On the Limits to Speculation in Centralized versus Descentralized Market Regimes.

Felipe Zurita
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On the Limits to Speculation in Centralized versus Decentralized Market Regimes

Felipe Zurita

Abstract

Speculation creates an adverse selection cost for utility traders, who will choose not to trade if this cost exceeds the benefits of using the asset market. However, if they do not participate, the market collapses, since private information alone is not sufficient to create a motive for trade. Therefore, there is a limit to the amount of speculative transactions that a given market can support. We compare this limit in decentralized versus centralized market regimes, finding that the centralized regime is more prone to speculation than the decentralized one: the transaction fees charged by an intermediary diminish the individual return to information, so that for a fixed value of trading, more speculative transactions can be supported. The analysis also suggests a reason for the existence of intermediaries in financial markets.

JEL classification numbers: D84, G10.
Keywords: speculation, adverse selection, centralized markets.
1 Introduction

If speculation, or information-based trading, is to be profitable, it must be at the expense of regular traders or investors, which we term utility traders. Utility traders use asset markets for non-specific purposes, usually categorized as consumption smoothing, insurance, investment, etc. Even though markets are beneficial for them, they will choose not to participate in the event that the adverse selection cost imposed by the action of speculators exceeds the benefits of using the market.

Nevertheless, as it is widely known, the market requires utility traders to operate, since private information alone is not sufficient to create trade, that is, a market composed solely of speculators will be characterized by zero volume (no-trade theorem\(^1\)). Therefore, we conclude that there is a limit to the amount of speculative transactions that a given market can afford, relative to non-speculative transactions that take place. If this ratio crosses that border, transactions will be zero, exactly as if there were no utility traders at all, and the no-trade theorem would apply. That ratio is determined by the maximum rents that can be extracted from utility traders before they abandon the market.

We explore this intuition: the existence of a market depends on the composition of its participants, according to their motivations for trading. Moreover, we ask how these limits vary across different market regimes. In particular, we compare a centralized (intermediated) market regime to a decentralized (non-intermediated) one, finding that the former is more prone to speculation. Our model tells us that the key issue determining this is the ability that an eventual intermediary has for transferring utility from the incumbent speculators to new ones—an ability generated by the act of charging transaction fees as a method of collecting profits. In fact, they provide a mechanism to diminish the individual return to information, decreasing the informational rent, so that for a fixed value of trading or surplus, more speculative transactions can be supported.

The analysis also opens two branches: on the one hand, it suggests a reason for the existence of intermediaries in financial markets, based on the adverse selection cost that the uninformed bear when they trade with the informed. This is unrelated to the incentive problems advanced by Leland and Pyle (1977). On the other hand, it allows the study of the conditions

\(^1\)For a version of this theorem, see Milgrom and Stokey (1982).
under which there will be a spontaneous move towards intermediation, or desintermediation. Both branches are briefly discussed at the end.

To address these issues, we use a random matching model in which players are paired to voluntarily bet on the occurrence of two states. Trade is modeled by the simultaneous acceptance of a bet. By modeling a betting game rather than a game in which players actually trade an asset, we hope to simplify the analysis while capturing what is essential to it. The key observation is that ultimately, any decision of buying or selling an asset involves a bet: whoever buys is betting that the price will not drop the following day, whoever sells is betting on the opposite. Regardless of the particular reasons any person could have to buy or sell an asset, the decision of doing it today rather than tomorrow reveals certain level of trust on the favorability of today’s conditions over tomorrow’s: that is where the bet lies. What we are missing in the simplification is the fact that people may actually choose which side of the market they want to be in, but this amounts to say that the bets are endogenous. We will discuss some methodological issues at the end.

To summarize, then, our main results are:

1. Given a certain value from trading, there is a maximum amount of speculative activity that a decentralized market can sustain. If the proportion of speculative over non-speculative bets passes that limit, the market shuts down (no-trade region).

2. That limiting amount is zero in an economy with a unique intermediary, that is, the intermediary is always able to keep the market open.

3. Moreover, the intermediary provides higher liquidity and volume is greater than in the decentralized market, increasing welfare.

