Episode 167. Will new US tax credits remake electric vehicle supply chains?

Episode webpage

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Transcript

(lightly edited)

Chad Bown: In May, President Joe Biden visited South Korea. As part of that trip, Biden met with the chair of Hyundai, the massive Korean car company. Together, the two celebrated Hyundai's $10 billion of new investments into the electric vehicle supply chain in the United States.

President Joe Biden: *This new commitment of $5 billion for advanced automotive technology and $5.5 billion investment to open a new factory near Savannah, Georgia, is going to create more than 8,000 new American jobs. The plan is to break ground as soon as January of 2023. And the new facility should be rolling out the latest electric vehicles and batteries to power them by 2025.*

Chad Bown: But just three months later, the South Korean company was suddenly furious. To Hyundai, the problem was in the details of the brand new electric vehicle tax credits found in America's newest legislation, the Inflation Reduction Act of 2022.

South Korea's Trade Minister, Dukgeun Ahn, flew to Washington to meet face to face with Biden's US Trade Representative, Katherine Tai.

Minister Dukgeun Ahn: *We understand that the Inflation Reduction Act is really important for the Biden administration. But just one single provision – they're requiring final assembly in North America – is causing huge trouble.*

On this week's show, we sift through the details of those provisions in the Inflation Reduction Act. We also catch up with the major changes now taking place in electric vehicle supply chains.

It turns out there are lots of new provisions in the Inflation Reduction Act that someone will say is causing them huge troubles.

Some companies, countries, and workers are happy, but many others are not.

What we know for sure is that those electric vehicle subsidies are pretty complicated.

We're here to help.

You are listening to an episode of *Trade Talks*, a podcast about the economics of trade and policy. I'm your host, Chad Bown, the Reginald Jones Senior Fellow at the Peterson Institute for International Economics in Washington.

To help us make sense of the emerging electric vehicle industry, as well as the new provisions in the Inflation Reduction Act, we're going to be joined by Kristin Dziczek. Kristin is a policy advisor and auto industry expert at the Federal Reserve Bank of Chicago, and she's also a friend of the show.

Chad Bown: Hi, Kristin.

Kristin Dziczek: Hi, Chad. Thanks for having me.

ELECTRIC VEHICLE ECONOMICS 101

Chad Bown: For over a hundred years, cars have mostly run on internal combustion engines powered by fossil fuels. With climate change, the auto industry's future needs to be different.

Tesla, the American company founded by Elon Musk, has become a global leader in one alternative – battery electric vehicles, or EVs.

Kristin Dziczek: Despite Tesla's early lead, the US really is lagging behind other countries in EV adoption. In 2021, just 5% of US vehicle sales were electric vehicles. In China and Europe, that number is more like 16-17%.

Chad Bown: In addition to some policy makers denying the climate problem, the United States had fallen behind for other reasons.

On the demand side, American consumers are somewhat special. Americans not only love their cars, they love their big cars. They also love the freedom of getting into their big cars, their SUVs, and their pickup trucks, and driving long distances.

But this is a problem for EVs, powered by battery technology, which works better for smaller cars and shorter distances.

Kristin Dziczek: Compared to the rest of the world, gas prices in the US are relatively low and gas is relatively accessible. EVs require a massive investment in a resilient electrical grid and in ubiquitous charging infrastructure.

Adding this network of charging stations – that is as convenient as the gas station on every corner in the United States – is going to be expensive and require government policies, especially in a country as big as the United States.

THE JOBS AND SUPPLY CHAIN TRANSITION FOR ELECTRIC VEHICLES

Chad Bown: On the supply side, you have other issues. In the United States, the automobile industry has a lot of workers and deep political connections.

Kristin Dziczek: And EVs are really very different. The EV propulsion system requires many fewer moving parts. They need very different parts than you need for an internal combustion engine or transmission. And that means different companies are sometimes making these parts with different workers and in different parts of the country.

There are a lot of jobs on the line in this transition. Where I am here in Michigan, there's about 13,000 people who work making engines for cars. New electric vehicles don't have engines. They have e-motors. Can engine workers build e-motors? Oh yeah, they can! But it's a sourcing decision whether they're built in those same plants. And because e-motors have fewer parts,

they may not have as many jobs in those plants and it may not completely replace the number of workers who are building engines.

And it's not just Michigan. Half of all US engines and three quarters of all transmissions built in the US are made in just three states: Michigan, Ohio, and Indiana.

Chad Bown: Even if these new electric vehicles are going to be manufactured in the United States, the new plants and jobs may not end up in Michigan, Ohio, or Indiana. There's going to be a massive transition for the industry and its workers.

