Cold War Lessons for Export Controls Against China

0:00 Introduction and Guest Welcome

Ryan Vest: Welcome to *Horns of A Dilemma*, the podcast of the *Texas National Security Review*. I'm Ryan Vest, executive editor of *TNSR*, and I'm here with our editor-in-chief, Sheena Chestnut Greitens. We are pleased to have joining us today, two outstanding national security scholars, Jennifer Lind and Michael Mastanduno. They are authors of the article, "Hard Then, Harder Now: CoCom's Lessons and the Challenge of Crafting Effective Export Controls Against China," which is featured in Volume 8, Issue 4 of the journal. Jennifer is an Associate Professor of Government at Dartmouth College. She is also an Associate Fellow at Chatham House and a faculty associate at the Reischauer Institute for Japanese Studies at Harvard University. Michael is the Nelson Rockefeller Professor of Government at Dartmouth College. Jennifer, Michael, welcome to *Horns of a Dilemma*. It's great to have you on the show.

Jennifer Lind: Thank you so much.

Michael Mastanduno: Thank you.

0:51 Historical Comparison: CoCom and Modern Export Controls

Sheena Chestnut Greitens: So, you both have written a really fantastic article that compares the efforts of the Cold War era Coordinating Committee for Multilateral Export Controls, or CoCom, to modern efforts to prevent China from acquiring some of the most sensitive United States technologies. What brought you all to this historical comparison? And tell us a little bit about how you came to write the article.

Jennifer Lind: Well, I guess I will start by saying, when I first heard about the export controls that the Biden administration was putting on China, I immediately thought that this sounded so similar to the technology control regime during the Cold War. And so, I think I basically jumped out of my chair and ran down to Mike's office because Mike literally wrote the book on CoCom. And so, I was so eager to talk to him about this. And, I guess I pestered him so relentlessly that he finally agreed to work on this issue with me.

Michael Mastanduno: Yeah, I mean, I was very glad to do so because it is such a natural comparison. I think we were looking for analytic leverage, you know, how do you make sense of what's going on today? Well, you can do it theoretically. You can do it historically. You can do it both, but there seemed like such a clear historical analog that we thought it would be crazy not to at least try to make the initial comparison and see how far it took us.

Ryan Vest: So for those that haven't read the article or haven't had a chance to read it yet, I was wondering if you could briefly explain the concept of CoCom, what it was, and its parallels to modern export control regimes with China.

Michael Mastanduno: The way to think about CoCom is that it was an institutionalized attempt to keep militarily sensitive technologies away from the Soviet Union and Eastern Bloc during the Cold War. It was institutionalized in the sense that the United States and its Western allies and partners basically got together, formed an institution, and said, we will meet weekly to discuss which things we will collectively agree to keep away from the Eastern Bloc. Now, no one heard very much about this because it was a rather shadowy organization, in part because European partners of the United States did not want to be seen publicly discriminating against the Soviet Union in trade. So it is interesting that from the beginning, this was always sort of behind the scenes and confidential.

Today's regime is a little bit looser. It's not institutionalized multilaterally in the same way. It involves the United States essentially making bargains or deals bilaterally with lots of countries. That has implications, obviously, for the effectiveness of the regime, but nevertheless, it is a very similar kind of exercise, even though it doesn't have the same institutional format.

3:43 Key Lessons from CoCom

Sheena Chestnut Greitens: So, one of the things that I really like about the article is that you frame it in terms of identifying three key lessons that we can draw from the historical study of the CoCom export control regime. And so, I think that that might be a good place to start in terms of unpacking your argument for listeners. The first of these lessons was that the size of the export control regime expanded over time, and that weakened enforcement and encouraged defection. Could you talk a little bit about how that played out in the CoCom context?

