CONVERSATIONS WITH MIKE MILKEN

Paul Romer

Economist and Policy Entrepreneur; University Professor, New York University School of Law; Nobel Laureate

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Mike Milken: Paul, I want to thank you for joining us today.

Paul Romer: It's a pleasure to be here.

Paul. I like to start, once again, and congratulating you on winning the Nobel Prize in Economics a couple of years ago. Your theories are ones that I have followed for decades. Tell us a little bit about your thinking and your theories that led to the Nobel Prize.

Economics got its start by focusing on the challenge of scarce resources. Thomas Malthus was one of the most-influential early economists and he made this famous observation that if you have more people and the same land and the land can only produce a certain amount of food, then you'll inevitably have less food per person. The scarcity is a central issue and it's sensible that economists have focused on this. How do

This interview has been lightly edited for clarity and readability.

you make the best use of land? How does our price system decide how it will end up being used?

But this approach missed the driving force that's the story of humans as a species, which is progress. Somehow we've made progress in terms of higher quality of life per person as the number of people has increased. I set out to understand what is the offsetting force relative to these scarce resources? The answer is that people can discover things and share them. One person discovers a better way to get food from land: you learn how to use fertilizer; you develop a better way to plant the seeds. Once you discover that, you can share it with everyone. This means that there's a negative effect of more people, but a positive effect there's more discoveries per person. We don't have to compete with each other for discoveries, we can actually use them all at the same time.

"Pessimism and a sense of foreboding, a sense of fear, can be self-reinforcing and self-confirming. If we really believe that nothing good can happen, nothing good will happen. We have to use all the powers we have of communication and explanation to try and keep people from being so scarred by a short-term downturn that they give up hope and settle into apathy."

What I tried to do for economics was create an economics of ideas that would operate alongside of our traditional economics of scarce objects that could help us understand why we've made progress over time: why there are such powerful gains from trade, and why globalization is such a powerfully beneficial force. Because it lets us bring together and share knowledge amongst larger and larger groups of people.

You're about a decade younger than myself, yet we're both baby boomers. I was at Berkeley viewing the world from the middle of the Free-Speech Movement. I actually went to Berkeley because I wanted to run our space program, but after the Watts riots, I had met a young African-American man who told me that he or his dad wouldn't have access to capital because of their race. So I had gone back and changed my major at Berkeley to business, finance and economics. I wrote down this formula, which essentially said, access to financial capital served as a multiplier effect on the world's largest asset, human capital, the next-largest social capital and the last one, those assets that appear on the balance sheet. In many ways, what you've written about is this creativity of individuals, the ideas they present and the technology today that allows them to move freely throughout the world. What in your background led you to these theories?

I think we share something I didn't realize, which was I think we were both marked by the terrible troubles that this country went through starting in the mid to late 1960s. It

sounds like we both had this instinct that things could be better, and that if we could explain that and communicate it to others, it could help us avoid the kind of very serious setbacks that we went through. So in a way, my work has been about the long-run trend and the message that things can get dramatically better from generation to generation.

I've wondered about the attention that my work attracted, partly because I could see other economists who tried to make the same points about 10 years earlier. It turns out Bill Nordhaus, with whom I shared the prize, he's best known for his work on climate change. But he had been working on the same questions about long-run progress that I had been working on, and I think we were both onto a key insight.

> ***"What would it be like to go to the dentist? I could have a test result that I can show the dentist and say, 'look, I was tested yesterday. I'm negative.' The dentist could show me a test result that 'I was tested yesterday too. I'm negative.' Then we both have the confidence to have him work on my teeth."***

I had the good fortune of starting work on this in the end of the 1970s, the first year or two of the 1980s, at a time when it seemed foolish for me to be talking about how great everything could be because this was the Volker recession; a time of great doom and gloom. But just shortly thereafter as we came out of that recession, as inflation came down, there was this renewed optimism and people were receptive to this message about the possibility of progress that I was bringing in a way that they hadn't been some 10 years before. Pessimism and a sense of foreboding, a sense of fear, can be self-reinforcing and self-confirming. If we really believe that nothing good can happen, nothing good will happen. We have to use all the powers we have of communication and explanation to try and keep people from being so scarred by a short-term downturn that they give up hope and settle into apathy. I think my story was in some sense the fight against what I lived through as a teenager and a downturn. I think right now we're entering another period where it'll be very important for us to fight against the pessimism and the fatalism and apathy that it could spawn.

