EconoFact Chats: On AI in Finance
Gary Gensler, MIT Sloan School of Management
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Michael Klein
I'm Michael Klein, executive editor of EconoFact, a non-partisan, web-based publication of the Fletcher School at Tufts University. At EconoFact, we bring key facts and insightful analysis to the national debate on economic and social policies, publishing work from leading economists across the country. You can learn more about us and see our work at www.econofact.org.

Michael Klein
Artificial intelligence may be the most transformative change for the economy and for social interactions since the internet. Or maybe not. Large language models take huge amounts of information and data, answer queries, write papers, offer insights, provide advice and create images. This could lead to new medicines, pathbreaking research, and illuminating graphs. It could also contribute to financial fraud, misguided analysis, and pictures that are deepfakes. What are the potential benefits and risks of AI, particularly in the financial realm? And what policies could help realize greater benefits while minimizing risks? I'm pleased to be discussing these issues today with Gary Gensler. Gary is Professor of the Practice of Global Economics and Management as well as of Finance at the MIT Sloan School of Management, where he teaches a course entitled 'AI and Money,' about the intersection of artificial intelligence and finance. Gary served as the Chair of the Securities and Exchange Commission during the Biden administration, leading the agency through a robust reform agenda for the $120 trillion U.S. capital markets. He previously served as the chair of the Commodity Futures Trading Commission in the Obama administration, and also Under Secretary of the Treasury for Domestic Finance during the Clinton administration. Along with Simon Johnson, Gary's colleague at MIT, he recently started a podcast series called "Power and Consequences," with a recent episode on AI. Gary, welcome to EconoFact Chats. It's a pleasure to have you as my guest today.

Gary Gensler
Hey, it's a real honor and it's kind of nice to be with somebody other than Simon, even though people tell us that we have chemistry on that "Power and Consequences" podcast, but fun to try it out on a different podcast.

Michael Klein
Well, I'm not sure that I'm a perfect substitute or even a close substitute for Simon, but I'll do my best.

Gary Gensler
Oh, and we won't get him jealous or anything.

Michael Klein
You know, maybe the Nobel Prize is enough of compensation for him. Gary, I know you've been researching and writing on the use of AI since 2020, well before it had the prominence it now has. What prompted you to this early dive into the topic?

Gary Gensler
Well, I got interested in it actually a little earlier than that. I've been around finance since I came out of Wharton, and went to Goldman Sachs, and I was fascinated with data analytics and the movement of money and how you did that. I was kind of a math geek, and math nerd as a kid. But then Simon approached me to come to MIT in the fall of 2017 and he said, would you come up here and get involved in the field of cryptocurrency? And I said, Simon, I'll come up if I can get into a broader set of things…the intersection of technology and finance, including AI. I really did. And in my first appointment letter and announcement in January of 2018, it was talking about that intersection. And I just think it's…I'm fascinated by history as well—but finance always gets transformed by new technologies, and I was struck that this is going to be the new data analytics technology. And I had been watching it when I was at the chair of the Commodity Futures Trading Commission during the Obama administration. The data analytics of high-frequency traders, the data analytics of hedge funds, the data analytics was morphing into this field of artificial intelligence.

Michael Klein
So, what is the potential for the use of AI in finance?

Gary Gensler
Well, as I say to students in this "AI and Money" course, it's not new. In fact, the first bit of AI is as old as I am, and I'm not a spring chicken anymore, Michael. Literally in 1957, it started, and there's been AI booms and AI winters that have come and gone. But starting in the 2010s, you really saw a lot of use of machine learning and deep learning to look for patterns. And that was the key thing, looking for patterns, called feature extraction, and to use it mostly for trading algorithms. Or at least, to get the best feature extracted to do that trading.

Michael Klein
So, how is AI already being used by financial firms and in the markets beyond what you just described as looking for patterns?

