Monetary-Fiscal-Capital Account Interactions in Small Open Economies

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Abstract

I develop a framework of monetary, fiscal, and capital account interactions for small open economies (SOEs) to study price level and exchange rate determination under different policy mixes. I identify three policy regimes where the equilibrium is uniquely determined. The first two generalize known monetary and fiscal dominance regimes to a SOE by adding a condition that capital account policies are consistent with external solvency. The third regime—capital account dominance—arises when policy targets the (real) exchange rate by actively managing capital flows, thereby uniquely determining the price level. Inflation in this regime is thus driven by current account imbalances rather than by monetary or fiscal policies. I highlight two implications of this theory for monetary policy in SOEs: (i) achieving price stability requires both fiscal and capital account backing (ii) strict inflation targeting and managed exchange rates are inconsistent with intertemporal current account solvency. As an application, I provide empirical evidence that Chile's experience during the late 1980s can be rationalized as a case of capital account dominance.

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1 Introduction

Economists and policymakers have long recognized the central role of government policies in shaping inflation and exchange rate dynamics. This role is especially important in emerging markets (EMs) and small open economies (SOEs), where policy mismanagement has frequently led to episodes of price instability. A large body of literature exists on the role that monetary and fiscal policies (and their interactions) have played for the evolution of prices and exchange rates in these countries.[1]

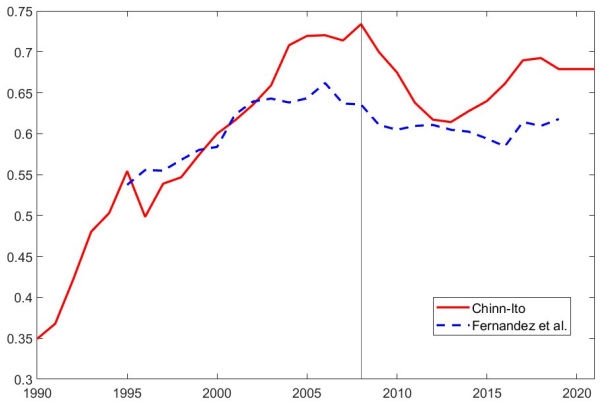


Figure 1: Chinn and Ito, 2008 financial openness index and (one minus) Fernández et al., 2015 capital controls index for selected SOEs (1990-2021)

In this paper, I study the role of a third, less emphasized, type of policy: capital account policies. Following Jeanne, 2013, I define capital account policies broadly to include any measures intervening the capital account and thus regulating capital flows—such as capital controls or foreign exchange (FX) market interventions.[2] Figure 1 shows that, after 2008, SOEs have become less financially open as capital account management policies have become an increasingly important policy tool in these countries.[3] By way of illustration, about 50% of SOEs in the selected sample considered had higher capital controls in 2019 than in 2008, according to the index in Fernández et al., 2015.[4] Using the index in Chinn and Ito, 2008, 33% of the SOEs in the sample were less financially open in 2021 than in 2008. This reversal in financial liberalization was also accompanied by a shift in consensus among international policy institutions in favor of using capital controls for purposes of financial stability (see Adrian et al., 2022). These two facts point to a renewed importance of capital account policies for policymaking in SOEs. Understanding how capital account policies interact with traditional monetary and fiscal policies thus becomes essential for the design of economic

[1] A well-studied case is Brazil: the hyperinflation of the late 1980s (Loyo, 1999) and the severe crisis of 2003 (Blanchard, 2004; Favero and Giavazzi, 2004) are largely attributed to inconsistent monetary and fiscal policies. See also Kehoe and Nicolini, 2022 for an extensive review of the history of monetary-fiscal policies in Latin America.

[2] Jeanne, 2013 defines capital account policies as "accumulation of foreign assets and liabilities by the public sector plus all the policies that affect the private sector's access to foreign capital."

[3] See J. Bianchi and Lorenzoni, 2022 and Reinhart et al., 2011 for accounts of this reversal in capital account openness in emerging markets.

[4] The sample includes: Argentina, Australia, Brazil, Canada, Chile, Colombia, Czech Republic, Ecuador, Hungary, Indonesia, Israel, Korea (Rep.), Malaysia, Mexico, New Zealand, Paraguay, Peru, Philippines, Poland, Romania, Singapore, South Africa, Sweden, Thailand, and Uruguay.

policies that promote price stability.

The purpose of this paper is to develop a theoretical framework of monetary-fiscal-capital account (henceforth MFK) interactions to understand how these policies interact with each other and how these interactions determine inflation dynamics. I ask: how do capital account policies interact with monetary and fiscal policies to determine the equilibrium price level and exchange rate? and, what are the implications for monetary policy's ability to achieve price stability in SOEs? Motivated by the pervasiveness of capital account policies, I extend a closed economy framework of monetary-fiscal interactions (e.g., Leeper, 1991) by adding capital account policy to a standard SOE model with monetary and fiscal policies. The fiscal authority levies lump-sum taxes and issues nominal debt (in both domestic and foreign currency) while the central bank conducts monetary policy through nominal interest rates *and* capital account policy through a tax on capital inflows (a bond tax). The novel aspect of this framework is requiring MFK policies to jointly satisfy a government budget constraint and a current account condition to be considered equilibrium policies. These two conditions are key to understand the link between MFK policies and how their joint behavior determines the stability and properties of the equilibrium. The joint modeling of MFK policies also implies this framework can nest a broad class of SOE models used in previous work, including models where capital account policy is not modeled.

As in closed-economy models of monetary-fiscal interactions, government debt is a key state variable for the dynamics of inflation. If fiscal policy does not stabilize government liabilities, inflation must erode the real value of debt to be consistent with the present value of taxes. That is, fiscal policy 'dominates' as monetary policy must allow for inflation deviations to happen in equilibrium so that government debt is stable. In the context of an open economy, the country's net foreign liabilities (NFLs) play a similar role for inflation and exchange rates. If capital account policy does not allow for a sufficient exchange rate adjustment to stabilize the country's external liabilities, inflation must erode the real value of *external* debt to be consistent with the present value of trade surpluses.[5] In this case, it is capital account policy who 'dominates' because monetary policy must allow for inflation deviations in equilibrium to ensure external debt is stable. The relationship between exchange rates and a country's net foreign asset position has a long tradition in international macroeconomics, dating back to Keynes, 1929. Yet, how this link might depend on the stance of monetary and fiscal policies, and vice versa, remains an underexplored subject.

The model is a stylized two-country, flexible-price, SOE model, adapted from De Paoli, 2009, where markets are incomplete as agents only trade in non-contingent assets. I use this model to show there exist three policy regimes under which the price level and exchange rate are uniquely determined. Two are open-economy extensions of 'monetary dominance' and 'fiscal dominance' regimes as in Sargent and Wallace, 1981. Unlike previous extensions of a monetary-fiscal interactions framework to open economy models (see e.g., Witheridge, 2024), these 'open economy' regimes include a condition that capital account policy is *passive* while either monetary or fiscal policy are

[5]Inflation can erode the value of NFLs by either directly diluting the value of local currency external debt or indirectly through a real appreciation of the local currency that reduces the value of foreign currency debt in units of domestic consumption. As I discuss below, these are two cases of the same policy regime.

active using the language of Leeper, 1991.[6] Much like passive fiscal policy means using taxes to ensure fiscal solvency, we can interpret passive capital account policy as using capital controls in a way that allows for enough exchange rate adjustment to ensure *external* solvency. A third regime emerges naturally—*capital account dominance*—in which capital account policy is active while monetary and fiscal policy are both passive. Active capital account policy can be interpreted as actively managing, or outright targeting, the exchange rate. By following this exchange rate objective, policy prevents the exchange rate adjustment necessary to balance the country's current account and therefore creates unstable NFL dynamics. In equilibrium, prices (i.e. inflation) will correct this imbalance by revaluing the country's NFL position. Although a *real* exchange target is a more analytically convenient case, I show that a *nominal* exchange rate target is also a form of active capital account policy. In either case, the equilibrium price level is uniquely determined as the value that balances the current account. Monetary and fiscal policies are therefore unable to control inflation under this regime. Instead, an equilibrium monetary policy uses nominal interest rates to stabilize the country's NFLs, therefore allowing for inflation deviations from target, while an equilibrium fiscal policy uses taxes to stabilize government liabilities.

Interpreting active capital account policy as exchange rate management policies implies capital account dominance can be linked to the many examples of currency manipulation in EMs. I show that, in the model, real exchange rate undervaluation policies—of the kind countries use to reduce trade deficits or protect domestic industries—reduce inflation by raising real interest rates and lowering domestic households' purchasing power.[7] I highlight the importance of a monetary-fiscal support for these exchange rate policies to be implementable in equilibrium. A policy-induced real devaluation requires: i) monetary policy to weakly respond to inflation, and ii) fiscal policy to raise taxes to finance higher real debt caused by lower inflation.

Interpreting nominal exchange rate management policies as a form of active capital account policy also links this new regime to the trilemma of international macroeconomics.[8] By showing that a nominal exchange rate target uniquely determines the equilibrium price level via the current account condition, I argue SOEs face a steeper trade-off between price and exchange rate stability than suggested by the classic trilemma. I show that, even if policy uses capital controls, simultaneous policies of fixed exchange rates and strict inflation targeting are inconsistent with intertemporal current account solvency. I reconcile this result with the original trilemma by proposing a dynamic dimension to it. In the short run, policymakers can make the trilemma hold by accumulating external liabilities while, in the long run, a dilemma between price and exchange rate stability exists as external debt must eventually be stabilized by either inflation or exchange rate fluctuations.

I then turn to the implications of the MFK framework for the most common policy arrangement in SOEs: inflation targeting. I extend the concept of a 'necessary fiscal backing' for monetary

[6] Leeper, 1991 defines 'active' policy as policy behaving unconstrained by the economy's budgetary conditions while 'passive' policy is defined as policy behaving consistent with budgetary conditions given agents' optimal behavior.

[7] Examples of real exchange manipulation policies include Chile in the 1980s (Caputo and Saravia, 2018), China in the early 2000s (Coudert and Couharde, 2007; Jeanne, 2013), and Brazil in the early 2010s (Benelli et al., 2014).

[8] The mundellian trilemma or 'impossible trinity' states that a country can at most have two out of the following (i) full capital mobility, (ii) a fixed exchange rate, and (iii) an independent monetary policy.

policy (Sims, 2005) to a SOE by showing that an inflation target is an equilibrium policy only if *both* fiscal and capital account policies accommodate. That is, an active monetary authority requires passive fiscal and capital account policies to be able to deliver low and stable inflation. I illustrate this point using a simple model to show that a monetary tightening only lowers inflation contemporaneously if supported by tighter fiscal policy (higher taxes) and tighter capital account policy (a real depreciation). I refer to this policy behavior as the 'necessary capital account backing' for monetary policy. Echoing Sargent and Wallace, 1981, I show that monetary policy contractions that lack capital account backing not only fail to lower inflation, but increase it in the future.

Lastly, as an application of how this theory can be useful to interpret macroeconomic time series in SOEs, I provide narrative and empirical evidence that Chile was an example of capital account dominance from 1985 to 1989. Narrative accounts suggest that the stance of policy during this period fits the description of active capital account, passive monetary, and passive fiscal policy. I then estimate a structural VAR using sign restrictions (Uhlig, 2005) to identify exogenous variation in FX reserves. I show that theoretical impulse responses under monetary and fiscal dominance regimes are rejected by the data whereas predictions from capital account dominance correctly capture the joint dynamics of inflation, output, and exchange rates. I emphasize that monetary and fiscal theories of inflation fail to capture this episode because they do not account for the role that capital account policies played in determining inflation dynamics during this time period.

Related Literature. This paper is first related to a literature on monetary-fiscal interactions. This paper fits into a growing body of the literature studying monetary-fiscal interactions in open economies.[9] I contribute to this literature by adding a third policy dimension to the conventional monetary-fiscal mix which allows for the study of monetary-fiscal interactions under both flexible and managed exchange rates. Moreover, by incorporating capital account policy into the policy mix, I extend the determinacy conditions in Leeper, 1991 from one active/one passive for closed economy models to one active/*two* passive for SOE models. Leith and Wren-Lewis, 2008 and Ding and Jiang, 2024 also find three policy regimes in open economy models. However, they consider two-country models and assume exchange rates are always flexible. Moreover, their new regimes arise from foreign policy behavior rather than from different domestic policy configurations.

Second, this paper relates to the literature on real exchange rate undervaluation policies in EMs (Costinot et al., 2014; Jeanne, 2013; Korinek and Serven, 2016). By developing a framework where the joint behavior of MFK policies is modeled, this paper provides an unified view of the monetary-fiscal conditions under which these common exchange rate policies lead to an equilibrium. In contrast to most papers in this literature, I consider a nominal model which allows me to show that popular policies of maintaining an undervalued real exchange rate have deflationary effects. The paper also contributes in showing how monetary-fiscal policies should coordinate to be consistent when government authorities seek to undervalue the currency.

Third, the capital account dominance regime is related to the trilemma of international finance

[9]See Cochrane, 1998, 2021; Leeper, 1991; Leeper and Leith, 2016; Sims, 1994, 2011; Woodford, 1994 for closed economy models and F. Bianchi, 2021; Witheridge, 2024 for models of monetary-fiscal interactions in SOEs and Abe, 2025; Daniel, 2001; Dupor, 2000; Loyo, 1997 for work on two-country models.

(Mundell, 1962) and recent extensions (Basu et al., 2023; Beltran and He, 2024; Itskhoki and Mukhin, 2023). My paper complements the discussion on the different ways in which the classic trilemma can be relaxed. My results shed light on a new dynamic interpretation of the policy trade-offs implied by the trilemma whereby the trade-off between price and exchange rate stability might be different ('steeper') in the long and the short run. This paper emphasizes the important role that the current account condition can play in open economy models when markets are incomplete (see Ghironi, 2006, 2008).

Fourth, this paper also contributes to a literature on the fiscal requirements for monetary policy (Aiyagari and Gertler, 1985; Cochrane, 2011; Davig and Leeper, 2011; Maćkowiak and Schmidt, 2023; Sims, 2005). Adding a capital account backing condition contributes to the discussion on the conditions under which a central bank can successfully target inflation and on how this differs in SOEs. This result points to additional challenges that monetary policy faces in these countries to control inflation. The perverse effects of an 'unbacked' (by capital account) monetary contraction echo and extend Sargent and Wallace's, 1981 'unpleasant monetarist arithmetic' result whereby the lack of fiscal backing causes a monetary tightening to fail to reduce inflation contemporaneously and raise it in the future.

Finally, this paper is connected to a vast literature on capital controls and their motives.[10] This paper contributes by bridging the two main motives identified in this literature (neo-mercantilist and prudential) with the definitions of active and passive capital account policy. By doing so, the model is able to nest these forms of capital controls as special cases of the three regimes.

2 A Framework of MFK Interactions for Small Open Economies

2.1 Model

I consider a two-country SOE setup (De Paoli, 2009) rather than a model of a continuum of SOEs (Gali and Monacelli, 2005). To focus on the policy interactions aspect of the model, I assume the SOE is a flexible-price, endowment economy populated by a continuum of identical and infinitely-lived households and a government split into a central bank that conducts monetary and capital account policies, and a fiscal authority. There are two tradable goods (home and foreign) and households in the SOE receive a constant endowment of y units of the domestic good each period. There are three types of assets: (i) a domestic currency one-period government bond, (ii) a foreign currency one-period government bond, and (iii) an international debt instrument denominated in the foreign currency (dollars). Domestic households have access to save in the domestic currency bond at the monetary policy rate R_t and borrow from abroad at the international interest rate R^*. They do not buy foreign currency bonds issued by their own government which also have a return of R^*. This assumption is meant to reflect the common occurrence that SOE governments borrow from foreign financial markets mostly in foreign currency and from domestic markets mostly in

[10] See e.g., Aizenman, 2019; Aizenman and Lee, 2007; J. Bianchi and Lorenzoni, 2022; J. Bianchi and Mendoza, 2010; Devereux et al., 2015; Erten et al., 2021; Farhi and Werning, 2012, 2014; Korinek, 2011; Pasricha, 2022

domestic currency. Foreign households (investors) have access to all three bonds.[11]

Markets are incomplete as households can only trade in non-contingent assets and are thus unable to fully share risk across borders and states of the economy. The only sources of uncertainty in the model are monetary, fiscal, and capital account policy shocks.

Households. The representative SOE household maximizes expected lifetime utility:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \log C_t$$

where aggregate consumption C_t is defined as a Cobb-Douglas composite of two tradable goods $C_t = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}} C_{Ht}^{1-\gamma} C_{Ft}^{\gamma}$ where C_{Ht}, C_{Ft} is domestic consumption of the home and foreign good. The parameter γ reflects the degree of preference for the foreign good in the domestic consumption basket ($1-\gamma$ is the degree of home bias). The price of aggregate consumption P_t (i.e. the price level) takes the form $P_t = P_{Ht}^{1-\gamma} P_{Ft}^{\gamma}$ where P_{Ht}, P_{Ft} are the local currency prices of the domestic and foreign good. Households in the SOE face the flow budget constraint:

$$P_{Ht}C_{Ht} + P_{Ft}C_{Ft} + \frac{B_{Ht}}{R_t} + e_t D_{t-1}^* + P_t T_t = P_{Ht} y - P_t \tau_t + \frac{e_t D_t^*}{R^*(1+\tau_t^c)} + B_{Ht-1} \tag{1}$$

where B_{Ht} are domestic holdings of the domestic bond and D_t^* is dollar-denominated foreign borrowing. I assume the law of one price holds for each individual good i.e. $e_t P_{Ht}^* = P_{Ht}$ and $e_t P_{Ft}^* = P_{Ft}$ where e_t is the nominal exchange rate defined as units of home currency per unit of the foreign currency.[12] Following J. Bianchi and Mendoza, 2010, I assume the government taxes capital inflows (foreign borrowing) at a rate of τ_t^c. Household also receive government transfers T_t each period.

Households in each country face a consumption-savings decision. Domestic household optimality implies the following bond pricing equations that equate the (effective) price of the bond to its expected, risk-adjusted real return:

$$\frac{1}{R_t} = \beta \mathbb{E}_t \left[\left(\frac{C_{t+1}}{C_t} \right)^{-1} \frac{P_t}{P_{t+1}} \right] \tag{2}$$

$$\frac{1}{R^*(1+\tau_t^c)} = \beta \mathbb{E}_t \left[\left(\frac{C_{t+1}}{C_t} \right)^{-1} \frac{P_t}{P_{t+1}} \frac{e_{t+1}}{e_t} \right] \tag{3}$$

The capital inflow tax creates a wedge between the international interest rate R^* and domestic households' foreign borrowing costs $R^*(1+\tau_t^c)$.

Since there are no foreign shocks in this model and shocks in the SOE have no effect on foreign variables, foreign inflation and consumption will be constant ($C_t^* = C^*$ and $\pi_t^* = \pi^*$ for all t). The foreign stochastic discount factor will therefore be constant and equal to one. The foreign bond

[11] Because I assume the foreign currency government bond has the same (constant) return as the international debt instrument, foreign investors are always indifferent between both assets. Since we only care about the SOE equilibrium, this indeterminacy in the portfolio choice of foreign investor is not an issue for the results below.

[12] When e_t goes up the home currency depreciates relative to the foreign currency.

pricing equations are:

$$\frac{1}{R^*} = \frac{\beta}{\pi^*} \tag{4}$$

$$\frac{1+\tau_t^c}{R_t} = \frac{\beta}{\pi^*}\mathbb{E}_t\left[\frac{e_t}{e_{t+1}}\right] \tag{5}$$

The tax τ_t^c shows up again in the foreign bond pricing equation as foreign households also pay the tax when purchasing domestic bonds.

Combining equations (4) and (5) implies the no-arbitrage condition:

$$0 = \mathbb{E}_t\left[R^* - \frac{R_t}{1+\tau_t^c}\frac{e_t}{e_{t+1}}\right] \tag{6}$$

which states that the expected foreign-currency return of domestic bonds adjusted for capital controls $\frac{R_t}{1+\tau_t^c}\frac{e_t}{e_{t+1}}$ must be equal to the return of foreign bonds R^*. Equation (6) implies that uncovered interest rate parity (UIP) will not hold in the presence of capital controls and that deviations from UIP in this model will be driven by capital account policy.[13]

Households also face an expenditure minimization problem given a level of aggregate consumption C_t, C_t^*. Domestic households minimizing their consumption expenditure implies demand for each good is:

$$C_{Ht} = (1-\gamma)\left(\frac{P_{Ht}}{P_t}\right)^{-1} C_t \quad ; \quad C_{Ft} = \gamma\left(\frac{P_{Ft}}{P_t}\right)^{-1} C_t \tag{7}$$

while foreign demand for the domestic good (demand for exports) is:

$$C_{Ht}^* = \gamma^*\left(\frac{P_{Ht}^*}{P_t^*}\right)^{-1} C_t^* \tag{8}$$

where $P_t^* = {P_{Ht}^*}^{\gamma^*}{P_{Ft}^*}^{1-\gamma^*}$ is the foreign price level and γ^* is foreign trade openness. Following De Paoli, 2009, I will consider the case of $\gamma^* \to 0$ as a way to reflect the fact that the home country is a SOE.[14] Lastly, an optimal consumption-savings plan must satisfy the transversality condition (TVC):

$$\lim_{T\to\infty} \mathbb{E}_t \Theta_{t+T} \frac{B_{Ht+T} - e_{t+T+1}D_{t+T+1}^*}{P_{t+T+1}} = 0 \tag{9}$$

where $\Theta_{t+T} = \beta^T\left(\frac{C_{t+T}}{C_t}\right)^{-1}$ is the household's stochastic discount factor T periods ahead. The

[13] The linearized UIP condition takes the familiar form $i_t - i_t^* = \mathbb{E}_t[e_{t+1} - e_t] + \widehat{1+\tau_t^c}$. Note that, since there are two separate prices for the same asset ($1/R_t$ for domestic households and $(1+\tau_t^c)/R_t$ for foreign households), capital controls effectively work as a policy-based market segmentation akin to Gabaix and Maggiori, 2015 and Itskhoki and Mukhin, 2021.

[14] The SOE assumption can be expressed as $\frac{y}{y^*} \to 0$. As in De Paoli, 2009; Sutherland, 2005 I relate the openness parameter γ^* to the SOE's relative size: $\gamma^* = \frac{y}{y^*}\gamma z$. Therefore, $\gamma^* \to 0$ follows directly from assuming the home country is a SOE. See Appendix A for more details.

TVC rules out as an equilibrium outcome that household assets (debt) grow 'too fast'. Intuitively, this condition effectively prevents households from running a Ponzi scheme by always rolling over their debt and never repaying it.

International Risk-Sharing and Net Foreign Assets. The incomplete risk-sharing condition can be obtained by combining equations (3) and (4) and using the definition of the real exchange rate $Q_t \equiv \frac{e_t P_t^*}{P_t}$:

$$(1+\tau_t^c)^{-1} = \mathbb{E}_t \left[\frac{C_t}{C_{t+1}} \frac{Q_{t+1}}{Q_t} \right] \tag{10}$$

The assumption that markets are incomplete implies that consumption growth is (inversely) related to the real depreciation rate only in expectation.[15] That is, since households are only able to trade in non-contingent assets, they are unable to perfectly smooth their consumption across states of the economy.

The assumption that markets are complete implies agents are able to equate the ratio of marginal utilities $1/C_t$ and $1/C_t^*$ to the real exchange rate *in every state of the world*. Formally, agents would buy and sell these state contingent assets until:

$$\frac{C_t}{C_t^*} = \vartheta Q_t$$

where ϑ is a constant that depends on initial relative net asset positions. While this assumption is common in the SOE literature (e.g., G. Benigno and Benigno, 2008; Gali and Monacelli, 2005; Witheridge, 2024), I deviate from it as market completeness effectively shuts down the current account channel in open economy models and therefore precludes the net foreign asset position from playing a role in the propagation of shocks in these models (see Ghironi, 2006, 2008 for a discussion of this point). As I show below, net foreign assets and the current account turn out to be central to the transmission of shocks to inflation under managed exchange rates.

Government. The SOE government consists of a fiscal authority and a central bank that conducts monetary and capital account policies. The monetary policy instrument is the gross nominal interest rate R_t while the capital account policy instrument is a (bond) tax on capital inflows τ_t^c.[16] Fiscal policy issues one-period nominal debt in both domestic and foreign currency B_t, B_t^*, levies lump-sum taxes τ_t, and sends transfers T_t to households.

Government revenues therefore consist of i) tax revenues net of transfers, ii) issuance of one-period nominal bonds sold at prices $1/R_t$ and $1/R^*$, and iii) capital controls revenue. The consoli-

[15] In the absence of capital controls, the incomplete markets assumption implies the real exchange rate (and therefore consumption and the trade balance) follows a random walk in equilibrium. As discussed in Schmitt-Grohé and Uribe, 2003 there are different, computationally similar, methods to induce stationary equilibrium dynamics in a SOE model so that a log-linear approximation is accurate. Equilibria with no controls can be studied in the linearized model by introducing any of these stationarity-inducing features with no change for my results.

[16] As I show in the appendix and in the New Keynesian model for Chile in section 5, changing the capital account instrument to foreign exchange (FX) interventions does not modify my results.

dated government budget constraint is:

$$P_t(\tau_t - T_t) + \frac{B_t}{R_t} + \frac{e_t B_t^*}{R^*} + \left(\frac{B_{Ft}}{R_t} + \frac{e_t D_t^*}{R^*(1+\tau_t^c)}\right)\tau_t^c = B_{t-1} + e_t B_{t-1}^* \tag{11}$$

where B_t, B_t^* are denote issuance of local and foreign currency debt and the term $\left(\frac{B_{Ft}}{R_t} + \frac{e_t D_t^*}{R^*(1+\tau_t^c)}\right)\tau_t^c$ reflects total capital control revenues from taxing domestic households' foreign borrowing and foreign households' purchases of domestic bonds. Because these capital controls revenues do not play a particularly important role in my results, I make the assumption that these revenues are fully rebated to domestic households in the form of transfers.

