Platform Money

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Motivation

- Platforms match buyers and sellers *and* manage **payment ecosystems**.
- The platform owner controls the seigniorage of **digital tokens**
- **Examples:** Uber Cash, WeChat Wallet, Alipay, Starbucks Stars, Diem (Libra), airline miles.
- On many platforms internal tokens are the mandatory medium of exchange.
- **Question:** How does this monetary control affect platform competition?

The Environment: DM and CM Stages

Each period t is split into two sequential sub-periods:

1. **Decentralized Market (DM):**
   - Buyers and sellers match s.t. search frictions to trade a consumption good.
   - Probability of a match: a_{jb} for buyers, a_{js} for sellers ($j \in \{P, L\}$).
   - $n_j = N_{js}/N_{jb}$ is market tightness.
2. **Centralized Market (CM):**
   - Frictionless market where agents rebalance money holdings.
   - Entry fees (f_j, k_j) are paid here.
   - Agents decide which market (P or L) to enter for the next period.

Inflation/Money Growth

- Supply of money: M_t^j
- Real value of money in the CM: ϕ_t^j for $j \in \{P, L\}$

- **Inflation:** $\mu_j = \frac{M_{t+1}^j}{M_t^j} = \frac{\phi_t^j}{\phi_{t+1}^j}$
- **Crucially:** μ_P is a strategic choice variable for the platform owner.
- Assume $\mu_j > \beta$ (holding money is costly; prevents infinite demand).
- Since buyers choose only one market per period, they never carry the "wrong" money.

Pricing the Consumption Good

- When a buyer and seller match in the DM, they bargain over a surplus $(u - c)$ (where $c = 0$).
- **Kalai Proportional Bargaining:** The surplus is split such that the buyer receives a fixed share $\gamma \in (0, 1)$.
- **The Resulting Price:**

$$\phi_t^j p_t^j = (1 - \gamma)u$$

- ϕ_t^j: Real value of money in the CM (j is platform or outside).
- p_t^j: Nominal price of the good.
- The buyer's gain is γu and the seller's is $(1 - \gamma)u$.

Perceived Value and Choice Shocks

In the CM, a buyer l chooses market j to maximize their perceived payoff:

$$\underbrace{-f_j}_{\text{fee}} + \underbrace{\beta a_{jb}(n_j)\gamma u}_{\text{expected match value}} + \underbrace{(\beta - \xi\mu_j)(1-\gamma)u}_{\text{cost of carrying money}} + \underbrace{\beta W(0,0)}_{\text{continuation value}} + \eta_{l,j}$$

- **Salience** $\xi \leq 1$**:** How much buyers "feel" the cost of inflation μ_j.
- **Preference Shock** $\eta_{l,j}$**:** Idiosyncratic shocks following a Gumbel distribution.

Perceived Value and Choice Shocks

- Buyer's choice probability $\Pi_b(\Delta_b)$ follows a Logit form based on

$$\Delta_b \equiv \underbrace{\beta\left(a_{Pb}(n_P) - a_{Lb}(n_L)\right)\gamma u}_{\text{utility difference from matching}} + \underbrace{\xi\left(\mu_L - \mu_P\right)(1-\gamma)\,u}_{\text{inflation cost difference}} + \underbrace{\left(f_L - f_P\right)}_{\text{fee difference}}.$$

- Seller's choice probability $\Pi_s(\Delta_s)$ also Logit based on

$$\Delta_s = \underbrace{\beta\left(a_{Ps}(n_P) - a_{Ls}(n_L)\right)(1-\gamma)\,u}_{\text{utility difference from matching}} + \underbrace{\left(k_L - k_P\right)}_{\text{fee difference}}$$

Optimization Problems

Market owners take market tightness as given.

- Legacy L chooses $f_L \geq 0$ and $k_L \geq 0$ to maximize

$$\underbrace{\bar{N}_s \left(1 - \Pi_s \left(\Delta_s\right)\right) k_L}_{\text{Fee revenue from sellers}} + \underbrace{\bar{N}_b \left(1 - \Pi_b \left(\Delta_b\right)\right) f_L}_{\text{Fee revenue from buyers}}$$

- Platform P chooses $k_P \geq 0$, $f_P \geq 0$ and $\mu_P \geq 1$ to maximize

$$\bar{N}_s \Pi_s \left(\Delta_s\right) k_P + \bar{N}_b \Pi_b \left(\Delta_b\right) \left[u \left(1 - \gamma\right) \left(\mu_P - 1\right) + f_P\right]$$

- Platform captures **seigniorage** from issuing new units of private money.

