THE BROOKINGS PODCAST ON ECONOMIC ACTIVITY

"Has the CHIPS Act created jobs?"

Washington, D.C.
Thursday, December 18, 2025

Participants:

MARK MURO
Senior Fellow, Brookings Metro

BILGE ERTEN
Assistant Professor of Economics and International Affairs, Northeastern University

JOSEPH STIGLITZ
University Professor, Columbia University

ERIC VERHOOGEN
Professor of International and Public Affairs and Economics, Columbia University

JANICE EBERLY
James R. and Helen D. Russell Professor of Finance
Kellogg School of Management, Northwestern University
Co-editor, Broo*kings Papers on Economic Activity*

JÓN STEINSSON
Chancellor's Professor of Economics
University of California, Berkeley
Co-editor, *Brookings Papers on Economic Activity*

Episode Summary:

The CHIPS and Science Act of 2022 included funds for billions of dollars in federal investments in U.S.-based manufacturing, a major landmark in the history of America's industrial policy. While the full impacts of such a large bill will take years to reveal themselves, new research shows that

firms have already responded to the CHIPS Act, with increases of roughly 15,000 new jobs in semiconductor production-related jobs attributable to the law. On this episode of the Brookings Podcast on Economic Activity, Bilge Erten, Joseph E. Stiglitz, and Eric Verhoogen, authors of the new study, join Brookings Senior Fellow Mark Muro to discuss the employment impacts of the CHIPS Act already visible in the data as well as potential implications for future industrial policy.

[music]

EBERLY: I am Jan Eberly, the James R. and Helen D. Russell Professor of Finance at Northwestern University.

STEINNSON: And I'm Jón Steinsson, Marek Professor of Public Policy and Economics at the University of California Berkeley.

EBERLY: We are the co-editors of the *Brookings Papers on Economic Activity*, a semi-annual academic conference and journal that pairs rigorous research with real-time policy analysis to address the most urgent economic challenges of the day.

STEINNSON: And this is the *Brookings Podcast on Economic Activity*, where we share conversations with leading economists on the research they do and how it will affect economic policy.

The CHIPS and Science Act of August 2022 was a milestone, and what many analysts saw as a revival of industrial policy in the United States, meaning efforts by the government to stimulate U.S. industry. The bill included significant incentives to boost semiconductor manufacturing in the U.S. and create jobs for American workers.

Now, three years after the law was signed, Bilge Erten, Joseph Stiglitz, and Eric Verhoogen explore whether it worked with a special focus on employment impacts, as suggested by the title of their paper, "Employment impacts of the CHIPSAct."

EBERLY: The authors look at early data on employment changes in the areas where chips manufacturing is likely to occur. They find that employment in those areas has risen relative to other high-tech areas, providing early evidence on the potential for the CHIPS Act to create jobs. These effects are likely due to anticipation of the program as it rolls out, so the authors will have more to say about the impact of the actual allocation of funds as those data become available.

Moreover, the CHIPS Act was also intended to address economic security by focusing on supply of a key high-tech input. But one of the important spillover effects of the program is to jobs and economic activity, so these results are of great interest to those following the impact of industrial policy.

STEINSSON: Today's episode will feature a discussion with co-authors Bilge Erten, Associate Professor of Economics and International Affairs at Northeastern University; Joseph Stiglitz, University Professor at Columbia University; and Eric Verhoogen, Professor of International and Public Affairs and Economics, also at Columbia. The authors will discuss their findings with Brookings Metro Senior Fellow Mark Muro.

Now let's hear from the authors and Mark.

MURO: Greetings! And hello, friends. It's good to have you here to talk about your recent contribution to the *Brookings Papers on Economic Activity*.

I'm Mark Muro, a Senior Fellow at Brookings Metro, where I study the interplay of people, place, and technology across the U.S. Most recently, we've been working a lot here alluding to multiple initiatives during the Biden administration on what we call place-based industrial strategy. And that vein my group has helped shape and track recent efforts to establish U.S. strength and industrial ecosystems, such as to enable semiconductor manufacturing that were launched most dramatically by passage of the CHIPS Act of 2022.