In open economy models, household and government debt need not be mirror of each other as households can hold foreign assets (debt). Unlike the TVC in the household problem, there is no optimality condition that requires government debt to remain finite in present value. Sims, 1997 and Bergin, 2000 have argued that political economy and political stability considerations make requiring an equilibrium policy to satisfy such a limiting condition a reasonable assumption.[17] Daniel, 2001 also showed that assuming the government runs a 'no-surplus' policy, whereby no resources are wasted in the long run, delivers a limiting condition stating that government debt remains finite. Following these papers, I assume the limiting condition

$$\lim_{T\to\infty} \mathbb{E}_t \Theta_{t+T} \frac{B_{t+T} + e_t B_{t+T}^*}{P_{t+T+1}} = 0 \tag{12}$$

must hold in equilibrium. Similar to the household TVC, this condition rules out explosive paths for total government debt as an equilibrium. Importantly, combining the TVC (9) with the limiting condition (12) yields a limiting condition for the country's net foreign liabilities (NFLs)

$$\lim_{T\to\infty} \mathbb{E}_t \Theta_{t+T} \frac{B_{Ft+T} + e_{t+T+1}(B_{t+T}^* + D_{t+T}^*)}{P_{t+T+1}} = 0 \tag{13}$$

stating that the SOE's external debt position must remain finite in any equilibrium. Equation (13) will play a crucial role for distinguishing the type of MFK policy mixes that are consistent with a bounded equilibrium.

Policy Rules. I assume the three policy instruments R_t, τ_t, τ_t^c are set according to rules. In specifying these rules, I use variables without subscript to denote steady state values. Interest rates are set following a standard Taylor rule:

$$\frac{R_t}{R} = \alpha^M + \phi_\pi \frac{\pi_t}{\pi} + \varepsilon_t^M \tag{14}$$

[17] In open economy models, the domestic and foreign TVCs are not enough to rule out equilibria where the domestic government debt position explodes. Domestic and foreign agents buy domestic debt by borrowing from the foreign government, thus maintaining a finite debt position and satisfying their TVCs. However, this implies indefinite lending by the foreign government which is financed by ever higher taxes in the foreign economy. Foreign agents can afford this due to ever rising interest payments from their holding of domestic debt. This scenario, while consistent with both domestic and foreign TVCs, implies an infinite transfer of wealth from the foreign to the domestic country.

where ε_t^M is a monetary policy shock and ϕ_π is a policy parameter governing the sensitivity of the nominal interest rate to deviations of inflation from steady state. Lump-sum taxes τ_t are set following a tax rule similar to Leeper, 1991:

$$\frac{\tau_t}{\tau} = \alpha^F + \phi_b \frac{\ell_t}{\ell} + \varepsilon_t^F \tag{15}$$

where $\ell_t \equiv \frac{B_{t-1}+e_t B^*_{t-1}}{P_t}$ is the real value of total outstanding government liabilities at time t, ε_t^F is a fiscal policy shock, and ϕ_b is a policy parameter governing the sensitivity of taxes to deviations of government liabilities from steady state. The capital inflow tax is set according to:

$$\frac{1+\tau_t^c}{1+\tau^c} = \alpha^K + \phi_k \frac{f_t}{f} + \varepsilon_t^K \tag{16}$$

where $f_t \equiv \frac{B_{Ft-1}+e_t(B^*_{t-1}+D^*_{t-1})}{P_t}$ is the real value of the SOE's outstanding NFLs at time t, ε_t^K is a capital account policy shock, and ϕ_k is a policy parameter governing the sensitivity of capital controls to deviations of NFLs from steady state. Importantly, all the policy rules above aim at modeling government behavior in a tractable, yet empirically relevant way. They are not meant to capture optimal policy.

Having said that, a policy rule like (16) can be motivated as a central bank that worries about NFLs deviating from a target level due to prudential considerations. An important body of work has focused on the role of capital controls as part of the optimal policy in the context of financially constrained households. A common result in this literature is that optimal capital controls respond to the SOE's external debt position (see J. Bianchi, 2011; J. Bianchi and Lorenzoni, 2022; Rojas and Saffie, 2022). Policy does so to correct the pecuniary externality caused by agents not internalizing the effects of their borrowing decision on the probability of making their borrowing constraint binds. Policy efficiently taxes capital inflows to reduce the stock of NFLs and reduce the severity of a future crisis. This is the sense in which these policies are said to be 'prudential'.

Although no externality exists in this framework that would justify this type of prudential policy, below I show there are values of ϕ_k that make capital account policy behave *as if* motivated by a prudential motive. Since the goal of this paper is to understand how different capital account policies interact with monetary-fiscal policy, and what are the implications for inflation dynamics, a policy that mimics prudential motives is a good enough approximation for the purposes of this paper. Questions about why these policies are in place and whether they are optimal, while very interesting and relevant, are beyond the scope of this paper.

As I show below, another attractive feature of (16) is that, depending on the sign and magnitude of ϕ_k, a whole different class of capital account policies can be captured with the same simple rule. This class of policies are closely related to what has been labeled the 'mercantilist' motive. Mercantilist capital controls are defined as those aimed at promoting export-led growth by manipulating the country's terms of trade to undervalue its exchange rate (see e.g. Aizenman and Lee, 2007; Pasricha, 2022). Motivated by this fact, and to address concerns over the specific form of (16), I show in Appendix E that considering a rule where capital controls respond directly to

the real exchange rate ($\frac{1+\tau_t^c}{1+\tau^c} = \alpha^K + \phi_k \frac{Q_t}{Q} + \varepsilon_t^K$) has virtually no effect on the regimes or the main intuition, and equilibrium dynamics under active capital account policies are equivalent under both rules.

2.2 Equilibrium

I now define the concept of a competitive equilibrium in this economy.

Definition 1. *Given values of predetermined variables* $B_{t-1}, B^*_{t-1}, B_{Ft-1}, D^*_{t-1}$*, policy rules* (14), (15)*, and* (16)*, and exogenous sequences* $\{y, y^*, R^*\}$*, a competitive equilibrium is a sequence of allocations* $\{C_t, C_{Ht}, C_{Ft}, B_{Ht}, B_{Ft}, D^*_t\}$*, prices* $\{P_t, P_{Ht}, P_{Ft}, e_t, Q_t\}$*, and government policies* $\{R_t, \tau_t, B_t, B^*_t, \tau^c_t\}$ *such that*

1. *Households maximize expected lifetime utility subject to* (1)*, taking prices and government policy as given*
2. *The government budget constraint* (11) *is satisfied*
3. *Goods, bond, and foreign exchange markets clear*

Market Clearing. There are three domestic markets: the goods market, the bond market, and the foreign exchange (FX) market. The domestic goods market clearing condition equates the supply (endowment) of the domestic good y to total demand (domestic and foreign):

$$\begin{aligned} y &= (1-\gamma)\left(\frac{P_{Ht}}{P_t}\right)^{-1} C_t + \gamma^* \left(\frac{P^*_{Ht}}{P^*_t}\right)^{-1} C^*_t \\ &= Q_t^{\frac{\gamma}{1-\gamma}}(1-\gamma)C_t + Q_t^{\frac{1}{1-\gamma}}\gamma^* C^*_t \end{aligned} \tag{17}$$

where I use individual demands for C_{Ht} and C^*_{Ht} and the fact that, from the definitions of P_t, P^*_t, we have $\frac{P_{Ht}}{P_t} = Q_t^{-\frac{\gamma}{1-\gamma}}$. Using the Law of One Price for each good and the definitions of P_t, P^*_t, we can write:

$$Q_t = \left(\frac{P_{Ft}}{P_{Ht}}\right)^{1-\gamma}$$

where I also make use of the fact that $\gamma^* \to 0$. Hence, a higher real exchange rate implies the domestic good becomes relatively cheaper. From (17) we can obtain the expression $C_t = \frac{Q_t^{-\frac{\gamma}{1-\gamma}} y - Q_t \gamma^* C^*_t}{1-\gamma}$ which shows that drop in the relative price of the domestic good (a real depreciation) will cause aggregate consumption to fall through an expenditure switching channel (higher demand for exports) and through a real income channel (lower real value of endowment).

The condition that ensures the FX market clears is the Balance of Payments identify also known as the current account condition. This condition equates the change of the country's net foreign

asset position to the trade balance:

$$-\left(\frac{B_{Ft}}{R_t}(1+\tau_t^c)+\frac{e_t(B_t^*+D_t^*)}{R^*}-B_{Ft-1}-e_t(B_{t-1}^*+D_{t-1}^*)\right)=e_tP_{Ht}^*C_{Ht}^*-P_{Ft}C_{Ft} \tag{18}$$

The term $\frac{B_{Ft}}{R_t}(1+\tau_t^c)$ arises from domestic currency bonds sold to foreign households who pay a unit price of $\frac{1+\tau_t^c}{R_t}$. By Walras' Law, the bond market will always clear when (17) and (18) hold.

Intertemporal Conditions. Imposing no arbitrage between domestic and foreign currency bonds in the government budget constraint (11), we can solve by forward iteration to obtain the first key intertemporal equilibrium condition:

$$\frac{B_{t-1}+e_tB_{t-1}^*}{P_t}=\sum_{j=0}^{\infty}\mathbb{E}_t\Theta_{t+j}\tau_{t+j}+\sum_{j=1}^{\infty}\mathbb{E}_t\Theta_{t+j}\tau_{t+j-1}^cb_{t+j}^* \tag{19}$$

where I also impose limiting condition (12). This equilibrium condition states that the real value of total outstanding government liabilities must equal the present value of current and future fiscal surpluses. In contrast to closed economy models, government liabilities have an foreign currency component B_t^* and fiscal surpluses are composed of tax revenues τ_{t+j} and revenues from excess returns on its debt position $\tau_{t+j-1}^cb_{t+j}^*$. Up to a first-order, excess returns in the domestic currency can be expressed as $er_{t+1}\equiv i_t-i^*-\mathbb{E}_t[e_{t+1}-e_t]=\widehat{1+\tau_t^c}$. Hence, when capital account policy raises capital controls $\tau_t^c>0$ it generates positive excess returns in the domestic currency. This constitutes a revenue for the domestic government because positive excess returns in the domestic currency are equivalent to negative excess returns in the foreign currency. From the perspective of a government who borrows in foreign currency, these are negative 'excess debt repayment costs' and, therefore, a source of revenue.

Similarly, we can impose no arbitrage and limiting condition (13) to solve the current account condition (18) by forward iteration and obtain the second key intertemporal condition:

$$\frac{B_{Ft-1}+e_t(B_{t-1}^*+D_{t-1}^*)}{P_t}=\sum_{j=0}^{\infty}\mathbb{E}_t\Theta_{t+j}tb_{t+j}+\sum_{j=1}^{\infty}\mathbb{E}_t\Theta_{t+j}\tau_{t+j-1}^cf_{t+j} \tag{20}$$

where, as before, $f_t=b_{Ft}+e_t(b_t^*+d_t^*)$ is the country's NFL position. This equilibrium condition states that the real value of the country's outstanding NFLs must equal the present value of current and future *external surpluses*. External surpluses are composed of trade surpluses tb_{t+j}, external revenues from capital controls $\tau_{t+j-1}^cb_{Ft+j}$, and revenues from excess returns $\tau_{t+j-1}^ce_{t+j}(b_{t+j}^*+d_{t+j}^*)$ that households and the government obtain from their external debt denominated in foreign currency. Using the definition of f_t, the last two components can be combined into $\tau_{t+j-1}^cf_{t+j}$ as shown in (20).

Condition (19) and (20) reveal the close connection that the equilibrium price level and exchange rate have with fiscal and capital account policies, as these directly influence what the present values on the right-hand side will be. To see how monetary policy *simultaneously* interacts with both fiscal

and capital account policy, substitute (19) back into (11) and (20) into (18) to obtain:

$$\frac{B_t}{R_t P_t} + \frac{e_t B_t^*}{R^* P_t} = \sum_{j=1}^{\infty} \mathbb{E}_t[\Theta_{t+j} \tau_{t+j}] + \sum_{j=2}^{\infty} \mathbb{E}_t[\Theta_{t+j} \tau_{t+j-1}^c b_{t+j}^*] \tag{21}$$

$$\frac{B_{Ft}}{R_t P_t} + \frac{e_t (D_t^* + B_t^*)}{R^* P_t} = \sum_{j=1}^{\infty} \mathbb{E}_t[\Theta_{t+j} tb_{t+j}] + \sum_{j=2}^{\infty} \mathbb{E}_t[\Theta_{t+j} \tau_{t+j-1}^c f_{t+j}] \tag{22}$$

Equations (21) and (22) show that the *market value* of government and external debt must equal the present value of future external and fiscal surpluses. Equation (21) reflects how monetary policy changes will always have fiscal consequences through its effect on the price at which the government can sell its debt. How fiscal policy responds to this change in its ability to sell debt will be the key difference between policy a monetary and a fiscal regime. This channel is equivalent to the one emphasized by Leeper and Leith, 2016 and others in closed economy models.

The same intuition can be used to interpret equation (22). This equation reflects how, in an open economy, monetary policy also has capital account consequences through its effect on the price at which the SOE can sell external debt in local currency. How capital account policy responds will determine whether the exchange rate adjustment will be enough to stabilize NFLs and thus will be the key difference between a monetary or fiscal regime and a capital account regime.

This unified framework of monetary-fiscal-capital account interactions will allow us to understand how the price level and the exchange rate are *jointly* determined by the actions of all three policies. This will also allow for the study of a wide range of different MFK policy mixes and their implications for inflation and exchange rate dynamics.

Log-Linearized Model. To study the local stability and determinacy of equilibria in this model, I log-linearize the model around a symmetric zero-inflation deterministic steady state where purchasing power parity (PPP) holds (i.e. $Q = 1$ and $\pi = \pi^* = 1$) and where capital controls are zero (i.e. $\tau^c = 0$).[18] To keep the main theoretical point simple, I concentrate in a steady state where the SOE is a net borrower (i.e. $f > 0$). I use the notation $\hat{x}_t$ to denote log deviations from steady state $\hat{x}_t = \log(\frac{x_t}{x}) \approx \frac{x_t - x}{x}$. For variables that can take negative values (e.g., τ_t, f_t) I define $\hat{x}_t = \frac{x_t - x}{x}$ as the percent deviation from steady state. Equilibrium dynamics can be reduced to a system of four difference equations in the real exchange rate Q_t, CPI inflation π_t, outstanding real

[18] See Appendix B for details about the deterministic steady state.

government liabilities ℓ_t, and outstanding real foreign liabilities f_t:[19]

$$\mathbb{E}_t[\hat{\pi}_{t+1}] = \phi_\pi \hat{\pi}_t + \varepsilon_t^M + \frac{\gamma+\kappa}{1-\gamma}\mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t] \tag{23}$$

$$\mathbb{E}_t[\hat{\ell}_{t+1}] = \frac{1-(1-\beta)\phi_b}{\beta}\hat{\ell}_t + \phi_\pi \hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] + \varepsilon_t^M - \frac{1-\beta}{\beta}\varepsilon_t^F - \frac{b^*}{b}(\phi_k \hat{f}_t + \varepsilon_t^K) \tag{24}$$

$$\mathbb{E}_t[\hat{Q}_{t+1}] = \hat{Q}_t - \frac{1-\gamma}{1+\kappa}\left(\phi_k \hat{f}_t + \varepsilon_t^K\right) \tag{25}$$

$$\mathbb{E}_t[\hat{f}_{t+1}] = \left(\frac{1}{\beta} - \phi_k\right)\hat{f}_t + \phi_\pi \hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \frac{\omega}{\beta f}\hat{Q}_t + \varepsilon_t^M - \varepsilon_t^K \tag{26}$$

where $\omega = \gamma^* C^* + \gamma C \frac{\gamma+\kappa}{1-\gamma}$ and $\kappa = \frac{\gamma^* C^*}{(1-\gamma)C}$. Equations (23) and (24) are the equilibrium Euler equation and government budget constraint governing the dynamics of inflation and real government debt. Equations (25) and (26) are the equilibrium risk-sharing and current account conditions governing the dynamics of the real exchange rate and real external debt. Note that setting $\gamma = 0$ (the SOE is a closed economy) the system collapses to a bivariate system in π_t and ℓ_t, essentially equivalent to the one in Leeper, 1991.

2.3 Existence and Uniqueness of Equilibrium

The dynamic system formed by equations (23)-(26) consists of two forward-looking (or 'jump') variables π_t, Q_t and two backward-looking (or state) variables ℓ_t, f_t. A sufficient condition for the existence of a unique saddle-path equilibrium is that two of the system's eigenvalues are greater than one and two are less than one in absolute value (Blanchard and Kahn, 1980). Below I use λ_x to refer to variable x's eigenvalue.

The eigenvalue of inflation can be directly obtained from (23) as $\lambda_\pi = \phi_\pi$. The nature of inflation dynamics will depend entirely on monetary policy behavior. This is a common feature of monetary models with interest rate rules (see e.g. Galí, 2015). The celebrated Taylor Principle $\phi_\pi > 1$ implies that inflation can be 'solved forward' to obtain a unique non-bubble solution where monetary policy is able to fully stabilize inflation around its target. These types of monetary equilibria are characterized by inflation being policy-determined (as opposed to market-determined) since equilibrium inflation depends on current and future monetary policy.

The eigenvalue of government liabilities can also be directly obtained from (24) as $\lambda_\ell = \frac{1-(1-\beta)\phi_b}{\beta}$. The condition for debt stability ($|\lambda_\ell| < 1$) can be easily derived to be $|\phi_b| > 1$. That is, fiscal policy must react strongly enough to changes in its liabilities (i.e. is Ricardian). As in closed economy models of monetary-fiscal interactions, debt stability depends on the behavior of fiscal policy. Intuitively, the fiscal authority can always ensure debt is stable by committing to raise taxes by enough when debt increases.

So far, the stability of the domestic sector (reflected by equations (23) and (24)) is equivalent to a closed economy model of monetary-fiscal interactions. The novelty will come from examining the stability of the external block reflected by equations (25) and (26).

[19] See Appendix C for a derivation of the linearized model.

As I show in Appendix D.1, $|\lambda_f| > 1$ for all values of ϕ_k and $\beta, \gamma \in (0,1)$. However, the dynamics of the real exchange rate will depend on the behavior of capital account policy through the parameter ϕ_k. When $\phi_k \in [0, \overline{\phi_k}]$, we have $|\lambda_Q| < 1$ and the equilibrium real exchange rate corresponds to the 'backward' solution of (25). This backward solution will not unique as there will many exchange rate paths satisfying (25) depending on initial conditions. A unique equilibrium real exchange rate will be pinned down in this case as the one consistent with market clearing. A 'backward-looking' real exchange rate can therefore be interpreted when real exchange rate is driven by market forces and clear markets. This case class of equilibria thus nests all SOE models with market-driven flexible exchanges rates.

When $\phi_k \notin [0, \overline{\phi_k}]$, we have $|\lambda_Q| > 1$ and the equilibrium real exchange rate will correspond to the forward solution of (25). That is, (25) can be solved forward to obtain the unique non-bubble solution in which the equilibrium real exchange rate depends on current and future policy, just as inflation under the Taylor Principle. Note that being a policy-determined price implies the real exchange rate needs not be consistent with market clearing.

The above discussion is formalized and summarized in Proposition 1 below.

Proposition 1. *Assuming the SOE is a net borrower ($f > 0$), the system of equations* (23)-(26) *has a (locally) unique and bounded equilibrium if and only if policy parameters ϕ_π, ϕ_b, ϕ_k satisfy:*

1. $|\phi_\pi|, |\phi_b| > 1$ *and* $\phi_k \in [0, \overline{\phi_k}]$ *(Monetary Dominance)*
2. $|\phi_\pi|, |\phi_b| < 1$ *and* $\phi_k \in [0, \overline{\phi_k}]$ *(Fiscal Dominance)*
3. $|\phi_\pi| < 1$, $|\phi_b| > 1$ *and* $\phi_k \notin [0, \overline{\phi_k}]$ *(Capital Account Dominance)*

where $\overline{\phi_k} = \frac{2(1+\beta^{-1})}{\frac{1-\gamma}{1+\kappa}(\frac{\omega}{\beta f}+2)} > 0$.
***Proof**: See Appendix D.1.*

The first two regimes in Proposition 1 can be thought of as open-economy extensions of the closed economy active money-passive fiscal and passive money-active fiscal regimes in Leeper, 1991. As noted above, the conditions for active/passive monetary and fiscal policy are equivalent to their closed economy counterparts. They are generalized to an open economy setting by adding a third condition restricting the behavior of capital account policy $\phi_k \in [0, \overline{\phi_k}]$. This condition defines 'passive' capital account policy behavior. To gain some intuition for this condition, note that it states capital controls responds 'weakly enough' to changes in external debt. This weak intervention in the capital account is what allows the exchange rate enough flexibility to still be consistent with market clearing.

Proposition 1 shows there is a third class of equilibria that emerges when we consider the possibility of heavy interventions to the capital account ($\phi_k \notin [0, \overline{\phi_k}]$), that is, 'active' capital account policy. Following Sargent and Wallace, 1981, I label this policy regime *capital account dominance*.

2.4 'Active' and 'Passive' Capital Account Policies in the Literature

While the terms 'active' and 'passive' have not been used to describe capital account policy before, there is an extensive literature characterizing the different types and motives for using capital controls. I this section I make the case for a mapping between the labels of 'active' and 'passive' and the main motives identified in the literature.

Passive capital account policy can also be viewed as policy stabilizing NFLs by allowing the exchange rate to correct imbalances in the current account. This interpretation is helpful to relate passive behavior to the widely-studied prudential motive. As discussed earlier, prudential capital controls aim at regulating capital flows and the level of external debt to reduce the severity of potential future crises. A policy that stabilizes NFLs is therefore closely related to this motive. Moreover, prudential controls have been characterized as 'leaning against the wind' as they display counter-cyclical behavior (see Farhi and Werning, 2014). The condition for passive capital account policy $\phi_k \in [0, \overline{\phi_k}]$ makes clear that passive capital account policy also behaves counter-cyclically as it raises controls when NFLs increase (inflows) and lowers them when NFLs fall (outflows). The concept of passive capital account policy can thus be associated with the prudential motive for capital controls in the literature.

As defined above, *active* capital account policy heavily intervenes the capital account and thus targets the exchange rate. I later show that this type of objective generates unstable NFL dynamics. Active capital account policy can therefore be related to the other main motive for capital controls, the competitiveness (or neo-mercantilist) motive. This motive has been described as using capital controls to promote export-led growth by manipulating the country's terms of trade (Pasricha, 2022). This connection is useful to bring capital account dominance closer to the reality of policy-making. In the past, many emerging economies have resorted to real exchange rate (and terms-of-trade) manipulation policies to boost growth by increasing the competitiveness of exports.[20]

The special case of $\phi_k = 0$ is interesting to mention because a broad class of SOE models where capital controls are absent is captured by $\phi_k = 0$. As Proposition 1 shows, this is a special case of passive capital account policy.[21] Therefore, standard SOE models that do not model capital account policy are implicitly assuming a passive capital account policy behavior and are also nested by this framework.

[20] Examples include the case of Chile in the 1980s , China in the early 2000s, and Brazil in the early 2010s. The case of Chile is analyzed in depth in Section 5.

[21] The basic argument of why constant capital controls can be classified as passive policy is as follows. If the bond tax is (expected to be) constant, it will not distort households' optimal consumption decision. Consumption and the real exchange rate will then be market-determined—as opposed to policy-determined. As a market-determined price, the real exchange rate will adjust to clear the FX market. Therefore, by setting a constant bond tax, capital account policy indirectly ensures the current account condition holds. This behavior satisfies the definition of passive policy.

3 The Capital Account Dominance Regime

Proposition 1 shows that bringing capital account policy into a SOE model of monetary-fiscal interactions has non-trivial implications for the regions of the parameter space where a unique and bounded equilibrium exists. Adding capital controls as a third policy instrument introduces a third class of equilibria where the price level and exchange rate are uniquely determined despite monetary and fiscal policies being both passive. In this section, I describe the main properties of this new regime emphasizing how the price level and exchange rate are uniquely determined.

3.1 Active Capital Account Policy and Real Exchange Rate Targeting

Under active capital account policy, the real exchange rate becomes a policy-determined variable. This implies obtaining the forward solution of (25) which can be shown to be (see Appendix D.2 for a derivation):

$$\hat{Q}_t = \sum_{k=0}^{\infty} \lambda_k \mathbb{E}_t[\varepsilon^K_{t+k}] \tag{27}$$

where $\lambda_k > 0$ depend on the policy parameter $\phi_k \notin [0, \overline{\phi_k}]$ and model parameters (but not ϕ_π or ϕ_b). As (27) makes clear, when capital account policy is active, capital account policy shocks are the only sources of equilibrium real exchange rate deviations from steady state.[22] What drives the equilibrium to behave like this is the fact that active capital account policy behavior destabilizes NFLs by either responding in the 'wrong direction' ($\phi_k < 0$) or 'too strongly' in the right direction ($\phi_k > \overline{\phi_k}$). This form of threat to 'blow up' the debt is what allows capital account policy to target the real exchange rate since a diverging path of NFLs is ruled out as an equilibrium outcome. This is the same kind of off-equilibrium threat that allows monetary policy to target inflation under the Taylor principle. Rational agents understand that policy will 'blow up' the economy if they do not conform with the policy target (see Castillo-Martinez and Reis, 2024; Cochrane, 2011 for a discussion).

So far, the result of active capital account policy as targeting the real exchange rate has relied on local properties of the model around the steady state. While this is convenient for interpretation, in Proposition 2 below I show that this result generalizes beyond local dynamics and is also independent of the type of policy rule we assume (or whether we specify one at all).

