Intermediary Cost and Coexistence Puzzle

Young Sik Kim and Manjong Lee
Intermediary Cost and Coexistence Puzzle

YOUNG SIK KIM* and MANJONG LEE†

Abstract

The coexistence puzzle is explained via an interaction between intermediary cost and uncertainty on consumption trade. If the trade opportunity as a buyer is more likely to arise, ex-ante net return on bond at the margin would be negative up to a certain amount of transaction and, therefore, agents are willing to hold money in the presence of interest-bearing bond.

Keywords: intermediary cost, interest-bearing asset, coexistence puzzle

JEL classification: E40, E42

1. Introduction

The coexistence puzzle has been one of the long-standing issues for monetary economists at least since Hicks (1935). Gherity (1993) and Burdekin and Weidenmier (2008) report that several types of bonds issued during the U.S. Civil War were circulated at par (face value without interest) as media of exchange until shortly before maturity, but failed to drive money out of circulation.

This paper provides an explanation for the coexistence puzzle based on the interaction between intermediary cost and uncertainty on consumption trade as the key determinant of portfolio choice between money and interest-bearing asset. Specifically, we embed the "shoeleather" or intermediary cost incurred in the purchase of government bond into a general equilibrium model in which money is essential. One-period interest-bearing government

*Department of Economics & SIRFE, Seoul National University, 599 Gwanak-no, Gwanak-gu, Seoul 151-746, Korea, Email: kimy@snu.ac.kr, Tel: +82-2-880-6387, Fax: +82-2-886-4231
†Corresponding Author, Department of Economics, Korea University, Anam-dong, Seongbuk-gu, Seoul 136-701, Korea, Email: manjong@korea.ac.kr, Tel: +82-2-3290-2223, Fax: +82-2-3290-2200
bond can be freely liquidated at par for consumption-good purchase and intermediary cost is strictly less than its return at maturity.\textsuperscript{1} Therefore, ex-post return on bond net of intermediary cost is strictly positive.

However, ex-ante return on bond net of intermediary cost is not always positive. For example, net return on bond can be negative at the margin if it is used for consumption purchase and its return from early redemption is sufficiently small, which was the case of Civil-War bonds that were circulated at face value without interest. Then people are willing to hold money for consumption purchase even in the presence of interest-bearing bond. In general, ex-ante return on bond net of intermediary cost depends on the likelihood that bond is liquidated for consumption purchase, which is determined by trade opportunity as a buyer and expected amount of transaction. The novelty here is that the commonly-observed intermediary cost together with uncertainty on consumption transaction turns out to be a fundamental ingredient of the coexistence result.\textsuperscript{2}

2. Model

The environment is that of Lagos and Wright (2005) with competitive markets as in Berentsen et al. (2005). Time is indexed by $t \in \mathbb{Z}_+$ and in each period a unit mass of infinitely-lived agents trade in three Walrasian markets for consumption good, called market 1, 2, and 3, that open sequentially. Trading histories are private and agent cannot commit to their future actions, which make a medium of exchange essential. Each agent maximizes discounted expected utility with the discount factor $\beta \in (0, 1)$ between one period and the next.

There is one perishable and perfectly divisible good which can be potentially produced and consumed by all agents. There are two other objects, called money and bond. Money is

\textsuperscript{1}Based on the observation of a non-trivial fraction of U.S. households with no interest-bearing assets, Mulligan and Sala-i-Martin (1996) and Lucas (2000) argue that this intermediary cost would be sizable.

\textsuperscript{2}Among the recent related works using search-theoretic models of money are Aiyagari et al. (1996), Shi (2005), Boel and Camera (2006), Zhu and Wallace (2007), Berentsen and Waller (2008), Marchesiani and Senesi (2009), and Lagos (2010).
durable, perfectly divisible, and its stock is exogenously given by $M > 0$. A risk-free bond takes the form of book-entry coupon bond issued by the government that has a technology for record keeping on intra-day bond transactions, but not on agents’ trading histories. The purchase of a bond at the price of one unit of money requires an agent physical effort which incurs disutility $\gamma > 0$ per unit of bond. In the real world, this cost can be interpreted as the time spent in purchasing a bond as well as the transaction fee charged by security dealers. Hence, hereinafter we call it an intermediary cost, although we do not introduce financial intermediary explicitly. Upon request for bond liquidation before maturity, the government can cash in a bond at par (i.e., one unit of money) with no coupon payment. This is consistent with the historical facts documented in Gherity (1993) and Burdekin and Weidenmier (2008). If a bond takes the form of discount bond rather than coupon bond, liquidating a bond can be interpreted as giving up remaining accrued interest.

