

Conversations on Economic Inclusion with Dr. Woodrow Whitlow

Dionissi Aliprantis

This is Conversations on Economic Inclusion. I'm Dionissi Aliprantis, this director of the program on economic inclusion here at The Federal Reserve Bank of Cleveland. In our program, we aim to bring together researchers and practitioners to learn about what it takes for more people to participate more fully in the economy. Fields related to science, technology, engineering and math offer opportunities to be productive and have successful careers, but some students who might be interested in these paths have faced systemic barriers like low quality schools or discrimination. What does it take for an individual to overcome these barriers? And what does that tell us about the potential growth society could unleash if it removed them?

In a recent conversation with Professor Basit Zafar, we learned how getting students into college majors that are a good fit for them is important for growing incomes and the economy. Careers in STEM fields pay particularly well, a reflection of the benefits the economy derives from their output. Considering STEM careers represent a path to success in the labor market, it's worth reflecting on the hurdles underrepresented groups face in studying STEM fields. To gain some insight on this issue, I recently spoke with Dr. Woodrow Whitlow Jr. Dr. Whitlow is a giant in aeronautics with an illustrious career at NASA. He completed his SB, SM, and PhD degrees in aeronautics and astronautics all from The Massachusetts Institute of Technology.

His career at NASA spanned decades, where he did everything from research on transonic dynamics for improving the stability of wings on aircraft, to serving as the director of NASA's Glenn Research Center, the deputy director of NASA's Kennedy Space Center, and the associate administrator of NASA headquarters. Given this distinguished career, it's hard to imagine that as a society we nearly wasted Dr. Whitlow's gifts. Dr. Whitlow grew up in a segregated city where some African Americans managed to thrive despite the opportunities they were denied, and the previous generations of his family had limited access to formal education. Only a few years before he attended MIT, he likely would not have been welcome on campus.

While I enjoyed picking Dr. Whitlow's brain about space travel and the ways that NASA's research supports economic growth, it was also helpful to hear about what helped him push past the barriers and achieve his goals. Our discussion drew my thoughts to how we can recreate the programs and relationships that gave him the ability to realize his potential. Before we get started, I should mention that the views expressed here are those of the participants and not necessarily those of the Federal Reserve Bank of Cleveland or the Federal Reserve System. And now here's my conversation with Dr. Woodrow Whitlow Jr.

So I just would like to know a little bit about some of the things that have shaped you personally and professionally to get to where you are today. So I was wondering if you could just tell us a little bit about your background and your upbringing.

Dr. Woodrow Whitlow

Okay. I'm a native of Inkster, Michigan. I always make clear that it's Inkster, and it's near Detroit, but it's not Detroit. And so I have a good-

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A world away. Huh?

Dr. Woodrow Whitlow

Yeah. Well, about 20 miles. But I had a good friend who works at the jet propulsion laboratory, and I would always tell him, and he was from Detroit, and I'd always tell him that Detroit is Inkster's biggest suburb, and so I would call him the man from the suburbs whenever I would see him, so we always had a good time with that. But when I was growing up, actually, Inkster was always ... It was a village, and we were incorporated as a city in 1964 when I was 11 years old, but a very-

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Recent.

Dr. Woodrow Whitlow

Yes, yes. But very, very interesting place, a lot of great things have happened there, going the days of slavery, what is now Inkster was a last stop on the Underground Railroad, so meaning slave people escaping to Canada. And we had a lot of firsts in Inkster, the first Black owned operated radio station, WCCB was named for two dentists who started it, Dr. Wendell Cox and Dr. Haley Bell, that's the WC in the [inaudible 00:04:33]. We had the first African American supermarket chain. It was in Inkster. The first MVP of the Major League Baseball All-Star game is from Inkster, Leon Wagner, who had his heyday playing right here in Cleveland.

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So that's an important one for you. Right?

Dr. Woodrow Whitlow

Yeah.

Dionissi Aliprantis

You're a [inaudible 00:04:59] guy.

Dr. Woodrow Whitlow

Oh, yes. And I used to go watch the sandlot team that he played on before he went to the big leagues, every Sunday, the Inkster Pirates. We'd go up to the elementary school and they played on the field there.