Gary Gensler
Well, let me say something more broadly, Michael, and then dive into that. It is that finance is ripe for use in artificial intelligence. Think of it…it's data-rich, and artificial intelligence likes soaking up data. Number two, it's already digital. It has been for decades. One doesn't need crypto to get digital; we have digital money, it's called bank deposit money. But all that wealth of information is digitized, loads of data. And the third thing about finance is it's probabilistic. And artificial intelligence actually is probabilistic. Now, for the listeners, that means it's not like 2 plus 2 always equals 4, it's like 2 plus 2 probably equals 4. And this is probably the next word that I'm going to generate given the six words you just typed in. So, it's probabilistic, but finance is as well. And so, Michael, with all that data, with all that probability, with all that forecasting and digitization, finance is really ripe for it. To your base question, it's being used throughout finance. It's being used in customer interaction just like Netflix does or Amazon does just to engage with customers. But then at the core of finance, in trading, in underwriting…meaning lending you money for your automobile or your house or your insurance underwriting. It's being used by asset managers to try to get excess returns, the proverbial chasing alpha, chasing excess returns. So in all of those areas. Not to mention, it's also being used in compliance, how to

protect finance against the threat actors. Because let's face it, finance is like big honeypots. JPMorgan or Citibank or BlackRock or Robinhood are custodians for big multibillions or trillions of dollars of digital assets. And so the threat actors are trying to do cyberattacks and trying to get inside, and they too, the threat actors, are using AI.

Michael Klein
In what ways have these changes made finance work better for people?

Gary Gensler
I think that the use of data analytics on top of the internet, on top of cloud computing, on top of, you know, the apps that we have on our phones, have lowered the cost of finance for everyday Americans. Then you layer on top of it these large language models. Will the large language models further make access to finance better? It already has in some places. Let me just name one: in the insurance field…the insurance field can let you and me put a claim in digitally. We can take a photograph right at the scene of an accident if we have an auto accident. We can take a little video, upload it, send it in, and guess what? A human's maybe not even looking at it. It's artificial intelligence on the other side taking a look at that claim and that processing and so forth. And so that's a real efficiency gain. Now, some of us don't really like the efficiency gains when we don't get a human, and we're calling into a call center and we have the bots on the other side. But even the bots—that's robots—are an efficiency gain and can give us better access to the everyday things that we consumers need, whether it's an auto loan, a mortgage, or an insurance claim, or even processing our checks on time.

Michael Klein
Yeah, when people complain to me that I got a bot instead of a person, I often reply, 'Well, you know, you might have waited 25 minutes for a person and the bot comes on right away.' So there's that tradeoff, of course.

Gary Gensler
Yeah, I just wish the bots were a little bit less rigid. I mean, sometimes I get the bot and I'm going, 'Just give me an operator, please. Give me a human.' Now, look, maybe I'm a little old school, but I do think it's already led to great efficiency. Back to trading, I would say that there's a great deal that's done there as well that's already making it more efficient. But no one should mistake…it's not all large language models. 80 or 90 percent of the use of artificial intelligence in finance is still good old-fashioned 2015 to 2020 machine learning and deep learning. For your listeners, that means, can I find a pattern in the midst of all this data and based on that pattern decide to trade a stock or a bond differently? Or can I find a pattern that says you're a better credit and I'm going to lend to you at a little lower rate than I'm going to lend to Michael because we found out that he's a little worse credit? Sorry, Michael.

Michael Klein
That's okay. This is just all hypothetical, right? Right?

Gary Gensler
Right, right! No, but it also then leads to one of the challenges. We're allocating a scarce resource in society. That scarce resource is credit. That scarce resource might be an insurance

coverage—life insurance, or auto insurance, or health insurance. And when we're allocating those scarce resources, we as society have decided through our democratic processes that we need to do that fairly, that we need to do that not based on race, or color, or creed, or sexual orientation, or national origin. And so how do we make sure that the bots, the AI—sorry—are doing this fairly and that there's not somehow a disparate impact? Michael, hypothetically, if you're worse credit, you're worse credit, but it shouldn't be about your age, or background, or orientation, or gender, and so forth.

Michael Klein
Yeah, you're introducing an important point here. There are risks to the use of AI in finance as well as benefits. For example, you've pointed out that AI is kind of a black box and there's incredible complexity involved when AI is used to respond to queries or come up with analysis. So, why is this?