And indeed, the CHIPS Act has been probably the highest profile element of this push to its investment of tens of billions of dollars in new and upgraded chip manufacturing facilities in U.S. states and regions.

Given that, we thought it would be excellent to hear about your recent compelling paper on the employment impacts of the CHIPS Act. You have some initial answers to some questions many people I think, have been wondering about.

So welcome Bilge.

[4:04]

ERTEN: Hello, Mark, Thank you.

MURO: Welcome, Joe.

STIGLITZ: Nice to be here.

MURO: You bet. And welcome, Eric.

STIGLITZ: Hi, Mark. Good morning.

MURO: Great. Well, thank you all for being here. Well, let's just jump right in.

Maybe I'll first turn to Joe. Joe, let's start by just recalling why all this matters. Can you say what's so important here about the research that you've done and the topic? Why did you look at this?

[4:34]

STIGLITZ: Well, this is bringing back industrial policy to the United States. We've had a long history of industrial policy. In fact, in the middle of the 19th century, agriculture was the main industry, and we passed the Morill Act, which was a major impetus to American agriculture. I think it played an important role in the success of America during the 19th and early 20th century, increasing productivity.

Well, we finally took notice that we didn't have the capacity to produce the chips that are absolutely essential for modern 21st century economy. Both the ordinary chips and the advanced chips which we use in AI. The absence of those chips showed America was not resilient in the pandemic. We couldn't get them, and we couldn't produce cars

because we didn't have these little, little products called chips. So, it had a major effect led to inflation in cars, and so we needed to be more resilient, have to have more capacity. The market wasn't doing it on its own, and so we needed a little push from government and that was what the CHIPS act was about.

And then our paper was a first attempt to try to look at just one aspect of it, but an important one. Did it work? What was its effect on employment in the long run? We wanna know, has it really achieved the objective of knowing resilience, but at least in the short run, let's see whether it's working on employment.

MURO: Excellent. And I think you've captured really well the historical moments that the CHIPS Act entered into.

Eric, why don't you go over what you actually found as far as job creation and wage changes in counties with semiconductor manufacturing facilities. And maybe say a little about how you arrived at that finding, the basic approach that the paper brought to this.

[6:51]

VERHOOGEN: Sure. The headline numbers that we arrive at the end is something like 15 to 16,000 jobs in the specific sector of semiconductors, and then 28 to 35,000 in related sectors including construction and other sectors that are related to semiconductors. So the question is, how do we arrive at that?

It's not an easy task to try and estimate just the effect of the CHIPS act apart from other things that happened at the same time. So there's Inflation Reduction Act. It was a big, much larger in terms of overall spending. There was an infrastructure bill, it was happening roughly the same time. There's other macro things going on, and so what we're basically doing is what economists would call a difference in difference strategies.

And we have two different strategies, one of which co compares counties with a semiconductor facility to other counties that have high tech employment, but no semiconductor facility. And just comparing their trends before the act and then looking at the deviation of the trends in the semiconductor counties from the non semiconductor counties after the act. So that's one strategy.

And then the second strategy was zooming in within the semiconductor industry, because the CHIPS Act was mainly oriented towards subsidizing production like fabs. We call it fabrication facilities. So, we end up comparing counties that have a semiconductor facility, but within that set we can look at some that have fabrication facilities, the big fabs versus non fabrication facilities, which would just have design or research and development, but still have some semiconductor employment.

And it turns out that using either of those strategies, we end up with numbers that are about the same. It's about a hundred jobs per county, a little bit more than a hundred jobs per county if we do semiconductor versus non semiconductor. But then there's more of those, or it's about, if you look at the fabrication counties, it's about 180 jobs in those.

But when we scale those up again, we get back to that 15 or 16,000 number, and then we can look in those counties that we're comparing, we can look at these other sectors, as well.

MURO: Really interesting. What was your hypothesis about what you would see here?

