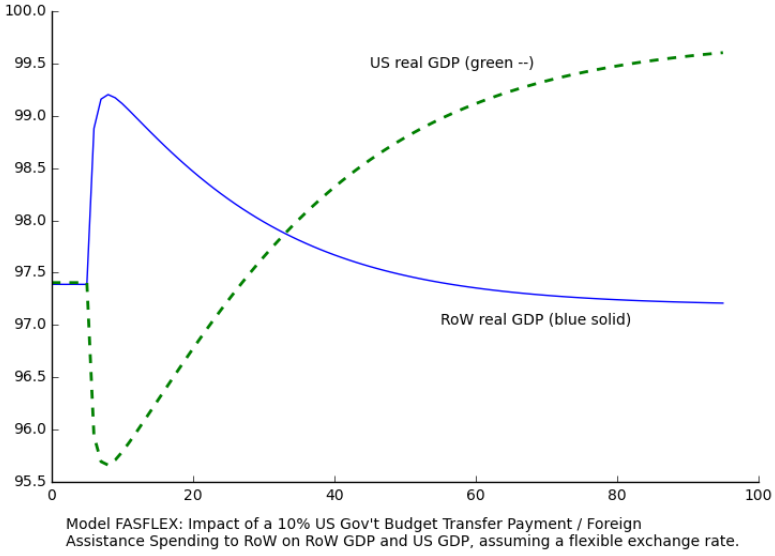


Figure 8: Impact of FAS on U.S. & ROW rGDP, Flexible Exchange Rate

decreases initially and directly, as U.S. government spending is partly diverted abroad without replacement. Then, U.S. GDP increases steadily until ROW CAB stabilizes, ending up at a quasi-steady state value about 2% higher than initially and 4% higher than the lowest point.

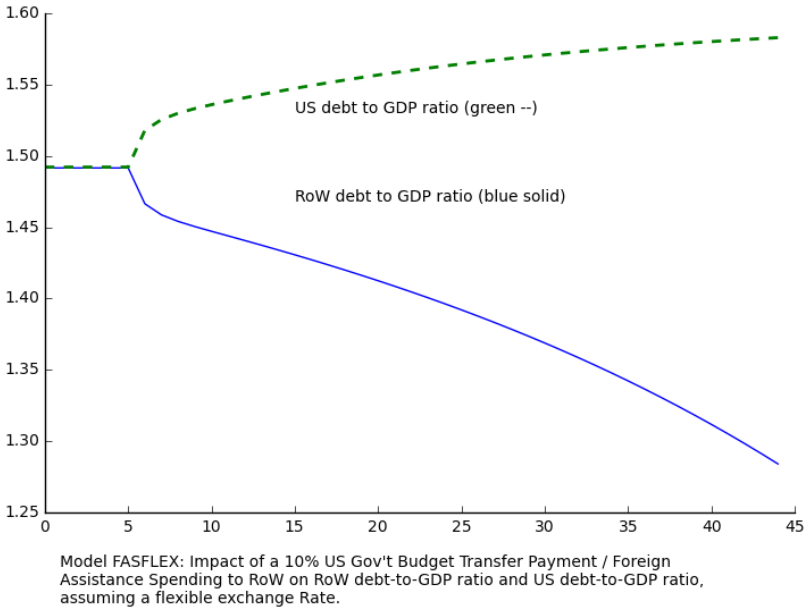


Figure 9: Impact of FAS on U.S. & ROW Debt-to-GDP, Flexible Exchange Rate

ROW GDP increases by the 2% that the U.S. initially decreases when U.S. FAS kicks in, but then settles back to around the exact same GDP as before when the quasi-steady state is reached once CAB reaches zero. Figure 9 shows the long-term impact of U.S. FAS. U.S. debt-to-GDP increases slightly initially and continues to increase, without settling at a new quasi-steady state. ROW debt-to-GDP decreases and continues to decrease. The non-mirroring behaviour of the U.S. and ROW debt-to-GDP is due to the LCU appreciation influencing how the ROW debt-to-GDP shows up on a USD graph.

1.72 Theoretical implications1

The resulting dynamics from a flexible exchange rate adjustment, as shown above, are similar to those seen if the ROW government reacted to the U.S. transfer payments by decreasing their government expenditures by a corresponding amount. ROW prices of imports (relative to exports) fall, increasing ROW real imports given constant ROW real exports. The ROW terms of trade continue to improve as the LCU appreciates further, until the ROW CAB finds its way back to zero and all changes in stock-flow variables revert to zero, too. Prices adjust, altering

trade flows, incomes, wealth target ratios, and so on until a quasi-steady state is reached, with a lower output than initially.

Compare these forced appreciations to the forced *depreciation* that would occur should the ROW experience a positive shock to its import propensity. A spontaneous rise in ROW imports would negatively impact ROW current account, trade, and government budget balances, causing net changes in the supply of ROW Treasury supplies, then equilibrated by a depreciated LCU exchange rate (or change in ROW reserves in a fixed exchange rate regime model).

1.8 Compensated Flexible Exchange Rate Closure

Let us, once again, assume that the U.S. increases its government spending by exactly the amount of the FAS. To set-up Model cFASFLEX (compensated Foreign Assistance Spending under a FLEXible exchange rate regime), I simply change the perturbation to include an augmentation of U.S. government spending ($G_{\$}; 16$) that is exactly equivalent to the amount diverted abroad (by simply changing $FAS = \gamma . G_{\$} = 0.1 * 16 = 1.6$) to get $G_{\$}^{a} = 16 + 1.6 = 17.6$) as before)

1.81 Practical implications

Figure 10 shows a similar story to Figure 7, except now the ROW government budget balance increases at an increasing rate, growing to yearly budget surplus nearly twice what it was in Model FASFLEX, where the same 10% of U.S. government spending is FAS but now U.S. government spending total increases by that 10%, so domestic U.S. government spending is unchanged.

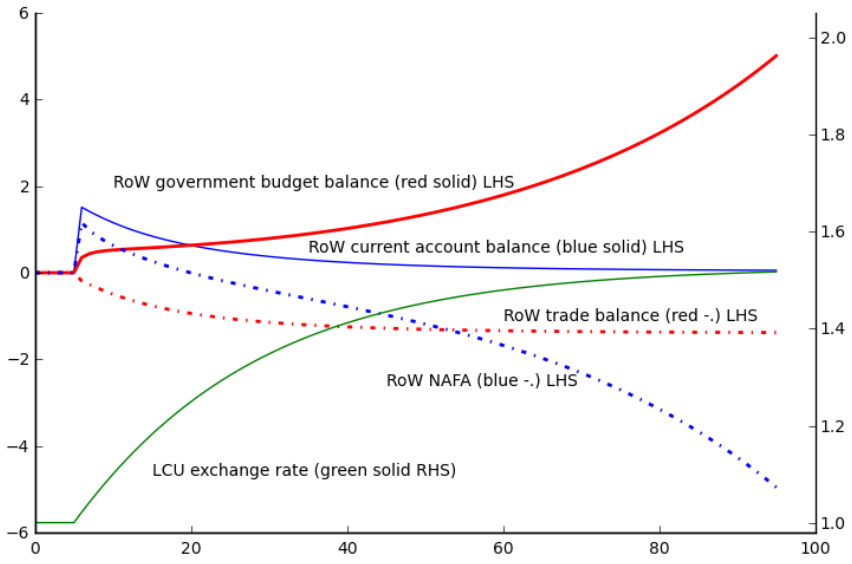
The ROW CAB has a positive shock that's slightly larger and of longer duration than before (due to the fact that no decreased U.S. government spending translates to no U.S. recession and no decrease in U.S. import volume/value). Without the compensation, U.S. import demand wanes which shrinks ROW export volume and adds negative pressure on the U.S. CAB.

So, the FAS' impact (a positive entry itself in the CAB as a transfer payment) is no longer pulled down by the decrease in U.S. imports/ROW exports. This can be seen by the larger trade deficit (negative trade balance), which is persistent in the quasi-steady state that emerges once changes in ROW CAB cease to be non-zero.

With U.S. imports no longer decreasing and the positive spike in ROW CAB larger, it is no surprise that the LCU exchange rate appreciates to the order of 50% instead of 30%. It also takes a bit longer than in the uncompensated model (Model FASFLEX).

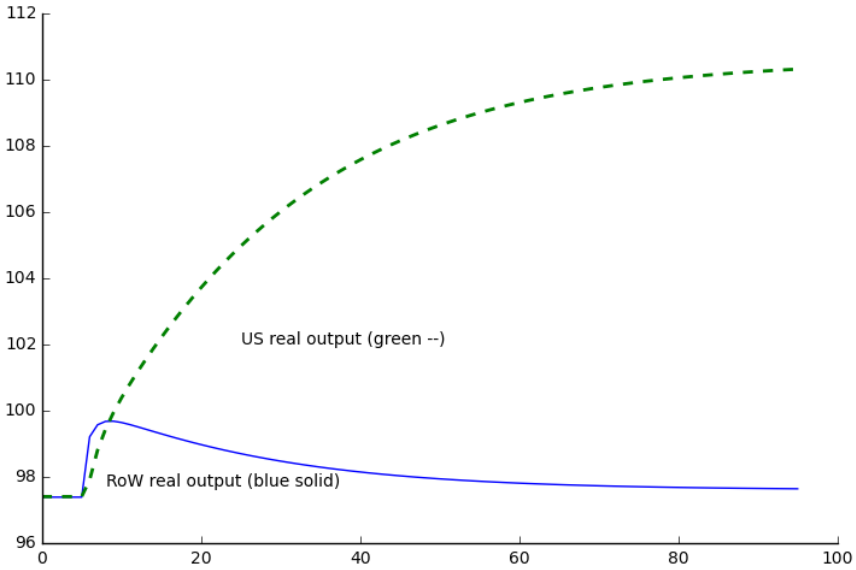
Figure 11 shows a very interesting dynamic: U.S. real GDP increases (this time by 10%) while ROW GDP increases and then goes back to its initial steady state value (when measured in USD). Now, U.S. real GDP increases because of the perturbation: in the compensated version of the simulations, any U.S. foreign assistance spending increase also increases total U.S. government spending. As U.S. government spending is a part of expenditure-side GDP accounting, GDP increases. The more interesting thing is the fact that the recipient/host countries (ROW) experience only a slight increase in real GDP before returning to their original steady state. In these simulations, U.S. aid spending abroad has no long-term positive impact on GDP—a finding that corroborates the lack of any empirical support for the aid-growth link.

Figure 12 shows long-term repercussions that are much milder for the U.S.: a debt-to-GDP ratio that increases but at a very mild and linear trend (only .1 over 50 periods; starts at 1.5 debt-to-GDP). As before, ROW debt-to-GDP decreases initially and continues to decrease over time.



Model CFASFLEX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on RoW budget balance, RoW trade balance, RoW current account balance, LCU exchange rate, assuming a flexible exchange rate.

Figure 10: Impact of CFAS on ROW External Vars, Flexible Exchange Rate



Model CFASFLEX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on RoW GDP and US GDP, assuming a flexible exchange rate.

Figure 11: Impact of CFAS on U.S. & ROW rGDP, Flexible Exchange Rate

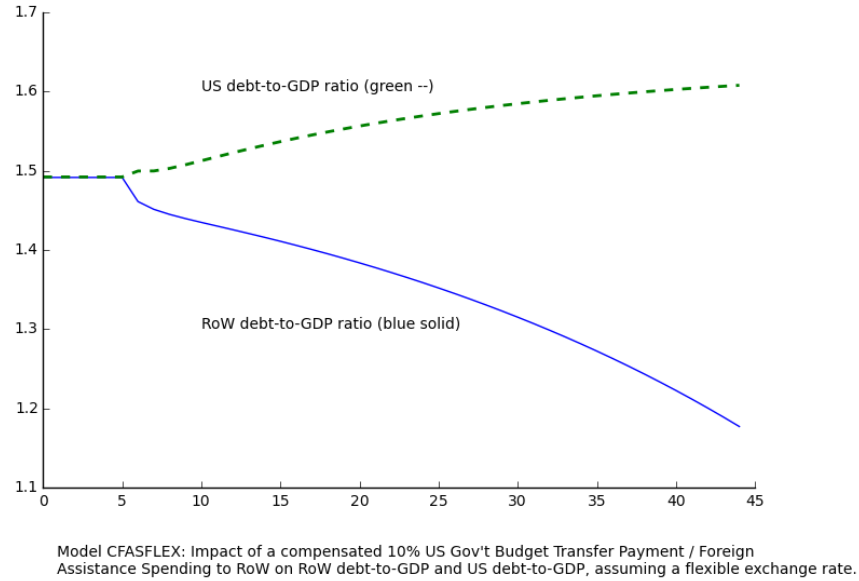


Figure 12: Impact of CFAS on U.S. & ROW Debt-to-GDP, Flexible Exchange Rate

1.9 Conclusions

U.S. FAS, whether compensated or not, is a public flow of funds from the U.S. to a foreign country and can have important financial and monetary repercussions. In the normal course of defensive actions, central banks wishing to keep their exchange rates managed neutralize any impact that the public flow injection (U.S. FAS) may have on the financial system (Godley & Lavoie, 2003). Central banks will expand their balance sheet to absorb or compensate for the public flow, either with repos or some other mechanism(Godley & Lavoie, 2003). Action is needed to keep both the exchange rate and the overnight lending rate (the base rate of any financial system) stable and within the targeted ranges (Godley & Lavoie, 2003).

I presented a two-block model that makes up the entire world. The model is set up with one block, the “U.S”., and another block, “ROW”. Goods are freely traded and financial assets (although imperfect substitutes) are freely exchanged. The ROW economies are overdraft monetary set-ups with central banks that use U.S. Treasuries as reserve assets. All models within

are rigorously defined with double entry, "watertight" accounting between countries and between stocks/flows. Income, consumption, and wealth, as well as government budget balances, trade balances, money supplies, and asset stocks are all endogenously determined. The models are solved dynamically over time.

The U.S. has been and continues to be the largest foreign aid provider. The impact of these transfer payments on foreign countries are felt in direct and indirect ways. The results from the dynamics modelled are most likely a lower bound, as there are numerous indirect benefits of receiving U.S. aid and integrating oneself with the U.S. global military security theatre. In fact, preliminary research suggests that U.S. aid and U.S. foreign military presence positively influences sovereign credit ratings and U.S. FDI, showing just two of the indirect impacts of U.S. foreign involvement.

1.91 Caveats

Readers may be wondering to themselves: why doesn't the U.S. just pay FAS in LCUs? Wouldn't that prevent this sequence of events from occurring? Well, not quite.

Most direct purchases and payments from the U.S. to aid recipients are made with local currency. The U.S. Agency for International Development has also created and maintained local currency trusts within many ROW countries—within or in coordination with the banks of ROW—which may be used to pay part or all USAID-related payments[15]. Further, these local currency trust have arrangements with their host country's ROW central banks to provide expedited U.S. treasuries and other settlement tools. The U.S. Department of Defense

[15] U.S. Agency for International Development Automated Directive Systems 627 details currency trusts and U.S. AID ADS 624 enumerates the rules on how to deal with host country-owned (U.S.-owned) foreign currency.

comptroller has policies requiring the U.S. to pay ROW (all foreign) contractors in LCU (local currency units) unless there is a particular circumstance that warrants USD substitution (U.S. AID (2014)).

However, even if most or all of U.S. FAS was denominated in LCU, there is still the matter of the indirect impact on asset demands. Regardless of denomination, ROW household wealth increases, so ROW NAFA increases, and ROW holdings of ROW and U.S. treasuries increase. One feature of all stock-flow consistent models is that governmental treasuries are sold only to cover ROW governmental budget deficits. As such, ROW treasuries supplied are exogenous, with the exchange rate determined both by the demand for ROW treasuries, the demand for U.S. treasuries, and the supply of U.S. treasuries.

The U.S. central bank is assumed to be largely passive, and so U.S. treasuries are likewise assumed exogenous. In this way, we can think of the exchange rate—which is both determined by, and determining of, many (simultaneous) equations — as the balance between the demand for U.S. treasuries and demand for ROW treasuries, *ceteris paribus*[16], particularly with regards to given supply levels of U.S. and ROW treasuries. Higher demand for U.S. and ROW treasuries by the ROW citizens will catalyse exchange rate pressures that will not be resolved on their own and can continue indefinitely if the ROW central bank does not intervene.

Normal operations by ROW's central bank result in the ROW central bank selling some of their ROW treasuries, to alleviate the renewed demand pressure for their own ROW government treasuries. They do this in the normal course of inflation targeting, as well as to

[16] None of the models within this paper corroborate this "*ceteris paribus"* clause, as U.S. foreign assistance spending will always result in an increase in the U.S. deficit, which, in turn, increases yearly U.S. treasury bill supply as the U.S. government borrows to cover its fiscal outlays not generated through tax revenue.

allow ROW households the freedom to allocate their wealth according to their Tobinesque asset demand. In order to nullify the upward pressures on the ROW exchange rate, the ROW central bank must enter the ROW government treasury market and act as a lender of last resort. Though no banking panic has ensued, ROW's central bank must meet the liquidity shortage posed by the renewed demand for ROW treasuries or face the consequence of a stronger exchange rate.

It is important to bear in mind that both the ROW central bank and households accumulate U.S. treasuries because of U.S. foreign assistance spending. Indeed, the models here corroborate that ROW households do accumulate more U.S. assets (ROW households increase their net accumulation of U.S. assets). Larger incomes and larger asset appetites result from receiving foreign assistance spending. ROW's central banks accumulate U.S. treasuries because it is preferable to holding cash on their balance sheets—and just as liquid.

So, ultimately, the denomination of U.S. FAS is of little import; it is the effect of wealth accumulation that destabilizes the equilibrium of the treasury's markets in both economies. While the positive demand shocks of ROW may not be sufficient to sizeably impact—individually—the U.S. Treasury bill market, I posit that the aggregated value of all countries' who receive U.S. foreign assistance spending is of economic significance.

1.911 Dollarization

Some countries choose to use the U.S. dollar as their domestic currency. This would alter the impact of the dynamics when receiving U.S. transfer payments. While the direct impact on foreign imports (increase) and net financial accumulation (also increase), the indirect impact that results from the central banks need to balance its supply and demand for its own financial assets will no longer be observed. Less money would be returned to the U.S., at least immediately.

Depending on how closely trade and financial markets are tied, the long-term impact could be of no substantial difference.

1.912 Infrastructure spill over

As stated in Section 4, infrastructure externality/spill-over effects are not the focus of this paper. As of yet, the degree of infrastructure accumulation abroad from foreign assistance spending receipts has yet to be empirically established. Aschauer (1989) looks at how, whether, and under what conditions public spending could be productive domestically in the U.S. Calderon (2015) perform a large cross-country analysis on the output elasticity of infrastructure input and find the elasticity to be statistically and economically significant (0.07-0.10). So, while there may be good reason to include infrastructure spill over effects, doing so would further complicate the model by adding yet another stock-flow process and all the variables that come with that. While capital accumulation is a vital part of economic development, this paper focuses on the monetary consequences of foreign assistance spending rather than the growth consequences, and so the exclusion of physical capital (and infrastructure) is permissible given the already extensive nature of the models.

1.913 Labor Endogeneity

The economies are assumed to not be at full employment. Since this paper is looking at the monetary consequences, the exogeneity and level of employment does not play a role. So long as ROW economies are not simultaneously and consistently at or near full employment, the results within should not significantly change due to the inclusion of an endogenous labor supply. Were economies to be coordinated in their full employment, U.S. transfer payments would still impact ROW import demand and asset demand behaviour.

The issue stems from the possibility that ROW labor supply is, in fact, both endogenous and at a level below full employment. Future research should endogenize the labor supply and start the ROW economy at a level of employment below that of the U.S., to better reflect a real-world starting scenario.

1.914 FDI & Crowding Out

U.S. transfer payments can, under the right circumstances, crowd out private investment in the host/recipient country. This possibility is low, due to the undeveloped and shallow financial markets that exist in most host/recipient countries.

A greater possibility is that U.S. transfer payments spur additional FDI, which does crowd out private domestic investment within the host/recipient country. Currently, the models are pure service economies, meaning that they use no capital/inventory and as such the need for FDI (investing or receiving) is non-existent. Including a more realistic business sector, with asset allocation demand functions similar to those of households, would allow for a more complicated analysis of U.S. transfer payments and their long-term impact on the host/recipient country. For the moment, inclusion of greater FDI flows inflates the existing impact and adds little to the overall analysis.

1.92 Concluding Remarks

Model FASFIX shows that the U.S. can feasibly and without penalty run a twin deficit situation perennially. Model cFASFIX doubles down on that lesson: the U.S. can easily control its high-powered money and interest rate, and not only that, *but* the U.S. can *also* run and exacerbate a twin deficit through deficit spending.

In addition, if the U.S. is the hegemon of the world, U.S. deficits are required to assure full employment in the ROW[17]. Otherwise, ROW governments are forced to run their own government deficits, drawing down reserves and hoping that they won't have to resort to central bank swaps or, in the worst-case scenario, IMF agreements. The U.S. twin deficit is the condition that allows for ROW full employment to exist alongside positive ROW government budget balances.

The other lesson is that U.S. transfer payments drive ROW to experience both trade and government budget surpluses, with no destabilization of the LCU money supply, the LCU exchange rate, or the ROW interest rate.

Consider the alternative—were the ROW to spend the U.S. transfer payments without intervention, the balance of payments deficit would either: (a) erode official reserves, (b) depress fiscal policy, (c) constrain monetary policy, (d) force central bank authorities to abandon their management of the LCU exchange rate target/band.

In the remainder of the paper, I showed that the main model could be adapted to alternative closures, namely a flexible exchange rate closure. In all models some form of quasi-stability emerged once changes in the current account balance revert to zero. When a foreign central bank decides to allow their exchange rates to adjust, the dynamics change greatly for ROW. ROW income increases only temporarily in Models FASFLEX and CFASFLEX (Figure 8 on p52 and Figure 11on p55). In the first model, where U.S. government spending stays constant but some is diverted abroad, ROW GDP initially by the direct injection amount (97.5, the initial steady-state rGDP, increases by 1.6 to 99.35, as 10% of U.S. government spending, which is 16,

[17] Thank you to Ramaa Vasudevan for this important point.

is 1.6) and then decreases within forty to fifty periods back to the initial value of 97.5. There are no long-term income gains for ROW when the exchange rate is allowed to adjust. Figure 11 shows the same picture, except that U.S. rGDP grows by nearly 12%! ROW rGDP increases by the same 1.6 as before to 99.35 and then returns to 97.5, its initial value, once the exchange rate reaches its new, higher, equilibrium value.