Proposition 2. *Under passive monetary policy, passive fiscal policy, and active capital account*

[22] As shown in Appendix E, assuming capital controls directly respond to the real exchange rate ($\frac{1+\tau^c_t}{1+\tau^c} = \alpha^K + \phi_k \frac{Q_t}{Q} + \varepsilon^K_t$) delivers the same results. The conditions for active capital account policy under this rule are again of the form $\phi_k < 0$ or $\phi_k > \overline{\phi}'_k$. The intuition of active capital account policy as a real exchange rate target is straightforward in this case. A negative policy parameters implies that when the real exchange rate depreciates (rises), policy will lower capital controls to appreciate the currency thus stabilizing the exchange rate.

policy, the unique equilibrium real exchange rate is given by:

$$Q_t = Q\left[\frac{\mathbb{E}_t\left[z_{t,\infty}\right]}{1+\frac{Q\gamma^* y^*}{y}\left(\mathbb{E}_t\left[z_{t,\infty}\right]-1\right)}\right]^{1-\gamma} \tag{28}$$

where $z_{t,\infty} = \prod_{j=0}^{\infty}(1+\tau^c_{t+j})$ *and* Q *is the long-run level of the real exchange rate.*
***Proof**: See Appendix D.2*

Using Leeper's, 1991 definition for active policy behavior, we can more formally define active capital account policy as when the sequence $\{\tau^c_t\}$ is set unconstrained by current budgetary conditions to follow some policy objective. Thus, Proposition 2 states that when capital account policy is active, it pins down a (globally) unique equilibrium real exchange rate. This result generalizes the idea that the stance of capital account policy can fundamentally change how the real exchange rate is determined in a SOE. As discussed, in standard SOE models the equilibrium real exchange is pinned down as the price that clears markets (balances the current account). In these models, capital account policy is therefore (implicitly) assumed to be always passive. When we consider the case of active capital account policy we see that a whole new class of equilibria emerges where the equilibrium real exchange rate is driven by policy behavior rather than by market forces.

Note that (28) is an equilibrium condition that must hold in all policy regimes. The difference between a standard SOE model and a regime of capital account dominance is whether the sequence $\{\tau^c_t\}$ is set endogenously to be consistent with an otherwise-determined real exchange rate or used as an instrument to achieve an exogenous exchange rate objective.

As I show in the following section, this dichotomy between policy- and market-determined exchange rates will have significant implications for the forces determining the price level and inflation.

3.2 Inflation Dynamics under Capital Account Dominance

3.2.1 Price Level Determination

A key feature of this new regime is that active capital account, by targeting the real exchange rate, pins down a unique price level and therefore determines inflation dynamics. This is stated in Proposition 3 below.

Proposition 3. *Under active capital account policy, the unique equilibrium price level is given by:*

$$P_t = \frac{B_{Ft-1}}{PVTB_t\left(\{\mathbb{E}_t[\tau^c_{t+j}]\}_{j=0}^{\infty}\right) - Q_t\frac{D^*_{t-1}+B^*_{t-1}}{P^*_t}} \tag{29}$$

where $PVTB_t$ *is the present value of current and future trade balances at time* t *defined as:*

$$PVTB_t \equiv tb_t + \sum_{j=1}^{\infty}\mathbb{E}_t\Theta_{t+j}\left(\prod_{k=0}^{j-1}(1+\tau^c_{t+k})\right)tb_{t+j}$$

which, in equilibrium, is a function of current and future capital account policies $\{\mathbb{E}_t[\tau^c_{t+j}]\}_{j=0}^{\infty}$.
***Proof**: See Appendix D.3*

Proposition 3 shows that active capital account policy, through the current account condition, pins down a (globally) unique price level. In conventional SOE models where the central bank targets inflation, the term $PVTB_t$ in Proposition 3 would be endogenously determined by equilibrium condition (29) such that the current account is balanced for *any* price level chosen by monetary (or fiscal) policy. In other words, when monetary policy targets inflation, the sequence of equilibrium real exchange rates $\{Q_{t+j}\}$ (and capital controls, if any) must adjust to balance the current account.

Under capital account dominance, the causality runs the other way. Capital account policy chooses the path of the real exchange rate $\{Q_t\}_{t=0}^{\infty}$ by freely picking a sequence capital controls $\{\tau^c_{t+j}\}_{j=0}^{\infty}$. In doing so, it determines the entire path of future real interest rates and trade balances which, in turn, pins down a value for the present value term $PVTB_t$. Equation (29) simply reflects the fact that, if the present value of trade surpluses is given by policy, the equilibrium price level must adjust satisfy the equilibrium condition that the real value of outstanding foreign liabilities equals the expected present value of trade surpluses.

In this simple model, this result implies that when policy targets the real exchange rate, inflation becomes a purely current account phenomenon—as opposed to a monetary or fiscal phenomenon—since only imbalances in the country's current account will create fluctuations in equilibrium inflation. This implies that *real exchange rate manipulation policies cause monetary (and fiscal) policy to loose control over inflation.* Although this result is less stark in a richer model, it emphasizes how the current account transmission channel of inflation can be an important driver of inflation when policy actively manages the exchange rate and how these policies can undermine monetary policy's ability to control inflation.

To understand the mechanisms at work, it is useful to linearize the intertemporal current account condition (20) imposing households' optimality conditions (23) and (25):

$$\hat{f}_t = \underbrace{\frac{\omega}{f}\sum_{j=0}^{\infty}\beta^j\mathbb{E}_t\hat{Q}_{t+j}}_{\text{PV of trade balances}} \underbrace{-\beta\frac{\gamma+\kappa}{1-\gamma}\sum_{j=0}^{\infty}\beta^j\mathbb{E}_t[\hat{Q}_{t+j}-\hat{Q}_{t+j+1}]}_{\text{PV of real interest rates}} + \underbrace{\beta\frac{1+\kappa}{1-\gamma}\sum_{j=0}^{\infty}\beta^j\mathbb{E}_t[\hat{Q}_{t+j}-\hat{Q}_{t+j+1}]}_{\text{PV of excess returns + CCs revenues}}$$

The present value of trade surpluses can therefore be decomposed into three main components. The first term reflects how the real exchange rate affects the trade balance, the second reflects how real exchange rate *changes* affect real interest rates at which these trade balances are discounted, and the third reflects how these changes also affect revenues from excess returns and capital controls.

If we define the real value of *current* NFLs as $\tilde{f}_t \equiv \frac{F_t}{P_t}$, outstanding and current NFLs are then related as $\hat{f}_t = \hat{\tilde{f}}_{t-1} - \alpha\hat{\pi}_t + (1-\alpha)(\Delta\hat{Q}_t - \hat{\pi}^*_t)$ where $\alpha = \frac{b_F}{f} \in [0,1]$ is the steady state share of local currency NFLs and $\Delta\hat{Q}_t = \hat{Q}_t - \hat{Q}_{t-1}$. Combining these expressions with the intertemporal condition above and the equilibrium real exchange rate (27) (imposing the assumption that foreign

inflation is constant $\hat{\pi}_t^* = 0$, $\forall t$ and that shocks are i.i.d) we can express equilibrium inflation as:

$$\hat{\pi}_t = \frac{1}{\alpha}\hat{\hat{f}}_{t-1} + \frac{\lambda_0}{\alpha}\left(\underbrace{1-\alpha}_{\text{valuation effect}} - \underbrace{\frac{\omega}{f}}_{\text{trade balance}} - \underbrace{\beta}_{\text{effective real int rates}}\right)\varepsilon_t^K \tag{30}$$

where I normalize $\varepsilon_{t-1}^K = 0$. Because $\lambda_0 > 0$ (see Appendix D.2), a one-time surprise increase in capital controls ($\varepsilon_t^K > 0$) *raises* inflation through a valuation effect channel but *reduces* it through a trade balance and an effective real interest rate channel. The first channel increases inflation by increasing the value of outstanding foreign currency debt which requires a revaluation of domestic currency debt and thus higher inflation, for a given value of trade balances.

The other two channels lower inflation by increasing the present value of trade balances which, by feasibility, implies the present value of consumption falls thus lowering aggregate demand and inflation. Specifically, the trade balance channel increases the present value by directly raising trade balances themselves while the effective real interest rate channel raises the present value by lowering *effective* real discount rates. While a real depreciation raises domestic real rates, the effect of higher excess returns and higher capital controls revenues always dominates. Thus, the effective real rates used to discount trade balance fall in equilibrium, raising the present value.

A few further remarks are in order regarding equation (30).

Remark 1. *If $\beta \to 1$, a surprise increase in the capital inflow tax rate τ_t^c under capital account dominance always reduces inflation since $\frac{d\pi_t}{d\varepsilon_t^K} \to -\frac{\lambda_0}{\alpha}(\alpha + \frac{\omega}{f}) < 0$ with $\lambda_0 > 0$.*

When β is close to 1, the trade balance and real interest rate effects dominate the valuation effect of a policy-induced real depreciation. Therefore, the final effect of an increase in capital controls ($\varepsilon_t^K > 0$) is to reduce inflation.

Remark 2. *When the SOE has no local currency external debt ($\alpha = 0$), policy can no longer implement a real exchange rate target as an equilibrium policy.*

If the SOE has no domestic currency external debt (i.e. $b_F = 0$), inflation is indeterminate when policy targets the real exchange rate and monetary-fiscal policies are passive since we can no longer obtain (30) from the intertemporal current account when $\alpha = \frac{b_F}{f} = 0$. The intuition is that, when $b_F = 0$, inflation can no longer erode the value of NFLs to rebalance the current account after a shock and thus leaves the price level indeterminate if monetary and fiscal policies are passive.[23] In section 4.4, I show that if policy targets the *nominal* exchange rate (e.g. a fixed exchange rate regime), the price level is uniquely determined under passive monetary-fiscal policies even if $\alpha = 0$.

Remark 3. *Equilibrium inflation under capital account dominance inherits the persistence of external debt. Higher share of foreign currency external debt (lower α) increases this persistence.*

[23] This is an important case for the study of EMs in the 1980s or 1990s, but it is quite far removed from the current reality of most EMs. As work by Arslanalp and Tsuda, 2014 on the currency composition of debt shows, the average share of local currency external debt in EMs is currently around 45% and has been steadily increasing since 2008.

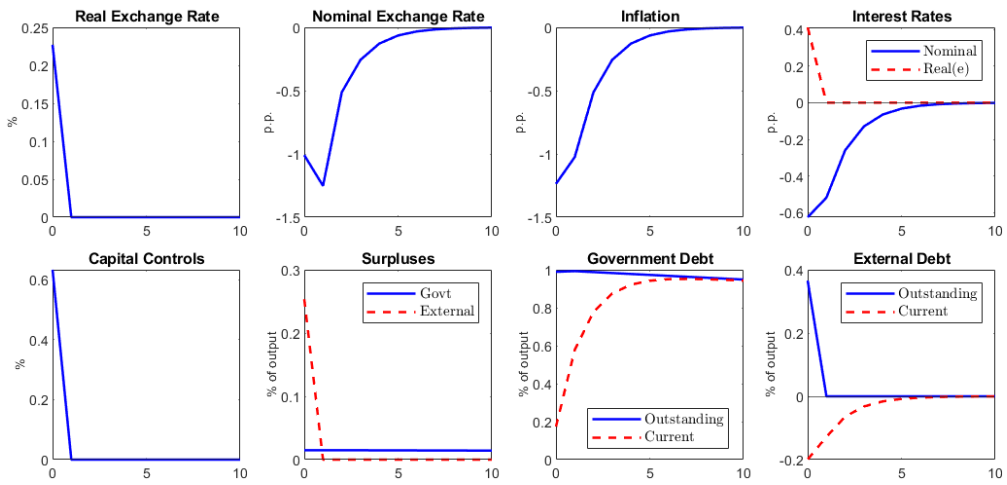


Figure 2: Impulse response functions after a one percentage point capital controls increase under capital account dominance

Because inflation under capital account dominance adjusts to revalue external debt, purely transitory shocks can have persistent effects on inflation, even in a flexible price environment. This persistence is decreasing in α because less local currency debt implies inflation has less influence on the real value of total NFLs. The inflation adjustment will therefore be longer-lived as this share falls. As discussed, in the limit of $\alpha = 0$, inflation becomes indeterminate.

The effects of a capital controls shock are summarized in Figure 2.[24] As discussed, the real exchange rate depreciates, trade balances increase, real interest rates rise, and inflation falls. Inflation is persistently lower as external debt falls due to higher foreign borrowing taxes. Both fiscal and external debt outstanding increase due to lower inflation and a more depreciated exchange rate. As implied by intertemporal conditions (19) and (20), higher debt must be backed by higher fiscal and external surpluses.

3.2.2 Inflation Expectations, NFLs, and Monetary Policy

An important implication of (30) is that monetary policy shocks have no effect on *today's* inflation. However, monetary policy will still play a role for *future* inflation. Inflation expectations in this regime will be driven by the expected path of NFLs which monetary policy can influence through the relationship between interest rates and capital inflows.

Suppose again that $\{\varepsilon^K_{t+j}\}$ are i.i.d and mean-zero shocks. Then, by rolling (30) forward and taking expectations conditional on information at t we can express the sequence of equilibrium inflation expectations as:

$$\mathbb{E}_t[\hat{\pi}_{t+j}] = \begin{cases} \frac{1}{\alpha}\hat{\hat{f}}_t - \frac{1-\alpha}{\alpha}\lambda_0\varepsilon^K_t, & j = 1 \\ \frac{1}{\alpha}\mathbb{E}_t[\hat{\hat{f}}_{t+j-1}], & \forall j > 1 \end{cases} \tag{31}$$

[24] To compute these impulse responses, model parameters are set to $\phi_\pi = 0.5, \phi_b = 1.5, \phi_k = -0.5, \beta = 0.99, \gamma = 0.4, z = 1.0075, \alpha = 0.5$

We see the path of expected inflation is closely related to the path of current NFLs $\tilde{f}_t$. Use the expressions for equilibrium inflation and real exchange rate ((30) and (27)) in the current account condition (26) (assuming i.i.d shocks) to obtain an equation that describes the equilibrium dynamics of $\tilde{f}_t$:

$$\hat{\tilde{f}}_t = \phi_\pi \hat{\tilde{f}}_{t-1} - \Phi\lambda_0 \varepsilon_t^K + \alpha\varepsilon_t^M \tag{32}$$

where $\Phi > 0$ is a function of model parameters and of both policy parameters ϕ_π, ϕ_k. While a monetary contraction at time t ($\varepsilon_t^M > 0$) has no effect on inflation π_t, it increases NFLs as higher domestic returns attract capital flows. These capital inflows then cause inflation expectations to rise, as (31) shows. To understand why capital inflows are inflationary in the context of capital account dominance, consider the UIP condition in real returns:

$$i_t - \mathbb{E}_t\hat{\pi}_{t+1} = r^*_{t+1} + \mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t] + \widehat{1+\tau_t^c}$$

That is, in the absence of capital controls, higher interest rates tend to raise domestic real returns which should create expectations of a real depreciation as r^*_{t+1} is exogenous. However, under capital account dominance, higher rates will not induce an expected real depreciation as policy is manipulating the real exchange rate. Domestic expected real returns are therefore 'too high' compared to the equivalent peso cost of dollar borrowing (i.e. the exchange rate does not adjusting following market forces). This creates arbitrage opportunities for investors could borrow in dollars and then invest in domestic bonds and obtain positive returns. In equilibrium, this cannot hold and inflation will adjust to correct this imbalance. An overvalued currency at $t+1$ causes agents to expect lower trade balances which, by feasibility, implies they also expect future consumption to be higher since lower trade balance means more goods available for domestic consumption. As households foresee higher aggregate demand in the future, they revise their inflation expectations upwards. This process revision process continues until the higher domestic currency real returns caused by tighter monetary policy are completely erased by higher expected inflation and the constant real exchange is again consistent with equilibrium.

The above is summarized in Figure 3 showing impulse response to a 25 basis point surprise increase in the nominal interest rate. Inflation rises in the future as government and external debt increase due to lower bond prices. Higher inflation is what stabilizes both kinds of debt and allows for constant external (and fiscal) surpluses to be an equilibrium (recall that fixed a real exchange rate necessarily means constant external surpluses).

3.3 Monetary and Fiscal Policies under Capital Account Dominance

An important policy question that this framework can answer is, what kind of monetary and fiscal policies are consistent with a stable equilibrium when policy manages the real exchange rate? Since active capital account policy uniquely determines equilibrium P_t and Q_t, *equilibrium* monetary and fiscal policies must ensure these prices are consistent with all equilibrium conditions in the model. In

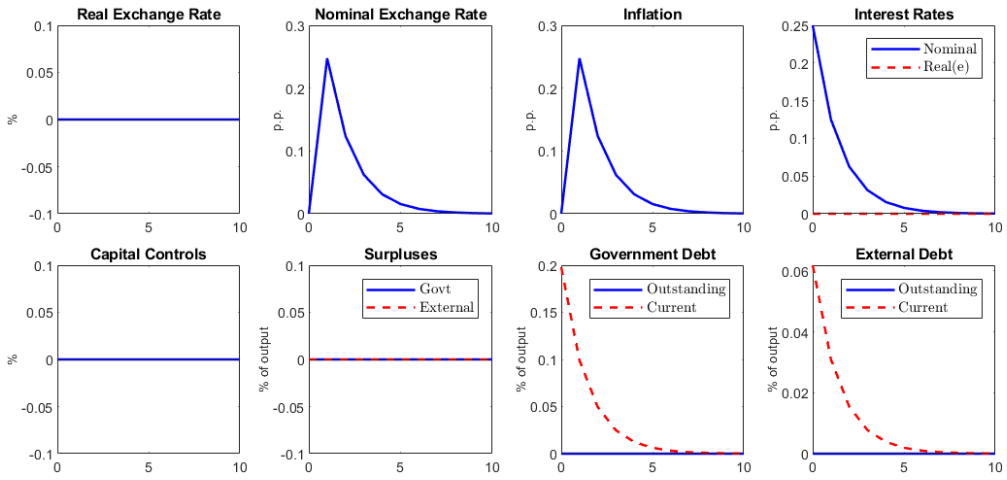


Figure 3: Impulse Response Functions after a one percentage point increase in the nominal interest rate under capital account dominance

the spirit of Cochrane, 2011 and Sims, 2005 I refer to this behavior as policy providing the 'necessary backing' for capital account policy. Unlike previous definitions for closed economies, however, the necessary backing in a SOE must be a *joint* backing from two policies. This is because, unlike in closed economy models where the government budget constraint is the only budgetary condition restricting the equilibrium, in an open economy the current account condition imposes an additional constraint on the equilibrium. It follows that two independent policy instruments are necessary to ensure that an equilibrium exists.

Corollary 1. *Equilibrium determinacy in a SOE model requires one active and two passive policies.*

To illustrate what consistent monetary and fiscal policy responses look like under capital account dominance, suppose capital account policy wants to depreciate the real exchange rate (increase Q_t) to, say, reduce trade deficits. As equation (27) above shows, this policy would entail a positive sequence of policy shocks $\{\varepsilon_t^K\}$ i.e. raising capital controls. As mentioned before, a real exchange rate depreciation will, under reasonable parameterizations, lower inflation through higher real interest rates and higher export demand. Lower inflation increases the real value of government liabilities on the left side of (19) while higher real interest rates reduce the present value of taxes on right side of (19). A consistent fiscal policy must therefore raise future taxes to ensure the government continues to be solvent under a policy-driven exchange rate.

On the monetary side, lower inflation prompts monetary policy to lower nominal rates. However, in order to remain consistent with rising real interest rates, monetary policy cannot be 'too aggressive' in its response. That is, a consistent monetary policy must adjust i_t by *less than one-to-one* with inflation (i.e. $\phi_\pi < 1$). The intuition is that, by increasing capital controls, capital account policy lowers demand for NFLs due to higher foreign borrowing costs. Since policy targets the real exchange rate, trade surpluses will not adjust downwards as current account solvency would require. Monetary policy's response is what ensures NFLs do not enter an unstable downward path. A weak response of interest rates to lower inflation implies higher real returns on domestic assets.

This increases demand for NFLs and offsets the effects of a higher bond tax and stabilizes NFLs in equilibrium. This is the intuition behind equation (32) where we see the monetary policy parameter ϕ_π governing the stability of NFL dynamics.

The key takeaway from this exercise is the fact that monetary policy becomes constrained by external solvency when capital account policy manages the real exchange rate. Targeting the real exchange rate precludes an *equilibrium* monetary policy from strongly responding to enforce an inflation target as this would cause the country's NFLs diverge.

3.4 Active Capital Account Policy and Nominal Exchange Rate Targeting

While a *real* exchange rate target is a more analytically convenient case of active capital account policy, a *nominal* exchange rate target (e.g. an exchange rate peg) is an alternative form of active capital account policy. In this section I show how, by targeting the nominal exchange rate, policy also determines the price level and therefore drives inflation. This extension is particularly relevant for the applications of capital account dominance as nominal exchange rate policies have been widely used in emerging economies. This will also allow me to relate the capital account dominance regime to the trilemma of international macroeconomics (Mundell, 1962) and shed new light on its policy implications.

First, I define a nominal exchange rate peg as policy having to enforce the following two conditions:

$$\Delta e_t = 0 \quad ; \quad \mathbb{E}_t[\Delta e_{t+j}] = 0, \quad \forall j \geq 1$$

In words, policy must not only be able to fix the nominal exchange rate today, but must also ensure the peg is credible in the future. Combining these conditions with the definition of the real exchange rate and the UIP condition yields:

$$\Delta \hat{Q}_t = \hat{\pi}^*_t - \hat{\pi}_t \quad ; \quad \widehat{1+\tau^c_t} = i_t - i^*_t \tag{33}$$

That is, a credible peg requires policy to do two things in equilibrium: i) the real exchange rate must vary exactly with inflation differentials, and ii) interest rate differentials and capital controls must move together. I will now show that, much like in the case of a real exchange rate target, a nominal exchange rate target also pins down a unique inflation rate that is consistent with the current account condition.

To gain some analytical intuition on how capital account policy determines inflation by pegging the nominal exchange rate, combine the conditions in (33) with the risk-sharing condition (25) and policy rules (14), (16) to obtain the law of motion for capital controls implied by a nominal exchange rate peg:

$$\mathbb{E}_t \widehat{1+\tau^c_{t+j}} = \left(\phi_\pi \frac{1-\gamma}{1+\kappa}\right)^j \widehat{1+\tau^c_t} + \sum_{k=0}^{j-1} \left(\phi_\pi \frac{1-\gamma}{1+\kappa}\right)^{j-k-1} \mathbb{E}_t[\varepsilon^M_{t+k+1}], \quad \forall j \geq 1$$

This expression reveals that, for the peg to be consistent with a bounded equilibrium, monetary policy behavior must satisfy $\phi_\pi \frac{1-\gamma}{1+\kappa} < 1$. In other words, the exchange rate peg imposes restrictions on monetary policy as it requires the response of interest rates to inflation to be weak enough.[25] Otherwise, capital account policy, by committing to the policy fixed exchange rates, sends the economy into an off-equilibrium explosive path where capital controls, and therefore NFLs, diverge.[26] The implication is that monetary policy behavior is not what determines inflation.

To see this combine the law of motion for capital controls with the intertemporal current account condition and optimality condition (25), imposing $\Delta e_t = 0$, to obtain an expression for equilibrium inflation:

$$\hat{\pi}_t = \hat{\tilde{f}}_{t-1} - \left[\frac{\omega}{f(1-\beta)} \left(\frac{1}{\frac{1+\kappa}{1-\gamma} - \phi_\pi} - \frac{\beta}{\frac{1+\kappa}{1-\gamma} - \phi_\pi \beta} \right) + \frac{\beta}{\frac{1+\kappa}{1-\gamma} - \phi_\pi \beta} \right] \widehat{1+\tau_t^c} \tag{34}$$

Equation (34) shows that, similarly to the case of a real exchange rate target, inflation is determined as the value that balances the current account (ensures external solvency). Monetary policy is therefore unable to stabilize inflation around a target when the exchange rate is pegged. Monetary policy's role in this case is to ensure the peg is consistent with the no arbitrage condition $i_t = \widehat{1+\tau_t^c}$ and thus sustain its credibility. Fiscal policy's role, as before, will be to ensure government solvency given inflation as given by (34) and a fixed nominal exchange rate.[27]

Figure 4 shows the effects of a monetary tightening on inflation under three assumptions on capital account policy: fixed nominal exchange rates, fixed real exchange rates, and flexible exchange rates. The blue dashed line replicates the previous result under a real exchange rate target that tighter monetary policy raises future inflation with no impact on today's inflation. The red solid line is the baseline case of flexible exchange rates in which a monetary tightening unequivocally lowers inflation and anchors inflation expectations ($\mathbb{E}_t \hat{\pi}_{t+1} = 0$).

In contrast, the green dotted line shows the case of a nominal peg where a monetary policy tightening does lower inflation contemporaneously but at the cost of higher future inflation.[28] It is important to distinguish the mechanism driving the fall in inflation under a nominal peg from the one under flexible exchange rates. In the first case it is the current account channel whereby higher rates imply higher capital controls which lower inflation by depreciating the real exchange rate and dampening domestic demand. In the second case it is the conventional substitution effect channel characteristic of New Keynesian models. The key distinction is that, as (34) shows, inflation adjusts to balance the current account regardless of whether this deviates from an inflation target.

[25] The notion of 'weak enough' now depends on the degree of trade openness. Since $\frac{1+\kappa}{1-\gamma} > 1$ for all $\gamma \in (0,1)$, this condition implies that monetary policy can still be 'passive' under a fixed exchange rate even it reacts more than one-to-one to inflation.

[26] Notice that, due to the equilibrium condition $i_t = \widehat{1+\tau_t^c}$, this would also create a diverging path for nominal interest rates.

