Reputation and the Credibility of Inflation Plans

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What is credibility?

- Macro models: expectations of future policy determine current outcomes
- Policy typically set assuming **commitment** or **discretion**

- Governments actively attempt to influence beliefs about future policy
  - Forward guidance, inflation targets, fiscal rules…

- This paper Rational-expectations theory of the credibility of announcements
  … borrowing insights from game-theory literature on reputation
- Application in a (modernized) Barro-Gordon setup

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Our approach

- Reputation is other agents' belief about my commitments
  - … conceptualize commitment with private-information behavioral types

- Discipline (rational expectations)
  - … can only have reputation for possible things
  - … reputation changes through Bayes' rule after actions and announcements

- Setup
  - Initial announcement of inflation targets
    - … collapses the set of reputations
  - Continuation equilibrium *given a plan*
    - … Crucial assumption: government action observed imperfectly
    - … Dynamics of reputation

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Main results

1. Compare continuation equilibria of different plans
   - … Larger deviations are easier to detect
   - … 'More time-inconsistent' plans have a more negative average drift of reputation
   - … Tradeoff between credibility and promised outcomes

2. Main result choose a back-loaded plan with gradual disinflation
   - … Gradualism helps incentives and slows down reputation losses
   - … despite no inertia or other *real* reasons for gradualism

3. Take the limit as *initial reputation* vanishes to zero
   - … Gradualism result is preserved

Literature

- **Sustainable plans** – anything goes
  from Kydland and Prescott (1977), Chari and Kehoe (1990), Abreu, Pearce, and Stacchetti (1990), Phelan and Stacchetti (2001)

- **Reputation without noise** – zero inflation at onset
  Milgrom and Roberts (1982), Kreps and Wilson (1982), Barro (1986), Backus and Driffill (1985), Barro and Gordon (1986), Sleet and Yeltekin (2007)

  Dovis and Kirpalani (2019) – constant but more than zero

- **Reputation with noise**
  Commitment: Lu (2013), Lu, King, and Pastén (2008, 2016)
  Static plans: Faingold and Sannikov (2011)

- **Preference uncertainty with noise** – announcements irrelevant
  Cukierman and Meltzer (1986), Faust and Svensson (2001), Phelan (2006), Amador and Phelan (2024), etc

Roadmap

- Model
- Continuation equilibria
- Plans
- Concluding remarks

Model

Framework

- A government dislikes inflation and output away from a target $y^\star > 0$

$$L_t = \mathbb{E}_t \left[\sum_{s=0}^{\infty} \beta^s \left((y^\star - y_{t+s})^2 + \gamma \pi_{t+s}^2 \right) \right]$$

- A Phillips curve relates output to current and expected future inflation

$$\pi_t = \kappa y_t + \beta \mathbb{E}_t \left[\pi_{t+1} \right]$$

- The government controls inflation only imperfectly (through g_t)

$$\pi_t = g_t + \epsilon_t$$

with $\epsilon_t \overset{iid}{\sim} F_\epsilon$

Reputation

- The government can be rational or one of many *behavioral* types
  - Behavioral types $c \in \mathcal{C}$
  - Type c is committed to an inflation plan $\{a_t\}_{t=0}^{\infty}$
  - For simplicity let all plans have $a_{t+1} = \phi_c(a_t)$ [Finding the state is an art]
- Behavioral types have (total) probability z (initial reputation)
  - Conditional on behavioral, probability ν over $\mathcal{C}$

- Private sector knows z and ν
  - Does *inference* over the government's type
  - Uses announcements and inflation observations

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Behavioral types

- What is the set $\mathcal{C}$?
  - $\cdots$ and associated possible ϕ_c functions
- Consider $\{a_t\}_t$ paths characterized by
  - Starting point a_0
  - Decay rate ω
  - Asymptote χ

$$a_t = \chi + (a_0 - \chi)e^{-\omega t}$$
$$\phi(a) = \chi + e^{-\omega}(a - \chi)$$