The results of Models CFASFIX and CFASFLEX are outer bounds for what impact U.S. FAS may have on the ROW economy. Most central banks are not strict in their exchange rate management policies, allowing for some float while targeting a band of values. ROW net accumulation of foreign assets can spike and then return to zero (in Models FASFIX and CFASFIX) or they can decrease at an increasing rate, never returning to a steady state (as in Models FASFLEX and CFASFLEX). Only in the least realistic model (that of FASFIX) does ROW rGDP increase and stay higher. In all other models, ROW rGDP increases only temporarily and then returns to its initial steady state value. It seems that U.S. FAS, due to the nature of the international monetary system, is U.S.-enriching while neutral to ROW income.

It is not to say that ROW does not benefit whatsoever: in all scenarios, ROW government budget balance increases, meaning that the yearly governmental deficit is lower. This makes sense, as U.S. FAS can easily be used to fund government projects, a situation known as "fungibility" in the foreign aid literature. If ROW central bank decides to tend more towards defending their fixed exchange rate, ROW international reserves increase, which can be useful up until a certain point. After a certain adequacy level, international reserves fail to be as much of a priority for developing and emerging countries. ROW trade balance always decreases by some small amount and finds a new quasi-stationary value, while U.S. trade balance always increases by the same amount.

U.S. rGDP increases in three of the four simulations and increases by nearly 12% in Model CFASFLEX. This increase in income is not without cost: U.S. debt-to-GDP is always increasing (in all four models) and U.S. government debt is also constantly increasing (meaning the government is constantly running a deficit). These last two things have been historically true for the U.S. in the past thirty years, largely the result of its status as the international lender of last resort and sole mint of the world international reserve currency and asset.

Future research and modelling concerning U.S. transfer payments will require increasing the complexity of business sectors both for the U.S. and ROW. Sectoral concerns are integral to explaining the effectiveness of different types of aid. U.S. transfer payments may also alleviate or exacerbate Minskyian/Kindleberger dynamics that other stock-flow consistent analyses find evidence for; therefore, integration with other, more sophisticated financial SFCA models is also warranted.

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Chapter 2: U.S. Politico-Military Integration: Good or Bad for Growth?

Within this paper, I test how U.S. military aid and economic aid separately and in conjunction impact economic growth. U.S. security integration is purported to enhance regional security, and therefore indirectly affecting economic growth. This study seeks to ascertain whether aid-dependence, hosting a U.S. military base, and signing security-related agreements with the U.S. positively correlate with recipient per-capita GDP growth. The aid-growth literature has only managed to show the statistical insignificance of aid on its impact on growth and economic development. U.S. aid is no exception. By disaggregating aid, a different picture emerges: military aid spent in conjunction with signed security agreements does increase economic growth, but only slightly. In general, there is a much larger negative impact on growth from signing military security-related treaties and hosting U.S. military bases, individually. Aid spent on infrastructure and productive investment projects, consistent with the literature, fails to show any statistically significant impact on economic growth. Over long periods of time, military aid and U.S. security integration negatively impact economic growth.

2.1 Introduction

What are the channels through which U.S. aid promotes lasting economic growth? Interest in this question stems from a rich history of nation-building and subsequent analysis of its effectiveness. While the literature on military aid and intervention constrains its analysis to places and years where U.S. military aid, economic aid, and military intervention occurred, I expand this line of inquiry to include situations where no military intervention occurred—despite the presence military-related security agreements, political-related security agreements, and the presence U.S. military bases. From here on, I use the term "politico-military integration" to express when countries: (1) receive U.S. economic aid, (2) receive U.S. military aid, and (3) are

integrated into the U.S. security apparatus through in-force security agreements and/or U.S. military bases.

Politico-military integration with the U.S. takes many forms, but for the purposes of this paper, I limit U.S. security integration to include the presence of at least one military-related security agreement. Politico-military integration is different than politico-economic integration, as the latter analyzes phenomenon such as taxation, tariffs, quotas, and spending policies in the context of their impact on economic development (Frey et al., n.d.). Spending policies of recipient/host countries are of little interest in the context of politico-military integration (due to the fact that tied aid creates spending obligations). Further, politico-economic integration is different from politico-military integration as politico-military integration encompasses concrete actions which tie the security and defenses of both countries together—in addition to enmeshing two (sometimes disparate) political systems for the purposes of joint policy making. Politico-economic integration also has elements of political enmeshing but focuses instead on the economic interdependence created as a result of joint policy.

In the limited literature addressing U.S. politico-military integration, U.S. troop deployment is often used as the best proxy for U.S. security integration (alongside the widespread use of a 100-troop cut-off). However, using a new dataset which accounts for all security-related agreements (including those which detail the barracking of U.S. troops and/or hosting of U.S. bases), I find that the type of security integration matters—even holding the number of U.S. military bases constant.

U.S. foreign aid spending started with the Marshall Plan and continues now; U.S. foreign aid has been and continues to be one of the largest aid flows globally (Tarnoff & Lawson, 2010). U.S. foreign aid peaked during the Marshall Plan period, then trended downward with

intermittent spikes caused by the Alliance for Progress[18] (1961) and the Camp David Middle East Peace Accords (1979) (Tarnoff & Lawson, 2010). 1997 marked the nadir of U.S. aid spending, representing near $18B (constant 2010 USD) or 29% of the peak of foreign aid committed during the Marshall Plan period.

The underlying motives of aid spending has changed significantly over the past 75 years: the glaring capital deficit in post-WWII Europe during the 1950s, technological gaps in the 1960s, the reaction to accusations of "aid for *in*equality", which led to "aid for equity" in the 1970s (Fei, 1979; Feng, 2011; Ranis, 1978), balance of payments support/stabilization concerns in the 1980s, and structural adjustments in the 1990s (Gunatilake et al., 2015).

Before the 1990s, Asia received the largest share of aid receipts in aggregate terms from donor nations, with Africa a close second. The 1990s saw a shift in the destination of aid, with Africa receiving most of the multilateral aid inflows (Gunatilake et al., 2015). Aid spending evolved in the 2000s to focus on technical assistance and conditionality lending, as donors and recipient nations learned the importance of institutions and how they interact with aid's effectiveness (e.g., Asian Financial Crisis) (Gunatilake et al., 2015).

After the events of 9/11, U.S. security concerns started to dominate U.S. aid spending. A discussion of post-9/11 U.S. security-aid entanglements can be found in *"Coalition of the Bribed and Bullied?" U.S. Economic Linkage and the Iraq War Coalition*, wherein the authors note—among other things—that many of the countries in the U.S.'s coalition of the willing (COTW)

[18] Essentially, a Marshall Plan for Latin America, as a bulwark against creeping communist influence.

were, historically, large recipients of U.S. aid (Newnham, 1995). Anecdotal evidence[19][20] also points to the use of U.S. aid for political purposes (Hooker, 1995; Newnham, 2008). The most salient example of this would be the failed U.S. attempt to gain access to Turkey in its 2003 invasion of Iraq; the U.S. wanted to force Saddam into a two-front war and offered Turkey as much as $24 billion in aid (Winrow 2006; 200). Turkey's initial acceptance and subsequent congressional veto—and rejection of the $24 billion aid package—negatively impacted the Turkish economy[21].

In general, U.S. aid's focus has pivoted to more military and security related concerns, especially in the Middle East and North Africa (MENA) region in the recent decades.

In this paper, I expand upon the period analyzed in previous analyses of U.S. politico-military integration to include the post-9/11 period, a period of rapid expansion in both U.S. military aid and U.S. security integration activities. I include two new databases: one which exhaustively documents all acknowledged or unacknowledged U.S. military bases and another which documents and classifies every security-related agreement that the U.S. has ever signed.

Anecdotally, it seems, U.S. aid allocation and effectiveness is conditional to the security salience and foreign policy goals of the U.S. State Department and Department of Defense. The preliminary findings corroborate those findings: U.S. military aid and U.S. security integration

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[19] For instance, Yemen—3 days after voting against the first Gulf War in 1991—lost its *entire* U.S. aid budget after being forewarned that "that would be the most expensive 'no' vote you ever cast" (Anderson et al. 2003:1)

[20] The exceptions to this rule include Guinea and Cameroon—former French colonies and members of the UNSC in early 2003—explicitly agreed to the French anti-war position at the annual summit of French and African states in Feb, 2003 (Howorth, 2006)

[21] There was a 25% fall in the Turkish stock market and significant financial outflows as international investors questioned the "strategic premium" of Turkish debt, in that the U.S. would keep Turkey financially solvent so long as Turkey remained a key U.S. strategic partner. (Thomas, 2003; Newham, 2008)

are bad for growth, in the long-run. When interacted, the coefficient estimate for the interaction term is positive, indicating that U.S. military aid is nonlinear in its impact on aid, conditional on the degree of U.S. security integration. However, the coefficient estimate on the interaction term is quite small, suggesting that the overall growth impact is usually negative.

2.2 Literature Review

Foreign aid programs were launched in the 1950s with a broad mandate to alleviate poverty and stimulate economic growth (Boone, 1996). Foreign aid increased during the 1960s, 1970s, and 1980s, with aid spending increasing yearly until its peak in 1991 when aggregate non-military donor aid approximated $50 billion (over 8% of the 1981-90 average of *all* recipient countries' GNP) (Boone, 1996).

Maizels & Nissanke (1984) are some of the first to model "recipient need", explaining multilateral aid by recipient nation characteristics, but fail to do so for bilateral aid flows. Their findings are still relevant, showing that multilateral aid flows in the 1970s were generally driven by recipients' needs up until the 1980s where aid started more so to reflect donors' strategic interests (Maizels & Nissanke, 1984). This trend accelerates to this day.

Lumnsdaine (1993) uses simple correlates to investigate some of the most important determinants of the direction of aid: colonial history, the democratic status of recipient nations, income (Alesina & Dollar, 2000). Consensus in the aid literature is as follows: income levels, colonial ties, ex-ante trade flows, strategic interests, and institutional quality determine and influence aid flows. But there is little empirical support to rank or quantify the relative importance of these five categorical explanations in their impact on aid flows (Alesina & Dollar, 2000).

A methodological weakness of the early literature stems from a "chicken and the egg" problem: is it aid that disables economic growth or is it that countries with historically low

economic growth receive more aid? This problem still exists and there are a few promising ways to tackle it. The lack of a definitive answer in the aid-endogeneity question may be due to the exclusion of important security variables in the economics literature, and important economic variables in political science / international affairs literature. This research aims to bridge that gap.

When discussing aid, there are a few different types/ways to categorize it. Aid can be bilateral or multilateral and can be as broadly categorized as economic aid and military aid. Economic aid can be further disaggregated into U.S. foreign assistance, Peace and Security assistance, Humanitarian Assistance, Health, Environment, Education, Social Services, Economic Growth, Democracy, Human Rights, and Governance, and "Cross-Sectoral" aid. There are special aid programs like the "Aid for Trade" (AfT) program, a program to offset free trade agreements (e.g., elimination of tariffs). Military aid can be disaggregated into Foreign Military Financing, International Military Education and Training, and Peacekeeping operations. Foreign military financing is the largest of the three, providing grant assistance for "key friends and allies" to acquire "U.S. defense articles, services, and training which promotes U.S. national security by contributing to regional stability; strengthening military support for democratically-elected governments; and containing transnational threats, including terrorism…" (US DOD & US DOS, 2019).

U.S. aid is primarily bilateral and conducted through the United States Agency for International Aid (USAID). U.S. economic aid to Africa is focused on education and health sectors (Wang & Ozanne, 2010; Amusa, Monkam, & Viegi, 2016). U.S. economic aid to South Asia focuses on economic support and global health programs, alongside migration and refugee assistance and "Food for Peace" (*Security Aid Dashboard | Security Assistance Monitor*, n.d.). In

addition, U.S. military aid in South Asia is focused on Afghanistan Security Forces and Coalition Support Funds, as well as International Narcotics Control, Counter-Drug assistance, and Foreign Military financing. U.S. military aid to East Asia is primarily used for foreign military financing, non-proliferation, anti-terrorism, and Indo-Pacific maritime security initiative (e.g., policing the South China Sea). U.S. *economic aid* in the Middle East is focused on economic support and development, migration and refugee assistance, and "Food for Peace" while U.S. *military aid* to the Middle East is primarily foreign military financing and counter-Islamic state funding, alongside the Iraq Train and Equip Fund and the Israel Cooperative Programs Fund. (Security Assistance Monitor, 2020)

The literature regarding the impact of foreign aid on growth shows no correlation positive or negative—a surprising result as foreign aid is *designed* to further economic development.

2.21 Micro-Macro paradox

The micro-macro paradox refers to the conflicting empirical results when comparing the positive results from microeconomic data evaluating aid-financed projects and inconclusive results from macroeconomic aid-growth regression specifications. (Mosley, 1986) posits three reasons for the micro-macro paradox: (i) data inaccuracies, (ii) biases in project data reporting, and (iii) macroeconomic effects outside of the project-based rate of return formulae. As my analysis regarding aid's indirect impact on growth through security, the third explanation is relevant. While direct effects are the multiplier of the direct injection or economic consequence of the project, the indirect effects take place on both the public and private sector. (Mosley, 1986) is one of the first to explain these public sector indirect effects: how, as governments receive aid, they may change their existing spending patterns, a problem of "fungibility" of aid receipt. Private sector spending is indirectly impacted as well through relative price changes.

Aggregating the rate of return results from microeconomic projects fails to account for the indirect effects on the public or private sector of the aid-receiving country.

Looking at 131 cross-country regression analyses over the last 30 years of the 20th century, (Hansen & Tarp, 2000a) conclude that there are only a few consistent patterns with regards to aid: (i) aid increases investment, (ii) aid increases savings, and (iii) aid has a positive impact on growth (but only in capital-accumulation driven growth environments). Looking over three generation of aid literature, (Hansen & Tarp, 2000a) argue that the micro-macro paradox with respect to aid and growth is non-existent, as the number of analyses showing positive relations clearly outnumber the negative studies—and that the negative studies happened to be highly influential.

In one of those influential papers—though in the meta-analysis category--(Doucouliagos & Paldam, 2008) look at 68 papers with comparable estimates of the effect of aid on growth and conclude that a substantial amount of the variation in aid's impact on growth can be attributed to data choices, specification differences, publication outlet, and institutional affiliation. They conclude that the only "real" differences between studies are regional in nature: Asia's aid-growth effect is the strongest[22]. Lastly, they conclude that further exploration is needed as the meta-analysis indicates that indirect effects are confounding factors in using aid as a treatment given to poor countries to generate development (Doucouliagos & Paldam, 2008).

Building off Doucouliagos & Paldam (2008), Jemaneh Mekasha & Tarp (2013) use the same 68 studies, also concluding that there is no evidence of any significant aid-growth

[22] In general, countries within the tropics are some of the worst-performing when it comes to aid effectiveness. However, when the timing of aid effects is better accounted for, (Clemens et al., 2012) find that Sub-Saharan Africa and Middle East/Northern Africa grew "substantially more than they otherwise would have because they received more aid than average". Once again, the literature outlines regional effects but fails to consistently show *which* regional effect is significant.

relationship. In addition, their results with regards to model selection show that random effects are preferred; and their statistical and graphical analysis shows a heterogeneity in the estimates of the "true effect" of aid on growth when looking at all 68 studies. Further, fixed effects have a "effect homogeneity assumption"[23], which is unrealistic when looking at any type of aid. As my panel is collapsed into a cross-section of lagged averages and sums, I sidestep this issue.

Minoiu & Reddy (2010a) follow Mosley (1986), arguing that attempts to capture even the direct impact of aid necessitate a sufficiently long time-horizon to account for all of the institutional, infrastructural, and multiplier impacts. I approach the regressions within from this perspective and use similar deep lags as Minoiu & Reddy (2010b) do.

(Mosley, 1986) conclude that sectoral allocation within countries is another way in which aid effectiveness could be maximized, as certain sectors historically absorb aid better than others (whether due to intra-sectoral differences in corruption and institutional quality, or due to the specific sectoral needs of different countries and regions—health aid is better spent in countries with lower infant mortality rates. In a similar way, I argue that disaggregating aid into military and economic aid is necessary to analyze aid effectiveness.

How does U.S. politico-military integration (U.S. security integration) impact aid effectiveness? The purpose is to empirically study how helpful or harmful U.S. security integration is to host/recipient countries during peaceful times as well as when conflict occurs. Earlier studies provide evidence that U.S. military aid does improve the effectiveness of economic aid and its impact on growth, but only during times of conflict (Creasey et al., 2015). In the re-building phase (commonly assumed in the literature to be 1 to 7 years), military aid

[23] Effect homogeneity in measure "occurs whenever the effect in one population (or subgroup) is equal to the effect in another population (or subgroup) in terms of a particular effect measure" (Huitfeldt et al., 2019)

seems to hinder economic aid's impact on growth (Paul Collier & Hoeffler, 2002; Creasey et al., 2015) . However, this analysis looks only to U.S. military interventions, leaving out instances where the U.S. security apparatus has integrated the recipient country willingly and without conflict/regime change – i.e., politico-military integration.

It is always possible that U.S. aid is showing simple correlates, since U.S. aid could be primarily serving those places where the tradeable sector is already large or shows significant growth potential. Endogeneity also interferes when looking at conflict's impact on aid, as certain studies show that the amount of aid is determined by the degree and extent of conflict within the country and even the country's regional neighbors (Flynn, 2020).

The purpose of this study is to investigate how the share of GDP funded by U.S. military and economic aid, U.S. security agreements, and U.S. military bases impact separately and together on recipient's per-capita GDP growth rate. I use deep lags, averages, and summations in order to look at the long-term impact and avoid any concerns about endogeneity. As a result, my panel dataset is collapsed into a cross-section where all right-hand side variables are either averages or sums during three different periods (1970-2010, 1980-2010, and 1980-2000). The left-hand side variable is always per-capita GDP growth, averaged over 2010-2019.

2.22 Foreign Aid & Growth

The impact of aid on economic growth would work primarily through multiplier effects. As aid flows are received by governments, by definition, it follows that there is an enlargement of the government sector. So long as crowding out and corruption are sufficiently mitigated, larger government spending would have a positive impact on development and economic growth in general. Increased aid increases government spending, thus increasing aggregate demand and GDP. U.S. military bases & trainees and U.S. military deployment should have a similar impact.

The aid effectiveness literature can be broadly categorized into four groups. For the sake of brevity, I will cover them only briefly. The first group argues that aid, in fact, leads to economic growth (Hansen & Tarp, 2000b). There are debates within this group, as is expected. Of note, C. J. C. Dalgaard et al. (2004) conjecture that good policies and economic aid are substitutes, so aid effectiveness (high when bad policies are in-place) decreases as policies improve.

The second group argues that there are necessary key features with which aid may effectively stimulate growth. The key features vary, from good policies (Burnside & Dollar, 2000a) to climate (Chauvet & Guillaumont, 2004; C. J. C. Dalgaard et al., 2004).

Group three argues that aid is counterproductive. Like debt-relief and investment catalysts, aid promises lots but delivers little. This group blames policymakers' lack of considering basic economic incentives when developing and implementing aid programs (Friedman, 1995).

The last group argues that aid does work, conditional on the goals set and benchmarks used for success. This group argues that academics' and policymakers' focus on GDP per-capita is myopic and inadequate, as aid is multifaceted in its goals: poverty reduction, hunger reduction, advances in healthcare and longevity, greater educational/entrepreneurial opportunities(Kenny, 2008). When aid flows coincide with effective programs, outcomes are positive[24]

In light of the historical attempts to identify a definitive aid-growth relation, one clear thing emerges: indirect channels through which aid impacts growth exist and may very well be the root cause of the inconsistency of aid's impact on development.

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[24] See Greenhalgh, Kristjansson, and Robinson (2007) and Bailey et al (2007) for examples of aid's effectiveness on growth when in conjunction with school lunch programs for disadvantaged students and circumcision efforts in Africa (significantly reducing individual risk of HIV acquisition).

When aid's lack of impact can be traced to higher relative prices of non-tradeables, a classic "transfer problem" arises. The "transfer problem" literature focuses on the exchange rate pressures and capital endogeneity. Historically, aid receipt impacts tradeable prices. However, aid could also impact growth through non-tradeable services. Using simple two-good model, McKinnon (1976) expand upon the existing paradigm to show that aid typically also impacts non-tradable services, as they typically have unfulfilled demand—a *spending effect*. Thus, increased aid increases construction, education, and health care spending[25]. There is a consequent increase in prices that leads to an appreciation of the foreign exchange rate, hurting their terms of trade, what is termed a *resource curse* effect[26]. This *resource curse* effect is also known as "Dutch disease", when the impact of aid inflows leads to exchange rate overvaluation and a consequent adverse impact on growth (Rajan & Subramanian, 2011). There could be a version of the *Transfer paradox* operating such that foreign aid is donor-enriching and recipient immiserating due to terms-of-trade effects associated with aid flows (Martínez-Zarzoso et al., 2014)

Despite these plausible narratives, there is scant evidence that aid positively impacts economic growth (as measured by percentage changes in real per-capita GDP). McPherson and Rakowski (2001) use a multi-equation system specification and find that aid impacts GDP growth, but only indirectly through investment. When interaction effects of the choices of macroeconomic variables are introduced, Burnside and Dollar (2000) do find that aid is beneficial but only when countries adopt appropriate, stable (and overlapping) policies that

[25] These short-run impacts may be mitigated through increased productivity of foreign workers (through education and learning-by-doing externalities from aid spending). The medium-run impact cannot be determined by theory alone, due to so many moving parts (Dudley et al., (1976)).

[26] With proper financing (from exports, U.S. aid, or central bank swap agreements), foreign central banks can and do take sufficient action such that any spending effect is rendered non-existent.

promote good institutions. But it is not the case that aid receipt is associated with better macroeconomic policies (Alesina & Dollar, 2000).

A variety of factors have been ascribed a role in explaining the lack of impact of aid impact on growth. These include capital market imperfections, lack of investment opportunities, political regime and institutional constraints.

Griffin (1969) shows that foreign capital injections (more generally) increase growth when domestic savings are moderately sensitive to capital imports. Early inquiries followed this line, to point to capital market imperfections as the explanation for aid's lack of impact on growth and development (Chatterjee & Turnovsky, 2004). The argument is that profitable investment projects might go unfunded in the recipient countries due to capital market imperfections.

It has also been argued that lack of domestic savings is a consequence (not a cause) of low-yielding investment opportunities. In such a context, where domestic savers (mostly domestic elite) face a dearth of investment opportunity, increased aid inflow would merely enrich the political elite. In this way, income inequality may also influence aid's impact on growth.

Historically, critics of aid allocations also argue that political regime type is a fundamental ingredient in achieving successful economic development (Shleifer, 2009), and would thus have a bearing on the impact of aid. Collier and Dollar's (1998) show that the level of poverty and quality of economic institutions are prime determinants in the maximization problem of poverty reduction given a constant amount of aid. (Alesina & Dollar, 2000). Countries that receive significant amounts of aid also tend to participate in unproductive, consumer spending, and therefore undercut any potential benefits of foreign aid receipt (Burnside & Dollar, 2000a).