[27] Note that, unlike in the case of a real exchange rate target, a non-zero local currency share (α) is not necessary for this channel to uniquely pin down inflation. Because policy targets the nominal exchange rate, higher inflation can erode the value of NFLs even if they are all denominated in dollars. Under fixed nominal exchange rate, higher inflation induces a real appreciation of the local currency that lowers the value of foreign currency NFLs.

[28] The term inside the squared brackets in (34) is always positive when $\phi_\pi < \frac{1+\kappa}{1-\gamma}$ and $\beta < 1$ assuming $f > 0$.

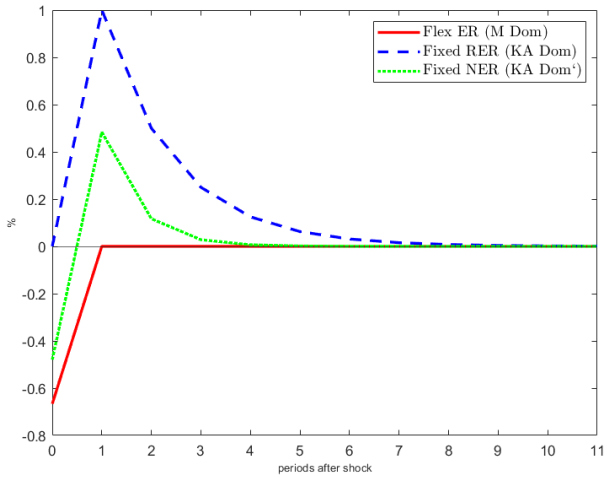


Figure 4: Impulse responses for inflation to a 100 basis point increase in the nominal interest rate under different capital account policies

While this does not preclude monetary policy surprises from having an effect on inflation, it means monetary policy's effectiveness is constrained by external solvency. Indeed, higher interest rates raise capital inflows and create current account deficits which, under a nominal peg, need to be financed by higher inflation. The central bank's ability to anchor inflation expectations, and thus achieve strict inflation targeting, is constrained by the exchange rate peg.

These results are consistent with F. Bianchi, 2021 and G. Benigno et al., 2007 who find that the central bank cannot simultaneously target inflation and the nominal exchange rate in a SOE model where the central bank only uses interest rates. They interpret this as a nominal exchange rate target being an alternative form of active monetary policy. My results suggest that even if the central bank has access to a second instrument (capital controls), targeting both inflation and the exchange rate is not an equilibrium policy mix.[29]

Capital Account Dominance and the Trilemma: The implications of capital account dominance seem to contradict the policy prescriptions of the classic trilemma (Mundell, 1962) suggesting that a country can target inflation and peg the exchange rate if it uses capital controls.

As we saw, strict inflation targeting and an exchange rate peg (real or nominal) is not an equilibrium policy mix as it clashes with intertemporal current account solvency. The latter part is what the original trilemma does not account for. Fixed exchange rates and an inflation target are perfectly consistent with agents' optimal behavior if the government uses capital controls to defend the exchange rate peg. This is reflected by the UIP condition under a constant exchange rate $i_t = \widehat{1+\tau_t^c}$. However, the intertemporal current account condition must also be satisfied in equilibrium. As highlighted throughout this paper, when policy targets the exchange rate it prevents the present value of trade balances from adjusting as needed to balance the country's

[29]The idea of fixed nominal exchange rates as active capital account policy is also consistent with theoretical findings suggesting that a responsible (passive) fiscal authority is central to the credibility of an exchange rate peg. See e.g., Sargent et al., 2009 and F. Bianchi, 2021.

current account. The price level must then adjust to revalue the country's foreign liabilities and satisfy this equilibrium condition, as (34) reflects. Inflation dynamics being constrained by the current account implies monetary policy is unable to enforce an exogenous inflation target (see Figure 4).

A key assumption in this stark incompatibility result is that the peg and the inflation target are expected to be *permanent and invariant* policy objectives. Given the unrealistic nature of this assumption, it is interesting to consider how a nominal peg and an inflation target could be sustained as an equilibrium policy mix. F. Bianchi and Melosi, 2019 show that by allowing policy rules to be state contingent, and thus evolve stochastically, agents expecting an 'unstable' policy regime to revert back to a stable configuration in the future with a positive probability is enough to ensure the existence of a rational expectations equilibrium. The intuition is that, because agents expect the unsustainable policy mix to end eventually, the current account condition is intertemporally balanced by (the probability of) an expected devaluation. Importantly, the stability of the model under this type of expectation formation implies the conflicting policy mix must end at some point. This suggests that, even in this setting, strict inflation targeting and fixed exchange rates are still incompatible in the long run.[30]

I therefore reconcile these results with the traditional trilemma by reinterpreting the latter as a short-run statement. That is, policy makers can *temporarily* sustain fixed exchange rates and strict inflation targeting by accumulating external liabilities. External solvency will then eventually force them to choose one objective in order to avoid exploding external debt dynamics. This suggests the presence of a long-run dilemma where policy faces a *long run trade-off* between price and exchange rate stability.

4 Inflation Targeting in the MFK Framework

The previous discussion raises the important policy question: when can a central bank actually target inflation in a SOE? In this section, I focus on the monetary dominance regime of Proposition 1 and show that passive capital account policy means managing capital inflows as monetary policy moves interest rates. I conclude that this response is critical for the theoretical conditions under which monetary policy is able to stabilize inflation around its target.

4.1 When Can a Central Bank Target Inflation in a SOE?

A common practice in the SOE and open economy literature is to assume a monetary authority that can, and does, target inflation. In the standard New Keynesian framework, this assumption relies on imposing the so-called 'Taylor principle' whereby the nominal interest rate responds to changes in inflation by more than one-to-one (i.e. $\phi_\pi > 1$).[31] The Taylor principle is a necessary

[30] Other deviations from the baseline model described above that could allow for the classic trilemma to seemingly hold in the short term could be allowing for: i) long term government bonds as in Abe, 2025 or ii) allowing the government to 'mine' a bubble term as in Brunnermeier et al., 2020.

[31] See Cochrane, 2011 for a discussion on the implications and issues with the Taylor principle. See also Castillo-Martinez and Reis, 2024 for a recent discussion and Angeletos and Lian, 2023 for potential alternative approaches.

assumption for the New Keynesian model to deliver a (locally) unique equilibrium.

An important insight from the monetary-fiscal interactions literature has been showing how, by imposing the Taylor principle, one automatically assumes that the fiscal authority is always passive (see e.g., Cochrane, 2011; Leeper and Yun, 2006). Alternative fiscal policy stances are therefore excluded by assumption. Similarly, Proposition 1 shows that by imposing the Taylor principle in a SOE model—as is standard in the SOE New Keynesian literature—one is also implicitly assuming that capital account policy is always passive. The alternative motives for capital controls are therefore also excluded by assumption in these models.

Targeting inflation in a SOE therefore requires specific conditions on fiscal *and* capital account policies. As Proposition 1 shows, this is reflected as restrictions on what equilibrium fiscal and capital account policies can be in a SOE model where the central bank is assumed to target inflation. These restrictions, which are effectively imposed by the Taylor principle, reflect the fact that, given the inflation target, fiscal and capital account policies are constrained by government and current account intertemporal solvency. More specifically, fiscal policy—taking the price level and the exchange rate as given—sets current and future taxes such that their present value is consistent with (19). Similarly, capital account policy—also taking the price level and exchange rate as given—sets capital controls to ensure that the present value of trade balances is consistent with (20).

Hence, a monetary tightening lowers equilibrium inflation only if a specific fiscal and capital account policy response takes place.

Corollary 2. *A monetary tightening lowers inflation contemporaneously if and only if backed by tighter fiscal and capital account policies.*

4.2 Some Unpleasant Monetarist Arithmetic in a SOE

In this section I replicate the celebrated result in Sargent and Wallace, 1981 known as the 'unpleasant monetarist arithmetic' that highlights how monetary-fiscal coordination are key for the effectiveness of monetary policy. By doing so, I extend this key message to the context of a SOE.

To show that the effects of monetary policy in a SOE also critically depend on coordination with capital account policy, I follow Ljungqvist and Sargent, 2018 and assume stationary dynamics after $t = 0$. This effectively creates two 'periods', the current ($t = 0$) and the future ($t \geq 1$) period. To sharpen intuition I assume (without loss of generality for the results): i) household endowment y is in units of the domestic consumption basket and ii) there is no trade in foreign currency bonds ($b^* = d^* = 0$).[32]

Imposing these assumptions and goods market clearing in the risk sharing condition (10) at

[32]The first assumption eliminates the relative price effect that changes in the real exchange rate have on households' real income. This assumption can be thought of as reflecting a case with inelastic labor supply and a constant real wage. The second assumption is inocuous for the main intuition behind my results, as the baseline model in section 2 shows. As long as there is some local currency debt ($b_F \neq 0$), the composition of external debt will only contribute to magnitudes.

$t = 0$ yields:

$$1 + \tau_0^c = \frac{y - Q\gamma^* y^*}{y - Q_0\gamma^* y^*} \frac{Q_0}{Q} \tag{35}$$

which shows, as before, that there will always be a inverse relationship between the equilibrium real depreciation rate $\frac{Q}{Q_0}$ and the capital inflow tax τ_0^c, regardless of the policy regime. The difference between regimes comes from whether τ^c is set to achieve some exogenous exchange rate objective or set to accommodate what the equilibrium real depreciation rate is based on a market-clearing condition.

Under these assumptions, the equilibrium government budget constraint (11) and current account condition (18) at $t = 0$ (the 'current' period) are:

$$\frac{B_{-1}}{P_0} = \tau_0 + \frac{b}{R_0} \qquad \text{(Current GBC)}$$

$$\frac{B_{F-1}}{P_0} = \frac{Q_0\gamma^* y^* - \gamma y}{1 - \gamma} + \frac{b_F}{R_0} + \frac{\tau_0^c}{R_0} b_F \qquad \text{(Current CA)}$$

and for $t \geq 1$ (the 'future' period):

$$\frac{b}{\pi} = \frac{\tau}{1 - \beta} \qquad \text{(Future GBC)}$$

$$\frac{b_F}{\pi} = \frac{1}{1 - \beta} \frac{Q\gamma^* y^* - \gamma y}{1 - \gamma} \qquad \text{(Future CA)}$$

(Current GBC) and (Current CA) reflect the sources of revenues that the government and the country as a whole have available at $t = 0$ and are analogous to conditions (11) and (18). (Future GBC) and (Future CA) are particularly illuminating because they reflect the *long-run* necessary adjustments for fiscal and external solvency. In the long run, both the government and the economy as a whole can only pay for an increase in their liabilities through either higher surpluses or higher inflation. Debt-financed government deficits must be eventually followed by either higher taxes or higher inflation. Similarly, (external) debt-financed trade deficits must be eventually followed by either a real depreciation (higher Q) or higher inflation.

With this in mind, below I describe how the effects of an open market operation (OMO)—defined as an increase in the supply of bonds to raise nominal interest rates (i.e. a monetary tightening)—critically depend on the stance of capital account policy.

4.2.1 An OMO with fiscal and capital account backing

By assumption, the OMO increases R_0 by increasing the supply of bonds B_0. First, this increases long-run real government indebtedness $b = \frac{B_0}{P_0}$ at initial prices. Fiscal policy provides backing for monetary policy by raising future taxes τ to pay for higher government debt. The expected tax increase induces agents to save more at $t = 0$ as they plan to use their higher future wealth to pay for higher future tax liabilities. Higher saving at $t = 0$ lowers demand for goods, creating downward

pressure on the price level P_0.

Second, higher domestic rates also increase the SOE's foreign indebtedness $b_F = \frac{B_{F0}}{P_0}$ since some of the bonds issued in the OMO are bought by foreign households who are attracted by lower domestic bond prices. Capital account policy provides backing for monetary policy by raising the capital controls tax τ_0^c to dampen foreign demand for domestic bonds and offset the effects of lower bond prices. In other words, backing from capital account policy takes the form of suppressing a surge in capital inflows by increasing the tax on incoming foreign capitals (i.e. 'leaning against the wind'). In equilibrium, policy increases τ_0^c by enough to offset the effects of both lower bond prices and a lower price level so that real external debt b_F is unchanged. Fiscal support for the OMO implies long-run inflation π is unchanged. Capital account support for the OMO then implies a constant long-run real exchange rate.[33] By equation (35), higher τ_0^c implies the local currency must be expected to appreciate (Q/Q_0 falls) as demand for the domestic currency falls today due to the higher capital controls. Since Q is constant, today's real exchange rate Q_0 depreciates. That is, by stabilizing capital flows (and NFLs), capital account policy induces the real depreciation that monetary policy needs to control the price level. A more depreciated real exchange rate generates higher trade balances at $t = 0$ (through more competitive exports) lowers domestic demand for goods and is consistent with a lower price level.

In sum, a monetary tightening with fiscal *and* capital account backing lowers current inflation as in the canonical New-Keynesian model. I now analyze the case where capital account backing is no longer present.

4.2.2 An OMO with fiscal backing but no capital account backing

Consider the same policy experiment but now capital account policy does not provide backing. In particular, assume that capital account policy has its own objective of stabilizing the real exchange rate (i.e. is active). As before, by assumption the OMO increases R_0 by increasing B_0 which, at the initial P_0, increases real government and external indebtedness b and b_F. As we have seen, higher external debt must be financed through either higher long-run trade surpluses (through a more depreciated currency) or higher inflation. It can be shown that, if policy sets τ_0^c with the objective to stabilize Q_0, equation (35) implies that a long run real depreciation is not consistent with an equilibrium where foreign liabilities b_F are finite. Hence, the equilibrium long run real exchange rate Q is constant under this type of policy. This, in turn, implies that policy can fully stabilize Q_0 by setting a constant τ_0^c.

Long-run exchange rate stability implies long-run inflation must rise in equilibrium after the OMO to equalize the real value of outstanding external debt $\frac{b_F}{\pi}$ to the present of long run trade balances. Given higher long-run inflation, fiscal policy adjusts taxes to whatever they need to be to ensure the new value of real outstanding government debt $\frac{b}{\pi}$ is equal to the present value of

[33] As mentioned above, the case of constant capital controls can be interpreted as passive capital account policy if the long-run real exchange rate is allowed to jump. However, it is straightforward to show that allowing the real exchange rate to be permanently higher is welfare-reducing compared the case where capital controls are used to stabilize it.

taxes $\frac{\tau}{1-\beta}$. Because agents internalize that their increased future wealth in the form of higher bond holdings will be eroded away by higher future inflation, they do not adjust their consumption plan and today's price level P_0 is constant.

In sum, we have shown that a monetary tightening **without** capital account backing replicates Sargent and Wallace's, 1981 result whereby tighter monetary policy not only fails to reduce current inflation, but raises future inflation.

4.2.3 Discussion

The two cases described above illustrate how capital account backing is a necessary condition for a monetary policy to be able to reduce inflation by increasing nominal interest rates. In other words, fiscal policy providing full backing for monetary policy is not enough for the latter to ensure price stability. This reflects the fact that, when policy target the exchange rate, inflation has current account rather than fiscal roots. Coordination with the fiscal authority is therefore not enough to ensure the central bank's ability to achieve low and stable inflation in a SOE. Coordinated capital account policies are also necessary. As shown above, coordination with capital account policy implies allowing the real exchange rate to depreciate so that the SOE can pay for higher levels of NFLs caused by the monetary contraction. Much like in the case of fiscal policy, coordination implies capital account policy taking on the role of stabilizing (external) debt, which is what then allows monetary policy to maintain control over inflation.

The conventional monetarist result wherein a monetary tightening always reduces inflation therefore critically depends on coordination with *both* fiscal and capital account policy.[34] Unlike in Sargent and Wallace, 1981, the 'unpleasant' consequences of a monetary tightening happen despite full monetary-fiscal coordination (i.e. fiscal policy is willing to adjust taxes as much as necessary to maintain government solvency). This has important implications for policy-making in SOEs as it illustrates the *necessity* of a three-way coordination between monetary, fiscal, and capital account policies to successfully implement an inflation target. Most previous work has focused exclusively on the coordination between monetary and fiscal policies, however, as the above example illustrates, including capital account policy into the analysis is critical to understand monetary-fiscal interactions under increasingly common policies of intervening the capital account.

5 An Application: The Case of Chile between 1985 and 1989

In this section, I provide an application of this theory's usefulness to understand and interpret macroeconomic time series in SOEs. I present both narrative and empirical evidence suggesting Chile in the late 1980s was an example of capital account dominance. Narrative evidence suggests the stance of monetary, fiscal, and capital account policy was consistent with the conditions for capital account dominance (i.e passive, passive, active). Empirical evidence corroborates the claim by showing that predictions from a calibrated New Keynesian MFK model under capital account

[34] The case of an OMO with capital account backing and no fiscal backing is essentially equivalent to the discussion in Sargent and Wallace, 1981.

dominance match estimates from a Structural Vector Autoregression (SVAR) much better than predictions under monetary or fiscal dominance regimes.

5.1 Policy Context and Narrative Evidence

After a severe banking crisis and recession in 1982-83 Chilean authorities decided to shift policy gears. In 1985, a newly appointed team of policymakers was assigned the task to bring back growth after the recession. To do so, a policy of discrete and surprise nominal devaluations was used to maintain a depreciated real exchange rate and thus foster export-led growth (Caputo and Saravia, 2018). Policy's intent to target a level of the real exchange rate was therefore clear.[35]

This new set of policies succeeded in depreciating the currency and increasing GDP growth rates. A significant disinflation also took place whereby annualized inflation rates fell from around 30% in the first half of 1985 to less than 15% by the end of 1988. To defend these discrete devaluations, the central bank accumulated international reserves accordingly. Monetary policy was beholden to this exchange rate objective since the central bank was not independent until 1989. Controlling inflation was determined by the government to be a secondary objective for the central bank (Caputo and Saravia, 2018). On the fiscal side, there was a strong sense among policymakers and the public that fiscal responsibility was the main goal of fiscal policy after the crisis. Unpopular austerity measures were implemented with the explicit objective of achieving fiscal sustainability (Edwards, 2023). See appendix H.1 for supporting narrative evidence.

Overall, a clear intent to target the real exchange rate coupled with a secondary concern for inflation stabilization and fiscal consolidation fits a qualitative description of a active capital account, passive monetary, and passive fiscal policy mix. I now provide quantitative evidence to further support this claim.

5.2 Understanding Chile's Disinflation

Chile's disinflation represents an interesting case study from the point of view of the literature on monetary-fiscal interactions because a central bank that is not independent and a fiscal authority geared towards fiscal sustainability fits a passive-passive monetary-fiscal policy arrangement. This type of policy mix has been widely claimed to always yield equilibrium indeterminacy as many self-fulling (sunspot) equilibria are possible. Studying Chile's experience through the lens of the theory developed in this paper, shows there is a an entire class of uniquely determined equilibria where monetary and fiscal policies are passive, as long as policy is engaged in exchange rate manipulation policies.

Specifically, I argue that Chile's disinflation was not the result of non-fundamental dynamics, but rather the outcome of a uniquely determined equilibrium process brought about by policies of exchange rate undervaluation.

[35]The Chilean government explicitly implemented a real exchange rate rule whereby nominal devaluations were chosen based on inflation differentials between U.S. and Chile with the goal of being as close as possible to purchasing power parity (PPP), that is, a real exchange rate equal to one. This so-called 'PPP rule' is therefore a clear and explicit example of a real exchange targeting policy.

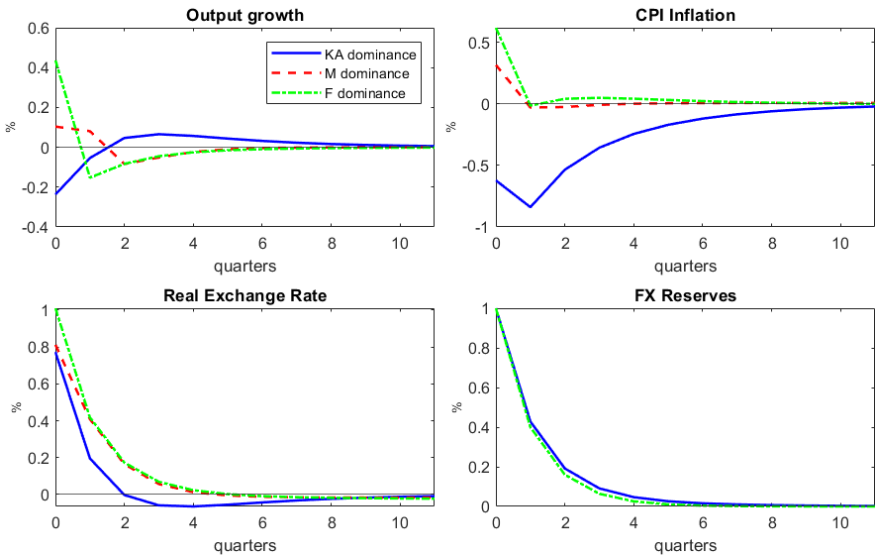


Figure 5: Impulse responses to 1% FX increase in calibrated New Keynesian MFK model under each policy regime

5.2.1 A New Keynesian MFK Model

To explain the disinflation as the result of a uniquely determined equilibrium, I extend the baseline model presented in section 2 to include nominal rigidities and monopolistic competition between firms producing the domestic good. To better match the main policy instrument used by the central bank of Chile, I assume the central bank's capital account instrument in the model are foreign exchange (FX) interventions instead of capital controls. As is well-known in the literature, FX interventions have no effect on equilibrium exchanges rates if financial markets are frictionless. To give FX interventions traction in the model, I assume there is a quadratic intermediation cost that households must pay to borrow from abroad (P. Benigno, 2009; De Paoli, 2009):

$$K(d^*_{t+1}) = \frac{\nu}{2}(d^*_{t+1} - d^*)^2$$

In the first-order approximation to the model this assumption is isomorphic more microfounded ways to model frictions in financial markets that can arise from limited commitment due to moral hazard (Gabaix and Maggiori, 2015), risk-averse intermediaries in segmented asset markets (Itskhoki and Mukhin, 2021), or heterogeneous entry costs for these intermediaries (Fanelli and Straub, 2021). The rest of the model is standard in the New Keynesian SOE literature (see Appendix G for a description).

I then proceed to calibrate the model to match averages of the Chilean economy over the period of interest and draw from the literature of calibrated New Keynesian SOE models to choose the remaining parameters. The policy parameters ϕ_π, ϕ_b, ϕ_k take on three different values (see appendix G.6 for full calibration table and a brief discussion). Figure 5 shows theoretical impulse responses to a 1% surprise increase in FX reserves in the calibrated model under each of the three regimes

in Proposition 1. These impulse responses show there is a clear testable implication of capital account dominance. An increase in reserves is inflationary under monetary and fiscal dominance but deflationary under capital account dominance.[36] The intuition for why inflation falls is similar to the mechanism emphasized in previous sections. That is, by purchasing reserves and inducing net capital outflows, policy depreciates the real exchange rate and raises the present value of trade surpluses. A higher present value of trade surpluses implies a lower present value of consumption, lower aggregate demand, and thus lowers inflation.

The inflationary effects of higher FX reserves under monetary dominance are intuitive when we realize that an increase in reserves amounts to a monetary expansion. When the central bank buys reserves (dollar assets), it does so by issuing peso liabilities (bank reserves or money) and therefore increases the supply of nominal domestic currency assets in the economy. In a context of monetary regime, this causes inflation to rise by the conventional monetarist mechanism.

Under fiscal dominance, inflation is driven by the relationship between government debt and the present of fiscal surpluses. When the central bank expands the supply of the government's nominal liabilities, inflation rises given the weak fiscal response that characterizes this regime. Inflation increases to dilute the real value of these newly issued liabilities and remain consistent with the present value of government surpluses.[37]

5.2.2 A Sign-Restriction SVAR Model for Chile

To capture joint dynamics of the key variables of interest in the data, I estimate a five-variable SVAR using Bayesian techniques with quarterly data from Q1-1985 to Q4-1989. The structural representation of the empirical model can be succinctly expressed as:

$$\boldsymbol{A}_0 \boldsymbol{Y}_t = \boldsymbol{A}(L)\boldsymbol{Y}_{t-1} + \varepsilon_t$$

where $\boldsymbol{Y}_t = \begin{bmatrix} \log FX_t & \log P_t & \log GDP_t & \log Q_t & i_t \end{bmatrix}$ includes the log of FX reserves in constant pesos, log of the CPI, log of real GDP, log of the real exchange rate, and the short term nominal deposit rate.[38] The polynomial $\boldsymbol{A}(L)$ includes two lags due to the limited sample size. To avoid imposing problematic timing restrictions on variables like interest rates and the exchange rate, I identify the matrix of contemporaneous responses $\boldsymbol{A}_0$ through sign restrictions following Uhlig, 2005. I impose that the same shock raises reserves, depreciates the real exchange rate, and lowers nominal interest rates on impact. The first assumption follows from theoretical work showing that, under frictional financial markets, an increase in reserves causes a real depreciation of the currency

[36] This result is consistent with the earlier finding that a capital account tightening (an increase in the bond tax) lowers inflation under capital account dominance (see Figure 2). An increase in reserves can be thought of as a tightening of the capital account as it also reduces net capital inflows by generating official outflows.

[37] The intuition here is that the government buys dollar assets at a return of i_t^* and borrows in local currency at a cost of i_t. With no frictions, the exchange rate depreciates to equalize these returns and therefore the FX intervention has no effect on public finances. However, in the presence of foreign borrowing costs or capital controls, the increase in reserves also creates positive excess returns for domestic bond holders since $i_t - i_t^* - \mathbb{E}_t \Delta e_{t+1} = \nu a_{t+1}^* > 0$ which implies excess debt service costs for the government and an increased fiscal burden.

[38] Fiscal variables were unavailable at the quarterly frequency for this time period.

