Securities and Exchange Commission Historical Society
Interview with Larry Harris
Conducted on September 6, 2017 by Kenneth Durr

KD: This is a telephone interview with Larry Harris for the SEC Historical Society's Virtual Museum and Archive of the History of Financial Regulation. I'm Kenneth Durr, and today is September 6, 2017. Let's start with a little bit of background. I want to get a sense of how you got involved in economics. Did you go into that in undergrad?

LH: I was an undergraduate economics major, but I chose it primarily to preserve my option to do other things. I was very curious to do everything, and when I became a junior and had to decide on a major, economics seemed like the best option as it gave me the most additional options. I guess I was already thinking like an economist.

KD: And you figured out that that's what you wanted to pursue, I guess, pretty quickly.

LH: Not really, but I was pretty immature when I was young, and I enjoyed learning a lot and I did really well as an undergraduate in economics. And so, I was directed towards the PhD program and went to Chicago, which was a great school. Even then I didn't know what the future was going to be. I didn't start going to Chicago figuring that I'd be an academic, but that's what happened. Since then it's all worked out well and I'm very happy with my decisions or lack of decisions.

KD: Well, you worked with Robert Lucas, a pretty famous economist, very influential. Did he have some influence on what it is you studied?

LH: Yes, he did. He had suggested an area where I might discover a research topic. It was a bit away from the topics that he had been studying, but it worked out very well and it was great working with him.

KD: Yes, this is the mixture of distribution theory, right? Can you tell me a little bit about that, explain it in layman's terms?

LH: Yes. The notion is that it can be easier to understand the evolution of markets if you don't necessarily think in chronological time. So if you imagine that markets sometimes move faster or slower in response to information, by thinking in terms of the speed at which information arrives, you can have a deeper understanding of the markets. So when we think in terms of chronological time, we know that some days are very fast days and some days are slow days. If you think in what we might call event time or business time, where everything moves not according to the clock but according to events, it turns out that the behavior of the market is far more regular. And seeing the market in this more regular way allows people to better understand what's happening in the market.

KD: So did you pursue that for a few years after you finished your PhD?

LH: Yes, I did. I wrote a couple additional papers out of that dissertation.

KD: Okay. And did you go right to USC after you got your PhD?

LH: Yes, I did.

KD: Okay. Well, I want to get to when you started to do other things, and I guess that the first major one was becoming an economic fellow at the Office of Economic Analysis?

LH: Yes.

KD: Economic fellow, was that a traditional position or was that a new one?

LH: It's the name that they give to visiting economists. Here's the progression. When I was studying the mixture of distribution, I was brought to become an expert in high-frequency data. I was one of the first people to look at actual transactions data in the stock market and the futures markets as well. That kindled my interest in how the markets were operating, how these data were being produced, and I had written several papers that distinguished me as an early expert in market microstructure, the study of how markets operate.

When the great stock market crash of 1987 – it's been so long ago, I'm starting to forget. When the '87 stock market crash happened, Ken Lehn, who was then chief economist at the Securities Exchange Commission, suggested it would be useful for me to join the

Commission and help them as they think about their response to the crash and so forth. And that's exactly what I did.

KD: So how did you go about that?

LH: Well, Ken made me an offer. The way it works is that the – it's called the IPA Program, I think. It's been a while since I've done it. The government has this program where they can hire professionals from – I don't know how broad the program is, but they certainly can hire professionals out of universities, and I believe from other agencies as well, to join an agency for a limited period. And the way that works is that they actually buy your time from the host institution. So in particular, the SEC executed a contract with USC and paid USC for me. And USC continue to pay my salary. This is the only situation that I'm aware of where a third party can pay your salary while you're working for the government, but of course it's all done under authorization of the Congress and under well-specified contracts.

And what happens is you actually have two employers. You're subject to the rules of your host institution and also to all the rules of the SEC as though you were a full-time employee. Makes it easy to join the government without giving up retirement benefits and other things, and health care and whatnot.

KD: So when you came into the SEC as an economic fellow, did you have a lot of leeway as to what your agenda was going to be, how you were going to do your research? Or did you sort of fit into an existing agenda of research?

LH: Well, because when I came in I basically became the subject area expert, I helped form the agenda for what I would be doing. And I worked on issues that I thought would be of interest to the Commission, and indeed they were. And they were good for my career as well.

KD: Well, let's talk about those. Prioritize what you felt were the top issues at that point.

LH: Well, perhaps the most important issue was understanding the relationship between the futures market and the stock market. In 1987, many people felt that the futures market contributed to the stock market crash, and there were various problems associated with how arbitrage was done between the two markets. So I worked on a paper – maybe it was shortly before that, but I continued working on it when I was there – about the relationship between the futures market and the stock market in terms of arbitrage and the staleness of information. Stale information means that market participants are not receiving information about prices as quickly as they should or that the markets are not processing information as it's arriving, which was a problem at the New York Stock Exchange.

So I don't recall whether I did that in the year before or at the SEC, but that was an important paper. At the SEC I'm sure that I worked on a paper that was entitled "The Economics of Cash Index Alternatives." That was a survey of the different ways that we could create what we now know as index ETFs. And so what I did is I laid out the different ways that people could trade the value of a large index like the S&P 500. There had been some regulatory proposals to do things called index participations, and I identified the weaknesses associated with the index participations, along with other people. And I think that's why those products, though they were ultimately approved, were never successful. And so this paper was widely read and I think pretty influential and probably allowed investment management to move forward with ETFs.

KD: Now, that wouldn't have had anything to do with the '87 market break, though, right?

LH: No, no. These products came along after '87, but they were proposed in response to what happened in '87. So this is in '88 that I was writing this, though. And in everything we talk about, let me remind you that every success has many, many parents. So though it may sometimes sound like I'm taking credit for something, I may have been instrumental but in no case was I responsible for all the good things that happened.

KD: Did you take a look at the exchanges and the specialist system and things like that?

LH: Yes. I had been talking to people throughout the industry about how the specialist system was working, and had been identifying problems that people saw with the specialist. And

I don't recall that I wrote very much on it at that time. Somewhere around there, I don't recall when, I wrote a paper entitled – something to do with liquidity. It since has been rewritten into a chapter in my book. I think it's "The Many Dimensions of Liquidity" or "Multidimensional Liquidity," something like that. Or maybe it was a monograph. I don't remember. It's a long time ago. But I don't recall if I did it at the Commission are not, but that was also pretty influential.

People talk about the markets not having any liquidity and they don't know what they're talking about because what liquidity means to one person means something else to somebody else. So then I tried to straighten that out. Of course, I also worked on enforcement cases there, and there I was largely assigned projects by the chief economist, Ken Lehn. And I consulted to the various divisions and to a lesser extent to the commissioners. I would talk to them.

KD: What was it like working on an enforcement case? Was there any typical type of issue or area that you would be called in to look at?

LH: I didn't do too many of those during that year since I was mostly focused on policy research and policy planning. I'm trying to remember what I did work on. Nothing stands out in my mind. I remember much better what I worked on when I was chief economist because then I had much more responsibility.

KD: Right. As you said, there were a lot of questions about the '87 market break, and they remained. But did you feel that during your time there that you and the SEC and the people you worked with came to more clarification about what had happened and why?

LH: I think so. There certainly was a lot of talk about what had happened. The New York Stock Exchange spent about a billion dollars or more afterwards to improve its technology. Technology had been a problem. What else? There were circuit breakers that were implemented. I didn't have much to do with that. I think that happened before I arrived. I don't believe that was particularly wise. They're so far away from the market, they've only once been triggered, I believe.

KD: Did you work in the area of mutual funds at all?