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And was that your plan B if NASA didn't work out?

Dr. Woodrow Whitlow

Oh, no. That was my plan A. NASA was my plan B if Major League Baseball didn't work out. And my wife's uncle, who eventually became the country's first African American casino owner, Mr. Don Barton, he's from Inkster. But he had the first Black owned cable business. So before there was a Comcast, there was Barton Cable Vision. And the Marvelettes wrote and recorded, they were my neighbors, they wrote and recorded the Motown's first number one hit, Please Mr. Postman, which has been recorded many, many times by many artists over the years, so they had Motown's first number one hit.

So it was great growing up there. Like I say, a lot of history there, we didn't have abundance of things, but we never thought we had a lack of anything growing up. I know much more about my mother's side of the family than my father's. And my mother, that side of the family was from Georgia, and he father, my grandfather, left the family behind in Georgia to come north to find work in an automobile factory. And he eventually took a job with Cadillac Motor Division of General Motors, found a place to live in Inkster, and sent for my grandmother and the children, my mother, and my aunts and my uncle. And when many African Americans came north from the South to factory jobs, there was a lot of segregation, and Detroit was no different. And some cities would not even allow African Americans to buy houses or even live in the city. And so to find housing close enough to the factory, and then still benefit from the [inaudible 00:07:38], which is about \$5 at the time. Inkster was a place that was open to African Americans. And so that's-

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[inaudible 00:07:51] to be at the time.

Dr. Woodrow Whitlow

Yeah, good place to be at the time. And my father made it, he was from Alabama, and he served in the Navy, fought with the 101st Seabees in the South Pacific and World War II. And so after the war, he made his way to Inkster.

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I guess I'm curious to hear about kind of the educational environment when you were growing up. So I guess on a personal level, but then also thinking about policy and thinking about the education system, what got you excited about learning when you were in school? And my understanding is that you actually wanted to do chemistry originally.

Dr. Woodrow Whitlow

Yeah. Well, originally, I was going to be this world-famous chemist. And I actually had a periodic table of the elements, and I was only about seven, eight years old. And I tried to memorize all the chemical symbols, and so that was my original plan B. Of course, plan A still was going to be to play left field for the Detroit Tigers.

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Let's be reasonable. I mean, clearly that's got be plan A.

Dr. Woodrow Whitlow

Yeah. And so NASA started launching people into space. Then I saw that, and I said, "That's cool. That's what I want to do." And so I went and started reading up about the astronauts and somehow figured, maybe it was Neil Armstrong had a degree in aeronautics and astronautics from Purdue, I think. And so I decided I had to get a degree in aeronautics and astronautics from Purdue. And I had to then go to work for NASA. And then once I did that, then I would automatically become an astronaut.

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That's how you were going to get on the moon.

Dr. Woodrow Whitlow

Yeah. And I didn't know there was some other steps in between there. And nobody in the family had a lot of formal education. And my grandfather's four children, the two older girls, then my mother was the youngest girl, then my uncle was the youngest of the four. And he actually became the first in the family, any of the family, even in Inkster or back in Georgia, to graduate from high school. And my mother declared that all of her children would graduate from high school. And Inkster was segregated, only about six and a quarter square miles, and divided in half, north to the south by-

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Even within Inkster was segregated.

Dr. Woodrow Whitlow

Yes. Everything north of Michigan Avenue was white and everything south of Michigan Avenue was Black. And so we went to the Inkster Public Schools, and it was great though because the teachers, most of them lived in the community, they were family friends. And you say, "Well, what motivated me was my mother and father would tell us every day when we'd leave for school, 'Don't go down there and embarrass us,'" because now these are their friends who were the teachers. And so that's where we got the big motivation to excel in school.

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Great. And then so when you started I guess at MIT, I believe it was the summer of 1970. Is that correct?

Dr. Woodrow Whitlow

Correct.