The sequence of events within a period is as follows. When entering market 1 with a given amount of money, each agent receives an individual trading shock such that she will become, with equal probability, either a buyer or a seller of consumption good. Agents get utility $u(q)$ from consuming $q \in \mathbb{R}_+$ units of good where $u''(q) < 0 < u'(q)$, $u'(\infty) = 0$, $u(0) = 0$, and $u'(0) = \infty$. Production of $q \in \mathbb{R}_+$ units of good incurs disutility $q$, which is also the case in market 2 and 3 described below.

With money balance after the trade in market 1, agents move on to market 2 and choose portfolio of money and bond. Then, an agent becomes either a buyer with probability $\rho_b$ or a seller with probability $\rho_s = 1 - \rho_b$. An agent gets utility $\varepsilon_i u(q)$ from consuming $q$ units of good where $\varepsilon_i \in \{\varepsilon_h, \varepsilon_l\}$ with $\varepsilon_h > \varepsilon_l$ represents an aggregate preference shock which is realized together with individual trading shocks (to be a buyer or a seller). In particular, $\varepsilon_i = \varepsilon_h$ with probability $\delta_h$ and $\varepsilon_i = \varepsilon_l$ with probability $\delta_l = 1 - \delta_h$. As a buyer, an agent can freely liquidate a bond at par for consumption purchase, in which case she essentially gives up interest-bearing coupon. The proceeds of bond sales are used to produce goods by
the government which has access to a linear technology. Specifically, the government can produce \( \theta > \gamma \) units of good per unit of money at no cost.

At the beginning of market 3, the government redeems a bond with a unit of money and \( \theta \) units of good according to its records that are wiped out immediately after redemption. Other than selling and redeeming bonds, there is no activity of the government so that its budget is always in balance. In market 3, all agents can consume and produce, and get utility \( U(q) \) from consuming \( q \in \mathbb{R}_+ \) units of good where \( U(\cdot) \) satisfies all the nice properties mentioned above.\(^3\) Agents also choose money balance to carry into the following period.

3. Equilibrium

Let \( p_{j,t} \) and \( q_{j,t} \) denote respectively price and quantity of good traded in market \( j \in \{1, 2, 3\} \) at period \( t \). We will study equilibria in which real balance of money at the end of period is constant with a fixed stock of money \( M \). For this reason, we will drop the time subscript \( t \) and index the next-period variable by +1, if there is no risk of confusion. An equilibrium can be defined as \( \{p_j\}_{j=1}^3, \{q_j\}_{j=1}^3 \), portfolio in market 2, and money demand in market 3, which satisfy the conditions described below.

Let \( V_3(m_3, g_3) \) denote the expected value for an agent who enters market 3 with \( (m_3, g_3) \) where \( m_3 \) and \( g_3 \) denote respectively money and government-bond balances brought into market 3. Let \( \phi \) denote the price of money in terms of good in market 3, \( p_3 = 1/\phi \). Then, the problem for an agent entering market 3 with \( (m_3, g_3) \) is

\[
V_3(m_3, g_3) = \max_{(q_3^b, q_3^s, m_{1,+1})} \left[ U(q_3^b) - q_3^s + \beta V_1(m_{1,+1}) \right]
\]

subject to \( q_3^b + \phi m_{1,+1} = q_3^s + \phi (m_3 + g_3) + \theta g_3 \). Here \( q_3^b \) and \( q_3^s \) denote respectively consumption and production in market 3, and \( V_1(m_{1,+1}) \) is the expected value of entering market 1 in the

\(^3\)As discussed in Berentsen et al. (2005), the different preference in market 3 is just a technical device to ensure degenerate distribution at the beginning of each period.
following period with money balance $m_{1,+1}$. Substituting $q^b_3$ from the constraint, we have

$$V_3(m_3, g_3) = \phi(m_3 + g_3) + \theta g_3 + \max_{(q^b_3, m_{1,+1})} \left[ U(q^b_3) - q^b_3 - \phi m_{1,+1} + \beta V_1(m_{1,+1}) \right].$$

The first-order conditions are $U'(q^b_3) = 1$ and $\phi = \beta V'_1(m_{1,+1})$ if $m_{1,+1} > 0$. As in Lagos and Wright (2005), the latter implies that all agents exit market 3 with identical money balance $(m_{1,+1})$.