LH: Yes, I have some memory of talking to people about mutual funds, but not too much. I did a lot more work in mutual funds when I was chief economist. I'm trying to remember what the issues were.

KD: 12b-1 came up in my research.

LH: Yes, I didn't have much to do with that then. I have pretty strong opinions about it now.

KD: Okay. Anything else we should talk about from your period as an economic fellow?

LH: No. It was an extremely productive period of my life. I really appreciated working for the Commission and I was delighted that people were listening to me. It was a lot of fun.

KD: And then did you go right into the New York Stock Exchange after that?

LH: Yes, so James Cochrane, the chief economist of the New York Stock Exchange, asked me to be a visiting economic fellow there or whatever they call that position. In that case I was actually the first such fellow, and that program continued through ten or twelve different economists until the New York Stock Exchange decided they needed to cut cost, as they had to, because the industry became much, much more competitive when they all privatized.

KD: What did he bring you in to do?

LH: He pretty much just asked me to be an in-house consultant and to do my research, whatever I wanted to do. But obviously, again, he expected that I would choose projects that were of mutual interest to the exchange and myself, and of course the SEC. So the main project that I did then was about program trading. A fellow named George Sofianos and – it's on the paper. His name's slipping me right now. Two other economists and I at the exchange did a paper on program trading and its impact on the markets. There had been a lot of controversy about program trading at the exchange and also about the impact of program trading on the stock market crash. And so, we tried to quantify the effect of program trading on the markets.

The common theme here is that program trading is used to implement index strategies, and it further identified the importance of having index products instead of just trading all 500 stocks at once. So while at the Exchange, I spent a fair amount of time on the floor learning what they were doing. I talked a lot with exchange management, everybody from Chairman Phelan and President Dick Grasso on down. Made them a lot of suggestions that I think, in retrospect, they might have wanted to undertake earlier.

The New York Stock Exchange at the time had an extraordinarily strong market position, and they were reluctant to make changes because the changes would ultimately, though making them more competitive, would have substantially reduced the profitability of their members. And as a consequence, they were very reluctant to change. They were trying to preserve specialist and floor broker profitability. As a result, they lost the opportunity to be a leader on electronic markets and in a few other places as well.

KD: Is that what you recommended, that they move into electronic markets more quickly?

LH: Well, I was aware of the political problems that they faced internally, and basically told them what the consequences would be of maintaining the current policies, which I think they understood. I suggested to them that they devote more effort to the electronic markets as a way of preserving an option to switch over quickly should they need to. They didn't follow that out. Interestingly, their electronic bond market was truly the first electronic bond exchange, and that would have been the ideal vehicle for learning more about electronic markets. I had suggested to them that they use that software and use it to run the New York Futures Exchange, which I thought was a huge missed opportunity.

In the end, they just weren't able to manage derivative trading very well and they ended up selling both the New York Futures and New York Options. But they missed some big opportunities. They didn't have to threaten the members. They should have figured out a way of preserving these options and developing them, but they didn't.

KD: They had things like DOT and SuperDOT at that point, right?

LH: Yes.

KD: Now, in what way were these not sufficient for the developing needs?

LH: Well, the DOT and SuperDOT systems were just order-routing systems, systems designed to bring orders to the specialist desk. Increasingly, the processing of those orders were automated, but the specialists still had to basically press the button. So I don't think that the automated executions or the preparation for a button-facilitated execution was normally thought of as being part of DOT. It's part of the specialist suite of software that they had there.

KD: So there was no thought of just sort of connecting them electronically and taking out the specialist entirely from the systems?

LH: No, absolutely not. No.

KD: Why not?

LH: Because the specialists made a lot of money. And also because the floor was participating in the trades and the specialist is operating as like a traffic cop, directing traffic, organizing that auction, and representing – so the electronic orders going through the exchange were directed to the specialist to act as broker in the crowd and you had lots of other orders coming into the crowd through other mechanisms.

And so we now think of trade as taking place in electronic environments, but that's not the right framework to think of in this environment. They were electronic systems that allowed those people who wanted to have the specialist represent their order, it allowed the specialist to receive those orders. And then the exchange imposed the specialist obligations, obligations to do things and obligations to refrain from doing things, on the specialist, so the specialists were these regulated entities. But many firms brought orders to the market through their booths. Certainly institutional orders, but even retail-size orders would go to their floor brokers who would try to get the best price then.

KD: All right. Now, does that go for ITS as well?

LH: ITS was a system that linked the various exchanges together. So in the Intermarket Trading System, ITS, the rules were – and this was imposed by the SEC in cooperation with the exchanges – if an order is present at one market and another market has the best available price, then you could put the order into the ITS system to transmit it to the other market, where the specialist at that other exchange would try to fill the order at the better price. So the idea was that no exchange should be trading through the prices of another exchange. That is to say, you should not allow a buyer to buy at twenty when some other exchange has an opportunity to buy at nineteen. So if you see that, you either fill the order at nineteen or you route the order through ITS to the other exchange, where hopefully you'll get it filled at nineteen.

Now, the problem with ITS is, because it was a fairly slow system, often when the order would arrive at the other exchange, the specialist would say the nineteen quote is no longer available. Or the specialist would look at it and decide, hmm, do I want to trade this at nineteen, or maybe I don't. So if I don't, then he says, well, the nineteen quote's no longer available. And nobody can keep him honest.

KD: And again, this is just linking specialists, it's not really linking the two parties of the trade.

LH: That's correct.

KD: Did any of the work that you did for the exchange affect the rules or the procedures in any way?

LH: Not that I'm specifically aware of. Let me think about this. No, I don't think so. I mean, who knows? I really spent a lot of time talking to Phelan and to Grasso and to other officers of the Exchange, but their issues were primarily about maintaining the public image of the exchange.

KD: Right. And the value of the people holding the seats.

LH: That's right. I mean, this was still, it was a fellow membership organization and the value of the exchange was manifest in the value of the seats. And of course, the exchange itself was a not-for-profit entity. I believe it's not-for-profit. But the seats were pretty valuable.

KD: So after you went back to the academy, then, after these two stints at the SEC and in the stock exchange, how did that change your perspective on your work and maybe change your research and teaching?

LH: Well, both experiences were extraordinarily valuable and I had a chance to see how exchanges and regulators operated firsthand. I had spent a lot of time on the floors of various exchanges and watched trading. Also spent a lot of time at investment banks on the trading desks and talked to the senior folks. It was really valuable being at the SEC because I could call up a senior manager at a large bank and ask, "Hey, I'd like to drop by. I'm going to be in New York next week or in a couple weeks. Can I drop by? Do you have somebody who can explain to me how this works?" or something like that. And because I was at the SEC, they respond right away. So that was really very helpful.

And so, the impact on my teaching and research, it helped me identify better research topics, although I had generally been pretty good at identifying topics that were of mutual interest to practitioners and academics. Academics in finance generally are very practice oriented, so if you are working on important topics that are of interest to practitioners, academics, the journal editors and whatnot will be interested. But just seeing what was hot and what was important.

As far as my teaching goes, it allowed me to much better understand the political economy associated with market microstructure issues, and this is an area where my younger colleagues, and myself, too, when I was younger, are often quite weak. We have a pretty good sense of what we think is right, but little sense until we mature as to how you get what you want and then how often you don't get what's best for the public.

The neat thing about academics is that though academics can often be hung up on their own careers and publishing so that other academics can read their stuff, ignoring that, what's really neat about academics is that they're generally not beholden to anybody. So when academics are involved in public policy, they usually have the public interest at heart. Industry members will say they have the public interest at heart, and often do, but usually that's only when it aligns with their own interest. And when their own interest runs contrary to the public interest, they usually find some way of explaining that what they're doing is actually in the public interest when, in fact, it may not be.