The present research is connected with two areas. On the one hand, we have the adverse selection problem that the uninformed face when trading with the speculators, or informed—a lemons problem—. Milgrom and Stokey (1982) provided an example of the “no trade theorem,” example on which the present model is based. However, they took the view that the theorem implied the incompatibility of the rational expectations model with reality. Glosten (1989), in a different setting (actually, the standard in the finance literature) analyzes the differences between competitive vs. monopolistic market makers. He concludes that when the asymmetries are more severe,
the monopolist is better because it increases liquidity, since it is not forced
to make zero profits on each transaction. However, he does not consider the
equilibrium without market makers, nor does he analyze the limiting amount
of speculation. Bhattacharya and Spiegel (1991) study the equilibria with
an informed monopolist and a continuum of uninformed risk averse traders,
in a setting similar to Glosten’s.

A second literature, from finance, refers to noisy rational expectations
equilibria. A seminal paper is Grossman and Stiglitz’s (1980). We do not
address the issue of information revelation; rather, we explicitly incorporate
the role of the noise traders as utility traders. Utility traders are simply
individuals who place a positive value on exchange. As opposed to noise
traders, however, their behavior is endogenous. In that exogenous behavior
paradigm, it is the noise that prevents the no-trade result, while in our model
it is the surplus they generate what prevents it. The problem of learning here
was assumed away, for there is no aggregate statistic about the state of the
economy from which the players could infer something. Instead, what we
need utility traders for is to generate a rent.

The rest of the paper is organized as follows: Section 3.2 introduces the
model. Section 3.3 is devoted to the analysis of the decentralized market,
while section 3.4 studies the market with an intermediary. Section 3.5 con-
cludes and discusses possible extensions.

2 The model: a betting game

There is a continuum of risk neutral players with common priors. Half of
them will be assigned the role of a “buyer”, the other half the role of a
“seller”. There is nothing to buy or sell; the name of “buyer” or “seller”
is purely metaphorical. At date 1, every buyer is randomly matched with
a seller, and vice versa. Then, the speculators will get to see a signal \( \omega \in \{\omega_1, \omega_2\} \) while the utility traders see nothing. At that point, everyone is
offered a bet: buyers are offered the possibility of winning $1 if state \( \theta_1 \)
happens while losing $1 if \( \theta_2 \) happens; sellers are offered the complementary
bet, that is, the possibility of losing $1 if state \( \theta_1 \) happens while winning
$1 if \( \theta_2 \) happens. In each match, the bet is carried out only when they
both accept; if any player, the one in the role of the buyer or the one in
the role of a seller, rejects the bet, they both get $0. After confirming the
acceptance, date 2 starts and everybody gets to see the state \( \theta \in \{\theta_1, \theta_2\} \)
and the payments are carried out. The bet is ex-ante a fair game, that is, the prior probability of $\theta_1$ is 0.5. We will further assume that each signal, $\omega_1$ and $\omega_2$, is equally likely.

The names of speculators and utility traders are assigned depending on the particular form of the utility function of each player. In general,

$$u = (x \times 1_{\text{utility traders}} + \text{expected value of the bet}) \times 1_{\text{bet}} \quad (1)$$

where $1_{\text{utility traders}}$ and $1_{\text{bet}}$ are indicator functions, that take on the value 1 in the case of utility traders and when the bet is carried out, respectively, and 0 otherwise. This is to say that utility traders enjoy gambling, getting a utility level of $x > 0$ just for betting. However, they are uninformed. On the other hand, speculators are informed but gambling is a neutral for them. Thus, in this model a pure speculator is someone who would not participate if he did not expect a direct monetary gain by betting, while a utility trader is someone who would participate even if she expected up to a certain monetary loss.

Notice that we could have defined four types, instead of two. We omitted the informed that enjoy gambling and the uninformed that regard gambling as a neutral. This exclusion was deliberately made in the sake of simplicity. However, it comes at no cost: these types play no role. Their behavior would be the same as the two types that remained. In addition, it allows us to identify motivations with people, which cannot be done in reality as easily as here.

Although this separation of traders according to their motivations is not something that we could hope to do as easily in practice, there is an argument to identify speculators with better information: if information were costly, speculators would have the highest demands for it, since they are the ones that would get the highest surplus from it. This is so because they are prepared to use information more fully than utility traders, in the sense that the arrival of even weak evidence will change the behavior of a speculator but not the behavior of a utility trader.