We next turn to market 2. Let $V_2(m_2)$ be the expected value for an agent entering market 2 with $m_2$. We let $\Gamma(m_2)$ be a set of feasible portfolios for an agent with $m_2$, defined by

$$\Gamma(m_2) = \{a = (\tilde{m}_2, g_2) \in \mathbb{R}^2_+ : \tilde{m}_2 + g_2 \leq m_2\}.$$ Then the portfolio choice problem is

$$V_2(m_2) = \max_{a \in \Gamma(m_2)} J(a)$$

where $J(a)$ represents the expected payoff from choosing $a = (\tilde{m}_2, g_2)$ prior to the realization of preference shocks in market 2, which can be expressed as

$$J(a) = \rho_b \left\{ \sum_{i \in \{h,l\}} \delta_i \max_{q^b_{2i}} \left[ \varepsilon_i u(q^b_{2i}) + V_3 \left( (\tilde{m}_2 - p_2 q^b_{2i}) I^c, g_2 - (p_2 q^b_{2i} - \tilde{m}_2) I_{\{p_2 q^b_{2i} > \tilde{m}_2\}} \right) \right] \right\} + \rho_s \left\{ \max_{q^s_2} \left[ -q^s_2 + V_3 ((\tilde{m}_2 + p_2 q^s_2), g_2) \right] \right\} - \gamma g_2.$$  \hspace{1cm} (2)

Here $I$ denotes an indicator such that $I = 1$ if and only if $p_2 q_2 > \tilde{m}_2$ and $I^c = 1 - I$. Conditional on the realization of $\varepsilon_i$ and individual trading shocks, an agent chooses $q^b_{2i}$ and $q^s_2$, taking $p_2$ as given. More specifically, as a seller, an agent solves the second term of (2), which yields the first-order condition $p_2 = (1/\phi) = p_3$ regardless of $a = (\tilde{m}_2, g_2)$. That is, sellers are willing to supply consumption good inelastically at a price $p_2 = p_3$. Similarly, as a buyer, an agent solves the first term of (2) subject to $p_2 q^b_{2i} \leq \tilde{m}_2 + g_2$, which yields the
optimal conditions for $i \in \{h, l\}$ as follows:

$$
\varepsilon_i u'(q^b_{2i}) = \begin{cases} 
V'_{3,1}(\cdot) = \phi & \text{if } \mathbb{I}_{\{p_2 q^b_{2i} > \bar{m}_2\}} = 0 \\
V'_{3,2}(\cdot) = \phi + \theta & \text{if } \mathbb{I}_{\{p_2 q^b_{2i} > \bar{m}_2\}} = 1.
\end{cases}
$$ (3)

Let $\hat{q}^b_{2i}$ be a solution to the second line of (3) for $i \in \{h, l\}$ with a given price $p_2$. Then it is easy to show that $\hat{q}^b_{2i}$ decreases in $\theta$. As the coupon rate increases, the willingness to liquidate a bond for consumption purchase decreases.

Finally, $V_1(m_1)$, the expected value for an agent entering market 1 with $m_1$ can be expressed as

$$
V_1(m_1) = \frac{1}{2} \left\{ \max_{q^b_i} [u(q^b_i) + V_2(m_1 - p_1 q^b_i)] \right\} + \frac{1}{2} \left\{ \max_{q^s_i} [V_2(m_1 + p_1 q^s_i) - q^s_i] \right\}.
$$ (4)

As in market 2, a seller chooses $q^s_i$ which solves the second term on the right-hand side of (4), taking $p_1$ as given. This yields the first-order condition

$$
\frac{1}{p_1} = V_2'(m_1 + p_1 q^s_i).
$$ (5)

Similarly, a buyer chooses $q^b_i$ which solves the first term on the right-hand side of (4) subject to $p_1 q^b_i \leq m_1$, taking $p_1$ as given. Notice that we can rule out the case of $p_1 q^b_i = m_1$ because $\varepsilon_i u'(0) = \infty$. The optimal condition is

$$
\frac{u'(q^b_i)}{p_1} = V_2'(m_1 - p_1 q^b_i).
$$ (6)

4. Coexistence Result

The following results show that ex-ante return on bond net of intermediary cost can be negative at the margin depending on (i) the trade opportunity as a buyer of consumption
good \((\rho_b)\) and (ii) the likelihood \(\delta_h\) of aggregate preference shock which determines amount of transaction.