Regulators are often very risk-averse and sometimes captured by the industry, and the investors themselves are generally poorly organized and poorly informed. Certainly, the retail investors, but also the institutional investors. They spend most of their time trying to figure out what valuations are, and in the area of market microstructure they defer to their buy-side traders for understanding how the markets should operate. The buy-side traders are vested in the system, they have relationships with large banks, and so they usually don't speak out in ways that would hurt those relationships. And so it falls to the academics to represent the interests of individual investors, and to a significant extent, also the beneficiaries of retail investment managers, management processes, falls to them to sort of weigh in with their influence. This is why the visiting programs that the SEC has are so important, both in economics but also in law and in accounting as well.

So the staff of the SEC, the major policymakers at the SEC typically are – at least among the professional staff – typically are attorneys, and they tend to be very, very good. But because the SEC as a governmental agency can't pay a lot, these attorneys often are aware that they won't be staying forever at the SEC. So the problem that they then face is unless they're going into academia, and not too many of them do, they expect to end up working for a brokerage firm or an investment manager or for counsel that serves those entities. And as a consequence, it creates two perverse incentives. One is to create regulation so complex that people have to come to you to interpret them. That makes you really valuable. The other one is not to do anyone that's going to piss off a future employer and ensure that you won't be hired. Now, most people aren't subject to the – nobody consciously says, "This is what I would do," but these effects are certainly pretty well understood.

KD: Yes. Now, I would suppose that when you left the SEC and the New York Stock Exchange back in the early nineties, you didn't figure that you'd be coming back to the Commission, certainly.

LH: I certainly didn't have a plan to, and I didn't imagine that I would come back as chief economist. The time was so valuable, I could easily have seen myself returning.

KD: Yes, so what were you looking at? What was your research about in the mid to late nineties, that period when you're back at the academy after working?

LH: Well, I spent a good portion of my time writing the book *Trading and Exchanges*. Let's see. I wrote on volatility. I have to look at my resume to see. Oh, I spent a lot of time working on trading rules, in particular the importance of the minimum price variation, the tick. I wrote several very popular influential papers about tick sizes and how something so seemingly trivial is so important, and remains so. In fact, I'm working on a paper right now about it.

KD: That would factor into some of the things that were happening in this period. You have Reg ATS that comes in, and you would have been watching this from where you were. And also, decimalization.

LH: Yes, the tick size stuff I was doing was related to decimalization. And in fact, I had a paper that predicted what was going to happen to bid-ask spreads and quotation sizes following decimalization, and the predictions at the time, people thought they were outlandish. And in fact, they were spot-on.

KD: Prediction being lower –

LH: The spreads were going to narrow and sizes were going to decrease, but not as much.

KD: Sizes of trades?

LH: Of displayed sizes of quotes. Aggregate display.

KD: Now, the prevailing argument was that this was going to save investors money, large amounts of money. And was that something that you agreed with?

LH: Generally. I think that the penny tick was probably too small for the technology that we then had, but the technology has evolved, and so we're probably at about the right point now.

KD: Why would it have been too small?

LH: The most important thing that the tick size does is it makes it expensive for somebody to jump out of line. So if there are lots of people who want to trade at twenty and the tick is a thousandth of a cent and you can trade it at twenty plus a thousandth of a cent, and get in front of everybody else. And most people don't think that's fair, but aside from the fairness issue it's also very problematic because clever and fast traders can exercise a strategy called the quote-matching strategy that exploits the people who are in line at twenty. And the way it works is you try to trade ahead of them and when there's a seller – say you're a buyer – seller comes along and you buy. And now if price subsequently rises, you'll make money. But if you see indications that the price will drop, you turn around and you sell to the person at twenty. And so now from the point of view of the person at twenty, they failed to trade when prices subsequent – rise, and that's not good, and ended up trading when prices fall. So they end up losing on net.

And so their response is to not show their prices, to not commit to the market. That's not good for the markets. So one way we can protect them from the strategy is we can say, listen, if you wanted to trade in front of another order, you have to improve the price by more than a fraction of a penny. You have to improve it by a full penny or maybe five cents. How important this issue is depends also on how high-priced the stock is. So a penny on a dollar is one percent, but a penny on $100 is just a basis point. So this is the heart of my work on minimum price variations. The minimum price variation, the tick, regulates the power relations among people who offer liquidity and those who try to exploit those people. And so, it's very, very important.

And my study, which was moderately influential, actually was based on a very simple observation. If you want to know what happens when you take the tick size, say, from five cents to one cent, all you have to do is look to see what the difference is between how a $10 stock trades on five cents and how a $50 stock would trade on five cents, because the $50 stock trading on five cents is the same thing as a $10 stock trading on a one penny tick. And so that comparison allowed me to create kind of a neat paper. Now, of course, it wasn't five cents to one penny, it was six and a quarter cents. We had gone from sixteenth to pennies. Yes, so that was six and a quarter percent, but you got the idea.

KD: Yes. Now did you go back and talk to the SEC or testify or anything like that when these discussions were taking place?

LH: Yes, it's on my resume. You probably have a copy of it. I don't recall the specifics. I know that I was involved with the discussion about decimalization and I think I testified to Congress and maybe I was at the SEC. I certainly talked to a lot of people about it. Lots of people called me. And of course I was on lots of conferences and that paper was very popular.

KD: Yes, so clearly you were very engaged in the subjects that were being talked about around decimalization.

LH: Yes.

KD: How about Reg ATS?

LH: Less so. I don't recall why. I'm not being fair here. I wrote a really important paper – I forget when I did it – that sort of identified the heart of the exchange competition issue. So the paper's title was "Consolidation, Fragmentation, Segmentation, and Regulation," and that was a paper that laid out the economics of competition among exchanges, and also within exchanges. That was very, very influential. I'm trying to remember when I wrote that. It certainly was around that time. It may have even been when I was at the SEC. I don't recall. Well, you'll see the date on it. When I first wrote it, it was probably three years earlier than the date of the paper.

KD: Right, I know how that works.

LH: Yes. That paper was very influential, and that did have to do with the ATS debate. I don't recall people calling me up when they were actually drafting Reg ATS, though.

KD: Right. So somebody called you up, though, to think about becoming the chief economist.

LH: Yes.

KD: Tell me a little bit about that opportunity, how that arose and the discussions around it.

LH: My understanding is that Annette Nazareth suggested my name to commissioner – the woman who is the economist.

KD: Oh, Cynthia Glassman.

LH: Glassman, yes. To Glassman, who recommended me to Pitt. And so I got a call to – this is what I heard afterwards. The first I got was "the chairman wants to talk to me," and so I flew out and talked to Harvey and we got along well, he was pleased and he hired me.

KD: Did he talk about the kinds of things he thought you would be doing?

LH: Yes, he mostly emphasized the importance of having rigorous thought. He was very attracted to the fact that I had been Chicago-trained, although I'm not sure what that meant to him. But he felt that it was really good that he was getting somebody that he thought was like a rising star in economics. He may have overestimated my trajectory, but I'm well-regarded and I certainly was then as well. And what's a little bit odd is I don't know whether he thought he was getting a conservative economist or what he thought was conservative. And what's odd about that is that though he thought of himself as conservative and still does, much of his thinking was somewhat at odds with other conservatives in the government, and that of course caused him a fair amount of pain and ultimately led to his sacking, I guess.

KD: Right. So he would have thought you were conservative because of your Chicago school pedigree, I guess.

