Platform Money*

Emre Ozdenoren	Yuan Tian	Kathy Yuan
London Business School	LSE	LSE

April 15, 2025

Preliminary and Incomplete
Comments Welcome

Abstract

This paper examines how a platform's ability to create its own money affects its pricing decisions, the search and matching dynamics between buyers and sellers, and overall economic welfare. We show that by pricing in its own currency, the platform can extract seignorage from buyers while imposing higher fees on sellers. In contrast, the legacy market uses fiat money, cannot recoup seignorage from buyers and thus operates at a competitive disadvantage, even when inflation costs are less salient compared to direct fees. In environments where the platform's technology is identical with that of the legacy market, the resulting market tightness on the platform is lower than socially optimal. However, when the platform's technology is superior, the introduction of platform money moves the equilibrium outcome closer to the social optimum than a fee-only platform, primarily because it is more cost-effective in attracting buyers.

Keywords:Platform Money, Platform Tokens, Private Money, Platform Competition, Search and Matching, BigTech, Platform Payments, Digital Platforms

*Ozdenoren (eozdenoren@london.edu), Tian (y.tian11@lse.ac.uk), and Yuan (k.yuan@lse.ac.uk).

We thank Markus Brunnermeier, seminar participants at Hitotsubashi University and LSE for helpful comments. Yuan thank IMF MCM PI colleagues, Tobias Adrian, Tommaso Griffoli, and Dong He for insightful discussions during her visit in 2022.

1 Introduction

The rise of the platform economy is evidenced by the growing popularity of super-apps such as Amazon, Facebook (Meta), X, Uber, WeChat, Alibaba, Gala Games, and many others. Empowered by advanced data processing technologies and machine learning algorithms, these applications deliver superior matching capabilities between buyers and sellers, offering a user experience that traditional brick-and-mortar marketplaces cannot match. Many of these apps have evolved into lifestyle platforms with integrated ecosystems, enabling users to conduct all their economic activities - from work to consumption - without ever leaving the platform.

At the same time, platforms are increasingly developing their own digital payment systems to align with the inherently digital nature of economic activity in their marketplaces. Examples include Diem (formerly Libra), WeChat Money, AliPay, and Gala Token. In many cases, these tokens and digital wallets have become fully embedded in a platform's commercial and financial transactions; indeed, for some platforms (e.g., WeChat Pay and Alipay), it is nearly impossible to conduct transactions without using their proprietary payment systems.

Consider, for instance, WeChat's digital wallet. Originally launched with a red packet service that allowed users to send money as gifts, the system became especially popular during the Chinese New Year in 2014. Sponsored cash drops during the annual gift-giving season spurred rapid growth; according to the Wall Street Journal, just one month after its launch, WeChat Pay's user base expanded from 30 million to 100 million, and 20 million red packets were distributed during the holiday. Today, WeChat has transformed from a social media platform into a comprehensive lifestyle app with a payment system that facilitates shopping, dining, transportation, education, donations, payments, financing, investment, and more. As of the first quarter of 2023, WeChat boasted 1.33 billion active users, and by 2021, the platform supported 3.7 million mini programs with 2.7 trillion RMB in transactions.

Traditionally, payment services in the brick-and-mortar economy have been managed by trusted third parties, such as financial service providers. However, digital technology now enables platforms to secure payment transfers and capitalize on transaction data to boost economic activity within their ecosystems. Digital payment systems and digital private money are functionally equivalent, as payment providers control the interest rates on their digital wallets. The income generated from the interest rates in these wallets denominated in the native currency, in effect, seignorage - typically captured by financial institutions in the traditional economy.[1] With the rise of the platform economy, however, a new scope economy is emerging at the intersection of payments and core platform activities.[2]

In this paper, we examine one source of that scope economy: how the ability to issue platform money as a medium of exchange affects competitive dynamics between platforms and legacy markets. In our model, the platform competes with a legacy market where money growth (inflation) is determined by a central bank to meet broader macroeconomic objectives. We explore how the platform's control over its own money supply influences its pricing decisions, the search and matching process, and overall economic welfare.

Our model also permits the possibility that consumers perceive inflation costs as less salient than direct fees when choosing between the platform and legacy marketplaces.[3] This assumption, combined with the ability to control its own money supply, grants the platform two key advantages over the legacy market. First, by controlling its own money supply, the platform can moderate the inflation cost experienced by its users, whereas the legacy market is limited to adjusting fees - since its supply of fiat money is managed by central banks. This is particularly disadvantageous in high-inflation environments, as fees cannot be set below zero. Second, if consumers are less sensitive to inflation, the platform can collect seignorage income through its private payment system. It is important to note, however, that inflation salience is double-edged: When the legacy marketplace experiences high inflation with fiat money, consumers in the legacy marketplace tend to be less sensitive to the resulting costs. As a result, even if the platform offers a lower inflation rate, these consumers are less inclined

[1] Platforms often have hidden fees for withdrawals from digital wallets which effectively results in an exchange rate between platform money and fiat. Platforms have other ways to expand money supply, e.g., sending coupons and rewards in platform money, that can only be used/redeemed on the platform, e.g. uber cash.

[2] There are other sources of this scope economy. There might be tax advantages to issuing private money as opposed to charging fees. Platforms can take advantage of alternative investment opportunities of cash balances and bundle payment and financial services.

[3] There is a long line of literature on inflation salience which we list in the literature review section.

to switch to the platform.

We cast these tradeoffs in a new monetarist model, following the approach of Lagos and Wright (2005), in which money acts as a medium of exchange in a two-sided platform competing with a legacy market that uses fiat currency. In these two-sided marketplaces, the entry of an additional buyer reduces the matching probability for other buyers while increasing it for sellers - or vice versa in the competing market.

We show that by leveraging its private money and advanced matching technology, the platform can lower the cost of attracting buyers while generating cross-group network externalities. Importantly, the effectiveness of using private money to attract buyers depends on several factors including the inflation regime in the legacy marketplace, the inflation salience among platform participants, the relative bargaining power of buyers and sellers over consumption goods, and other market-specific parameters affecting the choice of trading venue. In particular, we find that inflation on the platform increases less than one-for-one with the inflation in fiat money. As a result, in a low inflation environment platform experiences higher inflation than the legacy marketplace, and the opposite holds in a high inflation environment.

Moreover, the platform's superior matching capabilities further intensify the reinforcing network effects between buyers and sellers. In equilibrium, our analysis reveals that the platform attracts more buyers, imposes higher fees on sellers (yet still attracts more sellers overall), and higher profit compared to the legacy market. Market tightness (seller to buyer ratio) on the platform is lower than the legacy market when the two have similar matching technologies but can be higher if the platform has much superior matching technology. We derive closed-form results characterising these equilibrium properties and offer comparative insights through numerical examples.

Our results also indicate that if both the platform and the legacy marketplace utilise identical matching technology, the use of private money may lead to socially suboptimal outcomes. However, when the platform holds a technological advantage, its ability to control its money supply can yield equilibrium outcomes that are closer to the social optimum.

Literature This paper most directly relates to works that model platform network effects. One line of the platform literature focuses on platforms with exogenous network effects. For example, Rochet and Tirole (2002, 2003, 2006) and Caillaud and Jullien (2001, 2003) examine pricing structures where platforms charge below marginal cost on one side of the market and above marginal cost on the other. Other works such as Spulber (1999, 2017), Weyl (2010), and Evans and Schmalensee (2016) also feature this pricing asymmetry. Armstrong (2006), in particular, studies competing platforms and the determinants of equilibrium pricing.

Another line of the platform literature considers endogenous network effects. In this context, Chen and Huang (2012) and Goos et al. (2014) model a single two-sided platform where search and matching frictions determine outcomes. These models typically do not feature prices below the marginal cost for sellers. Gautier et al. (2023) explores directed search where the platform acts as a middleman. Our paper contributes to this literature by examining platform competition through endogenous network effects, emphasizing the role of money in generating such effects via search and matching.

In addition, our paper contributes to the growing literature on platform tokens. You and Rogoff (2019) model token issuance as a mechanism to promote customer loyalty but show that non-tradable tokens - lacking monetary function - lead to higher platform profits. Brunnermeier and Payne (2023) propose a ledger-keeper framework in which enforcement of repayment relies on exclusion from future trades. Sockin and Xiong (2023) view tokenization as a commitment device to prevent platforms from exploiting users. While tokens in their framework serve as a financing tool - especially for platforms with weak fundamentals - they do not function as a means of payment. In contrast, our paper integrates monetary economics with platform economics, including fee-setting and market tightness. Platforms compete with legacy systems by indirectly altering market tightness, generating seigniorage and charging entry fees to both buyers and sellers.

Finally, our work contributes to the new monetarist literature Lagos and Wright (2005); Lagos et al. (2017) by embedding money in an environment with search frictions. We differ by modelling platform competition and endogenizing demand for private money, enriching the connection between payment friction and network effects.

The rest of the paper is organized as follows. Section 2 sets up the model and provides the equilibrium definition. Section 3 analyses equilibrium properties. Section 4 presents comparative statics and numerical exercises. Section 5 solves the planner's problem. Section 6 concludes.