I think about the world that's in this transition phase of trying to deal with this pandemic, and you had shared with me an approach to getting greater control over the virus in the United States. I'd like if you could share that with our listeners.

Right now, there are all kinds of possibilities for testing for the presence of this virus more effectively; for creating a pharmaceutical that will treat people who are infected by it; and for creating vaccines that could help us become immune to it. We're trapped once again in one of these periods where we are underestimating the possibility for progress and being passive and reactive, withdrawing when we should be active and pushing on all fronts. Speed up the preparations for the vaccines. Find the ones that work. Be ready

to manufacture them when we've developed one that we know works. Explore pharmaceuticals.

The part where we're lagging the farthest behind unfortunately is the testing. This is the one that I've been trying to promote with my plan. We know how to test for the presence of this virus. We just need to figure out ways to make it more widely accessible, to scale it up, and to reduce the cost. If we do that, we get this amazing gift: we could know who's infected and who's not. We'd be able to react so much more effectively to the presence of the virus. Until we get the vaccine, what we could do is say to the small fraction of people who happened to be infectious – and it's only for a brief period, probably no more than two weeks – we just have to make sure that they're not in direct contact with other people. If we apply that only to the couple of percent or less that are infectious, we don't have to interfere in any way with the activities of everyone else. That will get us out of the trap we're in right now where because we don't know who's infectious, we're imposing all kinds of restrictions on everybody because if you don't know, you just do it to everybody. These restrictions are partly imposed by the government, but partly self-imposed because people who are afraid don't want to go out and do things that will expose them to infection. The information about who's infected and who's not would be enormously valuable. We just need to free up the talent that exists in the United States that knows how to do tests like this. Free them up to innovate and prove the process so we can make tests available to anybody everywhere.

"We're going to face other pathogens like this one. They may be as bad as this one; some of them could be even worse. This capacity for testing is something which we'll want to have available and want to be able to deploy for all of the viral threats."

Paul, one of the things that we've been thinking about is kind of having an XPrize competition, crowdsourcing, for this. One of the analogies that someone had made is, can we just turn it into a toothbrush: when you get up in the morning, can we just create a test that if you have [the virus], it turns red while you're actively brushing your teeth? Let's challenge innovation to solve this issue.

One of the things we've been doing at our centers of the Milken Institute, all 10 of them around the world, has been trying to focus on this concept of innovation in dealing with this issue. Basically, you've simplified, in many ways, our challenge: test and isolate, and let the rest of our economy return to normal. Wouldn't that be a simplistic way to summarize it?

I think that's exactly the right way to summarize it, and I think it's important to emphasize there may be other things that are worth doing too. There may be some form of contact tracing, which will speed up the process of figuring out who's the best person to test first. There might be things like encouraging masks in the near term. It's fine to do all of those things, but the point I keep trying to convey to people is that just test-and-isolate is something we know how to do. We just have to scale up what we're already capable of doing, and it will make sure that we're on a path where the number of infections is decreasing over time. The other thing about test-and-isolate is that it's simple enough that people can understand it. They don't have to rely on just the assurances of some authority. They could actually get a test result. I keep talking about like what would it be like to go to the dentist? For me, I could have a test result that I can show the dentist and say, 'look, I was tested yesterday. I'm negative.' The dentist could show me a test result that 'I was tested yesterday too. I'm negative.' Then we both have the confidence to have him work on my teeth. I use this example because it's worth reminding us that masks will not solve everything. He can't work on my teeth while I'm wearing a mask.

One of the things that struck me on your answer, my parents lived through the Depression and lived through World War II. The government played an essential role during that period of time, and this virus, this pandemic, challenges us where we are dependent on the government and where are we not dependent on the government. What role should the government play? And what I see as the most aggressive group on testing is actually employers of their own employees: Walmart, with well over a million employees in America, Amazon approaching 700,000, Kroger with a half a million or Target with 400,000. They all want to test their employees so there'll be safe. As you pointed out, their customers would want to know that the employees are safe, and likewise the employees would like to know the customers are safe. Will this redefine again the relationship between governments and the free enterprise system or not? What are your thoughts?

I think there will be an adjustment here that's overdue, and it will be welcomed when we get through it. Let me tell you the story of Jay Tischfield. Jay Tischfield was running a lab at Rutgers that grew out of the Human Genome Project. They got very good at reading the code, the DNA, the RNA of all kinds of organisms. When the coronavirus hit, he dropped everything. Everybody in the lab, about 150 people, they all dropped what they were doing and shifted towards testing because reading the code of the RNA of the virus is the most-effective early test. They knew how to do this.