[8:38]

VERHOOGEN: It's a good question. I think there were differing views. Some people were very skeptical, thought this is just gonna, you know, substitute for private investment and nothing's gonna happen. We're not gonna see any sort of effects, really it's just gonna be what would've happened otherwise. Some people were more optimistic. I think I was, I personally was more on the optimistic side, but I didn't have strong priors going in. I can't speak for Joe and Bilge.

But I think there's a question about is this a big effect or a small effect that we're finding. I mean, I think if you calculate the amount of spending and divided by the number of their jobs is not gonna look like that impressive. But on the other hand, especially given how capital intensive the industry is, we think this is sort of gonna update people's priors, is how we'd say it. We think that this is like larger than what many people were expecting the act to have, marginal employment effect.

MURO: Very nicely summarized. Bilge, what do we know here about the nature of the jobs? Does your work explore that some?

[9:30]

ERTEN: Yeah, so we looked at a separate data set called Quarterly Workforce Indicators that has some details about the worker characteristics. So specifically, what we see is that most of the jobs that were created were skilled jobs, so they required college educated workers. So we see about two-thirds of the jobs that were created were among the college educated.

But that said, the non-college educated makeup for one third. And then there's again, about two thirds of the jobs went to male workers and one third about women.And the predominant overwhelming majority of the jobs were among the white workers and also non-Hispanic.

So we see these characteristics and this roughly overlaps with the types the workers working in these high-tech manufacturing sectors in general. And that said, I mean, the act for example, tried to have childcare provisions or try to improve the entry of women into these jobs. It's a little bit too early to test whether that has really happened, but it does suggest that some women definitely started working in these jobs, as well.

And the other thing, we looked at also wages. So we see about 10 to 15% roughly increases. It's not very stable across different specifications. There's some, let's say suggest that about 15% increase in wages. So, these suggest that the jobs that are created are actually well-paying good jobs that we wanna have with industrial policy.

And that's certainly an important contribution as well of the policy in general. One thing is that these were very concentrated in terms of where the jobs were created. So, it didn't necessarily reduce spatial inequality that we see in terms of where the semiconductor industries are concentrated. They tend to come in industrial clusters.

But that said, you know, in those specific locations it did create good jobs, but jobs mostly went to types of workers where the industry predominantly employees.

MURO: That's very helpful. I wonder if you could say a little more about, you said these are skill jobs, a little more detail on the occupational mix. What are these workers doing?

[11:46]

ERTEN: We actually don't have that detail in the QWI. That will be actually very interesting to look at once the firm data comes out in about two years. So unfortunately, we couldn't quite look at the occupational mix.

MURO: Right. Circling back, Eric, to that question, is this a little or a lot in the effect that you see? You know, I think lots of people probably can't judge or would think, oh, well that's not that many. But on the other hand, you've suggested some reasons that it suggests real movement in various labor markets.

[12:20]

VERHOOGEN: I think the numbers that we found, the employment is bigger than many people would've expected, that I think most people's, you know, expectation was going in. Partly that's because, you know, it's a very capital intensive industry. It's among the most capital intensive industries in, in the U.S. economy, right?

And also employment generation was one of the goals, but building resilience of the supply chain was another big goal, and so people weren't so much focused on the employment and not expecting to find it. As Joe mentioned, part of the reason we're focusing on employment is not because we think resilience is unimportant, but this is something that we can look at at the short term.

But I think that the take home message is that CHIPS Act did have a substantial effect on employment. There's real value. There's a lot of skepticism out there still about industrial policy and about Biden's revival of this industrial policy. You know, especially, we're finding 15, 16,000 jobs in this very capital-intensive industry is actually a substantial number. The Semiconductor Industry Association had a larger estimate going in. We don't come up with a number that is large as what they had, but we regard it as substantial.

MURO: Well, yes. Salvation by manufacturing jobs has been one of the markers or benchmarks using squarely in a very realistic but encouraging zone.

Joe, I mean, what conclusions might you draw about industrial policy where you've started? I mean, you know, obviously this is one slice, one limited slice, and it's early, but any signals to you about what industrial policy or place-based interventions might be able to yield or any insights that this suggests to you?