2 The Model

2.1 The Environment

Time is discrete, lasts forever, and is indexed by $t \in \{0, 1, ...\}$. There are three types of agent: a measure $\bar{N}_b$ of consumers, a measure $\bar{N}_s$ of sellers, and two owners of the two trading marketplaces: a private platform P and a legacy market L, where the decentralized search and matching between buyers and sellers occurs.

We consider an economy where the discount factor between periods is $\beta \in (0, 1)$ and each period is divided into two stages. In the first stage, the decentralized marketplaces (DM) are open. There is a perishable consumption good y that only sellers can produce at zero marginal cost. Buyers obtain u from consuming one unit and do not value more units. In each period, buyers and sellers are able to participate in one and only one of the trading marketplaces. When a buyer and a seller match, the transaction is executed using money: on platform P, trades are conducted using platform money, whereas on legacy market L, government fiat money is used.

In the second stage, a centralized, frictionless settlement market (CM) is established. In this market, the owners of the trading platforms set buyer and seller fees, and agents decide which future DM marketplace to join, pay the corresponding fee, and rebalance their portfolios of platform and fiat money. Consequently, the platform money – as a medium of exchange – is priced. We assume that all types of agents consume the perishable CM good, x, and can supply labor, h, to produce the good x via a linear production technology with a 1:1 ratio. All agents obtain utility $U(x, h)$ by consuming x of the CM good but incur dis-utility from labor. To simplify the exposition, we assume that $U(x, h) = x - h$, thereby normalizing equilibrium utility in the CM to zero for consumers. In addition, both market owners impose fees denoted by k_t^j to sellers and f_t^j to buyers, where $j \in \{P, L\}$ (with the fees measured in units of x) while the owner of the platform (P) also decides whether to issue additional money. Finally, sellers and buyers select their market of entry, pay the associated fee, and adjust their money portfolios accordingly.

Under the assumption that consumption goods x and y are perishable, the only forms of money in this economy are platform money and fiat money. We denote the money supply and the corresponding money price in each market by M_t^j and ϕ_t^j, respectively, where $j \in \{P, L\}$. In the legacy market, a central bank sets the money growth rate (that is, inflation) to achieve macroeconomic objectives. In contrast, the platform determines the growth rate of its own money to meet its profit-maximization objectives.[4] In practice, the platform sets interest rates on its digital wallet - effectively expanding its money supply - and occasionally issues coupons or vouchers, which are equivalent to helicopter money.

In what follows, we specify the law of motion for the money supply in each marketplace:

$$M_{t+1}^j = \mu^j M_t^j. \tag{1}$$

We assume that $\mu^j > \beta$ is set in such a way that the fiat money depreciation rate exceeds the discount factor; otherwise, agents' demand for money would be infinite. Hence, a seller doesn't carry any money across period. A buyer doesn't carry the money of the market where she doesn't trade and carries exactly the amount of money necessary to trade in DM.[5] Following the new monetarist literature, we focus on a stationary equilibrium where in steady state $M_t^j \phi_t^j$ is constant. Figure 2.1 summarizes the aforementioned events in this economic environment.

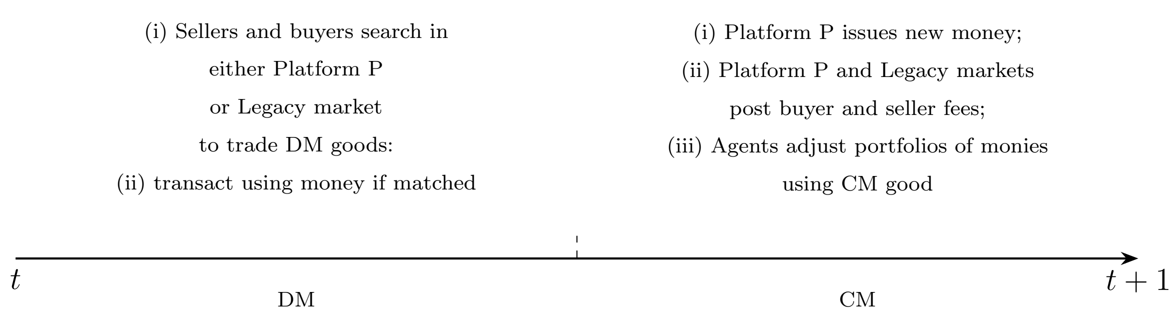


Figure 1: Timeline

[4]Since fewer people hold cash and use bank accounts for digital payments, this means that central bank influences aggregate money supply indirectly via affecting banks' deposit rates.

[5]A formal proof is provided in the appendix.

2.2 Centralized Market

We denote the agent's value function in the CM by W_t and in the DM by V_t. The CM value function of a buyer denoted by subscript b is given by:

$$W_{b,t}(m_t^P, m_t^L) = \hat{\Pi}_{b,t}^P W_{b,t}^P(m_t^P, m_t^L) + \hat{\Pi}_{b,t}^L W_{b,t}^L(m_t^P, m_t^L), \tag{2}$$

where $\hat{\Pi}_{b,t}^j$ is buyer's probability of choosing market j in the CM. This formulation allows buyers to bring in both types of money to CM but in fact buyers will bring at most one type of money (or none) since holding money is costly if not for transaction purposes. That is, buyers will only pay for the entry fee (f) and purchase the relevant money for the chosen marketplace. The continuation value of going to market j is:

$$\begin{aligned} W_{b,t}^j(m_t^P, m_t^L) &= \max_{x_t, h_t, m_{t+1}^j \geq 0} x_t - h_t + \beta V_{b,t+1}^j(m_{t+1}^j, 0) && (3) \\ \text{s.t.} \quad & x_t + f_j + \phi_t^j m_{t+1}^j \leq h_t + \phi_t^P m_t^P + \phi_t^L m_t^L, && (4) \end{aligned}$$

where buyers choose consumption, labour, and money holding amount optimally. By substituting for $x_t - h_t$, we obtain

$$W_{b,t}^j(m_t^P, m_t^L) = \phi_t^P m_t^P + \phi_t^L m_t^L + W_{b,t}^j(0,0),$$

where

$$W_{b,t}^j(0,0) = \max_{m_{t+1}^j \geq 0} -\phi_t^j m_{t+1}^j - f_j + \beta V_{b,t+1}^j(m_{t+1}^j, 0) \tag{5}$$

Thus, a buyer's optimization problem in CM is not history dependent and her value function in CM can be written as

$$W_{b,t}(m_t^P, m_t^L) = \phi_t^P m_t^P + \phi_t^L m_t^L + \left[\hat{\Pi}_{b,t}^P W_{b,t}^P(0,0) + \hat{\Pi}_{b,t}^L W_{b,t}^L(0,0)\right]. \tag{6}$$

Similarly, a seller's value function - where the seller is denoted by subscript s and the seller entry fee is denoted by k - can be written as:

$$W_{s,t}(m_t^P, m_t^L) = \phi_t^P m_t^P + \phi_t^L m_t^L + \left[\hat{\Pi}_{s,t}^P W_{s,t}^P(0,0) + \hat{\Pi}_{s,t}^L W_{s,t}^L(0,0)\right]. \tag{7}$$

where

$$W_{s,t}^j(0,0) = \max_{m_{t+1}^j \geq 0} -\phi_t^j m_{t+1}^j - k_j + \beta V_{s,t+1}^j(m_{t+1}^j, 0). \tag{8}$$

2.3 Decentralized Market

Trading in a decentralized marketplace is subject to search frictions that we capture with a matching function. For any market j with N_s sellers and N_b buyers, the matching function $Q^j(N_s, N_b)$ represents the total number of successful matches in j. We assume that the function $Q^j(\cdot)$ exhibits the constant-return-to-scale property. We also assume that Q^j is concave in both variables. It is also useful to define the market tightness in market j, denoted by n_j, as the ratio of sellers to buyers in this market, i.e, $n_j \equiv N_s/N_b$. Using this definition, the probability that a *buyer* successfully finds a match in market j is related to the market tightness in the following manner:

$$a_{jb}(n_j) \equiv \frac{Q^j(N_s, N_b)}{N_b} = Q^j(n_j, 1) \tag{9}$$

Similarly, the probability that a *seller* finds a match in market j is:

$$a_{js}(n_j) \equiv \frac{Q^j(N_s, N_b)}{N_s} = \frac{1}{n_j} Q^j(n_j, 1) \tag{10}$$

We assume that the platform has (weakly) better matching technology so that for any market tightness n buyers and sellers are (weakly) more likely to find a match on the platform: $a_{Pb}(n) \geq a_{Lb}(n)$ and $a_{Ps}(n) \geq a_{Ls}(n)$. Furthermore, the marginal increase (decrease) in matching probability is weakly larger for buyers (sellers) on the platform if market tightness increases: $a'_{Pb}(n) \geq a'_{Lb}(n)$ ($a'_{Ps}(n) \leq a'_{Ls}(n)$).

Conditional on a successful match, the real price of the DM good y is determined through bargaining between the matched buyer and seller pair. We assume that buyer and seller split the surplus upon a match and the buyer's share is γ. Thus, the resulting real price for the good y is: $p^j \phi^j = u(1-\gamma)$.

