# Policy Coordination, Monetary Independence, and Optimal Determinate Inflation

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**Abstract**

A non-committing Fiscal Authority (FA) and Central Bank (CB) set policy in a political economy with heterogeneous households. The electoral majority—net borrowers—demands policies decreasing the real value of nominal assets to reduce present borrowing costs, generating inflationary pressure even absent deficits. The FA and CB coordinate via a bargaining protocol enforced by an endogenous fighting threat. Optimal determinate inflation is achieved when the CB (which prioritizes average welfare) has full on-path bargaining power, while the FA retains off-path power. Inflation is therefore a political phenomenon: both optimality and determinacy hinge on institutional rules that credibly coordinate non-committing policymakers.

JEL: E5, E6

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# 1 Introduction

As of early 2026, over a dozen U.S. states have enacted laws recognizing gold and silver as legal tender, a trend accelerating since Utah's pioneering legislation in 2011, while 45 states have eliminated sales taxes on precious metals to facilitate their use. This reflects growing concerns over fiat dollar instability, which has lost about 87% of its purchasing power since the 1971 end of the gold standard. The monetary base expanded from roughly $0.8 trillion in 2008 to around $5.3 trillion recently, fueled by quantitative easing and stimulus, as the federal deficit-to-GDP ratio rose from 3.2% in 2008 to approximately 6.4% in 2024. Many view these state-level measures as a hedge against ongoing monetary expansion amid persistent deficits and debates over Federal Reserve independence.

This concern is global. An empirical literature now documents a systematic decline in de facto central bank independence—even where legal independence remains unchanged—across both advanced and emerging economies (Binder, 2021; Gavin and Manger, 2023; Pittaluga et al., 2024). At the same time, a body of evidence shows that inflation preferences are strongly shaped by households' net nominal positions: borrowers and low-wealth agents favor higher inflation because it erodes the real burden of their debts (Doepke and Schneider [18]; Meh et al. [32]; Auclert [5]; Coibion and Gorodnichenko [15]). Taken together, these developments point toward a common underlying force: political pressures tied to fiscal conditions increasingly shape the environment in which inflation emerges.

In the modern literature, viewing inflation as a fiscal problem can be traced at least to Sargent and Wallace [42]. In their "game of chicken (Sargent [41])," an unaccommodating central bank (CB) can force fiscal adjustment, whereas a dominant fiscal authority (FA) eventually compels monetary accommodation. Yet Sargent and Wallace [42] leave several foundational issues unresolved. Why does the fiscal authority seek to run deficits—and thereby promote inflation—in the first place? Why does the central bank, by contrast, attempt to restrain inflation? If the fiscal authority truly values deficit creation and the central bank truly values price stability, will their different objectives be reconciled to contain inflation, or will conflict instead amplify it? More generally, when policymakers have divergent interests and lack commitment, what mechanism—if any—anchors the price level and the path of inflation?

Addressing these questions requires a framework in which both authorities have welfare-based objectives. And because fiscal tensions are inherently political, it is natural to begin with a benchmark environment in which the Friedman rule is socially optimal—as in many baseline monetary models—yet fails to emerge for political reasons. We study such an environment. There are three stages of trade in each period. Households receive idiosyncratic productivity shocks at the start of the period, which temporarily split them into high-cost (low-productivity) and low-cost (high-productivity) groups. The government has exogenous expenditure commitments in stage-1 goods, and its old nominal bonds mature at the beginning of the period. The CB and FA choose their instruments—the nominal interest rate and lump-sum taxes, respectively—without commitment to future choices. Newly issued public and private bonds become liquid only after stage-2 trade, allowing the authorities to adjust instruments independently within the period. Following Lagos and Wright [26], we assume linear preferences in stage 3 to maintain a degenerate distribution of post-trade wealth.

We make three contributions. First, we identify a political channel through which welfare-based concerns generate inflationary pressure. Prior to stage-1 trade, households vote, and the FA adopts the preference of the winning majority, while the CB maximizes average welfare. When high-cost households constitute the majority—the case on which we focus—the FA deviates from the Friedman rule because these households are net private borrowers who finance stage-2 consumption by borrowing in stage 1. A lower real value of nominal assets reduces their borrowing cost. Thus we deliver a political-economy rationale for the widespread aversion to deflation that is absent in representative-agent models: deflation does not harm aggregate welfare, but it does harm the current electoral majority. Inflation therefore arises from a distributional motive transmitted through the political system, not from the deficit-financing channel emphasized by Sargent and Wallace [42].

Second, we formulate the FA–CB interaction as a bilateral bargaining game. Each authority may choose to fight, in which case both select their instruments simultaneously, yielding an inefficient mutual best response with high inflation and nominal interest rates—an outcome strictly worse for both. The endogenous fighting threat induces the FA and CB to follow a bargaining protocol, an institutional rule governing the resolution of political conflicts and taken as given by successive policymakers. This institutional rule allows us to characterize the entire static set of self-sustainable policy outcomes. The static characterization then disciplines intertemporal incentives and permits us to derive the dynamic set of politically sustainable stationary allocations, providing the foundation for our analysis of optimal determinate inflation

Third, within the set of politically sustainable allocations, we prove the existence of bargaining protocols that implement a globally determinate (monetary) equilibrium. Fiscal policy is always Ricardian: the government budget is balanced period-by-period with lump-sum taxes along every history. Determinacy is achieved solely through political incentives in the state-contingent bargaining protocol. As the optimal determinate inflation requires taxes at the highest politically-sustainable level, the CB has full bargaining power in the purported equilibrium. Determinacy calls for suitable fiscal adjustment. In particular, the protocol preserves full CB bargaining power whenever anticipated future conditions would otherwise weaken reconciliation incentives and threaten the optimal allocation.

Our framework lies at the intersection of several strands of the monetary–fiscal policy literature that emphasizes inflation as a joint monetary–fiscal phenomenon; see Leeper and Leith [28], Bhattarai et al. [11], Bianchi et al. [12], and Cochrane [14] for recent surveys. Classic models of inflation bias (Barro and Gordon [8], Rogoff [40], and Walsh [48]) are built on time inconsistency. Our mechanism is orthogonal: inflation arises from distributional political motives, not credibility problems.

From the strategic-interaction tradition (Alesina and Tabellini [3], Dixit and Lambertini [16], Tabellini [47], Niemann [34], Miller [33], and Camous and Matveev [13]),[1] we retain the premise of conflicting objectives. But rather than impose a particular game form (the leadership or simultaneous-move game) as this tradition, our bargaining structure identifies the complete set of politically sustainable allocations that allow us to study optimal determinate inflation.

As discussed above, our analysis also differs from the Fiscal Theory of the Price Level (Leeper [27], Sims [44], and Woodford [50]) in that fiscal behavior is always Ricardian, and determinacy does not rely on any non-Ricardian fiscal anchor. Finally, while the political-economy literature on debt and inflation (Alesina and Passalacqua [1], Battaglini and Coate [6], and Song et al. [45]) typically generates inflation through revenue needs, we offer a new political channel: a high-cost electoral majority desires to reduce the real cost of the private credit within the period.

[1]Relatedly, Martin [30] studies joint policy determination under government time inconsistency, highlighting how current choices shape future governments' responses. Martin [31] extends the setting to simultaneous moves by a current fiscal authority and central bank with conflicting objectives. These two papers employ Lagos–Wright quasi-linear preferences, as does our paper.

## 2 The model

Time is discrete, indexed by $t \geq 0$. Each period has three stages, $n = 1, 2, 3$. There is a unit mass of infinitely lived households, each consisting of a consumer and a producer. In stage $n \in \{1, 2\}$ of period $t$, there are two perishable goods, I and II. In half of the households, consumers consume good II and producers produce good I, and in the other half, consumers consume good I and producers produce good II. In stage 3 there is a single perishable good consumed and produced by all households. At the beginning of the period, an i.i.d idiosyncratic production-cost shock $\theta \in \{h, l\}$ with $0 < l < h$ is realized. A household's period utility is

$$u_1(x_1) - \theta c_1(y_1) + u_2(x_2) - c_2(y_2) + x_3 - y_3,$$

where $x_n$ denotes consumption and $y_n$ production in stage $n$. Preferences satisfy $u_n' > 0$, $u_n'' < 0$, $c_n' > 0$, $c_n'' \geq 0$, and $u_n'(0) > c_n'(0)$ for $n = 1, 2$. Households maximize expected discounted utility with discount factor $\beta \in (0, 1)$.