Alesina and Dollar (2000) also point to institutional quality, inefficiencies, and technological shortfalls as important obstacles to the beneficial impact of aid. On the donors' side, the choice of recipients and allocations based on political and strategic concerns rather than variables that influence the effectiveness of aid, also mutes beneficial economic impact of aid (Alesina & Dollar, 2000). The aid literature in the 1970s concluded that foreign aid crowded out private saving, led to increased public consumption, and failed to deliver any significant macroeconomic policy/growth improvement (Alesina & Dollar, 2000).

It bears mentioning that there is the possibility that military aid leads to increases in recipient government military expenditures, which would then increase growth. Some literature is in support of this (Langlotz & Potrafke, 2019). Langlotz & Potrafke (2019) find that conflict-prone and aid -dependent countries[27] do show increases in military expenditures[28] as aid receipt increases. Government spending and the size of recipients' military spending are included in robustness checks and do not alter the results significantly.

2.23 Security Integration

Despite the universality of sizeable military budgets, little evidence exists to show the positive impact of military spending on economic growth. And while aid inflows positively correlate with military spending, this may be a by-product of economic development, of growing

[27] Aid-dependent is measured by ODA Net Total disbursements of all DAC donors as a % of recipient general government final consumption expenditure and conflict-prone means interstate or domestic conflict dummy variables

[28] Military expenditures do also appear influenced by recipient government political structure, with presidential systems spending more on defense than parliamentary systems. When majority rule and presidential systems co-exist, however, military expenditures decrease (Albalate et al., 2012)

government budgets, in general. Here too, the literature is divided, with some studies finding a negative impact and others a positive impact.

Aizenman & Glick (2003) evaluate the non-linear interactions between military expenditure, corruption, conflict, and other relevant control factors, finding that high levels of military spending, everything else equal, are associated with lower growth, but—in the presence of conflict—military expenditure positively impacts growth. They use a proxy of external threat by counting the number of wars and adversaries against whom each nation has been in conflict with, or the number of years a country was at war with each of its adversaries, summed over the set of adversaries. They compute this from militarized interstate dispute (MIDB) data collected by the Correlates of War Project (COW) (Aizenman & Glick, 2003).

Foreign bases have been allowed by governments for a variety of reasons: the result of an armed occupation and regime change ("nation-building"), for certain compensation packages, in exchange for political concessions (such as when Portugal granted U.S. basing access in exchange for a promise from the U.S. to stop supporting liberation movements in Portugal's African colonies). Oftentimes, U.S. basing arrangements contain some negotiated sovereignty rights (types of activities the base can be used for, criminal jurisdiction that apply to foreign troops stationed on the base) and differ with respect to their duration and, even, whether they are of limited duration at all. Some are highly informal, like those with the United Kingdom. Some grant U.S. access for an indefinite amount of time while others must be renewed periodically. (Cooley & Nexon, 2007). All of these agreements are included in the RAND security-related agreement database used within.

2.231 Positive impact of U.S. security integration

U.S. foreign troop deployment and overseas basing makes significant contributions to regional security and stability, and as a result nations with U.S. troops enjoy greater trade with the U.S. & greater economic growth in general (Bove et al., 2014; Heo & Ye, 2019a; Jones & Kane, 2012). Biglaiser & DeRouen (2007) also find that U.S. FDI is influenced by U.S. security relations.

Braithwaite & Kucik (2017) find that U.S. troops deployed post-Cold War, positively impacted the stability as well as the political and legal institutions of the base-host nation. Kane, (2012) look to a variety of World Bank social development indicators and found that each one of them improved more in countries with U.S. troop presence when compared to those with zero U.S. troop presence.

Despite its magnitude and omnipresence, the literature is, to my knowledge, does not address inclusion or discussion of U.S. security-related agreements when discussing aid's impact on growth. Many of these security-related agreements are tied to foreign military financing, the main source of U.S. military aid abroad. Foreign military financing is used to purchase U.S. arms and U.S. training for those arms and systems. U.S. arms exports are a significant fraction of U.S. goods exports ($37 B total U.S. arms sales in 2017 of the $2.4 T U.S. goods exports in 2017) (Security Assistance Monitor, 2020).

2.232 Negative impact of U.S. security integration

The evidence of a negative impact of U.S. security integration comes in the form of anecdotal and macroeconomic evidence(Calder, 2010; Vine, 2015; Yeo, 2011)

Vine (2015), more journalistic/anecdotal analysis concludes that "there is no evidence to say conclusively that overseas bases make the United States or the world safer in a military

sense, [but] we have seen abundant evidence that bases abroad are harming the safety, security, and well-being of millions of people". This account looks at the impact of bases not only on the host nation's local residents, but also on the families and well-being of the base service members and employed civilians and finds the net impact of U.S. basing to be decidedly negative. In addition, Vine (2015) points to the general opposition that U.S. overseas base presence creates, including some rare but extremely violent cases (the attack on marines in Lebanon in 1983 and on the *USS Cole* in Yemen in 2000) and also draws on historical analyses (for instance how the U.S. occupation of Afghanistan was a major recruitment tool for al-Qaeda and a major motivation for Osama Bin Ladin's terrorist attack on New York).

Macro-evidence is rare but the most compelling is that country citizens' willingness to fight for their country decreases once U.S. troop deployment reaches a certain threshold (100 or 500 troops) (Jakobsen & Jakobsen, 2019). This was first pointed out by Machain & Morgan, (2013), who showed that the 5-year lagged U.S. troop deployment levels are consistently negatively associated with the military personnel of the host state. In addition, Machain & Morgan, (2013) find no decrease in the chance of either initiating or being the recipient of a militarized interstate dispute (MID) when U.S. troops presence in that country increases.

U.S. aid and leadership were central in post-WWII reconstruction. The required economic conditions for inclusion to new supra-national governmental organizations (IMF, GATT, World Bank), which were also led or funded by the U.S., essentially created a monopoly on inter-governmental lending. This "steady tightening of political, military, and economic control" led to a subordination of the "assistance aspects increasingly to U.S. military strategy"(Zevin & Hudson, 1975).

2.3 Analytical Framework

This study mainly differs from earlier research in that it: (1) looks at simultaneous and individual instances of U.S. economic aid and military aid disbursements and (2) explicitly includes U.S. security integration actions (using the presence of U.S. bases and/or U.S. security-related treaties).

Other papers modify the neoclassical growth model to analyze the impact of aid (Rajan & Subramanian, 2008), but fail to differentiate between different types of aid. The first attempts at differentiation were with regards to multilateral aid, but provide good guidance for the analysis within (Minoiu & Reddy, 2010b). This paper is an extension on that work. This paper differs from Minoiu & Reddy (2010) because I am interested in countries with established and lasting politico-military relations with the U.S. In this way, this paper also borrows from Creasey et al. (2015), who look at nation-building and ascertain its effectiveness.

My analysis differs from nation building (which requires (1) economic aid, (2) military aid, and (3) conflict or post-conflict), as I am identifying how U.S. politico-military integration (which requires (1) economic aid, (2) military aid, (3) U.S. security integration), where U.S. security integration can be the establishment of U.S. base or the presence of a signed, in-force military-related security agreement. Thus, the study goes beyond the narrower focus on security integration in the literature. Adopting a broader interpretation of U.S. military relations is necessary for two reasons: (1) U.S. foreign military actions and influence are not limited to those years and places in which explicit conflict occurs and (2) testing how different types of aid (military and economic) impact growth requires both control variables and interaction terms, as aid effectiveness depends not only on institutional backgrounds but is also contextual to degree and type of U.S. military relationship. This paper aims to bridge the gap between the aid-growth literature and the nation-building literature. Lack of consistent significant evidence within both

literatures shows that something is missing; I argue that the missing thing is this broader interpretation of U.S. military relations to include non-violent, non-conflict U.S. integration phenomenon.

2.4 Model Selection

The major focus of this study is the indirect effect of disaggregated U.S. aid on economic growth through their impact on security. U.S. military aid and security integration alleviate recipients' governmental budget concerns. Typically, military spending takes away funds that would have otherwise been invested, therefore diminishing economic growth and its determinants (namely, human capital through inadequate education spending).

The literature specific to the simultaneous disbursement of military and economic aid is limited, despite the numerous nation-building attempts made by the U.S. and others in the 20th century and presently. This joint provisioning of military and economic aid may increase the effectiveness of aid in conflict and post-conflict states through stimulating private investment through security-related reassurances and "U.S. backstopping" (Creasey et al., 2015). Alternatively, the provisioning of such large amounts of aid can create dependency on donors and/or crowd out domestic private investors, negatively impacting growth.

The aid-growth literature is plagued by identification concerns (mostly endogeneity). The other main identification concern (heterogeneity) reflects that likelihood that aid violates the slope homogeneity assumption on theoretical grounds; the effect of aid on growth has been shown to be a function of other factors. This strand of research can be called the "conditional" strand, where the conditionality of aid's effectiveness on growth rates is not dependent on 'good' policy, instead arguing for decreasing returns to aid and a high sensitivity to estimator choice and control variables chosen. Burnside & Dollar (2000b) show that developing country growth rates

depend on “initial income, institutional and policy constraints, aid, and aid interacted with distortions”..

As a counterpoint, another strand of literature argues that the lack of any significant positive effect of aid is due to misspecification. To correct this, authors introduce a squared aid variable, as they argue aid has diminishing returns. Other studies introduce interaction terms are used to identify the partial effect of aid on growth as it is a function and not a constant (Hansen & Tarp, 2001).

C. J. Dalgaard et al. (2004) test aid-squared as well as aid-squared interacted with measure of policies (CPIA) and fail to find convincing evidence of any interaction effect. However, C. J. C. Dalgaard et al. (2004) did find that, for the last three decades of the 21st century, there has been a persistent and negative interaction between aid and being located in the tropics. Geographic/climatic characteristics certainly shape the rate at which convergence should occur, but such a persistent and negative impact—the authors posit—cannot be explained by geography or climate alone. After exhausting every iteration of the reduced-form equations they derive, C. J. C. Dalgaard et al. (2004) conclude that “Disentangling the channels through which aid matters for productivity seems to be a crucial research topic at this stage”..

After controlling for investment and human capital, Hansen & Tarp (2001) find no significant impact of aid on growth. However, aid does significantly impact investment, and therefore indirectly impacts growth (Hansen & Tarp, 2000a; Stiglitz & Obstfeld, 2009).

2.41 Endogeneity concerns

The typical endogeneity concern within the aid-growth literature relates to developmental or economic aid: the amount of aid received may be influenced by the present or future growth rates (Minoiu & Reddy, 2010b). This type of bi-directional causation would violate the Gauss-

Markov principles. This concern about bi-directional causation stems from both concerns about economic aid and growth as well as the relation between economic aid and income levels, as lower-income countries may be perceived to be needier and receive greater aid as a result. I argue that the same is not true with regards to U.S. military aid and security integration. Nonetheless, as a robustness check, I will include the initial income level of military aid+-recipients as a control variable[29] to deal with the possible endogeneity between even military aid and economic growth.

Attempts at addressing the endogeneity between aid and growth fall into three categories: (i) instrumental variable (IV) analysis, (ii) lagging aid, and (iii) examining the effect of aid on economic growth over longer periods of time (Minoiu & Reddy, 2010a).

2.411 Instrumental Variables (IVs)

Instruments are typically geopolitical factors: lagged aid, lagged population, squared aid, terms of trade changes, agricultural output fluctuations, export demand shifts (Rajan & Subramanian, 2008; Reddy et al., 2006). Instrumenting for aid's endogeneity with respect to growth[30] originates from the seminal work of Boone (1996), who looks at non-military aid flows to 96 countries and instruments aid with political/economic regime type (egalitarian, elitist, and laissez-faire).

Boone (1996) shifts the dominant approach to solving the aid-growth puzzle, after instrumenting for aid to find that political regime type is the best predictor for the impact of

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[29] As was also done in (Reddy et al., 2006).

[30] The relationship between military aid and military expenditures is also frequently tested and shown to be endogenous, resulting in IV strategies using civil wars, international wars, external threats, neighbors' military spending, logged population, internal threats, democratic dummies, logged GDP per capita, as well as a few interaction IVs: donor origin and recipient language (important for the UK), donor origin and recipient religion (also important for UK aid), and donor origin and political similarity (important for the U.S.).

foreign aid. His main finding is that aid has the largest impact on governmental size, small positive impacts on investment and growth, and no measurable impact on poverty as measured by human development indicator improvements. Boone (1996) uses three instruments: (1) the logarithmic transformation of population, (2) a measure of geostrategic interests by key donors (Friends of U.S., Friends of OPEC, or Friends of France), and (3) using twice-lagged, 5-year averaged aid data.

2.412"Geostrategic Controls

Coding for alignment of strategic or geopolitical interest with donors has been coined the "friends of the donors" variables by Easterly (2003) as a result of Boone (1996)'s success and its pivoting of the aid-growth literature to novel ways of addressing endogeneity.

The "friends of the donors" variables exploit how aid is given for more geopolitical/strategic reasons than based on need. Examples include former colonialization, sharing a common language, being a member of a strategic alliance (usually NATO), and even UN voting patterns.

The "friends of donor" approach is valid if—after controlling for income, growth rates, etc—aid flows vary purely due to political reasons. This may not always hold true for nonmilitary aid and is instead a more plausible assumption with regards to military aid; U.S. military aid and security integration is driven by factors unrelated to country need (after controlling for the standard aid supply control variables), and therefore a geostrategic IV approach would work.

However, typical "friends of aid" approaches use aid donor characteristics, and as I am looking at just U.S. aid flows, these variables (e.g., colonial past, part of the 'Scandinavian club' of donors, etc) will not work. Similarly, the use of common language dummy is flawed as

English is the international language of business and a country whose main language is English does not denote a tie such as a French-speaking country in the Francophone.

Some traditional "friends of aid" instruments are still valid and warrant exploration, such as a UN security council presence, admittance into a military coalition, the formation of certain alliances, or other rotations onto organizations within which U.S. geostrategic interests dominate. Using the dummy for whether the member is a signatory to a strategic alliance usually means NATO, and most NATO countries are excluded from this analysis as the scope of my analysis is developing and emerging countries. As USA's colonial past is limited, that instrument will not be explored within an appendix; U.S. quasi-colonial ties are, for the most part, maintained in the form of territories, which are excluded from the analysis as I treat them *de facto* as part of the U.S. security apparatus.

Geostrategic variables may not be the most valid instruments for total aid but are excellent instruments for military aid and security integration: geostrategic-incentivized aid disbursements may have limited-to-no impact on actual development and are often instead used to purchase or reinforce political allegiances. Simply put, economic development often explicitly takes a backseat to political and geostrategic concerns when it comes to U.S. military aid and security integration policy.

Reddy et al, (2006) show a "strategic bias" problem to the typically-used ordinary least squares (OLS) and 2-stage Least Squares (2SLS) estimators, concluding that it arises from either a failure of geopolitical instrumental variables to wholly pick-up the effect of aid on growth (picking up only on the non-developmental aid's impact on growth) or a failure to disaggregate types of economic aid when the "true" effect of development and non-developmental aid on growth is different (Headey, 2005; Reddy et al., 2006). While the above poses a threat to the

validity of geostrategic variables as instruments for *total* aid, the existence of such a paradigm reinforces the validity of using geostrategic variables to instrument for non-development/military aid.

2.413 Lagging Aid

Lagged aid has often been used as an exogenous source of variation, using the exclusion assumption[31] (C. J. C. Dalgaard et al., 2004).

The approach taken by Boone (1996) was to use five-year averages of the data and use twice-lagged aid. By lagging the data, aid and emergencies should not be correlated, aid and business cycle factors as well. But aid remains correlated with any strategic or longer-term political factors that determines aid supply (especially for the U.S.).

2.414 Longer Time Periods

Similar to the approach of lagging aid ,Boone (1996) used longer periods of sufficient duration as to rule out any conditioning of aid on expected growth expectations. Minoiu & Reddy (2010a) address the problem of endogeneity with regards to aid's impact on growth by both disaggregating aid into developmental and geopolitical aid and by using deep lags and find that developmental aid is good for growth but only over sufficiently long periods of time.

It should be noted, however, that questions of endogeneity aren't as worrisome in the context of U.S. military aid and security integration, : as pointed out in (Jones & Kane, 2012), the "supply" or sending of U.S. military aid, troops, or signing of security-related agreements are

[31] The exclusion restriction condition is the second condition for Instrumental Variable Regression Analysis. The exclusion restriction "requires that any effect of the proposed instrument on the outcome is exclusively through its potential effect on exposure". While this assumption is not verifiable, it is falsifiable. To falsify this test, a subgroup must be identified in which the proposed instrument does not affect the exposure. For instance, using lagged aid

not chosen explicitly to countries with high expected growth. Instead, high security salience[32] is usually the determining factor. After all, U.S. politico-military integration, even when it does not occur simultaneously or closely following conflict, is likely to be in places that are inherently unstable and therefore provide expectations of low investment and anemic growth, if anything.

However, to address any endogeneity concerns, I use deep lags similar to (Minoiu & Reddy, 2010a; Rajan & Subramanian, 2008), using lagged periodic averages and sums to explain growth ten or twenty years later. By using recent growth rates as the dependent variable and deep lags as independent variables, there is no concern of reverse causality: growth in the 2010s cannot influence aid allocation or U.S. politico-military integration policy of the 1970s, 80s, and 90s.

2.5 Empirical Estimation

To gauge the growth effects of politico-military integration, I augment the neoclassical growth model, incorporating U.S. politico and military-related security agreements, the number of U.S. bases, and the share of GDP accounted for by military aid and economic aid receipt.

Following (Reddy et al., 2006), I disaggregate aid into two components: military aid and economic aid (which Reddy et al. (2006) called Non-Developmental Aid (NDA) and Developmental Aid (DA), respectively. The standard aid-growth model they use is as follows:

$$lny_i(t+T) - \ln\big(y_i(t)\big) = \beta_0 + \beta_1.\mathrm{DA} + \beta_2.\mathrm{NDA} + \delta_R.\mathrm{C} + e_R \quad (1)$$

Where C is a matrix of standard control variables. Using the standard Solow model as a foundation, I include initial GDP levels, $y_j(t)$, as growth may depend on a country's distance

[32] Security salience is defined as the relative importance of an overseas U.S. base or ally. For instance, countries with high security salience for the U.S. means that the U.S. cannot credibly threaten to remove troops from that country or region (Bell, Clay, & Martinez Machain, 2017)

from its own steady state. The possibility of unique steady states also drives the inclusion of the determinants of the steady state growth rate: capital, human capital, and population growth.

Inclusion of U.S. security integration within the standard growth model expands it to the following framework, substituting NDA for Military Aid (MA) and DA for Economic Aid (EA):

$$ln y_i(t+T) - \ln\big(y_i(t)\big) = \beta_0 + \beta_1.\mathrm{MA} + \beta_2.\mathrm{EA} + \beta_3.\#US\ bases + \beta_4.\#\ of\ military\ treaties + \beta_5.\#\ of\ political\ treaties + \beta_6.MA * \#\ of\ military\ treaties + \delta_R.\mathrm{C} + e_R \quad (2)$$

The main identification strategy of this paper is that U.S. military aid and security integration both separately and interactively impact per-capita GDP growth. As shown in the literature review, the aid literature is puzzling in its lack of consistent macroeconomic evidence with regards to aid's positive impact on growth and exports. One of the main ways in which this puzzle has been "solved" has been to disaggregate either aid (by type) or exports (sectorally).

Another way by which these aid-growth puzzles have been solved has been by identifying and testing different types of indirect channels (Clemens et al., 2012; Radelet et al., 2005) and non-linear empirical specifications (mostly through novel interactions)—squaring aid and interacting aid as in Aizenman & Glick (2003).

Reddy & Minou (2010), look at 86 countries between 1960 and 2010. I look at the same countries but extend the analysis to include data for the most recent data available (2019). I also include data on U.S. base presence and U.S. security agreements. Control variables are the same as were used in Reddy & Minou (2010), using their analysis as a baseline.

2.51 Dependent Variables

2.511 Economic Growth

In addition to the indirect impact on economic growth that U.S. aid+ has on economic growth, direct effects exist as well, through multiplier effects. Greater government spending, regardless of its source, will increase income by some multiplier[33]. However, as we have seen, the impact of aid on growth is not always positive. To look at economic growth, I use per-capita GDP growth from the World Bank World Development Indicators (WDI:

2.52 Independent Variables

2.521 U.S. Military Aid

Foreignassistance.gov aggregates all public and private aid and provides a sectoral dataset, broken down most simply into economic aid and military aid, which themselves consist of humanitarian and developmental aid for economic assistance and non-economic, military-enhancing aid for military assistance.

USAid.gov, which is consolidated with Foreignassistance.gov data, categorizes assistance disbursements whether they are economic or military assistance. Countries recognized as an "Independent State" by the U.S. Department of State and receiving over $500,000 cumulative military and economic assistance are included.

Military assistance is foreign aid grants for the express purpose of enhancing recipients' military capabilities. Any foreign aid not categorized explicitly as economic assistance is military assistance. Military assistance can be as benign as peace keeping operations (~5%) to International Military Education and Training (~1%) and Foreign Military Financing (~40%) (US AID, 2018). Much of U.S. military assistance is regionally focused, with (~35%) devoted to

the Afghanistan Security Forces Fund, ~11% allocated to Counter – ISIS Train and Equip Fund. The rest of U.S. military assistance is allocated to writing off excess defense articles (~3%) and general operation and maintenance (~5%).

2.522 U.S. Military Bases

David Vine, Anthropology Professor at American University, has a dataset freely available listing U.S. Military Bases Abroad, 1776-2019 (Lists of U.S. Military Bases Abroad, 1776-2019 | AU Digital Research Archive (american.edu)). This data is not continuous, however, and the only relevant years are those pertaining to 2015 and 2019. While there are data for previous years, they are few (1989, 1945, 1939) and reflect the existing politico-military structures of their time (Cold War, Post-WWII, pre-WWII). While it breaks with the pattern of all right-hand side variables being lagged averages, the inclusion of the most updated military base dataset is a better control and is used in my analysis.

2.523 U.S. Trainees

Trainee data is sourced from the same source as U.S. economic aid and U.S. military aid, Foreignassistance.gov. U.S. trainees are foreign military personnel that U.S. active-duty military personnel or U.S. civilian contractors are training. U.S. training programs may occur in conjunction with sales or grants provided by U.S. Foreign Military Financing. U.S. Training occurs in countries selected by the Secretary of State under the program of International Military Education and Training (IMET), which aims to train foreign leaders, establish and enhance U.S.-foreign military rapport, enhance joint operation interoperability and capabilities and provide English language training assistance (*International Military Education & Training (IMET) | Defense Security Cooperation Agency*, n.d.)