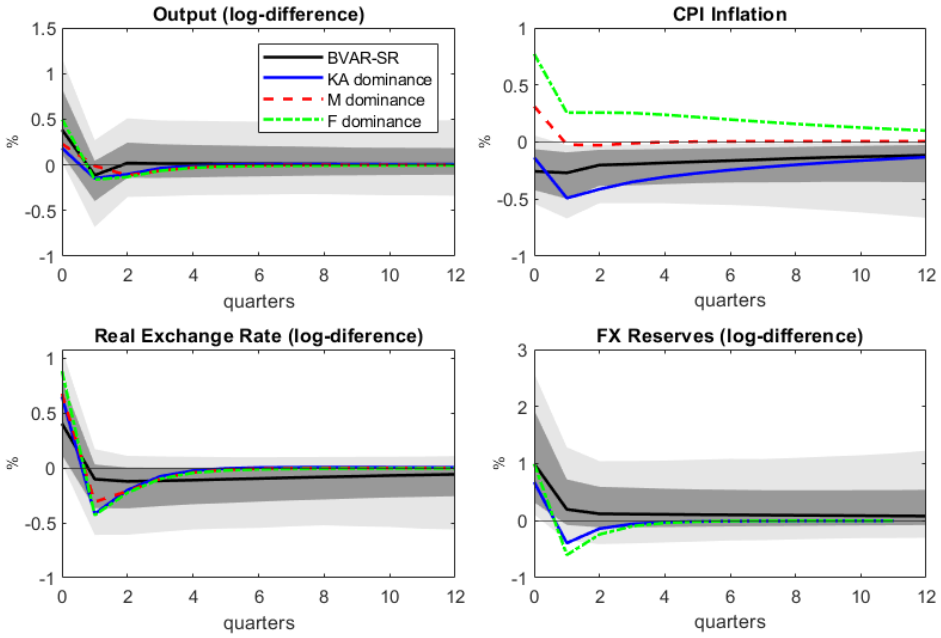


Figure 6: Impulse responses to a 1% increase in FX reserves in DSGE and SR-BVAR models
Note: Solid black lines depict posterior median responses while dark and light gray shading depict 68% and 90% posterior credible bands.

(Choi and Taylor, 2022). The second assumption is based on the fact that, as discussed, a purchase of FX reserves by the central bank amounts to a monetary loosening.

I estimate this VAR in log-levels following Sims et al., 1990 who show that doing so yields consistent estimates of the parameters even if variables are cointegrated (see Appendix H.3 for evidence of cointegration and unit-root). To account for unit-root or near-unit-root behavior in the system I use the prior suggested by Sims and Zha, 1998 which extend the conventional Minnesota prior to accommodate unit-root components as part of the prior. I obtain draws from the posterior distribution of the parameters using a conventional Gibbs sampler that exploits the conjugate property of the Normal and inverse-Wishart priors assumed for lagged variables and errors variance parameters.

Since the responses in Figure 5 are defined in log-deviations from steady state and the responses from the VAR are in log-levels, in Figure 6 I report first differences for both VAR and DSGE responses for comparison. By taking first differences we eliminate the influence of the steady state in DSGE responses. For the VAR, first differences impulse responses are taking first differences *within each draw* thus allowing us to compute correct credible bands from the posterior distribution.[39]

The empirical median response (black solid line) for inflation is mostly consistent with the predictions from capital account dominance. These estimates suggest that a 1% increase in FX reserves had a persistent and negative effect on inflation. The median posterior effect of higher reserves is estimated to be -0.26% on impact while the DSGE impulse response under capital

[39]See Appendix H.3 for a robustness analysis to estimating the VAR in log-levels using detrended data, specifying a looser prior, and using a Vector Error-Correction (VEC) model to allows for actual non-stationary and cointegrating behavior in the data.

account dominance (blue solid line) predicts a similarly-sized effect of -0.14%. The persistent disinflationary effect of this shock is also matched by the predictions of the capital account regime. Almost all posterior draws of the response for inflation are concentrated on negative territory, suggesting the data strongly supports the qualitative result that increases in reserves contributed to the disinflation. This is important because, in contrast, both monetary and fiscal regimes predict a positive effect on inflation from higher reserves. These theoretical responses lie outside the 90% posterior band, implying they are strongly rejected by the data.

Overall, narrative and quantitative evidence suggest Chile's experience between 1985 and 1989 was an example capital account dominance. This quantitative application underscores the importance of the framework developed in this paper as a way to understand episodes where policy heavily intervenes the capital account and the implications this has for the effects of policy shocks. Existing theories that focus only on monetary-fiscal interactions would have struggled to explain how expansionary monetary policy (through increases in reserves) and a depreciating currency could have resulted in lower inflation rates. As illustrated here, correctly interpreting macroeconomic time series in these cases requires taking into account the full spectrum of interactions that arise between monetary, fiscal, and capital account policies.

6 Conclusion

While leaving capital account policy unmodeled does not affect a SOE model's ability to produce a unique equilibrium, it restricts the set of possible equilibria that the model *is able to produce*. As shown in this paper, doing so not only rules out an entire class of equilibria where capital account policies drive inflation, but also ignores the *necessary* passive capital account policy behavior required to ensure the existence of an equilibrium where the central bank targets inflation. The application to Chile showed how this broader approach to policy interactions in SOEs can helps us better interpret and understand episodes where countries heavily intervene their capital account.

The resurgence of capital account management policies and other forms of financial repression suggests that the importance of capital account policies is likely to increase in the near future. Understanding the role that monetary, fiscal, *and* capital account policy interactions play in determining equilibrium inflation and exchange rates becomes essential for the design of policies that promote price stability in small and emerging economies.

The literature of monetary-fiscal interactions has argued for the importance of explicitly modeling the behavior of fiscal policy to better understand the dynamics of inflation in a country like the United States. Similarly, the main message of this paper is to argue that modeling the behavior and objectives of capital account policies is equally important to understand the dynamics of inflation and exchange rates in a SOE.

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Appendix

A Rest of the World and Trade Openness

In the spirit of Sutherland, 2005 and De Paoli, 2009, I assume the openness parameters γ, γ^* are related as follows:[40]

$$\gamma^* = \frac{y}{Qy^*}\gamma z \tag{A.1}$$

The scaling parameter z allows for deviations from the assumption that 'relative trade openness'—captured by γ^*/γ—is equal to the relative size of the domestic economy—reflected by $y/(Qy^*)$. Assumption (A.1) allows us to rationalize the fact that for a SOE (i.e. $\frac{y}{y^*} \to 0$), the rest of the world will be essentially a closed economy regardless of the SOE's trade openness γ since $\gamma^* \to 0$ for any value of $\gamma \in (0,1)$ whenever $\frac{y}{y^*} \to 0$.

The parameter z is closely related to the steady-state export-to-output ratio since re-writing (A.1) gives:

$$\gamma z = \frac{Q\gamma^* y^*}{y} \equiv x$$

where I define x as the steady state export-to-output ratio. z can ve used to parametrize steady states with non-zero trade balances tb and net foreign asset position f. Indeed, the goods market clearing conditions for the domestic and foreign countries imply:

$$C = \frac{y - Q\gamma^* C^*}{1-\gamma} \quad ; \quad C^* = y^*$$

Then using assumption (A.1), it is straightforward to show that the steady state trade balance is:

$$tb \equiv Q\gamma^* C^* - \gamma C = \frac{\gamma y}{1-\gamma}(z-1)$$

Thus, $z = 1$ is equivalent to the assumption of a balanced trade steady state ($tb = 0$). $z > 1$ implies the country is a net exporter (a positive steady state trade balance) and has positive NFLs in steady state. $z < 1$ implies the country is a net importer (a negative steady state trade balance) and has negative NFLs in steady state.

There are restrictions on the values parameter z can take. First, since $\gamma^* \in (0,1)$, by definition, we have that $z > 0$. Second, using (A.1) in the expression for steady state consumption above we

[40] De Paoli, 2009 and Sutherland, 2005 use $1-\nu$ to denote domestic households' preference for the foreign good (γ) and ν^* to denote foreign households' preference for the domestic good (γ^*). They specify $1-\nu = (1-n)\lambda$ and $\nu^* = n\lambda$ where n is the SOE's relative size in the world economy and λ is 'openness'. Relative trade openness is thus $\frac{\nu^*}{1-\nu} = \frac{n}{1-n}$. In my case, relative openness is $\frac{\gamma^*}{\gamma} = \frac{y}{y^*}z = \frac{y/Y}{y^*/Y}z = \frac{n}{1-n}z$ where I use Y to denote world output. Hence, assumption (A.1) is equivalent to these papers when $z = 1$.

obtain:

$$C = \frac{y - Q\gamma^* C^*}{1-\gamma} = \frac{1-\gamma z}{1-\gamma} y$$

Therefore, a strictly positive steady state consumption ($C > 0$), due to an infinite marginal utility of consumption at $C = 0$, requires $z < \frac{1}{\gamma}$. Hence, $z \in (0, \frac{1}{\gamma})$.

B Deterministic Steady State

I consider a symmetric zero-inflation steady state ($\pi = \pi^* = 1$) where purchasing power parity (PPP) holds ($Q = 1$). The steady state domestic and foreign Euler equations (2), (4), and (5) are:

$$\begin{aligned} 1 &= \beta R \\ 1 &= \beta R^* \\ 1 + \tau^c &= \beta R \end{aligned}$$

The first and second equations imply:

$$R = R^* = \beta^{-1} \tag{B.1}$$

from which we obtain that $\tau^c = 0$ must be true in steady state. The steady state goods market clearing conditions are

$$\begin{aligned} y &= Q^{\frac{\gamma}{1-\gamma-\gamma^*}}(1-\gamma)C + Q^{\frac{1-\gamma^*}{1-\gamma-\gamma^*}}\gamma^* C^* \\ y^* &= Q^{-\frac{1-\gamma}{1-\gamma-\gamma^*}}\gamma C + Q^{-\frac{\gamma^*}{1-\gamma-\gamma^*}}(1-\gamma^*)C^* \end{aligned}$$

Using the fact that $\gamma^* \to 0$ but $\gamma^* C^* \not\to 0$, and that $Q = 1$, these become:

$$\begin{aligned} y &= (1-\gamma)C + \gamma^* C^* \\ y^* &= \gamma C + (1-\gamma^*)C^* \end{aligned}$$

Dividing the second market clearing condition through by C^* and using $C/C^* \to 0$ we recover the foreign aggregate resource constraint:

$$C^* = y^* \tag{B.2}$$

Then use $\gamma^* C^* = z\gamma y$ so that the first condition implies:

$$C = \frac{y - \gamma^* C^*}{1-\gamma} = \frac{1-z\gamma}{1-\gamma} y \tag{B.3}$$

The bond market clearing requires that total government liabilities $\ell = b + Qb^*$ are equal to real domestic wealth $w = b_H - d^*$ and external liabilities (NFLs) $f = b_F + Q(b^* + d^*)$, hence:

$$\ell = w + f \tag{B.4}$$

The steady state household budget constraint is:

$$C + \frac{b_H}{R} + \frac{d^*}{\pi^*} = Q^{-\frac{\gamma}{1-\gamma}} y - \tau + \frac{b_H}{\pi} + \frac{d^*}{R^*}$$

Using $R = R^* = \beta^{-1}$ and the fact that $\pi = \pi^* = Q = 1$ we can write:

$$C = y - \tau + (1 - \beta)w \tag{B.5}$$

The steady state government budget constraint is:

$$\tau - T + \frac{b}{R} + \frac{b^*}{R^*} + \tau^c \left(\frac{b_F}{R} + \frac{d^*}{R^*(1+\tau^c)} \right) = \frac{b}{\pi} + \Delta Q \frac{b^*}{\pi^*}$$

Impose $\Delta Q = 1$, $R = R^* = \beta^{-1}$ and $\pi = \pi^* = 1$ and the fact that in steady state $\tau^c = 0$ (and therefore $T = 0$) to write:

$$\ell \equiv b + Qb^* = \frac{\tau}{1 - \beta} \tag{B.6}$$

The steady state current account is:

$$-\left(\frac{b_F}{R}(1+\tau^c) + \frac{d^* + b^*}{R^*} - \frac{b_F}{\pi} - \Delta Q \frac{d^* + b^*}{\pi^*} \right) = Q\gamma^* C^* - \gamma C \equiv tb$$

Impose again $\tau^c = 0$, $\Delta Q = 1$, $R = R^* = \beta^{-1}$, and $\pi = \pi^* = 1$ to write:

$$Q\gamma^* C^* - \gamma C = -(1 - \beta)f \tag{B.7}$$

where I also use the definition of $f = b_F + Q(d^* + b^*)$. Equations (B.1)-(B.7) fully describe the steady state as they pin down unique values for
$C, C^*, w, f, b, R, R^*, \tau^c$ given values for y, y^*, τ and parameters β, γ, z.

C Derivation of Linearized System

The linearized domestic and foreign Euler equations (2),(3),(4),(5) are:

$$\begin{aligned}
i_t &= \mathbb{E}_t[\hat{\pi}_{t+1}] + \mathbb{E}_t[\hat{C}_{t+1} - \hat{C}_t] \\
i_t^* + \widehat{1+\tau_t^c} &= \mathbb{E}_t[\hat{\pi}_{t+1}] + \mathbb{E}_t[\hat{C}_{t+1} - \hat{C}_t] - \mathbb{E}_t[\hat{e}_{t+1} - \hat{e}_t] \\
i_t^* &= \mathbb{E}_t[\hat{\pi}^*_{t+1}] + \mathbb{E}_t[\hat{C}^*_{t+1} - \hat{C}^*_t] \\
i_t - \widehat{1+\tau_t^c} &= \mathbb{E}_t[\hat{\pi}^*_{t+1}] + \mathbb{E}_t[\hat{C}^*_{t+1} - \hat{C}^*_t] + \mathbb{E}_t[\hat{e}_{t+1} - \hat{e}_t]
\end{aligned}$$

where $i_t \equiv \hat{R}_t = \log R_t/R$ and $\hat{e}_t = \log e_t/e$. The last two pricing equations imply the domestic UIP relationship:

$$i_t - i_t^* = \mathbb{E}_t[\hat{e}_{t+1} - \hat{e}_t] + \widehat{1+\tau_t^c}$$

Deviation from UIP will be driven by capital account policy. Using the definition of the real exchange rate implies $\mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t] = \mathbb{E}_t[\hat{\pi}^*_{t+1}] - \mathbb{E}_t[\hat{\pi}_{t+1}] + \mathbb{E}_t[\hat{\epsilon}_{t+1}]$, we can combine the two pricing equations for domestic bonds (first and third equations) to obtain the domestic household's risk-sharing condition:

$$\mathbb{E}_t[\hat{C}^*_{t+1} - \hat{C}^*_t] = \mathbb{E}_t[\hat{C}_{t+1} - \hat{C}_t] - \left[\mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t] + \widehat{1+\tau_t^c}\right] \tag{C.1}$$

Using the facts that $C/C^* \to 0$ but $\gamma^* C^* \to \gamma z y$ and that $C_t^* = y^*$, the linearized domestic goods market clearing conditions are:

$$\hat{C}_t = -\frac{\gamma + \kappa}{1-\gamma}\hat{Q}_t \quad ; \quad \hat{C}_t^* = 0 \tag{C.2}$$

where $\kappa = \frac{\gamma^* C^*}{(1-\gamma)C} = \frac{\gamma z}{1-\gamma z} > 0$. Aggregate consumption in the SOE will move inversely with the real exchange rate and foreign consumption will be constant at $C^* = y^*$.

The linearized policy rules (14)-(16) are:

$$\begin{aligned}
i_t &= \phi_\pi \hat{\pi}_t + \varepsilon_t^M \\
\hat{\tau}_t &= \phi_b \hat{\ell}_t + \varepsilon_t^F \\
\widehat{1+\tau_t^c} &= \phi_k \hat{f}_t + \varepsilon_t^K
\end{aligned}$$

Combining the linearized equilibrium conditions above, we can reduce the model's equilibrium dynamics to a four-equation dynamic system in Q_t, π_t, ℓ_t, f_t.

To do so, first substitute the goods market clearing conditions (C.2) and the linearized capital controls rule into the risk-sharing condition (C.1) to obtain the equilibrium law of motion for the

real exchange rate:

$$\mathbb{E}_t[\hat{Q}_{t+1}] = \hat{Q}_t - \frac{1-\gamma}{1+\kappa}\left(\phi_k \hat{f}_t + \varepsilon_t^K\right) \tag{C.3}$$

This difference equation shows that, in the absence of capital controls or when capital controls are constant ($\phi_k = 0$), the real exchange rate Q_t will follow a random walk. In this case, a debt-elastic foreign interest rate or an endogenous discount factor (Schmitt-Grohé and Uribe, 2003) can be added to the model with no substantive effect to my main results.

Next, combine the first Euler equation with the linearized monetary policy rule and the goods market clearing conditions (C.2) to get:

$$\mathbb{E}_t[\hat{\pi}_{t+1}] = \phi_\pi \hat{\pi}_t + \varepsilon_t^M + \frac{\gamma+\kappa}{1-\gamma}\mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t]$$

Then substitute (C.3) into the above and simplify terms to obtain the equilibrium law of motion for inflation:

$$\mathbb{E}_t[\hat{\pi}_{t+1}] = \phi_\pi \hat{\pi}_t + \varepsilon_t^M - \frac{\gamma+\kappa}{1+\kappa}(\phi_k \hat{f}_t + \varepsilon_t^K) \tag{C.4}$$

Next, linearize the current account condition (18) and take expectations conditional on information at time t:

$$\begin{aligned}\mathbb{E}_t\Big[-(\hat{b}_{Ft+1} + \widehat{1+\tau_t^c} + \hat{\pi}_{t+1} - i_t)\frac{b_F(1+\tau^c)\pi}{R} - (\hat{d}^*_{t+1} + \hat{b}^*_{t+1} + \hat{\pi}^*_{t+1} - \Delta Q_{t+1} - i^*_t)\frac{(d^*+b^*)\pi^*}{R^*} + \\ \hat{b}_{Ft} b_F + \hat{d}^*_t d^* + \hat{b}^*_t b^*\Big] \\ = \mathbb{E}_t\left[(\hat{Q}_t + \hat{C}^*_t)Q\gamma^* C^* - \hat{C}_t \gamma C\right]\end{aligned}$$

where I use individual good demands (7) and (8) to express the trade balance as a function of aggregate consumption and the real exchange rate. Impose steady state values and that $i^*_t - \mathbb{E}_t[\pi^*_{t+1}] = 0$ to write:

$$\begin{aligned}\mathbb{E}_t\Big[-(\hat{b}_{Ft+1} + \widehat{1+\tau_t^c} + \hat{\pi}_{t+1} - i_t)\beta\alpha - (\hat{d}^*_{t+1} - \Delta Q_{t+1})\beta(1-\alpha) + \hat{b}_{Ft}\alpha + \hat{d}^*_t(1-\alpha)\Big] \\ = \mathbb{E}_t\Big[(\hat{Q}_t + \hat{C}^*_t)\frac{\gamma^* C^*}{f} - \hat{C}_t \frac{\gamma C}{f}\Big]\end{aligned}$$

where I define steady state NFLs as $f = b_F + d^* + b^*$ and the steady state share of local currency $\alpha = \frac{b_F}{f}$ and foreign currency $1-\alpha = \frac{d^*+b^*}{f}$. Impose the goods market clearing conditions (C.2) as well as policy rules for i_t and $1+\tau_t^c$, and rearrange to obtain the equilibrium law of motion of outstanding NFLs:

$$\mathbb{E}_t[\hat{f}_{t+1}] = \left(\frac{1}{\beta} - \phi_k\right)\hat{f}_t + \phi_\pi \hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \frac{\omega}{\beta f}\hat{Q}_t + \varepsilon_t^M - \varepsilon_t^K \tag{C.5}$$

where $\omega = \gamma^* C^* + \gamma C \frac{\gamma+\kappa}{1-\gamma}$ and $\hat{f}_t = \alpha \hat{b}_{Ft} + (1-\alpha)(d_t^* + b_t^*)$. In this step I also make use of the fact that, by no arbitrage and the definition of the real exchange rate we have:

$$\begin{aligned}\mathbb{E}_t[\Delta Q_{t+1}] &= \mathbb{E}_t\Big[\Delta e_{t+1} + \pi_{t+1}^* - \pi_{t+1}\Big] \\ &= i_t - i_t^* - \widehat{1+\tau_t^c} + \mathbb{E}_t[\pi_{t+1}^* - \pi_{t+1}] \\ &= i_t - \mathbb{E}_t[\pi_{t+1}] - \widehat{1+\tau_t^c}\end{aligned}$$

since $i_t^* - \pi_{t+1}^* = 0$ by the foreign bond pricing equation (4).

Next, linearize the government budget constraint (11) using the fact that capital controls revenues are rebated to households, equilibrium transfers are $T_t = \tau_t^c(\frac{B_{Ft}}{P_t R_t} + \frac{e_t D_t^*}{P_t R^*(1+\tau_t^c)})$. Taking expectations conditional on information at time t of the linearized condition:

$$\hat{\tau}_t \tau + (\mathbb{E}_t[b_{t+1}] - i_t + \pi_{t+1}) b \frac{\pi}{R} + (\mathbb{E}_t[b_{t+1}^*] - i_t^* + \pi_{t+1}^* - \mathbb{E}_t[\Delta \hat{Q}_{t+1}]) b^* \frac{\pi^*}{R^*} = \hat{b}_t b + \hat{b}_t^* b^*$$

Impose policy rules for i_t, τ_t and rearrange to obtain the equilibrium law of motion for outstanding government liabilities:

$$\mathbb{E}_t[\hat{\ell}_{t+1}] = \frac{1-(1-\beta)\phi_b}{\beta}\hat{\ell}_t + \phi_\pi \hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] + \varepsilon_t^M - \frac{1-\beta}{\beta}\varepsilon_t^F - \frac{b^*}{\ell}(\phi_k \hat{f}_t + \varepsilon_t^K) \tag{C.6}$$

where $\hat{\ell}_t = \alpha \hat{b}_t + (1-\alpha)\hat{b}_t^*$ and $\ell = b + b^*$ in steady state. In this step, I again make use of the fact that $\mathbb{E}_t[\Delta Q_{t+1}] = i_t - \mathbb{E}_t[\pi_{t+1}] - \widehat{1+\tau_t^c}$ and the policy rule for $1+\tau_t^c$.

D Proofs

D.1 Proposition 1

The linearized system (23)-(26) can be written in matrix form as:

$$\underbrace{\begin{bmatrix}1 & 0 & 0 & 0\\ 1 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 1 & 0 & 0 & 1\end{bmatrix}}_{\mathbf{\Gamma}_0}\begin{bmatrix}\hat{\pi}_{t+1}\\ \hat{\ell}_{t+1}\\ \hat{Q}_{t+1}\\ \hat{f}_{t+1}\end{bmatrix} = \underbrace{\begin{bmatrix}\phi_\pi & 0 & 0 & -\frac{\gamma+\kappa}{1+\kappa}\phi_k\\ \phi_\pi & \frac{1-(1-\beta)\phi_b}{\beta} & 0 & -\frac{b^*}{\ell}\phi_k\\ 0 & 0 & 1 & -\frac{1-\gamma}{1+\kappa}\phi_k\\ \phi_\pi & 0 & -\frac{\omega}{\beta f} & \frac{1}{\beta}-\phi_k\end{bmatrix}}_{\mathbf{\Gamma}_1}\begin{bmatrix}\hat{\pi}_t\\ \hat{\ell}_t\\ \hat{Q}_t\\ \hat{f}_t\end{bmatrix} + \underbrace{\begin{bmatrix}1 & 0 & -\frac{\gamma+\kappa}{1+\kappa}\\ 1 & -\frac{1-\beta}{\beta} & -\frac{b^*}{\ell}\\ 0 & 0 & -\frac{1-\gamma}{1+\kappa}\\ 1 & 0 & -1\end{bmatrix}}_{\mathbf{\Psi}}\begin{bmatrix}\varepsilon_t^M\\ \varepsilon_t^F\\ \varepsilon_t^K\end{bmatrix}$$

$$+ \underbrace{\begin{bmatrix}1 & 0\\ 0 & 0\\ 0 & 1\\ 0 & 0\end{bmatrix}}_{\mathbf{\Phi}}\begin{bmatrix}\eta_{t+1}^\pi\\ \eta_{t+1}^Q\end{bmatrix}$$

and η^x_{t+1} is variable x's endogenous one-step-ahead forecast error defined as $\eta^x_{t+1} = x_{t+1} - \mathbb{E}_t[x_{t+1}]$. Premultiplying both sides by $\mathbf{\Gamma}_0^{-1}$:

$$\begin{bmatrix} \hat{\pi}_{t+1} \\ \hat{\ell}_{t+1} \\ \hat{Q}_{t+1} \\ \hat{f}_{t+1} \end{bmatrix} = \underbrace{\begin{bmatrix} \phi_\pi & 0 & 0 & -\frac{\gamma+\kappa}{1+\kappa}\phi_k \\ 0 & \frac{1-(1-\beta)\phi_b}{\beta} & 0 & \phi_k(\frac{\gamma+\kappa}{1+\kappa} - \frac{b^*}{\ell}) \\ 0 & 0 & 1 & -\phi_k\frac{1-\gamma}{1+\kappa} \\ 0 & 0 & -\frac{\omega}{\beta f} & \frac{1}{\beta} - \phi_k\frac{1-\gamma}{1+\kappa} \end{bmatrix}}_{\mathbf{\Gamma}} \begin{bmatrix} \hat{\pi}_t \\ \hat{\ell}_t \\ \hat{Q}_t \\ \hat{f}_t \end{bmatrix} + \begin{bmatrix} 1 & 0 & -\frac{\gamma+\kappa}{1+\kappa} \\ 0 & -\frac{1-\beta}{\beta} & \frac{\gamma+\kappa}{1+\kappa} - \frac{b^*}{\ell} \\ 0 & 0 & -\frac{1-\gamma}{1+\kappa} \\ 0 & 0 & -\frac{1-\gamma}{1+\kappa} \end{bmatrix} \begin{bmatrix} \varepsilon^M_t \\ \varepsilon^F_t \\ \varepsilon^K_t \end{bmatrix}$$

$$+ \begin{bmatrix} 1 & 0 \\ -1 & 0 \\ 0 & 1 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} \eta^\pi_{t+1} \\ \eta^Q_{t+1} \end{bmatrix}$$

The matrix $\mathbf{\Gamma} = \mathbf{\Gamma}_0^{-1}\mathbf{\Gamma}_1$ can be written in block form as:

$$\mathbf{\Gamma} = \begin{bmatrix} A & B \\ 0 & D \end{bmatrix}$$

where

$$A = \begin{bmatrix} \phi_\pi & 0 \\ 0 & \frac{1-(1-\beta)\phi_b}{\beta} \end{bmatrix} \quad ; \quad B = \begin{bmatrix} 0 & -\phi_k\frac{\gamma+\kappa}{1+\kappa} \\ 0 & \phi_k(\frac{\gamma+\kappa}{1+\kappa} - \frac{b^*}{\ell}) \end{bmatrix} \quad ; \quad D = \begin{bmatrix} 1 & -\phi_k\frac{1-\gamma}{1+\kappa} \\ -\frac{\omega}{\beta f} & \frac{1}{\beta} - \phi_k\frac{1-\gamma}{1+\kappa} \end{bmatrix}$$

Since $\mathbf{\Gamma}$ is upper block triangular, its eigenvalues correspond to the eigenvalues of submatrices A and D. Since submatrix A is diagonal, its eigenvalues are easily obtained as the diagonal elements:

$$\lambda_1 = \phi_\pi \quad ; \quad \lambda_2 = \frac{1-(1-\beta)\phi_b}{\beta} \tag{D.1}$$

The two eigenvalues of D can be obtained from solving the quadratic equation:

$$\lambda^2 - (d_{11} + d_{22})\lambda + (d_{11}d_{22} - d_{12}d_{21}) = 0$$

where d_{ij} is the ij element of submatrix D. That is:

$$\lambda_3 = \frac{d_{11} + d_{22} + \sqrt{(d_{11} + d_{22})^2 - 4(d_{11}d_{22} - d_{12}d_{21})}}{2} \tag{D.2}$$

$$\lambda_4 = \frac{d_{11} + d_{22} - \sqrt{(d_{11} + d_{22})^2 - 4(d_{11}d_{22} - d_{12}d_{21})}}{2} \tag{D.3}$$

Solving for the conditions when the first eigenvalues are inside the unit circle (i.e. $|\lambda_1| < 1, |\lambda_2| < 1$) from (D.1) is straightforward:

$$|\phi_\pi| < 1 \quad ; \quad |\phi_b| > 1$$

To obtain the conditions under which the second two eigenvalues are inside the unit circle (i.e. $|\lambda_3| < 1, |\lambda_4| < 1$) it is convenient to define:

$$x_1 \equiv d_{11} + d_{22} = 1 + \beta^{-1} - \phi_k \frac{1-\gamma}{1+\kappa} \tag{D.4}$$

$$x_2 \equiv -d_{12}d_{21} = -\frac{\phi_k}{f}\frac{1-\gamma}{1+\kappa}\frac{\omega}{\beta} \tag{D.5}$$

Then we can write λ_3 and λ_4 as:

$$\lambda_3 = \frac{x_1 + \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2}$$
$$\lambda_4 = \frac{x_1 - \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2}$$

Notice that the term inside the square root can be negative or positive depending on parameter values. This implies eigenvalues λ_3, λ_4 can be real or complex numbers.