Jennifer Lind: The Biden administration described the export control regime as a "small yard, high fence," and what they meant by that is they still wanted to encourage a lot of trade with China. So they wanted to keep the fenced-in area

relatively small, so the small yard side of things. And then when they talked about the “high fence,” which was another dimension we analyzed, the attempt was to really prevent things from getting through, right? So, you want to build a really high fence, really tall fence. And so for this narrow set of really critical cutting-edge technologies, you really want to make sure you deny those to China. Trade in other realms is fair game, so that was the idea of this small yard, high fence.

So one of our arguments, as you note, is that we found in the CoCom regime, and extrapolating to today also, that the size of the yard tends to grow over time. So again, the Biden administration had declared that they were taking this really specific kind of scalpel approach—were just carving off a little piece of the economy and the most cutting-edge technologies. And what we found is that the CoCom leaders wanted to do something similar, and there's all sorts of reasons why you would like to keep the denied technologies very small in number. They wanted to do that too, but what we saw is that over time, the number of banned technologies would just grow. And so we saw a few trends that contributed to this: one is just the problem of determining what belongs in that category of the most critical technologies. And because of the problem of dual use, many technologies having both a military and commercial usage—it is very hard to say that a given technology has only commercial usage. And so a lot of things tend to get added to the list of banned items.

And then second, the technology control regime was an instrument of statecraft, and American leaders saw it as a potential instrument they could use against Cold War rivals—the Soviet Union, China, and others—in a variety of means, right? So it is not just this narrow mission of: we’re worried about the Soviets gaining military technology, so we're trying to hold them back. That, of course, was the explicit goal of the regime. You have other goals, though, and so along the way, maybe, you know, the government is trying to encourage the Soviet Union to sign an arms control treaty, or they are trying to pressure them to not arm rebels or whatever the issue of the day was. But there was often this temptation to kind of reach for the export control instrument to wield influence over the Soviets in other areas. The problem is that you have this whole legion of partners within CoCom that maybe don't share those other foreign policy objectives. And so that continually created problems when the United States was frequently reaching for these export control instruments, and that created problems with its allies.

And then finally, I would just say that this is a very political issue within Washington. It was during the Cold War, and it is today, which is, you don't want to be seen as soft on this very dangerous adversary, and particularly if it is

a time of crisis where, perhaps, there was a piece of technology involved in the crisis. For example, the spy balloon incident with respect to China, right? Or during the Cold War, perhaps there was technology used in a Soviet invasion, for example, of Afghanistan, that was a real situation. So it's a little embarrassing to a government if technology that they allowed to be exported to China was then used in hostility against the United States or its partners. And so there's this ongoing temptation to be safe, right? Better safe than sorry. And especially if you have—you know, Washington is a pretty rambunctious environment—and you have, particularly these days, a lot of polarization and people very eager to wield this against their political adversaries that the other guy is soft on China.

Michael Mastanduno: Let me just add—I think that's a great summary. If I were just to think of a couple of examples from the Cold War and today, of some of the more technical and bureaucratic temptations to make the yard bigger. During the Cold War, the United States decided with its allies that supercomputers were something that the Soviets should not have. But what if the Soviets could take a whole set of personal computers, string them together, and get not the same, but maybe close to the same capacity? There is a temptation to say we should control not just supercomputers, but also personal computers. And then the allies would say, but wait a minute, you can buy those on every street corner. So we really can't make this work practically.

So you have this tension between: this might help, so therefore we should control it—versus this is an impractical thing to control; just focus on the most important things, and resist the temptation to control everything that might matter militarily. And I think we see that today. Jenny has done some work on this, but pulls up some nice examples of when you think about training AI models. You can use the most advanced chips, where the Chinese can actually use lesser advanced chips, more of them, more energy, more costs, but get the same outcome. And so the United States and its allies are struggling today with how far down do you go in order to prevent them from achieving a certain capability.

10:35 Challenges in Enforcement and Adaptation

Ryan Vest: The second key lesson that you identified in this article is that CoCom did not prevent the Soviet Union from accessing key technologies, as you were just noting. The current regime is similarly porous, and China is a lot more adept of a target than the Soviet Union was. Are these restrictions really worth the effort? Or are they just creating problems with our allies with no real benefits?