2.524 U.S. Treaties

The RAND corporation provides a comprehensive record on historical security-related treaties signed by the United States from 1955-2012. Bilateral and multilateral treaties and security-related agreements are included in the database, but for our purposes I only use bilateral security-related agreements. Previous data sources have gaps in their coverage, failing to cover both current and historical security-related treaties. To address this, the RAND corporation developed a data set that details every treaty: start date, end date, and type. Over five thousand individual treaties span from 1955-2012 between the United States and other countries. Security-related treaties and agreements[34] can include joint training agreements, military alliances, access treaties (for U.S. bases and U.S. personnel), and material transfer treaties (such as Foreign Military Financing). For our purposes, I only look at treaties with the following characteristics: mutual defense, amity, troops, training, SOFAs. The only omitted set of agreements are those that are Air Force specific. Air Force specific security agreements pertain to overflight, airfield access, or space-related issues.

Some recoding of the dataset was necessary for it to be useful for econometric analysis. Each treaty covers multiple years and has different characteristics. First, I expanded each treaty so that the variables reflected each year the treaty was in-force (rather than just the year in which the treaty was signed or entered). Then, I looked at each of the five security-related agreement characteristics: mutual defense, amity, troops, training, and SOFAs. If a treaty had the characteristic of both mutual defense and amity, then each of those variables was coded as 1 for all of the years.

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[34] Only formal treaties and agreements between two or more states are included—informal agreements and understandings are excluded.

Lastly, I create two categories of U.S. treaties: U.S. political treaties and U.S. military treaties. To my knowledge, this is the first analysis to not only explicitly include the presence of certain types of treaties, but also the first analysis to aggregate them into categories reflecting either their political or militaristic nature. Using a new database, the first comprehensive U.S. security-related treaty database, I take the liberty to group mutual defense and amity agreements into "U.S. political treaties", as, in terms of security-related treaties, these two require the least amount of effort and often are symbolic. U.S. military treaties (a grouping of U.S. base-related treaties—also known as Status of Forces Agreements--, U.S. troop-related treaties, and U.S. training-related treaties) are, by contrast to U.S. political treaties, accompanied by concrete actions: money spent, land rented, bases built, troops barracked, rights provided to military personnel and their families, and foreign soldiers trained by U.S. troops. U.S. military treaties are quite different than political treaties and should be grouped differently. In doing so, I find that military treaties and political treaties impact growth and interact with aid in different ways.

2.5241 U.S. Political Treaties

U.S. political treaties is a binary variable, taking the value of 1 for years which a country has an active (a) mutual defense agreement or (b) amity agreement.

2.52411 Mutual Defense Agreements

Mutual Defense agreements are just that: agreements that indicate the degree of security reinforcement expected during different escalations of war, internal and external. While mutual defense agreements include both mutual defense and collective security provisions, only the mutual defense provisions[35] will be captured as I only look to bilateral security-related

[35] It is important to note here that there are treaties titled "mutual defense assistance agreements", which are *not* included because—despite the title—these agreements are somewhat different than mutual

agreements. The presence of a mutual defense agreement is coded as a dummy variable, just as with SOFAs, with a 1 indicating an active mutual defense agreement and a 0 indicating no such agreement for that year with that country.

2.52412 Amity Agreements

Treaties that detail the peaceful settlement of disputes, proclaim cooperation, or promote amity are coded as "Amity Agreements". Years for which countries have active Amity Agreements are coded as a 1, 0 otherwise.

2.5242 U.S. Military Treaties

U.S. military treaties is a binary variable, taking the value of 1 whenever a country has, for a particular year, either: (a) troop-related agreements, (b) training agreements, or (c) SOFA agreements.

2.52421 Troop-related agreements

Troop-related agreements address U.S. troop commitment for any operation (training, observing, or contingency). Years for which countries have active troop-related agreements are coded 1, 0 otherwise.

2.52422 Training Agreements

As previously mentioned, a large portion of U.S. military assistance takes the form of either Foreign Military Financing (FMF) or International Military Education and Training (IMET). Both FMF and IMET have a training component. In addition, any security-related agreements having to do with U.S. provided training or joint training is included in this subtype. Training agreements are likewise coded as a dummy variable, with 1 indicating at least one

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defense-related agreements (mutual defense *assistance* agreements pertain to military aid and other pecuniary issues).

active training agreement during that year with that country and a 0 indicating no active training agreements.

2.52423 Status of Forces Agreements

Status of Forces Agreements (SOFAs) govern the rights and status of U.S. military personnel and family-members when stationed overseas. SOFAs often—but not always—preclude or coincide with U.S. basing operations. SOFAs are coded as dummy (or binary) variables, with 1 denoting the presence of at least one SOFA and 0 denoting no active SOFA agreement during that year with that country.

2.53 Control Variables

2.531 U.S. Economic Assistance

When cumulative military and economic aid totals are greater than half a million dollars (and the country is recognized by the U.S. Department of State), U.S. aid is recorded, and each program/disbursement is categorized as economic or military aid. Economic aid has a humanitarian or development objective: humanitarian aid can be a response to a disaster (natural or man-made) or a response to a failed or failing state; development aid promotes sustained, broad economic growth as well as increased geopolitical stability.(US AID, 2018) Economic aid, lagged, must be incorporated as a control variable so as to identify the conditional impact of politico-military integration on economic growth.

2.532 Conflict

The first choice is to use the standard conflict database, the Correlates of War (COW) project. The application of other conflict variables is included, as the COW dataset does have an annual fatality threshold of 1,000; Uppsala Conflict Data Program (UCDP) employs a threshold of 25 (Creasey et al., 2015). The most recent iteration of the Militarized Interstate Disputes

(MID) database (v5.0) provides information relevant to my analysis. MID instances are not just explicit acts of war, but range in intensity from threats to use force. Also, MID provides categorical information when exact fatality numbers are unknown or unverifiable, allowing for a greater inclusion of fatality data. I code a binary variable to have a value of 1 when fatality deaths are greater than 25 in any given year from any MID instance. For robustness, I also code a variable that takes a value of 1 when the "Hostility Level" indicator, is a 3 or higher, indicating that the interstate dispute is at the very least a "Display of force"[36] .

2.533 Initial GDP (in 2010 constant USD)

As stated before, standard growth regression specifications include a measure of initial income to account for differing rates of convergence. I use the real GDP, as measured by the World Bank WDI indicators (WDI: NY.GDP.MKTP.KD), take the first value for each country, and take its log and include it as a control in my regressions.

2.534 Institutions / Regime type

The two most popular ordinal indices are the Freedom House indices (with 7 categories each) and the Polity2 index (with 21 categories) (Cheibub et al., 2010). While these indices identify different *levels* of democracy (a "3" in the Polity2 scale signals a more democratic regime than a "2"), they lack specific characteristics of each ordinal level and thus cannot tell us much about different *kinds* of democracy. In addition, the use of any one of these constructed indices creates problems of errors in measurement, as ideological bias may be influencing the

[36] Level 4 on the Hostility level of dispute index is "Use of force"; Level 5 is "War"

categorization rules. I use other popular democracy indicators[37] as a robustness check, despite a high correlation between most indices (Skaaning et al., 2015).

Lastly, I use the World Bank CPIA ratings (used by P Collier & Dollar (2002) and Reddy et al., (2006)) as a proxy for the "quality" of policy environments. I use the "CPIA public sector management and institution cluster average (1=low to 6=high)" (WDI: IQ.CPA.PUBS.XQ) as it accounts for transparency, accountability, and corruption in the public sector, as well as property rights and rules-based governance and the quality of public administration, financial management, and revenue mobilization.

2.535 Population

Using the logarithmic transformation of the population is a standard control in cross-country growth regressions. Population data comes from the World Bank World Development Indicators and counts all residents of the country regardless of legal status or citizenship (WDI: SP.POP.TOTL).

2.536 Education

The education expenditure, as a % of GDP, is another common control variable in cross-country growth regressions. This includes all expenditures (current, capital, or transfer) that occur regardless of source (international or domestic) on education by a government body (local, state, or national) (WDI: SE.XPD.TOTL.GD.ZS).

2.537 Domestic Investment

Physical capital, alongside human capital, is a classic determinant of growth. Therefore, I include the logged percentage of GDP that consists of both fixed asset additions as well as

[37] I plan to introduce V-dem and Economist Intelligence Unit indices as robustness checks, in addition to two new democracy indices: the lexical index and the six-fold regime classification presented in Cheibub et al. (2010).

changes to inventory levels. The gross capital formation data (% of GDP) is from the World Bank World Development Indicators (WDI: NE.GDI.TOTL.ZS)

2.538 Geography (Rainfall; mm/yr)

The literature is divided in whether any particular geography proxy is the best, and as a result, there are many geographic proxies available. Some combine the fraction of a country's area in the tropics average number of frost days per month per winter (Bosworth et al., n.d.; Radelet et al., 2005; Reddy et al., 2006). Others use rainfall (average mm of rain per year weighted by its long-term average) in their attempts to investigate aid effectiveness (Clemens et al., 2012). I elect to also use rainfall as it is the most complete dataset and provides the widest cross-country sample.

2.539 Terms of Trade

Mercantilist or export-oriented development strategies are at the root of some of the most successful development stories. As a result, we must control for their influence. The best way to do this is to include two variables relating to the individual recipient countries' terms-of-trade: an average growth rate and the standard deviation. Looking at the average growth rate allows us to see how increases in recipients' terms-of-trade (export prices increasing relative to import prices) increase that recipients GDP, and, in turn, growth. I account for the standard deviation of the terms of trade as a proxy for large price fluctuations in the export and import markets of the recipient countries. Large standard deviations are expected to be associated with lower growth, as stability in prices is preferred when pursuing any development strategy (Bruckner, 2013). Terms of trade data comes from the World Bank World Development Indicators (WDI: TT.PRI.MRCH.XD.WD) and is defined as the "Net barter terms of trade index (2000 = 100)".

2.530 Initial Life Expectancy

Lastly, I include another proxy measure of institutional quality, the initial life expectancy of the recipient/host country. Similar to (Radelet et al., 2005), I take the first non-missing value of each period of Total Life Expectancy, as provided by the World Bank World Development Indicators (WDI: SP.DYN.LE00.IN). Life expectancies are often used a determinants of aid effectiveness, though usually in combination with another indicator, like daily caloric intake as in Schraeder et al. (2016). For robustness, I also run the regressions with the average of life expectancy over time, as well as the infant mortality rate.

2.54 Interaction Variables

Interaction terms are created and introduced to test certain non-linearities of economic and military aid. First, I test the interaction between economic aid and institutional quality (as measured by CPIA, polity2 and Freedom House indicators). It has been posited (but not shown) that economic aid is only effective in stimulating economic growth when in the presence of good policies. I find no evidence that lagged economic aid, when interacted with lagged institutional quality, has a statistically significant impact on economic growth.

Second, I construct and use a pair of interaction variables: (1) to see how changes in military aid interact with the number of military treaties and (2) how changes in economic aid intersect with the number of political treaties.

2.541 Military aid ∩ Military treaties

After taking cross-sectional averages, I multiply the logged, lagged military aid's share of GDP by the summed number of military treaties during that period (1970-2010; 1970-2000; 1980-2010). This creates the interaction term $Military\ aid \cap Military\ treaties$, which, if positive, indicates that U.S. military aid's effectiveness on growth increases as the number of

military treaties increase. If the interaction term is negative, this means that U.S. military aid's effectiveness decreases as the number of military treaties increase.

2.542 Economic aid ∩ Political treaties

Using the same process as above, I create an interaction term between the logged, lagged economic aid's share of GDP by the summed number of political treaties during that period. This interaction term, $Economic\ aid \cap Political\ treaties$, would show a positive feedback effect between U.S. political security-related agreements and treaties if the coefficient estimate for it was statistically significant and positive. However, in none of the estimations is this variable significant and as such is not reported in the results below.

2.6 Empirical Evidence

I estimate standard cross-country growth-aid models for a sample of developing countries from 1970-2019. Both economic and military aid are taken as shares of GDP and then logged. Lagged values of military and economic aid are used to explain recent (2010-2019) variations in recipients' average growth rates over that 10-year period. Per capita GDP is the dependent variable for each regression, averaged from 2010-2019. All other variables are either averages, initial values, or sums from periods preceding 2010 (1970-2010; 1980-2010; 1980-2000).

My baseline specification is similar to that of (Minoiu & Reddy, 2010b; Rajan & Subramanian, 2008), with control variables standard to growth regressions: logged GDP, institutional quality, indicators for the number of hostility episodes (including revolutions), the growth rate of the terms-of-trade, the standard deviation of the terms of trade, and the initial life expectancy.

2.61 Cross-sectional results

In order to estimate the long-term effects of aid and conflict on growth, I include 3 sets of deep lags for the aid variables, while the dependent variable remains the growth rate of per capita

GDP from 2010-2019. Other explanatory/control variables are similarly lagged and then averaged or summed over the three periods (1970-2010; 1980-2010; 1980-2000).

The results obtained provide more evidence that (1) deeper lags are necessary and (2) disaggregating aid flow data is necessary to tease out the "true" impact of aid. In addition, I add to the existing literature that shows non-linearities in the way that aid impacts growth. Disaggregating U.S. security-related agreements and treaties proves useful, as the presence of military treaties attenuates the negative impact of military aid. The following equation is estimated:

$$growth_i = \beta_0 + \beta_1.\ln\left(\frac{econaid}{GDP}\right)_i + \beta_2.\ln\left(\frac{milaid}{GDP}\right)_i + \beta_3.military\ treaties_i +$$
$$\beta_4.\ln\left(\frac{milaid}{GDP}\right)_i \cap Military\ treaties_i + \beta_5.political\ treaties_i +$$
$$\beta_6.No.of\ US\ bases_i + \beta_7.No.of\ US\ funded\ bases_i + \beta_8.\ln(GDP)_i +$$
$$\beta_9.\ln\left(\frac{K}{GDP}\right)_i + \beta_{10}.\ln\left(\frac{educ\ spending}{GDP}\right)_i + \beta_{11}.\ln(pop)_i +$$
$$\beta_{12}.initial\ life\ expectancy_i + \beta_{13}.rainfall_i + \beta_{14}.institution\ quality_i +$$
$$\beta_{15}.No.of\ years\ with\ conflict_i + \beta_{16}.\ln(TOT)_i + \beta_{17}.sd(TOT)_i + \epsilon_i \quad (3)$$

where institutional quality is represented by either the CPIA, polity2, or Freedom House indicator and the number of years with conflict is either measured as having a hostility level of 3 or above (meaning there is at least "use of force") or having had fatalities greater than 25.

Table 1 presents three novel specifications, which I use to examine the possibility that differing types of aid have unique impacts on economic growth. Three specifications are used to test different lags: the first uses lagged values from 1970-2010 regressed on growth from 2010-2019, the second uses lagged values from 1980-2010, the third uses lagged values from 1970-2000. All specifications have average growth from 2010-2019 as the dependent variable.

The results are fairly consistent through the specifications: military aid and security-integration (by way of signed, enforced security-related agreements) negatively impact economic growth. Average growth is lower as recipient/host countries receive military aid, host U.S. bases, and sign security-related treaties. Economic growth was 0.675-.70 percentage points lower for countries which has received an additional 1% of GDP as military aid from the U.S. The effects are economically and statistically significant as the coefficients are sufficiently large and hold at the 90 and 95% confidence levels.

The number of U.S. bases is shown to have a negative impact on economic growth, with each additional U.S. military base associated with decreases in economic growth of 26-32 percentage points per base. The highest number of bases within the sample of developing countries is 8, so the maximum negative impact of U.S. base present is well above the range of the dependent variable (200 percentage points) and shows large economic significance: if a country has 8 bases, it is expected that their economic growth will be 213 to 255 percentage points lower than a country with the exact same characteristics but 0 U.S. military bases. U.S. bases are often positioned in conflict-torn countries or in places with security-issues, so it is possible that this variable is picking up regional turmoil in addition to the (intended) isolated impact of U.S. basing presence abroad and should therefore be interpreted cautiously. There are controls in-place for conflict, however. The specifications within are robust to the inclusion of two widely-used conflict indicators, both from the MIDB (hostility levels rising above a level of "3" and fatalities greater than 25). Both controls are statistically insignificant and do not change the sign of the U.S. base coefficient estimate significantly.

A weaker—though still strong—effect is identified with regards to the more politically-motivated security-related treaties (mutual defense agreements and amity agreements): for every

year with a politically-motivated security-related treaty signed and in-force within the lagged period (only for 1980-2010 and 1980-2010), growth is shown to increase by 1.8-2.4 percentage points. Some countries have politically-motivated security-related treaties in-force for nearly every year within the period, so the maximum value for these variables is 22 and 31 respectively. In the full panel (before the time abridgement), the correlation between military and politically-related security treaties is low (0.318), so it is not necessarily the case that every country with a military treaty also has a political treaty. And the lagged summed number of political treaties is statistically and economically significant: if countries have politically-related treaties in-force during the whole of the analysis, economic growth could increase from 39.6 to 74.4 percentage points, nearly half of the range of economic growth (min: -65; max: 140)

When regressing 1970-2010 and 1980-2010 averages onto 2010-2019 average growth rate, the statistical and economic significance of the interaction effect between military aid receipt and security-related treaties is positive, suggesting that aid non-linearly impacts growth. However, the magnitude of the interaction effect is always less than the individual impact of military-related treaties, suggesting that the overall impact for military-related treaties is negative, even in conjunction with military aid receipt. This adds further evidence to an already growing body of literature regarding aid's nonlinearity (see lit review). Upon first look, the interaction variable between U.S. military aid and U.S. military treaties seems economically insignificant: the impact of security treaties only changes slightly as the average amount of military aid rises. Taken from a different perspective, the result becomes more meaningful: increases in the level of security treaties ameliorates the negative impact of military aid on growth (to the tune of 3 percentage point increases for each additional security treaty). The same can be said with regards to the negative impact of military aid: in the second model (regressing

1980-2010 values on average growth from 2010-2019), while 1% increases in military aid independently decrease economic growth by 0.7%, the same 1% increase in military aid will decrease growth by 0.67% if there is a new military treaty with that country. It seems that the presence of military aid receipt in conjunction with military treaties only slightly mitigates a net negative impact on growth.

Table 3: Cross-Sectional OLS Regressions: Similar to Minou and Redddy (2010)

Variables	Average growth (2010-2019)	Robustness Check		Average growth (2010-2019)	Robustness Check			Average growth (2010-2019)
	Coef.	Coef.	Std. err.	Coef.	Coef.	Std. err	Coef.	Std. err.
Economic aid / GDP (avg; logged; 1970-2000)		-60.51**	25.72					
Military aid / GDP (avg; logged; 1970-2010)	-67.45*		35.07					
Military aid's fraction of total aid		-2.62	8.17					
Military Treaties (sum; 1970-2010)	-3.70**		1.48					
		-4.19**	1.72					
Political Treaties (sum; 1970-2010)	1.21		.75					
		1.97***	.2.95					
Mil aid ∩ Military Treaties	2.44*		1.36					
Economic aid ∩ Military Treaties		2.03*	1.00					
U.S. Military Bases (sum; 1970-2010)	-31.94**		15.46					
		-34.8**	15.05					
Economic aid / GDP (avg; logged; 1980-2010)					-55.16*	(-2.59)		
Military aid / GDP (avg; logged; 1980-2010)				-70.57**		30.07		
Military aid's fraction of total aid					0.987	(-.13)		
Military Treaties (sum; 1980-2010)				-4.23**		1.67		
					-4.933**	(-2.86)		
Political Treaties (sum; 1980-2010)				1.80*		.91		
					1.749*	(-2.51)		
Mil aid ∩ Military Treaties				3.09**		1.34		

Variables	Average growth (2010-2019)	Robustness Check		Average growth (2010-2019)	Robustness Check			Average growth (2010-2019)
Econ aid ∩ Military Treaties					2.193*	(-2.75)		
U.S. Mil Bases (sum; 1980-2010)				-26.63*		14.87		
Economic aid / GDP (avg; logged; 1980-2000)								
Military aid / GDP (avg; logged; 1980-2000)							-35.55	105.17
Military aid's fraction of total aid								
Military Treaties (sum; 1980-2000)							-2.79*	1.51
Political Treaties (sum; 1980-2000)							2.35*	1.34
Mil aid ∩ No. of Military Treaties							5.74	7.46
Economic aid ∩ Military Treaties								
U.S. Military Bases (sum; 1980-2000)							-31.89*	16.57
Conflict	.435	1.26	1.58 2.22	9.05*	2.11	4.96 (.8)	6.17	5.70
Conflict Squared								
GDP	64.17*		34.98	67.40**		25.4	74.53***	23.46
GDP per capita		-23.09	13.99		-28.72*	(-2.11)		
Polity2 Index	-2.28		2.05	-3.09		2.10	1.94	2.28
Economist Democracy Index		-.14	.50		-0.0893	(-0.18)		
Population	.34	-.90	7.26 5.98	1.91	-3.4	6.18 (-0.57)	4.83	5.99
Education / GDP	-9.17	2.93	19.19 19.31	-1.09	-0.488	18.14 (-0.03)	6.60	18.11
Investment / GDP	-13.4	-12.15	15.86 14.17	4.48	-1.607	17.19 (-0.10)	-15.83	13.32

Variables	Average growth (2010-2019)	Robustness Check		Average growth (2010-2019)	Robustness Check			Average growth (2010-2019)
Rainfall (mm/yr)	-0.011	.175	.012 (.122	-.0051	0.0534	.012 (-0.41)	-.019	.014
Rainfall squared		-.0002*	.00009 (0			-		
Rainfall cubed		4.26-08*	2.22E-08 (0			-		
Terms-of-Trade (growth)	-71.72	-111.0**	54.52 (53.66	-54.84		54.58	-81.99*	41.66
Terms-of-Trade (std. dev.)	.67	.720	.41 (.59451	.73*	.711	.41 (-1.19)	1.07***	.37
Initial Life Expectancy	.97		.95	2.04*		1.15	.98	1.36
Infant Mortality Rate		-.21	.325		-0.62	(-1.83)		
Agricultural productivity		.0007	.0009		-0.0127	(-1.17)		
Asia Dummy		77.04**	28.08					
N	55	48		53	47		40	
Adj R-squared	0.4995	.5161		.5360	0.4118		.7098	

* Statistical significance at the 1%; ** Statistical significance at the 5%; *** Statistical significance at the 1%
T-stats are provided in parentheses during some robustness checks.
No coefficient estimates were significant running robustness checks on the 1980-2000 period and are not reported.