Consider the condition for the eigenvalues being complex numbers (i.e. the term in the square root is negative):

$$x_1^2 - 4(x_1 - 1 + x_2) < 0$$

Using the definitions of x_1 and x_2 and rearranging, the above condition becomes:

$$\left(\frac{1-\gamma}{1+\kappa}\right)^2 \phi_k^2 - 2\left((\beta^{-1}-1)\frac{1-\gamma}{1+\kappa} - 2\frac{1-\gamma}{1+\kappa}\frac{\omega}{\beta b_F}\right)\phi_k + (\beta^{-1}-1)^2 < 0 \tag{D.6}$$

The roots of this quadratic equation will give the threshold values ϕ_k^D and ϕ_k^U for which this condition is satisfied:

$$\phi_k^D = \frac{(\beta^{-1}-1)\frac{1-\gamma}{1+\kappa} - 2\frac{1-\gamma}{1+\kappa}\frac{\omega}{\beta f} - 2\sqrt{\left(\frac{1-\gamma}{1+\kappa}\right)^2\left(\frac{\omega}{\beta f}\right)^2 - (\beta^{-1}-1)\left(\frac{1-\gamma}{1+\kappa}\right)^2\frac{\omega}{\beta f}}}{\left(\frac{1-\gamma}{1+\kappa}\right)^2}$$

$$\phi_k^U = \frac{(\beta^{-1}-1)\frac{1-\gamma}{1+\kappa} - 2\frac{1-\gamma}{1+\kappa}\frac{\omega}{\beta f} + 2\sqrt{\left(\frac{1-\gamma}{1+\kappa}\right)^2\left(\frac{\omega}{\beta f}\right)^2 - (\beta^{-1}-1)\left(\frac{1-\gamma}{1+\kappa}\right)^2\frac{\omega}{\beta f}}}{\left(\frac{1-\gamma}{1+\kappa}\right)^2}$$

We can show that ϕ_k^D and ϕ_k^U are always strictly negative for all $\gamma \in (0,1)$ and $\beta \in (0,1)$. To see this, it is useful to consider the special case of $\beta \to 1$:

$$\lim_{\beta\to 1}(\phi_k^D, \phi_k^U) = \frac{-2\frac{1-\gamma}{1+\kappa}\frac{\omega}{f} \pm 2\frac{1-\gamma}{1+\kappa}\frac{\omega}{f}}{\left(\frac{1-\gamma}{1+\kappa}\right)^2} = \left(-\frac{4\frac{\omega}{f}}{\frac{1-\gamma}{1+\kappa}}, 0\right)$$

Since $\omega, \kappa > 0$, and we assumed $f > 0$, we know that $\phi_k^D, \phi_k^U < 0$ for all $\gamma \in (0,1)$ when $\beta \to 1$.

Moreover, we can show that ϕ_k^D, ϕ_k^U are both increasing in β which implies that $\phi_k^D, \phi_k^U < 0$ for all $\gamma, \beta \in (0,1)$. Finally, since the coefficient on the quadratic term $\left(\frac{1-\gamma}{1+\kappa}\right)^2$ is always positive, we have that the condition for complex eigenvalues is:

$$\phi_k \in (\phi_k^D, \phi_k^U) \tag{D.7}$$

With condition (D.7) we can analyze the sub-cases of complex and real eigenvalues. In all subsequent subcases, I will always assume that $f > 0$.

First consider λ_3:

Case 1.1: When λ_3 is complex, that is when $\phi_k \in (\phi_k^D, \phi_k^U)$, we know that $x_1^2 - 4(x_1 - 1 + x_2) < 0$. The eigenvalue can be written as $\lambda_3 = a + bi$ where $a = \frac{x_1}{2}$ is the real part and $b = \frac{\sqrt{4(x_1-1+x_2)-x_1^2}}{2}$ the complex part with a, b real numbers. Then, the modulus of λ_3 is:

$$|\lambda_3| = \sqrt{a^2 + b^2} = \frac{1}{2}\sqrt{x_1^2 + 4(x_1 - 1 + x_2) - x_1^2} = \frac{1}{2}\sqrt{4(x_1 - 1 + x_2)} = \sqrt{x_1 - 1 + x_2}$$

Since $4(x_1 - 1 + x_2) - x_1^2 > 0$ by assumption, we have that $4(x_1 - 1 + x_2) > x_1^2 > 0$, hence $x_1 - 1 + x_2 > 0$ is always true. Therefore, the condition for the eigenvalue to be outside the unit circle reduces to:

$$\sqrt{x_1 - 1 + x_2} > 1 \iff x_1 - 1 + x_2 > 1 \iff x_1 + x_2 > 2$$

Substituting for x_1, x_2 from (D.4) and (D.5) and reordering implies $|\lambda_3| > 1$ if and only if:

$$\phi_k < \frac{\beta^{-1} - 1}{\frac{1-\gamma}{1+\kappa}(\frac{\omega}{\beta f} + 1)} > 0$$

Since we assumed $\phi_k < \phi_k^U < 0$, this condition is always satisfied. Therefore, $|\lambda_3| > 1$ is always true whenever λ_3 is a complex number.
Case 1.2: When λ_3 is a real number, that is when $\phi_k \notin (\phi_k^D, \phi_k^U)$, then,

$$|\lambda_3| = \left|\frac{x_1 + \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2}\right|$$

Since the term inside the absolute value is, by assumption, a real and positive number we can write:

$$\begin{aligned} |\lambda_3| = \frac{x_1 + \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2} > 1 &\iff x_1 + \sqrt{x_1^2 - 4(x_1 - 1 + x_2)} > 2 \\ &\iff \sqrt{x_1^2 - 4(x_1 - 1 + x_2)} > 2 - x_1 = 1 - \beta^{-1} + \phi_k \frac{1-\gamma}{1+\kappa} \end{aligned}$$

- Case 1.2.1: If $\phi_k < 0$, the right-hand side of the inequality is always negative since $\beta < 1$.

Therefore:

$$|\lambda_3| > 1 \iff \sqrt{x_1^2 - 4(x_1 - 1 + x_2)} > 0 > 1 - \beta^{-1} + \phi_k \frac{1-\gamma}{1+\kappa}$$

is always true. Thus, $|\lambda_3| > 1$ whenever $\phi_k < 0$.

• Case 1.2.2: If $\phi_k > 0$, we need to consider two subcases. If $\phi_k \geq \frac{\beta^{-1}-1}{\frac{1-\gamma}{1+\kappa}} > 0$ such that the right-hand side of the inequality is still negative, the same argument as above applies and we can easily show that $|\lambda_3| > 1$ is always true. If $\phi_k < \frac{\beta^{-1}-1}{\frac{1-\gamma}{1+\kappa}}$ such that the right-hand side of the inequality is positive, then we have:

$$|\lambda_3| > 1 \iff x_1^2 - 4(x_1 - 1 + x_2) > (1 - \beta^{-1} + \phi_k \frac{1-\gamma}{1+\kappa})^2$$

Using the definitions of x_1, x_2 and of ω, κ we can simplify the above to:

$$4\phi_k \frac{1-\gamma}{1+\kappa} \frac{\omega}{\beta f} > 0$$

Since $\phi_k > 0$ by assumption and $\omega, \kappa > 0$ and $\gamma \in (0, 1)$, this condition is always satisfied. Combining these two subcases yields that $|\lambda_3| > 1$ whenever $\phi_k > 0$.

Finally, combining cases 1.2.1 and 1.2.2 implies that $|\lambda_3| > 1$ for all values of ϕ_k and $\beta, \gamma \in (0, 1)$.

Now consider λ_4:

Case 2.1: When λ_4 is complex, that is, when $\phi_k \in (\phi_k^D, \phi_k^U)$ we can use the fact that λ_3 and λ_4 are complex conjugates and therefore $|\lambda_3| = |\lambda_4|$. As we have already shown, $|\lambda_3| > 1$ for all values of ϕ_k such that λ_3 is complex. Thus, $|\lambda_4| > 1$ for all values of ϕ_k such that λ_4 is complex.
Case 2.2: When λ_4 is real, that is, when $\phi_k \notin (\phi_k^D, \phi_k^U)$, then:

$$|\lambda_4| = \Big| \frac{x_1 - \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2} \Big|$$

Since λ_4 can be positive or negative depending on parameter values, two more subcases need to be examined.
Case 2.2.1: If $\lambda_4 > 0$ then we have:

$$\begin{aligned} |\lambda_4| > 1 &\iff \frac{x_1 - \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2} > 1 \\ &\iff \sqrt{x_1^2 - 4(x_1 - 1 + x_2)} < x_1 - 2 = \beta^{-1} - 1 - \phi_k \frac{1-\gamma}{1+\kappa} \end{aligned}$$

• If $\phi_k < 0$: In this case the right-hand side of the inequality is always positive. Thus, we can

square both sides to write:

$$\begin{aligned}|\lambda_4| > 1 &\iff x_1^2 - 4(x_1 - 1 + x_2) < (x_1 - 2)^2 = x_1^2 - 4x_1 + 4 \\ &\iff -x_2 < 0 \\ &\iff \phi_k \frac{1-\gamma}{1+\kappa} \frac{\omega}{\beta f} < 0\end{aligned}$$

Since $\omega, \kappa, \beta, f > 0$ and $\gamma \in (0, 1)$ this reduces to

$$\phi_k < 0$$

which is true by assumption. Thus, $|\lambda_4| > 1$ whenever $\lambda_4 > 0$ and $\phi_k < 0$.

• If $\phi_k > 0$: In this case there two possible cases: $\phi_k \frac{1-\gamma}{1+\kappa} < \beta^{-1} - 1$ and $\phi_k \frac{1-\gamma}{1+\kappa} > \beta^{-1} - 1$. In the first case, the right-hand side of the inequality is still positive. Therefore, we can write again:

$$\begin{aligned}|\lambda_4| > 1 &\iff x_1^2 - 4(x_1 - 1 + x_2) < (x_1 - 2)^2 = x_1^2 - 4x_1 + 4 \\ &\iff -x_2 < 0 \\ &\iff \phi_k \frac{1-\gamma}{1+\kappa} \frac{\omega}{\beta f} < 0 \\ &\iff \phi_k < 0\end{aligned}$$

Now, however, $\phi_k > 0$ by assumption. Thus, this condition is never satisfied implying that $|\lambda_4| < 1$.

In the second case, the right-hand side turns negative:

$$\beta^{-1} - 1 - \phi_k \frac{1-\gamma}{1+\kappa} < 0$$

but, since λ_4 is a real number, we know that:

$$\sqrt{x_1^2 - 4(x_1 - 1 + x_2)} > 0$$

Therefore, the condition

$$\sqrt{x_1^2 - 4(x_1 - 1 + x_2)} < \beta^{-1} - 1 - \phi_k \frac{1-\gamma}{1+\kappa}$$

is never satisfied, implying that $|\lambda_4| < 1$. Combining these two subcases, we have that $|\lambda_4| < 1$ whenever $\lambda_4 > 0$ and $\phi_k > 0$.

Case 2.2.2: If $\lambda_4 < 0$ then we have:

$$\begin{aligned}
|\lambda_4| > 1 &\iff \frac{x_1 - \sqrt{x_1^2 - 4(x_1 - 1 + x_2)}}{2} < -1 \\
&\iff \sqrt{x_1^2 - 4(x_1 - 1 + x_2)} > 2 + x_1 = 3 + \beta^{-1} - \phi_k \frac{1-\gamma}{1+\kappa} > 0 \\
&\iff x_1^2 - 4(x_1 - 1 + x_2) > (2 + x_1)^2 = 4 + 4x_1 + x_1^2 \\
&\iff -x_2 > 2x_1 \\
&\iff \phi_k \frac{1-\gamma}{1+\kappa} \frac{\omega}{\beta f} > 2(1 + \beta^{-1} - \phi_k \frac{1-\gamma}{1+\kappa})
\end{aligned}$$

Solving for ϕ_k we obtain the condition:

$$\phi_k > \frac{2(1+\beta^{-1})}{\frac{1-\gamma}{1+\kappa}(\frac{\omega}{\beta f} + 2)} \equiv \overline{\phi_k}$$

Thus, when $\lambda_4 < 0$, $|\lambda_4| > 1$ if and only if $\phi_k > \overline{\phi_k}$.

In sum, from all the above cases we have shown that λ_3 is outside the unit circle (i.e. $|\lambda_3| > 1$) for all values of ϕ_k and $\beta, \gamma \in (0, 1)$. Moreover:

(i) $|\lambda_4| > 1$ if and only if $\phi_k < 0$ or $\phi_k > \overline{\phi_k}$

(ii) $|\lambda_4| < 1$ if and only if $\phi_k \in [0, \overline{\phi_k}]$

where $\overline{\phi_k} = \frac{2(1+\beta^{-1})}{\frac{1-\gamma}{1+\kappa}(\frac{\omega}{\beta f}+2)}$.

Finally, these results, together with the conditions for $|\lambda_1|$ and $|\lambda_2|$, imply three regions of the parameter space where the condition for existence of a unique equilibrium (i.e. two eigenvalues inside the unit circle and two outside) is satisfied:

1. $|\lambda_1|, |\lambda_3| > 1$; $|\lambda_2|, |\lambda_4| < 1 \iff |\phi_\pi| > 1$, $|\phi_b| > 1$, and $\phi_k \in [0, \overline{\phi_k}]$
2. $|\lambda_2|, |\lambda_3| > 1$; $|\lambda_1|, |\lambda_4| < 1 \iff |\phi_\pi| < 1$, $|\phi_b| < 1$, and $\phi_k \in [0, \overline{\phi_k}]$
3. $|\lambda_3|, |\lambda_4| > 1$; $|\lambda_1|, |\lambda_2| < 1 \iff |\phi_\pi| < 1$, $|\phi_b| > 1$, and $\phi_k \notin [0, \overline{\phi_k}]$

with $\overline{\phi_k} = \frac{2(1+\beta^{-1})}{\frac{1-\gamma}{1+\kappa}(\frac{\omega}{\beta f}+2)}$ as stated in Proposition 1. ■

D.2 Proposition 2

I first show that the equilibrium real exchange is uniquely determined by capital account policy in the non-linear model when $\{\tau_t^c\}$ is set unconstrained by budgetary conditions.

First, rearrange the risk-sharing condition (10) as:

$$\frac{Q_t}{C_t} = (1 + \tau_t^c)\mathbb{E}_t \left[\frac{Q_{t+1}}{C_{t+1}}\right]$$

We can iterate this expression forward:

$$\frac{Q_t}{C_t} = \mathbb{E}_t \left[z_{t,\infty} \lim_{T\to\infty} \frac{Q_T}{C_T} \right], \quad z_{t,\infty} = \prod_{k=0}^{\infty} (1 + \tau^c_{t+k})$$

Assuming the economy converges to a unique steady state that is independent of policy, we can write the above as

$$\frac{Q_t}{C_t} = \mathbb{E}_t \left[z_{t,\infty} \right] \frac{Q}{C}$$

where Q, C are steady state values. Imposing goods market clearing (equation (D.3)):

$$\frac{Q_t}{Q_t^{-\frac{\gamma}{1-\gamma}} y - Q_t \gamma^* y^*} = \mathbb{E}_t \left[z_{t,\infty} \right] \frac{Q}{Q^{-\frac{\gamma}{1-\gamma}} y - Q \gamma^* y^*}$$

Solving for the real exchange rate:

$$Q_t = Q \left[\frac{\mathbb{E}_t \left[z_{t,\infty} \right]}{1 + \frac{Q\gamma^* y^*}{y} (\mathbb{E}_t \left[z_{t,\infty} \right] - 1)} \right]^{1-\gamma}$$

Hence, the equilibrium real exchange rate is a function of current and expected capital controls. Capital account policy can therefore uniquely determine the real exchange rate by setting the sequence $\{\tau^c_t\}$. ■

Second, I show how in the log-linear approximation we can arrive at equation (27) using policy rule (16). Iterate the linearized risk sharing condition (25) forward to obtain:

$$\hat{Q}_t = \frac{1-\gamma}{1+\kappa} \phi_k \sum_{j=0}^{\infty} \mathbb{E}_t[\hat{f}_{t+j}] + \frac{1-\gamma}{1+\kappa} \sum_{k=0}^{\infty} \mathbb{E}_t[\varepsilon^K_{t+k}] \tag{D.1}$$

Impose household optimality (equations (23) and (25)) in the current account condition (18) to write:

$$\mathbb{E}_t[\hat{f}_{t+1}] = \phi_q \hat{f}_t - \frac{\omega}{\beta f} \hat{Q}_t - \frac{1-\gamma}{1+\kappa} \varepsilon^K_t \tag{D.2}$$

where I define the indirect policy parameter $\phi_q = \frac{1}{\beta} - \phi_k \frac{1-\gamma}{1+\kappa}$. Importantly, in capital account dominance, we know that $|\phi_q| > 1$ since $\phi_k < 0$ or $\phi_k > \overline{\phi}_k$. Rolling this expression one period forward and taking expectations conditional on information at time t implies:

$$\begin{aligned}
\mathbb{E}_t[\hat{f}_{t+2}] &= \phi_q \mathbb{E}_t[\hat{f}_{t+1}] - \frac{\omega}{\beta f} \mathbb{E}_t \hat{Q}_{t+1} - \frac{1-\gamma}{1+\kappa} \mathbb{E}_t \varepsilon^K_{t+1} \\
&= \phi_q^2 \hat{f}_t - \phi_q \frac{\omega}{\beta f} \hat{Q}_t - \phi_q \frac{1-\gamma}{1+\kappa} \varepsilon^K_t - \frac{\omega}{\beta f} \mathbb{E}_t \hat{Q}_{t+1} - \frac{1-\gamma}{1+\kappa} \mathbb{E}_t \varepsilon^K_{t+1}
\end{aligned}$$

where I use (D.2) to substitute for $\mathbb{E}_t \hat{f}_{t+1}$. The general pattern of this difference equation can be

extracted to write:

$$\mathbb{E}_t[\hat{f}_{t+j}] = \phi_q^j \hat{f}_t - \frac{\omega}{\beta f}\sum_{i=0}^{j-1}\phi_q^{j-i-1}\mathbb{E}_t\hat{Q}_{t+i} - \frac{1-\gamma}{1+\kappa}\sum_{i=0}^{j-1}\phi_q^{j-i-1}\mathbb{E}_t\varepsilon^K_{t+i}, \quad \forall j \geq 1$$

This expression implies that outstanding NFLs grow at rate $\phi_q > \beta^{-1} > 1$. Limiting condition (13) imposes that NFLs must be expected to eventually grow slower than the long run gross real interest rate, $1 + r = \beta^{-1}$. Since $\phi_q > \beta^{-1}$ is constant, equilibrium prices will have to adjust to prevent these explosive dynamics to be realized along the equilibrium path. Moreover, equation (D.1) tells us that the real exchange cannot adjust without itself affecting the path of NFLs. This implies that $\mathbb{E}_t\hat{f}_{t+j} = 0 \ \forall j \geq 1$ is the only solution that is consistent with a finite equilibrium real exchange rate given the unstable dynamics of NFLs caused by active capital account policy.

Now use the fact that we know that in equilibrium $\mathbb{E}_t\hat{f}_{t+j} = 0 \ \forall j \geq 1$ in equations (D.1) and (D.2) to write:

$$\hat{Q}_t = \frac{1-\gamma}{1+\kappa}\phi_k f_t + \frac{1-\gamma}{1+\kappa}\sum_{k=0}^{\infty}\mathbb{E}_t[\varepsilon^K_{t+k}]$$
$$0 = \phi_q\hat{f}_t - \frac{\omega}{\beta f}\hat{Q}_t - \frac{1-\gamma}{1+\kappa}\varepsilon^K_t$$

Combining these two implies:

$$Q_t = \frac{\frac{1-\gamma}{1+\kappa}(\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}+1)}{1-\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}\frac{\omega}{\beta f}}\varepsilon^K_t + \frac{\frac{1-\gamma}{1+\kappa}}{1-\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}\frac{\omega}{\beta f}}\sum_{j=1}^{\infty}\mathbb{E}_t[\varepsilon^K_{t+j}]$$

We can define the parameters λ_k:

$$\lambda_0 = \frac{\frac{1-\gamma}{1+\kappa}(\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}+1)}{1-\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}\frac{\omega}{\beta f}} \quad ; \quad \lambda_k = \frac{\frac{1-\gamma}{1+\kappa}}{1-\frac{1-\gamma}{1+\kappa}\frac{\phi_k}{\phi_q}\frac{\omega}{\beta f}}, \quad \forall k \geq 1$$

where $\lambda_k > 0$, $\forall k \geq 0$ whenever $\phi_k \notin [0, \overline{\phi}_k]$. Then, we can write:

$$\hat{Q}_t = \sum_{k=0}^{\infty}\lambda_k\mathbb{E}_t[\varepsilon^K_{t+k}]$$

as shown in equation (27) in the main text. ■

D.3 Proposition 3

We have that household optimality implies:

$$\frac{1}{R_t} = \mathbb{E}_t\left[\Theta_{t+1}\frac{P_t}{P_{t+1}}\right]$$
$$\frac{1}{R^*} = \mathbb{E}_t\left[(1+\tau_t^c)\Theta_{t+1}\frac{P_t}{P_{t+1}}\frac{e_{t+1}}{e_t}\right]$$

where $\Theta_{t+1} = \beta\left(\frac{C_{t+1}}{C_t}\right)^{-1}$ is the household's stochastic discount factor. Use this in the current account condition:

$$-\left(\frac{B_{Ft}}{P_tR_t}(1+\tau_t^c) + \frac{e_tD_t^*}{P_tR^*} - \frac{B_{Ft-1}}{P_t} - \frac{e_tD_{t-1}^*}{P_t}\right) = \frac{e_tP_{Ht}^*}{P_t}C_{Ht}^* - \frac{P_{Ft}}{P_t}C_{Ft}$$

to write:

$$-(1+\tau_t^c)\mathbb{E}_t\left[\Theta_{t+1}\left(\frac{B_{Ft}}{P_{t+1}} + \frac{e_{t+1}D_t^*}{P_{t+1}}\right)\right] - \left(\frac{B_{Ft-1}}{P_t} + \frac{e_tD_{t-1}^*}{P_t}\right) = tb_t$$

where $tb_t = \frac{e_tP_{Ht}^*}{P_t}C_{Ht}^* - \frac{P_{Ft}}{P_t}C_{Ft}$ is the SOE's trade balance. We can write this as a difference equation in $f_t = \frac{B_{Ft-1}}{P_t} + \frac{e_tD_{t-1}^*}{P_t}$:

$$(1+\tau_t^c)\mathbb{E}_t[\Theta_{t+1}f_{t+1}] = f_t - tb_t$$

Iterating this difference equation forward, we obtain the alternative representation of the intertemporal current account condition (20):

$$\frac{B_{Ft-1}}{P_t} + \frac{Q_tD_{t-1}^*}{P_t^*} = tb_t + \sum_{j=1}^{\infty}\mathbb{E}_t\Theta_{t+j}\left(\prod_{k=0}^{j-1}(1+\tau_{t+k}^c)\right)tb_{t+j} \tag{D.1}$$

where I use $Q_t \equiv \frac{e_tP_t^*}{P_t}$. Now solving for the price level P_t we have:

$$P_t = \frac{B_{Ft-1}}{tb_t + \sum_{j=1}^{\infty}\mathbb{E}_t\Theta_{t+j}\left(\prod_{k=0}^{j-1}(1+\tau_{t+k}^c)\right)tb_{t+j} - Q_t\frac{D_{t-1}^*}{P_t^*}} \tag{D.2}$$

We now need to show that the entire present value of trade balances is a function of current and expected real exchange rates and capital account policy.