**Lemma 1** If \(\rho_b \leq [(\theta - \gamma)/\theta]\), \(a = (0, m_2)\) is optimal for an agent with \(m_2\) after the trade in market 1.

This Lemma suggests that money would not be held at all if the trade opportunity as a buyer is too scarce.\(^4\) Therefore, hereinafter, we will focus on the case of \(\rho_b > [(\theta - \gamma)/\theta]\).

**Proposition 1** Suppose \(\rho_b > [(\theta - \gamma)/\theta]\). (i) If \(\delta_h \leq [(\theta - \gamma)/\theta \rho_b]\), an optimal portfolio for an agent with \(m_2 \geq p_2 q_{2h}^b\) is \(a = (p_2 q_{2l}^b, m_2 - p_2 q_{2l}^b)\), whereas that for an agent with \(m_2 < p_2 q_{2h}^b\) is \(a = (m_2, 0)\). (ii) If \(\delta_h > [(\theta - \gamma)/\theta \rho_b]\), an optimal portfolio for an agent with \(m_2 \geq p_2 q_{2h}^b\) is \(a = (p_2 q_{2h}^b, m_2 - p_2 q_{2h}^b)\), whereas that for an agent with \(m_2 < p_2 q_{2h}^b\) is \(a = (m_2, 0)\).

Proposition 1 implies that ex-ante net return on bond is negative up to \(p_2 q_{2h}^b\) if \(\varepsilon_h\) is most likely to occur in market 2. Hence, agents are willing to hold sufficient amount of money for the largest possible quantity of trade in the upcoming market 2. On the other hand, if \(\varepsilon_l\) is most likely to occur, ex-ante net return on bond exceeding \(p_2 q_{2l}^b\) dominates that of money. Hence, no one is willing to hold money more than \(p_2 q_{2l}^b\). Furthermore, Proposition 1 implies that if \(\delta_h > [(\theta - \gamma)/\theta \rho_b]\), all trades in market 2 are made using money carried into the market regardless of the realized aggregate preference shock \(\varepsilon_i\). More interesting equilibrium arises with \(\delta_h \leq [(\theta - \gamma)/\theta \rho_b]\).

**Lemma 2** Suppose \(\delta_h \leq [(\theta - \gamma)/\theta \rho_b]\). For \(\varepsilon_i = \varepsilon_h\), a buyer with \(a = (\tilde{m}_2, g_2)\) chooses \(q_{2h}^b = \tilde{q}_{2h}^b\) if \((\tilde{m}_2 + g_2) \geq p_2 \tilde{q}_{2h}\) and \(q_{2h}^b = [(\tilde{m}_2 + g_2)/p_2]\) otherwise. Similarly, for \(\varepsilon_i = \varepsilon_l\), a buyer with \(a = (\tilde{m}_2, g_2)\) chooses \(q_{2l}^b = \tilde{q}_{2l}^b\) if \((\tilde{m}_2 + g_2) \geq p_2 \tilde{q}_{2l}\) and \(q_{2l}^b = [(\tilde{m}_2 + g_2)/p_2]\) otherwise.

Now, in the equilibrium with \(\delta_h \leq [(\theta - \gamma)/\theta \rho_b]\), all trades in market 2 are again made using money carried into the market if \(\varepsilon_i = \varepsilon_l\) is realized. However, if \(\varepsilon_i = \varepsilon_h\) is realized, some fraction of trades in market 2 are carried out by liquidating bonds.

\(^4\)The proof is available upon request.
Proposition 2 Suppose $\delta_h \leq [(\theta - \gamma)/\theta \rho_b]$. There exists an equilibrium in which (i) a seller in market 1 holds both money and bond in market 2, whereas a buyer in market 1 holds money only in market 2; and (ii) a seller in market 1 liquidates bonds for consumption purchase in market 2 if she becomes a buyer and $\varepsilon_h$ is realized in market 2.