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And I thought I read somewhere that the class before yours was really one of the first to actually admit a kind of significant number of African Americans. So I'd be curious to hear what your experience was like at MIT. And I'm also thinking about the fact that MIT's a place that even very, very smart people can feel imposter syndrome for reasons totally independent of race. It's just such an intense place. So I'm just curious to know in your experience kind of what ... Were there any particular difficulties if there were factors that made it welcoming?

Dr. Woodrow Whitlow

Well, before I even thought about applying at MIT, I had spent the summer between my junior and senior years in high school at Michigan State University in the math program. But during my high school years, my counselor, Dr. Charles Ealy, well, he knew of my interest, and he had wanted to be a pilot, but he couldn't because he was colorblind. And I spent many hours in his office, and the way his office sat, faced, we could watch the planes. We were only about three miles from Detroit Metro Airport.

And we could sit there and watch the planes as they approached the airport, or depending on the winds, as they departed the airport, and talk about how the planes worked and how they operated. And so you talk about imposter syndrome, it was his idea for me to go to MIT, as he always would say, "I'm going to send you to one of those big schools in that East," I was unsure of MIT was the place for me. But I said, "Well, I'll go for a year and make him happy, and then I'll transfer."

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Well, and then it turned out to be the place for you. Right?

Dr. Woodrow Whitlow

Turned out to be the place for me. I remember in the catalog there was a statement that says, "Calculus is the language spoken at MIT." We didn't have calculus in the curriculum at my high school. And Dr. Shirley Jackson was a graduate student and she was the one who really pushed the administration to start to admit more Black students. And so I think the class before mine was about 53 African American students were admitted. My class had 51 or 52. And so one of the great things that MIT did, they had a bridge program called Interface. And so for students like me whose high school math curriculum was limited as compared to say other incoming students, we went to MIT for a six-week summer program, where we stayed on campus. We studied calculus, physics, chemistry and humanities. Doing that program and staying on campus and really learning about the rigors and what it would take to get through MIT, that probably was the most important thing that I did at MIT.

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I'm curious to hear about some combination of your motivation, your experience. And where did you find support? I don't know. Maybe you didn't stumble on any of your problems [inaudible 00:15:38] the exams.

Dr. Woodrow Whitlow

Well, I found support from my fellow students. One thing we had was, and this was again something that Dr. Jackson motivated, we had a Black student union tutoring program. And these were upperclassmen who had gone through the same thing that now you were going through. I know one of the tutors, and he was only a year ahead of me, probably the brightest guy that I've ever met, who's now Dr. Jim Gates. And so we had the tutoring program, which was good because I was the only ... There was I think one other African American who was a year ahead of me, maybe two years ahead of me, who was majoring in aeronautics and astronautics. And so having an opportunity to take advantage of the tutoring program that was offered, and then just the support of our fellow students.

And there was one student, he was a little older than us, he had gone to Tuskegee, and then he left Tuskegee, went to ... I think he spent a couple of years in the Army. And then he left the Army and went to West Point for two years. And then he came to MIT, so he was a little older than us, was a mathematical genius, but a little more mature than us, he would always sit down and tell us, "This is a great opportunity. Don't blow it." And when somebody tells you as a fellow student that, you tend to pay attention to it.

Dionissi Aliprantis

Yeah. It resonates a little more than say somebody a little bit older or further away. Just based on your experience and thinking about our school system, what are some of the ways that you think we could get kids more excited or motivated to learn STEM topics?

Dr. Woodrow Whitlow

We have lots of programs. NASA has lots of programs aimed at motivating and spurring young people to pursue STEM education and STEM careers. And so having mentors, being able to see people that look like you and who you feel comfortable talking to about STEM education or about being an engineer,

that's extremely important, having those examples. And we glorify our athletes. They're on TV all the time and they're built up. I don't think we do that so much as say with our engineers.

Now when I was coming along, one of the greatest things you could be was an astronaut. They were true American heroes. And to say, "We're going to the moon," that was something that certainly inspired me. And I didn't see any African Americans as part of the program, even though later on, I learned of course we had major roles in the space program. But being able to see it and just seeing something that excites, that puts that spark in you. We can have all the programs in the world that says, "You really ought to do this. You ought to consider being an engineer." But when you can see something that says, "Wow," something that makes you say, "I want to do that," without somebody else saying, "You really ought to think about doing that," that's a huge difference. So I had that internal motivation that this is what I want to do.

