Motivation

A **central issue** in the bargaining literature

- Will trade be (inefficiently) delayed?

What is usually ignored

- If trade is in fact delayed, **new information** may come to light...

This paper = Bargaining + News
A canonical setting

- An indivisible asset (e.g., firm, project, security)
  - Type of asset is either low or high

- One informed seller and one uninformed buyer
  - Buyer makes price offers
  - Common knowledge of gains from trade
  - Efficient outcome: trade immediately

- Infinite horizon; discounting; frequent offers; no commitment

+ **News**: information about the asset is gradually revealed
Application 1: Catered Innovation

Consider a startup (the informed seller) that has “catered” its innovation to a large firm, say, Google (the uninformed buyer)

- This strategy has become increasingly common (Wang, 2015)
- The longer the startup operates independently, the more Google will learn about the value of the innovation
- But delaying the acquisition is inefficient because Google can leverage economies of scale and has a portfolio of complimentary businesses

Questions: How does Google’s ability to learn about the startup affect

- the bargaining dynamics? their relative bargaining power?
- total surplus realized?
Application 2: Due Diligence

“Large” transactions typically involve a due diligence period:

- Corporate acquisitions
- Commercial real estate transactions

This information gathering stage is inherently dynamic.

Questions: How does the acquirer’s ability to conduct due diligence and renegotiate the initial terms of sale influence

- Initial terms of sale? Eventual terms of sale?
- Likelihood of deal completion?
- Profitability of acquisition?
The buyer’s ability to leverage the information to extract more surplus is remarkably limited.

- A negotiation takes place and yet the buyer gains nothing from the ability to negotiate a better price.
- Coasian force overwhelms access to information.

Buyer engages in a form of costly experimentation

- Makes offers that are sure to lose money if accepted, but generate information if rejected
- Seller benefits from buyer’s ability to renegotiate terms
- Seller may also benefit from buyer’s ability to learn

Introducing competition among buyers can lead to worse outcomes.

- Under certain conditions, seller’s payoff is higher and/or the outcome is more efficient with a single buyer than with competing ones.
## Literature

Bargaining with independent values


Bargaining with interdependent values


News in competitive markets with adverse selection

Setup: Players and Values

Players: seller and buyer

- Seller owns asset of type $\theta \in \{L, H\}$
- $\theta$ is the seller's private information

Values:

- Seller’s reservation value is $K_{\theta}$, where $K_H > K_L = 0$
- Buyer’s value is $V_{\theta}$, where $V_H \geq V_L$
  - Independent values: $V_H = V_L$
- Common knowledge of gains from trade: $V_{\theta} > K_{\theta}$
- “Lemons” condition: $K_H > V_L$
Setup: Timing and Payoffs

The model is formulated in continuous time.

- At every $t$ buyer makes offer, $w$, to seller
- If $w$ accepted at time $t$, the payoff to the seller is
  \[ e^{-rt}(w - K_\theta) \]
  and the buyer’s payoff is
  \[ e^{-rt}(V_\theta - w) \]
- Both players are risk neutral
Complete Information Outcome

Suppose $\theta$ is public information.

- The buyer has all the bargaining power.
- The buyer extracts all the surplus.
- Offers $K_\theta$ at $t = 0$ and the seller accepts
- Payoffs:

  \[
  \begin{align*}
  \text{Buyer payoff} &= V_\theta - K_\theta \\
  \text{Seller payoff} &= 0
  \end{align*}
  \]

Clearly, knowing $\theta$ is beneficial to the buyer.

- What happens if the buyer does not know $\theta$ but can learn about $\theta$ gradually?
Setup: News

- Represented by a publicly observable process:

\[ X_t(\omega) = \mu_0 t + \sigma B_t(\omega) \]

where \( B \) is standard B.M. and without loss \( \mu_H > \mu_L \)

- The quality of the news is captured by the signal-to-noise ratio:

\[ \phi \equiv \frac{\mu_H - \mu_L}{\sigma} \]
Equilibrium objects

1. Offer process, $W = \{W_t : 0 \leq t \leq \infty\}$

2. Seller stopping times: $\tau^\theta$
   - Access to private randomization for mixing
   - Endows CDF over acceptance times: $\{S^\theta_t : 0 \leq t < \infty\}$

3. Buyer’s belief process, $Z = \{Z_t : 0 \leq t \leq \infty\}$

We look for equilibria that are stationary in the buyer’s beliefs:

- $Z$ is a time-homogenous Markov process
- Offer is a function that depends only on the state, $W_t = w(Z_t)$
Buyer’s beliefs

Buyer starts with a prior \( P_0 = \Pr(\theta = H) \)

► At time \( t \), buyer conditions on
  (i) the path of the news,
  (ii) seller rejected all past offers

► Using Bayes Rule, the buyer’s belief at time \( t \) is

\[
P_t = \frac{P_0 f_t^H(X_t)(1 - S_t^H)}{P_0 f_t^H(X_t)(1 - S_t^H) + (1 - P_0) f_t^L(X_t)(1 - S_t^L)}
\]

► Define \( Z \equiv \ln \left( \frac{P_t}{1 - P_t} \right) \), we get that

\[
Z_t = \ln \left( \frac{P_0}{1 - P_0} \right) + \ln \left( \frac{f_t^H(X_t)}{f_t^L(X_t)} \right) + \ln \left( \frac{1 - S_t^H}{1 - S_t^L} \right)
\]
Given \((w, Z)\), the seller faces a stopping problem

**Seller’s Problem**

For all \(z\), the seller’s strategy solves

\[
\sup_{\tau} E_{z}^{\theta} \left[ e^{-r\tau} (w(Z_{\tau}) - K_{\theta}) \right]
\]

Let \(F_{\theta}(z)\) denote the solution.
Buyer’s problem

In any state \( z \), the buyer essentially has three options:

1. **Wait**: Make a non-serious offer that is rejected w.p.1.

2. **Screen**: Make an offer \( w < K_H \) that only the low type accepts with positive probability.

3. **Buy/Stop**: Offer \( w = K_H \) and buy the regardless of \( \theta \)

Let \( F_B(z) \) denote the buyer’s value function.
Buyer’s problem

**Lemma**

For all $z$, $F_B(z)$ satisfies:

*Option to wait:* \( rF_B(z) \geq \frac{\phi^2}{2} (2p(z) - 1) F'_B(z) + \frac{\phi^2}{2} F''_B(z) \)

*Optimal screening:* \( F_B(z) \geq \sup_{z' > z} \left\{ \left( 1 - \frac{p(z)}{p(z')} \right) (V_L - F_L(z')) + \frac{p(z)}{p(z')} F_B(z') \right\} \)

*Option to buy:* \( F_B(z) \geq E_z[V_\theta] - K_H \)

where at least one of the inequalities must hold with equality.
There exists a unique equilibrium. In it,

- For $P_t \geq b$, trade happens immediately: buyer offers $K_H$ and both type sellers accept
- For $P_t < b$, trade happens “smoothly”: only the low-type seller trades and with probability that is proportional to $dt$.  

Equilibrium
Equilibrium: sample path
Equilibrium: sample path
Equilibrium construction: sketch

1. Buyer’s problem is linear in the rate of trade: \( \dot{q} \)
   - Derive \( F_B \) (independent of \( F_L \))

2. Given \( F_B \), what must be true about \( F_L \) for smooth trade to be optimal?
   - Derive \( F_L \), which implies \( w \)

3. Low type must be indifferent between waiting and accepting
   - Indifference condition implies \( \dot{q} \) and therefore low-type acceptance rate.

Summary: Smooth \( \implies F_B \implies F_L \implies \dot{q} \)
A bit more about Step 1

For $z < \beta$,

$$r F_B(z) = \frac{\phi^2}{2} (2p(z) - 1) F'_B(z) + \frac{\phi^2}{2} F''_B(z)$$

Evolution due to news

$$+ \dot{q}(z) \left( (1 - p(z)) (V_L - F_L(z) - F_B(z)) + F'_B(z) \right)$$

$\Gamma(z) =$ net-benefit of screening at $z$

- Buyer’s value is linear in $\dot{q}$
- For “smooth” trade to be optimal, it must be that $\Gamma(z) = 0$
  $\rightarrow$ $F_B$ does not depend on $\dot{q}$ (and has simple closed-form solution)
- Therefore, buyer does not benefit from screening!
  $\rightarrow$ Otherwise, she would want to trade “faster”
  $\rightarrow$ Pins down exactly how expensive it must be to buy $L$, i.e., $F_L(z)$
Equilibrium payoffs

Buyer value, $F_B$

Low-type value, $F_L$
Equilibrium rate of trade

\[ \dot{q}(b^-) > 0 \]
Interesting Predictions?