Let us say that $\Pr(\theta_1|\omega_1) > 0.5 = \Pr(\theta_1) > \Pr(\theta_1|\omega_2)$, so that a buyer would find it favorable to accept after receiving the signal $\omega_1$. Let “$z$” be the percentage of utility traders in the total population, and “$g$” the expected gain for a buyer conditional on receiving a signal $\omega_1$ (our symmetry assumption implies that $g$ is also the expected gain of a seller conditional on receiving a signal $\omega_2$, since $\Pr(\theta_2|\omega_2) = \Pr(\theta_1|\omega_1)$). Then,
Table 1: The distribution of types.

<table>
<thead>
<tr>
<th></th>
<th>Buyer</th>
<th>Seller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speculator</td>
<td>$(1 - z)/2$</td>
<td>$(1 - z)/2$</td>
</tr>
<tr>
<td>Utility trader</td>
<td>$(z/2)$</td>
<td>$(z/2)$</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

The distribution of types is common knowledge, and is as in table 3.1.


g = (1) \Pr(\theta_1|\omega_1) + (-1) \Pr(\theta_2|\omega_1) = \frac{\Pr(\theta_1 \land \omega_1) - \Pr(\theta_2 \land \omega_1)}{\Pr(\omega_1)}

Throughout we will assume that $x < g$; otherwise, the utility from gambling would be so high relative to the expected monetary gain/loss, that a utility player would not care about timing his decision. It follows that a speculator in possession of good news will always accept, while in possession of bad news never will: there is nothing else that such a person could learn either by direct observation or by inferring from other people’s behavior, that would make him change his mind\(^2\). He knows whether the game is fair or unfair to him.

In this way, the problem is in the hands of utility traders: if they do not participate, we get no trade and no market can exist. They will, on the other hand, accept as long as the monetary loss due to the participation of speculators does not outweigh the utility from gambling, $x$. Then, we have:

We can verify in the table that for a speculator, the expected utility is proportional to $g$ or $-g$, so that the decision is unambiguous, as we claimed earlier. However, this is not true for a utility trader; we analyze her decision in the next section.

Before moving into that, we would like to discuss briefly the probability that the opponent accepts. This probability may depend on the matching rule. So far, we have assumed that the mechanism creates matches before the

\(^2\)This is a consequence of assuming that there is one signal common to all, rather than one for each individual. The latter would be required to analyze the information aggregation problem, which we do not aim to do here.
Upon receiving the signal...

<table>
<thead>
<tr>
<th>Buyer</th>
<th>$\omega_1$</th>
<th>$\omega_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speculator</td>
<td>$g \Pr(\text{opponent accepts})$</td>
<td>$-g \Pr(\text{opponent accepts})$</td>
</tr>
<tr>
<td>Utility trader</td>
<td>${\frac{1}{2}(x - g) \Pr(\text{opponent accepts if } \omega_1) + \frac{1}{2}(x + g) \Pr(\text{opponent accepts if } \omega_2)}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seller</th>
<th>$-g \Pr(\text{opponent accepts})$</th>
<th>$g \Pr(\text{opponent accepts})$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speculator</td>
<td>${\frac{1}{2}(x - g) \Pr(\text{opponent accepts if } \omega_1) + \frac{1}{2}(x + g) \Pr(\text{opponent accepts if } \omega_2)}$</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Expected utilities.

<table>
<thead>
<tr>
<th>Speculators</th>
<th>Buyer</th>
<th>Seller</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\omega_1$</td>
<td>Accept</td>
<td>Reject</td>
</tr>
<tr>
<td>$\omega_2$</td>
<td>Reject</td>
<td>Accept</td>
</tr>
<tr>
<td>Utility Traders</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Table 3: Who accepts the bet.

players get to observe the signal, but it is perfectly possible to conceive, for instance, one in which the mechanism asks about intentions before making matches; in this case, we could have situations in which the largest side of the market gets rationed while the other side is completely served. The same happens here, even though the mechanism does not try to maximize trade. The reason is that in one of the sides everybody wishes to accept, so that it is always partially rationed. Nevertheless, the conclusions of this analysis will also extend to other matching rules, as long as those rules give rise to probabilities that are proportional to the one we consider, though the utility level of each player will be different.

3 Decentralized equilibrium

We now turn to the analysis of who accepts the bet. So far, we know that behavior will be as table 3.3 shows.