Michael Mastanduno: I think that's a great question, and for me, the answer is yes, they are worth the effort, provided that you can be disciplined, keep the list short and focused on the most significant things, and minimize the alliance discontent in that way. And you also have to be very careful about objectives, right? If you start to treat export controls like some kind of panacea or magic bullet, you're going to run into problems. I mean, at best, they're going to make a modest contribution to your ability to stay ahead of your competitor in the application of advanced technologies to military use, but they're not going to stop a country from being a military competitor. That's just not going to happen. So, if you rely too much on this mechanism or over-rely on it, you're going to run into the problems that we identify in the article.

Jennifer Lind: On the question of "is it worth it?", I think the Biden administration was actually pretty realistic in terms of what it thought it could achieve. When you talk to folks involved with this, the idea was we were going to try to slow China down, and we saw them as rapidly gaining in the AI sector and so on. And so the idea is: Can we slow them down and maintain the US technological lead for as long as possible? And the phrase that Chris Miller notes in his book, *Chip War*, and others have discussed is this idea of, you want to throw sand in the gears. Chris notes that the gears still turn, that the gears still keep on turning, and so maybe at best you've kind of created some problems and slowed them down a little bit.

The key idea here in terms of slowing them down is—we need to ask ourselves: are we going to take advantage of the time that we have bought for ourselves, right?—which is, we've slowed them down, but have we done anything with that period of time? And the kinds of things that we should be doing are really doubling down on our investments in ourselves, right, and our investments in the US innovation ecosystem. So are we creating a streamlined regulatory environment? Are we investing in highly skilled human capital? Are we having dialogues with the tech sector and the education sector and other aspects of the labor market as to how we can allow labor to kind of move efficiently among these different sectors of the economy, right?

So those are the kinds of things that we can do to get our own house in order while we're trying to buy ourselves some time. And so it is useful to buy yourself some time, and I think we have done that.

Sheena Chestnut Greitens: I think that's a great point that the cost-benefit analysis here doesn't just rest on things that China does or how it affects China, but also what opportunities and benefits the United States is able to use that time to create for itself and for American interests. So, your last key lesson, the

third lesson in the piece, is that during the Cold War, CoCom actually had relatively favorable conditions for partner cooperation or coordination, and it was still rife with tensions and jealousies that disrupted US, you know, alliances and partnerships.

So, CoCom—you know, ultimately because it was operating under these relatively favorable conditions, yet it still had these tensions—seems like it might create an even harder, you know, the title of the piece is, "Hard Then, Harder Now," right? This is an area where some US partners today have even deeper economic ties to China, and maybe more than to China, than to the United States. So, what do you see that we can learn from CoCom's history in terms of the most likely triggers for friction within the United States coalition, or the coalition that the United States would want to build and maintain?

Michael Mastanduno: Yeah, again, a really important question in all of this, and we can make a couple of points about this. One is, not only are Western states, including the United States, far more dependent on China than they ever were on the Soviet Union, but China can do something that the Soviets could never do: it can hit back. And this was something you didn't worry about during the CoCom regime. The Soviets weren't gonna be able to retaliate in the high technology area against those states that were discriminating against them. But China has proven that it can, especially in the area of critical materials and rare earths. And that leads to one of the triggers, I think, as you put it, that the United States has to worry about here. One of the triggers is that these restrictions are costly economically, so we want to make sure that they are clean and mutually agreed upon.

The Trump administration recently did something interesting. First, it said to the allies: you must restrict this, this, and that. Then it said to China: but we will loosen our software and AI export controls if you agree to sell us critical minerals and also buy some more American soybeans—right? And so allies reacted to this by saying: "Wait a minute, you can't take the agreements we've made and then simply cut a side deal like that, especially if we suspect that you're doing it for mercantilist reasons in order to improve America's trade position at our expense." This was a constant problem during the Cold War and it's reemerging today.