The government has a fixed expenditure of $g \geq 0$ units of stage-1 goods, split symmetrically between goods I and II. It issues two nominal assets: money and one-period nominal bonds.

There are three physical locations: a central location and two trading locations (I and II). At the start of period $t$, all households are in the central location. In stage $n \in \{1, 2\}$, consumers who consume good K$\in$ {I,II} and producers who produce good K travel to trading location K. In stage 3, each household's consumer and producer randomly select a trading location and travel there together.

In each trading location, all agents are anonymous, ruling out private credits. The trading location has a competitive market for consumers and producers to exchange nominal assets for goods; in stage 2, only money is liquid in that market. Nominal earnings cannot be transferred across locations within a stage (so a producer's income cannot be spent by the consumer of the same household in the same stage). Because the two locations are symmetric, let $P_{nt}$ denote the nominal price of goods traded at stage $n$. The government prints $P_{1t}g$ units of money to purchase stage-1 goods.

After stage-1 trade, all agents return to the central location. The government then levies a nominal lump-sum tax $P_{1t}\tau_t$ and issues new one-period bonds that mature at the beginning of period $t + 1$. Households simultaneously issue private one-period nominal bonds. (Identity is verifiable in the central location, permitting lump-sum taxation and private borrowing/lending.) Because all bonds are perfect substitutes, they bear the same nominal interest rate. The government operates a discount window—or equivalently, open-market operations—that pegs the nominal interest rate at $i_t$.

Let $M_t$ and $B_t$ denote the amounts of money and government bonds held by households at the end of stage 1 in period $t$. At the start of period 0, each household holds $M_0 + B_0$ nominal assets. The government's budget constraint is

$$P_{1t}(g - \tau_t) = M_t + B_t/(1 + i_t) - M_{t-1} - B_{t-1}. \quad (1)$$

Thus the government injects $P_{1t}(g - \tau_t)$ units of nominal assets at stage 1 if $\tau_t \leq g$, and withdraws $P_{1t}(\tau_t - g)$ if $\tau_t > g$. The government uses $\tau_t$ and $i_t$ as the fiscal instrument and the monetary instrument, respectively. A pair $(\tau_t, i_t)$ constitutes a *temporary policy* in period $t$, and a sequence $\{(\tau_t, i_t)\}_{t\geq 0}$ is a *policy*.

For clarity and without loss of generality, we set $g = 0$ and assume that the proportion $\pi^h$ of high-cost ($\theta = h$) households exceeds that of low-cost ($\theta = l$) $\pi^l$.[2]

# 3 Market equilibrium

In each period $t$, households take as given current and future good prices $\{(P_{1s}, P_{2s}, P_{3s})\}_{s\geq t}$ and current and future components of a policy $\{(\tau_s, i_s)\}_{s\geq t}$. For a household entering period $t$ with nominal assets $a_{t-1}$ and receiving shock $\theta$, let $x^\theta_{nt}$ denote its stage-$n$ consumption, $y^\theta_{nt}$ stage-$n$ production, $m^\theta_{nt}$ money holdings entering stage $n \in \{2, 3\}$, $b^\theta_t$ holdings of (private and government) bonds at the end of stage 1, and $a_t$ the nominal assets at the end of period $t$. The household is subject to the constraints

$$P_{1t}x^\theta_{1t} \leq a_{t-1},\ \ P_{2t}x^\theta_{2t} \leq m^\theta_{2t},$$

$$m^\theta_{2t} + b^\theta_t(1 + i_t)^{-1} = a_{t-1} + P_{1t}(y^\theta_{1t} - x^\theta_{1t} - \tau_t),$$

$$m^\theta_{3t} - m^\theta_{2t} = P_{2t}(y^\theta_{2t} - x^\theta_{2t}),\ \ a_t = m^\theta_{3t} + b^\theta_t + P_{3t}(y^\theta_{3t} - x^\theta_{3t}).$$

The first two constraints reflect that nominal earnings in one location cannot be moved to another within a stage, and that money is the only liquid asset at stage 2.

With linear stage-3 utility, the household's continuation value at the entry of stage

[2]When $g > 0$, the optimal inflation characterized in Proposition 3 is strictly increasing in $g$.

3 is affine in its stage-3 entry wealth (if its entry wealth is $a$, then its continuation payoff is $a/P_{3t} + C_t$ for some $C_t$ independent of $a$). This affine continuation value function implies that if all households enter $t$ with nominal assets $M_{t-1} + B_{t-1}$ then they all exit with $M_t + B_t$. Moreover, the affine continuation value function yields the following standard necessary and sufficient optimality conditions for a household entering period $t$ with $M_{t-1} + B_{t-1}$,

$$\theta c_1'(y_{1t}^\theta) = \frac{(1+i_t)P_{1t}}{P_{3t}},\ \theta c_1'(y_{1t}^\theta) = \frac{u_2'(x_{2t}^\theta)P_{1t}}{P_{2t}},\ c_2'(y_{2t}^\theta) = \frac{P_{2t}}{P_{3t}}, \tag{2}$$

$$u_1'(x_{1t}^\theta) \geq \theta c_1'(y_{1t}^\theta) \tag{3}$$

with complementary slackness on the stage-1 asset constraint $P_{1t}x_{1t}^\theta \leq M_{t-1} + B_{t-1}$. Three immediate and useful implications follow:

(a) Stage-1 production $y_{1t}^\theta$ differs by type, while stage-1 consumption $x_{1t}^\theta$ and stage-2 quantities $(x_{2t}, y_{2t}, m_{2t})$ do not;

(b) When $i_t > 0$, money carried into stage 2 satisfies $m_{2t} = P_{2t}x_{2t}$ and, without loss of generality, we can assume that the same holds at $i_t = 0$;

(c) Without loss of generality, the stage-1 asset constraint binds so

$$x_{1t}^\theta = x_{1t} = \frac{M_{t-1} + B_{t-1}}{P_{1t}}.$$

(Because high-cost households produce less than low-cost households in stage 1 while consuming the same in stages 1 and 2, they must borrow intratemporally in stage 1.)

To normalize the nominal terms, let

$$\phi_{1t} = \frac{M_t + B_t/(1+i_t)}{P_{1t}},\ \phi_{2t} = \frac{M_t + B_t}{P_{2t}},\ \phi_{3t} = \frac{M_t + B_t}{P_{3t}}, \tag{4}$$

$$\delta_t = \frac{M_{t-1} + B_{t-1} - M_t - B_t/(1+i_t)}{M_{t-1} + B_{t-1}},\ \lambda_t = \frac{M_t}{M_t + B_t/(1+i_t)}. \tag{5}$$

For the above terms, think of that new bonds are issued after money is withdrawn by lump-sum taxes at stage 1 so that $M_t + B_t/(1+i_t)$ is the amount of assets right before bond issuance in period $t$. Then $\phi_{1t}$ is the real value of pre-bond-issuance assets measured by the stage-1 price, $\phi_{nt}$ is the real value of post-bond-issuance assets measured by the stage-$n$ price for $n \in \{2, 3\}$, $\delta_t$ is the rate of assets withdrawn from the economy before bond issuance, and $\lambda_t$ is the proportion of assets carried in the form of money after bond issuance ($\lambda_t$ can be greater than unity as $B_t$ can be negative). Now the first order conditions in (2) and (3) can be written as

$$\theta c_1'(y_{1t}^\theta) = \frac{\phi_{3t}}{\phi_{1t}} \frac{1+i_t}{1+(1-\lambda_t)i_t},\ \theta c_1'(y_{1t}^\theta) = \frac{\phi_{2t}}{\phi_{1t}} \frac{u_2'(x_{2t})}{1+(1-\lambda_t)i_t},\ x_{2t} = \frac{\lambda_t \phi_{2t}}{1+(1-\lambda_t)i_t}, \quad (6)$$

$$c_2'(y_{2t}) = \frac{\phi_{3t}}{\phi_{2t}},\ u_1'(x_{1t}) \geq \theta c_1'(y_{1t}^\theta),\ x_{1t} = \frac{\phi_{1t}}{1-\delta_t}. \quad (7)$$

With $g = 0$, the government budget constraint (1) becomes

$$\delta_t x_{1t} = \tau_t. \quad (8)$$

Market-clearing conditions on goods in stages 1 and 2 are

$$x_{1t} = \textstyle\sum_\theta \pi^\theta y_{1t}^\theta \text{ and } x_{2t} = y_{2t}. \quad (9)$$