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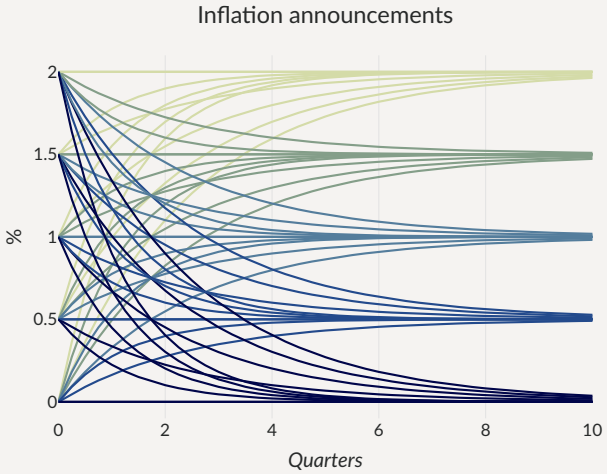
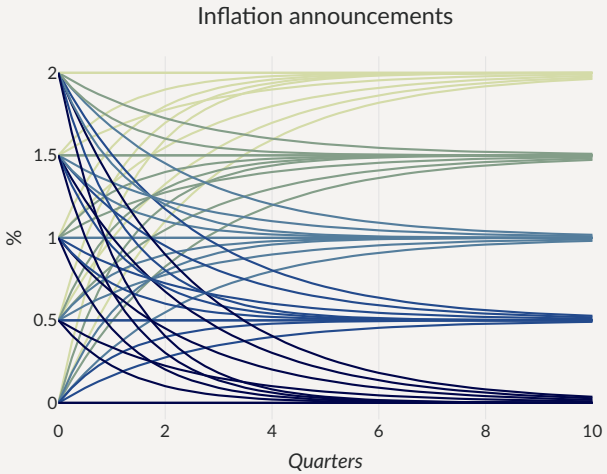


Gameplay

- At $t = 0$, inflation targets are announced
  - Type $c \in \mathcal{C}$ says c
  - Rational type **strategizes** announces r possibly $\in \mathcal{C}$
- At time $t \geq 0$, the government sets inflation
  - Behavioral type $c \in \mathcal{C}$ implements $g_t = a_t^c$
  - Rational type acts strategically chooses $g_t \gtreqless a_t^c$



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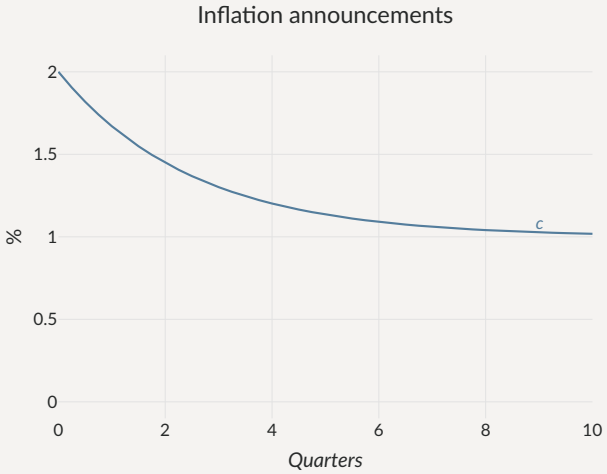

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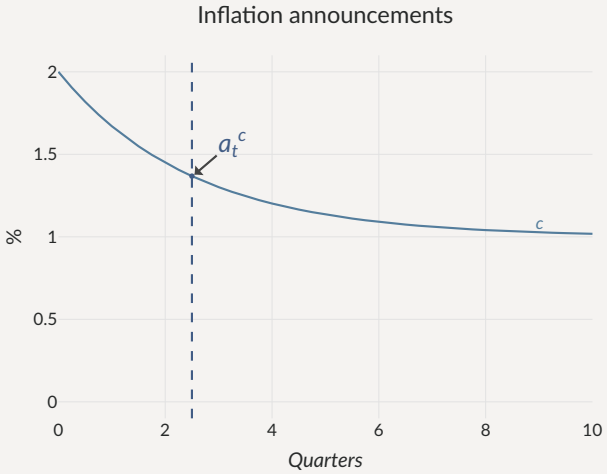

Continuation equilibria

Reputation and Outcomes

- Output is determined by **beliefs** $\mathbb{E}_t[\pi_{t+1}]$ and **actual inflation** $\pi_t = g_t + \epsilon_t$

$$\pi_t = \kappa y_t + \beta \mathbb{E}_t[\pi_{t+1}] \quad = \kappa y_t + \beta \mathbb{E}_t\left[\mathbb{1}_c a^c_{t+1} + (1 - \mathbb{1}_c) g^\star_{t+1}\right]$$