1. Buyer does **not benefit** from the ability to negotiate the price.
   - Though she *must* negotiate in equilibrium.

2. The buyer is **guaranteed to lose money** on any offer below $K_H$ that is accepted.
   - A form of costly experimentation.

3. The low-type seller may actually **benefit from** buyer’s ability to learn his type.
Suppose the price is **exogenously fixed** at the lowest price that the seller will accept: \( K_H \) (e.g., initial terms of sale).

- The buyer conducts due diligence (observes \( \hat{Z} \)) and decides when and whether to actually complete the deal.
- Buyer’s strategy is simply a stopping rule, where the expected payoff upon stopping in state \( z \) is

\[
E_z[V_\theta] - K_H
\]

- Call this the **due diligence game**.
  - NB: it is not hard to endogenize the initial terms.
Due Diligence Game

\[ V_H - K_H \]

\[ E[V_\theta] - K_H \]

\[ V_L - K_H \]

\[ p \]
Due Diligence Game

\[ V_{H} - K_{H} \]

\[ V_{L} - K_{H} \]

smooth-pasting
Who Benefits from the Negotiation?

Result

In the equilibrium of the bargaining game:

1. The buyer’s payoff is identical to the due diligence game.
2. The \((L\text{-type})\) seller’s payoff is higher than in the due diligence game.

Total surplus higher with bargaining, but fully captured by seller.

- Despite the fact that the buyer makes all the offers.
No Lemons $\implies$ No Learning

$$V_H - K_H$$

$$E_z[V_\theta] - K_H$$

$$V_L - K_H$$

$p(z)$

$$\frac{1}{1}$$
No Lemons $\implies$ No Learning

$$V_H - K_H$$

$$V_L - K_H$$

$$F_B = E[V_\theta] - K_H$$

value

p(z)
Result

When $V_L \geq K_H$, unique equilibrium is immediate trade at price $K_H$.

- Absent a lemons condition, the Coasian force overwhelms the buyer’s incentive to learn.
For all $z$, the buyer offers $F_L(z)$, which is strictly greater than $V_L$.

And for $z < \beta$, only the low type trades.
Experimentation and regret

So below $b$, the buyer is making an offer that:

1. will ONLY be accepted by the low type
2. will make a loss whenever accepted

Why?

- One interpretation: costly experimentation
- Buyer willing to lose money today (if offer accepted) in order to learn and reach $\beta$ faster (if rejected)
- News is critical for this feature to arise
Effect of news quality

Proposition (The effect of news quality)

As the quality of news increases:

1. Both $\beta$ and $F_B$ increase

2. The rate of trade, $\dot{q}$, decreases for low beliefs but increases for intermediate beliefs

3. Total surplus and $F_L$ increase for low beliefs, but decrease for intermediate beliefs

Two opposing forces driving 3.

- Higher $\phi$ increases volatility of $\widehat{Z} \implies$ faster trade
- Higher $\beta$ (and/or) lower $\dot{q} \implies$ slower trade
Effect of news on buyer payoff
Effect of news on buyer payoff

\[ V_H - K_H \]

\[ 0 \]

\[ 0 \]

\[ b_1 \]

\[ b_2 \]

\[ 1 \]
Effect of news on buyer payoff

The graph illustrates the relationship between $V_H - K_H$ and $p$, with points $b_1, b_2, b_3$ on the x-axis.
Effect of news on buyer payoff

$V_H - K_H$

$p$

Graph showing the effect of news on buyer payoff with various curves for different thresholds $b_1$, $b_2$, and $b_3$. The vertical axis represents $V_H - K_H$ and the horizontal axis represents $p$.
Effect of news on low-type payoff
Effect of news on low-type payoff
(In)efficiency

% Loss

\[ p \]

\[ b_1 \]

\[ b_2 \]

\[ b_3 \]
The buyer’s desire to capture any future profits from trade leads to a form of intertemporal competition.

- Seller knows buyer will be tempted to increase price tomorrow
- Which increases the price seller is willing to accept today
- Buyer “competes” against future self

**Coase Conjecture:** Absent some form of commitment (delay, price, etc.), the outcome with a monopolistic buyer will resemble the outcome with competitive buyers.