**Definition 1** *A market price vector $\phi_t \equiv (\phi_{1t}, \phi_{2t}, \phi_{3t})$ is a temporary market equilibrium admitted by a temporary policy $(\tau_t, i_t)$ if there exists a tuple $(x_{1t}, y_{1t}^h, y_{1t}^l, x_{2t}, y_{2t}, \delta_t, \lambda_t)$ satisfying (6)-(9).*

Given a policy $\{(\tau_t, i_t)\}_{t\geq 0}$, a market equilibrium endogenizes all prices. The dynamic link between $\phi_t$ and $\phi_{t+1}$ is obtained from the optimality condition that for a household to leave the current stage-3 market with $M_t + B_t$, the marginal cost of obtaining an infinitesimal amount of nominal assets from current stage 3 equals the discounted marginal return of spending that amount in the coming stage-1 market,

$$\phi_{3t} = \beta \frac{\phi_{t+1}}{1-\delta_{t+1}} u_1'(\frac{\phi_{1t+1}}{1-\delta_{t+1}}). \quad (10)$$

**Definition 2** *A sequence of market price vectors $\{\phi_t\}_{t\geq 0}$ is a market equilibrium admitted by a policy $\{(\tau_t, i_t)\}_{t\geq 0}$ if for each $t$, $\phi_t$ is a temporary market equilibrium admitted by $(\tau_t, i_t)$ and (10) holds.*

# 4 Equilibrium allocations and *ex ante* optimal inflation

Consider a social planner who picks a policy at the start of period 0 (before agents know their types) to maximize the representative agent's discounted expected utility. To describe the welfare value of an arbitrary policy, we start with a result for a temporary policy and then extends it to the policy. The result says that for a set of temporary policies that maintain $u_1'(x_{1t}) \geq \theta c_1'(y_{1t}^\theta)$, given a fixed positive number $\upsilon$, there exists a unique temporary market equilibrium with $\phi_{3t} = \upsilon$. To be specific, let

$$w_1(y_1^h) = u_1(\pi^h y_1^h + \pi^l y_1^l(y_1^h)) - \pi^h h c_1(y_1^h) - \pi^l l c_1(y_1^l(y_1^h)), \tag{11}$$

where $y_1^l(y_1^h)$ is the unique $y_1^l$ satisfying

$$h c_1'(y_1^h) = l c_1'(y_1^l)$$

for a given $y_1^h \geq 0$. Let $y_1^{h*}$ satisfy $w_1'(y_1^{h*}) = 0$, $y_1^{l*} = y_1^l(y_1^{h*})$, and $y_1^* = \sum_\theta \pi^\theta y_1^{\theta *}$. Let $S = \{(\tau, i) : \tau \leq (1-\beta) y_1^* \text{ and } i \geq 0\}$.

**Lemma 1** *Fix $\upsilon > 0$ and $(\tau_t, i_t) \in S$. Then $(\tau_t, i_t)$ admits a unique temporary market equilibrium with $\phi_{3t} = \upsilon$, and the following holds in this temporary equilibrium.*

*(i) $\lambda_t = (1 + i_t) y_{2t} c_2'(y_{2t})[\upsilon + i_t y_{2t} c_2'(y_{2t})]^{-1}$ and $\delta_t = \tau_t y_{1t}^{-1}$, where*

$$y_{1t} = \sum_\theta \pi^\theta y_{1t}^\theta.$$

*(ii) The triplet $(y_{1t}^h, y_{1t}^l, y_{2t})$, referred to as the temporary allocation supported by $(\tau_t, i_t, \upsilon)$, satisfies*

$$y_{2t} = y_2(i_t), \tag{12}$$

*where $y_2(i)$ is the unique $y_2$ satisfying $(1+i)c'(y_2) = u'(y_2)$ for a given $i > 0$, $y_1^l = y_1^l(y_1^h)$, and*

$$h c_1'(y_{1t}^h) = \frac{\upsilon + y_{2t}[u_2'(y_{2t}) - c_2'(y_{2t})]}{y_{1t} - \tau_t}. \tag{13}$$

**Proof.** See the appendix. ■

**Lemma 2** *Suppose a policy $\{(\tau_t, i_t)\}_{t \geq 0}$ admits an equilibrium $\{\phi_t\}_{t \geq 0}$. Then there exists a unique sequence of $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}_{t \geq 0}$, referred to as an allocation supported by $\{(\tau_t, i_t, \phi_t)\}_{t \geq 0}$, such that for each $t$, $(y_{1t}^h, y_{1t}^l, y_{2t})$ satisfies the conditions in Lemma 1 (ii) when $\upsilon$ in (13) equals $\beta y_{1t+1} u_1'(y_{1t+1})$.*

**Proof.** The proof is the same as the proof of Lemma 1, with $\upsilon$ replaced by $\phi_{3t}$ in (10), namely, $\upsilon = \beta y_{1t+1} u_1'(y_{1t+1})$. ■

Because the preference for stage-3 goods is linear, the representative household's discounted expected utility in an equilibrium $\{\phi_t\}_{t \geq 0}$ admitted by a policy $\{(\tau_t, i_t)\}_{t \geq 0}$

is

$$\sum_{t\geq 0} \beta^t [w_1(y_{1t}^h) + w_2(y_{2t})], \tag{14}$$

where $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}_{t\geq 0}$ is the allocation supported by $\{(\tau_t, i_t, \phi_t)\}_{t\geq 0}$ and where

$$w_2(y_2) = u_2(y_2) - c_2(y_2).$$

Let $\Gamma(\{(\tau_t, i_t)\})$ be the maximum representative-agent utility attainable across allocations supported by $\{((\tau_t, i_t, \phi_t)\}$ for some $\{\phi_t\}$ which is an equilibrium admitted by the policy $\{(\tau_t, i_t)\}$. A policy $\{(\tau_t, i_t)\}$ is *ex ante* optimal if it maximizes $\Gamma(\{(\tau_t, i_t)\})$ and the corresponding allocation is an *ex ante* optimal allocation.

**Lemma 3** *Let $y_2^*$ satisfy $w_2'(y_2^*) = 0$. Then the Friedman rule—$\{(\tau_t, i_t)\}_{t\geq 0}$ with $(\tau_t, i_t) = ((1-\beta)y_1^*, 0)$ all $t$—is* ex ante *optimal, and the allocation $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}_{t\geq 0}$ with $(y_{1t}^h, y_{1t}^l, y_{2t}) = (y_1^{h*}, y_1^{l*}, y_2^*)$ all $t$ is the (unique) ex ante optimal allocation.*

**Proof.** By the definition of ex ante optimal policy and Lemma 2, a policy $\{(\tau_t, i_t)\}$ is *ex ante* optimal iff there exists an allocation $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}$ maximizes (14) subject to the Lemma-2 equilibrium conditions. Observe that $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}$ with $(y_{1t}^h, y_{1t}^l, y_{2t}) = (y_1^{h*}, y_1^{l*}, y_2^*)$ all $t$ is the unique solution to the problem when the constraints are dropped. Because the Lemma-2 conditions hold when $i_t = 0$, $\tau_t = (1-\beta)y_1^*$, and $(y_{1t}^h, y_{1t}^l, y_{2t}) = (y_1^{h*}, y_1^{l*}, y_2^*)$, the Friedman rule is *ex ante* optimal and $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}$ is the *ex ante* optimal allocation. ■

We define the *inflation rate* as the weighted average of the gross growth rates of stage-1 and stage-2 prices, with weights equal to their respective nominal output shares (stage-3 output adds no value). Under the Friedman rule—the ex-ante optimal policy, the asset-withdrawal rate is $1-\beta$ and the inflation rate equals $\beta - 1$.

The next section departs from the benevolent-planner perspective and studies how policies are chosen by two different authorities that have conflicting objectives and cannot commit. For this analysis, the fact that every temporary policy $(\tau_t, i_t) \in S$ admits a unique temporary equilibrium with $\phi_{3t} = \upsilon$ allows the interaction of the two authorities to be formulated as a coordination game in which one agent's feasible actions depend on the other's.

# 5 Policy coordination

Here we consider an environment in which two independent government authorities—a fiscal authority (FA) and a central bank (CB)—jointly determine the temporary policy $(\tau_t, i_t)$ before stage-1 trade in period $t$. The FA controls the fiscal instrument $\tau_t$, while the CB controls the monetary instrument $i_t$. Each authority is short-lived and replaced by a new authority in $t+1$. There is voting right after households know their types. Every household has one vote. The FA maximizes the welfare of the winning majority. The CB maximizes average household welfare.