Jennifer Lind: I would really underscore the significant differences in just the geopolitical, geo-economic situation today versus the Cold War, that really make this a significantly more challenging effort. And Mike talked about: it's going to be challenging if the United States tries to, you know, as we were discussing before, achieve other foreign policy goals and depart from the rules

that it set up. Absolutely, that's going to be a recipe for a lot of discord among the different partners here who are, I should note, our key security partners.

But I think it's really important to take a step back and just think about just how different the kind of underlying conditions are. So, Mike mentioned early on that CoCom was an institutionalized regime. They met frequently; they agreed on where they were gonna set these limits and so on. And it was a much more institutionalized, much more multilateral effort than this current one, which is essentially the United States speaking with different countries and key suppliers within the semiconductor supply chain, such as the Netherlands, such as Japan, Taiwan, and asking them: hey, will you restrict your export of this, this, and this? And so it's a much less formal regime. It's much less institutionalized. And so it's going to have a lot more trouble in terms of encouraging cooperation for those reasons.

There's also the security environment factor, which is, if you think about CoCom's mission, the countries that were participating in that were, for the most part, concentrated in Western Europe. And these were countries that would be devastated if there was a war in Europe, if the Soviet Union fought against their forces. And so there was this keen awareness of the Soviet danger, and there was that kind of geographical concentration that was part of that.

What about today? We're talking about countries, some of which aren't even in the region, right? So the Netherlands isn't in China's neighborhood. We're talking about countries that have very differing levels of threat perception against China and are balancing to very different degrees, in some cases just not balancing against China in the military sense. During the Cold War, we see these are close military allies, deeply concerned about an existential security threat, and that is going to instill significantly more motivation to deny the Soviet's advanced military technology. And then relative to today, where there's just not that kind of agreement, let alone kind of a formal apparatus to broker that kind of cooperation.

I have to say, taking a step back, when we were doing this research, I was amazed by the extent to which, actually, during the Cold War, there was such variety of views about the Soviet threat and the extent to which these countries wanted to be trading with the Soviet Union and wanted to sell them advanced technologies. I guess I had projected onto that era much more unity and much less discord and much more agreement that the Soviet Union was indeed a serious threat. But there was a lot of discussion and debate about this. And you see, during that time, a lot of European countries, even under the conditions that

I'm describing, really wanted to sell their technology to China. I was amazed by that.

And one thing I'll point out is—I think that in Europe, certainly on this issue, and then we've seen it more recently—there's been this kind of powerful liberal theory about economic interdependence as this pacifying effect. And you saw this with many European countries during the Cold War, where they thought: We can make our relations with the USSR better if we establish trade links with it. So, there was that very powerful liberal view. And then of course we know that that later on showed up in the Nord Stream pipeline and so on, and that didn't go so well. So, and then obviously that liberal view was very powerful in the United States with respect to China.

So, we have seen these philosophies about the effect of trade really have a very powerful effect on whether or not countries were behind putting these sanctions in motion. Obviously, in the US, that view has—we pursued that for a long time as a policy of engagement with China—that's no longer considered a good argument in Washington, right? So if you're making that argument today in Washington, it is probably not going to win a lot of arguments. But it was fascinating to see that that was one of the powerful views expressed among Europeans during the Cold War, when otherwise, you would've probably expected that they would be more afraid of transferring these kinds of technologies to their security rival.

Ryan Vest: You note that in both eras the domestic politicization of national security policy played a key role in the eventual expansion of export control regimes. How is this dynamic unfolding today in a time when no one in Washington wants to come off, just like you were saying, as being too lenient on China? And what does it mean for sustaining a disciplined, narrow control regime over time?

Michael Mastanduno: Yeah, I mean, it just makes it very difficult, but I would actually distinguish two circumstances. It's difficult enough in the day-to-day context, when you're under sort of constant political pressure and scrutiny, but it gets much more intense in times of crisis. I mean, that was one of the lessons of the Cold War, that when the Soviet Union invaded Afghanistan, all of a sudden, everybody put on the table their kind of grievances about the export control regime.