LH: Perhaps. Who knows? And I'm sort of uncomfortable with these labels. If I were to characterize myself, I would characterize myself as a pro-competition economist but not as a free market economist. I believe that our economy is best served by having competitive markets just about everywhere. And when free markets will produce competitive outcomes, then I definitely want free markets without much regulation. But where agency problems, externalities, and a diversity of standards for how we organize information or organize trading, when those problems make it difficult to obtain competitive markets, then I think that we need to have regulators step in and help produce better markets.

I would also include in that list information problems. Retail investors simply don't have the knowledge to process information and they don't have the information to know how they're being treated in the markets. And so it's important that entities like the SEC or in some cases private regulators or even ratings agencies or other consultants, it's important that they have the tools to help individual retail traders get a fair shake in the markets. So I don't know if that makes me liberal or conservative or if it's somewhere obviously in between, but I would like to say highly principled in the sense that I think it's very, very important that we create markets that promote the welfare of the economy as a whole. And often there are trade-offs between the interests of the industry and the interests of the industry's customers, but in the end you want to promote the welfare of the economy as a whole. And though everybody will argue their position, usually it's pretty straightforward to see what's necessary. At least in my opinion, from my training.

KD: And you talked about diversity of standards and information problems, and I would assume at this point everybody's talking about fragmentation.

LH: Not just fragmentation. Fragmentation by itself is not necessarily a problem because that's basically the competition among exchanges to provide the best exchange services, although sometimes it's screwed up by agency problems and it's basically hidden pipelines of profitability and stuff like that, like payment for order flow. But here's a classic example of pricing standards, and it's a problem that we presently face and one that I worked on when I was working on Reg NMS. That's the maker-taker pricing versus, say, traditional exchange pricing, or nowadays we have taker-maker pricing. So this all refers to how exchanges collect their fees.

And we have different ways of doing it, and as a consequence, a twenty bid means different things to different exchanges. At a make-or-take exchange, a twenty bid to a seller who wants to sell at twenty means that he will sell for twenty but he will have to pay a take fee of about three-tenths of a cent per share. If he sees that twenty bid at a taker-maker exchange, then that twenty bid means that he can sell for twenty and he'll get a rebate of about a tenth to two-tenths of a cent per share. So his net price is different. And now even worse, the trader, the end trader, the beneficiary, probably doesn't even know about this, but the broker knows about it and the exchange fees and rebates are being paid and received by the broker, and so the broker is making routing decisions based on this information. Or on these incentives, not just information.

And so that leads to various efficiency problems and, in fact, it results in effectively having a half-penny tick between – but it's not a half-penny tick at a given exchange, because that's not allowed. But within the national market system, there's a half-penny tick as people who are sophisticated bounce from one exchange to another based on what they know about exchange fees. So I'm working on this right now, but that's a classic example of a pricing issue, a pricing standard. So when we were working on Reg NMS, I wanted to eliminate the maker-taker pricing scheme because it was representing a diversity of pricing standards.

The exchanges should be pricing based on a single standard, and at the time we had basically two standards: your traditional standard, which was what charged the seller a small fee. Maybe it was also the seller and the buyer, I forget what it was. But it was a small commission. And the other standard was that we will charge the taker a large fee and rebate much of it to the maker so that the exchange fee was the difference between the two. And economically, the only thing that matters is the difference between the two. That's what the exchange gets out of it. But now you've got this system that's created incentives for brokers to route orders to make-or-take exchanges simply because the brokers are getting paid for the orders if they execute, stuff like that. It's just not being done the right way.

KD: Right, and the incentives are for the wrong things.

LH: Yes, and they're still there.

KD: So when you came in, you came in in 2002, I guess.

LH: Yes.

KD: And the Commission had some market structure hearings. So this must have been in the wind. I mean, was the idea that Reg NMS or what would become Reg NMS, was that already moving when you came in?

LH: It was moving a little bit, but it moved substantially during the time I was there. Annette Nazareth and I and her staff and a couple of my people had regular meetings to talk about how to structure the rule and what to put in it and so forth. So that was probably among my most significant contributions at the Commission, although there were a few other things that were very important as well.

KD: Tell me a little bit about how the process worked. What did you see change over time as you shaped this thing into a regulation that would ultimately be adopted?

LH: Well, I guess first, Annette and I had a really good relationship and so we shared a lot of information and participated in the same meetings. The industry was there lobbying all of us regularly. There were the hearings that you spoke of or the various meetings. I forget what they were. And so we would get together to talk about what we wanted to do, and what was feasible and whatnot. I think the Commission was extremely lucky to have Annette at that time. Annette came from a law firm that had been basically a consultant to the industry, but she had much more independence than most people. Well, first of all, she was independent by virtue of not working for the industry directly, but indirectly as having clients in the industry. But she was also substantially independent because her husband, Roger Ferguson, was a very significant player at the Federal Reserve. And of course let's not minimize the strength of her character either. She's a very strong woman who has strong feelings about what's right for society as a whole.

And so it was really great that she was in that position at that time because it allowed the Commission to make changes that ultimately very substantially changed the structure of the markets. So the New York Stock Exchange, of course, was saying that the world was going to end if their trading system was not fully supported, but in the end we created a set of rules in Reg NMS that effectively forced the New York Stock Exchange to convert to electronic trading. And the efficiency gains were enormous, but it hurt a lot of people. A lot of people lost jobs on the floor of the New York Stock Exchange and commissions continued to decline. And this doesn't have to do with commissions, but bid-ask spreads declined a lot. But volumes increased very substantially. And the character of the trading changed a lot. This was all, basically, regulations that facilitated the use of new technologies.

KD: Right. Was there a sense that this, after the order handling rules, Reg ATS, all that, was there a sense that Reg NMS was kind of inevitable, that you were going to sort of push the structure of the exchanges toward going fully electronic?

LH: I think so. I mean, how long can you continue to claim that the American system is the very best system when you see that the futures exchanges and the Europeans' trading equities have very efficient markets? And when you see that Island and Archipelago and the other ATS's are running extraordinarily effective markets. The buy-side wants to trade there. You had some really interesting things happen at that time. So at some point, Island became so big in the SPDR that it exceeded one of the parameters of Reg ATS, which meant that it could no longer display its quotes. And so the rule wasn't changed quick enough, and the law basically said they couldn't display quotes. So Island went dark on the SPDR and you had this market in the SPDR, before it had like 40 percent of the market share, it dropped to 25 or 20 percent, something like that. But it was remarkable that it just continued to trade on, even in the dark. So an incredibly fast, efficient market. So I think everybody knew it was inevitable, and then the question is how to do it, and over what time frame.

KD: Right, and a lot of the how-to-do-it is those four components to Reg NMS.

LH: Right.

KD: How early did you have those in place? I mean, was it pretty clear that those were the four things you wanted to do and then it's a matter of adjusting, or how did that work?

LH: Well, the four were all different issues, and so they were kind of crammed together. They didn't have much. Some of them had some relation to each other, but pretty much they were largely unrelated. And so it basically came together in the end that, look, we're working on market structure, these are four issues that we have to work on, and let's just lump them all together and call them Reg NMS. And we can go through those issues.

KD: Yes, sure. Obviously, the big one, the contentious one, is the trade-through.

LH: Right. And also the least well understood. You want to do that one first?

KD: Yes, talk about how that developed.