In selecting a temporary policy, the FA and CB take as given an expected stage-3 price $\upsilon = \phi_{3t}$ and understand that their selected policy results in a temporary equilibrium with $\phi_{3t} = \upsilon$. The next lemma explicitly describes each authority's valuation of $(\tau_t, i_t) \in S$ in terms of the temporary allocation supported by $(\tau_t, i_t, \upsilon)$.

**Lemma 4** *Fix $\upsilon > 0$ and $(\tau_t, i_t) \in S$. Let $(y_{1t}^h, y_{1t}^l, y_{2t})$ be the temporary allocation supported by $(\tau_t, i_t, \upsilon)$. Let*

$$\hat{w}_1(y_1^h) = u_1(\pi^h y_1^h + \pi^l y_1^l(y_1^h)) - hc_1(y_1^h) - \pi^l(y_1^l(y_1^h) - y_1^h)hc_1'(y_1^h). \tag{15}$$

*Then the value of $(\tau_t, i_t)$ for the FA is $V^{FA}(\tau_t, i_t, \upsilon) \equiv \hat{w}_1(y_{1t}^h) + w_2(y_{2t})$ and the value for the CB is $V^{CB}(\tau_t, i_t, \upsilon) \equiv w_1(y_{1t}^h) + w_2(y_{2t})$. In particular, $(\tau_t, i_t) \notin S^e(\upsilon)$ if $i_t > 0$, where $S^e(\upsilon) \subset S$ contains all temporary policies that are efficient for the FA and CB when $\upsilon$ is the expected stage-3 price.*

**Proof.** See the appendix. ■

**Condition 1** *(i) $\hat{w}_1(y_1^h)$ is strictly concave in $y_1^h$. (ii) $y_2[u_2''(y_2) - c_2''(y_2)]/[u_2'(y_2) - c_2'(y_2)]$ is bounded as $y_2 \to 0$.*

We maintain Condition 1 from now on. By Condition 1 (i), there exists a unique $\hat{y}_1^h$ satisfying $w_1'(\hat{y}_1^h) = 0$. Let $\hat{y}_1^l = y_1^l(\hat{y}_1^h)$. By Lemma 4, if the FA can dictate the policy selection, then $(\hat{y}_1^h, \hat{y}_1^l, y_2^*)$ is the resulting temporary allocation. If the CB can dictate, then $(y_1^{h*}, y_1^{l*}, y_2^*)$ is. Comparing (11) and (15), we see $(\hat{y}_1^h, \hat{y}_1^l) < (y_1^{h*}, y_1^{l*})$. This disparity reflects the majority's preference for reducing the real cost of their nominal debt.

Because each authority controls a policy instrument, the FA and CB must coordinate in a way that respects each other's control of the respective policy instrument. We formulate the selection process as the following two-round coordination game.

*Round 1.* The FA and CB simultaneously say *yes* or *no*. If one authority says *no*, then the CB selects $i_t$ and the FA selects $\tau_t$ simultaneously and independently, and the game ends after the selections are made. Otherwise, they move to round 2.

*Round 2.* The CB proposes $(\tau_t, i_t)$ and the FA says *yes* or *no*. If *yes*, then the selection outcome is $(\tau_t, i_t)$. Otherwise, the selection outcome is the temporary policy $(\tau(\upsilon), i(\upsilon))$ assigned by a bargaining protocol $(\tau(.), i(.))$.

A *bargaining protocol* $(\tau(.), i(.))$ is a mapping that maps $\upsilon$ to a temporary policy $(\tau(\upsilon), i(\upsilon)) \in S^e(\upsilon)$ for all $\upsilon > 0$.

In playing the coordination game, if one authority says *no* at round 1, then in equilibrium each authority's selection must be a best response to the other's. This mutual best response outcome, referred to as a *fighting temporary policy*, satisfies

$$\tau^\circ(\upsilon) \in \arg\max_{\tau_t} V^{FA}(\tau_t, i^\circ(\upsilon), \upsilon) \text{ and } i^\circ(\upsilon) \in \arg\max_{i_t} V^{CB}(\tau^\circ(\upsilon), i_t, \upsilon). \quad (16)$$

**Proposition 1** *Fix $\upsilon > 0$. Given $i, j \geq 0$, let $f(j,i) = w_1(y_1^h(j,i)) + w_2(y_2(j))$, where $y_1^h(j,i)$ is determined by*

$$\frac{\upsilon + y_2(j)[u_2'(y_2(j)) - c_2'(y_2(j))]}{hc_1'(y_1^h(j,i))} - y_1(j,i) = \frac{\upsilon + y_2(i)[u_2'(y_2(i)) - c_2'(y_2(i))]}{hc_1'(\hat{y}_1^h)} - \hat{y}_1, \quad (17)$$

*$y_1^l(j,i) = y_1^l(y_1^h(j,i))$, $y_1(j,i) = \sum \pi^\theta y_1^\theta(j,i)$, and $\hat{y}_1 = \sum \pi^\theta \hat{y}_1^\theta$. Let $y_2 = y_2(i)$, $y_2' = y_2'(i)$, $u_2' = u_2'(y_2)$, $c_2' = c_2'(y_2)$, $u_2'' = u_2''(y_2)$, and $c_2'' = c_2''(y_2)$.*

*(i) There exists a fighting temporary policy, and, moreover, a temporary policy $(\tau, i) \in S(\upsilon, t)$ is a fighting temporary policy iff*

$$i \in \arg\max_{j \geq 0} f(j,i), \quad (18)$$

$$hc_1'(\hat{y}_1^h)(\hat{y}_1 - \tau) = \upsilon + y_2(u_2' - c_2'). \quad (19)$$

*(ii) If $(\tau, i)$ is a temporary fighting policy, then it supports the temporary allocation $(\hat{y}_1^h, \hat{y}_1^l, y_2(i))$ satisfying*

$$[(u_2' - c_2') + y_2(u_2'' - c_2'')][u_1'(\hat{y}_1)) - hc_1'(\hat{y}_1^h)] = -A(u_2' - c_2'), \quad (20)$$

*where $A = [c_1''(\hat{y}_1^h)/c_1'(\hat{y}_1^h)][\upsilon + y_2(u_2' - c_2')] + [\pi^h + \pi^l(h/l)c_1''(\hat{y}_1^h)/c_1''(\hat{y}_1^l)]$, and, in particular, $i > 0$.*

*(iii) The equilibrium selection outcome of the coordination game is $(\tau(\upsilon), i(\upsilon))$.*

**Proof.** For part (i), first suppose a temporary policy $(\tau, i)$ is a fighting temporary policy. Let first us examine the first maximization in (16). Given $i_t = i$, the FA must pick a value of $\tau_t$ so that $(\hat{y}_1^h, \hat{y}_1^l)$ is the stage-1 production. By (12) and (13), that value is $\tau$ given by (19). Next, provided that $(\hat{y}_1^h, \hat{y}_1^l)$ is the stage-1 production when $(\tau_t, i_t) = (\tau, i)$, by (12) and (13), the stage-1 production is $(y_1^h(j,i), y_1^l(j,i))$ when $(\tau_t, i_t) = (\tau, j)$. Examine the second maximization in (16). Given $\tau_t = \tau$, the CB must pick a value of $i_t$ that maximizes $f(i_t, i)$. That value is $i$ given by (18). We conclude that $(\tau, i)$ satisfies (18) and (19). Now suppose $(\tau, i)$ satisfies (18) and (19). When $i_t = i$, $\tau$ is the best response because by (12) and (13), it ensures that $(\hat{y}_1^h, \hat{y}_1^l)$ is the stage-1 production. When $\tau_t = \tau$, $i$ is a best response of the CB because it satisfies (18). We conclude that $(\tau, i)$ is a fighting temporary policy.