2.3.1 Buyers

Given the matching probabilities, we obtain the DM value function for each individual buyer who chooses to trade on market $j \in \{P, L\}$ as

$$V^j_{b,t}(m^j_{b,t}, 0) = a_{jb}(n_{jt})[u + W_{b,t}(m^j_{b,t} - p^j_t, 0)] + (1 - a_{jb}(n_{jt}))W_{b,t}(m^j_{b,t}, 0). \tag{11}$$

The first term states that, conditional on being matched, the buyer gains utility u and carries the after-trade money balance $m^j_{b,t} - p^j_t$ into the centralized market (CM). The second term captures the case where the buyer simply carries over their money to the CM if not matched. By plugging for $W_{b,t}(\cdot)$, we simplify the value function as follows:

$$V_{b,t}^{j}(m_{b,t}^{j},0) = a_{jb}(n_{jt})[u - \phi_t^j p_t^j] + \phi_t^j m_{b,t}^j + W_{b,t}(0,0). \tag{12}$$

In the steady state, the real price of the DM good is set by the bargaining rule: $\phi_t^j m_t^j = \phi_t^j p_t^j = u(1-\gamma), \forall t$ and buyers bring the exact amount of money to pay for it. Plugging the real price, the money holding, and (12) into (5), we obtain:

$$W_b^j(0,0) = -\underbrace{f_j}_{\text{Fee}} + \underbrace{\beta a_{jb}(n_j)\gamma u}_{\text{Utility from trade}} + \underbrace{(\beta-\mu_j)(1-\gamma)u}_{\text{Cost of holding money}} + \underbrace{\beta W_b(0,0)}_{\text{Continuation value}} \tag{13}$$

2.3.2 Buyers' marketplace choice

Next, we formalize the buyer's marketplace selection as a random discrete choice problem. In this framework, the buyer's decision is influenced not only by the anticipated value each marketplace offers but also by an idiosyncratic shock and a behavioral bias toward inflation. In our interpretation, a buyer's actual experienced payoff is $W_b^j(0,0)$ but at the choice stage each buyer l uses their perceived payoffs $\hat{W}_{l,b}^j$ to choose between the two marketplaces. Formally, the perceived payoff of buyer l is given by:

$$\hat{W}_{l,b}^j(\xi) = -f_j + \beta a_{jb}(n_j)\gamma u + (\beta - \xi\mu_j)(1-\gamma)u + \beta W(0,0) + \eta_{jl} \tag{14}$$

where the idiosyncratic noise term η_{jl} captures the randomness of the choice stage. The parameter $\xi \in [0,1]$ captures the salience of inflation (from either fiat money or platform money) to the buyer. That is, the buyer does not fully account for the inflation cost when choosing between marketplaces. Thus, the perceived advantage of platform (P) over legacy (L) marketplace without the idiosyncratic shock is

$$\Delta_b \equiv \underbrace{\beta\left(a_{Pb}(n_P) - a_{Lb}(n_L)\right)\gamma u}_{\text{Utility from trade difference}} + \underbrace{\xi(\mu_L - \mu_P)}_{\text{Inflation cost difference}} + \underbrace{(f_L - f_P)}_{\text{Fee difference}}. \tag{15}$$

It is important to note that the salience of inflation can either help or hinder platform P's ability to attract buyers. When the legacy marketplace faces higher inflation set by the central bank, any inflation cost savings offered by platform P become less compelling to buyers, who tend to discount these savings. Conversely, if the legacy marketplace experiences lower inflation, platform P can afford to impose a higher inflation rate, and buyers may not fully account for this increased inflation in their decision-making.

Hence, the probability of a buyer choosing market P in the CM can be determined by the following attraction function $\Pi_b(\cdot)$:

$$\Pi_b(\Delta_b) = \Pr\left\{l : \Delta_b \geq \eta_{Ll} - \eta_{Pl}\right\}. \tag{16}$$

This attraction function also yields the fraction of buyers choosing platform P.

2.3.3 Sellers

Sellers do not want to hold any additional money in the CM and would convert all the money they have received (if matched) to CM consumption goods immediately to avoid facing inflation cost in the next period. A seller's value function in steady state if he chooses to enter market j to trade is then:

$$W_s^j(0,0) = -\underbrace{k_j}_{\text{Fee}} + \underbrace{\beta a_{js}(n_j)(1-\gamma)u}_{\text{Utility from trade}} + \underbrace{\beta W_s(0,0)}_{\text{Continuation value}} \tag{17}$$

The attraction function of a seller for platform P over legacy L can be similarly defined as $\Pi_s(\Delta_s)$ where

$$\Delta_s = \beta\left(a_{Ps}(n_P) - a_{Ls}(n_L)\right)(1-\gamma)u + (k_L - k_P), \tag{18}$$

and a seller also faces an idiosyncratic choice shock. The attraction function $\Pi_s(\Delta_s)$ yields the fraction of sellers who trade on P.

2.3.4 Legacy and Platform Owners

We assume that owners of both marketplaces take matching probabilities (or equivalently equilibrium market tightness) as given and maximize their revenue by optimally setting the entry fees for sellers and buyers ($k_j \geq 0$, $f_j \geq 0$ where $j \in \{P, L\}$) and choosing the rate of money growth in the case of platform P.

We first study platform P owner's optimization problem who chooses the sellers' entry fee k_P, money growth rate μ_P, and the buyers' entry fee f_P to maximize:

$$\underbrace{\bar{N}_s \Pi_s\left(\Delta_s\right) k_P}_{\text{Fee revenue from sellers}} + \underbrace{\bar{N}_b \Pi_b\left(\Delta_b\right) f_P}_{\text{Fee revenue from buyers}} + \underbrace{\left(M_{t+1}^P - M_t^P\right)\phi_t^P}_{\text{Seignorage}}. \tag{19}$$

where M_t^P is the supply of platform money at t, and Δ_b and Δ_s are given by (15) and (18).

Using the market clearing condition for platform money ($m_{b,t}^P \phi_t^P = u(1-\gamma)$), we obtain

$$M_t^P = \bar{N}_b \Pi_b(\Delta_b) m_{b,t}^P = \bar{N}_b \Pi_b(\Delta_b) \frac{u(1-\gamma)}{\phi_t^P}. \tag{20}$$

Combining this expression with (19), the objective function of the platform P's owner becomes:

$$\bar{N}_s \Pi_s(\Delta_s) k_P + \bar{N}_b \Pi_b(\Delta_b) [u(1-\gamma)(\mu_P - 1) + f_P]. \tag{21}$$

We are now ready to take first order conditions with respect to fees and rate of money growth. The first order condition with regards to the seller fee k^P gives:

$$k_P = \frac{\Pi_s(\Delta_s)}{\Pi_s'(\Delta_s)}. \tag{22}$$

That is, the fee is set so that the marginal increase in the seller fee revenue from the fee levied on all sellers who choose to enter is equal to the marginal loss from those choose not to enter.

The first order condition with regards to the buyer fee f^P gives:

$$\Pi_b(\Delta_b) - \Pi_b'(\Delta_b)[u(1-\gamma)(\mu_P - 1) + f_P] \leq 0, \text{ with equality if } f_P > 0 \tag{23}$$

The first order condition with regards to the rate of money growth μ_P gives:

$$\Pi_b(\Delta_b) - \Pi_b'(\Delta_b)[u(1-\gamma)(\mu_P - 1) + f_P]\xi \leq 0, \text{with equality if } \mu_P > 1 \tag{24}$$

Notice that for $\xi < 1$, we have the optimal solution as:

$$f_P = 0 \tag{25}$$

$$\mu_P = 1 + \frac{1}{\xi(1-\gamma)u} \frac{\Pi_b(\Delta_b)}{\Pi_b'(\Delta_b)} \tag{26}$$

That is, when buyers do not fully account for inflation costs, the owner of platform P prefers to charge buyers via an inflation mechanism rather than by imposing a direct fee. Conversely, if buyers fully internalize the inflation cost, the owner becomes indifferent between the two methods. In this case, his primary concern is to extract an optimal combined charge from buyers, which is given by $u(1-\gamma)(\mu_P - 1) + f_P$, where μ_P represents the inflation rate and f_P is the buyer fee. This leads to the following lemma.

Lemma 1 *Platform P prefers to charge buyers via inflation rather than by setting a direct fee when $\xi < 1$ and is indifferent between the two methods when $\xi = 1$.*

It is important to note that the owner of platform P strictly prefers using platform money over fiat money if $\mu_L > 1$, which is a reasonable assumption. In this case using platform money gives the platform two advantages. First, the platform can set a different inflation rate than the central bank to control the cost of inflation experienced by the buyers on the platform. Second, it earns seignorage from issuing new money. Even when $\mu_L = 1$, the platform strictly prefers to use platform money as long as $\xi < 1$ since it is more effective to charge buyers through inflation than fees. Only when both $\mu_L = 1$ and $\xi = 1$, the platform would be indifferent between using fiat money and platform money since both advantages of issuing its own money disappear: buyers do not experience cost of holding money and there is no seignorage.

We next study legacy market L's owner's optimization problem. It is simpler since legacy market L's owner does not have control over the fiat money supply. He chooses f^L and k^L to maximize:

$$\bar{N}_s \left(1 - \Pi_s \left(\Delta_s\right)\right) k_L + \bar{N}_b \left(1 - \Pi_b \left(\Delta_b\right)\right) f_L \tag{27}$$

The two first order conditions are:

$$k_L = \frac{1 - \Pi_s \left(\Delta_s\right)}{\Pi_s' \left(\Delta_s\right)} \tag{28}$$

$$f_L = \frac{1 - \Pi_b \left(\Delta_b\right)}{\Pi_b' \left(\Delta_b\right)} \tag{29}$$

where Δ_b and Δ_s are defined the same as above.