The Biden administration is developing an industrial policy that it hopes will ease that transition.

They also want a full EV supply chain in America that can support it.

ADVANCED BATTERIES

Kristin Dziczek: While electric vehicles are still cars and still have tires and doors and windows, there are a lot of parts from today's auto supply chain that electric vehicles won't need.

But there's one part that every EV needs, and that's pretty new, and that's advanced batteries.

The battery part of the industry is still really evolving. Right now there's a handful of companies that have a huge share of the battery market for cars and trucks.

There's Japanese firms like Panasonic that has been working with Tesla, out in Sparks, Nevada, to build batteries for their vehicles.

China has some of the biggest players in the industry, including CATL and BYD.

And then there are the South Korean battery companies, LG Energy Solutions and SK Innovation.

Chad Bown: Up until last year, these two Korean companies, LG and SK, were having a big legal fight that was threatening to keep SK out of the US market.

LG had won a legal dispute in which SK was accused of stealing LG's trade secrets.

But the uncertainty was holding back SK's plans to supply batteries for electric vehicles being made in the United States.

President Biden's new US Trade Representative, Katherine Tai, in one of her first actions on the job, helped mediate a settlement so that both LG and SK could supply batteries for electric vehicles in the US market.

And since then, both have announced a number of investments in new battery facilities in the United States.

SK has a new joint venture with Ford to make an electric version of its popular F-150 pickup truck.

LG has joint ventures with both General Motors and Stellantis, and is building plants in Ohio, Tennessee, and Michigan.

BIDEN'S CLIMATE AGENDA

Kristin Dziczek: When President Biden took office in January 2021, he began to follow through on his campaign pledge to prioritize climate policy.

And this could have potentially very big implications for the auto industry.

He did, on his first day in office, commit the US to rejoining the Paris Climate Agreement.

He also set about reversing the Trump administration's fuel economy standards for vehicles.

Then, Biden's US Trade Representative helped settle this dispute between those Korean battery companies so they could build new American plants.

Chad Bown: And for the problem that the United States needed more of those charging stations for EVs, there was funding to deal with that in the Infrastructure Investment and Jobs Act that passed Congress and became law in November 2021.

But one of the really big policies for electric vehicles was going to involve consumer tax credits, and that legislation just kept on getting delayed.

CONSUMER TAX CREDITS FOR EVS: THEORY AND EVIDENCE

Chad Bown: Lots of countries have consumer tax credits for electric vehicles, including Japan, China, and countries in Europe. The idea is to subsidize buyers so that they switch over and purchase EVs instead of traditional cars running on gas or diesel.

Kristin Dziczek: The US has had consumer tax credits for EVs for more than a decade, and those incentives have come both from the federal government as well as some states, especially California.

In 2009, as part of the American Recovery and Reinvestment Act (ARRA), the federal government offered up to $7,500 of EV tax credit per vehicle. These credits were structured so that any American buying a qualified EV could get the credit and the more battery power in the vehicle, the bigger the credit.

Chad Bown: In the years since 2009, there has been some serious economic research examining the effects of these US state and federal tax credits.

Tamara Sheldon, at the University of South Carolina, has an excellent survey on this and, and I'll make sure to put it in the show notes.

That research tends to find that while the early versions of these consumer subsidies did work at encouraging Americans to switch from gas to electric vehicles, the subsidies were pretty costly and not very well targeted.

For the same dollar amount of total subsidies being paid out by the government, more people would've switched over to EVs if the government had increased subsidies available for lower income households and not given away as many tax credits to richer households, who would've bought the EVs anyway.

Kristin Dziczek: Another critical part of the ARRA credits were that they were capped at the company's first 200,000 vehicles sold in the US before they started to phase out.

Tesla and General Motors hit those caps in 2018 and 2019, and the vehicles made by both automakers were no longer eligible for the ARRA subsidies starting in 2020. Nissan, Ford and Toyota were also getting close to the 200,000 cap.

But for South Korean companies like Kia and Hyundai – the ones that President Biden was meeting with in our opening – they only started ramping up exports to the US market in 2021. And so they had quite a ways to go before they would hit that cap.

But the Hyundai and Kia models they did bring to the US market had been very popular. By 2022 Hyundai and Kia had three of the 10 most popular EV models in the US market, and five of the semifinalists for the coveted *North American Car and Truck of the Year Awards* in 2023.

Chad Bown: <insert joke here>

Chad Bown: Overall for these consumption subsidies, and again, these tax credits at the federal level date back to 2009, the main message was that the United States wasn't offering enough and they weren't being targeted precisely enough to really get Americans to switch from gas to electric vehicles.