We also know that for the market to exist at all, we need utility traders to accept. They will as long as they get positive utility by doing it, that is,
as long as
\[
\frac{1}{2}(x - g) + \frac{1}{2}(x + g) \geq 0 \iff x \geq g \frac{1 - z}{1 + z} \iff z \geq \frac{g - x}{g + x}
\] (3)

There are two possibilities: a utility trader can be matched to another uninformed utility trader, in which case she faces a fair game that is worth accepting, because she gets \(x\). But she could also be matched to a speculator, a case in which she is definitely facing an unfair game, that she clearly would be better off avoiding. As she cannot distinguish a utility trader from a speculator, she would participate if she thinks that it is likely enough that she would find herself in the first situation and not in the second one.

Condition (3) embodies the above reasoning, giving a precise meaning to what is “likely enough”. The probability of facing an unfair game is determined by the proportion of speculators in the population. Depending on how valuable information is, it will be required a different level of utility \(x\) (gains from trade) in order to support trade for a given composition of the population. The more valuable information is, that is, the bigger \(g\) is, the higher the adverse selection problem to the uninformed, and as a consequence, the higher the value of trading the asset must be so that she still wants to trade. Alternatively, for a fixed value of \(x\), to maintain trade while increasing \(g\) will require a reduction in the proportion of informed.

In other words, the cost of the adverse selection problem to the utility traders is determined together by \(g\), the individual information rent, and \((1 - z)\), the probability of being matched with a speculator, that add up to \(\frac{1}{2}g(1 - z)\). This cost must be smaller than the utility she gets by gambling, \(x\), with probability \(\frac{1}{2}(1 + z)\).

It is interesting to note that there is a trade-off between the maximum proportion of speculators in the economy and the predictive power of their information. For instance, if this information service is not very accurate, \(g\) is small, and the maximum number of speculators can be very large with respect to the number of utility traders, that is, a very small proportion of the transactions needs to be non-speculative. This appears to be the case in the foreign exchange market, characterized by a huge volume of trade, many times larger than needs as means of exchange would justify, and traders making many tiny profits on each transaction.

Another way to look at condition (3) is this: \(x\) and \(z\) determine the size of the pie, which in the limiting population composition is completely exhausted by speculators; \(g\) is the size of individual portions, i.e., the per-speculator...
rent. How many of them we can get is a matter of dividing $xz$ by $g$. The existence of an intermediary will change both, the size of the pie and the size of individual portions.

![Figure 1: Minimum proportion of utility traders as a function of $x$.](image)

We can visualize this on figure (1). Each line traps below it a “no-trade region”, whose size depends on the value of private information, $g$. Put another way, the minimum proportion of non-speculative transactions is determined by the potential expected loss relative to the value of owning the asset for one period.

Observe in figure (2) the concavity of the function: $z$ becomes nearly insensitive to $\frac{g}{x}$ for high values of this variable.

4 One intermediary

Notice that in the decentralized equilibrium utility traders lose to speculators; the only reason why they still trade is that the probability of being matched to play a fair game and therefore gain the utility from gambling overcomes the risk of losing to the better-informed players. Imagine now that one player announces that she will accept all bets, from anyone, no matter what.
That single player is telling the uninformed that she will solve their adverse selection problem, so naturally they will prefer to trade with her, rather than in the anonymous decentralized market, even if they are required to pay a small transaction fee. However, if all the uninformed prefer to trade with her, then the decentralized economy is left only with speculators, making the market disappear by the no-trade theorem. Thus, she will centralize all trading, since utility traders prefer to trade with her, while speculators are forced to trade with her when they lose the decentralized market.

In this section, however, we will not address the issue of whether a desintermediated market will move towards intermediation. Rather, we will assume the existence of an intermediary, and we will ask about the maximum speculative activity that such a market can afford.

The first choice variable of this intermediary, that we assume is informed, is to accept or reject a bet from any single player that communicates its intention of betting with her. As bettors are anonymous, except for their roles, this variable takes the form of a probability of accepting to each of them, maybe conditioning on whether she faces a buyer or a seller, and on the message received. The second choice variable is the transaction fee.