2.7 Discussion and conclusion

In this paper, I estimated the relationship between different types of aid and per-capita economic growth in a large cross-section of aid recipients. U.S. aid is already labelled as military or economic, where military aid is any aid not explicitly tied to development goals or aims. My specifications allow for aid's impact on growth to take place after long time lags.

I find that U.S. aid has a robust, negative, effect on subsequent growth. Initially, it seemed that military aid was the culprit: coefficient estimates show significant impact within the cross-country regressions: 1% increase in average U.S. military aid over 1970-2010 is associated with average per capita GDP growth rates in the 2010s that are lower by .67-.70 percentage points. The negative growth effect occurs despite controlling for the existence and number of U.S. military bases. However, these regressions also include the amount of foreign GDP financed by economic aid, which moves with military aid for the most part.

By checking the correlation coefficient, I see that multicollinearity issues between economic aid and military aid exist (r=0.66). By looking at just the growth rate of economic aid (logged economic aid as a share of recipient GDP) and the military aid's fraction of total aid, I sidestep this multicollinearity issue and see a slightly different, though reinforcing picture: US aid (whether it is labelled economic or military) is associated with lower long-term growth rates, all else equal. This negative impact is ameliorated by the presence and number of years with active US military treaties, treaties that—while not correlated in the data—are accompanied by troop movements, US foreign trainees, sales of US arms, and US foreign basing operations, all actions which increase host economic activity. This impact is seen but is weak, the amelioration is not enough to ever offset the net negative impact of U.S. military/economic aid and security integration.

My other main findings are that not all U.S. security-agreements are equal in their impact on growth. Military-specific security agreements (those having to do with U.S. training, bases, or troops) are, generally, negatively associated with economic growth. Countries with one more military-related security agreement over 1970-2010 are associated with average per capita GDP growth rates in the 2010s that are lower by 2.8 to 4.2 percentage points. Conversely, more politically-leaning security agreements (those having to do with mutual defense pacts or amity[38] agreements) are positively associated with economic growth. An additional politically-leaning security agreement is shown to be associated with increases in per capita economic growth of 1.8 to 2.4 percentage points. These results hold over most specifications and robustness checks.

U.S. politico-military integration takes place for different reasons in different regions. Often, these regions have security-related concerns which precipitate a desire for U.S. integration to create more stability—an understated determinant of economic development. The evidence presents a different picture: U.S. politico-military integration is generally associated with lower growth rates. Increases in security treaties—only in conjunction with military aid flows—can be associated with increases growth. Otherwise, military treaties are associated with lower economic growth, an unexpected result. This may be because U.S. military treaties are mostly with countries in or around regions where security is a problem, dragging growth down. Regional controls were introduced and did not change the coefficient estimate results significantly.

Years of hostility was controlled for in two different ways, but both of them come from an interstate database, lacking information about domestic terrorism, civil wars, and other violent or security-indicative events that may draw or ward off US foreign investors. It may well be that

[38] Loosely translates to “a friendly relationship”.

U.S. military treaties have no impact on growth, positive or negative, but that the countries with which the U.S. has most of its military treaties with are geographically or regionally limited in their growth potential.

There is limited support that U.S. political treaties increase economic growth. This fits with our expectations: U.S. political treaties (mutual defense and amity treaties) address security concerns without any explicit manifestation. U.S. military treaties (troops, trainees, and Status of Forces Agreements) are accompanied by some sort of manifestation U.S. military personnel for troops treaties, sales of arms and training arrangements for training treaties, and the relocation and settlement of U.S. active military personnel and their families with Status of Forces Agreements. The U.S., when it makes credible commitments but is yet to put any pieces on the board (or boots on the ground), is growth-enhancing with respect to political treaties.

U.S. economic aid shows a negative or null impact. This is contrary to common sense but not altogether surprising given the previous findings within the literature. U.S. economic aid is defined to be any aid that is not explicitly military in purpose. As such, U.S. economic aid could be suffering from the fungibility problem of all aid: governments failed to use the economic aid for productive means and instead financed existing projects with aid monies while funnelling the previously budgeted monies to non-productive uses. U.S. military treaties is negative in its impact, alongside the number and presence of U.S. military bases. Only when U.S. aid is interacted with U.S. military treaties do we see a slight attenuation of the net negative association with growth, and even then, it is quite small. U.S. politico-military integration, when given the choice, seems to be bad for growth in the long-run.

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Chapter 3: Following the Funded Flag? The Impact of Foreign U.S. Military Aid, Military Presence, Trainees, and Basing on U.S. FDI

Conflict often plays a role in securing direct investment. U.S. politico-military relations, in the form of U.S. military aid, U.S. troop deployment, U.S. training of foreign soldiers, U.S.-funded military bases, and U.S. military bases hosted abroad may be assurances to U.S. investors that U.S. FDI is secure. If this is true, U.S. FDI would be seen to "follow the flag" with regards to FDI following U.S. basing and troop deployment activities. Following (Biglaiser & DeRouen, 2007), I use panel data for 87 developing and emerging countries between 2000 and 2019 and test the effects of "follow the flag" variables on U.S. bilateral FDI. After controlling for macroeconomic conditions, economic and political reforms, and democratic regimes, I find that security factors do impact FDI in both the initial decision of whether to invest as well as the second decision, how much to invest. My results indicate a strong positive selection effect of U.S. military presence (active duty, reserve troops, and civilian DOD employees). The main equation shows a negative impact of U.S. military presence, as well as a negative impact of U.S. trainee presence. However, these negative impacts are small economically, especially when compared to the outsized economic significance of U.S. military aid spending abroad. 1% increases in U.S. military presence is associated with increases in FDI of only 0.56%. Lastly, the coefficient estimate for the logged total U.S. aid shows statistical (but not economic) significance, while the coefficient estimate for the military share of aid shows no significance. It seems that U.S. politico-military integration is associated with greater likelihood of positive FDI flows and greater amounts of FDI flows, but only for U.S. investors and not for global investors.

This paper investigates whether U.S. FDI "follows a *funded* flag": large U.S. FDI flows following not only U.S. troop deployments, but also U.S. military aid flows and the establishment of U.S. foreign military bases (both U.S. and U.S.-sponsored). This paper extends and builds on Biglaiser & DeRouen (2007)'s panel analysis of emerging and developing countries from 1966-2002, who find that U.S. "follows the flag" in that U.S. troop presence leads to an increase in the likelihood of net positive FDI and the amount of FDI. I find no significant evidence that the U.S. FDI only "follows a *funded* flag" while still finding evidence that U.S. FDI "follows the flag" similar to Biglaiser & DeRouen (2007). While U.S. military base presence shows the correct sign and size (the presence of at least one base increases the likelihood of positive U.S. FDI by 34% that year), U.S. military aid has no impact in the likelihood of positive U.S. FDI that year and has a negative impact on U.S. FDI flow volume. Why is this? After all, the logged total aid shows a statistically significant and positive coefficient estimate throughout most of the specifications—even when looking at global FDI flows, not just U.S. FDI. It may be that U.S. military aid crowds out U.S. FDI. Having U.S. troops and U.S. bases is one thing, but large yearly receipt of military aid could stifle private investment activity in the recipient countries, deterring both domestic and foreign investment.

While increases in the number of U.S. troops increases the *likelihood* of net positive U.S. FDI, increases in the number of U.S. troops decreases the *amount* of U.S. FDI flowing that year. This holds for U.S. trainees of foreign troops as well: increases in U.S. trainees increase the *likelihood* of net positive U.S. FDI but decrease the expected *amount* of U.S. FDI. This unexpected result is likely due to the inclusion of U.S. aid, a U.S. base presence dummy, and a variable capturing the share of aid devoted to military purposes.

The one expected result within, is with respect to U.S. bases: U.S. bases increase both the likelihood and the amount of U.S. FDI invested abroad in any given year. U.S. bases are costly to set-up and move, and so provide the most concrete and visible evidence of a U.S. backstop to the host nation. Note that these results hold whether I include unconfirmed U.S. bases, U.S.-funded bases, or smaller, supply- or refuelling-oriented "lily pad" bases.

This paper focuses on the post-9/11 period of U.S. foreign policy. Other analyses are either now historical or they extend their analysis to cover both a portion of the post-9/11 period and earlier., Biglaiser & DeRouen (2007) looked over a period that includes both the Cold War and the start of the War in Iraq, and found that U.S. troop deployment has a positive impact on the collective decision-making of the U.S. investment community regarding foreign direct in/divestment, as well as a positive impact on the amount of FDI invested abroad. Host countries increasing U.S. troops deployed are associated with an increased chance of net positive U.S. bilateral FDI inflows by 24%. FDI also increased when U.S. troops increased. However, their analysis spans too great a period[39] (1966-2002) and fails to capture the post-9/11 period. In addition, there is no mention of the impact of significant (and often complementary) element of U.S. foreign aid. This paper seeks to bridge that gap and add to it the important and understudied effect of aid and U.S. politico-military integration on FDI.

Globerman and Shapiro (2003) uses the same two-stage estimation process as within to show the threshold effects of effective governance with regards to FDI: some minimum level of government/institutional quality is necessary for net positive FDI decision-making on the part of

[39] Using fixed effects requires that any unobserved heterogeneity holds for the period in question. Using fixed effects with such a long panel of developing and emerging countries stretches the above assumption.

international investors, and more effective governance infrastructure, particularly with regards to the legal system, are important determinants of the amount of multilateral FDI received.

The inherent instability of financial flows and trade volume create pressure for governments to present and maintain a strong, trustworthy reputation in financial markets. As trust in a sovereign's finances breaks down, financial flows reverse, and trade volume shrivels. Maintaining trust requires a credible commitment to repaying debt. Despite the above problems, larger U.S. aid flows make debt commitments more creditable, and provides an implicit guarantee for foreign governments debts.

In addition, greater U.S. presence (in the form of more than 100 active-duty deployed troops) improves sovereign credit ratings (Vea, 2015). Provided a country has not previously defaulted, a 1% increase in U.S. troop deployment is associated with an approximately 14 percent improvement in the sovereign credit rating of the host country (Vea, 2015). As sovereign credit ratings are used by international investors when determining the interest rates at which the host countries can borrow, upgraded assessments of host countries provide tangible rewards in the form of cheaper capital and lower debt service payments. U.S. troop deployments have been shown to increase economic growth in host-nation states; every additional 100 troops deployed is associated with a small but significant increase (0.0023 percentage points) (Heo & Ye, 2019b).

Countries that host U.S. active-duty troop deployments also host U.S. military bases or build U.S.-funded military bases of their own. U.S. military bases are either explicitly acknowledged, unacknowledged but documented, or small, mostly supply-oriented bases called "lily pads"[40] (Vine, 2015). The specific impact of U.S. bases (outside U.S. troop presence) has

[40] For the purposes of this paper, these "lily pad" bases are not included; the presence of a lily pad, in and of itself, does not suggest any increase in U.S. troop deployment, U.S. military or economic aid, or

not been rigorously tested. There are anecdotal analyses, but few looks to the economic impact of the establishment of U.S. bases. There is a small literature on base closures (Ashley & Touchton, 2014; Cooley, 2005; Hooker & Knetter, 2001; Paloyo et al., 2010; Sorenson & Stenberg, 2015), but the literature is heavily quantitative, focused on closures, and pertains to specific countries or periods of base closures and so is irrelevant for our discussion here.

Foreign military aid is shown to have various impacts (positive and negative) on recipient country's institutional and political outcomes (conflict, democratic backsliding or democratization, and human rights) (Dimant et al., n.d.; Dube & Naidu, 2010). U.S. aid may be associated with decreases in the human rights as government elites may use the extra aid (and influence) to suppress political opposition and/or democratization efforts, but U.S. aid and U.S. military presence may also improve human rights as U.S. military personnel are heavily trained to uphold human rights and (despite some notable exceptions) the moral leadership of U.S. foreign military troops may generate positive externalities with regards to fewer host-nation human rights abuses by host-nation police and/or troops (Apodaca & Stohl, 1999; Blanton, 2000; Blanton & Blanton, 2006, 2007; Meyer & Sinani, 2009).

In this paper, I explore the idea that FDI flows are influenced by the perceived security of the country, which is enhanced not only by U.S. troop deployments and U.S. military aid, but also by the presence of U.S. foreign bases and U.S. trainees of foreign troops. Positive coefficient estimates in the first and second stage of the estimation are expected and will show that international investors collectively perceive U.S. involvement as a semi-permanent, bolstering signal.

U.S. trainees of foreign troops. Only U.S. foreign military bases, U.S.-sponsored military bases, and unacknowledged U.S. military bases are included in this analysis for the above reason.

The overt wielding of U.S. military or aid mechanisms is no exception to the U.S. foreign policy playbook; it is the playbook. One example: U.S. Federal Reserve central bank swap auctions disproportionately benefit more U.S.-exposed countries (whether trade or asset exposure) (Rose & Spiegel, 2012). Theoretically, the impact of U.S. swap announcements on countries depends on three main things: exposure to the U.S., illiquidity, and dollar holding transparency/opaqueness. Empirically, only U.S. exposure shows robust, significant results, indicating a strong preference is given in swap auctions to those countries with strong U.S. ties (Rose & Spiegel, 2012). And with dollar liabilities to non-U.S. banks reaching $13 trillion (pre-Great Financial Crisis levels), the need for dollar swaps is crucial (Aldasoro et al., 2020).

A second example is the creation of Overseas Private Investment Corporation (OPIC) in 1969, a manifestation of the U.S.'s commitment to backstopping foreign investment. The U.S. Foreign Assistance Act was amended to include OPIC, an independent political risk insurer for U.S. multinational enterprises (Tarnoff & Lawson, 2010). OPIC was the direct response to host country contract abrogation, renegotiation, and even outright expropriation (Tarnoff & Lawson, 2010). OPIC serves the U.S. by lowering risk for U.S. firms that invest in countries with foreign policy goals like the U.S. As the scope of OPIC operations is large, their actions can and do dampen general interest rates of host countries. OPIC operations have been large in scale and size, reaching over 150 countries[41] in a various sectors have received funding/guarantee/or insurance for more than $200 billion since OPIC operations began in 1971 (Akhtar, 2016). In 2012 (date of the latest Congressional Research Service report), OPIC provided $3.6 billion in new financing and risk insurance for U.S. firms (Akhtar, 2016) .

3.1 Literature Review

[41] E.g., OPIC guaranteed the 1990 General Electric's deal in Hungary. (Klein & Welfens, 2012)

In the most recent political economic analysis of U.S. foreign intervention, Coyne & Wood (2020) discuss the constraints of U.S. nation-building; successful foreign interventions require interveners to build more than physical infrastructure--institutions are equally important. The constraints stem from a knowledge problem, and the unintended consequences are fourfold.

First, U.S. military and economic aid may increase corruption, while decreasing institutional quality. U.S. aid may introduce or perpetuate distortions to the public sector, increase rent-seeking, and delay policy reform (Coyne & Wood, 2020; Ear & Ear, 2015; Svensson, 2000)

Second, U.S. aid can create a "dependency effect", rendering recipient nations reliant on perennial foreign assistance. Also known as the "Samaritan's Dilemma[42]," this second effect is related to the "fungibility" of aid (discussed later), or the ability for aid to create disincentives for the recipient nation's populace to invest productively (whether in themselves in the form of human capital, new business ventures, or necessary infrastructure) (Coyne, 2014; Coyne & Wood, 2020; Ostrom et al., 2002) .

Third, there may be a "paradox of humanitarian action" in conflict-torn areas: interveners react quickly without full information of the political and ethical repercussions, thus creating a paradox where while intervention is almost always aimed at alleviating suffering, it may actually exacerbate it (Coyne & Wood, 2020). In a series of case studies of Pakistan, Honduras, Thailand, and Zaire, Terry (2013) shows the unsavory reality of how the rush for outsiders to "do something" resulted in resources in the hands of the very combatants that generated or were perpetuating the human suffering the aid was intended to ameliorate. Though hardly definitive, a

[42] Due to the fact that the "good samaritan"—in saving the distressed party—disincentivizes and/or precludes the possibility of the distressed party exerting sufficient effort (pulling up of one's bootstraps) to be self-reliant.

recent study, *U.S. Food Aid and Civil Conflict*, showed that U.S. food aid can increase in the incidence and duration of civil conflicts[43] (Coyne & Wood, 2020; Nunn & Qian, 2014).

The fourth and final unintended consequence of foreign intervention is the crimes committed by interveners against host or recipient nations. These disturbing crimes include fraud, theft, assault, sexual assault, smuggling, and torture (Calder, 2010; Coyne & Wood, 2020; Vine, 2015).

3.2 Determinants of FDI

FDI determinants are generally split into three categories: (1) macroeconomic variables (which include "democratic advantage"), (2) state and regional security concerns, and (3) capital controls and other policy reforms. In addition, foreign aid, would also have an impact on FDI.

3.21 Macroeconomic Determinants

Macroeconomic variables are important determinants of FDI, as they are the best quantitative indicators of an economy's health (Oneal, 1988). Market size, real wage costs, infrastructure availability and growth, foreign exchange value, and gross capital formation are other factors widely seen as determinants of FDI flows (A. Chakrabarti, 2001; Kok & Ersoy, 2009; Nunnenkamp, 2002).

Agarwal (1980) found that host country market size the greatest determinant for FDI inflows to developing countries. When looking at multilateral FDI inflows to Africa, market size shows the expected large, positive coefficient estimate result (Kandiero & Chitiga, 2006).

In perhaps the most well-known analysis, (Nunnenkamp, 2002) shows that market-related (macroeconomic) determinants are the most dominant in explaining FDI flows. Empirical

[43] Though the impact is only economically significant in those countries with a recent history of civil conflict.

evidence has and continues to confirm that market-related variables such as GDP, GDP growth, population, and GDP per capita are correlated to FDI, a result robust to conditional information backgrounds . A. Chakrabarti (2001) finds GDP per capita to have the greatest explanatory power, also disproving the usefulness of a whole set of traditional controls (wage, exchange rate, tariff, taxes, trade balance[44]). In addition, they find trade volume increases increase the likelihood of FDI inflows.

Other, non-traditional variables have rarely held up to empirical scrutiny, apart from average years of schooling. However, this relationship may be more complicated than first appears, as the average level of schooling (i.e. above a primary education or secondary education) and the quality of schooling are shown to be important in *how* FDI flows impact growth, and so while it may also be an influence on FDI, we cannot consistently estimate the specific marginal impact with the current models and empirical tests (Wang & Wong, 2011).

Multinational enterprises only choose direct investment when portfolio investment is relatively illiquid or non-existent. Traditional determinants (economic size, health, and growth) alone are surprisingly still dominant factors in explaining FDI (Nunnenkamp, 2002). Once again, of the non-traditional factors influencing FDI, only local skill (human capital) availability shows significance (Nunnenkamp, 2002).

Spurred by (M. M. Olson, 1993)'s analysis of foreign investors' penchant for authoritarian regimes, there has been significant debate regarding whether the governmental regime type is influential in attracting FDI, in stimulating growth and development, and in aid effectiveness. As there has been a broad trend of democratization in regimes globally, so too has

[44] And, surprisingly, the growth rate of GDP, which is excluded as a determinant in my equations for reasons explained below.

there been a trend towards showing that democratic regimes are "better" in terms of aid effectiveness, appeal to international investors, and growth. This so-called "democratic advantage" should be controlled for through the inclusion of some sort of institutional variable representing government regime type.

3.211 Democratic advantage

Democratization is said to play a large role in determining FDI flows (Biglaiser et al., 2008; Busse & Hefeker, 2007; N. M. Jensen, 2003a; Li & Resnick, 2003; Oneal, 1994b; Tures, 2003). Authoritarian regimes don't have to worry about keeping their populace happy, and so may be less likely to bend to populist whims and more likely to hold fast to investment agreements (so is the argument of (Tuman, John P. Emmert, 2004)). However, democratic institutions can help oversee financial markets and contain corruption, making them the more attractive place for FDI (Biglaiser & Danis, 2002; N. M. Jensen, 2003a),

Overall, democratic regimes have been shown to positively influence FDI inflows, regardless of their origin. This so-called "democratic advantage"—a signal to foreign investors that their investments are less likely to be expropriated or interfered with—does hold. After controlling for democratic regimes, security alliances still have a positive impact on FDI (Li & Vashchilko, 2010a). This impact may be partially or wholly the result of U.S. military aid (the "funding") and its multiplier effects. I investigate within this chapter whether the supplemental funding (in the form of U.S. military aid) has a significant impact on U.S. FDI flows, after controlling for democratic regimes and security alliances.

3.22 Security, Conflict, and FDI

It makes sense that conflict would decrease, and alliances increase net bilateral FDI: regions with greater conflict are less likely to have the sustained increase in economic activity

desired by MNCs and foreign investors. It may also be true that areas with greater conflict may also draw investors as they think (maybe correctly) that they can demand higher rates of return for their capital and/or fill the gap where domestic production may fall short. A broad analysis studying 95 developing countries from 1980-2000 finds strong evidence for enduring risk of internal and regional conflicts to foreign portfolio flows, but only finds weak evidence with regards to FDI (Kim, 2016).

In a similar manner, political instability is shown to have negative impacts on FDI flows, at least historically (Schneider & Frey, 1985). Stability may be bolstered by U.S. troop presence (Braithwaite & Kucik, 2017). Using an IV regression and endogenizing troop deployment, (Braithwaite & Kucik, 2017) find supporting evidence of U.S. troops reducing civil conflict likelihood in host states. Li & Vashchilko (2010) find that interstate military conflict negatively impacts bilateral FDI.

As we have observed above, FDI's impact is often due to the existing infrastructure or affected by extent of spending on productive infrastructure during and after FDI spending. The presence of U.S. troops and the receipt of U.S. aid (economic and military) can have positive externalities, above and beyond the direct injection when U.S. bases are built, troops spend off-base, and foreign governments spend U.S. aid dollars; there can be "ship-yard externalities" from the knowledge transfer that comes from hiring local residents and training them in new production processes.

However, U.S. presence abroad is not always positive. Nor is it necessarily negative. U.S. bases have been shown to only improve human rights conditions in places with low security

salience[45] (Bell, Clay, Machain, et al., 2017); U.S. military interests can sometimes overshadow human rights concerns with regards to aid (Apodaca & Stohl, 1999). To complicate matters further, strong human rights are an important political determinant for FDI (Blanton & Blanton, 2007).

U.S. military presence may be linked to *increases* in terrorist episodes, when looking at 106 countries between 1986 and 2011 (Dimant et al., 2017). However, it is important to keep in mind that the above paper fails to distinguish between business-related and non-business-related terrorism; only business-related terrorism has a significant negative impact on FDI (Powers & Choi, n.d.). Analyzing a cross-sectional, time-series dataset spanning 123 countries from 1980-2008, the authors found no evidence that non-business-related transnational terrorism significantly impacts FDI (Powers & Choi, n.d.).