So, for example, there was a huge debate over trucks that were produced by Western factories in the Soviet Union because trucks aren't that sophisticated technologically, but they were the same trucks used by Soviet forces to enter

Afghanistan. So, there were lots of politicians saying, “Why are we selling trucks to the Soviet Union when they're using them to invade Afghanistan?” So in that context, there's this sort of fever pitch of: we need to control things that we otherwise wouldn't control because the adversary is using them militarily.

Now we haven't really seen that. We saw—Jennifer mentioned earlier—the balloon incident, this spy balloon thing, but we haven't seen the crisis similar to the invasion of Afghanistan or the Korean War. I mean, just imagine a Chinese incursion into Taiwan—what that would do to the export control regime, because there would be so much pressure politically on denying them almost everything possible, because they've, you know, undertaken this sort of highly contentious military effort.

Sheena Chestnut Greitens: So, the issue of enforcement seems pretty central to your analysis, and I wondered if you could talk about what specific weaknesses in CoCom’s enforcement most resonate, you think, with the challenges that US officials face today in policing or trying to erect strong boundaries on semiconductor and AI controls, vis-à-vis China.

Jennifer Lind: Yeah, this is the fence, right? This is the high fence part of things, which is, you've said we're going to have this small yard and that we're going to create this high fence such that these cutting-edge technologies aren't going to get through it. And the question is, how optimistic should we be about that?

So, we have the CoCom experience to look back on, and what we saw was the Soviet Union mounted a really determined effort to try and get its hands on the technologies that it wanted. Again, it was trying to catch up to compete in this new era of computerization and information technologies, and so on. And so, it was trying really hard through spying, through even just open access, attending conferences—a really vast effort, particularly interestingly concentrated around its San Francisco consulate, which was of course near Silicon Valley.

And so, basically, what you see is they actually did pretty well. They were able to really gather, get access to, and, you know, intensely study the technologies that CoCom was ostensibly denying them. And, the other thing of course is the—not necessarily the Soviets being so diligent, but also about CoCom being lax, right?—about the porousness of the regime, about outright cheating, right, sales that happened that had actually been prohibited by the regime. So, we see the combination of Soviet industriousness in trying to get these technologies, and then also flaws with CoCom itself.

Now, I should say, it seems like when we look back at this, what we saw is, here is the Soviet Union, which—the Russian tradition in science and engineering and physics and, you know, life sciences and, I mean, this is one of the world's great scientific societies, right?—they had these tremendous minds and these wonderful thinkers. And during the 1950s, the Soviet Union, in that kind of previous industrial era, were actually winning many Nobel prizes and seen as one of the most advanced societies.

The problem, though, is when the world shifts into the new technological age, and there, again, the problem was not the fence; the problem was not that they couldn't get their hands on these technologies. The problem really was the kind of broken Soviet economic system that prevented the great Russian scientific community from being able to participate in the global economy, from being able to successfully commercialize and diffuse these innovations, and so on. And so, it seems like at the end of the day, the biggest problem was the Soviet Union itself. It was the Soviet's own economy.

And then if you look today, what you see is, China has also been—I mean, certainly Chinese firms individually, which are dying to get their hands on these cutting-edge chips to train their AI models—they've been finding all sorts of very clever ways to access these technologies. So, we hear about all the smuggling and the transshipment through third countries, right? And the Biden administration tried to put a stop to that, but it's this game of whack-a-mole, right?—where it's just going to be endlessly challenging.

And essentially, we see that there's also these new technologies creating problems that the CoCom leaders never had to deal with, like, for example, cloud computing, right? Can you train your AI models using cloud computing that's located in other countries, and so on? Chip rentals, right? So, okay, you don't need to actually buy the chips. You can rent the chips to train your AI models. So, there's just so many different ways in which this high fence is actually quite permeable.