Gary Gensler
Well, I did self-describe myself as a bit of a math nerd, and I am here as a professor at MIT. So, let me just say most folks listening will probably not want to think about their high school math, but you might remember these formulas like a function equals some multiple of x plus a constant. Well, those multiples and those constants were kind of complicated for us when we were 12 and 14. Artificial intelligence doesn't have one or two variables, or one or two constants called parameters. They don't even have just thousands or millions. They have billions, and in fact, the largest large language models are over a trillion of those so-called parameters. So, Michael, what that means is you're taking high school math and doing it at many dimensions—I would say hyper-dimension, trillion-dimension space. We live in a three-dimensional space, but this math is in trillion-dimensional space. And because of that, plus because it's probabilistic—it's not like 2 plus 2 always equals 4, it's doing it all on probabilities—and it's changing. So, think about that. We all know when you use a large language model, whether you use Gemini, or Perplexity, or OpenAI, or Anthropic, any of those common models, that it's not always accurate. And part of the reason it's not always accurate is what I just said: it's probabilistic, it's guessing the next word, and thus it is not always accurate.

Michael Klein
So, that ability or inability to verify the accuracy of AI analysis creates a real problem, right?

Gary Gensler
It does, it does. And add to it that because it's so hyper-dimensional, it can find patterns that we humans maybe can't. But then what if we humans can't explain them? And you're denying somebody important medical procedure, or in finance you're denying them credit and can't tell them why. That explainability feature is part of the basic bargain we have in our financial system that if you're denied credit, that somebody can tell you why.

Michael Klein
So, one of the issues as you mentioned is that AI draws on huge amounts of data, but the data themselves may reflect societal biases. So, if people use AI to determine, for example, who gets a loan, who's hired for a job or who's admitted to a college or university, and AI is just drawing on data that are out there, would it just be propagating past inequities?

Gary Gensler
It might. There was a study years ago in the United Kingdom across a lot of folks and somehow they found a pattern that people that buy frozen pizza and like eating frozen pizza are worse credit. And by the way, Michael, there's another fun one that was in the United States that over hundreds of thousands of accounts, they found that people that charge their cellphones at night are better credit.

Michael Klein
Well, you know, you said I might not be such a good credit. I want you to know I do charge my cellphone at night and I don't eat frozen pizza.

Gary Gensler
Ah, but here I like frozen pizza, so maybe that's a problem. But think about it, think about it. If you happen to like frozen pizza and you got denied credit, are they going to tell you that it's because you eat frozen pizza they're denying you credit? Will they explain that? And importantly, might there be some correlation that's just a racial or ethnic pattern as to who eats frozen pizza?

Michael Klein
Another issue is that AI can convince people of things that are not true, for example by creating false images or inaccurate statistics. And there are a lot of concerns about this. Could you speak to how this could lead to financial fraud and was this something of concern when you were at the Securities and Exchange Commission?

Gary Gensler
Yes and yes. I remember one day there was something going on and there was a fake news story out about me, Gary Gensler. I was then chair of this great organization called the Securities and Exchange Commission, and it was completely made up. And the sophistication now goes even further than that. Look, AI did not create human nature, and most humans are really good folks. But there's always going to be some folks that mislead you and want to lie. And so, AI is a new tool to do that, to do old things. And it's a real challenge when you open up an email to know whether it's a real email or not a good email. And there's a new sophisticated way to do identity fraud, to, in essence, do fraud in payments. This is a hard challenge for banks right now; it's a hard challenge for Visa and Mastercard and the like as to how to guard against all the clever ways that you can use artificial intelligence to fake an identity or to break into a system through cyberattacks. But the broad thing about the capital markets too, it's when something goes out and it could be a state actor like Russia, or some other country that puts something out on the internet that President Trump did this or that, and then all of a sudden the stock market moves for six or ten seconds before the White House denies it was some fake thing.

Michael Klein
Well, that points to the issue of systemic risk. And you've also argued that AI can lead to systemic risk, that is an increased chance that the financial system faces a major meltdown like what we saw in 2008. How could AI do this? You kind of alluded to fake stories already, but are there other ways in which AI could lead to systemic risk?