[13:50]

STIGLITZ: Let me make three comments. First, let me amplify something that Eric said. We didn't expect effects to show up so quickly. The act was passed. It takes time for people to do their plans and so forth. And one of the striking results was that the effects showed up early. It was the anticipation that really got things going, and that shows the importance of, you might say, creating an awareness in an industry. Something's going on and people respond. So that's very positive, I think, and that's reinforcing the fact that the effects were larger than we had expected at the time.

The second thing to say is there's a long history in development in East Asia of industrial policies really working. And I've also studied the role of industrial policies in Africa in Ethiopia and South Africa. And so actually there's been a long history of successful industrial policies. So, in that sense, I was not surprised that my prior, as we say, going in was that industrial policy would work. It might not show up in the data so quickly, but I was not surprised that it did have an impact.

The third point that you noted is, these are place-based policies. The design of the analysis was really focused on particular counties where money went or where there was hope that money would go. And the United States right now faces a problem of some places have not done as well as other places. And that has had, I think, major both political and economic consequences.

And so this aspect of industrial policy, which has not been as explored in the past. Can we actually succeed in addressing the problems in particular places that in the past have not done very well? I guess the results of this study leave me with a more optimistic note that we may be able to do it.

But let me say, the CHIPS Act was not so much focused on directing resources to the worst places, worst in the sense that those who have been most left behind, but it did very strongly have a component that many of the places where the money was going, or hoped to get the money, were places that have been struggling.

MURO: One follow up question: you talk about this prompting a degree of optimism at this early moment. Any thoughts about where the arc of this policy in this industry will carry us? What will we see down the road, perhaps informed by some of your work in other circumstances? I mean, so you are seeing more activity earlier than maybe you expected. I wonder what's the kind of trajectory look like? If any of you have thoughts on that.

[17:22]

VERHOOGEN: So the patterns that we saw, pretty flat in employment, then a jump as Joe said, in anticipation. Basically, when a precursor bill was introduced in the Senate and passed in the Senate with bipartisan support, that's when we saw firms starting to react. But then already in July, 2024, we start seeing a decline. Right?

And partly that may be, that's when Biden dropped out and then there was election. And so Trump brought in a lot of uncertainty about the future of the policy. There's still a lot of uncertainty about the future of the policy. So it may be in part have been firms reacting to that uncertainty. They didn't know whether the support was gonna be forthcoming and we see a sharp drop in the employment. There may be other reasons as well. There were sort of oversupply of semiconductors possibly in that time as well.

So I think right now we're in a phase of, there's lots of uncertainty. We don't know what's going on. And probably also the firms don't know what's going on. The companies are trying to decide. And the uncertainty is very hard for them to deal with.

So I think I wouldn't feel very confident about making predictions about what's happening in the future. There was kind of bipartisan consensus around building resilience in this industry. That's probably hasn't disappeared, but there's a lot of noise here still to be resolved.

MURO: And Bilge, what would you say is the most important takeaway? For industrial policy thinking in the United States from your work.

[18:33]

ERTEN: So we also had a very interesting conference past week at Columbia University and we had some panels there. I want to just bring some insights from one of the panels where in one of them we had someone, Frank Keller, who was involved in the government in making of the grants from the CHIPS office.

And one of the insights that he brought was that this was a very lengthy, elaborate process in terms of how firms applied and the many different contractual obligations throughout the process, how the milestones were put and what's going to happen going forward.

And so, there were actually a lot of contracts that were still under negotiation. They had PMTs, preliminary memorandum of terms, and they were not finalized when the new administration came into power. And what Frank Keller said, in fact, that a lot of these are actually still not finalized, and in fact they're told it's on hold and it's intentional on the part of the current government. So that, as Eric said, introduces a lot of uncertainty in terms of what firms can expect, and together with like the oversupply, existing oversupply, so a lot of the initial impetus in terms of hiring is likely a bit more on the shrinkage phase right now.