Studies have also investigated the connection between aid and public spending. Country-specific studies, such as (Pack & Pack, 1990) for Indonesia and (Gang et al., n.d.) for India, show that total (bilateral plus multilateral) foreign aid is retained in the public sector, primarily stimulating development (Khilji & Zampelli, 1994). However, multilateral aid shows no significant correlation with recipient country military spending. Looking at 46 less developed countries over the 1975-1980 period, (Cashel-Cordo & Craig, 1990) disaggregate aid and public spending and find no correlation between DAC bilateral ODA loan disbursements, DAC bilateral ODA grants, local currency disbursements, and highly conditional IMF disbursements—they did find a slight negative correlation between low conditional IMF disbursements and IMF

[45] According to Bell et al. (2017), "While any state where the U.S. has a large military presence will have some security salience, among the wide array of states where the U.S. has troops present there is going to be variation in just how important that state is to the U.S. security goals".

commodity disbursements. In addition, (Cashel-Cordo & Craig, 1990) find that bilateral aid is largely diverted to the private sector.

(Feyzioglu et al., 1998) form a model of aid fungibility[46] and test it on a panel of 14 developing countries from 1971-1990 and with annual time-series data from 1970-1990 on 38 countries to find that only a fraction of development assistance shows up in increased public investment. Most aid is fungible, as the sectoral analysis in the smaller sample shows that concessionary agricultural, energy, and education-related loans are diverted when aid inflows increase; only transport and communication sector loans are fully spent on donor-intended purposes (Feyzioglu et al., 1998).

3.23 Capital Controls / Policy Reforms

Multinationals may be wary of investment due to the risk of expropriation. Certain policy choices may assure (or deter) international investors, depending on the country and geopolitical environment.

Economic and policy reform variables include indicators for trade restriction and capital control measures. However, there are issues regarding the conflicting nature of how capital and trade restriction measures are received by international investors. Trade restrictions like tariffs and quotas at times and under certain circumstances positively and negatively impact FDI flows, so the net impact is ambiguous. For instance, FDI may be more likely to occur where tariffs are lowest, an intuitive result as profitability increases when taxes of any type are lowest (Agarwal, Gubitz, and Nunnenkamp 1992).

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[46] Fungibility denoting the ability/penchant/action of diverting resources away from government sectors or programs that are now to receive foreign aid funding.

On the other hand, FDI may be involved in circumventing high trade barriers; high trade barriers would then be sometimes positively correlated with FDI, and they are (Ellingsen and Warneryd 1999). However, the perceived trend of the 1990s and early 2000s—where FDI was formed to jump tariffs and other trade controls—lost its little evidence supporting it as general liberalization of FDI frameworks have resulted in explosion of service sector activity, and failed to result in any significant impact regarding export-oriented sectors or efficiency-seeking industries (low-labor and/or low-environmental regulatory cost) (Nunnenkamp, 2002).

With regards to capital controls, there is also a time and a place for when they are positive indicators for FDI and when otherwise are seen to be negative. While it seems natural that reduced capital controls would incentivize greater FDI, international investors may react positively, perceiving the continual presence of capital controls as an indication of a stabilized economy (Desai, Fritz, and Hines (2005)[47]. Capital control liberalization is positively correlated with a 6.9% increase in annual rates of property, plant, and equipment (investment) growth by U.S. multinational firm spending abroad (Desai et al., 2006).

Capital account openness is shown to be associated with increases in developing country FDI inflows[48] (Reinhardt et al., 2013). Other papers have fail to find significant evidence that capital flows are significant determinants of medium-run capital flows, but posit that this is likely due to measurement error rather than a finding that capital controls have no impact on net capital flows (as measured by changes in the current account balance) (Chinn & Prasad, 2003). In an extension of that work on medium-run capital flow dynamics, Chinn et al. (2014) find that

[47] Bilateral investment treaties with the U.S., when and only when they are in force, are associated with increases in FDI (Haftel, 2010). Later iterations of this paper will include enforced bilateral investment treaties as an independent variable.

[48] They also find that more open capital accounts are associated with net capital outflows in developed countries. This paper only pertains to developing and emerging countries though.

removing capital controls can be harmful, making the direct, negative impact of financial development on the current account even worse.

While macroeconomic indicators, political and economic policy reforms, and the level of democratization may play a role in FDI flows, the focus here is on how U.S. military aid and military presence impacts FDI. Therefore, I control for the factors above. The politicians/bureaucrats in charge are, after all, primarily concerned with retaining power, maintaining sovereignty, and expanding economic development, all of which foreign investment support. Barring some natural resource windfall, developing and emerging countries simply lack the existing capital, domestically, to expand at a rate to which their populace expects.

While theory and common sense would have FDI catalysing growth, there is limited evidence that growth causes FDI[49] (Avik Chakrabarti, n.d.). While market size does play a role, the growth of the market is also important to investors when looking at expanding MNC activity or investing abroad. I include the lagged growth rate of GDP as a control variable as a result.

International investors, though, are justifiably cautious in further expansions of their balance sheets, as sovereign debt defaults often create untenable positions for those investors, resulting in complete losses or large hair-cuts. Governments do not care so much about a potential loss of credit rating; it will not keep them from defaulting, as shown in (Ahmed et al., 2010). International investors will look to other enforcement mechanisms. Barring that, they will seek investments that—while still providing yield—are financially backstopped in some manner.

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[49] In addition, there is mixed evidence regarding FDI's impact on growth (Chowdhury & Mavrotas, 2005; Durham, 2003; Wang, 2009)

3.24 U.S. Aid and U.S. FDI

The literature that attempts to directly link aid with FDI (and test the possible complementarities) is inconsistent. Schneider & Frey (1985) test four standard FDI flow models for 80 developing and emerging countries and find that that bilateral aid from western countries[50] is the strongest of the significant coefficient estimates found, with per-capita GNP a close second. Multilateral aid (when disaggregated into political and economic aid flows) also positively impacted FDI flows, though the impact is around 1/3 of that of bilateral aid from western countries.

Harms & Lutz (2006) look at a panel of emerging and developing countries in the 1990s and find no significant impact of aid on FDI, even after controlling for governance and institutional controls. Their results reinforce those found by Rodrik (1995)[51], who found no significant impact on lagged multilateral lending and private financial flows. Bird & Rowlands (2004) also fail to find any significant impact of multilateral lending on private financial flows, pointing to the heterogeneity of both capital flows and lending and the need to disaggregate. Ratha (2001) argues and shows that while a contemporaneous aid-FDI effect may not be present, there may be a staggered complementarity between aid and FDI as aid creates and sustains improved institutional environments, an attractive quality for FDI.

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[50] As opposed to bilateral FDI from communist countries (which shows a statistically significant negative impact on FDI flows) (Schneider & Frey, 1985)

[51] One thing Rodrik (1995) did find was that multilateral lending seemed to follow private financial flows, providing support for a theory of international lending organizations "bailing out" private investors, a theory argued by (Dooley & Svenson (1994).

Aid could, theoretically, be good or bad for FDI. It could be good because aid, when accompanied by an increase in complementary factors of production[52], can increase the productivity of all private investment and therefore make that aid recipient more attractive for international investors and multinational corporations (Selaya & Sunesen, 2012).. Aid could be bad for FDI because of the possibility of (1) crowding out the recipient countries' tradeable goods sector (Beladi & Oladi, 2006) or the possibility that (2) aid inflows encourage rent-seeking behavior, decreasing productivity (Economides et al., 2008).

Infrastructure is a possible channel for the impact of aid on FDI.Donaubauer et al. (2016) posits that there are inextricable dependencies between aid allocation (sectorally), infrastructure growth, and FDI flows. As such, they estimate three structural equation representing each of the above in a 3SLS process and find strong evidence that aid in transportation shows a significant direct link to FDI flows, while targeted aid and aid in infrastructure projects increase infrastructure directly[53]—and infrastructure is shown to directly increase FDI—and so also indirectly.

This approach is well-guided, as foreign investors often comment that poor infrastructure is a leading bottleneck to FDI (Asiedu, 2002). And infrastructure indices are inconsistent, leading international investors to largely rely on reputation and (perhaps) previously funded and completed infrastructure-related aid projects as indicators of existing good infrastructure.

The extent of politico-military integration with the U.S. would also affect bilateral FDI flows. Thus, U.S. bilateral FDI to Iraq has remained consistently positive despite the significant

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[52] Complementary inputs defined to be health, educational, transportation, communication, and energy sectors (Selaya & Sunesen, 2012). Inputs that crowd out FDI were shown to be aid directed into "productive sectors" like industry, trade, agriculture, and banking (Selaya & Sunesen, 2012).

[53] Vijil & Wagner (2012) find evidence that well-targeted aid improves infrastructure, using a cross-country approach similar to Donaubauer et al. (2016).

drawdown of U.S. troop deployment in Iraq in 2011 and the correlating pattern of perennial net negative multilateral FDI that has lasted from 2012 to 2019 (BEA, WDI). U.S. bilateral FDI to Afghanistan has also been perennially positive in the years for which data has been collected (BEA, WDI). In both these circumstances, the presence of the U.S. military has a lasting and positive impact on FDI decisions.

U.S. FDI, when involving considerable integration with the host country or in a higher-skilled sector, tends to value stronger human rights, particularly physical integrity rights (Blanton & Blanton, 2009).

Further, the positive impact of U.S. military presence on FDI decisions may like the impact of aid, flow through an infrastructure spending channel. After all, large aid packages are offered in compensation[54] for basing rights, and barring significant corruption, greater amount of government revenue allows for and encourages productive public spending, possibly leading to better infrastructure and institutions.

The literature surrounding security and U.S. FDI shows evidence that U.S. FDI "follows the flag", in that U.S. investors feel more comfortable when U.S. basing and troop deployments are present in the country within which they are considering investing (Biglaiser & DeRouen, 2007; Bove et al., 2014). What has received less attention is the impact of the interplay of military aid and military presence on FDI flows. This is gap that this study addresses.

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[54] For example, President Ismael Gulleh of Djibouti renegotiated from $7 million annual in aid in 2002 (when the U.S. base was established) to over $90 million in 2003 and 2004. Rental payments for the land used for the base increased to $30 million in 2007!(Cooley & Nexon, 2007)

3.3 Method

There are causality issues with both "follow the flag" and aid-for-FDI dynamics. Is it that U.S. investors invest abroad when the U.S. security apparatus appears to be enhancing the security of the region? Or does U.S. policy reflect the changing foreign interests of U.S. investors and multinational companies? Ultimately, correlation may play a key factor here too: a low capital may stock reflects the high aid need for aid and that same dearth in capital is often accompanied by larger returns for investors. Similarly, highly corrupt governments disincentivize aid donors and international investors alike.

To estimate how the security variables impact U.S. FDI, I control for macroeconomic, policy, and polity conditions in an approach familiar in the literature (Dreher & Jensen, 2007; N. M. Jensen, 2003a; N. Jensen & McGillivray, 2005; Lee et al., 2012). The Hausman test suggests the need to model fixed effects (Biglaiser & DeRouen, 2007). There are likely unobservable systematic factors influencing U.S. investment decisions with regards to FDI (Biglaiser & DeRouen, 2007; Blanton & Blanton, 2006; Reed, 2000). U.S. FDI may fail to go to the poorest developing countries or those with frequent conflict. If this occurred, the coefficient estimates for the independent variables of interest would be biased. If a selection process predetermines the countries receiving FDI (as opposed to disinvestment—net financial outflows from the host/recipient country), I must solve two equations simultaneously, one for the selection equation and one for the main equation (Reed, 2000) (Biglaiser & DeRouen, 2007).

The reason for the two-stage Heckman process is that bilateral FDI is negative at times. As the relationship is non-linear, there are two solutions to analyzing the net bilateral FDI flows. The first is to use a Heckman process whereby a dummy variable is created and coded to 1 when FDI is positive and 0 otherwise. A (probit) selection equation is estimated with the dummy variable as the dependent variable while a main equation uses just the selected datapoints to

estimate with (now, only the positive) bilateral FDI country-year datapoints. A two-stage Heckman process is used to model the two equations simultaneously. Consistent estimators are produced despite the possible selection bias (Blanton 2000:127) (Biglaiser & DeRouen, 2007). Biglaiser and DeRouen (2007, pp. 836-837) assert that security influences both the decision to invest internationally as well as the amount invested. Following this logic, FDI would follow an enhanced security status, due, in part, to U.S. military presence, military aid, and non-active troop foreign military employment.

Biglaiser and DeRouen (2007, pp. 836-837) use the same methodology as Blanton (2000), who looks at U.S. military aid and uses the same two-stage model where a selection ("gatekeeping") stage bifurcates the dataset depending on whether the country received aid or not. The dependent variable of Blanton (2000)'s outcome equation is the amount of aid. Negative FDI years (divestment years) are treated as non-selected and coded as 0 in the selection equation. Biglaiser and DeRouen (2007, pp. 836-837) use U.S. FDI and the percentage of GDP that is global FDI as the dependent variables in their analysis. I use the same dependent variable in my outcome equations. I expect all security factors (troops, non-troops, trainees, military aid, number of bases) to be positive and significant in both phases but particularly economically significant in the gate-keeping (selection) phase.

The second approach is to add some constant, *c*, to the dependent variable before taking the logarithmic transformation of it. I do this in the fixed effects regression, same as (Biglaiser & DeRouen, 2007).

Lastly, to investigate whether the "follow the flag" phenomenon is isolated to U.S. FDI, I include another robustness check where I use the same Heckman selection process but code a

new variable, Multi_Positive_FDI_Dummy, which takes the value of 1 when multilateral net FDI inflows are positive and 0 when they are negative.

3.4 Data

The variables used within reflect the seminal paper from which is my point of departure, Biglaiser and DeRouen (2007, pp. 836-837). In the following section, I detail the variables employed and their sources. There are some notable exceptions with regards to my attempt to replicate (Biglaiser & DeRouen, 2007) in exact: there are a different set of capital controls and the new inclusions of military bases and military aid.

3.41 Summary Information for Data

Table 4: Summary Statistics for Chapter 3.41

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP (constant 2010)	1,704	$120 B	$328 B	$29 M	$2.9 Trillion
Bilateral FDI	1051	$20 M	$265 M	- $2 B	$3.6 B
Bilateral Trade	1,671	$50 M	$114 M	0	$730 M
Hostility dummy	1,739	.0477286	.2132527	0	1
Democracy dummy	1,330	.5894737	.4921144	0	1
Troops	1,739	120.7677	607.3531	0	12174
Trainees	1,528	305.0465	630.9117	1	9122
Military Aid	1,548	$29.8 M	$149 M	0	$1.3 B
Number of Bases	1,244	.1720257	1.021564	0	8
Capital Control Dummy	517	.4719536	.4996963	0	1
DoD Civilian Employment	799	5.688039	24.50397	0	257
Labor Force	1619	16 B	53 B	43 M	49 B
Growth	1,706	4.050092	5.505768	-62.07592	123.1396

Table 5: Variable Sources for Chapter 3.41

Variable	**Operationalization**	**Source**
	Dependent Variables	
Bilateral FDI *(bilat_FDI)*	Negative values indicate divestment; positive values indicate net investment	BEA
Multilateral FDI *(FDI)*	Foreign direct investment, net inflows (BoP, current U.S.$) BX.KLT.DINV.CD.WD	WDI
	Independent Variables	
Security Variables		
U.S. Troops > 100 (active_duty_over_100)	U.S. forward presence episodes (years where U.S. active-duty troops>100)	Heritage Foundation (Tim Kane) (2000-2006) U.S. DOD (2008-2020)
Military Presence (mil_pres)	U.S. active duty	Heritage Foundation (Tim Kane) (2000-2006) U.S. DOD (2008-2020)
Max Presence (max_presence)	Summation of all U.S. troops, reserve deployments, civilian DoD deployments, and trainees	U.S. DOD (reserves, civilians; 2008-2020) Security Assistance Monitor https://securityassistance.org/ (trainees; all years)
Total aid (total_aid)	Summation of U.S. economic and U.S. military aid	Security Assistance Monitor https://securityassistance.org/
Military Share of Aid *(mil_share)*	Quotient of U.S. military aid and *total_aid*	Security Assistance Monitor https://securityassistance.org/
Macroeconomic Controls		
Bilateral Trade (deflated_bilat_trade)	IYR + EYR Bilateral Trade totals divided by *gdp_deflator*	U.S. Census WDI

GDP (GDP_2010)	GDP (constant 2010 U.S.$) NY.GDP.MKTP.KD	WDI
GDP per capita *(GDP_pc_2010)*	GDP per capita (constant 2010 U.S.$) NY.GDP.PCAP.KD	WDI
Economic Growth (growth)	GDP growth (annual %) NY.GDP.MKTP.KD.ZG	WDI
Education (education)	School enrollment, primary (% gross) (SE.PRM.ENRR)	WDI
Labor (labor)	Labor force, total # employed (SL.TLF.TOTL.IN)	WDI
Econ/Policy Reform Proxies & Controls		
Openness (wdi_trade)	Trade in % GDP (WDI)	WDI
Capital Control Measure	0 for no direct investment inflow capital controls, 1 for enforced direct investment inflow capital controls	Fernandez, Klein, Rebucci, Schindler, Uribe NBER WP No. 20970, Feb. 2015
Polity		
Democracy Regime (democracy_lexical)	0 for nondemocratic, 1 for democratic regime	Skaaning et al. 2015
Democratization *(polity)*	Polity IV measure (-10 to 10, 10 = most democratic)	Marshall and Jaggers 2002
Regime Type (*htw_regime1ny)*	Regime type, collapsed	Hadenius et al. 2013

3.42 Dependent Variable

I use 85 developing and emerging countries to assess the effect of U.S. security ties on bilateral U.S. FDI. I use every available case where data is available. FDI data is provided by the Bureau of Economic Analysis (BEA). The data provided by the BEA is in nominal millions of

dollars and measures long-term investments by U.S. residents. Deflating this with the GDP deflator controls for inflation. As the BEA suppresses some years from their analysis (to avoid the possibility that investments can be traced back to a single investor/firm), I exclude those country-year data from my analysis, following (Rosecrance & Thompson, 2003) (Little et al., 2004) and (Biglaiser & DeRouen, 2007). Similarly, country-years where changes in financial stocks fall between -$500,000 and $500,000 are omitted from the BEA data and are not available. In this way, the U.S. bilateral FDI flow data is bottom-coded.

U.S. military deployment data is missing for the years of 2006 and 2007. The Department of Defense DMDC provides data on global troop deployment locations starting in September 2008. I use these to augment the existing database of U.S. troop deployments, made available by Tim Kane and the Heritage Foundation. The Heritage Foundation troop database provides detailed information for the active-duty personnel positioned abroad beginning in 1950 and ending in 2005. Data availability for many developing- and emerging countries is spotty at best pre-2000. I use all data available post-2000, including the most recent year (2019).

3.43 Independent Variables

3.431 Security Variables:

The United States maintains an extensive network of foreign basing operations and has since the end of World War II in addition to widespread U.S. military deployment abroad (Heo & Ye, 2017a; Vine, 2015). Moderate estimates price the cost of U.S. foreign base maintenance around U.S.$85 billion annually (Vine, 2015). Overseas military bases employed 81,425 local residents and has been valued around 127 billion USD in 2005, the last date available (Vine, 2015; Johnson, 2006).

Greater U.S. foreign basing presence, military aid, and non-military deployment impact trade relations, capital flows, and economic growth. Greater involvement of the U.S. security apparatus (as proxied through non-troop deployment and U.S. basing presence) can be seen to be strengthening regional stability, one reflection of which is better sovereign host nation credit ratings (Vea, 2015).

U.S. troop deployment is measured as any country-year observations where active-duty troop deployment is greater than 100. This cut-off is common to the literature, as troop deployments of less than 100 are indicative of small contingency forces guarding embassies and/or other small U.S. holdings. U.S. non-troop deployment is an aggregation of all reserve and civilian (DoD) employees (U.S. DMDC) as well as all U.S. trainees (SecurityAssistance.Org).

U.S. basing presence is calculated as a dummy variable, coded as 1 when there is a U.S. base, U.S.-funded base, lily-pad base, or unconfirmed U.S. base, or any combination.

Total aid is calculated by combining economic aid and military aid. Economic and military aid is sourced from both government and non-government organizations and is the most encompassing measure of U.S. transfer payments abroad.

The military share of aid is calculated by dividing military aid by total aid.

3.432 Macroeconomic Variables:

Macroeconomic variables are, as shown above, the foundation of the FDI determinant literature. Specifically, countries with high growth rates, increasing living standards (as proxied by GDP per capita), and large markets are sought by multinational enterprises as FDI destinations. The macroeconomic variables used in the regression are: GDP per capita, economic growth, lagged, logged bilateral trade with the U.S., the total number of employed persons in that country, a dummy variable for the presence of at least one hostility event that year, a dummy

variable for capital controls on foreign direct inflows, a dummy variable for whether the country is a democracy or not, and a squared distance between capital cities variable as the gravity model applies to financial flows as well as trade.

3.433 Economic / Policy Reform Variables:

Despite the mixed evidence regarding capital controls and their hypothesized impact on FDI, I choose to include capital controls since I am closely following (Biglaiser & DeRouen, 2007). As I was unable to acquire or otherwise replicate the exact capital controls used in (Biglaiser & DeRouen, 2007), I use a new capital control dataset published by the NBER in 2015. This capital control dataset is unique in that it disaggregates capital control measures by the sector and flow measure. As I am interested in FDI flows from the U.S. to host/recipient nations, I look at the direct investment inflow (dii) controls (Fernández et al., 2015).[55] Instead of the 9-point capital control measure developed by (Brune et al., 2001), I use the (Fernández et al., 2015) measurement, while is a simple binary variable with 0 indicating no capital controls on direct investment inflows and 1 indicating enforced capital controls on direct investment inflows.

3.434 Democratization Variables:

As with growth, it is hotly debated as to whether democratization is an important determinant of FDI. On one side, researchers find that "benevolent dictators" with authoritarian regimes create and maintain domestic stability, which then allows for and translates to international creditworthiness (G. O'Donnell, 1978; G. A. O'Donnell, 1988; Oneal, 1994a; Tuman, John P. Emmert, 2004). On the other side, it is argued that democratic institutions are more effective at monitoring and defending capital (Tures, 2003).

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[55] Upon further reflection, I should run another regression set with **dio,** direct investment outflow controls, as the ability to withdraw funds may be what really drives FDI behavior.

