

Volume and Information. Comments on “Random Risk Aversion and Liquidity: a Model of Asset Pricing and Trade Volumes” by Fernando Alvarez and Andy Atkeson

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This is a great economics paper in the Bob Lucas tradition: Preferences, technology, equilibrium, predictions, facts, welfare calculations, full stop.

However, it's not yet a great finance paper. It's missing the motivation, vision, methodological speculation, calls for future research — in short, all the BS — that Bob tells you to leave out. I'll follow my comparative advantage, then, to help to fill this yawning gap.

Volume is The Great Unsolved Problem of Financial Economics. In our canonical models — such as Bob's classic consumption-based model — trading volume is essentially zero.

The reason is beautifully set out in Nancy Stokey and Paul Milgrom's no-trade theorem, which I call the Groucho Marx theorem: don't belong to any club that will have you as a member. If someone offers to sell you something, he knows something you don't.

More deeply, all trading — any deviation of portfolios from the value-weighted market index — is zero sum. Informed traders do not make money from us passive investors, they make money from other traders.

It is not a puzzle that informed traders trade and make money. The deep puzzle is why the uninformed trade, when they could do better by indexing.

Here's how markets “should” work: You think the new iPhone is great. You try to buy Apple stock, but you run in to a wall of indexers. “How about \$100?” “Sorry, we only buy and sell the whole index.” “Well, how about \$120?” “Are you deaf?” You keep trying until you bid the price up to the efficient-market value, but no shares trade hands. As Andy Abel put it, financial markets should work like the market for senior economists: Bids fly, prices change, nobody moves.

And, soon, seeing the futility of the whole business, nobody serves on committees any more. Why put time and effort into finding information if you can't profit from it? If information is expensive to obtain, then nobody bothers, and markets cannot become efficient. (This is the Grossman-Stiglitz theorem on the impossibility of efficient markets.)

I gather quantum mechanics is off by 10 to the 120th power in the mass of empty space, which determines the fate of the universe. Volume is a puzzle of the same order, and importance, at least within our little universe.

Stock exchanges *exist* to support information trading. The theory of finance predicts that stock exchanges, the central institution it studies, the central source of our data, should not *exist*. The

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tiny amounts of trading you can generate for life cycle or other reasons could all easily be handled at a bank. All of the smart students I sent to Wall Street for 20 years went to participate in something that my theory said should not exist.

And it's an important puzzle. For a long time, I think, finance got by on the presumption that we'll get the price mostly right with the zero-volume theory, and you microstructure guys can have the last 10 basis points. More recent empirical work makes that guess seem quite wrong. It turns out to be true that prices rise when a lot of people place buy orders, despite the fact that there is a seller for each buyer. There is a strong correlation between the level of prices and trading volume — price booms involve huge turnover, busts are quiet.

At a deeper level, if we need trading to make prices efficient, but we have no idea how that process works, we are in danger that prices are quite far from efficient. Perhaps there is too little trading volume, as the rewards for digging up information are not high enough! (Ken French's AFA presidential speech artfully asks this question.)

Our policy makers, as well as far too many economists, jump from not understanding something, to that something must be wrong, irrational, exploitative, or reflective of "greed" and needs to be stopped. A large transactions tax could well be imposed soon. Half of Washington and most of Harvard believes there is "too much" finance, meaning trading, not compliance staff, and needs policy interventions to cut trading down. The SEC and CFTC already regulate trading in great detail, and send people to jail. Without a good model of information trading, of course, those judgments are guesses, but equally hard to refute.

How do we get out of this conundrum? Well, so far, by a sequence of ugly patches.

Grossman and Stiglitz added "noise traders." Why they trade rather than index is just outside the model.

Another strand, for example Viral Acharya and Lasse Pedersen's liquidity based asset pricing model, uses life cycle motives, what you here would recognize as an overlapping generations model. They imagine that people work a week, retire for a week, and die without descendants. Well, that gets them to trade. But people are not fruit flies either.

Fernando and Andy adopt another common trick — unobservable preference shocks. If trade fundamentally comes from preferences rather than information then we avoid the puzzle of who signs up to lose money.

I don't think it does a lot of good to call them shocks to risk aversion, and tie them to habit formation, as enamored as I am of that formulation in other contexts. Habit formation induces changes in risk aversion from changes in consumption. That makes risk aversion shocks observable, and hence contractable, which would undo trading.

More deeply, to explain volume in individual securities, you need a shock that makes you more risk averse to Apple and less risk averse to Google. It can be done, but it is less attractive and pretty close to preferences for shares themselves.

Finally, trading is huge, and hugely concentrated. Renaissance seems to have a preference shock every 10 milliseconds. I last rebalanced in 1994.

The key first principle of modern finance, going back to Markowitz, is that preferences attach to money — to the payoffs of portfolios — not to the securities that make up portfolios. A basket of stocks is not a basket of fruits. It's not the first time that researchers have crossed this bright line. Fama and French do it. But if it is a *necessary* condition to generate volume, it's awfully unpalatable. Do we really need to throw out this most basic insight of modern finance?

Another strain of literature supposes people have “dogmatic priors” or suffer from “overconfidence.” (José Scheinman and Wei Xiong have a very nice paper along these lines.) Perhaps. I ask practitioners why they trade and they say “I’m smarter than the average.” Exactly half are mistaken.

At one level this is a plausible path. It takes just a little overconfidence in one’s own signal to undo the no-trade-theorem information story — to introduce a little doubt into the “if he’s offering to sell me something he knows something I don’t” recursion.