Michael Mastanduno: It's hard to underestimate just how different Soviet firms and Chinese firms are. So, for example, one of the things that the Chinese do very well is when a Chinese firm is targeted and put on the entity list for being barred from technology exports, they can set up a dummy firm, maybe in Indonesia, or Singapore, or Thailand, very quickly. And by the time the United States and its allies figure out that that's a dummy firm of China, they've set up another one. The Soviet Union never could do that. I mean, they just weren't in the world economy. So there were no Soviet private firms that could actually carry out that kind of evasion.

So, China just has so many more tools precisely because it's so deeply integrated into the world economy and because it takes the market signals in a way that Soviet entities—not sure we'd call them firms, enterprises—never did because they never were forced to. So, the biggest problem we saw in our research was that the Chinese can steal just as well, but they're far more adept at adapting and diffusing and building on what they steal or buy.

30:37 China's Technological Advancements

Ryan Vest: Given that even effective controls can only throw sand in the gears, as you mentioned before, what benchmarks should policymakers realistically use to measure success from a practical standpoint? And what are the early warning signs that a control regime is beginning to overextend itself?

Jennifer Lind: Well, if we're specifically interested in the semiconductor industry, which is again what these export controls are aimed at, we want to ask ourselves: where is China—Chinese firms—where are they producing relative to the global technological frontier? And so, can they produce at that degree of sophistication? And can they do it at the scale required to satisfy the demand they face for chips, which is massive? So, on that first question, we usually talk about the frontier in terms of nanometers. And it used to be the frontier was, you know, seven nanometers, and I think that has gotten down to five, and maybe now it's down to three. And, I think TSMC in Taiwan is actually producing at two. No other firm in the world can do that. So think of nanometers as like the size of the parts on the microchip, so that the smaller they are, the more performance the engineers can cram in and the less energy that's wasted. So, that is why the smaller you can go, the better, and so on.

So again, if the tech frontier is at three nanometers and if China can consistently produce at that level, then that would be signs of success. If it's stuck several steps back—if it is at twenty nanometers or twelve nanometers or something—then the export controls are still buying you some time. And so, the way you would assess this is, you know, you have people obtaining Chinese products and tearing them down and analyzing them to see what's the level of sophistication of the semiconductors inside, and so on, and running independent tests and saying: "Do they have the same level of performance as the, you know, Nvidia chips and the other top global rivals?"

And then, the matter of scale is really important too, because, you know, think of it as like—you build a concept car versus you're an automobile maker that has an assembly line and you're churning out vehicles, right? So, it's not just that you've built a handful of these chips and you're proudly displaying them to

the world and it's getting splashed on the headlines, it's that you can manufacture these at scale and that the yields are high—meaning that the chips that are coming off the line actually work. They test well. So there's that—there is, can you achieve that steady output rather than kind of a stop, start kind of spurts. And can you meet the demand for the chips that your market is actually asking for?

We hear reports that China is producing—sometimes, we hear them hitting these benchmarks, and it's very exciting news or alarming news, depending on your perspective. But then the key question is, well, what are the yields? And the data on that are always a little trickier to come by, you know, the firms are very cagey about that. And so, that's going to be tricky. What we're interested in looking for is, you know, can they produce these most sophisticated chips? And can they do it to scale?

And then in terms of, "is this regime overextending itself?", I think that the more that you see US partners basically kind of chafing at these rules, the more you see them complaining to Washington or asking for waivers and exemptions and this sort of thing, the more tense political relations grow with our allies—those would all be signs that this effort might be running its course.

Sheena Chestnut Greitens: Let me follow up a little bit on that. You noted in the article that the Soviet Union was able to obtain restricted technologies, but subsequently really struggled to absorb and exploit them. One of the differences with today is that China's doing both successfully. And so you mentioned the shock of DeepSeek in January of 2025, and I wanted to ask you a little bit more about what you think explains China's greater ability to innovate under constraints. Is this something to do with military civil fusion? Is this some other feature of what China is doing? And then, how does that reality shape the current administration's calculus, for example, in its dealings with a company like Nvidia?