What they saw was that the existing tests that had been approved by the FDA required this swab; this thing we now know as the nasal pharyngeal swab is a very precise structure and makeup. You stick it way up your nose to get a sample and then you do the test. There were shortages of those swabs and Jay felt that it wasn't the best way to do the testing. He got people to just spit in a tube to take saliva samples, run those

through the machines that could read it, and look for the RNA of the virus. They found that it actually worked better than the swabs. There's a paper out now from Yale where they verify that saliva tests are actually more sensitive than the swabs. This solves the swab shortage and it's more accurate.

Why isn't this just spread throughout the whole United States? A big problem with the swabs is that the healthcare providers who swab have to have full-protective equipment gear set up because people will sneeze and cough when you swap them this way. If people just spit in a tube, you don't even have to have a healthcare professional in the room exposed to this person until we know if they're infectious. So, why hasn't this spread throughout the whole United States? Unfortunately, the FDA tells everybody this is what you can and can't do when you do a test. All existing machines were licensed under the condition that the way you took the sample was with the swab. Jay took the trouble to work through the FDA and did this huge presentation and got it approved, where their lab could test saliva samples instead of samples based on these swabs. That was all good and this was positively reported. I was puzzled, why isn't this taking off?

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It turns out the restrictions imposed by the FDA were that to spit in a tube, you had to do it in the physical presence of a healthcare professional to collect these samples. It would violate the law if you had a healthcare professional watch over a computer monitor remotely while you spit in the tube and then you mail it in. Then the FDA said that they approved this way of testing saliva samples, but only at the lab in New Jersey that Jay runs at Rutgers. So, the restrictions kept this very powerful discovery from spreading. We need to just create a system where innovative, ambitious people like Jay who find better ways to do testing, everybody else can use those. And we don't have a bunch of regulators getting in the way and slowing this process of innovation down.

Let's talk about incentivizing. We have an innovations group at the Milken Institute in our Center for Financial Markets. We have believed that in many ways that you can incentivize to find solutions to problems. This group consisted of Gary Becker and Myron Scholes and Lew Ranieri and myself and Dr. [Richard] Sandor. Between us, a very high percentage of all the new financial markets have been created over the last 50 years.

One of the things where this occurred was in sulfur dioxide [in the 1980s]. We were all going to die of sulfur dioxide from the release of sulfur into the air. Movies were made in the eighties and if you went and looked at a satellite photo hanging over the U.S., let's call it the industrial belt of Indiana, Ohio, Pennsylvania, Michigan, you saw this cloud. Well, what was created were the sulfur index credits where when you had to reduce your emissions. If you could reduce more than required, you got to credit. If you couldn't reduce them to the level required, you had to buy credits. You were able to take old inefficient plants, shut them down via these credits. And 15 years later they weren't making movies that were all going to die of this sulfur dioxide cloud. How do we best incentivize Americans to comply with testing or testing and isolation for a period of time?

The story of how we dealt with sulfur dioxide and acid rain, it's a great story. It's a real success. Part of what we can do is do what you're doing, which is just help retell this story and help people understand how successful the strategy of creating incentives for better solutions can be. It's also good to remind people, that in that case and in many other cases, the experts said in advance, it's going to be very expensive to control this problem. When you actually created a market-like incentive to come up with better ways to reduce it because you could get some profits and credits for doing it, people found much less expensive ways to reduce sulfur emissions. So don't trust the experts when they tell you it's really going to be incredibly expensive and difficult and we just have to give up a lot to solve a problem. Historically it hasn't been true.

"The U.S. government should create a billion dollar prize ... that it will give to the first lab that can process 10 million tests per day. We should have another billion-dollar prize that could be for the firm that comes up with the best home, small-scale-based test, so everybody could have a device at their home to just test themselves and find out if they are any of their family members are infectious."

Now what could we do today? The U.S. government should create a billion dollar prize – that's billion with a B – a billion-dollar prize that they will give to the first lab that can process 10 million tests per day. Maybe I'm trying to be a little too ambitious, but there's so many ways to scale this up. I actually think we could get to that 10 million a day. But that's not the only prize we should have. We should have another billion-dollar prize that could be for the firm that comes up with the best home, small-scale-based test, so everybody could have a device at their home to just test themselves and find out if they or any of their family members are infectious. You think about it, what's the risk in this? If those prizes were collected, it would be a huge win for society because we'd have so many more options for finding out who's infectious and who's not. And if people don't collect the prizes, well it doesn't cost the government anything. So I think prizes would

be a very powerful way to motivate the kind of clever individuals that we need to engage to help us solve these problems. A billion-dollar prize would just be peanuts compared to the value it could generate.