2.4 Equilibrium Definition

Definition 1 *A stationary equilibrium consists of market tightness measures on the two platforms (n_P^*, n_L^*), platform entry fees for the buyers and the sellers (f_P^*, k_P^*), platform's money growth policy μ_P^*, and legacy market entry fees for the buyers and the sellers (f_L^*, k_L^*) such that*

1. *In the CM buyers and sellers optimally choose which market to enter (and hold money of that market for trade)*

2. *Given $(n_P^*, n_L^*, f_L^*, k_L^*)$ and buyers' and sellers' entry decisions, platform's profit maximizing fees are $f_P = f_P^*$ and $k_P = k_P^*$ and its optimal money growth policy is $\frac{M_{t+1}^P}{M_t^P} = \mu_P^*$.*

3. *Given $(n_P^*, n_L^*, f_P^*, k_P^*, \mu_P^*)$ and buyers' and sellers' entry decisions, legacy market's profit maximizing fees are $f_L = f_L^*$ and $k_L = k_L^*$.*

4. *Market tightness on the two markets are given by*

$$\begin{aligned} \frac{\overline{N}_s \Pi_s(\Delta_s)}{\overline{N}_b \Pi_b(\Delta_b)} &= n_P^* \\ \frac{\overline{N}_s (1 - \Pi_s(\Delta_s))}{\overline{N}_b (1 - \Pi_b(\Delta_b))} &= n_L^* \end{aligned}$$

3 Equilibrium Properties

In the remainder of the paper we assume that the attraction functions take the following form: $\Pi_b(x) = \left[1 + \exp\left(-\frac{\Delta_b}{\sigma_b}\right)\right]^{-1}$ and $\Pi_s(x) = \left[1 + \exp\left(-\frac{\Delta_s}{\sigma_s}\right)\right]^{-1}$. These functional forms are standard in discrete choice where shocks to payoffs follow Gumbel distribution with scale parameters σ_b for buyers and σ_s and sellers.[6]

We first establish that the market tightness is positively linked with to the market attractiveness.

Lemma 2 *The platform market is tighter if fewer sellers are attracted relative to buyers, i.e.,*

$$n_P \leq n_L \Leftrightarrow \frac{\Delta_s}{\sigma_s} \leq \frac{\Delta_b}{\sigma_b}. \tag{30}$$

This lemma allows us to show that platform P has a unique advantage in attracting buyers by controlling its own money supply and hence offers sellers a higher matching probability.

Proposition 1 *In equilibrium, sellers are more likely to be matched on the platform than on legacy market, i.e. $a_{Ps}(n_P) > a_{Ls}(n_L)$.*

[6] It becomes difficult to attract buyers (sellers) as the scale parameter increases. When σ_b (σ_s) approaches ∞, the likelihood of buyers (sellers) to enter the platform versus the legacy market approaches half and half regardless of Δ_b (Δ_s). At the other extreme, when σ_b (σ_s) approaches 0, all buyers (sellers) go to the platform if $\Delta_b > 0$ ($\Delta_s > 0$) and to the legacy if $\Delta_b < 0$ ($\Delta_s < 0$).

Note that this result holds even when matching technology is symmetric across two marketplaces and $\xi = 1$. The key insight is that platform P has a distinct advantage: it can control its own inflation and collect seignorage income, whereas the legacy market cannot manage inflation, does not benefit from seignorage, and passes the full inflation cost onto its buyers. Under the condition $\xi = 1$, platform P can choose to regulate either inflation or buyer fees. For example, if platform P opts to control fees, it can set $\mu_P = 1$ (i.e., maintain zero inflation) and adjust its fee structure to attract more buyers. When $\xi < 1$, Lemma 1 implies that platform P optimally sets a zero fee to buyers and can charge them a higher "fee" via the inflation mechanism and attract the same amount of (if not more) buyers since inflation is less salient to buyers.

A corollary of this result is that if two marketplaces have similar matching technologies, platform P is tighter than the legacy marketplace, which is summarized below.

Corollary 1 *If $a_{Ps}(n) - a_{Ls}(n) \geq 0$ is small enough for all n then $n_P < n_L$.*

This follows directly from the previous proposition: if $a_{Ps} = a_{Ls}$ then $a_{Ps}(n_P) > a_{Ps}(n_L) \Rightarrow n_P < n_L$. By continuity this must also hold if a_{Ps} is close to a_{Ls}.

In search and matching models, cross-group positive network externalities are common: an increase in the number of buyers improves the matching probabilities for sellers, and vice versa. Since platform P has an advantage in attracting buyers from legacy market, it initiates the positive externalities from the buyer side that improves the seller matching probability. This dynamic enables platform P to leverage its advantage by drawing more sellers into its market while also charging sellers a higher fee. This finding is summarized in the next proposition.

Proposition 2 *Platform P charges a higher seller fee than the legacy market, i.e., $k_P > k_L$, and attracts more sellers than the legacy market, i.e. $\Delta_s > 0$.*

The following proposition demonstrates the effect of the feedback loop of cross-group positive externalities in search and matching models. As more sellers are drawn in by the better matching probability on platform P, the buyer's matching probability is improved and more buyers choose to move from legacy market to platform P, creating a reinforced feedback loop.

Proposition 3 *There are more buyers on the platform.*

The next proposition shows that when legacy inflation is below a threshold platform inflation is below the legacy inflation and otherwise it is above.

Proposition 4 *Suppose $\xi < 1$. There is a threshold value $\hat{\mu}_L > 1$ such that if $\mu_L \lesseqqgtr \hat{\mu}_L$ then $\mu_P \gtreqqless \mu_L$.*

It is clear that $\mu_L = 1$, platform sets $\mu_P > 1$ to generate seignorage. This proposition follows because as legacy inflation μ_L goes up, platform inflation μ_P increases at a rate less than one and eventually falls below the legacy inflation. To see why, note that as legacy inflation rises, the legacy market lowers its buyer fee to retain customers. Consequently, the platform owner must take into account both the higher legacy inflation and the reduced legacy buyer fee, resulting in less than on a one-for-one increase in its inflation.

4 Comparative Statics: Numerical Exercises

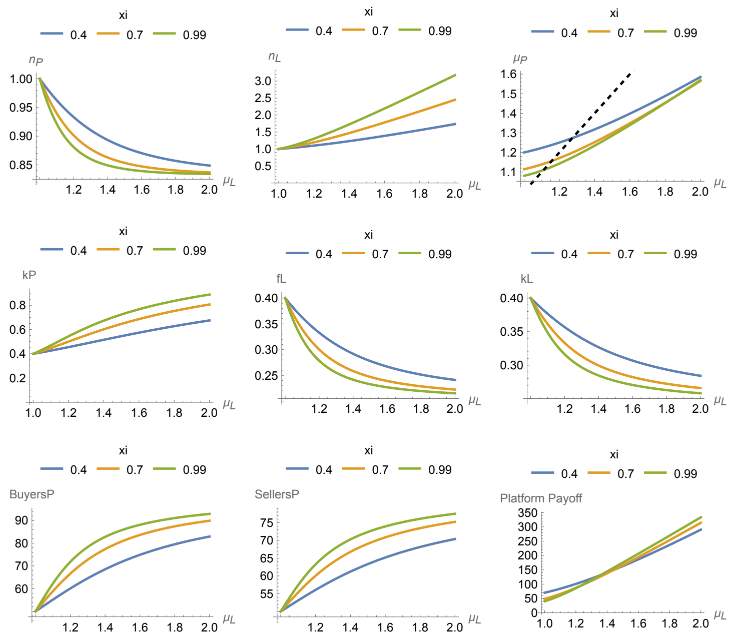
4.1 Identical Matching Technology

In our initial set of numerical analysis, we assume that the platform and legacy market share the same matching technology. Hence, the numerical findings in this subsection focus exclusively on the platform's unique advantage over the legacy market - its ability to control its money supply and collect seignorage.

Figure 2 summarizes our key findings regarding buyers' inflation salience by illustrating how variations in inflation salience affect equilibrium outcomes. Each graph plots legacy inflation on the x-axis against one outcome variable on the y-axis (e.g., market tightness, inflation rates, seller fees, the number of buyers and sellers, the platform owner's payoff, and buyer and seller fees in the legacy market). In every graph, three lines represent different levels of inflation salience (e.g., 0.4, 0.7, and 0.9).

In the third graph on the top row, we observe that platform inflation rises as legacy inflation increases. However, its response is less than one-to-one, as its slope is smaller than the 45-degree dashed line. This subdued response occurs because, as fiat inflation rises, the

Figure 2: Legacy Inflation: Salience



The graphs have μ_L on x-axis and an outcome variable (n_P, n_L, μ_P, k_P, f_L, k_l, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff) on y-axis. $\xi = 0.4$ in blue line, $\xi = 0.7$ in orange line, and $\xi = 0.9$ in green line. Parameters: $\alpha_P = 0.1$; $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 10$; $\sigma_b = 0.2$; $\gamma = 0.5$; $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 100$.

legacy marketplace lowers its buyer fee to retain customers (see the middle graph in the middle row). Consequently, the platform owner must raise its own inflation in reaction to both the higher legacy inflation and the reduced buyer fee but not on a one-for-one basis since the platform does not charge a buyer fee. Moreover, this graph reveals a double-edged effect of inflation salience on the platform's ability to adjust its money supply. When platform inflation lies above the 45-degree line (i.e., it is higher than legacy inflation), the platform effectively imposes higher inflation on buyers under low inflation salience (illustrated by the blue line being above the others). In contrast, when platform inflation falls below the 45-degree line (attracting buyers by offering lower inflation than the legacy market), the advantage narrows if buyers are relatively insensitive to high legacy inflation (as shown by the diminishing gap between the blue and green lines).