More specifically, in the equilibrium with $m_1 - p_1 q^b_1 \equiv m^b_2 < p_2 q^b_2$ and $m_1 + p_1 q^s_1 \equiv m^s_2 \geq p_2 q^s_2$, a seller in market 1 (who carries over relatively large amount of money ($m^s_2$) to market 2) holds both money and bond, whereas a buyer in market 1 (who carries over relatively small amount of money ($m^b_2$) to market 2) holds money only. This seems to be consistent with the actual pattern of portfolio holdings depending on wealth level.

In short, ex-ante return on interest-bearing bond net of intermediary cost at the margin varies with the likelihood that bond is liquidated for consumption purchase. If the trade opportunity as a buyer is less likely to arise, ex-ante net return on bond at the margin is positive and bond dominates money in all respects. On the other hand, if the trade opportunity as a buyer is more likely to arise, rate-of-return dominance by bond does not necessarily hold from the viewpoint of its ex-ante return. That is, noting that ex-ante return on bond net of intermediary cost at the margin is negative up to a certain amount, agents are willing to hold money for consumption purchase even though bond can be freely liquidated.

This explanation seems also applicable to the coexistence of money and demand deposit in modern economies. If one is to spend money sooner or later, she would not bother to deposit it in bank despite the fact that interest-bearing demand deposit is immediately available as a means of payment. This is because its expected return would not be high enough to cover the intermediary cost.

---

5 Andolfatto (2006) suggests that this should constitute a present-day version of the coexistence puzzle in the sense that demand deposits are mostly insured by the government.
5. Appendix

Proof of Proposition 1: Consider an agent with \( m_2 \geq p_2q_{21}^b \). Notice that for \( g_2 \in [0, p_2q_{21}^b) \), ex-ante net return on bond at the margin is negative. For \( \tilde{m}_2 \in (p_2q_{21}^b, \min\{m_2, p_2q_{2h}^b\}) \), 
\[
\frac{\partial J}{\partial \tilde{m}_2} = \rho_b \delta_t(V'_{3,1} - V'_{3,2}) + \rho_s(V'_{3,1} - V'_{3,2}) + \gamma = \gamma - \theta(\rho_b \delta_l - \rho_s) = \gamma - \theta + \theta \rho_b \delta_h.
\]
Therefore if \( \gamma - \theta + \theta \rho_b \delta_h \leq 0 \), an agent is not willing to hold money more than \( p_2q_{21}^b \), which implies the result in (i). Now if \( \gamma - \theta + \theta \rho_b \delta_h > 0 \), for \( \tilde{m}_2 \in (p_2q_{21}^b, \min\{m_2, p_2q_{2h}^b\}) \), ex-ante return on money dominates that on bond net of intermediary cost. Therefore \( a = (m_2, 0) \) is optimal if \( p_2q_{21}^b < \min\{m_2, p_2q_{2h}^b\} = m_2 \). If \( \min\{m_2, p_2q_{2h}^b\} = p_2q_{2h}^b \), then for \( \tilde{m}_2 \in (p_2q_{2h}^b, m_2) \),
\[
\frac{\partial J}{\partial \tilde{m}_2} = \rho_b \delta_h(V'_{3,1} - V'_{3,2}) + \rho_b \delta_l(V'_{3,1} - V'_{3,2}) + \rho_s(V'_{3,1} - V'_{3,2}) + \gamma = \gamma - \theta < 0,
\]
which implies ex-ante return on money is dominated by that on bond net of intermediary cost. This yields the result in (ii).

Proof of Lemma 2: Consider a buyer with \( a = (\tilde{m}_2, g_2) \) and \( \varepsilon_i = \varepsilon_h \). Notice that \( \varepsilon_h u'(q) < [1 + (\theta/\phi)] \) for \( q \in (q_{2h}^b, \infty) \) and \( \varepsilon_h u'(q) > [1 + (\theta/\phi)] \) for \( q \in [0, q_{2h}^b) \) by the definition of \( q_{2h}^b \). Since the marginal cost of increasing consumption beyond \( q_{2h}^b \) is \( p_2(\phi + \theta) = 1 + (\theta/\phi) \) by Proposition 1-(i), she chooses \( q_{2h}^b = q_{2h}^b \) if \( (\tilde{m}_2 + g_2) \geq p_2q_{2h}^b \) and \( q_{2h}^b = [(\tilde{m}_2 + g_2)/p_2] \) otherwise. Now consider a buyer with \( a = (\tilde{m}_2, g_2) \) and \( \varepsilon_i = \varepsilon_l \). Again by Proposition 1-(i), the marginal cost of increasing consumption beyond \( q_{21}^b \) is \( p_2(\phi + \theta) = 1 + (\theta/\phi) \). Then the definition of \( q_{21}^b \) immediately gives the result.