We have felt that this pandemic is costing the United States $1 trillion a month; that might be financial and the human costs are far greater.

I came up with my own estimates and what I've been saying publicly is $500 billion a month, but when I looked at it, there was a range of estimates and the range went all the way up to a trillion. I was hesitant to say that because I was afraid people wouldn't take me seriously. But I think you're right that this is the scale of the loss that we're incurring.

The country and the government has already responded. Let's take BARDA, which is the Biomedical Advanced Research and Development Authority under Health and Human Services. They made a $483 million grant to Moderna [Therapeutics], the first company to have a vaccine to build out manufacturing capacities and have a hundred million doses available if it works. If it doesn't work, you'll throw it away. Here was almost a half a billion-dollar bet that might work.

Johnson & Johnson and BARDA are investing $1 billion in their vaccine that they're going to give away free to everyone on the planet if it works. There is a lot of commitment today to make things even before you know if they work, so that if they do work, they're available at that time. I think this underlines the financial costs to society and the unlimited incalculable human costs. Let's go to a different experiment. Sweden. How would you evaluate Sweden's approach to the virus?

The fundamental decision that every society has to make is, can we suppress this virus forever if necessary? Can we afford to do that? By suppress, I mean make sure that only a very small number of people are infected and protect everybody else. But it's expensive to suppress, and expensive to do that for a long time. Can we do that or do we need to accept the reality that it will spread through most of the population? If you know that you're going to give up, there's no point to suppress for a while and then give up because it's not sustainable. When you give up you have as many people who die as if you gave up right from the beginning. You need, if you're going to commit to suppression, to be very confident that you can stick with it forever, because otherwise you incur a bunch of costs and get no benefit from it.

In Sweden, they made the calculation early on that they didn't think they could afford to do the suppression or at least they couldn't afford to use the kind of expensive suppression of lockdown and so forth. They're willing to accept the possibility that this virus may just spread throughout the whole population. The death rate in Sweden is higher than in other European countries, but it's not the highest in the world. It may be that their strategy of just gradually letting it spread through most of the population will work. I don't think that's the best solution for the U.S. The reason I'm not optimistic about that approach is that it'll take a year and a half for us to get to the point of herd immunity, where we can no longer have to worry about the risk of catching this virus and being very sick, maybe dying. I don't think we can afford to wait a year, a year and a half, to get this behind us. I do think that we could commit to the strategy of test-and-isolate and just bear that cost permanently and that could get us to a point where 98, 99% of the population just goes about its business and only a very small percentage have to be restricted.

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I would say to you, I agree with you. We cannot go a year and a half, which is why we have gone to every major bioscience company and challenged them on anything they've ever put into a human being that was safe and work to see how it, one, can kill the virus or, two, prevent the virus from doing damage to your lungs. There are a number of them available and as you focused on innovation and getting ideas around, there are more than a hundred vaccines of which 10 have already gone into humans. Likewise, there are dozens of antivirals, antibodies and immunology treatments available today.

If I could just make one other point. The way this kind of molecular testing works is you literally just program in the code for the RNA or the DNA of a virus. Run the test to see if that virus is present. If we scale up this capacity for identifying whether somebody is infected, it will work not just for this current virus, but it'll work for the next and the next and the next. We're going to face other pathogens like this one. They may be as bad as this one; some of them could be even worse. This capacity for testing is something which we'll want to have available and want to be able to deploy for all of the viral threats that we're going to face in the future.

Today we are looking at a number of test technologies that can measure any [virus] in the future, not just this one, as you've pointed out. The other one I would say to you is the Moderna vaccine. This RNA vaccine is different than the others in that it gives you a

little bit of the virus and energizes your immune system to create its own vaccine. This technology has the ability to turn on your immune system to create vaccines against other pathogens in the future. So, it's exciting.

I don't know enough about the underlying science here, but I'm told that the Moderna strategy is a whole new approach based on RNA, and that it could have a similar characteristic to what I was just describing – that once you figured out how to do it for this virus, we'll know how to do it for the subsequent ones.

Paul, I want to thank you for joining us today and for your creative and very practical ideas on how to stop this pandemic here in the United States and get our economy back to working. We look forward to following up on the challenges you've given us today fighting this pandemic.

Thank you for having me. It was great to chat and I look forward to staying in touch.