So I think one of the important takeaway lessons that we think from this policy experiment is that it's important to send more clear messages, non-bipartisan and kind of agreeing on what should be the national goal because we know, as Joe said from

East Asian experiment, is that they were always very clear about what they wanted to do, right? So they knew they wanna get to the target, and they were very furious when the firms didn't do what they wanted them to do, and there's a lot of this kind of government intervention.

I mean, I think we wanna do it more democratically compared to the East Asian experiment, but at the same time, we want accountability, both from the power of the government and from the power of the firms, so that the process can actually really work, right?

So as a government, when you say you want to do this, and you put all these resources, and all of a sudden in the middle, you just say, okay, I don't know, I'm just gonna keep it on hold. It doesn't give a very clear message to the firms that are involved in the process.

MURO: Very good. Joe, let's give you the last word. And I'm wondering: it seems like you see early encouraging results and impacts. We're also talking about a kind of shadow of a lot of question marks and uncertainty in, in this phase that we're entering.

I wonder what you see are the next questions? And to what extent do you all have an interest in continuing to track this particular program or maybe others in the CHIPS and Science Act?

[21:21]

STIGLITZ: Well, I think there's a lot of interesting questions that when we began the study we had hoped to do, and maybe now that the world's changed out differently from what we had anticipated, new questions that are raised.

So for instance, I think originally, our hope would be that as we've already indicated, that over time we would be able to trace out how this would play out not only in terms of employment, but output of chips. Did it succeed in increasing the production of chips relative to what would otherwise have been the case? And in that sense, has it increased the resilience of the American economy?

So that would've been in the normal course of events as the data came in, you know, it takes time to get that data. We would be able to say it actually worked or maybe it didn't work as well as we would've hoped.

We might have been able to say, these were individual grants. We might be able to look at what characteristics made them more successful or less successful. And that's really important, because we're at the learning stage of industrial policy, and so we would like to be able to give advice about how to design the program better.

An interesting question is now raised by what has happened and the importance of which is in some ways hinted at by our work. Our work shows how important anticipations are, forward looking. And as Eric and Bilge already mentioned, once we went into the Trump administration and there became an enormous amount of

uncertainty where things were going, it was at least one of the factors that contributed to limiting that employment growth and maybe even contributing to its decline. And there's a lot of discussions in the popular press about how uncertainty, it has such a negative effect. The chaos has such a negative effect on investment, employment.

Going forward a related project that would be quite interesting is to see, can we get a finer tune assessment of the impact of uncertainty? And so that we can say with the greater precision how bad this kind of chaos and uncertainty has been for manufacturing, for other sectors of our economy.

MURO: Maybe that'll yield Stieglitz's uncertainty principle. But well, so we've exhausted our time here, but I found this extremely helpful. And I hope you'll continue your valuable monitoring work. Look forward to further findings as the CHIPS act continues to influence economic development and debates over industrial policy continues.

So thanks so much, and congratulations on this excellent work.

[24:35]

STIGLITZ: Thank you.

VERHOOGEN: Thank you.

ERTEN: Thank you, Mark.

[music]

STEINNSON: Once again, I'm Jón Steinsson.

EBERLY: And I'm Jan Eberly.

STEINNSON: And this has been season 7 of the *Brookings Podcast on Economic Activity*. Thanks to our guests for this great conversation, as well as a big thanks to all the BPEA authors and Brookings experts who joined the podcast this season. If you enjoyed this season, please take a moment to leave us a review, and be sure to subscribe to get notifications when we launch season 8 in April 2026.

EBERLY: The *Brookings Podcast on Economic Activity* is produced by the Brookings Podcast Network. Learn more about this and our other podcasts at Brookings dot edu slash podcasts. Send feedback to podcasts at Brookings dot edu and find out more about the *Brookings Papers on Economic Activity* online at Brookings dot edu slash B-P-E-A.

STEINNSON: Thanks to the team that makes this podcast possible: Fred Dews, supervising producer, Chris Miller, co-producer, Gastón Reboredo, co-producer and audio engineer. Show art was designed by Katie Meris and promotional support comes from our colleagues in Brookings Communications.