On the other hand, understanding that other people are just like us, and therefore inferring motives behind actions, is very deep in psychology and rationality as well. Even chimps, offered to trade a banana for an apple, will check to make sure the banana isn’t rotten². Questioning the motives of other chimp’s actions is the core of the no trade theorem.

More deeply *if* you are forced to trade, a little overconfidence will get it going. But why trade at all? Why not index and make sure you’re not one of the losers? Inferring information from other’s offer to trade is only half of the no-trade theorem. The fact that rational people don’t enter a zero-sum casino in the first place is the other, much more robust, half. That line of thought equates trading with gambling — also a puzzle — or other fundamentally irrational behavior.

But are we really satisfied to state that the *existence* of exchanges, and the fact that information percolates into prices via a series of trades, are facts only “explainable” by human folly, that would be absent in a more perfect (or perfectly-run) world?

Moreover, that “people are idiots” (what Owen Lamont once humorously called a “technical term of behavioral finance”) might be a trenchant observation on the human condition. But, by being capable of “explaining” everything, it is not a theory of anything, as Bob Lucas uses the word “theory.”

The sheer volume of trading is the puzzle. All these non-information mechanisms — life-cycle, preference shocks, rebalancing among heterogeneous agents (Andy Lo and Jiang Wang), preference shifts, generate trading volume. But they do not generate the astronomical magnitude and concentration of volume that we see.

We know what this huge volume of trading is about. It’s about information, not preference shocks. Information seems to need trades to percolate into prices. We just don’t understand why.

² I made the banana story up. I remember seeing a science show on PBS about how chimps and other mammals understand that others are like them and question motives, but don’t have the reference handy.

Does this matter? How realistic do micro foundations have to be anyway? Actually, for Andy and Fernando's main purpose, and that of the whole literature I just seemed to make fun of, I don't think it's much of a problem at all.

Grossman and Stiglitz, and their followers, want to study information traders, liquidity providers, bid-ask spreads, and other microstructure issues. Noise traders, "overconfidence," short life spans, or preference shocks just get around the technicalities of the no-trade theorem to focus on the important part of the model, and the phenomena in the data it wants to match. Andy and Fernando want a model that generates the correlations between risk premiums and volume. For that purpose, the ultimate source of volume and why some people don't index is probably unimportant.

We do this all the time. Bob's great 1972 paper put people on islands and money in their hands via overlapping generations. People live in suburbs and hold money as a transactions inventory. OLG models miss velocity by a factor of 100 too. (OLG money and life-cycle volume models are closely related.) So what? Economic models are quantitative parables. You get nowhere if you fuss too much about micro foundations of peripheral parts. More precisely, we have experience and intuition that roughly the same results come from different peripheral micro foundations.

If I were trying to come up with a model of trading tomorrow, for example to address the correlation of prices with volume (my "Money as stock" left that hanging, and I've always wanted to come back to it), I would that's what I'd do too.

At least, for positive purposes. We also have experience that models with different micro foundations can produce much the same positive predictions, but have wildly different welfare implications and policy conclusions. So I would be much more wary of policy conclusions from a model in which trading has nothing to do with information. So, though I love this paper's answer (transactions taxes are highly damaging), and I tend to like models that produce this result, that is no more honest than most transactions tax thought, which is also an answer eternally in search of a question.

At this point, I should summarize the actual contributions of the paper. It's really a great paper about risk sharing in incomplete markets, and less about volume. Though the micro foundations are a bit artificial, it very nicely gets at why volume factors seem to generate risk premiums. For that purpose, I agree, just why people trade so much is probably irrelevant. But, having blabbed so much about big picture, I'll have to cut short the substance.

How will we really solve the volume puzzle, and related just what "liquidity" means? How does information make its way into markets via trading? With many PhD students in the audience, let me emphasize how deep and important this question is, and offer some wild speculations.

As in all science, new observations drive new theory. We're learning a lot about how information gets incorporated in prices via trading. For example, Brian Weller and Shrihari Santosh show how pieces of information end up in prices through a string of intermediaries, just as vegetables make their way from farmer to your table — and with just as much objection from bien-pensant economists who have decried "profiteers" and "middlemen" for centuries.

Also, there is a lot of trading after a discrete piece of information hits the market symmetrically, such as a change in Federal Funds rate. Apparently it takes trading for people to figure out what the information means. I find this observation particularly interesting. It's not just my signal and your signal.

And new theory demands new technique too, something that we learned from Bob. (Bob once confessed that learning the math behind dynamic programming had been really hard.)

What is this "information" anyway? Models specify a "signal" about liquidating dividends. But 99% of "information" trading is not about that at all. If you ask a high speed trader about signals about liquidating dividends, they will give you a blank stare. 99% of what they do is exactly inferring information from prices — not just the level of the price but its history, the history of quotes, volumes, and other data. This is the mechanism we need to understand.

Behind the no-trade theorem lies a classic view of information — there are 52 cards in the deck, you have three up and two down, I infer probabilities, and so forth. Omega, F, P. But when we think about information trading in asset markets, we don't even know what the card deck is. Perhaps the ambiguity or robust control ideas Lars Hansen and Tom Sargent describe, or the descriptions of decision making under information overload that computer scientists study will hold the key. For a puzzle this big, and this intractable, I think we will end up needing new models of information itself. And then, hopefully, we will not have to throw out rationality, the implication that trading is all due to human folly, or the basic principles of finance such as preferences for money not securities.

Well, I think I've hit 4 of the 6 Bob Lucas deadly sins — big picture motivation, comments about whole classes of theories, methodological musings, and wild speculation about future research. I'll leave the last two — speculations about policy and politics, and the story of how one thought about the paper — for Andy and Fernando!