LH: So the trade-through rule was the main rule that changed the US markets from floor-based to electronic trading. And the basic rule was that before, under the ITS system, electronic markets had to yield to the floor-based markets. By yield I mean you couldn't trade through an existing quote if it was in the national market system. And so if an electronic exchange wanted to do a trade that would violate, that would cross a quote or something like that, they just couldn't do it. And so the power resided with the manual exchanges, the floor-based exchanges. So we changed that rule and we said that you can't trade through a quote if it's electronically accessible within like a second or something like that. But if there was a quote that was not electronically accessible, then you could trade through it. And that was the main effect of that rule.

The part that people don't understand goes like this. People knew that NASDAQ did not have a trade-through rule, and it was very competitive, and that the New York Stock Exchange seemed to have been – in their perspective, they thought the New York Stock Exchange, that trading was protected by a trade-through rule because you had the ITS system, and they knew that the New York Stock Exchange had this incredible market power. Some people call it a monopoly. Just call it market power. You know, market share of 80 to 90 percent, depending on when you queried it. And so the casual observer would say, well, there must be a correlation here, that the trade-through rule was protecting the New York Stock Exchange. So that was part of the controversy.

The other part of the controversy was that the broker has an obligation to get the best price. If the broker's meeting that obligation, you don't need a trade-through rule because the broker never wants to arrange a trade that would disadvantage his client by trading through a better price. At least, that's the principle. So a lot of people, then and now, are opposed to trade-through rules because they think that it's sufficient just to require the broker to meet their obligations. But here's what the SEC knew at that time. Two to three percent of retail trades that were being arranged by NASDAQ dealers were trading through better prices, and it was apparent that a good fraction of that was not accidental, that it was intentional attempts to obtain better prices for the dealers.

And so the SEC wasn't very happy about that and they imposed a trade-through rule on all markets in an attempt to create a bright line so they could enforce the rule, which basically should have been just a fiduciary rule. Brokers are supposed to get the best price. But now if they don't get the best price, they're in violation of the SEC rule and not just in violation of their fiduciary responsibilities to their clients. So that was the main reason for the current form of the trade-through rule. It had little to do with market structure, it had to do with enforcement issues associated with broker-dealers that, frankly, were not being as good to their clients as they should have been.

Now, why didn't the clients leave? Because the clients have no clue of what's happening to them. They miss a price by a tenth of a second or a quarter of a second or something like that, and they should have gotten that price, but given the amount of time involved they had no idea that they could have gotten the price, and they don't do transaction cost analyses. They don't even do enough trading to make transaction cost analyses meaningful, so they have no idea that one broker is better than another broker, and in any event they'd have to trade with a whole bunch of different brokers in order to collect all that data so that they know who is the better broker.

So here is an example of the information problems associated with regulating best execution. They're just too difficult for retail clients to solve. So if we want to solve the problem, the government has to do something, or at least the threat of enforcement or the threat of class action suits. I don't think that the regulators particularly care for the class action suits. It's just, you know, you're throwing another group of people who make money off of other folks, the class action attorneys.

KD: But now in making sure the brokers offered the best price, you forced everything into the electronic markets.

LH: No, it doesn't force it into the electronic market, it just forces the manual markets to convert to electronic markets because otherwise their quotes aren't going to be honored. So there was no regulation to force people to route to electronic markets, but the manual markets didn't want to remain manual, for the reasons that we discussed. So, any rate, so that's the trade-through rule. It remains controversial because, again, if you are anti-government intervention, it just looks like a heavy-handed rule. Nowadays it's probably less important than it was before because it's much easier for us to identify trade-throughs, but the truth of the matter is unless somebody is looking for it and unless you can enforce on it, it's going to happen because people can make money doing it.

But in the end, what's the problem with the rule? It really requires people to do what they're supposed to do anyway. So now the question is, is should we get rid of the rule because they're supposed to do it anyway, or if they're doing it anyway, what difference does the room make? So if you are anti-rules, you say it's just an unnecessary rule, but it has no impact. If you're in favor of the regulation, you go, well, yes, maybe it's supposed to be unnecessary, but if everybody's doing what they're supposed to be doing, then what difference does the rule make? So that's the trade-through rule.

The other three areas here, the minimum tick. So we had had ATS's that were trading on a millionth of a penny or something like that. The buy-side just went nuts because the people were basically front-running their orders using the strategy that I described to you earlier. And already, the ATS's had responded and said, okay, we're going to increase the tick size to a penny. So the sub-penny rule just said that you can only quote on pennies. You could still negotiate trades on smaller, but you couldn't quote except on pennies. We spent a lot of time discussing this. There were a lot of different alternatives. This and the make-or-take rule, which is the next one I want to talk about, are the ones that interact the most, and so we did spend a lot of time talking about this.

KD: What were some of the alternatives?

LH: The alternatives were to – let's talk about make-or-take first, because the two are related. Okay, so to close up on the sub-penny, the SEC basically codified what had already been done. The ATS's have largely gotten away from sub-penny pricing because there was so much noise about it, and so the rule just codified that.

Okay, so the make-or-take pricing. The ATS's introduced make-or-take pricing to effectively create an agency problem in which they rewarded brokers for sending them retail orders from their clients. Okay, so maker-taker creates this incentive that brokers can place their customer order at an – if it's a standing limit order, it stands at an exchange, at typically an ETS or something like that. At the time it was the only ones that were doing this. And the effect was that if the order executed, the broker-dealer would get paid for the rebate from the execution, and that of course would not get passed on to the client.

So this is disadvantageous to the client because imagine you have a bid at a traditional exchange and a bid at the make-or-take exchange. The seller, who's sophisticated, or the seller's broker, who's sophisticated, is always going to sell to the – you have the same bid, a bid of twenty at both places, you're always going to route first to the traditional exchange where you pay a small fee or no fee for doing the execution using a market order, because if you route to the ECN, which is an ATS, then you would end up receiving the twenty bid but you'd have to pay more for it. So as a result, any standing orders that were placed at a ECN, a make-or-take exchange, would be the last to trade, and that's poor representation of the order flow.

So the SEC didn't understand this or refused to. The staff certainly understood it. But certain commissioners who were reluctant to intervene did not want to do away with this system. I can talk a little bit more of that later. So what did we see? Initially, they started out with like two mil, two-tenths of a cent access fee and a one-tenth of a cent rebate. So it was two and one. And then it went to three and two. And then there were others who went to five and four. And there was one entity that had a penny and a quarter, or something like that, access fee, and a rebate of like eight or ten tenths of a cent. So you had this game of leapfrog that was being played, and it was really bad. And you were forced to route to the best price, but in routing to the best price as a broker-dealer, you might be forced to pay an egregious access fee that actually affected the price, but you couldn't pass that through to your client, or typically couldn't, because of your business model. And so some of these guys simply, they routed because they were required to and then they just refused to pay their bills.

So, a sort of chaos resulted, and the Division of Market Reg, as it was then known, basically wrote a letter saying that you can't have an access fee of more than three-tenths of a cent. And Reg NMS codified that, but over my strong objections. I said these access fees are akin to kickbacks. They're basically saying, I've got a client who wants to trade. If you want to click trade with my client, you've got to pay me first. If I did that as a purchasing officer for USC, it's a felony. I'd go to jail. So I wanted to eliminate the system entirely, and I claimed it was a pricing standard issue.

And commissioners who were opposed said, no, the SEC does not regulate prices. And I said you're not regulating prices, the price is the difference between the take fee and the make rebate, also known as the access fee and the liquidity rebate. That's the price of exchange services. We have no business regulating that. But what we can regulate is how that price is quoted, so we can say that one of those fees cannot be any more than something else, and they can adjust the other fee or the rebate. Or we can simply say that's just not how you're going to do it. Instead of collecting based on who's the maker and who's the taker, set your fees based on who the buyer was and the seller, as we traditionally did, or just split it among the two of them. So I unfortunately lost that one, and that one has become a really hot issue now because we now have maker-taker and taker-maker exchanges, and as I explained before, that has led to the creation of basically a half-penny tick even though we have strong reason to desire a one-penny tick or even more.