BIDEN'S ORIGINAL PLAN FOR CONSUMER EV TAX CREDITS: BUILD BACK BETTER

Chad Bown: When the Biden administration came into office, another part of its climate agenda was a proposal for new consumer EV tax credits. This was part of its Build Back Better legislation that passed the House of Representatives in late 2021.

It offered a consumer subsidy of up to $12,500 in tax credits for buying an electric vehicle.

Kristin Dziczek: But some parts of the Build Back Better tax credits were really controversial.

The biggest part was that $4,500 of that $12,500 was only eligible for vehicles that were assembled at a US plant using unionized labor.

Chad Bown: Canada and Mexico – huge parts of the North American auto industry supply chain – would have been shut out.

The Canadian government threatened retaliatory tariffs on US exporters almost immediately.

Deputy Prime Minister Chrystia Freeland and Trade Minister Mary Ng sent a strongly worded letter warning American Senators of the consequences if they voted to make the tax credits found in the House version of that Build Back Better legislation part of US law.

Minister Mary Ng: *Canada is prepared to stand up for our national interest. When jobs are on the line, when the industry is on the line, we need to be prepared to take strong action, which is what this letter is.*

Kristin Dziczek: The EU and Japan were worried too. Their problem wasn't just that their EV exports to the US wouldn't be eligible for these credits, it's that EU and Japanese companies making EVs in the United States would not have been eligible for this additional $4,500.

Companies like Toyota, Volkswagen, BMW, and Mercedes were all planning to make EVs in the US employing American workers. But their workers aren't unionized, so their products wouldn't get the full consumer credit and would be at a competitive disadvantage in the market.

Build Back Better had the potential to create a huge trade fight with the United States.

Chad Bown: That version of the Build Back Better legislation never passed the Senate. So that trade friction disappeared, and for a long time it looked like the US was never going to get legislation updating its electric vehicle tax credits in 2022.

Until late July when two Senators announced their surprise deal, the Inflation Reduction Act.

Yahoo Finance: *Senate Majority Leader Chuck Schumer and Senator Joe Manchin announced a surprise $369 billion yesterday on a spreading energy and health care bill that will include billions of dollars for electric vehicles, for solar panels, for other clean energy priorities…*

EV TAX CREDITS IN THE INFLATION REDUCTION ACT: THE CONSUMER SIDE

Kristin Dziczek: Let's start with the consumer side of the electric vehicle tax credits in the Inflation Reduction Act, or the IRA.

First, they got rid of the 200,000 unit cap, so buyers of Tesla and GM vehicles will once again be eligible for consumer credits in 2023.

Next, it instituted a price cap. Vehicles must cost less than $55,000 for cars, or $80,000 for SUVs, trucks and vans.

There's an income cap as well. Households must make less than $300,000 per year and single people less than $150,000 a year.

Chad Bown: Some used vehicles are eligible for these EV credits for the first time as well.

This combined with the price caps and income thresholds are consistent with those policy recommendations coming out of the economic evidence that we talked about earlier.

The goals were to better target these subsidies at people whose behavior could be changed and to try to incentivize companies to develop more affordable models for the mass market. A concern with the earlier American tax credits is that they were too often used by people at the high end of the market who would've bought EVs anyway.

Now, it will take time to see if the new rules are effective. And while they do limit the set of vehicles and consumers that are eligible today, the credits in this legislation are good through 2032.

So the hope is that the car companies respond by expanding their portfolio of EV models to serve this other important segment of the market.

EV TAX CREDITS IN THE INFLATION REDUCTION ACT: THE SUPPLY CHAIN SIDE

Chad Bown: Let's go now to the supply side of the EV tax credit eligibility in the Inflation Reduction Act. For trading partners and supply chains, that is where a lot of the action is going to be.

Two of the most controversial parts of that original Build Back Better legislation have been stripped out of the Inflation Reduction Act.

The first thing to go was that requirement that an EV would need to be assembled in the United States to be eligible for the consumer tax credit. That was replaced with a requirement that EV assembly only had to take place in North America.

Kristin Dziczek: This addressed Canada's main concern. So now vehicles made in its plants, and in Mexico, are eligible. Canada is no longer complaining or threatening the US with any tariffs.

Chad Bown: The second controversial part of Build Back Better to be dropped was that unionization requirement.

EV tax credit eligibility no longer requires that the North American assembly plant be unionized.

Kristin Dziczek: Since South Korean, Japanese, and European automakers make EVs in North America and the plants don't need to be unionized under the IRA, they're not completely iced out of these new credits.