Democratic countries are not conclusively found to be more attractive in the eyes of international investors nor more prone to economic growth (when compared to authoritarian regimes). Indeed, despite the merits of democratic rule, "benevolent dictators" so-to-speak can and do quite well at managing their economies and, as such, attract significant FDI and see consistent economic growth (Burnside & Dollar, 2000a; N. M. Jensen, 2003b; M. Olson, 1993). Olsen (1993) and Heo & Ye (2017a) assert that regime type (democratic vs. authoritarian) had a significant impact on domestic and foreign investment. And while regime type did statistically and economically significantly impact the measures of domestic and foreign investment and trade, the seemingly unrelated regression dropped that variable from sub-regression where economic growth was the dependent variable, further justifying skepticism regarding the growth impact of regime type (Heo & Ye, 2017a).

Democratic institutions can and do provide international credibility as they are shown to bolster property rights enforcement and lower political risks for foreign investors (Biglaiser & Danis, 2002; Li & Resnick, 2003). I include a democracy dummy as well as the commonly used Polity IV index to control for this.

3.44 Regression Equations

The Heckman two-stage process is combined with lagging the LHS variable one period and lagging select RHS variables one period. The main equation is:

$$FDI_{i,t} = B_0 + B_1.In(Military\ Presence)_{i,t-1} + B_2.Trainees_{i,t-1} +$$
$$B_3.Base\ Presence\ Dummy_{i,t} + B_4.\ln(Total\ Aid)_{i,t-1} +$$
$$B_5.Military\ Share\ of\ Aid_{i,t-1} + B_6.GDP\ per\ capita_{i,t} + B_7.Growth_{i,t} +$$
$$B_8.Trade\ Volume_{i,t-1} + B_9.Hostility\ Dummy_{i,t} +$$

$$B_{10}.Capital\ Control\ Dummy_{i,t} + B_{11}.Democracy_{i,t} + B_{12}.dist_i^2 +$$

$$B_{13}.FDI_{i,t-1} + e_{i,t} \quad (1)$$

The selection equation is:

$$PositiveFDIDummy_{i,t} = B_0 + B_1.ln\ (Military\ Presence)_{i,t-1} + B_2.US\ Trainees_{i,t} +$$

$$B_3.Base\ Presence\ Dummy_{i,t} + B_4.Hostility\ Dummy_{i,t-1} +$$

$$B_5.Democracy\ Dummy_{i,t} + B_6.Civilian\ Emp_{i,t-1} +$$

$$B_7.dist_i^2 + e_{i,t} \quad (2)$$

As I am looking at how the inclusion of aid and bases impacts the already established impact of U.S. troop deployment on FDI, I include a second and third Heckman regression: one without aid & bases, and with troops & trainees; and one with aid & bases, but without troops or trainees. The main equation for the Heckman 2 regression (without aid & bases) is as follows:

$$FDI_{i,t} = B_0 + B_1.In(Active\ Duty\ over\ 100)_{i,t-1} + B_2.Trainees_{i,t-1} +$$

$$B_3.GDP\ per\ capita_{i,t} + B_4.Growth_{i,t} + B_5.Trade\ Volume_{i,t-1} +$$

$$B_6.Hostility\ Dummy_{i,t} + B_7.Capital\ Control\ Dummy_{i,t} +$$

$$B_8.Democracy_{i,t} + B_9.dist_i^2 + B_{10}.FDI_{i,t-1} + e_{i,t} \quad (3)$$

While the selection equation changes from (2) to become:

$$PositiveFDIDummy_{i,t} = B_0 + B_1.\ln\ (Max\ Presence)_{i,t-1} + +B_4.Hostility\ Dummy_{i,t-1} +$$

$$B_5.CapitalControl\ Dummy_{i,t} + B_5.Democracy\ Dummy_{i,t} +$$

$$B_6.Civilian\ Emp_{i,t-1} + \mathrm{B}_7.dist_i^2 + e_{i,t} \quad (4)$$

Heckman 3 regression drops troops and trainees, keeps total aid and the military share of aid in the main equation, replace the Base Presence Dummy for Number of U.S. Bases and adds total aid and the military share of aid to the selection equation as well. The result is as follows:

$$FDI_{i,t} = B_0 + B_1.\ln(Total\ Aid)_{i,t-1} + B_2.Military\ Share\ of\ Aid_{i,t-1} +$$
$$B_3.GDP\ per\ capita_{i,t} + B_4.Growth_{i,t} + B_5.Trade\ Volume_{i,t-1} +$$
$$B_6.Hostility\ Dummy_{i,t} + B_7.Capital\ Control\ Dummy_{i,t} +$$
$$B_8.Democracy_{i,t} + B_9.dist_i^2 + B_{10}.FDI_{i,t-1} + B_{11}.Number\ of\ US\ bases_{i,t} +$$
$$e_{i,t} \quad (5)$$

The selection equation is:

$$PositiveFDIDummy_{i,t} = B_0 + B_1.Base\ Presence\ Dummy_{i,t} + B_2.Hostility_{i,t} +$$
$$B_3.Democracy\ Dummy_{i,t} + B_4.Civilian\ Emp_{i,t-1} +$$
$$B_5.dist_i^2 + B_6.\ln(Total\ Aid)_{i,t} +$$
$$B_7.Military\ Share\ of\ Aid_{i,t} + e_{i,t} \quad (6)$$

The fixed effects regression is accomplished by first adding a constant[56] to bilateral FDI and then taking the logarithmic transformation. This is the same procedure used in (Biglaiser & DeRouen, 2007). The fixed effects equation is:

$$\ln(positive\ FDI)_{i,t} = B_0 + B_1.USloggedTroops_{i,t-1} + B_2.USTrainees_{i,t} +$$
$$B_3.Base\ Presence\ Dummy_{i,t} + B_4.\ln(Total\ Aid)_{i,t-1} +$$
$$B_2.Military\ Share\ of\ Aid_{i,t-1} + B_3.GDPpc_{i,t-1} +$$
$$B_4.Growth_{i,t-1} + B_5.Bilateral\ Trade\ Vol_{i,t-1} +$$
$$B_6.ConflictDummy_{i,t-1} + B_6.CapitalControls_{i,t-1} +$$
$$B_7.DemocracyDummy_{i,t-1} + +B_{10}.MilitaryAid_{i,t-1} +$$
$$FDI_{i,t-1}e_{i,t} \quad (7)$$

[56] For my data, I used \$17 million as the variable c, since the lowest value in my net FDI data was less than \$16 million

For further robustness, (Biglaiser & DeRouen, 2007) thought to test whether the security impact is isolated to just U.S. investors. By looking at multilateral FDI (global FDI), and running the same Heckman selection model, I look at whether or not the gatekeeping and security-enhancing effects still hold. I use the same measure of multilateral FDI as (Biglaiser & DeRouen, 2007): global FDI as a percentage of GDP. The equation is below:

$$Multi\_FDI_{i,t} = B_0 + B_1.In(Military\ Presence)_{i,t-1} + B_2.Trainees_{i,t-1} + B_3.Base\ Presence\ Dummy_{i,t} + B_4.\ln(Total\ Aid)_{i,t-1} + B_5.Military\ Share\ of\ Aid_{i,t-1} + B_6.GDP\ per\ capita_{i,t} + B_7.Growth_{i,t} + B_8.Trade\ Volume_{i,t-1} + B_9.Hostility\ Dummy_{i,t} + B_{10}.Capital\ Control\ Dummy_{i,t} + B_{11}.Democracy_{i,t} + B_{12}.dist_i^2 + B_{13}.Multi\_FDI_{i,t-1} + e_{i,t} \quad (8)$$

The selection equation is:

$$Positive\ Multi\ FDI\ Dummy_{i,t} = B_0 + B_1.\ln(Military\ Presence)_{i,t-1} + B_2.US\ Trainees_{i,t} + B_3.Base\ Presence\ Dummy_{i,t} + B_4.Hostility\ Dummy_{i,t-1} + B_5.Democracy\ Dummy_{i,t} + B_6.Civilian\ Emp_{i,t-1} + B_7.dist_i^2 + e_{i,t} \quad (9)$$

3.5 Results

Results of the two-stage Heckman process models and the panel time-series are shown in Table 3. The first column reports the selection results as well as the full Heckman specification. Robust standard errors are employed. Column two reports the Heckman 2 model, the model without aid & bases but with active duty over 100 and the aggregate maximum presence variable. Column 2 presents the regression results most similar to those in (Biglaiser &

DeRouen, 2007), although comparisons should be made cautiously as my sample is smaller, the time period different, and I include the additional variable of U.S. trainees as well as U.S. active duty troops over 100 (the latter of which is the same primary independent variable used in Biglaiser & DeRouen (2007).

Column 3 presents the Heckman 3 results, which includes total aid, military share of aid, and number of bases, but leaves out U.S. troops and trainees. Column 4 presents the panel time-series fixed effect regression results (using logged positive FDI as the dependent variable). The fourth column reports the findings from the main and selection specification for a multilateral FDI model. The Wald tests on the two Heckman models are inconclusive, indicating that the selection and main equation equations may not be independent, suggesting these results should be interpreted with caution.

The story within is as follows: U.S. military presence, when logged and lagged, shows a positive impact on the selection of U.S. FDI flows but a negative impact on the amount of U.S. FDI. A 1% increase in U.S. military presence last year is associated with a 17.5% increase in the likelihood of positive bilateral FDI flows to that country this year. These findings are largely consistent with those found by (Biglaiser & DeRouen, 2007), who found that 1% increases in military presence increases the likelihood of positive U.S. FDI by ~24%. However, the similarities end there, as the coefficient estimate for U.S. troops on the main equation (that determining the actual U.S. FDI flow that year if it is net positive) is negative in my analysis, not positive as expected. Increases in U.S. troops increase the likelihood of U.S. investors to directly invest abroad but decreases the amount of FDI invested abroad, even after controlling for the typical macroeconomic determinants of FDI as well as variables reflecting security concerns, policy differences, capital controls, and democratization. For every 100 additional U.S. troops,

there is an associated *decrease* in U.S. FDI of $69,000. Looking military base presence, I find that the presence of a U.S. base, lily-pad, or U.S.-sponsored base increases the likelihood of positive U.S. FDI by 34%.

Logged total aid is consistently statistically significant, even in the regressions using global FDI flows[57] instead of U.S. FDI flows. A 1% increase in total aid is associated with a 22%-31% increase in total U.S. FDI. The military share of aid is playing a large role here as well, but not in the selection equation or "gatekeeping" phase and not in the direction I hypothesized. Once the decision has been made by U.S. investors to invest abroad, the military share of U.S. total aid has a large and statistically significant impact on the amount of FDI invested. A 1% increase in the military share of aid is associated with a decrease in total bilateral U.S. FDI of ~$260,000. This result makes sense if increases in military aid are always associated with increases in conflict or hostility[58]. Since the coefficient estimate of changes in total aid are consistently positive, this means that economic aid is associated with positive changes in FDI flows.

U.S. troops are not the only determinant at work here in the selection equation. In the selection equation, we see that democratic regimes, employed persons, and the presence of at least one U.S. military base have a positive and significant impact on whether U.S. FDI flows are net positive that year. Democratic regimes are also associated with increases in the amount of U.S. FDI. The presence of a democratic regime increases the likelihood of positive FDI by 30%

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[57] The coefficient estimate for logged, lagged total U.S. aid on global FDI flows is statistically significant but much lower in magnitude than when looking at U.S. FDI flows only: 0.007% compared to 22-42%.

[58] Hostility Presence Dummy should be controlling for that. Perhaps the inclusion of a robustness check using the Correlates of War Projects' Militarized Interstate Dispute (v3.10) data would be worth inclusion in a future revision.

to 45% and increases the average amount of $1.3 million. These are both large impacts, further confirmation of the "democratic advantage" hypothesis.

All control variables—apart from the hostility variable—show statistical significance. This is reassuring, as I am attempting to replicate the process used and same control variables used as in in Biglaiser & DeRouen (2007)[59]. In addition, although my sample and time-period of study are different, the unobserved factors should be considered and accounted for by the Heckman two-stage selection models. The consistent range of coefficient estimates is also consistent.

Capital controls are one vexing result. Capital controls are only statistically significant and economically significant in the selection equation of Heckman 3. In this one statistically significant result, the impact of capital controls on the likelihood of positive net U.S. FDI is as large as that of having at least one U.S. military base and being a democracy (31% for capital control dummy, 34% for base presence dummy, and 30% for democracy dummy). This result is counter to my expectation, as capital controls are usually seen as restrictive and undesirable. The presence of capital controls, in and of themselves, is not seen as a bad thing. However, it is more likely that capital openness (lower capital controls) is associated with greater FDI flows, so the result of a positive and large impact of capital controls on foreign direct inflows is perhaps capturing the impact of some unobserved variable that is highly correlated with FDI inflow capital controls. For now, taking the results at face value, it seems that U.S. investors see capital controls as just as important as U.S. backstopping (in the form of at least one U.S. base) and the democratization of the recipient country.

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[59] Excepting the inclusion of a variable for alliance portfolio similarity.

However, investors may see capital controls, at times, as good and sometimes bad, and perhaps have no opinion. Regardless, the coefficient estimates for my measure of capital controls was statistically insignificant. Of course, this could also mean that an alternative measure of capital controls is needed. While the NBER capital control dataset is nice in that it disaggregates control measures into the inflow/outflow as well as by type, the sample size is low, and the simplicity of the dummy variable leaves something wanting. Robustness checks will use alternative measures of capital controls, or even lagged values of capital volume (inflows + outflows) as the methodology and construction of most capital controls are problematic for panel analysis.

The main equation shows that U.S. Trainees, the presence of a U.S. base, and U.S. military aid are significant determinants in the amount of U.S. FDI invested abroad. When these are taken into account, there is no longer a positive impact of U.S. troops on U.S. FDI, as found in (Biglaiser & DeRouen, 2007) (who found a mere 26 to 55 constant 1995 dollars increase per 1% increase in U.S. troops—only $495.70 when U.S. troops are moved from their minimum to their maximum and multiplied by the coefficient estimate!).

In the Heckman 1 specification, U.S. troops show no statistical significance at all; U.S. trainees and the Base Presence Dummy are the only statistically significant determinants, and only holding at the 10% significance level. A 1% increase in U.S. trainees of foreign soldiers decreases U.S. FDI by $35, an economically insignificant amount. The coefficient estimates for the base present dummy variable are both statistically and economically significant: U.S. base presence is associated with a $1.87 million increase in FDI, the largest impact of the regressions.

It seems that establishing some kind of U.S. base (whether it's a declared U.S. base, U.S. Lilypad base, U.S.-sponsored foreign base, or unconfirmed U.S. base) is a strong signal to U.S.

investors that the U.S. will financially backstop the host nation, after controlling for the relevant determinants[60]. U.S. basing presence increases the likelihood of positive U.S. FDI by around 35%.

Increasing U.S. troop presence, however, increases only the likelihood of investing (rather than divesting) in that country that year but decreases the expected amount of net positive U.S. FDI invested that year.

All in all, the three Heckman specifications (1-3) indicate that U.S. military aid and U.S. base presence, as well as the changes in total U.S. aid and the number of total U.S. bases, have an impact on not only the decision of whether to invest abroad in the form of FDI, but the amount invested. U.S. troops and bases increase the likelihood of positive FDI, while U.S. trainees of foreign troops and U.S. military aid decrease the amount of FDI invested after that initial decision is made. The regression results taken together suggest that a little bit of help from the U.S. may, on average, increase the likelihood and amount of U.S. FDI, but too much of this activity seems to signal to investors that the U.S. backstopping may not be enough to compensate the additional risk of establishing direct investment projects in conflicted regions.

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[60] Other notable determinants of FDI include: the change in the total amount of aid, the change in the military share of aid, GDP per capita, logged bilateral trade volume, whether the host nation is a democracy, and squared distance (negative, as expected).

Table 6: Regression Results for Chapter 3.5

	Heckman 1	Heckman 2	Heckman 3	FE--Full Model	Global FDI--Full Model
Main Equation	Full Model	Without aid & bases	Without troops & Trainees		
Log Military Presence$_{t-1}$	-0.2			0.0	-.0000692***
Log Active Duty over 100		-.6915082**			
Military Presence+Trainees+		.0004713***			
Reserves+Civilian DoD (Max Presence)					
Trainees $_{t-1}$	-.0003572*			0.0	0.0
Base Presence Dummy	1.873603*			0.0	0.0
Log Total Aid $_{t-1}$	.4153898*		0.2	.2158009***	.000067***
Military Share of Aid $_{t-1}$	-2.579634**		-2.725596***	0.0	0.0
GDP per capita (constant 2010 USD)	.0005926**	0.000595	.0004057*	0.0	0.0
Economic growth (% of GDP)	0.1	-.1288018***	0.0	0.0	0.0
Log Bilateral Trade$_{i,t}$ (Constant 2010 USD)	.0152971***	0.0	.0158351***	-.0034924***	0.0
Hostility Presence Dummy	0.7	-1.192097***	0.3	0.0	0.0
Capital Control Dummy	0.9	-0.4	0.1	0.0	0.0
Democracy Dummy	1.333848*	0.2	0.7	0.1	0.0
Distance squared	-1.34e-08**	0.0	-1.52e-08**		-8.28e-13*
FDI $_{t-1}$	0.2	.3055673**	0.2	-.3334088***	
Number of U.S. Bases			-.385198***		
Positive bilateral FDI $_{t-1}$				-0.1	
Multilateral FDI $_{t-1}$					0.0
Positive Bilateral FDI (Pos Multi for Global)					
Log Military Presence $_{t-1}$	.1755058**				-0.1
Max Presence		0.001226***			
Trainees $_{t-1}$	0.0				0.0
Base Presence Dummy	-0.2		.3434326**		0.1
Hostility Presence Dummy	0.0	0.2	0		-0.1
Capital Control Dummy	0.2	0.8	.3045503**		0.0
Democracy Dummy	.4537121***	0.4	.306112*		0.0
Civilian Employment (# of persons)	3.63e-09***	0	4.35e-09***		0.0
Distance squared	0.0	8.83-09***	2.06e-09*		0.0
Log Total Aid $_{t-1}$			0.0		
Military Share of Aid$_{t-1}$			0.1		
athrho	-.3626667*	0.0	-.5066637***		17.52804***
lnsigma	1.362525***	-.5905**	1.399708***		-7.885279***
N	350	277	395	222	297
Selected	90	17	100		290
Nonselected	260	260	295		7
Country Fixed Effects	No	No	No	Yes	Yes

** denotes 10%, ** denotes 5%, *** denotes 1% significance level*

3.6 Discussion

Going beyond the traditional focus on macroeconomic determinants of FDI flows, this study finds that troops and trainees, as well as total aid and base presence, are the important determinants that shape investor sentiment about the security of a country. This study also finds that increases in total aid and having a U.S. military base are associated with increased U.S. FDI flows, while increases in the military share of aid is associated with decreases in U.S. FDI.

Puzzling results from the study are that U.S. troops and U.S. trainees—while positively shaping investor sentiment and influencing the likelihood of net positive U.S. FDI—are associated with *decreases* in U.S. FDI flows, a result counter to the existing literature. The existing literature does not consider aid flows or U.S. foreign basing presence, with the limited literature showing that U.S. troops are associated with *increases* in U.S. FDI flows, not decreases as I found here.

It is the inclusion of U.S. politico-military integration that brings to light the harmful impact of U.S. troops and trainees abroad on U.S. FDI (and multilateral, global FDI flows as well). After controlling for conflict, development level, standard of living, bilateral trade, and all of the typical FDI flow controls used in the literature, I find that while the presence of a base increases the likelihood of net positive FDI, there is small support (one specification) that increases in the *number* of bases are also *negatively* associated with the *amount* of U.S. FDI. There is a similar story with U.S. troops: while troops are positively associated with the likelihood of net positive FDI, additional troops (and U.S. trainees of foreign troops) are associated with decreases in the amount of U.S. FDI.

One refreshing result is that of logged total U.S. aid: coefficient estimates consistently show the positive impact of total U.S. aid on U.S. (and global) FDI. Aid, after controlling for the

share of aid that is military aid, the degree of U.S. politico-military integration, and other standard FDI controls, seems to positively influence U.S. FDI.

U.S. bases and foreign military personnel are—when possible—supported and provisioned by the host countries themselves. The U.S. military rents facilities, purchases material (from food to spare parts), hires local civilians, and hires local companies to perform services (Tillson, 1997). This makes sense given my results: there is no observed effect on the quantity of U.S. FDI when U.S. politico-military integration increases. The U.S. military hires lots of host-nation civilians and contractors and does not prioritize U.S. firms. As it is, only 'command and control functions', which, by definition, are to be handled internally, are explicitly disallowed from subcontracting to some form of external support, be it host- or some other foreign nation[61].

3.61 Limitations & Issues

The approach within has issues, as the lagged dependent variables, by definition, are correlated with any unobserved country-specific effects (correlations between lagged values and the error term), and therefore are inconsistent estimates for both OLS and random effect estimators (Arellano & Bond, 1991). Fixed effect is biased and inconsistent too. I either need to test the lagged dependent variable with a Hausman test or use a specialized GMM estimator. Right now, my finite sample selection bias is 1/T, so near 5% here whereas the finite sample selection bias in Li & Vashchilko (2010b) was around 10%

[61] Filipinos and Indian nationals and other "Third-Country Nationals" or (T.C.N.s as they are known in military parlance) have often been called the U.S.' "invisible army" due to the widespread use of civilian contractors by the U.S. military (Stillman, 2011). In 2011, over 70,000 T.C.N.s were working (often through a chain of subsidiaries) for the U.S. military throughout the world, on bases and shipyards and adjacent locales (Stillman, 2011).

In addition, there is most probably a problem in that the presence of special dependence creates bias in my coefficient estimates. If the security ties and U.S. foreign aid decisions made in other countries B, C, and D influence the decision of country A. The solution is to allow third-party observations so I can analyze not only alliances the U.S. forms with other countries but also the alliances those countries form without any U.S. involvement. Similar to the example provided in Neumayer and Plumer where "Whether country i and country j form an alliance may partly depend on what other alliances exist between countries in the world, including those that either country i or country j have concluded with countries besides each other (inclusive of alliances that countries i and j have with other countries" (Plümper & Neumayer, 2010). Using a dyadic spatial-effect model: spatial lag model or a spatial autoregressive model of what Neumayer and Plumper (2010b) named *inclusive dyad contagion* may be warranted.

3.7 Conclusion

In the post-9/11 era, the use of U.S. foreign aid, U.S. basing presence, and U.S. troop presence abroad is seen to be tied to financial behavior of large U.S. multinational companies. In this analysis of the period from 2000 to 2019, we see that there is clearly a bias of U.S. investors towards places with U.S. bases and troops and places receiving economic aid. While the presence of bases and troops increase the likelihood of positive bilateral FDI flows that year, further increases in those troops or number of bases appears to decrease the amount of FDI invested in that country. The same goes for foreign troops that the U.S. trains (U.S. trainees). The existence of at least one base and the receipt of U.S. aid are both seen to motivate U.S. investors and multinational enterprises to invest more in those countries that already receive positive amounts of U.S. FDI. Once the host/recipient nation has "embraced" the U.S. in terms of ramping up troop presence, receiving U.S. economic aid, or establishing a U.S. base, additional

troops or U.S. trainees has a negative impact on the amount of FDI invested by U.S. multinational enterprises.