- Private sector solves a signal extraction problem to update beliefs

$$\mathbb{P}(c \mid \pi_t, \mathcal{F}_{t-1}) = \frac{\mathbb{P}(c \mid \mathcal{F}_{t-1}) \cdot f_\epsilon(\epsilon_t|c)}{\mathbb{P}(c \mid \mathcal{F}_{t-1}) \cdot f_\epsilon(\epsilon_t|c) + (1 - \mathbb{P}(c \mid \mathcal{F}_{t-1})) \cdot f_\epsilon(\epsilon_t|r)}$$

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- Private sector solves a **signal extraction** problem to update beliefs

$$p_{t+1} = \frac{p_t \cdot f_\epsilon(\pi_t - a^c_t)}{p_t \cdot f_\epsilon(\pi_t - a^c_t) + (1 - p_t) \cdot f_\epsilon(\pi_t - g^\star_t)}$$

Rational type's problem

Given an announcement c,

- The problem of the rational type is, given expectations $g_c^\star$

$$\mathcal{L}^c(p,a) = \min_g \mathbb{E}\left[(y^\star - y)^2 + \gamma\pi^2 + \beta\mathcal{L}^c(p', \phi_c(a))\right]$$

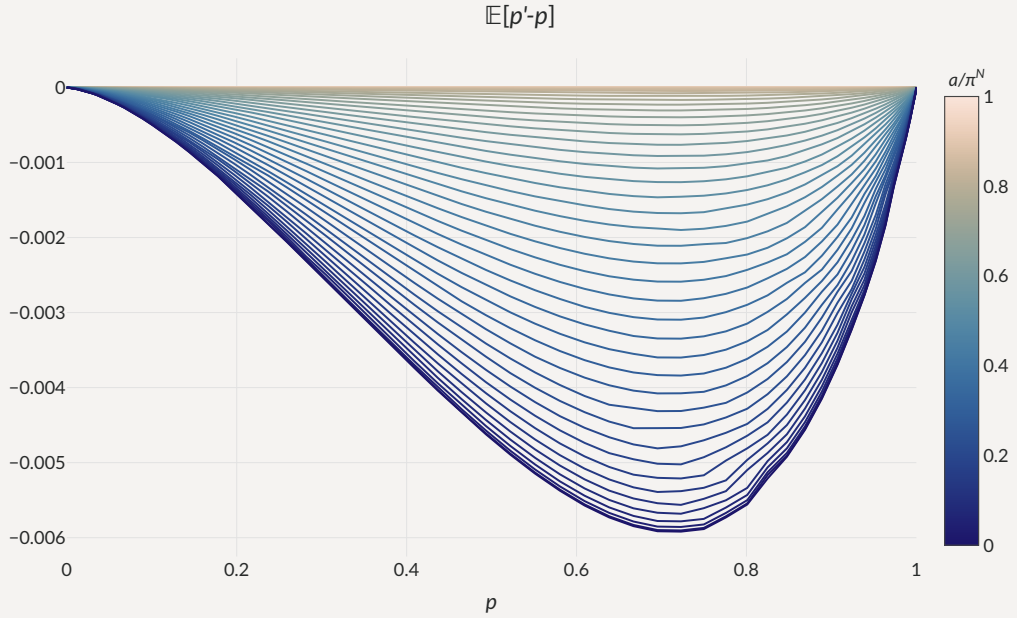
$$\text{subject to } \pi = g + \epsilon$$

$$\pi = \kappa y + \beta\left[p'\phi_c(a) + (1-p')g_c^\star(p', \phi_c(a))\right]$$