Chad Bown: From the perspective of the auto makers, especially the foreign headquartered ones, the Inflation Production Act may be better than Build Back Better, but there are still some problems with it.

The Korean car makers are really upset, and this is why their trade minister came to Washington to complain. They lost access to the old tax credits as of August 16th when the North American assembly requirement of the IRA went into effect.

Before August 16th, American consumers were being subsidized for buying Hyundai and Kia EVs imported from Korea.

Under the Inflation Reduction Act, tax credits for EVs assembled outside of North America are now gone. Hyundai may not be eligible for the new tax credits until its $5 billion EV plant in Georgia starts rolling cars off the assembly line in 2025.

Overall, US policy at the moment is really a mixed bag for South Korean companies.

Hyundai and Kia are upset that they've lost these exports. But at the same time, Hyundai did get a major tax break from the state of Georgia to build that $5 billion EV plant.

Kristin Dziczek: With all of the investment in electric vehicle production in the US, those Korean battery companies, LG and SK, stand to benefit. They're the ones being tapped by car makers to build battery plants for them in the US.

Chad Bown: Hyundai is not the only foreign car company affected by the North American final assembly requirement under this new US law. Other companies are too, though, which are affected and how depends on the company and often the electric vehicle model.

Volkswagen is another mixed story. It too had just started exporting a new EV model to the United States. Like Hyundai, those Volkswagens will lose access to the US tax credit because of this new final assembly provision in the IRA.

Also, like Hyundai, Volkswagen had been preparing to assemble its EV locally in the United States. The main difference is that Volkswagen's American plant has already managed to deliver

its first cars. While it may not yet be operating the American plant at scale, it's certainly better than Hyundai's situation of not having its plant ready until 2025.

BATTERY SUPPLY CHAIN REQUIREMENTS IN THE INFLATION REDUCTION ACT

Chad Bown: Let's turn to some of the other new rules in the Inflation Reduction Act likely to impact the electric vehicle supply chain. Companies are still trying to figure these out, but they already know that some of the new rules are going to be really tough to meet.

Especially complicated are the new rules for batteries. Tax credit eligibility there requires satisfying new rules on battery inputs.

Kristin Dziczek: For the inputs into EV batteries, there's two things to keep straight.

First, critical minerals, and those are things like lithium and cobalt and nickel.

And components those are things like anodes and cathodes. You can think of those as sort of like the positive and negative poles in a battery where the electrons flow between them to store and release power.

For critical minerals, an increasing amount has to be sourced from either the US, a country with which the US has a free trade agreement (Canada and Mexico will qualify from USMCA, also South Korea, Australia, Chile, or a number of other countries), or the battery materials have to be recycled in North America.

For battery components, they have to eventually be sourced from only North America.

And for both the components and critical minerals, the EV must soon not have any content at all coming from “foreign entities of concern,” which could include China.

Chad Bown: To be clear, for these complicated requirements for batteries involving critical minerals and components, there is one main goal.

That is to diversify the electric vehicle battery supply chain out of China. For processing a lot of these critical minerals and manufacturing these components, China is currently too big a part of the EV supply chain.

Kristin Dziczek: Building even more electric vehicles without China is not going to be easy. They had 80% of the world's advanced battery manufacturing capacity in 2021. They've gone out and invested in critical minerals extraction, not only in China, but around the world – 61% of the lithium refining capacity in the world is in China. They are a majority investor in cobalt extraction, processing, and refining.

Chad Bown: When it comes to essential inputs for batteries, the United States is taking to heart one important lesson from Europe's exposure to energy imports from Russia – Do not become reliant on a potential adversary.

But even trading with friends, the same message emerges time and again because of floods or droughts or fires or even the pandemic lockdowns. Single sourcing is too risky and industries need supply chain diversification.

When it comes to China specifically, though, there is one additional worry.

China has a long history of using export restrictions on critical inputs as an industrial policy that helps its domestic industries, but that also comes at the expense of everyone else.

An export restriction on an input acts like a subsidy to Chinese own downstream industries that use that input. They get cheaper access, but only by imposing costs on China's downstream competitors in the rest of the world.

Over the years, China has faced multiple WTO disputes about its export-restricting policies. Those restrictions have been a core argument of the aluminum industry in the United States and Europe. Even just last year, China suddenly imposed new restrictions on exports of fertilizer and steel.

So wanting to diversify the EV battery supply chain out of China makes sense as US policy. Getting companies to do it is going to be the hard part. That will require strong policy incentives and is also likely to be costly.