Proof of Proposition 2: It suffices to show that there exists an equilibrium in which \( M - p_1q_1 < p_2q_{21}^b \) and \( M + p_1q_1 \geq p_2q_{2h}^b \), where we have inserted the equilibrium condition \( m_{1,+1} = M \). Since \( \delta_h \leq [(\theta - \gamma)/\theta \rho_b] \), the seller in market 1 chooses a portfolio \( (p_2q_{21}^b, M + p_1q_1 - p_2q_{2h}^b) \) and the buyer in market 1 chooses a portfolio \( (M - p_1q_1, 0) \) by Proposition 1-(i). Further, in this equilibrium, \( q_{2}^b \) for the sellers in market 1 equals to \( q_{21}^b \) contingent on the realization of \( \varepsilon_i \in \{\varepsilon_h, \varepsilon_l\} \) and that for the buyers in market 1 is less than \( q_{21}^b \). Then, \( V'_2(M + p_1q_1) = \phi + \theta - \gamma \equiv \phi \) and \( V'_1 = (\phi/2)[u'(q_1) + 1] \), and hence \( 1/p_1 = \phi \) from (5) and \( u'(q_1) = [2(\kappa - \beta)/\beta] + 1 \) from
\[ \phi = \beta V'_1(m_{1,+1}), \] where \( \kappa \equiv \phi/\tilde{\phi}. \) Since \( V'_2(M - p_1q_1) = [\rho_\delta \delta_h \varepsilon_h u'(q'_2) + \rho_\delta \delta_i \varepsilon_1 u'(q'_2) + \rho_\delta] \phi, \) we further have \( u'(q_1) = \kappa[\rho_\delta \delta_h \varepsilon_h u'(\Phi - \phi p_1q_1) + \rho_\delta \delta_i \varepsilon_1 u'(\Phi - \phi p_1q_1) + \rho_\delta] \) from (6), which determines \( \Phi = \phi M \) for a given \( q_1. \) Finally, for this equilibrium to exist, the real balance for the rich in market 2 should satisfy \( \Phi + \phi p_1q_1 \geq \bar{q}_{2h} \), whereas those for the poor in market 2 should satisfy \( \Phi - \phi p_1q_1 < \bar{q}_{2l}. \) Therefore, this equilibrium exists if \( \bar{q}_{2h} + \phi p_1q_1 > \bar{q}_{2l} - \phi p_1q_1 \) and for the case, the sufficient condition is \( \bar{q}_{2h} - \phi p_1q_1 \leq \Phi < \bar{q}_{2l} + \phi p_1q_1. \) Notice that if \( \varepsilon_h = \varepsilon_l, \bar{q}_{2h} = \bar{q}_{2l} = \check{q} \) and hence \( \bar{q} - \phi p_1q_1 \leq \Phi < \bar{q} + \phi p_1q_1 \) from \( (q'_2)_{\text{rich}} = \check{q} \leq \Phi + \phi p_1q_1 \) and \( (q'_2)_{\text{poor}} = \Phi - \phi p_1q_1 < \check{q}. \) Now, as \( \varepsilon_h \) increases above \( \varepsilon_l, \Phi \) falls faster than \( \bar{q}_{2l} + \phi p_1q_1 \) because \( \partial q_1/\partial \varepsilon_h < 0 \) and \( (\partial \Phi/\partial q_1) = \phi p_1 + \{u''(q_1)/[\rho_\delta \delta_h \varepsilon_h u''(q'_2) + \rho_\delta \delta_i \varepsilon_1 u''(q'_2) + \rho_\delta] \} > \phi p_1. \) This implies that the right-hand inequality of the sufficient condition is preserved. However, the left-hand inequality binds at some \( \varepsilon_h, \) say \( \check{\varepsilon}_h, \) and hence this equilibrium exists for \( \varepsilon_h \in (\varepsilon_l, \check{\varepsilon}_h). \)

References


Andolfatto, D., 2006. Revisiting the Legal Restrictions Hypothesis. manuscript, Simon Fraser University.