The first and second graphs on the bottom row demonstrate that, as legacy inflation rises, the platform attracts more buyers and sellers. This attraction is stronger when buyers more fully account for inflation costs (i.e., with a higher ξ). In other words, if buyers are less sensitive to inflation, it becomes more challenging for the platform to attract them (as evidenced by the green lines lying above the blue lines in these graphs). Nonetheless, the platform's ability to control its own inflation and collect seignorage income enables it to reduce buyer's participation costs, thereby drawing a large fraction of buyers and sellers away from the legacy market.

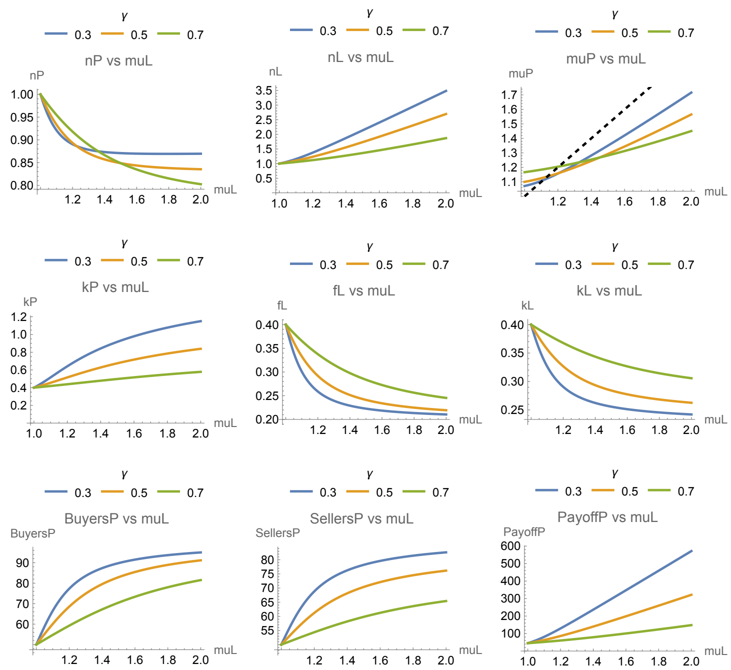
This advantage, in turn, allows the platform to charge a higher seller fee - since its increased buyer base improves matching probabilities for sellers (see k_P in the first graph, middle row) - while the legacy market is forced to lower its seller fee (k_L in the third graph, middle row). As a result, the market tightness (measured by the seller-buyer ratio) is lower on the platform (n_P, first graph, top row) and higher in the legacy market (n_L in the second graph, top row) as legacy inflation increases.

Finally, the third graph on the bottom row illustrates the double-edged effect of inflation salience on the platform's advantage of having private money. When platform inflation exceeds legacy inflation, the platform collects higher payoffs from buyers who are more inflation-biased (the blue line lies above the green line). However, when platform inflation is lower than legacy inflation, this advantage is eroded, as inflation-insensitive buyers do not fully internalize the cost of high legacy inflation (the green line then lies above the blue).

Using the same set of graphs and parameters (with $\xi = 0.8$), Figure 3 summarizes how variations in buyer's bargaining power affect equilibrium outcomes. In each graph, three lines represent different levels of buyer's bargaining power (for example, 0, 0.3, and 0.5). The figure shows that as buyers bargaining power decreases, the platform's profit increases, for instance in the third graph (bottom row), the blue line (indicating the lowest bargaining power) lies above the others.

Intuitively, when buyers have low bargaining power, they must pay higher prices for DM goods from sellers. As a result, they are required to hold more platform money for their transactions, which in turn gives the platform a greater advantage over the legacy market. Consequently, platform P is able to attract more buyers and, in turn, more sellers. This advantage allows the platform to charge sellers higher fees, while the legacy market must

Figure 3: Legacy Inflation: Bargaining Power



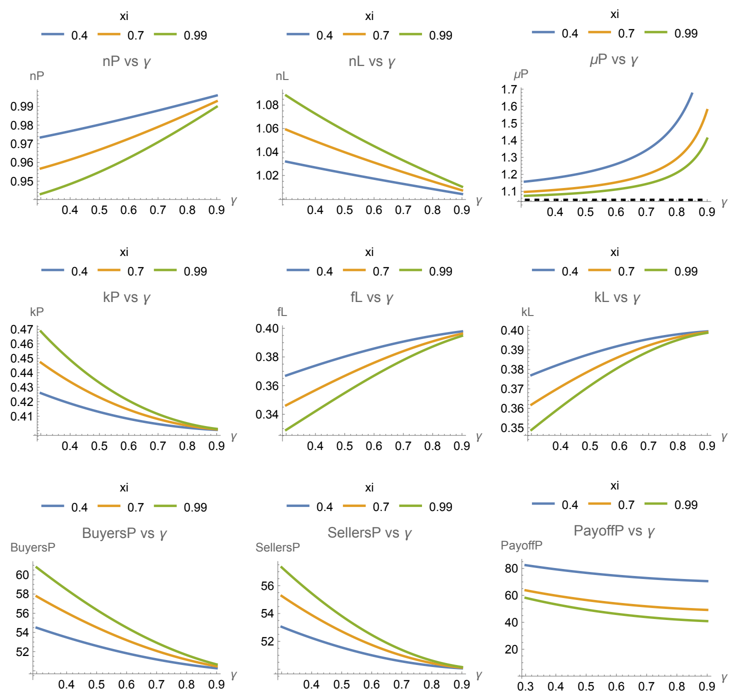
The graphs have μ_L on x-axis and an outcome variable (n_P, n_L, μ_P, k_P, f_L, k_l, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff) on y-axis. $\gamma = 0.3$ in blue line, $\gamma = 0.5$ in orange line, and $\gamma = 0.7$ in green line. Parameters: $\alpha_P = 0.1$; $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 10$; $\sigma_b = 0.2$; $\xi = 0.8$; $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 100$.

lower both buyer and seller fees by a larger margin in order to retain its participants (see the blue lines relative to the other lines in the middle and bottom row graphs). As a result, the market tightness (i.e., the seller-to-buyer ratio) in the legacy market becomes substantially higher than that on the platform (as shown in the second graph on the top row: n_L).

For high levels of legacy inflation, the platform can attract more buyers and sellers even if it imposes a higher platform inflation rate (though still lower than legacy inflation, as indicated by the region where all three lines lie below the 45-degree line in the third graph on the top row). In this regime, the platform charges more to sellers, which results in lower market tightness. Because the platform is more successful at attracting buyers than sellers under these conditions, we observe that platform inflation is higher and market tightness is lower when buyer's bargaining power is reduced.

However, at lower levels of legacy inflation, the platform's inflation rate is relatively larger, and its capacity to attract buyers by imposing higher inflation becomes limited. This issue is even more pronounced for sellers, who not only face fewer buyers but also must contend with a higher entry fee. Consequently, the seller-to-buyer ratio on the platform is lower when buyer's bargaining power is weak (See the first graph on the top row: n_P).

Figure 4: Bargaining Power and Inflation Salience



The graphs have γ on x-axis and an outcome variable (n_P, n_L, μ_P, k_P, f_L, k_l, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff) on y-axis. $\xi = 0.4$ in blue line, $\xi = 0.7$ in orange line, and $\xi = 0.99$ in green line. Parameters: $\alpha_P = 0.1$; $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 10$; $\sigma_b = 0.2$; $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 100$.

Using similar sets of parameters, Figure 4 illustrates that buyer's bargaining power plays a critical role in the platform's advantage over the legacy market when it comes to controlling inflation costs. The figure shows how variations in buyer's bargaining power affect key equilibrium outcomes. In every graph, three lines represent different levels of inflation salience (e.g., 0.4, 0.7, and 0.99).

The graphs reveal that as γ increases, the equilibrium outcome variables for the platform and legacy marketplaces tend to converge. This occurs because a higher γ means buyers hold less money, leaving platform P with reduced flexibility to adjust its money inflation rate to influence buyer's entry decisions. Moreover, as γ increases, the three lines in graphs of market tightness, buyer and seller proportions, buyer and seller fees on both marketplaces begin to converge. This convergence indicates that the impact of inflation salience diminishes when buyers have a lower demand for holding any form of money.