Okay, so what were the alternatives, now that we have both of these issues laid out? So the alternatives was that we can force everybody to trade net and quote net. So if an exchange has a 20 bid but you have to pay three-tenths of a cent to get it, we'll just say that that bid is actually 19.7, or 20.3, depending on – let me get this right. If you're bidding 20, from the perspective of the seller if you have to pay to get it, you only get 19.7. So one of the things we thought about doing is just force everybody to display only net prices. Now, if we display net prices the problem with that is that now the real estate on the screen is severely taxed, and of course we have a minimum price variation that's now perhaps a tenth of a cent, which we didn't want. So you see how the two interact. In the end, they just didn't satisfactorily solve it. They put a cap on the access fee and they didn't even anticipate that someday somebody was going to create a taker-maker exchange. And I wish I had anticipated it too.

KD: Who was it that did that? Which exchange?

LH: I think BATS was first. I'm not sure, it might have been Direct Edge. And so you have these two identical exchanges, BATS A and BATS B or it's X and Z or something, or Y, or I don't know what they are. And I think it was directed at JNB or something like that. Now, of course, all of them are together in one exchange because BATS owns both of them and then BATS itself was bought by CBOE.

So what was going on there? Well, what's going on is that there's a ton of money in this issue. We're talking about hidden plumbing that generates a lot of revenue for the broker-dealers, certainly the retail brokers. And it's also generating a lot of business for some super lucrative businesses at the time, the ECNs. They lobby their senators, the senators press on the SEC and on their commissioners, and at this time we had Republicans in the administration and a Republican majority in the Commission. And even commissioners who might have known better simply did not believe that they had the strength to resist, to do what I think should have been the right thing to do. And in particular, they just didn't want the regulation to be so – they didn't want to vote for that kind of regulation.

Now, the irony is, and I told this to staff at the time, I said, "They're not going to vote for it anyway, so just don't worry about it." And indeed, when Reg NMS was passed, two of the three Republicans didn't vote for it – those were the noisy ones – and Donaldson, who understood it, voted with the Democrats. So perhaps we could have had what we should have had, and if we did the world would have been very different now. So that's life.

The fourth prong was completely unrelated to anything we've talked about. That was the market data fees. So the market data network's basically a consortia of exchanges that collected last trade and best bidder offer quotes from all the exchanges and aggregate them together, and they still do this. And they charge vendors for the right to use this, and ultimately it gets passed on to the client in the form of various fees, the end-user client. So you had these big data pools, revenue pools that had to be divided up according to some formula, with the money going back to the exchanges who basically owned it.

And an interesting thing happened. For the New York Stock Exchange, the data was being divided up in proportion to the number of trades. And so if somebody did a thousand-share trade, what happened is that the exchanges would – if the trade was done off an exchange, it's to be reported in the exchange. And so the exchange would say, listen, if you report the trade to us, we will get paid and we'll rebate some of that payment back to you. And so there was this competition to rebate some of the revenues that were associated with this system.

So, nothing wrong with that. That was kind of a neat competition. But what the problem was is now somebody did a thousand-share trade, they would split it into ten parts, called tape shredding. And so then they would report ten trades and they'd get ten times as much revenue. And so you wouldn't see the full thousand shares, you'd just see a whole bunch of – it was just craziness. And so when the exchanges proposed to raise the rebates for this reporting revenue, they had to do it through a rule change to get it, and you had to be approved by the SEC. So they always proposed to raise their rates, or a few of them did, and the SEC stepped in and abrogated the rules.

So the SEC was in the somewhat unenviable position – it wasn't pointed out by many people – they were in the strange position of basically closing down a competitive market. And they did this two weeks into my time at the Commission before I was really aware of what was going on. So then they had this problem. Okay, so the existing rule stayed. The exchanges didn't want to raise their rebate rates. They would have liked to have lowered them. But the SEC was in the business of effectively enforcing the higher-than-market rates in their interest to put a lid on the tape shredding, which they thought was potentially a manipulative process or something like that because it could generate the sense that there was more liquidity than there was actually or something like that. You had the same numbers of shares traded but you got more trades, and some people might interpret that as being more liquidity, remembering, of course that liquidity has many different definitions.

So they had to deal with this problem. The question was is, how are they going to rebate these revenues in a way that would not cause tape shredding? So this was the part of Reg NMS where I had by far and away the most influence. I basically wrote the rule. So what I did is I said, okay, there's a bunch of ways we can do this. We can do it based on the number of trades. You can base it on the volume that you traded. We could do it on the time that your exchange is at the best bid. We could do it on the time that your exchange is at the best bid when you were the one who created the best bid.

So I created all these different concepts, then I came up with a proposal that said it should be – this percentage of revenue should be allocated according to this criteria, and this much according to that criteria, and so forth. And then the clever thing that I did – and I'll just share this because it was fun – I asked my staff to create a calculator – it was a macro that was written in Excel – in which the user could input their own percentages. So I'd like 10 percent to be based, say, on volume, and 50 percent based on the best bid or something like that. And then the user would input these numbers. They have to add up to 100 percent. I populated the calculator with numbers that I thought were appropriate, so I basically set the stage for what my opinion was.

What did the calculator do? It calculated the only thing that anybody was interested in, except for me. What they were interested in was how much would each of the exchanges get. And so based on the existing order flow, the calculator would tell you if you had used these rules in the past and the order flow hadn't changed in response to the existence of these rules, this is how much the various exchanges would make. And so that calculator, I sent a copy to the key players in the Division of Market Reg and to the various commissioners and so forth and they all played with it, and what happened was really interesting. And if I'm going to boast about anything, I should boast about this, and I also should talk about TRACE. Should talk about TRACE and we also should talk about position limits. That was a fun story too.

Okay, so what's the boast? By creating this calculator, I changed the debate. The debate had been who's going to get these revenues and how should we distribute them, who actually owns them, stuff like that. And frankly, I think they really do belong to the traders, but it's not an important issue. If you rebate it through the exchanges, the exchanges will compete it away and it goes back to the traders eventually in the form of lower commissions. So I was comfortable giving it to the exchanges. The New York Stock Exchange claimed that it should go to the people who were providing regulation, but I said, you know, look, money's fungible it doesn't make a difference. But that was their strong argument, and I respect it but I didn't want to see it.

So what did I do with this calculator? I changed the debate from, "How should we do this?" to, "What numbers should we use in Larry's system?" So the question very quickly became, okay, we're going to do it Larry's way, and what numbers should we use? And basically, that got written into fourth prong of Reg NMS. The New York Stock Exchange had had a ton of fun with it. They created this ridiculously complex flowchart that was their attempt to characterize what I had done for the purpose of saying that I had created this massive amount of complexity. But I pointed out that it was an easy thing to program, only one entity had to do the programming. So it was simplified a little bit in response. Basically, they were trying to beat down my system because they wanted to get all the money through regulation. And they didn't get it. So that was an amusement.

Now, but there's an interesting story that's not well-known about this. The good thing about my system is that it provided a direct subsidy to the exchanges, and hopefully, therefore, openly to the traders, to provide competitive quotes. And the reason that this is important is that when people provide quotes to an exchange that are available to the market, they give away free options to the public. In order to buy, a bid is like a put option. It allows anybody who wants to sell at that price to sell when they want to sell as long as they can get there while the price is still there. So have to beat other people, they have to get there before the order might be canceled by the guy who issued it.