Using equation (17) we can write aggregate consumption as a function of only the real exchange rate and exogenous variables:

$$C_t = \frac{Q_t^{-\frac{\gamma}{1-\gamma}}y - Q_t\gamma^*C_t^*}{1-\gamma} \tag{D.3}$$

This expression shows that domestic consumption will be inversely related to the real exchange

rate. The real exchange rate in this model can be interpreted as the relative price of the foreign good in terms of the domestic good.

Combining the household budget constraint (1) and the government budget constraint (11), imposing market clearing, we can obtain this economy's aggregate resource constraint:

$$C_t + tb_t = Q_t^{-\frac{\gamma}{1-\gamma}} y \tag{D.4}$$

where I define $tb_t \equiv \frac{e_t P^*_{Ht}}{P_t} C^*_{Ht} - \frac{P_{Ft}}{P_t} C_{Ft}$ as the SOE's trade balance in units of the domestic consumption basket. Combining the resource constraint (D.4) with the expression for consumption (D.3), we can also write the trade balance as a function of only the real exchange rate and exogenous variables:

$$tb_t = \frac{Q_t \gamma^* C^*_t - Q_t^{-\frac{\gamma}{1-\gamma}} \gamma y}{1-\gamma} \tag{D.5}$$

Now write the expressions for consumption (D.3) and the trade balance (D.5) as:

$$C_t = \frac{Q_t^{-\frac{\gamma}{1-\gamma}} y - Q_t \gamma^* C^*_t}{1-\gamma} \equiv C(Q_t)$$
$$tb_t = \frac{Q_t \gamma^* C^*_t - Q_t^{-\frac{\gamma}{1-\gamma}} \gamma y}{1-\gamma} \equiv tb(Q_t)$$

Thus making explicit the fact that both consumption and the trade balance are a function of the real exchange rate and exogenous variables C^*_t and y. From the definition of the stochastic discount factor and the expression for equilibrium consumption we have:

$$\Theta_{t+j} = \beta^j \left(\frac{C_{t+j}}{C_t} \right)^{-1} = \beta^j \frac{Q_t^{-\frac{\gamma}{1-\gamma}} y - Q_t \gamma^* y^*}{Q_{t+j}^{-\frac{\gamma}{1-\gamma}} y - Q_{t+j} \gamma^* y^*} \equiv \Theta(Q_t, Q_{t+j})$$

where I also impose foreign goods market clearing $C^*_t = y^*$. Using these equilibrium conditions, we have that the present value of trade balances will depend on the sequence of current and future real exchange rates and capital account policy:

$$PVTB_t = tb(Q_t) + \sum_{j=1}^{\infty} \mathbb{E}_t \Theta(Q_t, Q_{t+j}) z_{t,t+j-1} tb(Q_{t+j})$$

where $z_{t,t+j-1} = \prod_{k=0}^{j-1} (1 + \tau^c_{t+k})$. Finally, using the fact that

$$Q_t = Q \left[\frac{\mathbb{E}_t \left[z_{t,\infty} \right]}{1 + \frac{Q \gamma^* y^*}{y} (\mathbb{E}_t \left[z_{t,\infty} \right] - 1)} \right]^{1-\gamma}, \quad \forall t$$

where $z_{t,\infty} = \prod_{k=0}^{\infty}(1+\tau^c_{t+k})$, the price level can therefore be expressed as:

$$P_t = \frac{B_{Ft-1}}{PVTB_t\Big(\{\mathbb{E}_t[\tau^c_{t+j}]\}_{j=0}^{\infty}\Big) - Q_t\frac{D^*_{t-1}}{P^*_t}}$$

as shown in the main text. ■

E Alternative Capital Account Policy Rule

Changing the capital account policy rule in the baseline model to respond to deviations of the real exchange rate as:

$$\frac{1+\tau^c_t}{1+\tau^c} = \alpha^K + \phi_k\frac{Q_t}{Q} + \varepsilon^K_t \tag{E.1}$$

implies a log-linearized capital controls rule:

$$\widehat{1+\tau^c_t} = \phi_k\hat{Q}_t + \varepsilon^K_t \tag{E.2}$$

Using rule (E.2) we can re-derive the linearized system and obtain:

$$\mathbb{E}_t[\hat{\pi}_{t+1}] = \phi_\pi\hat{\pi}_t + \varepsilon^M_t - \frac{\gamma+\kappa}{1+\kappa}\phi_k\hat{Q}_t - \frac{\gamma+\kappa}{1+\kappa}\varepsilon^K_t \tag{E.3}$$

$$\mathbb{E}_t[\hat{b}_{t+1}] = \frac{1-(1-\beta)\phi_b}{\beta}\hat{b}_t + \phi_\pi\hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \phi_k\frac{b_F}{b}\hat{Q}_t + \varepsilon^M_t - \frac{1-\beta}{\beta}\varepsilon^F_t - \frac{b_F}{b}\varepsilon^K_t \tag{E.4}$$

$$\mathbb{E}_t[\hat{Q}_{t+1}] = (1-\phi_k\frac{1-\gamma}{1+\kappa})\hat{Q}_t - \frac{1-\gamma}{1+\kappa}\varepsilon^K_t \tag{E.5}$$

$$\mathbb{E}_t[\hat{f}_{t+1}] = \frac{1}{\beta}\hat{f}_t + \phi_\pi\hat{\pi}_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \left(\frac{\omega}{\beta f} + \phi_k\right)\hat{Q}_t + \varepsilon^M_t - \varepsilon^K_t \tag{E.6}$$

The eigenvalues of the above system can now be directly read from these equations:

$$\lambda_\pi = \phi_\pi \quad ; \quad \lambda_b = \frac{1-(1-\beta)\phi_b}{\beta} \quad ; \quad \lambda_Q = 1-\phi_k\frac{1-\gamma}{1+\kappa} \quad ; \quad \lambda_{b_F} = \beta^{-1}$$

where λ_x is the eigenvalue associated with variable x. Since the difference equation for external debt is always unstable ($\lambda_f = \beta^{-1} > 1$), a unique and bounded equilibrium requires policy parameters ϕ_π, ϕ_b, ϕ_k to be such that one more eigenvalue is greater than one in absolute value. This implies

$$|\phi_\pi| > 1 \quad \text{or} \quad |\phi_b| < 1 \quad \text{or} \quad \phi_k \notin (0, 2\frac{1+\kappa}{1-\gamma})$$

Which correspond to the conditions for active policy in each case. These conditions can be stated as a modified proposition.

Proposition 4. *The system of equations* (E.3)-(E.6) *has a (locally) unique and bounded equilibrium if and only if policy parameters ϕ_π, ϕ_b, ϕ_k satisfy:*

1. $|\phi_\pi|, |\phi_b| > 1$ *and* $\phi_k \in [0, 2\frac{1+\kappa}{1-\gamma}]$ *(Monetary Dominance)*

2. $|\phi_\pi|, |\phi_b| < 1$ *and* $\phi_k \in [0, 2\frac{1+\kappa}{1-\gamma}]$ *(Fiscal Dominance)*

3. $|\phi_\pi| < 1$, $|\phi_b| > 1$ *and* $\phi_k \notin [0, 2\frac{1+\kappa}{1-\gamma}]$ *(Capital Account Dominance)*

I now show that inflation and exchange rate dynamics in this 'alternative' capital account dominance regime are equivalent to those of the 'original' regime presented in the main text.

First, define the indirect policy parameter $\phi_q \equiv 1 - \phi_k \frac{1-\gamma}{1+\kappa}$. So that $\lambda_Q = \phi_q$. If $\phi_k < 0$ (capital account is active), we know that $\phi_q > 1$ and therefore we can iterate the difference equation (E.5) forward to obtain:

$$\hat{Q}_t = \phi_q^{-1} \frac{1-\gamma}{1+\kappa} \sum_{j=0}^{\infty} \phi_q^{-j} \mathbb{E}_t \varepsilon_{t+j}^K \tag{E.7}$$

where the infinite sum converges since $\phi_q^{-1} < 1$. As in equation (27) in the main text, the equilibrium real exchange rate is a function of only current and future capital control surprises $\{\varepsilon_t^K\}$. This implies, same as in the baseline model, that capital account policy can choose the real exchange rate when it is active. Iterating the current account condition (E.6) forward imposing (E.3) yields:

$$\hat{\tilde{f}}_{t-1} - \alpha\hat{\pi}_t + (1-\alpha)\Delta Q_t = (\frac{\omega}{b_F} + \beta\phi_k \frac{1-\gamma}{1+\kappa}) \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t \hat{Q}_{t+j} + \beta \frac{1-\gamma}{1+\kappa} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t[\varepsilon_{t+j}^K]$$

Hence,

$$\hat{\pi}_t = \frac{1}{\alpha}\hat{\tilde{f}}_{t-1} + \frac{1-\alpha}{\alpha}\Delta Q_t - \frac{1}{\alpha}\left(\frac{\omega}{f} + \beta\phi_k \frac{1-\gamma}{1+\kappa}\right) \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t \hat{Q}_{t+j} - \frac{\beta}{\alpha} \frac{1-\gamma}{1+\kappa} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t[\varepsilon_{t+j}^K] \tag{E.8}$$

Using equation (E.5) to substitute:

$$-\frac{1-\gamma}{1+\kappa}\varepsilon_t^K = \mathbb{E}_t[Q_{t+1} - Q_t] + \phi_k \frac{1-\gamma}{1+\kappa} Q_t$$

yields:

$$\hat{\pi}_t = \frac{1}{\alpha}\hat{\tilde{f}}_{t-1} + \frac{1-\alpha}{\alpha}\Delta Q_t - \frac{\omega}{\alpha f} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t \hat{Q}_{t+j} - \frac{\beta}{\alpha} \sum_{j=0}^{\infty} \beta^j \mathbb{E}_t[Q_{t+j+1} - Q_{t+j}] \tag{E.9}$$

which is exactly the same expression as equation (30) in the main text. Equilibrium real exchange rate and inflation dynamics in this 'alternative' capital account dominance regime are therefore equivalent to those of the original regime where capital controls respond to deviations of NFLs.

F Recovering the Coefficient on the Capital Account Policy Rule

Assuming the government follows a policy rule of the form shown in equation (16), we have the linearized relationship:

$$\widehat{1+\tau_t^c} = \phi_k \hat{f}_t + \varepsilon_t^K \tag{F.1}$$

First, assume we are in an equilibrium where capital account policy is active. From the solution for equilibrium real exchange rate (27), assuming $\varepsilon_t^K \sim iid$, we the have:

$$\hat{Q}_t = \lambda_0 \varepsilon_t^K$$

where $\lambda_0 = \frac{1}{\frac{1+\kappa}{1-\gamma} - \phi_k(\beta + \frac{\omega}{f})}$. The i.i.d assumption also implies that $\mathbb{E}_t[\hat{Q}_{t+j}] = 0 \ \forall j \geq 1$. Combining this with the risk-sharing equation (25), we have:

$$0 = \lambda_0 \varepsilon_t^K - \frac{1-\gamma}{1+\kappa}\left(\phi_k \hat{f}_t + \varepsilon_t^K\right)$$

Hence,

$$\hat{f}_t = \frac{1}{\phi_k}\left(\frac{1+\kappa}{1-\gamma}\lambda_0 - 1\right)\varepsilon_t^K$$

Substituting this expression into the capital controls rule yields:

$$\begin{aligned}
\widehat{1+\tau_t^c} &= \phi_k \hat{f}_t + \varepsilon_t^K \\
&= \frac{1+\kappa}{1-\gamma}\lambda_0 \varepsilon_t^K \\
&= \frac{\frac{1+\kappa}{1-\gamma}}{\frac{1+\kappa}{1-\gamma} - \phi_k(\beta + \frac{\omega}{f})}\varepsilon_t^K
\end{aligned}$$

where the last line uses the definition of λ_0. Assuming the policy shocks are uncorrelated with each other, the econometrician running the regression:

$$\widehat{1+\tau_t^c} = a_0 + a_1 \hat{f}_t + u_t \tag{F.2}$$

obtains the least-squares estimate with $R^2 = 1$:

$$\tilde{a}_1 = \frac{Cov_t(\widehat{1+\tau_t^c}, \hat{f}_t)}{Var_t(\hat{f}_t)} = \frac{\frac{\frac{1+\kappa}{1-\gamma}(\beta+\frac{\omega}{f})}{(\frac{1+\kappa}{1-\gamma} - \phi_k(\beta+\frac{\omega}{f}))^2}\sigma_k^2}{\frac{(\beta+\frac{\omega}{f})^2}{(\frac{1+\kappa}{1-\gamma} - \phi_k(\beta+\frac{\omega}{f}))^2}\sigma_k^2} = \frac{\frac{1+\kappa}{1-\gamma}}{\beta + \frac{\omega}{f}} \tag{F.3}$$

where $Cov_t(.), Var_t(.)$ are conditional covariance and variance given information available at time t and $\sigma_k^2 = Var(\varepsilon_t^K)$.

First note that the estimate $\tilde{a}_1$ does not depend on ϕ_k, implying that the econometrician observes the same estimate regardless of the stance of capital account policy. Second, it is straightforward to show that $0 < \tilde{a}_1 < \overline{\phi_k} = \frac{2(1+\beta^{-1})}{\frac{1-\gamma}{1+\kappa}(2+\frac{\omega}{\beta f})}$ whenever $f > 0$. Hence, the econometrician would always conclude that capital account policy is passive (i.e. $\phi_k \in (0, \overline{\phi_k})$) even when the data is produced by a regime where capital account policy is active. If the policy reaction function is to be very sensitive to changes in NFLs, i.e. $\phi_k > \overline{\phi_k}$, the econometrician obtains an estimate of ϕ_k that is downwards biased. In the case of $\phi_k < 0$ the estimate $\tilde{a}_1$ has the wrong sign.

Now assume we are in an equilibrium where capital account policy is passive $\phi_k \in [0, \overline{\phi_k}]$. Assuming monetary policy is active (i.e. $\phi_\pi > 1$), equilibrium NFLs can be expressed as:

$$\hat{f}_t = \psi_1 \hat{\tilde{f}}_{t-1} + \psi_2 \varepsilon_t^K + \psi_3 \varepsilon_t^M$$

where $\psi_1, \psi_2, \psi_3 > 0$ are functions of model parameters β, γ, z and policy parameters ϕ_π, ϕ_k. Equilibrium capital controls are therefore described by:

$$\begin{aligned}\widehat{1+\tau_t^c} &= \phi_k f_t + \varepsilon_t^K \\ &= \phi_k \psi_1 \hat{\tilde{f}}_{t-1} + (\phi_k \psi_2 + 1)\varepsilon_t^K + \phi_k \psi_3 \varepsilon_t^M\end{aligned}$$

The econometrician estimating (F.2) now obtains the least-squares coefficient:

$$\tilde{a}_1' = \frac{Cov_t(\widehat{1+\tau_t^c}, \hat{f}_t)}{Var_t(\hat{f}_t)} = \phi_k - \psi_2 \frac{\sigma_k^2}{\psi_2^2 \sigma_k^2 + \psi_3^2 \sigma_M^2} \tag{F.4}$$

Since $\psi_2 > 0$, $\tilde{a}_1'$ will be downwards biased and potentially have the wrong sign if the second term is large enough. Note that only when $\sigma_k^2 = 0$ does (F.2) recover the true parameter ϕ_k.

Therefore, under either active or passive capital account policy, attempts to estimate a capital controls reaction function using equilibrium data will potentially exhibit significant (downward) bias. In both cases the source of the bias is the fact that the econometrician only observes equilibrium sequences while the policy authority reacts to potential outcomes that are off the equilibrium path. I argue that the estimates in Fernández et al., 2015, while interesting in their own right, are subject to this type of bias and, therefore, cannot be interpreted as evidence against specifying a policy rule like (16).[41]

These results echo the point made by Leeper, 1991, Lubik and Schorfheide, 2004, Cochrane, 2011, and Castillo-Martinez and Reis, 2024 regarding the issues with empirically estimating policy reaction functions using equilibrium data. Leeper, 1991 shows in a similar exercise that estimates of the inflation parameter on a Taylor rule, obtained by regressing a time series of nominal interest rates on inflation, exhibit a similar downward bias. In Leeper, 1991, the econometrician estimating the Taylor rule $i_t = \alpha \pi_t + u_t$ obtains an estimate for α that is always below one (or below β^{-1}). Like in the above example, the econometrician wrongly concludes that monetary policy is passive.

[41] Replacing NFLs (f_t) with capital inflows ($KI_t = \Delta f_t$) in (F.2) yields equivalent results.

G New-Keynesian MFK Model

The small open economy (SOE) is populated by households, firms and a government that conducts monetary, fiscal, and capital account policies. There are two tradable goods: domestic and foreign. Domestic households consume a basket composed of both goods and can save in domestic government bonds and a foreign debt instrument. Domestic firms produce a continuum of different varieties of the domestic good using a linear technology in labor. The foreign country (i.e. the rest of the world) trades with the SOE in goods and bonds but, due to its size, will be assumed to be approximately closed with respect to the SOE.

G.1 Households

The representative households maximizes expected lifetime utility:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi} \right]$$

where C_t is aggregate consumption and N_t is labor supply. The parameter σ governs households' risk-aversion and φ is the inverse Frisch-elasticity of labor supply. Aggregate consumption is defined as a CES aggregator:

$$C_t = \left[(1-\gamma)^{\frac{1}{\theta}} C_{Ht}^{\frac{\theta-1}{\theta}} + \gamma^{\frac{1}{\theta}} C_{Ft}^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}}$$

where $\gamma \in (0,1)$ reflects the SOE's trade openness and $\theta > 0$ is the elasticity of substitution between the domestic and foreign good. Consumption of the domestic good C_{Ht} is in turn a CES aggregator over varieties $i \in [0,1]$:

$$C_{Ht} = \left(\int_0^1 C_{Ht}(i)^{\frac{\eta-1}{\eta}} di \right)^{\frac{\eta}{\eta-1}}$$

where $\eta > 0$ is the elasticity of substitution between these varieties and represents consumers' love for variety. The household maximizes utility subject to the flow budget constraint:

$$\int_0^1 P_{Ht}(i) C_{Ht}(i) di + P_{Ft} C_{Ft} + \frac{B_{Ht}}{R_t} + e_t D_{t-1}^* + P_t K(d_{t+1}^*) = W_t N_t - P_t(\tau_t - T_t) + B_{Ht-1} + \frac{e_t D_t^*}{R^*} + \Pi_t$$

where W_t is the nominal wage per unit of labor supplied by the household and Π_t are domestic firm profits. $K(.)$ represents a foreign borrowing cost that depends on the households' foreign borrowing $d_{t+1}^* = \frac{e_t D_t^*}{P_t}$. For simplicity, I assume a quadratic functional form:

$$K(d_{t+1}^*) = \frac{\nu}{2}(d_{t+1}^* - d^*)^2$$

where ν captures the elasticity of the cost of deviating from some level of foreign borrowing d^*. This can be interpreted as a generic restriction on inflows imposed by the government as in Choi

and Taylor, 2022, the presence of a debt-elastic foreign interest rate (Schmitt-Grohé and Uribe, 2003), or as the consequence of intermediation costs as in P. Benigno, 2009; De Paoli, 2009. More recent and microfounded ways of modeling financial frictions (e.g. Fanelli and Straub, 2021; Gabaix and Maggiori, 2015; Itskhoki and Mukhin, 2021) can be used to derive similar conditions to this reduced form approach (at least up to a first-order approximation). As in J. Bianchi and Lorenzoni, 2022, the key component for this model is generated an upward-sloping demand for funds in foreign financial markers.

Households also minimize their consumption expenditure given a level of aggregate consumption C_t yielding individual good demands:

$$C_{Ht} = (1-\gamma)\left(\frac{P_{Ht}}{P_t}\right)^{-\theta} C_t \quad ; \quad C_{Ft} = \gamma\left(\frac{P_{Ft}}{P_t}\right)^{-\theta} C_t$$

while demand for each variety takes the form:

$$C_{Ht}(i) = \left(\frac{P_{Ht}(i)}{P_{Ht}}\right)^{-\eta} C_{Ht}$$

The ideal price level aggregator P_t takes the form:

$$P_t = \left[(1-\gamma)P_{Ht}^{1-\theta} + \gamma P_{Ft}^{1-\theta}\right]^{\frac{1}{1-\theta}}$$

where P_{Ht} is in turn a price index of the different domestic varieties:

$$P_{Ht} = \left(\int_0^1 P_{Ht}(i)^{1-\eta} di\right)^{\frac{1}{1-\eta}}$$

with $P_{Ht}(i)$ the price of domestic variety i. Similarly, export demand is:

$$C_{Ht}^* = \gamma^*\left(\frac{P_{Ht}^*}{P_t^*}\right)^{-\theta} C_t^*$$

where P_{Ht}^*, P_{Ft}^* are foreign currency prices of domestic and foreign goods and P_t^* is the foreign aggregate price level.

Households' optimal consumption saving decision will be governed by the set of first-order conditions:

$$\begin{aligned}
\frac{W_t}{P_t} &= C_t^\sigma N_t^\varphi \\
\frac{1}{R_t} &= \beta \mathbb{E}_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} \frac{P_t}{P_{t+1}}\right] \\
\frac{1-K'(d_{t+1}^*)}{R^*} &= \beta \mathbb{E}_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} \frac{P_t}{P_{t+1}}\frac{e_{t+1}}{e_t}\right]
\end{aligned}$$

and a transversality condition (TVC):

$$\lim_{T\to\infty} \mathbb{E}_t \Theta_{t+T} \left(\frac{B_{Ht+T}}{P_{t+T+1}} - \frac{e_{t+T+1} D^*_{t+T}}{P_{t+T+1}} \right) = 0$$

where Θ_{t+T} is the household's stochastic discount factor $T \geq 1$ periods ahead.

Combining the two bond pricing equations above we can write the UIP and risk-sharing conditions of this model:

$$0 = \mathbb{E}_t \left[\frac{R^*}{1 - K'(d^*_{t+1})} - R_t \frac{e_t}{e_{t+1}} \right]$$

and

$$1 - K'(d^*_{t+1}) = \mathbb{E}_t \left[\left(\frac{C_{t+1}}{C_t} \right)^{-\sigma} \frac{Q_{t+1}}{Q_t} \right]$$

No arbitrage implies the distortion caused by the friction in international markets must be zero in steady state ($K'(d^*) = 0$).

G.2 Firms

A continuum of firms hire labor from households to produce variety i of the domestic good using a linear technology:

$$y_t(i) = A_t n_t(i)$$

with A_t a common technology component. Domestic firm i faces domestic demand $C_{Ht}(i)$ and foreign demand $C^*_{Ht}(i)$. Firm's i profits are:

$$\Pi_t(i) = P_{Ht}(i) A_t n_t(i) - W_t n_t(i)$$

which implies that its real marginal cost is:

$$mc_t(i) = \frac{W_t}{P_{Ht}(i) A_t}$$

This expression shows that a real depreciation of the currency, which lowers the relative price of the domestic good, tends to increase firms' marginal cost.

I assume a monopolistic competition setting where domestic firm i is a monopolist in its variety and can therefore choose the price $P_{Ht}(i)$. I also assume price stickiness à la Calvo, 1983 with an exogenous probability of adjustment equal to $1 - \alpha$. The firm's problem therefore consists of maximizing the present value of all future discounted profits, taking into account the probability

of being unable to adjust it price in the future:

$$\max_{P_{Ht}(i)} \sum_{k=0}^{\infty} \alpha^k \mathbb{E}_t \left[\Theta_{t+k} \Big(y_{t+k|t}(i)(P_{Ht}(i) - mc_{t+k|t}(i)) \Big) \right]$$

where $y_{t+k|t}(i)$ and $MC_{t+k|t}(i)$ denote output and real marginal cost of a firm which last reset its price in period t. The firm's optimal price setting will be described by the first order condition:

$$\mathbb{E}_t \sum_{k=0}^{\infty} \alpha^k \Theta_{t+k} y_{t+k|t}(i) \left(\frac{\tilde{P}_{Ht}(i)}{P_{Ht+k}} - \frac{\eta}{\eta - 1} mc_{t+k|t}(i) \right) = 0$$

Since all firms that adjust in period t face the same problem, $\tilde{P}_{Ht}(i) = P_{Ht}\ \forall i$.

G.3 Government

The consolidated government budget constraint is:

$$P_t(\tau_t - T_t) + \frac{B_t}{R_t} + \frac{e_t B_t^*}{R^*} - e_t \left(\frac{A_t^*}{R^*} - A_{t-1}^* \right) + K_t = B_{t-1} + e_t B_{t-1}^*$$

where I assume the central bank buys dollar-denominated assets (e.g. international reserves) A_t^* at a price of $1/R^*$ and K_t are intermediation profits which I assume are collected by the government and then rebated to households lump-sum (i.e. $K_t = T_t$ in equilibrium).