**Question:** How does news affect Coase’s conjecture?
Theorem (Daley and Green, 2012)

There is a unique equilibrium satisfying a mild refinement on off-path beliefs. In it,

- For $P_t \geq b$: trade happens immediately, buyers offer $V(P_t)$ and both type sellers accept.
- For $P_t < a$: buyers offer $V_L$, high types reject w.p.1. Low types mix such that the posterior jumps to $a$.
- For $P_t \in (a, b)$: there is no trade, buyers make non-serious offers which are rejected by both types.
Intuition for equilibrium play

1. *H*-seller can get $V(p)$ whenever she wants it. For $p < b$, she does better by waiting for news.

2. For high enough $p$, $H$ has little to gain by waiting, so exercises the option to trade at $V(p)$. The low type (happily) pools.

3. $L$ can always get $V_L$. But for $p \in (a, b)$, he does better to mimic $H$.

4. $L$’s prospects of reaching $b$ decrease as $p$ falls.
   - At $p = a$, she is indifferent $\Rightarrow$ willing to mix.

Buyer competition eliminates incentive for experimentation.
Effect of competition

Bilateral

Trade is efficient for \( p \geq b_b \).

For \( p < b_b \)

- probability of trade is proportional to \( dt \).
- rate is decreasing in \( p \).

Competitive

Trade is efficient for \( p \geq b_c \).

For \( p < b_c \)

- \( p \in (a_c, b_c) \), complete trade breakdown.
- \( p < a_c \), atom of trade

Result

Efficient trade requires higher belief in the competitive market: \( b_b < b_c \)
Difference in the efficient-trade threshold

Intuition?

▶ Buyers and sellers differ in their expectations about the realization of future news.

▶ With competitive buyers, the high-type seller decides when to “stop” and net $E_z[V_\theta] - K_H$.

▶ With one buyer, the buyer decides when to “stop” and net $E_z[V_\theta] - K_H$.

▶ But the high-type seller expects good news, while the buyer does not.

More generally: competition does not necessarily lead to more efficient outcomes in dynamic models with adverse selection

▶ Pushes prices up in later periods $\Rightarrow$ more incentive to wait

▶ See also Asyrian et al (2016)
Efficiency: bilateral vs competitive

\begin{equation}
\mathcal{L} = \begin{cases} 
0 & \text{Bilateral} \\
\hat{p} & \text{Competitive}
\end{cases}
\end{equation}

Efficiency Loss (\(\mathcal{L}\))

Belief

\begin{align*}
\hat{p} & \quad a_c \\
& \quad b_b \\
& \quad b_c \\
0 & \quad 1
\end{align*}
Low-type value: bilateral vs. competitive
Implications

- Entrepreneurs who cater their innovation are more likely to have negative private information.
  - All else equal, catered innovations are less valuable innovations.

- Acquisitions that take place at a price below the initial terms add less value for the acquirer.
  - In fact, they necessarily lose value for the acquirer.
  - A downward renegotiation of the acquisition price should negatively affect acquirer's share price.
  - E.g., when Verizon announced the Yahoo merger is going through but at a price $300M below the original bid.
Suppose there is competition for the right to conduct due diligence.

- Multiple bidders submit bids in an auction at $t = 0$
- The seller selects a winner
- The winner can conduct due diligence
- No renegotiation of price allowed

**Preliminary Result**

A higher bid is not necessarily better for the seller because it induces stricter due diligence.

- The winning bid lies strictly between $K_H$ and $V_H$
- The winning bidder makes strictly positive profit

**To do list:**

- Incorporate/allow for renegotiation
- Enrich the space of contracts
Summary

We explore the effect of news in a canonical bargaining environment

- Construct the equilibrium (in closed form).

- Show that uninformed player’s ability to leverage news to extract surplus is remarkably limited.
  - Buyer negotiates based on new information in equilibrium, but gains nothing from doing so!

- More news does not necessarily lead to more efficient outcomes
  - Seller may actually benefit from buyer’s ability to learn.

- Relation to the competitive outcome
  - Competition among buyers eliminates the Coasian force and may reduce both total surplus and seller payoff.
Additional Results

- Uniqueness

- The no-news limit

- Extensions
  1. Costly acquisition
  2. Arrival of “perfect” news
Other equilibria?

We focused on the (unique) smooth equilibrium. Can other stationary equilibria exist?