So that's costly. That free option actually has value. And earlier, I told you about how you can extract value from these orders. You do it with this – I didn't call it the quote-matching strategy, but that's the strategy where somebody steps in front of an order to buy at twenty. The market goes up, they profit, if it goes down, they turn around and sell it to this one. So what did I have here? I had a system that provided what should have been an indirect subsidy, but a real subsidy, to people who are willing to do good things for other people.

People who are willing to do good things for other people without getting paid really ought to be paid for it. So when you offer to bid or sell, when you bid or offer to the market and you display them, you give other people the opportunity to trade when they want to trade. That's a service. And to some extent you're paid for it in the form of better trade prices if you execute, but often you don't execute because the market moves away from you. And you've provided a service to the market but you're not compensated for that service. So I said, why don't we compensate you. Even if you don't trade, if you were the best bid and you sit there for five minutes or something, you'll be entitled to a certain fraction of this market data revenue.

So my thought was that the exchanges were going to rebate the revenue according to the formulas, but I don't know how many of them ever did that, frankly. I haven't heard much about it. But that was the idea. So it was a very clever system of using an economic tool to address an economic problem. And so this one also is sort of related to the minimum tick rule because it addressed the problem that was associated with having ticks that are too small, that people would be front-running you to execute this quote-matching strategy that disadvantages people who are basically doing what we want them to do, showing other people that liquidity is available, come and get it. So that was really clever about that rule. Most people didn't really recognize that, but that's why I knew it was the right thing to do. And it was the right thing to do and they still do it, although it's been modified a couple times since. It's not nearly so important.

The really big debate now which we only tangentially addressed was who owns the value-added products that the exchanges sell. So the behind-the-book stuff, the high-speed data feeds and so forth. That's very controversial. If we had had more courage, if the issue was then ripe, perhaps the SEC would have worked on that issue. So now the problem with that is that the exchanges are selling data products to high-frequency traders that allow the high-frequency traders to do their business in a way that, frankly, is not quite a level playing field. And as a consequence, the exchanges want to keep those high-frequency traders happy so that they will trade there and so that they can then sell the data.

So those data sales effectively allow the exchanges to participate in the revenues that the high-frequency traders make from trading on their exchange. So it tends to co-opt the interest of the exchanges in favor of the high-frequency traders. But that's a different issue. Any rate, so that's Reg NMS.

KD: So what other things did you do while you were chief economist in that period?

LH: In terms of public policy and research, did a couple papers on TRACE. Well, a paper on TRACE and a paper on a similar system, EMMA, that was being produced by the MSRB in muni bonds. So the dealers, there had been a pilot study saying what happens if we allow these data to become public, the last trade prices for bonds. And the dealers basically said that, well, western civilization as we know it is going to end, and so I did a study with Mike Piwowar, and a second one on corporate bonds with Piwowar and Amy Edwards, who's still at the Commission, in which we showed that there was about a billion dollars in savings that we could expect to receive, or that investors could expect to receive if we made the TRACE data publicly available.

So this was fun because Annette Nazareth kept asking, "When is the study going to be done? We want to move forward with this." And I said, "You know, the study has to be done extremely carefully because as soon as it's done it's going to be given to econometricians to criticize" – the Bond Dealer Association's going to do it. And so a few years after this, long after I left the Commission, I did get a report that indeed, it had gone to a bunch of econometricians, I believe at MIT, and the upshot of the report was that the econometricians told the dealers, "You're going to have to find a way to live with these results."

So as a result of that study, and in addition, my coaching the commissioners about how to speak about this and how to sell it, they adopted TRACE. Now, let me remind you again that every success has many, many parents. And so, I don't want to suggest that I was the only one, but I certainly contributed there. And perhaps I'm being immodest about my contributions concerning the rhetoric. So one of the ways you get things done is you make sure that the policymakers can defend it and that actually what they're doing becomes a tool to them with respect to their own personal objectives. So, and that difference with each commissioner, some commissioners want to stay in government. Some commissioners, they have to win popularity contests. Some of them have to win popularity contests in front of Republicans or Democrats who have different values or something like that.

If you want something done, you've got to make sure that you meet their needs. This is what I was speaking about when I spoke about political economy before. So you've got to be conscious of the political economy. You can't ask for stuff that they can't do, but you can change what they can do by empowering them. And so, creating these results and telling them how to talk about these results and how to lay it out usually is creating a – just the existence of a single stylized stack, this is going to result in a billion dollars in savings to American pensioners, the primary holders of bonds. Well, that stuff got into their speeches, it resonated with her staff, and so then it happened. So that was kind of neat.

And then what did I spend most of my time on and most of my energy? At least a single project. I'm not sure it was the most, but it certainly competed for a lot of my time. The Commodity Futures Modernization Act put the SEC and the CFTC in bed together as regulators of narrow stock index funds. So a narrow stock index is a stock index that only has something like five different stocks in it. So this narrow stock index futures contract, ChicagoOne, wants to introduce these contracts, and now the SEC and the CFTC have to approve them.

And I looked at the contract and I immediately recognized the potential for market manipulation. Because the contract is cash-settled, means that if you go into the underlying securities and change the price just before settlement, you could change the settlement value of the contract. So this is not attractive. Now, the CFTC was dominated by three market elements, and the SEC was dominated by more people interested in regulation, and I was simply interested in making sure that people didn't get ripped off.

And so I looked at it and I said, "I'm okay with the contract but as you go into settlement, there ought to be a position limit so that it's not likely that this manipulation is going to take place." And the response was, "Why are you doing this? This is going to kill the product." And I said, "Well, let's do some empirical work and figure out how large this thing needs to be to prevent manipulation, and let's see what the CFTC has already done for similar contracts. And let's just get it in the ballpark." So I do this work, the paper with Hans Dutt that that we did together, and found what the position limits would be – they were huge and therefore not likely to be of much concern to anybody, except they just didn't like it. They ended up blaming us for – and then I just stood my ground on it. I just said – and the Commission was completely behind me, and eventually won the issue in front of the CFTC.

KD: What was this product called again that you were talking about?

LH: These were cash-settled futures contracts on narrow stock indices, as being proposed by ChicagoOne. So the limits were never binding. They were really wide. The product never did well. So the whole thing was sort of a futile exercise, because even at the beginning I knew there was going to be little interest in these products. Although interestingly, I think the market for these products nowadays is manifest in the sector ETFs, but OneChicago wanted to do these futures contracts. The problem with it is that these sector ETFs, basically, it's a retail gambling product. And a few other people use them too. And retail can't just – they don't trade futures contracts.

So I couldn't explain this to OneChicago because that was their business, and I tried to explain it to the CFTC but they didn't care because their business is to approve futures contracts. And so it didn't matter whether it was going to be – it was not mine to opine on whether it would be successful or not. I knew that it wasn't going to be and that my effort was futile. But the reason I kept on it was twofold. First of all, it was the right thing to do, although perhaps not the best allocation of my time. And secondly, I wanted to create at least one datum where we showed that we put the right regulations in place before we had a problem, you know?

Normally what happens is you just throw something together and then a problem results that could easily have been anticipated and then you fix the problem, because there's nothing – so the reason it was such a fight was because there never was a problem. Now, the thing is, I probably knew that there was never going to be a problem because the product wasn't going to be successful, but still I thought it was important. So those who don't understand the nuances will look at that and say, geez, this is a guy who loves regulation, and it's not. I mean, there was a problem out there, the problem needed to be solved. Could not be solved a different way. And it would have been our responsibility if the problem actually did pop up.