THE TRADING PARTNER RESPONSE TO EV TAX CREDITS

Chad Bown: Let's turn now to the potential policy response of US trading partners. We've seen the South Korean trade minister rush to Washington to lodge a protest about the final assembly provision.

But realistically, if you're Korea, Japan, or Europe, what are your options?

Kristin Dziczek: In the olden days, we might have seen these countries file a WTO dispute challenging the discriminatory nature of the final assembly provision. And after a couple of years, the WTO might have given a country like South Korea a ruling or an authorization to retaliate against the United States, if the US didn't amend that law to get rid of that part.

Chad Bown: Nowadays I'm not so sure that we'll see a WTO dispute.

First, Europe, Japan, and South Korea all have bigger issues that they're working on jointly with the United States. Obviously most important is solidarity over the Russia-Ukraine war. But they're also trying to work somewhat collectively when it comes to China. And those factors alone might be enough to make them decide to let this particular issue go.

It's also important here that the underlying policy issue involves climate. Overall, if these tax credits help facilitate the green transition in the United States, that is probably the most important thing. Threatening to throw any US progress off course here has its own risks.

These countries would also be asking a lot of the WTO. To me, there would be similarities with the controversial *Tobacco-Plain Packaging* dispute. In that case, the WTO was painted in a bad light merely by having to adjudicate a dispute, challenging Australia's public health policy. I don't think Korea, Japan, or Europe would be all that happy with the public relations backlash they might face if they were seen as bringing a climate hostile dispute to the WTO.

WTO dispute settlement is not entirely operational at the moment anyway. The Appellate Body is still not really working.

So instead, what we may end up seeing is other countries simply replicating the US approach and subsidizing EV assembly in their markets for their EV purchases.

France's Treasury Minister has already said that they are looking into it.

One result of that, of course, is it would become more difficult for North American EVs to be exported to those countries in the future.

And globally this combination of policies would likely be bad for the world. Plant sizes may end up being smaller if companies can't take advantage of economies of scale from their domestic markets alone.

And ultimately what that might mean is EVs end up being more expensive and there are fewer of them, and we don't address the climate crisis as quickly as we could have otherwise.

EV TAX CREDITS: OPEN QUESTIONS

Chad Bown: To wrap things up, there are a lot of open questions on the Inflation Reduction Act.

Kristin, tell us what other things you're going be looking out for.

Kristin Dziczek: For me, how the Treasury Department writes these regulations is going to be pretty important. How are they going to measure all of this stuff? We still don't know. They're working on that right now . They're supposed to release those by the end of this year.

For example, China is so massively invested in critical minerals, extraction, processing, and refining around the world. You could have a case where there's a lithium extraction mine in Australia, a free trade partner, that's built with Chinese investment or with a Chinese minority ownership stake. We're not entirely clear how that will be treated.

Economically it also raises the question of does this forced diversification – to get access to the American consumer – does that create opportunities for producers who want to sell EVs outside of the US?

If you're a company building EVs in Europe, do you now get cheaper raw materials and components for batteries from China because you face less competition for those scarce inputs that can no longer be used in EVs sold in the United States?

Chad Bown: On those Treasury regulations, one of the sourcing requirement possibilities for critical minerals are US free trade agreement partners. Well, South Korea has a free trade agreement with the United States, but Japan, the European Union, and the UK do not. So does this create new incentives for Japan, the EU, or UK, to negotiate full free trade agreements with the United States? Or when defining trade agreement partners in the regulations, does Treasury get creative?

Kristin Dziczek: Also, we've mainly focused on the consumer market for battery electric vehicles. There's a commercial market as well. The demand there is different and the IRA has different criteria for those vehicles. There doesn't appear to be a North American production

requirement or any critical minerals or battery component sourcing requirements. And importantly, it doesn't seem to include the language about "foreign entities of concern."

Chad Bown: The very last thing I want to acknowledge is the possibility that automakers just don't try to take up these tax credits. Maybe it turns out that moving their supply chains out of China – to satisfy these battery requirements – is so costly relative to the subsidy in the Inflation Reduction Act that they just keep sourcing from there after all.

One thing is for certain, there's a lot to keep track of and this whole thing is far from over.

Chad Bown: Kristin, thank you very much.

Kristin Dziczek: Thanks for having me, Chad.

GOODBYE FOR NOW

Chad Bown: And that is all for *Trade Talks.* A huge thanks to Kristin Dziczek at the Chicago Fed for all her help on electric vehicles and tax credits.

Thanks also to Melina Kolb, our supervising producer, and Yiling Wang on data.

As always, thanks to Colin Warren, our audio guy.

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That's not one but two underscores, @Trade__Talks.

<insert double underscore joke here>. ▮