Jennifer Lind: The DeepSeek episode, you know, routinely described as the "Sputnik moment" and so on, that was really eye-opening to people because it was something that China was not supposed to be able to do, given the export controls that the United States and others were holding over it.

I actually interviewed an executive in a Taiwanese semiconductor firm a few years ago, and I remember him saying, "Gosh, the idea of restricting China's access to key tech at this time seems kind of risky to me because it's a young industry in terms of AI, right? It is a young industry, and everybody is just trying to figure out new ideas and new ways of doing things." And so, he

thought it was actually potentially going to encourage more innovation in China—this notion of necessity is the mother of invention, right? So, his worry about the export controls was, you know, gosh, if you give them an incentive to do more with less, they'll probably figure that out, right?

So, he had a very high opinion of the Chinese scientific and engineering community, and DeepSeek was exactly what he was essentially predicting. What happened with that is, DeepSeek created an AI model that it trained using a fraction of the high-tech chips. And so, the reason that this sent Nvidia's stock plummeting is because previously everybody thought you need to have this very high number of Nvidia chips in order to train your AI models. And DeepSeek showed us, maybe you don't, right? Maybe you need a lot fewer than we thought because the Chinese have come up with all these clever workarounds.

So, I have just written a book on this, as Mike kindly pointed out, about how we have for a long time really underestimated China as a technological innovator. I think we often do this. We often look at rising economies, and because for so long they were copying more advanced technology from other places in the world, we would say: Oh, they can't do anything other than copy. And in many cases, you know, Japan, South Korea, Taiwan, now China, we have been very wrong about that.

And so essentially, I think what American leaders expected is that we are dealing with another Soviet Union. So, we looked at the Soviet Union and said: Soviet Union, they're an authoritarian country, and we extrapolated from that—well, China's an authoritarian country, so it's going to be equally inefficient and, you know, not very good at organizing innovation in its society, and not very good at diffusing innovation throughout its economy, and so on. And we really got that one wrong, right? So, yes, it's an authoritarian country, but obviously, it reformed its economy in many ways, such that this is a completely different economy than the Soviet one.

So the Chinese have gotten where they are precisely through engagement with high-tech countries, right, and technology transfer that followed from that. The Chinese, in other words, unlike the Soviet Union, were connected to the rest of the world, and they were absolutely interested in building up through technology transfer and through these export linkages to these other economies—through students studying in these other economies. They were interested in accessing the top technology of the world, and we see that they really succeeded at that.

So first, we thought China couldn't innovate at all, and then we said—well, looks like they're actually doing a really good job at innovation, but that's entirely due to their extensive ties with the United States and with the West. And so if we cut that off, they're not going to be able to compete. And so, I think—in the past few years with these export controls wielded as the weapon—I think we've seen that we were just wrong again. So, they have pursued a much more indigenous effort. They're trying to protect themselves from a world that imposes these kinds of export controls and other restraints on them. And their economy, because it's so massive and because they're investing so much in it—their economy is actually doing quite well as a result.

Michael Mastanduno: No, I think there's an interesting theoretical point that we make in the paper that is relevant to what Jennifer was just arguing. And that's: if you think about the sanctions literature, which I spent some time with, the past consensus was overly pessimistic, right?—sanctions never work; don't use them because they always fail. The weaponized interdependence literature has now become, I think, overly optimistic that the United States, and maybe with a few Western partners, has this magic bullet—this chokepoint hold—over key parts of the world economy and can use them coercively to bring other countries to heal. And that's an over-exaggeration as well, just as the first consensus was. And the reasons have to do a lot with Chinese adaptability and its determination and the ability of it to develop indigenous technologies in ways the Soviets just never ever could.

I mean, if we underestimated China, we overestimated, during the Cold War, the Soviet Union, and every once in a while, we'd get a reminder like, you know, when a MiG plane crashed somewhere in the 1970s and the intelligence people realized it was using vacuum tubes instead of integrated circuits. It's like, wait a minute, this is the other superpower here. So, they were significantly further behind and didn't have the kind of capacity China has today to catch up.