Monetary policy sets R_t according to the following Taylor rule:

$$\frac{R_t}{R} = \alpha^M + \phi_\pi \frac{\pi_t}{\pi} + \phi_x \frac{Y_t}{Y} + \varepsilon_t^M$$

where $\pi_t \equiv P_t / P_{t-1}$ is the SOE's gross inflation rate, Y_t is aggregate output, and ε_t^M is a monetary policy shock. Fiscal policy sets lump-sum taxes τ_t according to a tax rule following Leeper, 1991:

$$\frac{\tau_t}{\tau} = \alpha^F + \phi_b \frac{\ell_t}{\ell} + \varepsilon_t^F$$

where $\ell_t \equiv \frac{B_{t-1} + e_t B_{t-1}^*}{P_t}$ is the real value of total outstanding government liabilites at time t and ε_t^F is a fiscal policy shock. Capital account policy decides its stock of reserves for next period a_{t+1}^* according to:

$$\frac{a_{t+1}^*}{a^*} = \alpha^{FX} + \phi_k \frac{Q_t}{Q} + \varepsilon_t^{FX}$$

where $a_{t+1}^* \equiv \frac{e_{t+1} A_t^*}{P_{t+1}}$ is the real value of outstanding FX reserves at $t+1$ and ε_t^{FX} is a FX policy shock. FX interventions—defined as the buying or selling of international reserves by central banks on a large scale—have been a staple of central banks' policy framework in SOEs in recent years. A growing literature analyzes the role that this policy instrument can and does play in managing

exchange rates and its implications. A symptom of this is the fact that the stock of FX reserves in these countries has more than tripled as a share of GDP since 1990. This empirical observation motivates considering a policy rule where capital account policy uses FX reserves instead of using capital controls. The substantial accumulation of reserves has led some researchers to suggest that reserves may be used as an instrument to undervalue the currency and so ensure the exports competitiveness (see e.g., Choi and Taylor, 2022; Costinot et al., 2014; Korinek and Serven, 2016). This 'neo-mercantilist' motive is consistent with the behavior implied by an active capital account policy since, under this motive, policy accumulates reserves to manipulate (target) the real exchange rate. Extending my regime to this increasingly common form of policy intervention underscores the potential applications of my new regime to describe actual policy behavior in SOEs.

G.4 Market Clearing

The labor market clears when total labor supply equals labor demanded by firms:

$$N_t = \int_0^1 n_t(i)di$$

The market for each domestic-produced variety clears when the quantity produced by the domestic firm equals the quantities demanded by domestic and foreign households:

$$y_t(i) = C_{Ht}(i) + C^*_{Ht}(i), \quad \forall i$$

Aggregating over all domestic varieties $i \in [0, 1]$ we can obtain the aggregate goods market clearing condition:

$$Y_t = C_{Ht} + C^*_{Ht}$$

where aggregate output is defined as $Y_t = \left(\int_0^1 y_t(i)^{1-\eta}di\right)^{\frac{1}{1-\eta}}$. This implies the aggregate production function is

$$Y_t\Delta_t = A_tN_t$$

where $\Delta_t \equiv \int_0^1 \left(\frac{P_{Ht}(i)}{P_{Ht}}\right)^{-\eta} di$ reflects domestic price dispersion. Importantly, up to a first order $\log \Delta_t = 0$ for all t.

The market for domestic-issued bonds clears when the quantity supplied by the government B_t equals domestic and foreign demand:

$$B_t = B_{Ht} + B_{Ft}$$

I assume that foreign-issued dollar bonds have an exogenous (constant) supply S^*, implying the

condition:

$$D_t^* - A_t^* = S^*, \qquad \forall t$$

The foreign currency (FX) market clearing condition is reflected by the current account condition:

$$\left(\frac{e_t(D_t^* + B_t^* - A_t^*)}{R^*} + \frac{B_{Ft}}{R_t}\right) - \left(e_t(D_{t-1}^* + B_{t-1}^* - A_{t-1}^*) + B_{Ft-1}\right) - P_t K(d_{t+1}^*) = P_{Ft}C_{Ft} - e_t P_{Ht}^* C_{Ht}^*$$

which equates the change in the country's NFLs (net of foreign borrowing costs) to the trade deficit.

G.5 Log-Linearized Equilibrium Conditions

I proceed by log-linearizing the model above around a symmetric zero-inflation deterministic steady state where purchase power parity (PPP) holds (i.e. $Q = 1$ and $\pi = \pi^* = 1$). Equilibrium dynamics can be summarized by the system of equations[42]:

$$\begin{aligned}
\hat{Q}_t &= \mathbb{E}_t[\hat{Q}_{t+1}] - \frac{\sigma_\gamma}{1+\theta\sigma\chi}\mathbb{E}_t[\hat{Y}_{t+1} - \hat{Y}_t] + \frac{\nu}{1+\theta\sigma\chi}\hat{a}_{t+1}^* \\
\hat{Y}_t &= \mathbb{E}_t[\hat{Y}_{t+1}] - \frac{1}{\sigma_\gamma}\left(i_t - \mathbb{E}_t[\hat{\pi}_{t+1}] + \sigma\theta\chi\mathbb{E}_t[\hat{Q}_{t+1} - \hat{Q}_t]\right) \\
\hat{\pi}_{Ht} &= \beta\mathbb{E}_t[\hat{\pi}_{Ht+1}] + \lambda\left((\sigma_\gamma + \varphi)\hat{Y}_t + \left(\frac{\gamma}{1-\gamma} - \sigma\theta\chi\right)\hat{Q}_t - (1+\varphi)\hat{A}_t\right) \\
\hat{\pi}_t &= \hat{\pi}_{Ht} + \frac{\gamma}{1-\gamma}\left(\hat{Q}_t - \hat{Q}_{t-1}\right) \\
\mathbb{E}_t[\hat{\ell}_{t+1}] &= \beta^{-1}\hat{\ell}_t + i_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \frac{\tau}{\beta\ell}\hat{\tau}_t + \frac{a^*}{\beta\ell}(\beta\hat{a}_{t+1}^* - \hat{a}_t^*) - \nu\frac{b^* - a^*}{\ell}\hat{a}_{t+1}^* \\
\mathbb{E}_t[\hat{f}_{t+1}] &= \beta^{-1}\hat{f}_t + i_t - \mathbb{E}_t[\hat{\pi}_{t+1}] - \frac{1}{\beta\delta_F}\frac{\gamma}{1-\gamma}(\vartheta\hat{Q}_t - \hat{Y}_t) + \frac{a^*}{\beta f}(\beta\hat{a}_{t+1}^* - \hat{a}_t^*) - \nu\frac{d^* + b^* - a^*}{f}\hat{a}_{t+1}^*
\end{aligned}$$

and the linearized policy rules:

$$\begin{aligned}
i_t &= \phi_\pi\hat{\pi}_t + \phi_x\hat{Y}_t + \varepsilon_t^M \\
\hat{\tau}_t &= \phi_b\hat{\ell}_t + \varepsilon_t^F \\
\hat{a}_{t+1}^* &= \phi_k\hat{Q}_t + \varepsilon_t^{FX}
\end{aligned}$$

Since, by the no arbitrage $K'(d^*) = 0$, intermediation profits are zero up to a first-order approximation around the steady state $K(d_{t+1}^*) - K(d^*) \approx K'(d^*)(d_{t+1}^* - d^*) = 0$. However, the

[42] The following constants are defined:

$$\chi = \frac{\gamma}{1-\gamma}\left(1 + \frac{z}{1-\gamma z}\right) \quad ; \quad \sigma_\gamma = \frac{\sigma}{1-\gamma z} \quad ; \quad \lambda = \frac{(1-\beta\alpha)(1-\alpha)}{\alpha}$$
$$\vartheta = z(\theta - \gamma) + (1-\gamma z)(\theta\chi - (1-\theta)) \quad ; \quad \delta_F = \frac{f}{y}$$

distortionary effects of this friction are not zero since $K'(d^*_{t+1}) - K'(d^*) \approx K''(d^*)(d^*_{t+1} - d^*) = \nu(a^*_{t+1} - a^*) = \nu a^* \hat{a}^*_{t+1}$. This term therefore shows up in both the government budget constrain and the current account condition and will capture revenues from excess returns that both derive from holding foreign currency debt when the central bank purchases reserves.

The friction $K(d^*)$ plays the key role of preventing households from freely adjusting their portfolio of foreign liabilities after the FX intervention. When the central bank increases reserves, it creates capital outflows by buying foreign assets which tends to depreciate the domestic currency. As households expect the currency to appreciate next period, they increase their dollar borrowing. However, as they increase demand for dollar borrowing, the domestic currency appreciates as more dollars flow into the economy. That is, *official* outflows are offset by *private* inflows. Households will borrow from abroad until the expected depreciation of the local currency is equal to zero resulting in an ineffective FX intervention by the central bank. If, however, policy raises capital controls at the same time it buys reserves, it can dampen the effect of a more appreciated dollar on household borrowing. By increasing the cost of foreign borrowing, policy ensures the increase in private inflows is less than the increase of official outflows. Policy therefore creates net capital outflows which implies the real exchange rate depreciates in equilibrium.

Note that in the above discussion, FX policy had no consideration over the fact that, by reducing NFLs (increasing NFAs), the present value of trade balances should be expected to decrease to remain consistent with external solvency. However, a more depreciated real exchange rate *increases* trade surpluses thus moving the present value in the opposite direction. This again is the sense in which policy acts unconstrained by budgetary conditions and can thus be characterized as 'active'. In equilibrium, inflation will fall to raise the real value of NFLs and match the increase in the present value of trade balances.

G.6 Calibration

The full calibration table is reported below. To choose parameter values in the calibration exercise, I draw from previous literature and match certain moments of the Chilean economy during the late 1980s.

I set households' discount factor 0.985 to match an average real interest rate of around 6% between 1984 and 1989. I follow F. Bianchi, 2021 and assume a risk aversion of 1 and high inverse Frisch elasticity of labor supply of 4. The elasticity between home and foreign goods is 1.5 draws from Witheridge, 2024 and Feenstra et al., 2018. The elasticity of substitution between varieties is set to 6, implying a steady state markup of 20 percent. The probability of a firm not being able to adjust its price (α) is set to 0.8 implying an average duration of 5 quarters. This in line with values used in F. Bianchi, 2021 (0.875) and Witheridge, 2024 (0.8). This value is also consistent with previous estimates for Chile in the 1990s and 2000s between 0.40 and 0.67 (Céspedes et al., 2005, Del Negro and Schorfheide, 2008 and Caputo et al., 2006). A higher Calvo parameter is meant to reflect the higher level of indexation in prices and wages in Chile in the late 1980s. The foreign borrowing elasticity ν is set to 0.01 following calibrations in De Paoli, 2009 and P. Benigno, 2009.

Table 1: New-Keynesian MFK Model Calibration

Parameter		Value	Parameter		Value
Discount factor	β	0.985	Openness shifter	z	1.01
Risk-aversion	σ	2	Foreign borrowing cost elast.	ν	0.01
Inv. Frisch elasticity	φ	4	LC share of NFL	α_F	0
H-F good elasticity	θ	1.5	SS FX-to-GDP	δ_a	0.12
Trade openness	γ	0.25	MP inflation coefficient	ϕ_π	{0.5,1.5,0.5}
FX shock persistence	ρ	0.4	MP output coefficient	ϕ_x	{0.9,0.9,0.9}
Calvo coefficient	α	0.8	FP debt coefficient	ϕ_b	{2,2,0.5}
SS debt-to-GDP	δ	0.67	KA policy RER coefficient	ϕ_k	{-0.5,0,0}

Policy parameters values are set to reflect active/passive behavior in depending on the regime. For active monetary policy, I use $\phi_\pi = 1.5$ as commonly assumed in the literature and dates back to estimates by Taylor, 1993 for the U.S. For passive fiscal policy I choose $\phi_b = 2$. The values passive for passive monetary and active fiscal are set to $\phi_\pi = 0.5$ and $\phi_b = 0.5$ to reflect weak responses from both monetary and fiscal authorities. The value for monetary policy's response to output $\phi_x = 0.9$ is based on estimates in Witheridge, 2024 for emerging economies. The capital account policy parameter is set to $\phi_k = -0.5$ for capital account dominance and to $\phi_k = 0$ in order to capture the conventional monetary and fiscal regimes.

The parameters $\delta = 0.67$ and $\delta_a = 0.12$ are set to match Chile's average public debt-to-GDP and reserves-to-GDP ratios during the late 1980s. Similarly, the local currency share of NFLs (α_F) is set to 0 as Chile's external was overwhelmingly denominated in dollars during this time. The trade openness γ and openness shifter z parameters are set to $\gamma = 0.25$ and $z = 1.01$ such that they jointly match an average trade balance-to-GDP ratio of 0.3% and an average export-to-GDP ratio of 25% during the 1980s.

H Case of Chile: Details

H.1 Narrative Evidence

In this section I show a series of selected quotes from different authors supporting my description of the stance of policy in Chile during between 1985 and 1989.

Shift in policy stance in 1985:

> "Thus, the reaction was a complete overhaul and switch of macro policies in 1985-90."
>
> Morandé and Tapia, 2002, p. 2

> "In 1985 [...], the new economic team decided to focus narrowly on two interrelated priorities: acceleration of growth and recovery of employment."
>
> Edwards, 2023, p. 156

Policy's intentions to target the real exchange rate:

"Since the end of 1982, the central bank has applied a policy of daily mini devaluations of the peso aimed at preserving a given real exchange rate"

Fontaine, 1989, p. 216

"After 1985, monetary policy involved periodic devaluations in order to avoid depreciation of the real exchange rate"

Caputo and Saravia, 2018, p. 19

"The formula was to allow the peso depreciate and try to keep it depreciated in real terms, so net exports could go up"

Morandé and Tapia, 2002, p. 2

Inflation control as secondary objective for central bank:

"Controlling inflation, which was running at 25 percent per year, was, of course, important, but was not an obsession as it had been [...]"

Edwards, 2023, p. 156

"The emphasis on controlling inflation was diminished, and from 1984 to 1990, inflation was much higher [...]"

Caputo and Saravia, 2018, p. 5

"There was less concern for reducing inflation, more concern for overcoming the problems posed by the excessive external debt [...]"

Morandé and Tapia, 2002, p. 2

Fiscal policy geared toward debt repayment and fiscal sustainability:

"The third phase, from 1982 to 1990, [...] has two features [...]. The first is that the fiscal discipline, implemented in the mid-1970s, was still present [...]"

Caputo and Saravia, 2018, p. 16

"[...] the central government implemented austerity measures with two objectives in mind: to prevent an increase in the fiscal deficit and to be able to support the rescue plans of the private sector."

Caputo and Saravia, 2018, p. 5

"[The policy] worked, aid by an austere fiscal policy and a stimulative monetary policy on average."

Morandé and Tapia, 2002, p. 2

H.2 Data and Sample

The main data sources for the empirical exercise are the Central Bank of Chile's historical databases and the IMF's Consumer Price Index (CPI) Dataset. All series used in the estimation are available at a monthly frequency, except for real GDP. Because of this, I use quarterly averages of all other series for estimation. As stated in the main text, the five variables used in the VAR are (in log-levels except for the nominal interest rate): FX reserves deflated by the CPI index, a re-normalized CPI index, real GDP in millions of constant 1986 pesos, a CPI-based real exchange rate index, and the short-term nominal deposit rate (30 to 90 days). Below I describe in detail of how I construct each variable.

To construct the real exchange rate index, first, I use the monthly month-on-month inflation series from the IMF's CPI dataset to construct a series for price level index re-normalized to $P = 100$ in Q1-1984. I then use the monthly series of U.S. inflation obtained from FRED to similarly construct the re-normalized U.S. price level index. I combine these two series to compute the CPI-based real exchange rate with the U.S. as:

$$RER^{US/CL} = \frac{eP^{US}}{P^{CL}}$$

where e the nominal exchange rate in pesos per dollar obtained from the Central Bank of Chile, P^{US} is the U.S. price level index, and P^{CL} is the Chile price level index.

The nominal interest rate variable is the 30 to 90 days nominal deposit rate, as reported by the Central Bank of Chile at a monthly frequency, averaged to quarterly frequency.

Real FX reserves are constructed using data for international reserves as reported by the Central Bank of Chile at a monthly basis (in U.S. dollars), averaged to quarterly frequency. I construct the real FX reserves series as

$$FX = \frac{eFX^{USD}}{P^{CL}}$$

where FX^{US} is the stock of FX reserves in U.S. dollars.

Finally, the real GDP series was constructed data from quarterly real GDP tables (Table 1) in historic quarterly economic and financial reports published by the Central Bank of Chile. The series prior to Q1-1986, the series is adjusted to account for the change in base year.

In term of the sample, as the GDP series restricts the frequency to be quarterly the sample size is 20 observations spanning the period from Q1-1985 to Q4-1989 which corresponds to the length of the episode.

H.3 Robustness

In this section I perform several sensitivity exercises to show that the disinflationary effects of FX shocks are largely robust to detrending the data, changing in prior tightness, and explicitly modeling unit-root and cointegration behavior in the data (estimating a VEC model).

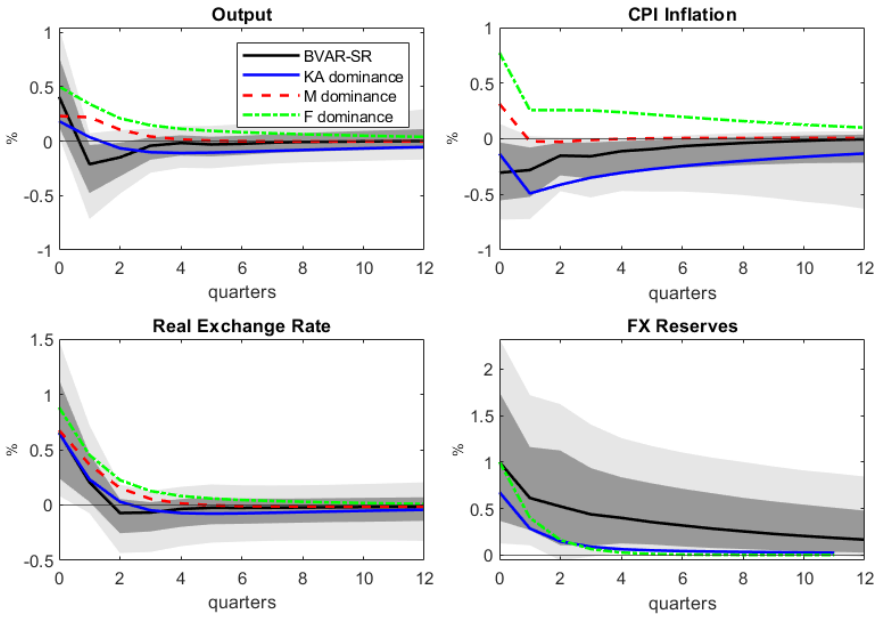
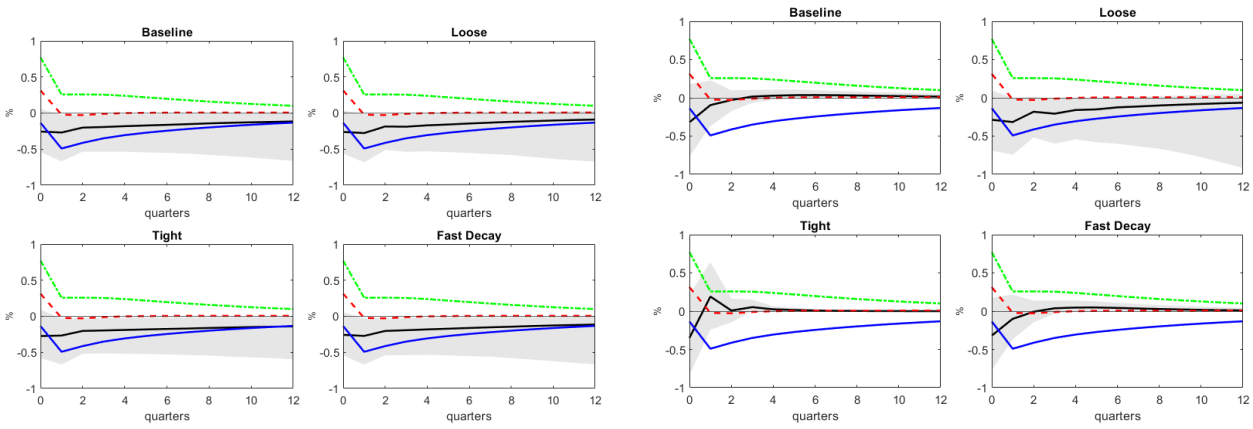


Figure 7: Posterior Impulse Responses (Detrended Data)

Detrended Data. To confirm that the prior of highly trending data being imposed in the baseline model is consistent with the data, I re-estimate the VAR model using detrended data (except nominal interest rates). I de-trend the data by simply subtracting a linear trend (results are also robust to using other detrending methods). Since the data is de-trended I modify no longer use the Sims-Zha prior as imposing near-unit-root behavior would not be consistent with the data. I then use a standard Minnesota prior approach for estimation. Accordingly, I also use a looser prior to reflect the fact that, after de-trending the data, there are no strong prior beliefs on the distribution of data and thus prevent over-weighting the prior versus the likelihood. Figure 7 shows the results of this exercise. We see the estimates using detrended data instead of imposing near-unit-root behavior directly in the prior are similar. Specifically, the negative and persistent effects on inflation remain.

Prior Sensitivity. Given the short sample size used in the estimation, a concern with these results is that they will overly sensitive to prior choice and not reflect information embedded in the data. To address these concerns, I re-estimate the VAR model varying the tightness of the prior. Figure 8a summarizes the sensitivity analysis by showing the posterior median and 90% posterior credible bands for the response of inflation in the baseline prior and for three other prior specifications. We see that loosening or tightening the prior has virtually no effect for the effects on inflation. Figure 8b shows the same sensitivity exercise using detrended data which yield the same conclusion.

VEC Model. I report ADR unit-root tests showing strong evidence that variables in the VAR are I(1) in levels. I also report results from Johansen cointegration tests (Johansen, 1991) for different levels of cointegration r. The test includes one lagged value of first differences given that the VAR includes two lags. Test results with no lags yield the same conclusions.



(a) Log-Levels Data **(b)** Detrended Data

Figure 8: Posterior Impulse Responses of Inflation: Prior Sensitivity

Table 2: Augmented Dickey-Fuller Unit Root Test

Variable	$p = 0$	$p = 1$	$p = 2$
Real GDP	0.999	0.996	0.996
CPI index	0.999	0.999	0.985
Real Exchange Rate	0.614	0.665	0.199
FX Reserves	0.964	0.997	0.991
Nominal Int. Rate	0.500	0.505	0.657

These tests indicate the presence of two cointegrating relationships as we fail to reject the null hypothesis of $r \leq 2$ at a 5% significance using both trace and max-eigenvalue statistics. Given

Table 3: Johansen Cointegration Test Results

H_0	Trace Stat.	p-value	Max-Eig Stat.	p-value
$r = 0$	124.37	0.001	54.71	0.001
$r \leq 1$	69.67	0.001	42.86	0.001
$r \leq 2$	26.80	0.107	14.74	0.345
$r \leq 3$	12.06	0.154	8.96	0.330
$r \leq 4$	3.10	0.078	3.10	0.078

strong evidence suggesting the presence of unit-roots in the system, I estimate a VEC model that explicitly allows for non-stationary variables and cointegration relationships in the data. I allow for two orders of cointegration ($r = 2$) as per the results of the above tests. This exercise is meant to address concerns that imposing unit-root behavior in the prior might not be fully accounting for the bias from non-stationary data in log-levels. I maintain the same sign restrictions as to identify structural FX shocks. Figure 9 reports impulse responses from this VEC model. While uncertainty around other variables increases significantly (as was expected due to the introduction variance in long run relationships), the main message around the effects of inflation remains consistent. That

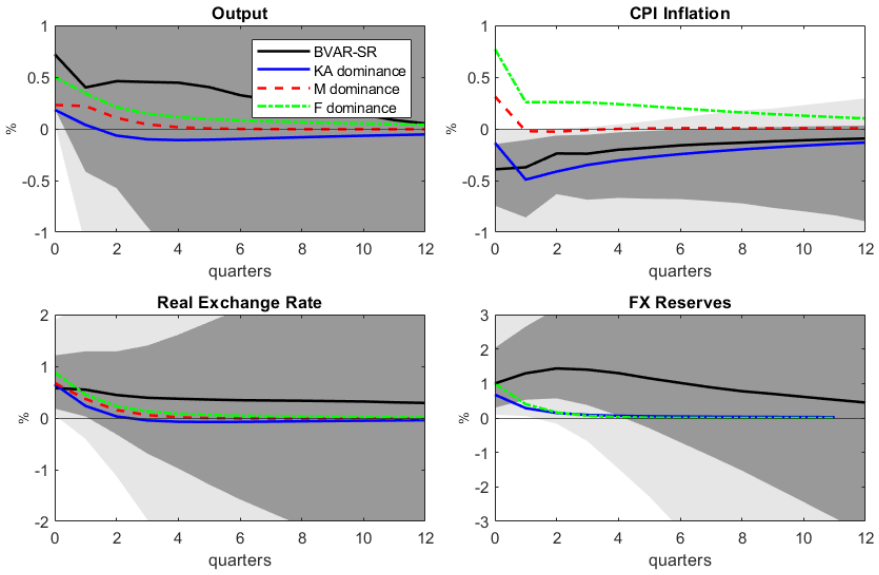


Figure 9: Posterior Impulse Responses (VEC model)

is, increases in reserves had negative and persistent effects on inflation.