So we did the responsible thing, and what we did was completely within precedent as well. The CFTC has position limits on lots of future contracts that are cash-settled, and they do it because they know about the manipulation problem. So there's some economists that don't like it because they say it's not really a manipulation if there's one guy who's going in to manipulate, if the buyer is trying to push prices up – I'm sorry, if the short position of the futures contract wants a higher price and goes in and tries to buy, then the long position on the futures contract ought to be in the underlying trying to push the prices down, that the two will offset each other. And my response to that is that that doesn't quite seem like it's right that the way to protect yourself against manipulation is to try to manipulate yourself.

Now, there's another argument too, which is that it's not really a manipulation, it's that if you are demanding settlement then you're getting a trade, and the trade should not be free. You're getting cash settlement, which would otherwise look to be a free trade, there's no market impact. And the manipulation is not really a manipulation. If you're the long holder and you're demanding settlement, the person who sold to you has hedged by buying the underlying, and if you're demanding settlement, the underlying needs to be sold and that's what he's doing. So he's not manipulating price down, he's just getting out of the position. Well, that's a subtlety that, I believe that's true, but I also believe that under the circumstances, people will manipulate.

KD: Yes. So I want to move toward wrapping up by getting your sense of your perspective on Reg NMS as the months and years went by, and obviously the market adapted to the new set of externals. What were you surprised by, what confirmed to you that you'd done the right thing?

LH: Well, I think it's largely worked well. I mean the most important thing is it gave us electronic markets that are far more efficient than the markets that we had before. The trade-through rule is probably not as important now as it used to be.

KD: Why not?

LH: Simply because with electronic systems, it's very easy to determine whether somebody's cheating or not, and the responsibility to get the best price still should dominate. To the extent that there's enforcement efforts, they should be focused on best execution. It's easier to do this now than it used to be. And it'll be even easier with the consolidated audit trail, which is coming up, though the intermarket routing, I think is unnecessary at this point. A part of Reg NMS requires that if an exchange receives an order where there's another exchange at the better price, the exchange is required to route to the better price, and I'm not sure why this should be an exchange responsibility. Let it be the broker's responsibility. The broker should know where the best prices are, and just let them do it. So there can be some regulatory simplification here.

So there's now an exemption from that rule about routing. It's called the intermarket sweep order. If you mark your order as being a sweep order, which says that you're going to pick up liquidity everywhere, by yourself, and the exchange doesn't have to route it. I would just simplify it substantially. Let's see. The make-or-take stuff, I thought that was wrong to begin with and we've only seen that it's gotten worse.

KD: Yes, it's still there.

LH: Yes. It's created an agency problem and it's now created a half-penny tick. I think that we should simply restore traditional exchange pricing schemes. The argument against doing that is that the make-or-take pricing is not as simple as I just described it. Most exchanges have thresholds that you have to qualify in order to get the rebates and stuff like that. As far as I'm concerned, these thresholds are just anti-competitive, more anti-competitive behavior. You're creating a complex system that's unnecessary and it's designed to create market power, and I don't think that the SEC should sanction competition among people to obtain market power. We should create competitions to provide services, but we shouldn't allow them to compete to have the most market power when providing those services. That's just crazy.

KD: Yes. Well, speaking of competition, high-frequency trading, that's really I think the thing that has captured the public imagination.

LH: Yes. Well, high-frequency trading, the vast majority of it is electronic dealing. They replaced the specialist and it's a highly competitive business. The profits have largely been competed away. There were always people who had better access and there always will be. Now it's the high-frequency traders. The vast majority of the high-frequency trading is pretty benign. The stuff that Michael Lewis commented on, he made it look like the world was full of that. It's not. It's probably less than 5 percent of the trading.

So you do have parasitic high-frequency trading that we should be trying to deal with in various ways. One way to do this is to introduce some randomization into how an order flow is processed, or to introduce delays. So the IEX has introduced delays. Randomization was a proposal that I made. Basically upon every order instruction – that would be a take, make, or cancel – the exchange receiving that would timestamp it and then they would add a random increment, say between zero and five milliseconds, and the modified arrival time, which includes this random increment, would be the arrival time in which the orders are actually processed. So that means that if you're the fastest entity, your order is not necessarily first because it might end up with a later timestamp.

Now, five milliseconds is not very long. You could even randomize it to one millisecond and you'd be okay. So it's not going to affect the markets much, but what it will do, and which is really important, is it will vastly increase the incentives to acquire these expensive high-speed technologies. And the reason we want to do that is that there's a huge barrier to entry now to be a high-frequency trader. Most people can't do it anymore because they can't afford the massively expensive technologies that it takes to be fast enough to beat everybody else. And so, as these high-frequency traders are competing each other away, we're going to end up with a situation where there's a limited number of remaining traders, and then they'll start exercising some market power, which we don't want. So that's my main concern.

But as far as the front-running stuff goes, if we deal with the tick size issue and especially the problems associated with make-or-take and take-or-make, that'll help beat down that type of front-running. The other type of front-running that we're worried about is that the buy-side uses algorithms too. They're also high-speed traders. They split up their orders and often in predictable ways, but they try to be as unpredictable as possible. The high-frequency traders use lots and lots of artificial intelligence to discover when these guys are present, and it's possible. You don't know for certain, but on average, you can be right and make money.

So how do we break that up? The money that they make is coming at the cost of the buy-side, so the way to break that up is to reduce the amount of information or the timeliness of the information that's available to the high-frequency traders. So to that end, and this may be politically impossible, try to regulate the amount of information that the exchanges sell to the high-frequency traders, or alternatively, and this is I think the really clever way of doing it, is to not report every trade size as the trades occur. So to report every trade price as the prices occur.

But every trade size, if you reported them, say reported aggregate size you say, since the last time we gave you a report, 10,035 shares traded. So whenever an addition – and then we'll reset our counter and we'll tell you again when the next 10,000 shares trade. So you report aggregates of the trading. That's not going to affect the quality of prices in the slightest, but it will make it very difficult for high-frequency traders to figure out what other traders are doing and to exploit them. Now, this is sort of a pie-in-the-sky suggestion of the type that you kind of expect from an academic, but if we truly want to fix the system, this is the way to do it, and there are ways that this could be sold. And, you know, if I were in a position of power, I think could sell it, but it wouldn't be an easy sell.

KD: So in the wake of Reg NMS then, it sounds like your take is that adjustments are what's needed and not another fundamental –

LH: Yes, just small adjustments. But nothing's fundamentally wrong except for the make-or-take. Yes, the trade-through rule, it's unnecessary burden it's not generating unnecessary cost. It tells people that they should be doing what they already should be doing, so there's no incremental cost there.

KD: Okay. Anything else we should talk about?

LH: Not that occurs to me right now. There's tons of stories and stuff like that, but I think we've covered the main public policy issues and my activities there. I had a great time when I was there and I worked with people who were reasonable. Certainly, the staff was very much so, and most of the commissioners were great. The thing to remember, of course, is that the commissioners are subject to different constraints than the rest of us and you have to respect that even though – well, you have to deal with it even if you don't respect it.

And advice to people going to the Commission? Don't expect to ever win. Just expect that your job is to add value, and to choose your issues carefully and not to get emotionally invested. You're far more effective if you're not emotionally invested, and just you've got to recognize that people live in different worlds than you necessarily do.

It can be very frustrating if you care too much, and I cared an awful lot, but I also had the right distance, I think.

KD: Terrific. I think that's good insight that I don't get very often. I appreciate your taking some time to talk.

LH: Okay, thank you for your efforts on this project. I think it's really important. And sorry it's taken so long to get to this point. If you want to talk any further or touch on any of these issues, or if you think of another issue that we should have talked about, then definitely give me a call again.