42:18 Future of US–China Technology Competition

Ryan Vest: So, I'd like to just wrap up our discussion a little bit today by looking ahead. And I'd like to ask you, what do you expect the US–China technology competition will look like over the next decade, given the historical patterns you've identified?

Michael Mastanduno: I would think of this as sort of a long-term, you know, durable kind of competition—like there's not going to be no knockout blow; no one's going to win this game. It's just going to be a game of patience where you're trying to stay a little ahead in the most important areas, but you have to

recognize that you have a formidable competitor that's not simply going to go away because of the policies that you adapt.

Now, there's always the chance of a shock. I mean, we always sort of think of China as ten feet tall, but it also has all sorts of vulnerabilities and problems. So, although it might be a lower probability, the idea of a superpower challenger collapsing is not out of the question. Remember, no one expected what we saw at the end of the 1980s, and it would be foolish to think that we should emphasize only Chinese strengths and not Chinese weaknesses. But, I think the kind of baseline projection should be that you've got a competition that will be long enduring, and it's sort of a grinded out, do your best to stay ahead in the application of civilian technologies to military needs.

Jennifer Lind: I think what China's performance over the past few years under the export control regime—I think what it tells us is basically what we were not hoping to find, which is that China is a lot more adept technologically, much more advanced as a global innovator than we had thought. And so, this picture was already starting to form.

If you look at—as I do in my book—if you look at data, basically over the past 10 years, you see China really rising up the rankings of various innovation indices, such as the Global Innovation Index, such as Stanford has an index—there are all these different firms that are keeping track of these kinds of metrics of innovation. If you look at patenting, if you look at the number of highly cited scientific articles, for example—there's all these different metrics you can look at. Over the past 10 years, China's really been climbing those ranks and now ranks among the most technologically advanced countries in the world.

So, I think that's a realization that the US has been slow to catch onto, and partly again, it's because we had this very dominant idea in our head that I think we got from the Cold War, which is: we didn't think authoritarian countries would be able to successfully preside over innovation. So we have been slow to catch up to just how competent China is, how extraordinarily innovative it actually can be. And I think the experience with the export controls has really magnified that.

I think people expected that because China was so vulnerable, in terms of: it was heavily dependent on that semiconductor supply chain, which again, that is made up of the United States and some of its closest security allies. And so, China was in this position of being heavily reliant, heavily vulnerable to a cutoff, which we then did. So, given that vulnerability and given these ideas about weaponized interdependence, I think we were pretty confident about the

effect of the export controls. And this is yet another piece of information that we're gathering that shows a lot of adaptation on the part of Chinese firms.

This is not your father's Soviet Union, right? This is a very different country, a very different economy. And so, as we are looking at the US technological competition with China, it tells us to be humble. It tells us we have to get our act together, right? We have been very dominant in global innovation. And I think we have a lot of strengths that will keep us very strong, but we have to try, like we can't just rest on our laurels. We have to keep investing in ourselves on this dimension. And so, we are up against a very formidable competitor, in other words. And like Mike says, this is a very long race, and so we have to have that in our minds going forward.

47:19 Conclusion and Farewell

Ryan Vest: Thanks for joining us on *Horns of a Dilemma* from the *Texas National Security Review.* Our guests today have been Jennifer Lind and Michael Mastanduno, authors of the article, "Hard Then, Harder Now: CoCom's Lessons in the Challenge of Crafting Effective Export Controls Against China," which, as always, can be accessed for free on our website, tnsr.org. Jennifer, Michael, thank you very much for joining us today.

Jennifer Lind: Thank you for having us.

Michael Mastanduno: It was a pleasure. Thank you.

Ryan Vest: If you enjoyed this episode, be sure to subscribe and leave a review wherever you listen, and you can always find more of our work at tnsr.org. Today's episode was produced by *TNSR* Digital and Technical Manager Jordan Morning and made possible by The University of Texas System. This is Ryan Vest and Sheena Chestnut Greitens. Thanks for listening.