For existence, it suffices to show that there exists $i$ satisfying (18). We claim that there exists $\bar{i}>0$ , which is independent of $i$, such that if $j > \bar{i}$ then

$$\frac{\partial f(j,i)}{\partial j} = w_1'(y_1^h(j,i))\frac{\partial y_1^h(j,i)}{\partial j} + w_2'(y_2(j))y_2'(j). \tag{21}$$

is negative. The verification of the claim, which uses Condition 1 (ii), is in the appendix. For $j \in [0, \bar{i}]$, let $\alpha(i) = \arg\max_{j \geq 0} f(j,i)$. Because $y_1^h(j,i)$ is continuous in $(j,i)$, it follows from theorem of maximum and the property of $\bar{i}$ that $\alpha(.)$ is a continuous and compact-valued correspondence on $[0, \bar{i}]$. Thus min$\alpha(.)$ is a continuous mapping from $[0, \bar{i}]$ to $[0, \bar{i}]$, which, by the Brouwer fixed point theorem, has a fixed point.

For part (ii), we already establish that $(\hat{y}_1^h, \hat{y}_1^l)$ is the stage-1 production. Taking derivatives in (17) with respect to $j$ and evaluating at $j = i$, we get

$$[(u_2' - c_2') + y_2(u_2'' - c_2'')]y_2'(i) = A\frac{\partial y_1^h(i,i)}{\partial j}, \tag{22}$$

where we use the fact that $y_1^h(i,i) = \hat{y}_1^h$. By (18), $\partial f(j,i)/\partial j = 0$ when $j = i$. Setting $j = i$ in (21) and using (22), we obtain (20). Because $u_2' = c_2'$ when $i = 0$, (20) can hold only if $i \neq 0$.

For part (iii), recall that $(\tau(\upsilon), i(\upsilon)) \in S^e(\upsilon)$. So when round 2 is reached, the CB cannot benefit from offering $(\tau_t, i_t) \neq (\tau(\upsilon), i(\upsilon))$ and, therefore, $(\tau(\upsilon), i(\upsilon))$ must be the equilibrium outcome. By part (ii) and Lemma 4, $(\tau^\circ(\upsilon), i^\circ(\upsilon))) \notin S^e(\upsilon)$. So knowing $(\tau(\upsilon), i(\upsilon)) \in S^e(\upsilon)$ is the outcome when round 2 is reached, each authority says yes at round 1. ■

The central result of Proposition 1 is that the nominal interest rate is positive in the fighting temporary policy. This may be understood as follows. In the simultaneous-move game, given the CB sets the nominal interest at $i$, the FA picks lump sum taxes $\tau$ according to (19)—which comes from (13) (how $y_1^h$ depends on the nominal interest rate and the stage-3 price $\upsilon$)—to achieve its desired stage-1 output per high-cost household $\hat{y}_1^h$. If the FA sticks to this $\tau$ and the CB contemplates a deviation to some other rate $j$, the resulting stage-1 output per high-cost household becomes $y(j, i)$. When $i = 0$, (13) implies that a marginal increase in the nominal interest rate can raise $y_1^h(j, i)$ enough to benefit the CB, even though it lowers stage-2 output.

Exactly because the positive nominal interest due to fighting results in a stage-2 welfare loss ($y_2 < y_2^*$), both authorities have incentives to return to the bargaining table to avoid this inefficiency. Proposition 1, however, does not rule out that there may exist multiple fighting temporary policies. That being the case, we assume that the FA and CB choose the one with the highest nominal interest rate, i.e., the most inefficient fighting outcome, and denote the corresponding $y_2(i^\circ(\upsilon))$ by $y_2^\circ(\upsilon)$. This enlarges the scope for cooperation, which we are going to characterize.

**Proposition 2** *Fix $\upsilon > 0$. Let $\Delta(\upsilon) = w_2(y_2^*) - w_2(y_2^\circ(\upsilon))$. Let $\tilde{y}_1^h(\upsilon)$ be the unique $y_1^h > \hat{y}_1^h$ satisfying $\hat{w}_1(y_1^h) = \hat{w}_1(\hat{y}_1^h) - \Delta(\upsilon)$, $\bar{y}_1^h(\upsilon) = min\{\tilde{y}_1^h(\upsilon), y_1^{h*}\}$, and $Y_1^e(\upsilon) = [\hat{y}_1^h, \bar{y}_1^h(\upsilon)]$. Let $Y^e(\upsilon)$ be the set of efficient temporary allocations associated with $S^e(\upsilon)$, i.e., $(y_1^h, y_1^l, y_2) \in Y^e(\upsilon)$ if it is supported by $(\tau, i, \upsilon)$ for some $(\tau, i) \in S^e(\upsilon)$. Then*

$$Y^e(\upsilon) = \{(y_1^h, y_1^l(y_1^h), y_2^*) : y_1^h \in Y_1^e(\upsilon)\}, \tag{23}$$

$$S^e(\upsilon) = \{(\dot{\tau}(y_1^h; \upsilon), 0) : y_1^h \in Y_1^e(\upsilon)\}, \tag{24}$$

*where $\dot{\tau}(y_1^h; \upsilon) = \pi^h y_1^h + \pi^l y_1^l(y_1^h) - \upsilon[hc_1'(y_1^h)]^{-1}$.*

**Proof.** By Lemma 4 and Proposition 1 (ii), $(\tau, i) \in S^e(\upsilon)$ only if $i = 0$ and $(y_1^h, y_1^l, y_2) \in Y^e(\upsilon)$ only if $y_2 = y_2^*$. Because $\hat{w}_1(.)$ is strictly concave, $\{(y_1^h, y_1^l(y_1^h), y_2^*) : \hat{y}_1^h \leq y_1^h \leq \bar{y}_1^h(\upsilon)\}$ is a subset of $Y^e(\upsilon)$. Because FA can secure the temporary allocation $(\hat{y}_1^h, \hat{y}_1^l, y_2^\circ(\upsilon))$ by fighting and $\hat{y}_1^h < y_1^{h*}$, we have (23). When $(y_1^h, y_1^l(y_1^h), y_2^*)$ is supported by $(\tau, 0, \upsilon)$, by (12) and (13), $\tau = \dot{\tau}(y_1^h; \upsilon)$. This and (23) lead to (24). ■

The logic of Proposition 2 is straightforward. All efficient temporary policies must have the zero nominal interest rate to attain the efficient stage-2 output $y_2^*$. Hence the only dimension over which FA and CB can bargain is the stage-1 output $y_1^h$ per high-cost household. Because the FA's gain from reconciliation (which avoids the inefficient stage-2 output $y_2^\circ(\upsilon)$) is bounded above by $\Delta(\upsilon)$, the interval $[\hat{y}_1^h, \bar{y}_1^h(\upsilon)]$ is exactly the politically sustainable range of $y_1^h$ consistent with both authorities preferring agreement to the fighting outcome.

To complete this section, we parameterize efficient policy selection by a generalized Nash bargaining protocol. We denote such a protocol by $\varphi(.)$, which means that for a given value of $\upsilon$, the CB's bargaining power is $\varphi(\upsilon) \in [0,1]$ and the resulting temporary policy is

$$\begin{aligned}(\tau(\upsilon), i(\upsilon)) = \arg \max_{(\tau,i)\in S(\upsilon,t)} &[V^{CB}(\tau, i, \upsilon) - w_1(\hat{y}_1^h) - w_2(y_2^\circ(\upsilon))]^{\varphi(\upsilon)} \\ \times &[V^{FA}(\tau, i, \upsilon) - \hat{w}_1(\hat{y}_1^h) - w_2(y_2^\circ(\upsilon))]^{1-\varphi(\upsilon)}.\end{aligned} \tag{25}$$

When $\varphi(\upsilon) = 0$ all $\upsilon$ (FA always has all the bargaining power), the protocol is the fiscal dominance protocol; when $\varphi(\upsilon) = 1$ (CB always has all the bargaining power), the protocol is the monetary-dominance protocol.

**Corollary 1** *Fix $y_1^h \in [\hat{y}_1^h, \bar{y}_1^h(\upsilon)]$. There exists a CB's bargaining power, denoted $\dot{\varphi}(y_1^h;\upsilon)$, such that the generalized Nash bargaining protocol with this bargaining power yields $(\tau(\upsilon), i(\upsilon)) = (\dot{\tau}(y_1^h;\upsilon), 0)$. Moreover, $\dot{\varphi}(y_1^h;\upsilon)$ is unique and strictly increasing in $y_1^h$, equals 1 at $y_1^h = \bar{y}_1^h(\upsilon)$, and equals 0 at $y_1^h = \hat{y}_1^h$.*

# 6 Political-Economy Equilibrium and Optimal Determinate Inflation

We now take a given bargaining protocol as the only exogenous object, and establish its general-equilibrium implications on the optimal determinate inflation rate arising from political-economy interaction (Proposition 3 and Corollary 2).