Gary Gensler
So there's this wonderful movie that came out years ago named *Her*, do you remember this Michael? Where Scarlett Johansson is the virtual assistant love interest to Joaquin Phoenix. Any event, at some point in time, Scarlett Johansson goes offline and Joaquin Phoenix is just heart-struck. He just can't believe it. And when she comes back online, he says, "What were you doing?" She says, "I was rebooting and some of my other clients noticed I had a problem." He said, "Wait, wait, there's others?" She says, "Yeah, there's 8,316 others." He says, "But you only love me." And I don't remember the number, but I think she said, "Well, no, there are 180 others that I'm in love with." Well, just imagine that. Just imagine that. I don't know who it's going to be, Michael, but in China and the US each, we're probably going to have one or two dominant large language models that many in the financial community are relying on. And if Scarlett Johansson or OpenAI or Google go offline, it could be 8,316 love-stricken banks or insurance companies that are all offline. So that's the systemic risk issue. I know that at Tufts you have a wonderful student who's going to help edit this podcast who just defended a thesis on herding. And I don't know if I'm allowed to say his name, you can do that Michael if you want.

Michael Klein
Gabriel De Luca Vinocur, who is just graduating and then will be attending Columbia for a Master's in Economics next year. So nice shoutout to you, Gabriel.

Gary Gensler
So Gabriel did this paper about herding, that's H-E-R-D, that's like cows running in a field and do they herd together. Well, that happens in financial markets as well. We've seen it for thousands of years, Michael. We know it, we humans kind of herd…the mood of the crowd. Well, that could happen if we're all following one Scarlett Johansson, I'm sorry, if we're following one OpenAI model.

Michael Klein
And even if there's more than one, I guess, you know, if they're drawing from the same data, they may come to similar results. And people kind of, because of the complexity, they don't really know why they're doing it, they're just following the model. And then that could lead to herding as well, right?

Gary Gensler
That's right, that complexity. So, there's an interconnectedness, a complexity as you mentioned, hard to explain, herding. Lily Bailey and I wrote this paper back in 2020. Just like Gabriel, Lily was just a fabulous MIT undergraduate working on getting out of this place and she's now working on her master's elsewhere. But you can find that paper, and I think it still has relevance. I think some future financial crisis, maybe in the 2030s, we're going to see at the core of it some Scarlett Johansson model in the middle of it. And I'm not trying to pick on Scarlett Johansson, I mean, she's a wonderful actress, you know, but I think it helps understand this risk.

Michael Klein
Financial regulation is supposed to minimize risk, and of course you were very involved in different aspects of financial regulation in your previous roles. How do you have financial regulation for AI that ensures stability and fairness without squelching innovation and market

efficiency? And especially it's a challenge because it's such a quickly evolving area. What do you see as the biggest challenges for financial regulation with respect to AI?

Gary Gensler
I think what's important is to remember those things in a democratic society that we've sort of come together, and we say these are the core principles to help promote fairness across an economic system. And it's around transparency in the economic system, it's about market integrity like we were talking about, don't lie. Don't manipulate. And it's about access to the financial system, and it's hard. I think anyone deploying an artificial intelligence model, whether it's the older deep learning feature extraction models or the modern large language models, I think it's really important to say, ah, we still have to make sure that we put the client before our interest, that we don't lie, that we put guardrails in the algorithms and what's called in the math, the optimization functions, to ensure that we still stay within certain guardrails. I do worry, Michael, though, that regular folks are using chatbots now and thinking, I'll get financial advice from it. And there's an addictive quality to the use of these as well. I hope Michael you're not addicted to it or I'm not, but...

Michael Klein
No, no, I'm addicted to coffee, but not to chatbots.

Gary Gensler
Okay, okay! But you know, there was this case out in California that a jury found against Google and Meta about addiction, and that's not the subject of this podcast. But these things can be used for all sorts of queries and used successfully for all sorts of queries. But if you go into the model and you query it for financial advice, because these models hallucinate a lot, because they're not that accurate, I just give a cautionary note. Maybe some years from now they'll replace human judgment on financial advice, but right now we're in a transitional period, and right now, that's a risk as well.

Michael Klein
So, in what ways would AI offer special challenges to regulators that you wouldn't see otherwise?