- No

By Lesbegue’s decomposition theorem for monotonic functions

\[ Q = Q_{abs} + Q_{jump} + Q_{sing} \]

To sketch the argument, we will illustrate how to rule out:

1. Atoms of trade with \( L \) (i.e., jumps)
2. Reflecting barriers (i.e., singular component)
Uniqueness

Suppose there is some $z_0$ such that:
- Buyer makes offer $w_0$
- Low type accepts with atom

Let $\alpha$ denote the buyer’s belief conditional on a rejection. Then
- $F_L(z_0) = F_L(\alpha) = w_0$, by $L$-seller optimality
- $F_L(z) = w_0$ for all $z \in (z_0, \alpha)$, by Buyer optimality

Therefore, starting from any $z \in (z_0, \alpha)$, the belief conditional on a rejection jumps to $\alpha$.

- If there is an atom, the behavior must resemble the competitive-buyer model...
Uniqueness

To rule out the dynamics of the competitive-buyer model:

Suppose $\alpha$ is a reflecting barrier, such that
- for $z \leq \alpha$, the offer is $w$, and rejection jumps the belief to $\alpha$,
- there is no trade on an interval $(\alpha, \bar{z})$,
- so, $Z$ reflects upward at $\alpha$ (conditional on rejection).

Hence, the low type is mixing at $\alpha$, implying the boundary condition:

$$F_L'(\alpha^+) = 0.$$
Uniqueness

\[ F_L = w \text{ below } \alpha \]

\[ F_L \text{ implied by proposed strategies} \]
Consider now the buyer’s incentives.

On \((\alpha, \bar{z})\), he is not screening, so:

- \(F_B\) evolves according to the “waiting” ODE,

- It must be that \(\Gamma \leq 0\). Hence,

\[
F_L(z) \geq V_L - F_B(z) + \frac{1}{1 - p(\bar{z})} F_B'(\bar{z})
\]

which must hold with equality at \(z = \alpha\).
Uniqueness

Lower bound on $F_L$ needed for buyer not to speed up trade above $\alpha$

$F_L = w$ below $\alpha$

$F_L$ implied by proposed strategies
Uniqueness

Intuitively,

- The low type is no more expensive to trade with at $z = \alpha + \epsilon$ than at $z = \alpha$.

- If the buyer wants to trade with the low type at price $w$ at $z = \alpha$, he will want to extend this behavior $z = \alpha + \epsilon$ as well.
Effect of news

Our $\phi \to 0$ limit differs from Deneckere and Liang (2006)

![Graph showing $V_H - K_H$ and $V_L - w_0^{DL}$ vs $\phi \to 0$ and DL06 lines.](image-url)
Effect of news

Intuition for DL06:

- Coasian force disappears at precisely $Z_t = \bar{z}$
- Buyer leverages this to extract concessions from low type at $z < \bar{z}$
With news, his belief cannot just “sit at $\tilde{z}$”, so this power evaporates.

- Even with arbitrarily low-quality news!
With news, his belief **cannot** just “sit at $\tilde{z}$”, so this power evaporates.

- Even with arbitrarily low-quality news!
Stochastic control problem

The buyer must decide:

- How quickly to trade with only the low type (i.e., choose $Q$ given $F_L$)
- When to “buy the market” (i.e., choose $T$ at which to offer $K_H$)

Buyer’s Problem

Choose $(Q, T)$ to solve, for all $z$,

$$
\sup_{Q,T} \left\{ (1 - p(z))E_z^L \left[ \int_0^T e^{-rt} (V_L - F_L(\hat{Z}_t + Q_t))e^{-Q_t} - dQ_t 
+ e^{-(rT+QT)}(V_L - K_H) \right] + p(z)E_z^H \left[ e^{-rT}(V_H - K_H) \right] \right\}
$$

Let $F_B(z)$ denote the solution.
Buyer's problem

Lemma

For all $z$, $F_B(z)$ satisfies:

Option to wait: \[ r F_B(z) \geq \frac{\phi^2}{2} (2p(z) - 1) F_B'(z) + \frac{\phi^2}{2} F_B''(z) \]

Optimal screening: \[ F_B(z) \geq \sup_{z' > z} \left\{ \left( 1 - \frac{p(z)}{p(z')} \right) (V_L - F_L(z')) + \frac{p(z)}{p(z')} F_B(z') \right\} \]

Option to buy: \[ F_B(z) \geq E_z[V_\theta] - K_H \]

where at least one of the inequalities must hold with equality.
Equilibrium construction