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Thinking about your time in NASA, can you think about some of the big times when the R and D that you all were doing at NASA would kind of spill out into the broader economy and allow for some kind of innovation, or create a new business? I guess this is probably just something that was happening all the time.

Dr. Woodrow Whitlow

Yeah. I mean, there are just so many. We talk about spinoffs. We developed technologies for the NASA mission, but I think since 1976, there've been over 2000 what we call NASA spinoffs, where we take technology from the mission and then we spin it off. Commercial sector may adopt it for their own use and start new businesses. And just so much NASA work has application in the food industry and showing food health and the health of drinks. But the whole aerospace industry, which NASA's been a huge driver of, NASA technology has been a huge driver of. I call that the crown jewels of the American economy. And I think the aerospace industry is the only one, only manufacturing industry that has a positive balance of trade, the only manufacturing industry. And maybe the only other industry is the food industry.

But if you look at what just aviation alone, how important aviation is to the economy in terms of moving people and moving goods. And just think what happens when there's a big snowstorm and a major airport gets socked in for a day. I think the numbers are, aviation contributes more than a trillion dollars annually to our economy and it supports more than 10 million good jobs, good paying jobs. And that's about a million manufacturing jobs involved in aviation. And it's about 5% of the US gross domestic product. I always tell folks, you want to see what a few billion dollars looks like, go out to an airport and stand there and look at the airplanes parked at the gate. And when you look at what NASA has contributed to airplanes, jet engine combustion, which helps the environment. If you look at the chevrons, the little sawtooth shape on the back of modern jet engines to reduce noise pollution, that's NASA work.

Dionissi Aliprantis

I don't want to totally put you on the spot, but I'm just thinking if you were the secretary of education, or HUD, or even the president, if you were I guess in a role that was a little bit more focused on social policy, what would you think of I guess in two dimensions? How would you think about kind of overall prioritizing our country's performance in STEM, but then also thinking about getting kids I guess prepared, but also students, getting students prepared to get to college and then have success once

they get there? What are some of the big things that you, whether it's from your time at MIT, or your time at NASA, what do you think are some of the most effective approaches there?

Dr. Woodrow Whitlow

Well, I went to public schools, as I mentioned earlier. One, I would put more money in public schools. I would put more money into public school teacher pay. And I don't know specifically how I would do this, but I would incentivize somehow math and science education and literacy in our pre-college schools, public, and want to encourage it certainly in our public schools, in our private schools, even I don't think is as big a problem in our private schools as in our public schools. But I would certainly incentivize it, math science education, to prepare our students. I wouldn't necessarily say I would put strict requirements on education, on math science education, but I would certainly do as much as I could to encourage it and maybe use ambassadors, people that our students look up to, and maybe have a campaign to make students aware that these opportunities are there, there's something other than the entertainment industry or the sports industry. And tell the students, "Well, if you pursue this path, well, you might not be LeBron James. Maybe you could be the person who pays LeBron James." That may be a little better.

Dionissi Aliprantis

That might be appealing.

Dr. Woodrow Whitlow

But I would also invest more in these support programs to give students all they needed to complete these chosen courses of study.

Dionissi Aliprantis

So I'm thinking about the ambassadors you're describing. So those would be, I don't know, for grade school kids, maybe it would be high schoolers. And for high schoolers, maybe it would be college students or something along those lines, or college students or recent graduates. I think you and I are, I mean, we would probably be ineligible maybe. I don't know.

Dr. Woodrow Whitlow

Well, I certainly think the students relate to people who are closer in age to them. I don't know how much they could relate to me. Certainly, I'm more than willing to go out and talk to students and explain to them the opportunities. But I've found even in recruiting employees, it's better to take new hires out to the college career fairs than somebody like me, somebody that they can relate to. Just like if you were trying to convince me when I was young, if you were trying to convince me to pursue a STEM education, if you had brought in say a recent college graduate who was a practicing engineer or something like that, and he was an African American, I certainly could've related to that person more than I could have someone say with different ethnicity.

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