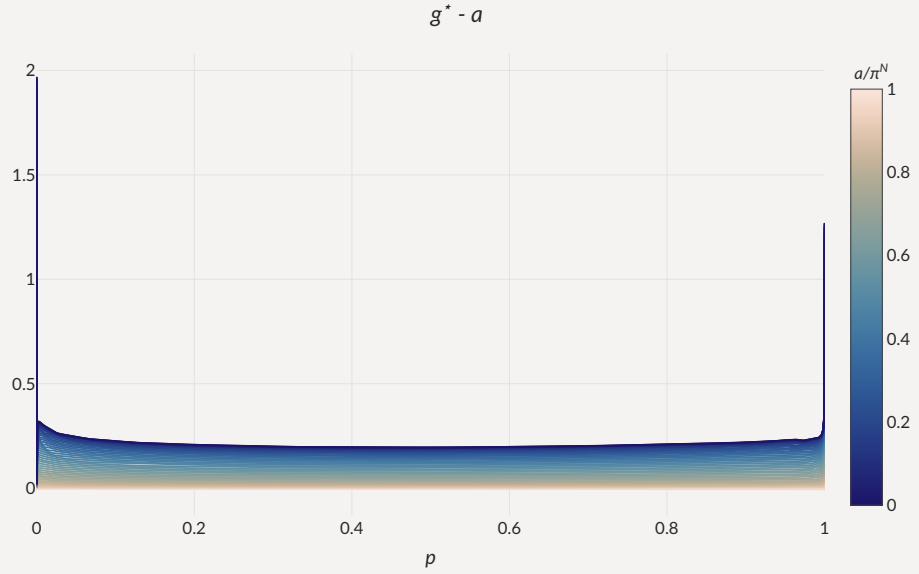
$$p' = p + p(1-p)\frac{f_\epsilon(\pi - a) - f_\epsilon(\pi - g_c^\star(p,a))}{pf_\epsilon(\pi - a) + (1-p)f_\epsilon(\pi - g_c^\star(p,a))}$$

- Rational expectations requires $g_c^\star$ to be the policy associated with $\mathcal{L}^c$

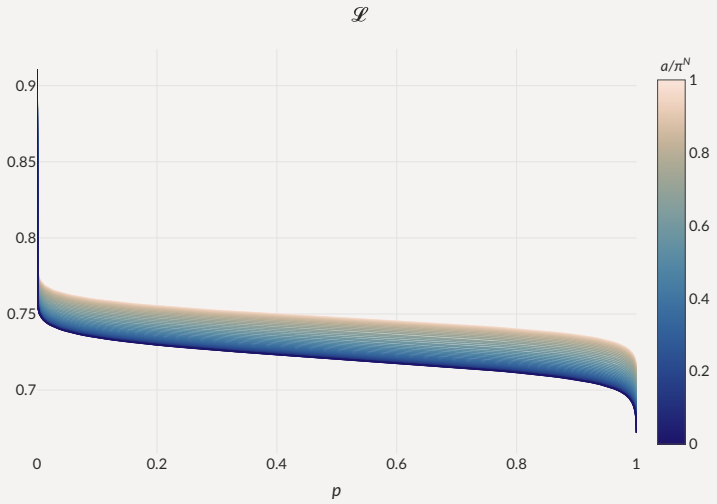
Reputation Dynamics



Equilibrium Deviations



The Value Function



- $\mathcal{L}$ decreasing in p
- $\mathcal{L}$ convex-concave in p
- $\mathcal{L}$ increasing in a for large p only

Credibility

- Let π^N be the Nash equilibrium inflation of the stage game. Then

$$\forall c \in \mathcal{C}: \qquad g_c^\star(p,a) \leq \pi^N$$

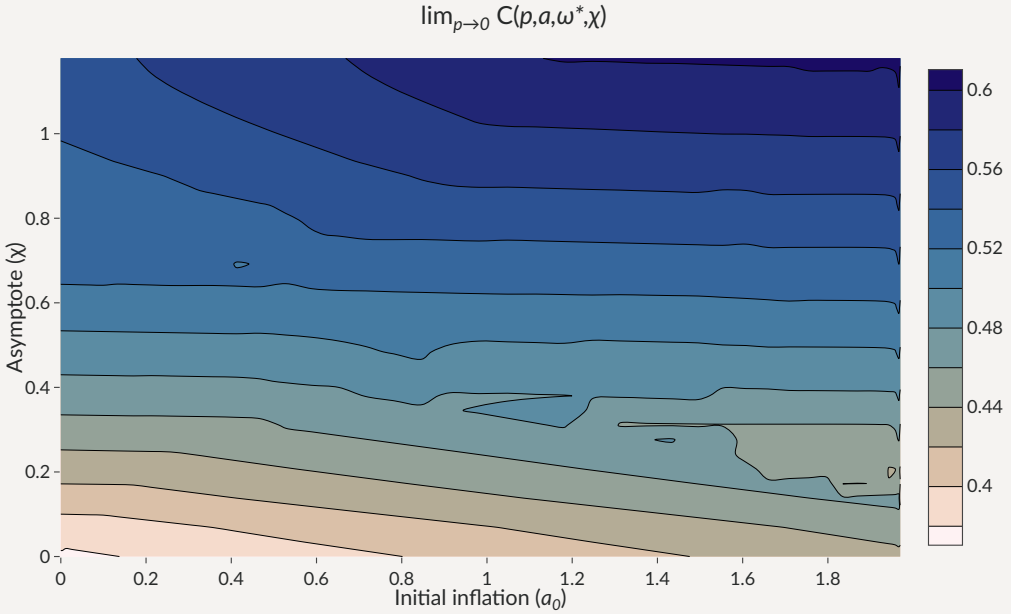
- Define the *remaining credibility* of a plan as