**Definition 3** *Given a bargaining protocol $(\tau(.), i(.))$, a sequence $\{(\tau_t, i_t, \phi_t)\}_{t\geq 0}$ is a political-economy equilibrium if $\{\phi_t\}$ is a market equilibrium admitted by the policy $\{(\tau_t, i_t)\}$ and the policy is chosen by the protocol, i.e, $(\tau_t, i_t) = (\tau(\phi_{3t}), i(\phi_{3t}))$ all $t$.*

*If $\{(\tau_t, i_t, \phi_t)\}$ is a political-economy equilibrium, then $\{\tau_t, i_t\}$ is a political-economy* policy *and any allocation supported by $\{(\tau_t, i_t, \phi_t)\}$ is a* political-economy allocation.

*An allocation is a determinate allocation if given some bargaining protocol, it is the unique political-economy allocation.*

An allocation $\{(y^h_{1t}, y^l_{1t}, y_{2t})\}$ is a *stationary allocation* if $(y^h_{1t}, y^l_{1t}, y_{2t})$ is equal to some $(y^h_1, y^l_1, y_2)$ all $t$, and we use $(y^h_1, y^l_1, y_2)$ to represent the stationary allocation.

To motivate the main result, consider the case that the fiscal-dominance protocol is the bargaining protocol. Now the stationary allocation $(\hat{y}^h_1, \hat{y}^l_1, y^*_2)$ is the unique political-economy allocation. To see this, first letting $\upsilon = \beta\hat{y}_1 u'_1(\hat{y}_1)$, $(\tau_t, i_t) = (\dot{\tau}(\hat{y}^h_1; \upsilon), 0)$, and $\phi_t = (\hat{y}_1 - \dot{\tau}(\hat{y}^h_1; \upsilon), \upsilon/c'_2(y^*_2), \upsilon)$, then by Lemma 2 and Corollary 1, $\{(\tau_t, i_t, \phi_t)\}$ is a political-economy equilibrium that supports $(\hat{y}^h_1, \hat{y}^l_1, y^*_2)$. Next suppose $\{(y^h_{1t}, y^l_{1t}, y_{2t})\}$ is a political-economy allocation. Let

$$\upsilon = \beta y_{1t+1} u'_1(y_{1t+1}). \tag{26}$$

By Corollary 1, $(y^h_{1t}, y^l_{1t}, y_{2t}) = (\hat{y}^h_1, \hat{y}^l_1, y^*_2)$.

It is useful to point out two distinct forces that contribute determinacy under fiscal dominance. First, the current tax $\tau_t$ responds to the future condition, specifically, the future stage-1 production $y_{1t+1}$, through the relationship (26) and

$$\tau_t = \dot{\tau}(y^h_{1t}; \upsilon). \tag{27}$$

Second, with fiscal dominance, the current stage-1 production per high-cost household $y^h_{1t}$ favored by the FA, namely, $\hat{y}^h_1$, is politically sustainable independent of the future stage-1 production, which effectively eliminates any potential equilibrium switch that may be triggered by, say, some unanticipated extrinsic signal.

Two questions arise. What is the set of stationary political-economy equilibrium allocations? If a particular stationary allocation is desirable—for any normative or political reason—can some bargaining protocol make it the unique political-economy allocation?

**Proposition 3** *Let $\upsilon(z) = \beta(\pi^h y^h_1 + \pi^l y^l_1(z))u'_1(\pi^h y^h_1 + \pi^l y^l_1(z))$. Let $\tilde{z}$ denote the smallest solution to the equation*

$$z = \tilde{y}^h_1(\upsilon(z)) \tag{28}$$

*if the equation has at least one solution, let $\tilde{z} = y^{h*}_1 + 1$ otherwise. Let $\bar{z} = min\{\tilde{z}, y^{h*}_1\}$. Let*

$$Y^e_1 = \{z \geq \hat{y}^h_1 : z \leq \bar{y}^h_1(\upsilon(z))\}.$$

*(Refer to Proposition 2 for the definitions of $\tilde{y}^h_1(\upsilon)$ and $\bar{y}^h_1(\upsilon)$.)*

*(i) The set of stationary political-economy allocations is*

$$Y^e = \{(y_1^h, y_1^l(y_1^h), y_2^*) : y_1^h = z \text{ for some } z \in Y_1^e\}.$$

*(ii) Suppose $\Delta(\upsilon)$ is continuous in $\upsilon$. Then $[\hat{y}_1^h, \bar{z}] \subseteq Y_1^e$.*

*(iii) Suppose further $\tilde{y}_1^h(\upsilon(z)) \leq \bar{z}$ for $z \in [\hat{y}_1^h, \bar{z}]$. Then a stationary allocation $(y_1^h, y_1^l(y_1^h), y_2^*) \in Y^e$ is determinate if and only if $y_1^h \in [\hat{y}_1^h, \bar{z}]$.*

**Proof.** For part (i), let $(y_1^h, y_1^l(y_1^h), y_2)$ be a stationary allocation supported by a political-economy equilibrium for some given bargaining protocol. By Proposition 2, $y_1^h = z$ for some $z \in Y_1^e$ and $y_2 = y_2^*$.

For part (ii), we start with two observations: $z < \bar{y}_1^h(\upsilon(z))$ at $z = \hat{y}_1^h$, and $\Delta(\upsilon(z))$ is continuous in $z$. If either (28) has no solution or its least solution is greater than $y_1^{h*}$, then $\tilde{z} > \bar{z} = y_1^{h*}$ and these observations imply that for $z \in [\hat{y}_1^h, \bar{z}]$, $z < \bar{y}_1^h(\upsilon(z))$. If the least solution to (28) is no greater than $y_1^{h*}$, then $\tilde{z} = \bar{z}$ and these observations imply that for $z \in [\hat{y}_1^h, \bar{z}]$, $z \leq \bar{y}_1^h(\upsilon(z))$ (strict if $z < \bar{z}$). We conclude that $[\hat{y}_1^h, \bar{z}] \subseteq Y_1^e$.

For the "if" statement in part (iii), fix $y_1^h \in [\hat{y}_1^h, \bar{z}]$ and let $\varphi(.)$ satisfy the following. If $\Delta(\upsilon) \geq \Delta(\upsilon(y_1^h))$ then $\varphi(\upsilon) = \dot{\varphi}(y_1^h; \upsilon)$; otherwise, $\varphi(\upsilon) = 1$. That is, if the anticipated future condition permits sufficient gains from reconciliation for the current to accept $y_1^h$, then just assign the bargaining power accordingly; otherwise, the CB has all the bargaining power. Given this $\varphi(.)$, $(y_1^h, y_1^l(y_1^h), y_2^*)$ is apparently a political-economy allocation. It remains to show that it is the unique political-economy allocation. To this end, suppose by contradiction that there exists a political-economy allocation $\{(y_{1t}^h, y_{1t}^l, y_{2t})\}$ other than $(y_1^h, y_1^l(y_1^h), y_2^*)$.

Without loss of generality, we can assume $y_{10}^h \neq y_1^h$. By the construction of $\varphi(.)$, we must have $y_{1t}^h \neq y_1^h$ and, in particular, $\Delta(\upsilon(y_{1t}^h)) < \Delta(\upsilon(y_1^h))$ all $t \geq 1$. The last inequality implies $y_{1t}^h < y_1^h$. For, if $y_{1t}^h > y_1^h$ then $\Delta(\upsilon(y_{1t+1}^h))$ is more than sufficient for the FA to accept $y_1^h$ in $t$,which, by the construction of $\varphi(.)$, implies $y_{1t}^h = y_1^h$. Therefore, we conclude that $\Delta(\upsilon(y_{1t}^h)) < \Delta(\upsilon(y_1^h))$ and $y_{1t}^h < y_1^h$ all $t \geq 1$. Then by the construction of $\varphi(.)$, the sequence $\{y_{1t}^h\}$ satisfies

$$y_{1t}^h = \tilde{y}_1^h(\upsilon(y_{1t+1}^h)). \tag{29}$$

We claim that the sequence $\{y_{1t}^h\}$ is strictly decreasing. To see this, fix $t$ and note that $y_{1t+1}^h < \bar{z}$. So

$$\Delta(\upsilon(y_{1t+1}^h)) > \hat{w}_1(\hat{y}_1^h) - w_2(y_{1t+1}^h). \tag{30}$$

But by the construction of $\varphi(.)$,

$$\Delta(\upsilon(y^h_{1t+1})) = \hat{w}_1(\hat{y}^h_1) - w_2(y^h_{1t}). \tag{31}$$

Comparing (30) with (31), we have $y^h_{1t} > y^h_{1t+1}$.