Result

When $\xi < 1$ optimal to set $f_P = 0$ and inflate private money (seigniorage).

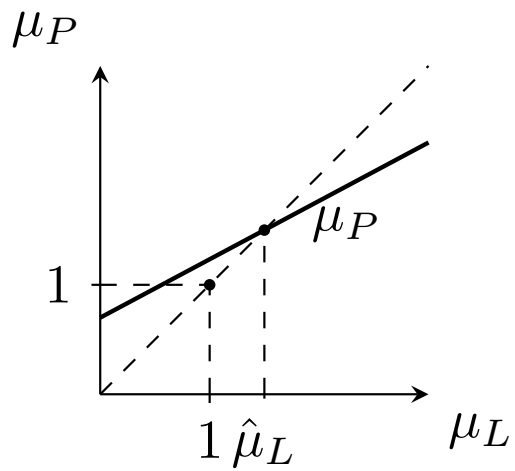
Endogenous Cross-Group Externalities

- Two advantages of using private money when competing with legacy
  - Platform collects seigniorage income, legacy cannot if there is outside inflation ($\mu_L > 1$)
  - If $\xi < 1$ use seigniorage instead of fee
  - both advantages disappear *only if* $\mu_L = 1$ and $\xi = 1$
- Platform can attract buyers at lower cost
- **Feedback Loop:** More buyers lead to a higher match rate for sellers on the platform (a_{Ps}).
- **Proposition:** The platform can charge sellers **higher fees** ($k_P > k_L$) and still attract more sellers because the probability of trade is higher than in the legacy market.
- If platform has superior matching technology, feedback loop is amplified.

Platform Inflation Reaction to Outside Inflation

Proposition

Suppose $\xi < 1$. There is $\hat{\mu}_L > 1$ s.t. $\mu_L \lessgtr \hat{\mu}_L \Leftrightarrow \mu_P \gtrless \mu_L$.



- Platform sets $\mu_P > 1$ when $\mu_L = 1$.
- As μ_L increases, legacy lowers buyer fee.
- P responds to higher μ_L and lower f_L by increasing μ_P less than one-for-one $\implies \partial\mu_P/\partial\mu_L < 1$

Social Welfare

- **Identical Technology:** If P and L have the same matching tech, platform money is a distortion. It should be banned.
- **Superior Technology:** If the platform has better Big Data/ML matching:
  - Platform money kickstarts network externalities.
  - It helps move the economy toward the superior technology, potentially improving social welfare.

Extension: The Open vs. Closed Choice

- Suppose a fraction $(1 - \phi)$ of buyers are "biased."
- They suffer a utility loss κ if they hold platform money.
- **The Dilemma:**
  1. **Closed:** Only accept platform money. Maximize seigniorage but lose some of the biased group.
  2. **Open:** Accept both platform and outside money. More attractive to biased segment but loses seigniorage from them.

Equilibrium Policy

- It is **never** optimal to accept only outside money.
- **Closed** optimal if the bias (κ) is low.
- **Open** optimal if fraction of flexible buyers (ϕ) is below a threshold and the bias is large
- **Close** optimal if fraction of flexible buyers (ϕ) is above a threshold and the bias is large
  - direct effect: lose biased segment
  - strategic effect: legacy raises its fees to captive biased segment, leading to higher inflation (hence income) for platform
- **Examples:**
  - **Closed:** Fortnite (V-Bucks) or Roblox.
  - **Open:** Uber in Mexico (accepting cash to capture unbanked/biased users).

Conclusion

- Platforms use their own money to endogenize network effects.
- Seigniorage allows the platform to out-compete the legacy market by subsidizing one side of the trade.
- The benefit of platform money depends on the gap between platform and legacy matching efficiency.
- Seigniorage typically enjoyed by banks. Should payments systems instead be controlled by platforms?
  - Eg Covid-19 transfers made to digital wallets in China and to bank accounts in the US.
  - Especially relevant given the amount of data and ML learning capabilities of the platforms.