Chapter 3 List of References

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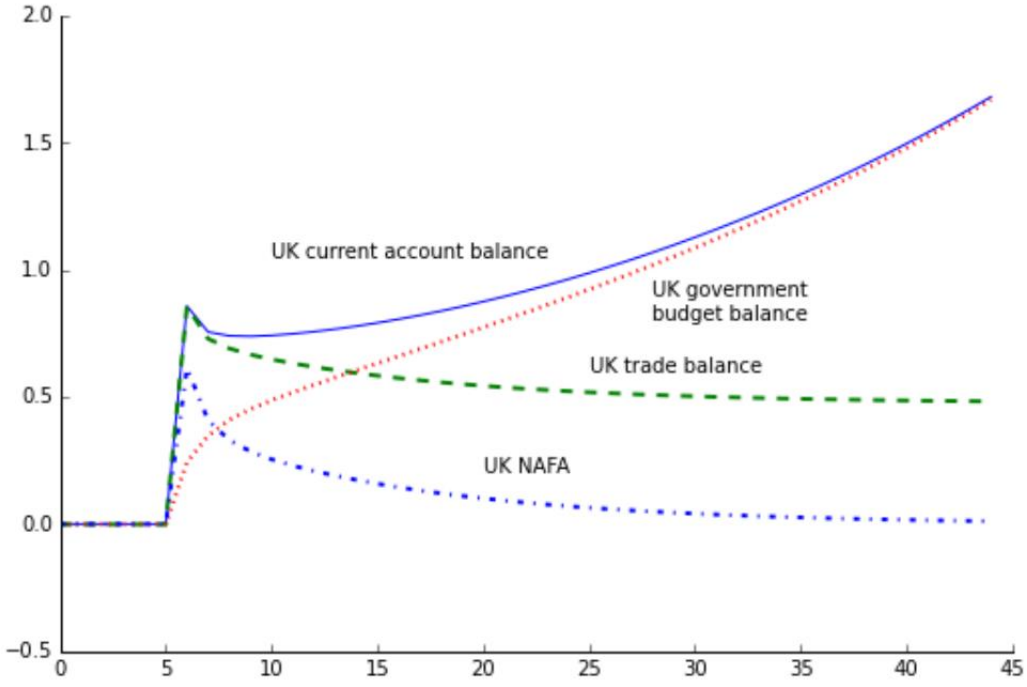


Figure 12.1A Effect of an increase in the US propensity to import on UK variables, within a fixed exchange rate regime with endogenous foreign reserves: net accumulation of financial assets, current account balance, trade balance, and government budget balance.

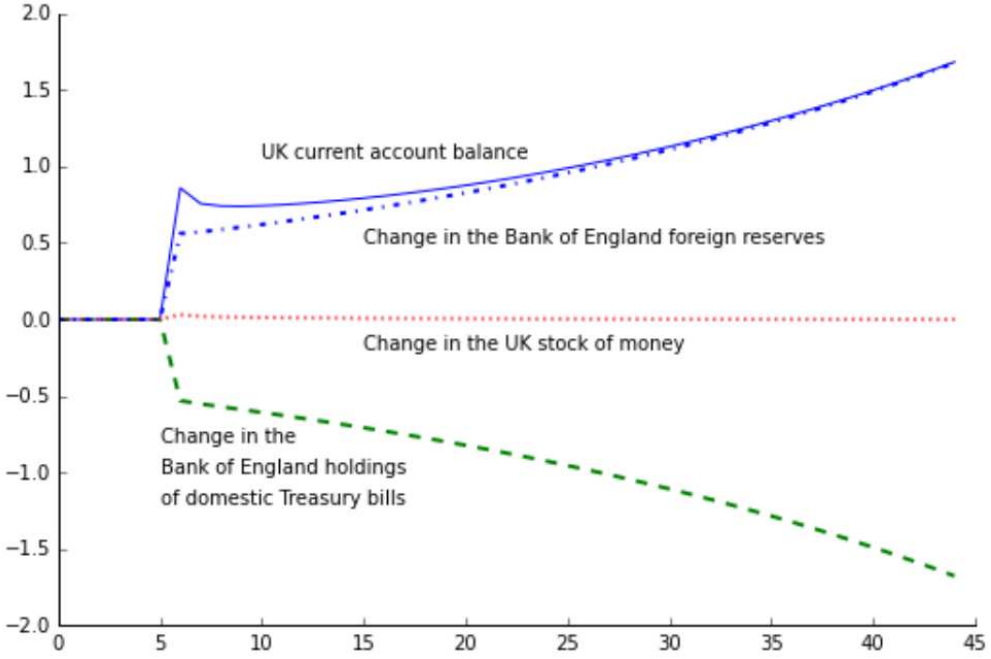


Figure 12.1B Effect of an increase in the US propensity to import, within a fixed exchange rate regime with endogenous foreign reserves, on the UK current account balance and elements of the balance sheet of the Bank of England (the UK central bank): change in foreign reserves, stock of money, holdings of domestic Treasury bills.

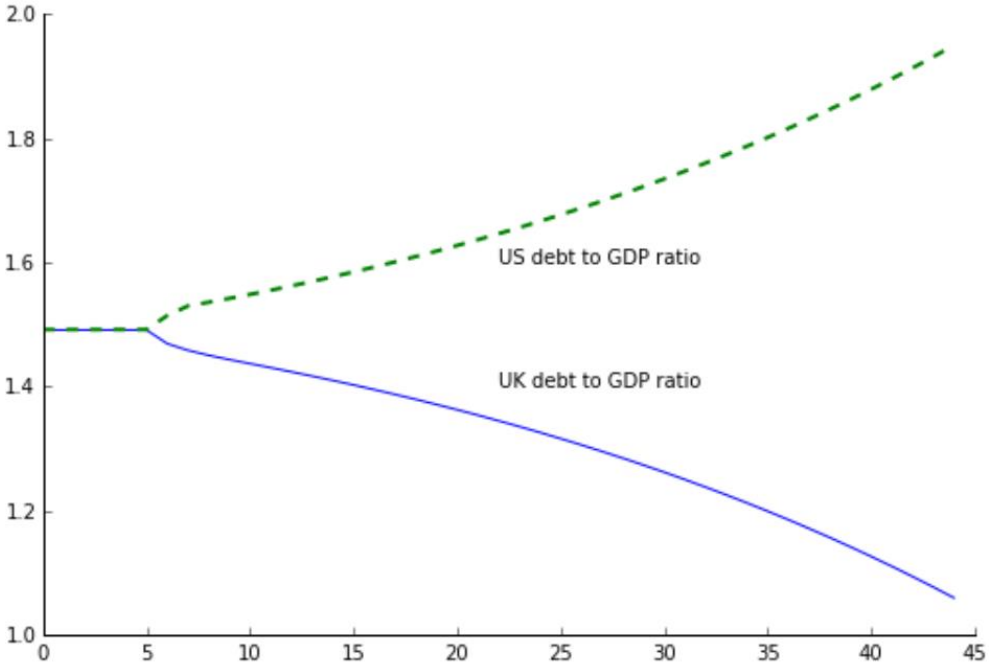


Figure 12.1C Effect of an increase in the US propensity to import on the US debt to GDP ratio and on the UK debt to income ratio, within a fixed exchange rate regime with endogenous foreign reserves.

Appendix B Remaining Equations for Section 4.2 Income & Expenditure

The volume (s) and value of sales (S) are defined as follows:

$$s_{lcu} \equiv c_{lcu} + g_{lcu} + x_{lcu} \tag{61}$$

$$s_{\$} \equiv c_{\$} + g_{\$} + x_{\$} \tag{62}$$

$$S_{lcu} \equiv s_{lcu}.ps_{lcu} \equiv (c_{lcu} + g_{lcu} + x_{lcu}).ps_{lcu} \tag{63}$$

$$S_{\$} \equiv s_{\$}.ps_{\$} \equiv (c_{\$} + g_{\$} + x_{\$}).ps_{\$} \tag{64}$$

Where ps is the average price of all sales in each economy or price level.

The price level of sales, ps, is determined in a traditional, mark-up cost fashion, with a mark-up, ρ, on unit costs:

$$ps_{lcu} = (1 + \rho).(W_{lcu}.N_{lcu} + IM_{lcu})/s_{lcu} \tag{65}$$

$$ps_{\$} = (1 + \rho).(W_{\$}.N_{\$} + IM_{\$})/s_{\$} \tag{66}$$

where W is the nominal wage rate, N represents employment in each block, and all profits resulting from the mark-up are assumed to be instantaneously distributed from the firms to the household sector (which, ultimately, do own firms and receive dividends and other payments from firm profits—though distributed very unequally[62].

[62] Another limitation of this model is that all firm income is dispersed homogenously to the households as if all households owned the same amount of firm stock, a far cry from the reality wherein a small minority own the majority of assets in the U.S. and in the rest of the world as well.

Domestic sales are prices as follows:

$$pds_{lcu} \equiv (S_{lcu} - X_{lcu})/(s_{lcu} - x_{lcu}) \tag{67}$$

$$pds_{\$} \equiv (S_{\$} - X_{\$})/(s_{\$} - x_{\$}) \tag{68}$$

Domestic sales value:

$$DS_{lcu} \equiv S_{lcu} - X_{lcu} \tag{69}$$

$$DS_{\$} \equiv S_{\$} - X_{\$} \tag{70}$$

Domestic sales volume:

$$ds_{lcu} \equiv c_{lcu} + g_{lcu}) \tag{71}$$

$$ds_{\$} \equiv c_{\$} + g_{\$} \tag{72}$$

Nominal GDP

$$Y_{lcu} \equiv S_{lcu} - IM_{lcu} \tag{73}$$

$$Y_{\$} \equiv S_{\$} - IM_{\$} \tag{74}$$

Real GDP

$$y_{lcu} \equiv s_{lcu} - im_{lcu} \tag{75}$$

$$y_{\$} \equiv s_{\$} - im_{\$} \tag{76}$$

GDP deflator:

$$py_{lcu} \equiv Y_{lcu}/y_{lcu} \tag{77}$$

$$py_{\$} \equiv Y_{\$}/y_{\$} \tag{78}$$

Value of consumption:

$$C_{lcu} \equiv c_{lcu}.pds_{lcu} \tag{79}$$

$$C_{\$} \equiv c_{\$}.pds_{\$} \tag{80}$$

Value of government expenditure:

$$G_{lcu} \equiv g_{lcu}.pds_{lcu} \tag{81}$$

$$G_{\$} \equiv g_{\$}.pds_{\$} \tag{82}$$

Tax revenue:

$$T_{lcu} \equiv \Theta_{lcu}.(Y_{lcu} + r_{lcu}^{-1}.B_{lcu,lcu}^{-1} + r_{\$}^{-1}.B_{lcu,\$}^{-1}.xr_{\$}) \tag{83}$$

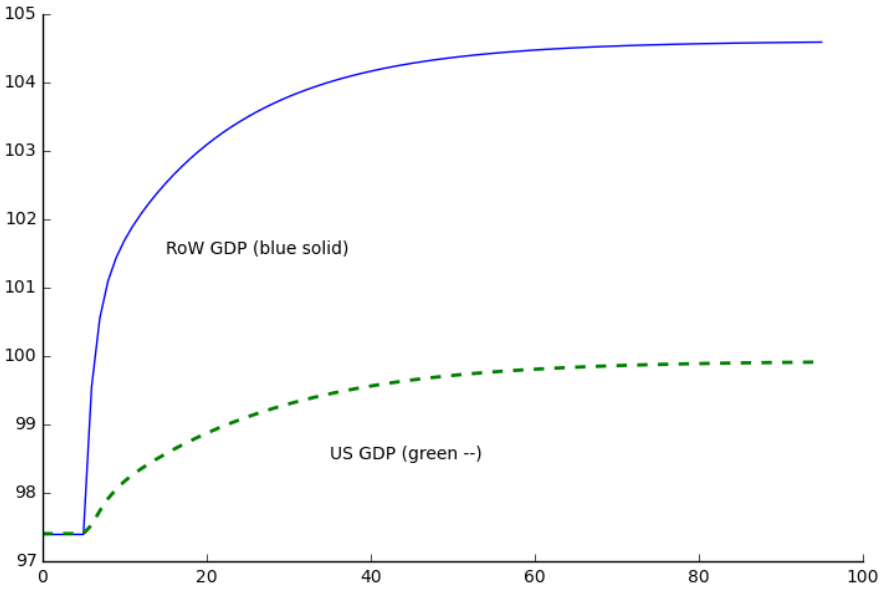
$$T_{\$} \equiv \Theta_{\$}.(Y_{\$} + r_{\$}^{-1}.B_{\$,\$}^{-1} + r_{lcu}^{-1}.B_{\$,lcu}^{-1}.xr_{lcu}) \tag{84}$$

Employment:

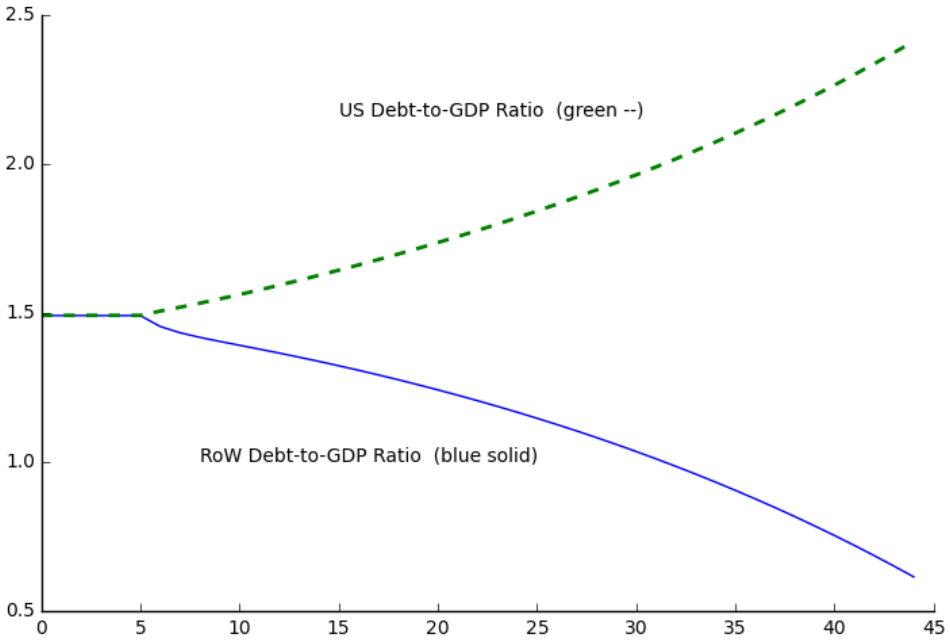
$$N_{lcu} \equiv y_{lcu}/pr_{lcu} \tag{85}$$

$$N_{\$} \equiv y_{\$}/pr_{\$} \tag{86}$$

where pr represents productivity.



Model CFASFIX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on the US & RoW GDP, Assuming a Fixed Exchange Rate.



Model CFASFIX: Impact of a compensated 10% US Gov't Budget Transfer Payment / Foreign Assistance Spending to RoW on the US Debt-to-GDP Ratio & RoW Debt-to-GDP Ratio, Assuming a Fixed Exchange Rate.

Appendix D Countries Included in Chapter 2

1. Algeria
2. Angola
3. Bangladesh
4. Benin
5. Bhutan
6. Burkina
7. Burundi
8. Cambodia
9. Cameroon
10. Chad
11. Comoros
12. Egypt
13. El
14. Ethiopia
15. Gambia
16. Ghana
17. Guinea
18. Guinea-Bissau
19. Haiti
20. Honduras
21. India
22. Kenya
23. Laos
24. Lesotho
25. Liberia
26. Madagascar
27. Malawi
28. Mali
29. Mauritania
30. Mongolia
31. Morocco
32. Mozambique
33. Nepal
34. Nicaragua
35. Niger
36. Pakistan
37. Philippines
38. Rwanda

39. Senegal
40. Sierra
41. Sri
42. Togo
43. Tunisia
44. Uganda
45. Vietnam
46. Zambia
47. Zimbabwe

Appendix E Countries with Security Treaties

1) Afghanistan
2) Angola
3) Albania
4) Argentina
5) Armenia
6) Azerbaijan
7) Burundi
8) Benin
9) Burkina Faso
10) Bangladesh
11) Bulgaria
12) Bosnia and Herz
13) Belize
14) Brazil
15) Botswana
16) Central African
17) China
18) Cote d'Ivoire
19) Cameroon
20) Colombia
21) Comoros
22) Cabo Verde
23) Costa Rica
24) Djibouti
25) Dominica
26) Dominican Repub
27) Ecuador
28) Egypt
29) Eritrea
30) Ethiopia
31) Fiji
32) Micronesia, Fed
33) Gabon
34) Georgia
35) Ghana
36) Guinea
37) Gambia

38) Guinea-Bissau
39) Equatorial Guinea
40) Grenada
41) Guatemala
42) Guyana
43) Honduras
44) Haiti
45) Hungary
46) Indonesia
47) Iraq
48) Jamaica
49) Jordan
50) Kazakhstan
51) Kenya
52) Kyrgyzstan
53) Cambodia
54) Lao People's De
55) Lebanon
56) Liberia
57) Libya
58) Saint Lucia
59) Sri Lanka
60) Morocco
61) Moldova, Republic
62) Madagascar
63) Maldives
64) Mexico
65) Macedonia, the
66) Mali
67) Myanmar
68) Montenegro
69) Mongolia
70) Mozambique
71) Mauritania
72) Mauritius
73) Malawi
74) Malaysia
75) Namibia
76) Niger
77) Nigeria
78) Nicaragua

79) Nepal
80) Pakistan
81) Panama
82) Peru
83) Philippines
84) Papua New Guinea
85) Paraguay
86) Romania
87) Rwanda
88) Sudan
89) Senegal
90) Solomon Islands
91) Sierra Leone
92) El Salvador
93) Somalia
94) Serbia
95) Sao Tome and Pr
96) Suriname
97) Swaziland
98) Seychelles
99) Chad
100) Togo
101) Thailand
102) Tajikistan
103) Turkmenistan
104) Timor-Leste
105) Tonga
106) Tunisia
107) Tanzania, Unite
108) Uganda
109) Ukraine
110) Uzbekistan
111) Venezuela, Boli
112) Viet Nam
113) Yemen
114) South Africa
115) Zambia
116) Zimbabwe

Appendix F 3-year Average Robustness Checks

As FDI flows are notoriously erratic, a common convention within the literature is to use 3-year rolling averages instead of single-year data when analysing bilateral FDI under a panel context. The table below reflects a similar regression specification to that of the main paper, with some slight differences, and ultimately shows the same phenomenon.

For greater granularity, I no longer use the US foreign basing variable (as it does not vary over time) and use the newly constructed dataset from Paper 2 to include military-related treaties and political-related treaties as determinants of both the selection and main equation determining US FDI flows. Using different instruments, I find the same thing: US politico-military integration is associated with periods of negative FDI flows and decreased total US FDI amounts invested abroad. This impact is mitigated, somewhat, by the expansion of US military-related treaties, although each individual impact is large and negative. Changes in total amounts of US aid are shown to have no impact on the 3-year moving average of FDI flows, possibly due to the long time periods with which aid requires to have its effect present and observable. Dummy variables for SSA, ME, and Asia show no significance, and clustering by region does not alter standard errors observably.

The inclusion of different policy indices (Economics Intelligence Unit Democracy Index, Polity2, Democracy Lexical Index) does not alter the main conclusions: that US politico-military integration, even after controlling for different types and specifications of hostility (squared, cubed, logged, etc), is associated with net-negative probability of positive US FDI flows and less amounts of US FDI. Increases in US military-related treaties (those having to do with troops, treaties, or bases) independently are negatively associated with the probability of positive US

FDI and the amount of US FDI. As the interaction term between military aid's fraction of total aid and the number of years with active US military-related treaties shows, this negative impact is ameliorated, although not entirely, when both the US military aid's fraction of total aid and number of years with US military-related treaties are positive in that three year period.

Table 7: 3-Year Average US FDI Heckman Robustness Checks

	Log(Bilateral US FDI)				
Main Equation	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5
Log Total Aid$_t$	0.00899	0.0289	-0.0376	0.0398	0.0533
Military Aid Fraction of Aid$_T$	-9.546*	-13.43*	-14.14*	-10.13*	-10.01*
Military Treaties	-0.446	-1.029	-0.327	-0.513	-0.467
Political Treaties	-0.0877	0.0229	-0.311	-0.0944	-0.102
Military Fraction ∩ Military Treaties	3.545*	4.932**	4.458	3.779**	3.683*
GDP per capita (constant 2010 USD)	-0.221	0.347	-0.468	-0.380	-0.360
Economic Growth (% of GDP)	-0.116	-0.331	-0.296	-0.0367	-0.0698
Log Bilateral Trade (Constant 2010 USD)	0.281	0.310*	0.646***	0.405**	0.404**
Log Education Spending Share of GDP	-0.635	-0.997*	-0.293	-0.588	-0.589
Hostility Presence Dummy	0.267	-0.191	0	-0.0862	-0.0667
K	-0.00191	0.0136			
Economics Democracy Index			0.00797		
Polity2				0.00813	
vDem Polyarchy Index					-0.237
Government Spending	2.39e-11**	1.92e-11*	1.77e-11	2.80e-11***	2.85e-11**
Selection Equation (Positive Bilateral FDI)					
Log total aid	0.0303	0.0501	0.0708	0.0372	0.0432
Military aid fraction of total aid	-5.287*	-3.586	-2.484	-3.283*	-3.542*
Military Treaties	-0.806**	-0.547*	-0.488*	-0.545***	-0.573***
Political Treaties	0.145	0.142	0.174*	0.133	0.146
Military fraction ∩ Military Treaties	1.902*	1.298	1.117	1.286*	1.329*
Hostility Presence Dummy	-0.554	0.215	0.484*	0.188	0.213
SSA Dummy		-0.132			
ME Dummy			-.502		
Economics Democracy Index			-0.0135		
Polity2				0.0203	
vDem Polyarchy Index	-0.0337	-0.0998			-0.0729
athrho	-0.0340	0.0155	-0.966	-0.0574	-0.223
lnsigma	-0.0340	0.0155	-0.966	-0.0574	-0.223
N	146	146	151	146	146