Now for $z \in [\hat{y}^h_1, \bar{z}]$, construct a sequence $\gamma(z)$ by

$$z_{t+1} = \tilde{y}^h_1(\upsilon(z_t)) \tag{32}$$

with $z_t = 0$. Let $\Gamma = \{\gamma(z) : z \in [\hat{y}^h_1, \bar{z}], \gamma(z) \text{ is strictly increasing}\}$. By the hypothesis of part (iii) and the definition of $\bar{z}$, the limit of $\gamma(z) \in \Gamma$ is $\bar{z}$. By Dini's theorem, the convergence of sequences in $\Gamma$ is uniform. Therefore, given $\epsilon = y^h_1 - y^h_{11}$, when $T$ is sufficiently large, whatever the value of $y^h_{1T}$ is, (29) is to produce $y^h_{1T-1}$, $y^h_{1T-2}$,..., $y^h_{11}$ sequentially so that the produced value of $y^h_{11}$ is greater than $y^h_1 - \epsilon$, a contradiction.

For the "only-if" statement in part (iii), let $(y^h_1, y^l_1(y^h_1), y^*_2) \in Y^e$ and $y^h_1 > \bar{y}^h_1$. Fix any bargaining protocol and we show that there exists a political-economy allocation $\{(y^h_{1t}, y^l_{1t}, y_{2t})\}$ with $y^h_{1t} \leq \bar{y}^h_1$ all $t$. Consider the sequence of truncated $T$-period economies ($T = 2, 3, 4...$) in which we impose the terminal condition $y^h_{1T} \leq \bar{y}^h_1$. For each $T > 1$, by the definition of $\bar{y}^h_1$, the unique equilibrium allocation of the truncated economy has

$$y^h_{1t} \leq \bar{y}^h_1 \tag{33}$$

all $t \leq T - 1$. Therefore, the sequence of the truncated-equilibrium allocations is uniformly bounded in $l^\infty$. By the Banach–Alaoglu theorem, there exists a subsequence that converges in the weak* topology to a limit allocation satisfying (33) all $t$. Because optimality conditions and market clearing pass to the limit, this limit sequence is a political-economy allocation of the untruncated economy. ■

In Proposition 3, the hypothesis of part (ii) is generic: it ensures a continuous relationship between current reconciliation gains $\Delta(\upsilon(y^h_{1t+1}))$ and the future condition $y^h_{1t+1}$. The hypothesis of part (iii) appears robust—we find no counterexamples for standard functional forms. Roughly speaking, it rules out that a small change in the future condition would cause a large change in current reconciliation gains.As in the special case of fiscal dominance, determinacy in Proposition 3 relies on current taxes responding to the future condition by way of (29) and (27). Different from the special case, the bargaining protocol cannot simply hold current stage-1 output per high-cost household $y^h_{1t}$ independent of future $y^h_{1t+1}$. Indeed, if the FA and CB in period $t$ rationally expect that an equilibrium switch occur in $t+1$, then the switch affects the relevant $\upsilon$ value for the current FA-CB game, which in turn affects the stage-1 production in $t$—implying the switch would also occur in $t$.

Rational expectations, however, exert a powerful force for determinacy. Suppose, for contradiction, that a deviation (switch) from the target $y_1^h$ occurs in period 0. Rationality then requires authorities to anticipate the same deviation in period 1, and by induction in all future periods. Thus, although the FA–CB coordination game is static within each period, rational expectations permit the bargaining protocol to create a dynamic channel such that any prospective future deviation feeds back monotonically to the present.

To be precise, in the proof of Proposition 3, the bargaining protocol is designed as follows. If gains from reconciliation are sufficient to sustain the target $y_1^h$, it assigns just enough bargaining power to the CB to achieve $y_1^h$ as current stage-1 production per high-cost household. Otherwise, it grants the CB full bargaining power, pushing $y_{1t}^h$ to the current maximum on the politically sustainable frontier. This design generates positive feedback when moving backward in time: the sequence $\{y_{1t}^h\}$ is a strictly decreasing sequence. Consequently, any hypothetical switch sufficiently far in the future would be amplified backward until cooperation gains at some earlier period $t$ become sufficient to sustain the target $y_1^h$, leaving no impact on period $t$ or earlier. Such a switch therefore cannot rationally materialize in period 0, establishing uniqueness.

Now consider the benevolent planner in Section 4 who recognizes the political reality that the CB and FA possess distinct instruments and preferences as specified earlier. The planner, therefore, cannot directly impose allocations but can choose the bargaining protocol. Suppose the planner restricts attention to the set $Y^e$ of stationary political-economy allocations. Then Proposition 3, combined with Lemma 2, yields the following conclusion regarding determinate optimal inflation.

**Corollary 2** *The optimal determinate inflation is obtained when the bargaining protocol* $(\tau(.), i(.))$ *is the one in Proposition 2 such that given this protocol, the unique political-economy equilibrium* $\{(\tau_t, i_t, \phi_t)\}$ *supports* $(\bar{y}_1^h, \bar{y}_1^l, y_2^*)$ *as the unique allocation. Specifically, the optimal inflation is equal to the negative asset-withdrawal rate in the political-economy equilibrium,*

$$\frac{-\dot{\tau}(\bar{y}_1^h; \upsilon(\bar{y}_1^h))}{\pi^h \bar{y}_1^h + \pi^l y_1^l(\bar{y}_1^h)}.$$

A couple of remarks on Corollary 2 are in order. First, the optimal determinate inflation is achieved when the CB has all bargaining power along the equilibrium path. However—as emphasized above—the protocol is not the monetary-dominance protocol, because the FA retains bargaining power along certain off-equilibrium paths. Second, depending on parameter values, the optimal inflation rate may be positive, even though it is determinate and arises from a protocol emphasizing the CB's strength on the equilibrium path.

# 7 Discussion

Our main result shows that the optimal determinate inflation is achieved when the central bank has all the bargaining power along the equilibrium path. In practice, however, political constraints may limit the extent to which the bargaining protocol can favor the CB. In particular, the fiscal authority may be able to incur a cost to disrupt or renegotiate the institutional arrangement encoded in the protocol, thereby obtaining a larger share of bargaining power. When such renegotiation is possible, the planner must ensure that the equilibrium-path assignment of bargaining power does not give the FA an incentive to exercise this option. In this case, the optimal determinate inflation corresponds to the largest CB bargaining power that is renegotiation-proof. For plausible ranges of the FA's renegotiation cost, this constraint may rule out the allocation with $y_1^h = \bar{y}_1^h$, implying an optimal inflation rate that is strictly higher than the one identified in Corollary 2.

On a separate note, the benchmark environment relies on lump-sum taxation, which delivers a clean political channel for inflation and a sharp bargaining structure. A natural concern is whether the main insights survive when taxes are distortionary and government debt may accumulate. A full treatment of such an environment is nontrivial and beyond the scope of this paper. Nevertheless, two points are important. First, because both authorities are short-lived and lack commitment, the conventional rationale for debt—intertemporal tax smoothing—does not apply here. Second, distortionary stage-1 labor taxes and positive government debt introduce new interactions between stage-1 and stage-2 production. In particular, positive debt and a positive nominal interest rate dampen stage-2 output but help sustain stage-1 output when taxation is distortionary. These additional margins would require adapting the bargaining protocol to manage a richer set of fiscal distortions. Still, the core mechanism—the crucial role of a well-designed bargaining protocol in coordinating myopic fiscal and monetary authorities—remains robust.

## 8 Concluding Remarks

The analysis shows that political incentives, not fiscal gaps, can be the primary force behind inflation, and that determinacy requires a bargaining protocol capable of coordinating short-lived fiscal and monetary authorities. These findings offer a fresh lens on fiscal–monetary interactions and suggest several promising extensions involving distortionary taxation, debt dynamics, and more intricate political environments.