Gary Gensler
I think that there's the three core areas that I mentioned earlier and have been discussed broadly for at least eight to ten years around explainability—it's really hard to explain what the models are doing in human terms. The bias, and third accuracy. Those three, those are the core three. We talked about financial stability, so it's hard. But let me mention one other thing and it relates to the overall economy. Finance plays a big role in artificial intelligence. It means financing this big boom. This year Goldman Sachs, J.P. Morgan estimate we'll be spending between $700 and $800 billion dollars in our economy on the data centers and the build-out and so forth. To put this in context, this is about 2.5 to 2.75 percent of our Gross Domestic Product, and it's tripled in the last two years. And so, we've got a market that's very heavily weighted to the big tech companies. If it's a very successful set of bets, a very successful set of investments, it's going to be very disruptive for a lot of businesses and a lot of businesses might be overvalued. We see some of those questions percolating through the private credit field and the lending to a lot of

software companies. If the AI doesn't grow as fast, if the OpenAIs and the others don't grow as fast, then they're overvalued and we have another thing happening. So, there's a real big part of our economy that's reliant on this growth, building the data centers and the like. And yet I think that finance is playing a role, but we could see that at the…as a result, because there's always risk in the system, that it could play poorly. This is really the question: are we in a boom? Yes. Everybody would say we're in an AI boom. But are we in a bubble, Michael? That's where it gets rather interesting.

Michael Klein
I guess, you know, you see this in other examples too. For example, I know in the area where we both live now, there's been a big expansion of building for biotech companies, but a lot of them are now empty offices. And so, it's not just for AI, but because as you mentioned it's so big it could have some really big downside effects if it falls apart. And you know, in one of our memos in EconoFact, the point is made that this is a little like the 19th-century railroad boom where there are sort of lots of companies and then there was a shakeout, a few survived, but all the others didn't. And so, you know, maybe there's overcapacity or overbuilding and if the bill comes due and these companies can't make it then it could have some real downside risks, right?

Gary Gensler
Yes, and you can pick your favorite general-purpose technology over the last 200 years and there's eight or twelve of them that we economists study, from the canals and railroads to electricity, the internet more recently, now AI. And these booms generally lead to some recessions or softening afterwards. We humans get enthusiastic, there's a lot of incentives as to why finance will support the financing of the build, and then the question is what happens after the build. I'd say this, Michael…I think the railroad boom of the 1870s, which peaked at about 6 or 7 percent of Gross Domestic Product points spending a year in building those railroads, was heavily debt-financed. This right now approaching 2.5 to 3 percent of Gross Domestic Product spend is like those empty buildings you're talking about because it only is producing maybe 1/10th of that in revenues or 1/8th of that in revenues. So, the buildings aren't filled up yet. The question is, can you build this AI infrastructure and will they be filled up? But if they're not filled up, then you would have something similar. But the optimist would not only tell you that the buildings, the AI building so to speak, will be filled up and used, the data centers…but they would say, slow down, it's not like railroads, we're not debt-financing this, we're largely financing it in the stock market. Okay, maybe the stock market is overvaluing things, but just as when the internet bubble burst back 26 years ago, it wasn't a deep recession. We did have a recession, but it was not calamitous like that railroad—that was a great depression in the 1870s. Michael I wasn't around, I don't think you were, but it was a real problem. It was a real problem.

Michael Klein
Well, maybe we should just ask ChatGPT if we're in a bubble or not.

Gary Gensler
You know, it would give you a probabilistic answer and it would be sure to compliment you for asking such a thoughtful question.

Michael Klein
Well, I compliment you for giving such great answers today, Gary, to my questions, whether they were on target or not. And I really appreciate your insights drawn from your own research but also your very important policy experience. So, thank you for joining me today on EconoFact Chats.

Gary Gensler
Oh, I thank you and I'll say this if listeners want, just listen to Simon Johnson and I put out a full podcast on this about two weeks ago on "Power and Consequences" that you can find on the usual spots, Apple, Spotify, or our Substack.

Michael Klein
Great. Well, thanks a lot, Gary.

Gary Gensler
Thanks.

Michael Klein
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