We advanced earlier that the transaction fee is the only way the intermediary has to collect profits. The reason is that if she tries to profit from her private information, by giving higher probability of acceptance in the cases in
which the public is at a disadvantage, she is replicating the adverse selection problem the utility traders are trying to avoid. To attract them, she must offer better conditions than the decentralized market. However, in this way she collects money only from utility traders, while by charging a transaction fee she will also get money from the speculators, thereby increasing total revenue.

Let \( y_\omega \) be the proportion of bets accepted from role \( r \) players \((r = b \text{ if buyer, } r = s \text{ if seller})\) after receiving a signal \( \omega \), and let \( c \) denote the transaction fee. The problem for this monopolistic intermediary is to maximize profits:

\[
\frac{c}{2} \left( \left( \frac{y_b^b}{2} + \frac{z y_b^s}{2} \right) + \frac{y_s^b}{2} + \frac{z y_s^s}{2} \right) + \frac{g}{2} \left[ \left( \frac{z y_b^s}{2} - \frac{y_b^b}{2} \right) + \left( \frac{z y_s^b}{2} - \frac{y_s^s}{2} \right) \right]
\]

subject to the participation of utility traders and speculators\(^3\), that is,

\[
s/t \ c \leq x + g \left( \frac{y_b^b - y_s^b}{y_b^b + y_s^b} \right), \ c \leq x + g \left( \frac{y_s^b - y_b^s}{y_b^b + y_s^b} \right) \text{ and } c \leq g.
\]

Expected profit is, then, composed of the transaction fee that is collected from all buyers and just utility traders among sellers if the information is \( \omega_1 \), or from all sellers and just utility traders among buyers, if \( \omega_2 \); plus, the expected payoff formed by the gap between buyers and sellers on each \( \omega \), everything weighted by the probability of accepting from a buyer or seller on each state.

We can further simplify the problem by exploiting the symmetry between speculators on each side, as well as utility traders on each side. Let \( y_u = y_b^b = y_s^b \) and \( y_f = y_b^s = y_s^s \), where subscripts “u” and “f” stand for unfavorable and favorable trades for the intermediary. Then, the optimization problem of the intermediary can be rewritten as:

\[
\max_{\{y_u,y_f,c\}} \frac{1}{2} \left\{ y_u (c - g) + y_f z (c + g) \right\}
\]

subject to \( c = x + g \left( \frac{y_u - y_f}{y_u + y_f} \right) \) and \( c \leq g \)

\(^3\)It is possible for the monopolist to charge \( c > g \) by giving back to utility traders the difference \((c - x)\) in the form of accepting more unfavorable bets to herself, thereby excluding speculators completely. However, this strategy is dominated, so it will never be used.
It can readily be seen that the problem of the monopolist is to balance two forces: on the one hand, she would prefer to avoid the adverse selection cost \((c - g)\) by avoiding all unfavorable bets, while accepting all favorable ones; however, moving in such direction minimizes the transaction fee that can be charged and endangers the participation of utility traders.

Observe that to set \(y_u = y_f = 1\), that is, to accept all bets, yields positive profits as long as \(x \geq g \frac{1 - z^2}{1 + z^2}\), which is precisely the condition for the decentralized market to exist. This is to say that, if the condition for the existence of a decentralized market is met, the condition for the existence of an intermediated market\(^4\) is also met.

Moreover, even when the above condition is not satisfied, it is possible for the intermediated market to exist. In effect, we can verify that when \(x = g \frac{1 - z}{1 + z} , \quad \frac{\partial E_x}{\partial y_f} \bigg|_{y_u = y_f = 1} < 0\) and \(\frac{\partial E_x}{\partial y_u} \bigg|_{y_u = y_f = 1} > 0\), meaning that there is a better strategy than accepting all bets in such case. Therefore, the optimal strategy is able to yield positive profits even in cases in which \(x < g \frac{1 - z}{1 + z}\).

It turns out that the optimal policy takes the form:

\[
(y_u, y_f, c) = \begin{cases} 
(1, \frac{x}{2g-x}, g) & \text{if } x < g \frac{1 - z}{2z} \\
(1, 1, x) & \text{if } x \geq g \frac{1 - z}{2z}
\end{cases}
\] (6)

Two elements are noteworthy. First, what is the theme of this paper, the monopolist is able to make profits and keep the market open in any circumstances in which there is some value from trading \((x > 0)\). The reason the intermediary is able to keep the market open in situations in which the decentralized market would shut down is that by charging a transaction fee to speculators as well as utility traders, she is able to reduce the individual informational rents, thus allowing a larger number (proportion) of speculators in the population.