# Appendix

### Proof of Lemma 1

We first show that if there exists a temporary equilibrium with $\phi_{3t} = \upsilon$, then this is the unique temporary equilibrium with $\phi_{3t} = \upsilon$ and it satisfies (i) and (ii) of the lemma. Fix a tuple $(x_{1t}, y_{1t}^h, y_{1t}^l, x_{2t}, y_{2t}, \delta_t, \lambda_t)$ satisfying (6)-(8) when $\phi_{3t} = \upsilon$. Then $x_{2t} = y_{2t}$, $u_1'(x_{1t}) \geq \theta c_1'(y_{1t}^\theta)$, and $x_{1t} = y_{1t}$. By (8), $\delta_t = \tau_t y_{1t}^{-1}$. By the last equality in (7), $\phi_{1t} = (1-\delta_t)x_{1t} = y_{1t} - \tau_t$. By the second equality in (7) and the second equality in (9), $\phi_{2t} = (y_{2t}/\lambda_t)[1 + (1-\lambda_t)i_t]$. Substituting these values of $\phi_{1t}$ and $\phi_{2t}$ into (6), we have (a) $y_{2t}c_2'(y_{2t}) = \upsilon\lambda_t[1 + (1-\lambda_t)i_t]^{-1}$, (b) $\theta c_1'(y_{1t}^\theta) = u_2'(y_{2t})y_{2t}[\lambda_t(y_{1t} - \tau_t)]^{-1}$, and

$$\theta c_1'(y_{1t}^\theta) = \frac{1+i_t}{y_{1t}-\tau_t}\frac{\upsilon}{1+(1-\lambda_t)i_t}. \tag{34}$$

By (b) and (34), $(1+i_t)\upsilon/[1+(1-\lambda_t)i_t] = u_2'(y_{2t})y_{2t}/\lambda_t$; then by (a), we get $(1+i_t)c_2'(y_{2t}) = u_2'(y_{2t})$. So $y_{2t} = y_2(i)$ and $i_t = u_2'(y_{2t})/c_2'(y_{2t}) - 1$. By (a) and (34), we get

$$\theta c_1'(y_{1t}^\theta) = \frac{1+i_t}{y_{1t}-\tau_t}\frac{y_{2t}}{\lambda_t}c_2'(y_{2t}). \tag{35}$$

By (35) and (34), we get $\lambda_t = (1+i_t)y_{2t}c_2'(y_{2t})[\upsilon + i_t y_{2t}c_2'(y_{2t})]^{-1}$. Plugging this $\lambda_t$ into (35) and using $i_t = [u_2'(y_{2t})/c_2'(y_{2t}) - 1]$, we get (13).

Now we show that there exists a temporary equilibrium with $\phi_{3t} = \upsilon$. Conditions in part (ii) of the lemma give rise to the unique values of $(y_{1t}^h, y_{1t}^l, y_{2t})$ with $y_{1t}^h \leq y_{1t}^{h*}$. Using these values and conditions in part (i) of the lemma, we obtain the unique values of $(\delta_t, \lambda_t)$. Then $(x_{1t}, y_{1t}^h, y_{1t}^l, x_{2t}, y_{2t}, \delta_t, \lambda_t)$ with $x_{1t} = y_{1t}$ and $x_{2t} = y_{2t}$ satisfies (6)-(8) and $u_1'(x_{1t}) \geq \theta c_1'(y_{1t}^\theta)$.

### Proof of Lemma 4

Let $\kappa_t$ be per type-$h$ household stage-1 borrowing from type-$l$ households in the unit of stage-1 goods. Let $L_t = M_t + B_t/(1+i_t)$. Notice that every household carries $\lambda_t L_t$ units of money at the end of stage 1 and a type-$h$ household only holds money at the end of stage 1. Thus $P_{1t}(y_{1t}^h - \tau_t + \kappa_t) = \lambda_t L_t$. And, because at stage 1 per household nominal lending to the government is $(1-\lambda_t)L_t$, a type-$l$ household nominal lending to the government is $(1-\lambda_t)L_t/\pi^l$, implying $P_{1t}(\pi^l y_{1t}^l - \pi^l\tau_t - \pi^h\kappa_t) - (1-\lambda_t)L_t = \pi^l L_t$. This and $P_{1t}(y_{1t}^h - \tau_t + \kappa_t) = \lambda_t L_t$ give rise to $\pi^l(y_{1t}^h + \kappa_t) = \pi^l y_{1t}^l - \pi^h\kappa_t - (1-\lambda_t)L_t P_{1t}^{-1}$.

Using $L_t P_{1t}^{-1} = (1-\delta_t)x_{1t}$, we have

$$\kappa_t = \pi^l(y_{1t}^l - y_{1t}^h) - (1-\lambda_t)(1-\delta_t)x_{1t}. \tag{36}$$

When reaching stage 3, all households carry the same amount of money, each type-$h$ household has $(1+i_t)\upsilon[1+(1-\lambda_t)\,i_t]^{-1}[x_{1t}(1-\delta_t)]^{-1}\kappa_t$ private debt in the unit of stage-3 goods, only type-$l$ households hold government bonds, and government bonds are worth $(1-\lambda_t)(1+i_t)[1+(1-\lambda_t)\,i_t]^{-1}\upsilon$ in the unit of stage-3 goods. At the end of stage 3, each household net worth is $\upsilon$ in the unit of stage-3 goods. To reach this net worth, a type-$h$ household produces

$$y_{3t}^h = \frac{(1-\lambda_t)(1+i_t)\upsilon}{1+(1-\lambda_t)i_t} + \frac{1+i_t}{1+(1-\lambda_t)\,i_t}\frac{\upsilon\kappa_t}{x_{1t}(1-\delta_t)} \tag{37}$$

at stage 3, and, correspondingly, a type-$l$ household consumes $x_{3t}^l = (\pi^h/\pi^l)y_{3t}^h$. Substituting the value of $\kappa_t$ in (36) into (37) and using (34), we have

$$y_{3t}^h = \frac{1+i_t}{1+(1-\lambda_t)\,i_t}\frac{\upsilon\pi^l(y_{1t}^l - y_{1t}^h)}{x_{1t}(1-\delta_t)} = \pi^l(y_{1t}^l - y_{1t}^h)hc_1'(y_{1t}^h).$$

By $y_{1t}^l = y_1^l(y_{1t}^h)$, this confirms $V^{FA}(\tau_t, i_t, \upsilon) = \hat{w}_1(y_{1t}^h) + w_2(y_{2t})$ and $V^{CB}(\tau_t, i_t, \upsilon) = w_1(y_{1t}^h) + w_2(y_{2t})$. To continue, suppose $i_t > 0$. Inspecting the equilibrium conditions in Lemma 1, we see that $y_{2t} \neq y_2^*$ and that some $(\tau_t', 0) \in S(\upsilon, t)$ admits the temporary allocation $(y_{1t}^h, y_{1t}^l, y_2^*)$. So $(\tau_t, i_t) \notin S^e(\upsilon, t)$.

## Verification of the Claim in the Proof of Proposition 1 (i)

To verify the claim, let $\gamma(z) = z[u_2'(z) - c_2'(z)]$. We consider two cases. In the first case, $\gamma(z)$ converges as $z \to 0$. Let $\bar{z} = \max\arg\max_{0\le z\le y_2^*}\gamma(z)$, where $\gamma(0) = \lim_{z\to 0}(z)$. We can let $\bar{i}$ be determined by $y_2(\bar{i}) = \bar{z}$. Notice that $y_1^h(j,i)) < y_1^h(j,\bar{i}))$ if $j > \bar{i}$ and that $y_2'(j) < 0$. In the second case, $\gamma(z) \to \infty$ as $z \to 0$. Taking derivatives at the left side of (17) with respect to $j$, we have

$$\frac{\partial y_1^h}{\partial j} = \frac{y_{2j}(u_{2j}'' - c_{2j}'') + (u_{2j}' - c_{2j}')}{[\upsilon + y_{2j}(u_{2j}' - c_{2j}')]c_1''(y_1^h)/c_1'(y_1^h) + hc_1'(y_1^h)(\pi^l y_1^{l\prime} + \pi^h)}y_{2j}',$$

where $y_1^h = y_1^h(j,i)$, $y_{2j} = y_2(j)$, $y_{2j}' = y_2'(j)$, $u_{2j}'' = u_2''(y_{2j})$, $u_{2j}' = u_2'(y_{2j})$, $c_{2j}' = c_2'(y_{2j})$, $c_{2j}'' = c_2''(y_{2j})$, and $y_1^{l\prime} = (h/l)c_1''(y_1^h)/c_1''(y_1^l(y_1^h))$. By Condition 1 (ii), the right hand side in (21) is negative when $j$ is sufficiently large (i.e., $y_2$ is sufficiently small).

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