4.2 Better Platform Matching Technology

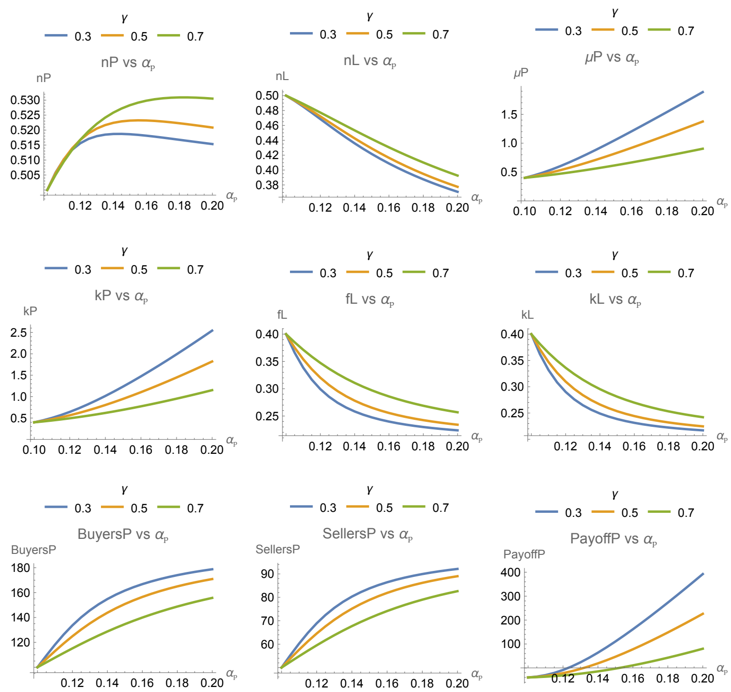
Next, we study the impact of better matching technology on the platform together with platform money on the same set of equilibrium outcomes studied in the earlier numerical exercises. We use either buyer bargaining power γ or inflation salience ξ to measure the extent of advantage of platform over legacy by having private money and α_P to measure the superiority of platform matching technology.

Figure 5 examines how variations in buyer bargaining power affect equilibrium outcomes. In these graphs, bargaining power is plotted on the x-axis while the y-axis represents a specific outcome variable. Each graph includes three lines corresponding to different levels of γ (e.g., 0.3, 0.5, and 0.7).

Our findings indicate that as the platform's matching technology improves, key variables such as the fraction of buyers on the platform, the number of sellers attracted, the seller fee, platform inflation, and the platform owner's payoff all increase. At the same time, the seller-to-buyer ratio (market tightness) initially rises but then falls as matching technology advances. This non-monotonic behaviour suggests that while the platform captures more seignorage income by attracting more buyers via private money, but better technology boosts the number of matches it can create, allowing more income from seller fees, thus more profitable to alter the balance of buyers and sellers by having a tighter market.

Moreover, the level of buyer bargaining power plays an important role in these dynamics. In most cases, the outcomes for the platform improve as γ decreases evidenced by the blue line (representing lower γ) lying above the others for almost all platform variables, except market tightness (n_P). In other words, when buyers have lower bargaining power, superior matching technology more effectively leverages platform money to attract buyers, which in

Figure 5: Bargaining Power with Better Platform Technology



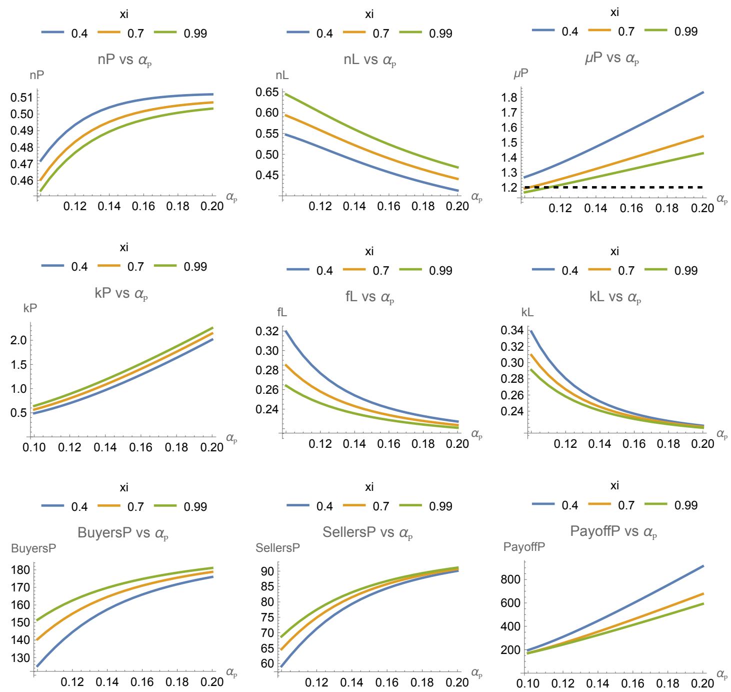
The graphs have α_P on x-axis and an outcome variable (n_P, n_L, μ_P, k_P, f_L, k_l, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff) on y-axis. $\gamma = 0.3$ in blue line, $\gamma = 0.5$ in orange line, and $\gamma = 0.7$ in green line. Parameters: $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 10$; $\sigma_b = 0.2$; $\xi = 0.8$; $\mu_L = 1.05$, $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 200$.

turn draws more sellers.

This advantage is further highlighted when comparing the platform to the legacy market. In the legacy market, the seller-to-buyer ratio consistently decreases with improvements in the platform matching technology, even as the legacy reduces buyer and seller fees (as shown in the corresponding graphs for n_L, f_L and k_L). This indicates that fewer sellers are willing to remain in the legacy market as the platform's matching technology becomes increasingly superior. In fact, each additional buyer attracted to the platform via its control over money supply generates a relatively larger influx of sellers compared to a scenario where both markets have the same technology, as illustrated in Figure 3.

Overall, these results reveal that lower buyer bargaining power, combined with enhanced platform matching technology, substantially strengthens the platform's competitive advan-

Figure 6: Inflation Salience with High Legacy Inflation: Better Platform Technology



The graphs have α_P on x-axis and an outcome variable (n_P, n_L, μ_P, k_P, f_L, k_l, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff) on y-axis. $\xi = 0.4$ in blue line, $\xi = 0.7$ in orange line, and $\xi = 0.99$ in green line. Parameters: $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 10$; $\sigma_b = 0.2$; $\gamma = 0.5$; $\mu_L = 1.20$, $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 200$.

tage over the legacy market.

Next, we examine how variations in buyer's inflation salience affect equilibrium outcomes in Figure 6. Each graph plots bargaining power on the x-axis against one outcome variable on the y-axis. In every graph, three lines represent different levels of ξ (e.g., 0.4, 0.7, and 0.99).

We observe similar results to those in Figure 5, with one notable exception. In the first graph on the top row, the platform's market tightness is higher for buyers with low inflation salience than for those with high inflation salience. This suggests that when buyers are less aware of the high inflation costs in the legacy market, the platform finds it more difficult to attract them. Consequently, limited inflation salience may erode the platform's advantage of controlling its own money supply, especially in an environment of high legacy inflation.

5 The Planner's Problem

In this section, we analyze social welfare by studying the planner's solution. The planner's objective is to maximize the total utility for all buyers, sellers, and the owners of marketplaces in this economy. Given that all the transactions in the CM as well as the payments from buyers to sellers are transfers between agents, maximization of total utility is equivalent to maximization of the total surplus from trade in DM.[7] Hence planner's problem can be stated as:

$$\begin{aligned}\max_{\Pi_b,\Pi_s} \quad & \overline{N}_b \gamma u \left[\Pi_b a_{Pb}(n_P) + (1-\Pi_b) a_{bL}(n_L)\right] \\ & + \overline{N}_s (1-\gamma) u \left[\Pi_s a_{Ps}(n_P) + (1-\Pi_s) a_{Ls}(n_L)\right] \end{aligned} \tag{31}$$

and subject to the market clearing conditions:

$$n_P = \frac{\overline{N}_s \Pi_s}{\overline{N}_b \Pi_b} \text{ and } n_L = \frac{\overline{N}_s (1-\Pi_s)}{\overline{N}_b (1-\Pi_b)}. \tag{32}$$

Note that we allow the planner to allocate the shares of buyers (Π_b) and of sellers (Π_s) to each marketplace directly. Clearly, any allocation that the planner can achieve by choosing fees and money growth rates, she can also achieve by directly allocating buyers and sellers. In fact, the opposite is also true. The planner can achieve any allocation of buyers and sellers by choosing the fees to buyers and sellers appropriately.

We can simplify the above objective function using $a_{js}(n_j) = a_{jb}(n_j)/n_j$ and plugging in for the expressions of n_P and n_L. The objective becomes:

$$\max_{\Pi_b,\Pi_s} \Pi_b a_{Pb}(n_P) + (1-\Pi_b) a_{Lb}(n_L). \tag{33}$$

That is, maximizing the trading surplus is equivalent to maximizing the combined matching probabilities for buyers on the two marketplaces.

Proposition 5 *When the matching technology is symmetric across marketplaces, the planner's solution is $n_P = n_L = \overline{N}_s/\overline{N}_b$. When platform P has a superior matching technology, the planner's solution is $\Pi_s = \Pi_b = 1$.*

[7]See the appendix for a formal derivation.

Due to concavity of the matching function, in any marketplace where there is trade, it is optimal to set market tightness equal to $\overline{N}_s/\overline{N}_b$. With symmetric technology any allocation of buyers and sellers to the two marketplaces that preserves the optimal tightness is socially optimal. When platform P has superior matching technology, it is optimal to have all sellers and buyers on the platform which automatically preserves the optimal tightness.

Recall from Corollary 1 that $n_P < n_L$. This leads to the next corollary.