$$C_c(p,a) = (1-\beta)\frac{\pi^N - g_c^\star(p,a)}{\pi^N - a} + \beta\mathbb{E}\left[C_c(p_c'(p,a), \phi_c(a))\right]$$

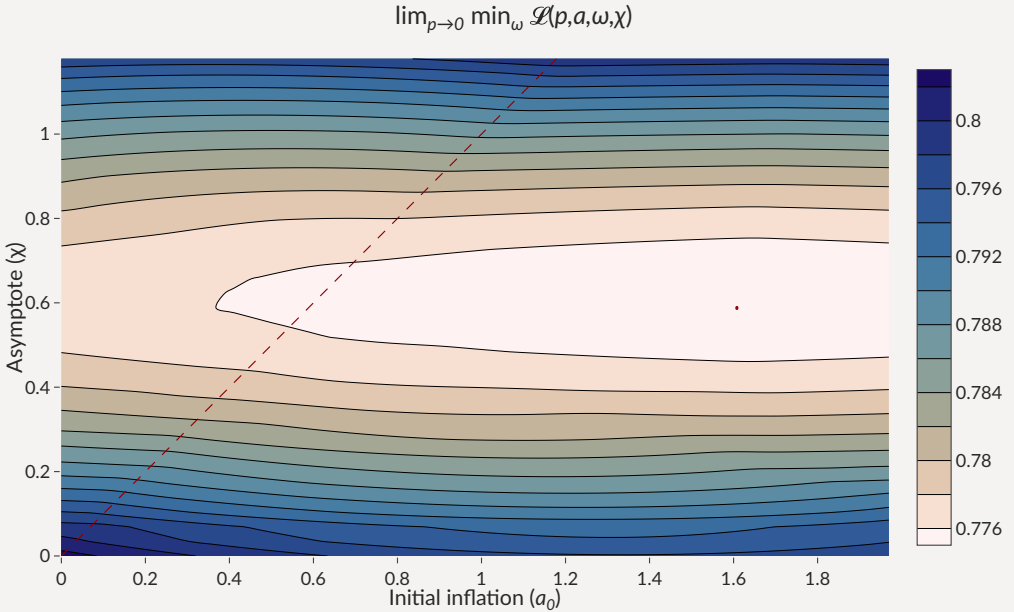
- If $0 \leq g^\star(p,a) \leq \pi^N$ always, then $C_c \in [0,1]$

Plans

Credibility



K-equilibrium



Concluding remarks

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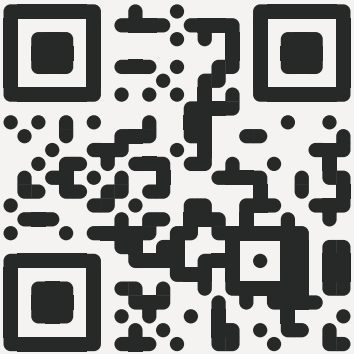
- Model of reputational dynamics and policy
  - Simple environment
  - Focus on low reputation limit

- Credibility dynamics concerns influence choice of policy
  - Tradeoff between promises and incentives
  - Gradual plans boost reputation-building incentives for future decision-makers

- Structure of reputation maps into the incentive constraint of a planner's problem
  - … creating large option values of complying
  - … which are larger when the plan is backloaded



Scan to find the paper