1. For $z < \beta$, $w(z) = F_L(z)$ and the buyer’s value is

$$F_B(z) = (V_L - F_L(z)) \left(1 - p(z)\right) \dot{q}(z) dt + \left(1 - \frac{\dot{q}(z)}{1 + e^z} dt\right) E_z \left[F_B(z + dZ_t)\right]$$

and $dZ_t = d\hat{Z}_t + \dot{q}(Z_t) dt$. So,

$$r F_B(z) = \frac{\phi^2}{2} \left(2p(z) - 1\right) F_B'(z) + \frac{\phi^2}{2} F_B''(z)$$

\[\text{Evolution due to news}\]

$$+ \dot{q}(z) \left( (1 - p(z))(V_L - F_L(z) - F_B(z)) + F_B'(z) \right)$$

\[\Gamma(z) = \text{net-benefit of screening at } z\]
Equilibrium construction

2. Observe that the buyer’s problem is linear in $\dot{q}$

$$r F_B(z) = \frac{\phi^2}{2} (2p - 1) F'_B + \frac{\phi^2}{2} F''_B$$

Evolution due to news

$$+ \sup_{\dot{q} \geq 0} \dot{q} \left( (1 - p)(V_L - F_L - F_B) + F'_B \right)$$

$\Gamma(z)=$net-benefit of screening

Hence, in any state $z < \beta$, either

(i) the buyer strictly prefers $\dot{q} = 0$, or
(ii) the buyer is indifferent over all $\dot{q} \in \mathbb{R}_+$
Equilibrium construction

3. In either case

\[ \dot{q}(z) \Gamma(z) = 0 \]

4. This simplifies the ODE for \( F_B \) to just

\[ rF_B = \frac{\phi^2}{2} (2p - 1) F'_B + \frac{\phi^2}{2} F''_B \]

→ \( F_B \) does not depend on \( \dot{q} \)

→ Buyer gets same value he would get from \( \dot{q} = 0 \)

→ Buyer gains nothing from the ability to screen using prices!
Equilibrium construction

Using the appropriate boundary conditions, we find $F_B(z) = C_1 \frac{e^{u_1 z}}{1+e^z}$,

where $u_1 = \frac{1}{2} \left( 1 + \sqrt{1 + \frac{8r}{\phi^2}} \right)$ and $C_1$ solves VM and SP at $z = \beta$. 
Next, conjecture that $\dot{q}(z) > 0$ for all $z < \beta$. Then, it must be that

$$\Gamma(z) = 0$$

Or equivalently

$$F_L(z) = (1 + e^z)F'_B(z) + V_L - F_B(z)$$

This pins down exactly how “expensive” the low type must be for the buyer to be indifferent to the speed of trade (i.e., $F_L$).
Equilibrium construction

For $z < \beta$, the low-type must be indifferent between accepting $w(z)$ and waiting.

The waiting payoff is

$$F_L(z) = \mathbb{E}_z^L \left[ e^{-rT(\beta)} K_H \right]$$

which evolves as

$$r F_L(z) = \left( \dot{q}(z) - \frac{\phi^2}{2} \right) F_L'(z) + \frac{\phi^2}{2} F_L''(z)$$

So, $\dot{q}(z)$ must satisfy

$$\dot{q}(z) = \frac{r F_L(z) + \frac{\phi^2}{2} F_L'(z) - \frac{\phi^2}{2} F_L''(z)}{F_L'(z)}$$
Equilibrium verification

Seller optimality ✓

- By construction, low type is indifferent between accepting and rejecting at all \( z < \beta \).

Buyer optimality: Recall the three necessary conditions ✓

- By construction, option to wait holds with equality for all \( z < \beta \).
- In addition, we verify directly that for all \( z' > z \),

\[
F_B(z) > \left(1 - \frac{p(z)}{p(z')}\right) (V_L - F_L(z')) + \frac{p(z)}{p(z')} F_B(z')
\]

Payoff from deviating to \( w = F_L(z') \)

- So buyer cannot benefit from deviating to a higher (or lower) offer.
No “no-trade” regions

We assumed \( \dot{q} > 0 \), could there exists an interval on which \( \dot{q} = 0 \)?

- No.

If there was, the low-type’s waiting payoff would be strictly lower:

\[
E^L_z \left[ e^{-rT(\beta)} K_H \right] = F_L(z) < (1 + e^z) F_B'(z) + V_L - F_B(z)
\]

or, equivalently

\[ \Gamma(z) > 0, \]

which means the buyer actually wants to speed up trade, a contradiction.

**Intuition**: If trade rate ever slows to zero, the low type becomes too cheap for the buyer not to want to trade (i.e., \( \Gamma(z) \) turns positive).