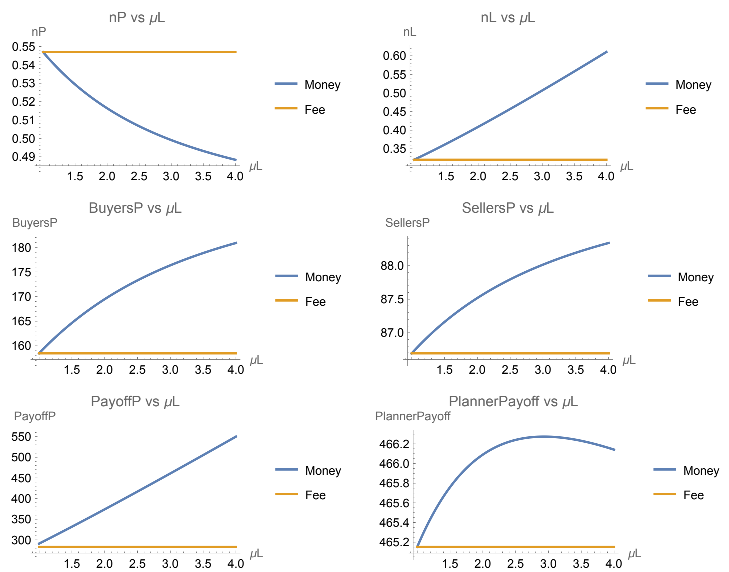
Corollary 2 *When the matching technology is the same cross two marketplaces, competitive equilibrium with private money does not achieve the social optimum because the seller-buyer ratio on platform P is too low.*

When platform P has superior matching technology, the social optimum is for all buyers and sellers to be on the platform. There are two important outcome differences between the competitive equilibrium and the social optimum: the market tightness is generically not equal to $\overline{N}_s/\overline{N}_b$ and the number of buyers or sellers are too low on the platform. Controlling platform money helps platform P to attract buyers, moving the competitive equilibrium towards the social optimum. However it also has a cost, which is that as more buyers come to platform, there are not enough sellers to enter the platform due to the high entry cost set by the platform's owner. Because of the concavity of the matching function, the probability of buyers being matched is not increasing fast enough, causing the competitive outcome deviating from the social optimum. The following proposition states this result formally.

Proposition 6 *When platform P has strictly better matching technology, allowing private money in the competitive equilibrium can achieve a better outcome from the planner's perspective than the case where private money is not allowed. This happens if the number of total buyers or the scale parameter σ_b is high enough.*

Figure 7 compares how each of the equilibrium outcomes (n_P, n_L, number of buyers (BuyerP), number of sellers (SellerP), platform's payoff and planner's payoff) varies with legacy inflation for the following two cases: the case when platform is allowed to use private money (labeled as money in the blue line) and the case where the private money is not allowed (labeled as fee in the orange line). In these graphs, legacy inflation is plotted on the x-axis while the y-axis represents a specific outcome variable. It gives an example that

Figure 7: Money vs Fee



The graphs have μ_L on x-axis and an outcome variable (n_p, n_L, buyer number on platform (BuyersP), seller number on platform (SellersP), platform owner's payoff, planner's payoff) on y-axis. Platform money in the blue line and platform fee only in the orange line. Parameters: $\alpha_L = 0.1$; $\rho = 0.5$; $\beta = 0.9$; $u = 1$; $\sigma_b = 0.2$; $\gamma = 0.5$; $\mu_L = 1.20$, $\sigma_s = 0.2$; $\bar{N}_s = 100$; $\bar{N}_b = 200$; $\alpha_P = 0.8$; $\xi = 0.95$.

planner prefers money outcome versus the fee outcome (see the second graph on the bottom row). In the equilibrium where platform money is allowed, the market tightness on the platform is lower (further away from the social optimum), but the number of buyer on the platform is larger (closer to the social optimum), than the case when platform is only allowed to charge a fixed fee.

6 Conclusion

Our analysis demonstrates that when a platform possesses the ability to issue its own money, it can strategically control its money supply to attract buyers. This increased buyer participation subsequently draws more sellers, thereby launching and amplifying network externalities between buyers and sellers - especially when combined with enhanced matching technologies. Moreover, our results indicate that such platforms exercise considerable market power - not only over the money supply but also over seller entry - by imposing relatively high seller fees. Importantly, the resulting equilibrium may deviate from social efficiency, highlighting potential welfare implications.

This study raises a critical policy question regarding the social welfare consequences of allowing platforms to maintain private payment systems. Currently, regulated financial institutions, regarded as trustworthy third parties, dominate payment systems. However, digital platforms are increasingly equipped with advanced data processing and machine learning capabilities that not only improve buyer-seller matching but also secure transactions. With the growing prevalence of platform-based economies, it is essential to examine whether these digital marketplaces, through their intrinsic economic synergy with payment systems, should be entitled to the seigniorage income traditionally captured by financial institutions.

Empirical policy experiences further underscore the relevance of this inquiry. For instance, following the easing of COVID-19 restrictions, cities and regional governments in China deployed e-coupons and e-voucher – disbursed directly to resident's WeChat or Alipay wallet - to boost consumption. A study of 42 Chinese cities reveal that the most adversely affected sectors, including dining, retail, and tourism, received significant support (with 81% of vouchers allocated to eating out, 73% for retail, and 48% for tourism).[8] In September 2024, the Shanghai government further injected 500 million yuan (approximately US $71.2 million) in consumption vouchers into digital wallets as part of a broader strategy to revive the economy. By contrast, the U.S. response to the pandemic involved dispersing Economic Impact Payments (or Stimulus checks) via direct deposits and bank-issued cards under the $1.9 billion American Rescue Plan Act, without spending restrictions. Future work could profitably investigate the spending patterns and ultimate beneficiaries of these distinct policy approaches.

[8]https://www.caixinglobal.com/2020-05-20/in-depth-who-really-benefits-from-consumption-vouchers-101556620.html

References

Armstrong, M. (2006). Competition in two-sided markets. *The RAND journal of economics*, 37(3):668–691.

Brunnermeier, M. K. and Payne, J. (2023). Strategic money and credit ledgers. Technical report, National Bureau of Economic Research.

Caillaud, B. and Jullien, B. (2001). Competing cybermediaries. *European Economic Review*, 45(4-6):797–808.

Caillaud, B. and Jullien, B. (2003). Chicken & egg: Competition among intermediation service providers. *RAND journal of Economics*, pages 309–328.

Chen, K.-P. and Huang, Y.-C. (2012). A search-matching model of the buyer–seller platforms. *CESifo Economic Studies*, 58(4):626–649.

Evans, D. S. and Schmalensee, R. (2016). *Matchmakers: The new economics of multisided platforms*. Harvard Business Review Press.

Gautier, P., Hu, B., and Watanabe, M. (2023). Marketmaking middlemen. *The Rand journal of economics*, 54(1):83–103.

Goos, M., Van Cayseele, P., and Willekens, B. (2014). Platform pricing in matching markets. *Review of Network Economics*, 12(4):437–457.

Lagos, R., Rocheteau, G., and Wright, R. (2017). Liquidity: A new monetarist perspective. *Journal of Economic Literature*, 55(2):371–440.

Lagos, R. and Wright, R. (2005). A unified framework for monetary theory and policy analysis. *Journal of political Economy*, 113(3):463–484.

Rochet, J.-C. and Tirole, J. (2002). Cooperation among competitors: Some economics of payment card associations. *Rand Journal of economics*, pages 549–570.

Rochet, J.-C. and Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the european economic association*, 1(4):990–1029.

Rochet, J.-C. and Tirole, J. (2006). Two-sided markets: a progress report. *The RAND journal of economics*, 37(3):645–667.

Sockin, M. and Xiong, W. (2023). Decentralization through tokenization. *The Journal of Finance*, 78(1):247–299.

Spulber, D. F. (1999). *Market microstructure: intermediaries and the theory of the firm*. Cambridge University Press.

Spulber, D. F. (2017). Complementary monopolies and bargaining. *The Journal of Law and Economics*, 60(1):29–74.

Weyl, E. G. (2010). A price theory of multi-sided platforms. *American economic review*, 100(4):1642–1672.

You, Y. and Rogoff, K. S. (2019). Redeemable platform currencies. Technical report, National Bureau of Economic Research.