Secondly, it is not optimal for the monopolist to use her information “against” her customers, in the sense that she will never be more inclined to accept favorable than unfavorable bets to herself. Instead of offering some “adverse selection” to her clients, she will offer some “favorable selection,” if any. This is so because that way she increases the transaction fee utility

\(^4\)The reader may have noticed that in the paper we only refer to a monopolistic intermediated market, not to any possible intermediated market. Yet, we talk about the existence of intermediated markets in general. The reason for this is that if there are not enough rents for a monopolist to survive, there can be no place for more than one firm.
traders are willing to pay, thereby allowing a greater surplus extraction from speculators.

Nevertheless, keeping the market open is not the only difference between these two regimes. There is also a difference on the total number of transactions. In fact, in the decentralized economy only \((1+\varepsilon)^\frac{3}{2}\)% of the possible bets actually take place due to “incorrect” matches, while by not having any matching problem the intermediated market fulfills 100% of the possible matches. This implies that the total surplus generated in the former regime is proportional to \((1+\varepsilon)^\frac{3}{2}\)\(x\), while it is proportional to \(x\) in the centralized market. Therefore, from this perspective the intermediated market is more efficient than the decentralized one.

The increased liquidity also means that the expected utility (before deducing transaction fees) of speculators is higher, an effect that goes in the opposite direction from the transaction fee. It turns out that when the intermediary sets \(y_u = y_f = 1\), in our example they cancel out exactly, explaining why the conditions for the existence of a decentralized market and a centralized one in which the intermediary is committed to accept all bets are the same.

The existence of a better strategy than always accepting bets in this limiting case, as shown in our example, explains that the market may still exist under intermediation.

5 Concluding remarks

We have compared centralized versus decentralized asset markets in a metaphorical way, by analyzing betting games. Our main conclusion, that a centralized market could exist even when a decentralized one would not, rests on both the fact that by charging a transaction fee the monopolist is able to extract utility from the informed to sustain a larger proportion of them in the population which otherwise would be impossible, and the fact that the monopolist is better suited to deal with asymmetries in the population and the information structure. These ideas go beyond the limited scope of our simple model.

In particular, we have made the following simplifying assumptions.

1. The signals are equally likely (symmetry). If they are not, then the condition for the existence of a decentralized market would be given
by the more restrictive of the two participation constraints (the one for the utility traders on the demand side, and the one for the utility traders on the supply side), while the intermediary has the ability of “squeezing” utility traders on both sides simultaneously. The same is true about the composition of speculators to utility traders in both sides of the market, that is, if speculators are more concentrated among buyers, or among sellers. In other words, the monopolist can exploit asymmetries, either in the population or in the informational structure.

2. Each player cannot bet more than $1. This does not seem to be important, insofar as players are anonymous: we can allow for “larger” players with no substantial change, as long as their bets are bounded.

3. The value of trading is the same across utility traders, and informed traders do not get utility from gambling. Relaxing this assumption would only give continuity to the frontier, leaving the rationale of its existence unchanged.

4. Players do not choose which side of the market they are in. To some extent, this is true, for unless short sales are allowed, not owning the asset clearly defines the side of the bet one can take. However, the same does not hold for someone who owns the asset: without liquidity constraints, it is always possible to take the other side too. In any event, this assumption is restrictive just for utility traders, since we can imagine that it is the same group of speculators that chooses side before being paired rather than two groups being active exchangeably as presented.

5. The populations have the same size. This also seems to be restrictive. We can think of this as meaning that at the current price of the asset—which we do not model—demand equals supply.

A question suggested by the present exercise is: Do we necessarily go from a decentralized to a centralized market? In our example, the answer is on the affirmative, since the condition for the existence of a decentralized market is sufficient to guarantee that an intermediary accepting all bets will get positive profits while offering a transaction fee smaller than the adverse selection cost that utility traders face in the decentralized market. However, we do not know whether the same answer holds in more general cases.
The following questions are, naturally, what would change in the presence of competition, and whether there will necessarily be competitive forces in a centralized market. Those questions are left for future research.

References