A Appendix

A.1 Proof of Lemma 2

By the equilibrium condition:

$$\frac{\overline{N}_s \Pi_s(\Delta_s)}{\overline{N}_b \Pi_b(\Delta_b)} = n_P, \text{ and} \tag{A.1}$$

$$\frac{\overline{N}_s (1 - \Pi_s(\Delta_s))}{\overline{N}_b (1 - \Pi_b(\Delta_b))} = n_L. \tag{A.2}$$

Hence:

$$n_p \leq n_L \Leftrightarrow \Pi_s(\Delta_s) \leq \Pi_b(\Delta_b) \Leftrightarrow \frac{1}{1 + \exp\left(-\frac{\Delta_s}{\sigma_s}\right)} \leq \frac{1}{1 + \exp\left(-\frac{\Delta_b}{\sigma_b}\right)} \Leftrightarrow \frac{\Delta_s}{\sigma_s} \leq \frac{\Delta_b}{\sigma_b}.$$

A.2 Proof of Proposition 1

Suppose $a_{Ps}(n_P) \le a_{Ls}(n_L)$. Then $n_P \ge n_L$ and by Lemma 2 $\frac{\Delta_s}{\sigma_s} \ge \frac{\Delta_b}{\sigma_b}$. Unpacking the expression of Δ_b using Equation (15) and Δ_s using Equation (18) and plugging optimal $f_L, f_P, k_P, k_L, \mu_P$ as in (22), (28), (29), (25), and (26), we obtain

$$\frac{1}{\sigma_s}\beta\left(a_{Ps}(n_P) - a_{Ls}(n_L)\right)(1-\gamma)\,u + \frac{1}{\sigma_s}\left(\frac{1-2\Pi_s(\Delta_s)}{\Pi_s'(\Delta_s)}\right) \ge$$

$$\frac{1}{\sigma_b}\left[\beta\left(\underbrace{a_{Pb}(n_P) - a_{Lb}(n_L)}_{\text{Superior matching}}\right)\gamma u + \underbrace{\xi\,(1-\gamma)\,u\,(\mu_L - 1)}_{\text{Control money supply}}\right] + \frac{1}{\sigma_b}\left(\frac{1-2\Pi_b(\Delta_b)}{\Pi_b'(\Delta_b)}\right). \quad \text{(A.3)}$$

Since $\mu_L > 1$, $a_{Ps}(n_P) \le a_{Ps}(n_L)$, and $a_{Pb}(n_P) \ge a_{Lb}(n_L)$. The above inequality must imply the following:

$$\frac{1}{\sigma_s}\left[\left(\frac{1-2\Pi_s(\Delta_s)}{\Pi_s'(\Delta_s)}\right)\right] \ge \frac{1}{\sigma_b}\left[\left(\frac{1-2\Pi_b(\Delta_b)}{\Pi_b'(\Delta_b)}\right)\right]. \quad \text{(A.4)}$$

By Gumble distribution, we know that:

$$\Pi_i(x) = \left[1 + \exp\left(-\frac{\Delta_i}{\sigma_i}\right)\right]^{-1} \text{ and} \quad \text{(A.5)}$$

$$\Pi_i'(x) = \frac{1}{\sigma_i}\left[1 + \exp\left(-\frac{\Delta_i}{\sigma_i}\right)\right]^{-2}\exp\left(-\frac{\Delta_i}{\sigma_i}\right), i \in \{b, s\}. \quad \text{(A.6)}$$

Plug in $\Pi_i(\cdot)$ and after some algebra, the above equation can then be simplified as:

$$\exp\left(-\frac{\Delta_b}{\sigma_b}\right)\exp\left(-\frac{\Delta_s}{\sigma_s}\right)\left[\left(\exp\left(-\frac{\Delta_s}{\sigma_s}\right)\right) - \left(\exp\left(-\frac{\Delta_b}{\sigma_b}\right)\right)\right] > \exp\left(-\frac{\Delta_b}{\sigma_b}\right) - \exp\left(-\frac{\Delta_s}{\sigma_s}\right).$$

Note that for this inequality to hold we must have:

$$\frac{\Delta_s}{\sigma_s} < \frac{\Delta_b}{\sigma_b}, \quad \text{(A.7)}$$

which is a contradiction.

A.3 Proof of Proposition 2

Using FOCs for k_P and k_L, we have $k_P > k_L$ if and only if $\frac{\Pi_s(\Delta_s)}{\Pi_s'(\Delta_s)} > \frac{1-\Pi_s(\Delta_s)}{\Pi_s'(\Delta_s)}$. This is true if and only if $\Pi_s(\Delta_s) > \frac{1}{2}$ if and only if $\Delta_s > 0$. Note $\Delta_s = \beta\left(a_{Ps}(n_P) - a_{Ls}(n_L)\right)(1-\gamma)\,u + (k_L - k_P)$. The first term is strictly positive. Suppose that $k_P \le k_L$, the second term is also positive and hence, $\Delta_s > 0$, which implies $k_P > k_L$. Thus, we must have $k_P > k_L$. We must also have $\Delta_s > 0$.

A.4 Proof of Proposition 3

More buyers on platform P if

$$\Delta_b = \beta \left(a_{Pb}(n_P) - a_{Lb}(n_L)\right) \gamma u + \xi \left(1-\gamma\right) u \left(\mu_L - 1\right) + \left(\frac{1 - 2\Pi_b\left(\Delta_b\right)}{\Pi_b'\left(\Delta_b\right)}\right) > 0. \qquad \text{(A.8)}$$

Towards a contradiction, let us suppose that $\Delta_b < 0$ or equivalently $\Pi_b\left(\Delta_b\right) < 0.5$. In this case, it must be that $a_{Pb}(n_P) < a_{Lb}(n_L)$ since otherwise all the terms on the right side of the above equation are positive.

However, if $a_{Pb}(n_P) < a_{Lb}(n_L)$ then $n_P < n_L$, which by Lemma 1 implies $\frac{\Delta_s}{\sigma_s} < \frac{\Delta_b}{\sigma_b} < 0$. But then $\Delta_s < 0$, which is a contradiction since we already established $\Delta_s > 0$ in Proposition 2. Then, we must have $\Delta_b > 0$.

A.5 Proof of Proposition 5

The first order condition with respect to $\Pi_b < 1$ is:

$$a_{Pb}(n_P) - a'_{Pb}(n_P)n_P \;\; \geq \;\; a_{Lb}(n_L) - a'_{Lb}(n_L)n_L, \qquad \text{(A.9)}$$

where the above condition holds with equality if $\Pi_b < 1$.

The first order condition with respect to $\Pi_s < 1$ is:

$$a'_{Pb}(n_P) \;\; \geq \;\; a'_{Lb}(n_L), \qquad \text{(A.10)}$$

where the above condition holds with equality if $\Pi_s < 1$.

We observe $a_{Pb}\left(0\right) = a_{Lb}\left(0\right) = 0$. We assume that $a'_{Pb}(n) > a'_{Lb}(n), \forall n > 0$. That is, the concave matching function for for the platform has a steeper slope for the same tightness than the legacy marketplace.

Let us suppose that $\Pi_s < 1$. Then FOC gives $a'_{Pb}(n_P) = a'_{Lb}(n_L)$. By concavity of a_{Pb} and a_{Lb}, $n_P > n_L$. However, we find that

$$\begin{aligned} a_{Pb}(n_P) - a'_{Pb}(n_P)n_P &= \\ a_{Pb}(n_L) - a'_{Pb}(n_P)n_L + \int_{n_L}^{n_P} a'_{Pb}(n)dn - a'_{Pb}(n_P)\left(n_P - n_L\right) &> \\ a_{Pb}(n_L) - a'_{Pb}(n_P)n_L + \int_{n_L}^{n_P} a'_{Pb}(n_P)dn - a'_{Pb}(n_P)\left(n_P - n_L\right) &= \\ a_{Pb}(n_L) - a'_{Pb}(n_P)n_L &> \\ a_{Lb}(n_L) - a'_{Lb}(n_L)n_L. \end{aligned}$$

The second inequality holds because $a'_{Pb}(n) > a'_{Pb}(n_P)$ for all $n \in (n_L, n_P)$. Since the first order condition with respect to Π_b holds in strict inequality, therefore $\Pi_b = 1$. Plugging $\Pi_b = 1$ into the objective function, we get:

$$\max_{\Pi_s,\Pi_b} \Pi_b a_{Pb}\left(\frac{\overline{N}_s\Pi_s}{\overline{N}_b\Pi_b}\right) + (1-\Pi_b)a_{Lb}\left(\frac{\overline{N}_s\left(1-\Pi_s\right)}{\overline{N}_b\left(1-\Pi_b\right)}\right) = \max_{\Pi_s,\Pi_b} a_{Pb}\left(\frac{\overline{N}_s\Pi_s}{\overline{N}_b}\right).$$

This maximization problem implies that $\Pi_s = 1$ since a_{Pb} is increasing. Hence we must have $\Pi_s = 1$.

After proving that $\Pi_s = 1$, we now turn to show that $\Pi_b = 1$. Plugging $\Pi_s = 1$ into the planner's objective function, we obtain

$$\begin{aligned}\max_{\Pi_s,\Pi_b} \Pi_b a_{Pb}\left(\frac{\overline{N}_s\Pi_s}{\overline{N}_b\Pi_b}\right) + (1-\Pi_b)a_{Lb}\left(\frac{\overline{N}_s\left(1-\Pi_s\right)}{\overline{N}_b\left(1-\Pi_b\right)}\right) &= \\ \max_{\Pi_s,\Pi_b} \Pi_b a_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right) + (1-\Pi_b)a_{Lb}(0) &= \max_{\Pi_b} \Pi_b a_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right).\end{aligned}$$

The first order condition with respect to Π_b becomes:

$$a_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right) - a'_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right)\frac{\overline{N}_s}{\overline{N}_b\Pi_b} \geq a_{Lb}(0) - a'_{Lb}(0)0 = 0. \tag{A.11}$$

Or

$$\frac{a_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right)}{\frac{\overline{N}_s}{\overline{N}_b\Pi_b}} \geq a'_{Pb}\left(\frac{\overline{N}_s}{\overline{N}_b\Pi_b}\right). \tag{A.12}$$

Since a_{Pb} is concave, the above cannot hold with equality. So we must have $\Pi_b = 1$.