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PAPER: FROM IMPORTER TO EXPORTER: OIL SHOCKS AND THE US ECONOMY

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STEINSSON: All right. Welcome, everyone. Let's get started. So I am going to start by handing it over to Ben Harris, Director of Economic Studies at Brookings.

HARRIS: Thanks, Jon. So hi, everyone. I just wanted to welcome everyone to the fall twenty twenty-six BPEA conference. Let me thank the editors, Jan and Jon, for putting together another terrific program.

I would also like to thank the generous supporters who make BPEA possible, the National Science Foundation and State Farm Mutual Automobile Insurance Company. We're also grateful to the contributions of Dina Axelrod Perry for establishing the George Perry and William Brainard BPEA Chair. Thank you all for joining, and I hope you enjoy the conference.

STEINSSON: Okay. So, before I hand it over to Diego, our first speaker, I just want to remind everybody about a few things. First this is live-streamed and recorded. Second, if you're a presenter, please speak into the mic. Well, I see you have a lav mic, so you're okay. And if you're speaking from the floor, you know, you turn on one of these things and, and speak.

And then there are also gonna be some mics around for those that are further away from, from these at the table. Okay. So without further ado let me turn it over to Diego.

KÄNZIG: Great. Thanks so much for including our paper in the program. I'm super excited to be here today. This is joint work with James Stock and Luca Zanolini, who are also in the room, and Luca is a fantastic PhD student at Northwestern.

In this paper, we ask a simple question: Given the stark transformation of the US economy from being one of the major petroleum importers to becoming a net petroleum exporter recently, do oil shocks still affect the US economy in the same way than they used to? Historically, oil shocks have been thought to be one of the key drivers of the US business cycle.

And Hamilton and others famously noted that from the '70s until the early 2000s, basically every US recession was preceded by a major oil market disruption. This is what you can see here in this chart, which depicts the unemployment rate in the US together with NBER recession dates and some of the major oil shock dates.

So these are certainly true in the big oil-- with the big oil shocks in the '70s, but it was also the case with the Iran-Iraq war in nineteen eighty, the Kuwait invasion, as well as the coordinated non-OPEC, OPEC cuts in the late '90s. However, recent oil shocks, such as the Libyan civil war and Arab Spring in twenty eleven or Russia's invasion of Ukraine in twenty twenty-two seems to have broken this historical pattern.

Both these episodes were associated with large global oil disruptions and sent oil prices soaring, but there was no discernible impact on the US economy. So you can see no subsequent change in the unemployment rate in this chart. Another way to see this is to impose a bit more structure. So I'm gonna talk in more detail how we estimate this, but what we show here is the response of US industrial production and the US Consumer Price Index one year after an oil supply shock that increases oil prices by ten percent.

And we map out basically how this response has changed from nineteen eighty until today. And we can see that in the early part of the sample, we observe the familiar stagflationary impact. So these shocks led to a contraction in US industrial production and an increase in US consumer prices. However, this impact seems to have changed substantially over time.

In particular, the effect on US industrial production, again, being contractionary in the '80s and '90s, falling by around point five percent after a ten percent oil price increase, has subsequently weakened over time and even turned positive towards the end of our sample. There were also changes in the US consumer price response, even though that has remained positive throughout our sample, just the magnitude has moved around a bit.

But there was no systematic change as we observed for US industrial production. This then asks the question, what can explain this changing impact of oil shocks on the US economy? And one big thing is obviously the shale revolution, shale oil revolution, which has transformed the US oil economy. So in this chart, you can see on the left, US crude oil production, and on the right, US net petroleum imports.

And we can see that after twenty ten, US crude oil production nearly tripled, but at the same time, net petroleum imports steadily fell, turning the US into a net oil exporter, net petroleum exporter in twenty nineteen. What's also interesting is the timing, right? So basically, the timing aligns pretty well with what I've shown you before, right?

That this exposure of the US economy to oil shocks has weakened and may have even reversed in recent decades, in the recent decade

In the next part of the paper, we then ask more formally, can basically this transformation, the US petroleum trade balance account for this change? To do so, we first have to confront an identification channel challenge, and that is how to estimate the causal effect of oil shocks on the US economy.

Because oil prices are market prices, at least since the '70s, they are driven by both supply and demand. This complicates the estimation of their effects on the US economy. So if you were just to naively project the US unemployment rate on oil prices, we would in general get only a biased estimate of, of this impact.

To overcome this challenge, we rely on variation that is driven by news about OPEC's future production plans. So the idea is we look at OPEC meetings and their oil production announcements, and we study how oil futures prices change in a narrow window around these announcements, and this allows us to identify some variation in the oil price that is driven by this news about OPEC's oil supply and plausibly unrelated to the US macroeconomy.

So this is based on some of my earlier work, and we extend this here throughout the recent period until 2025. Equipped with this approach, we then study how the transmission of these oil shocks on the US economy has changed, and we employ two complementary approaches. The first is a very simple sample split, essentially.

So we study the response in the pre- and the post-shale period. And the second, I guess the more important specification that we employ is basically tying the change in response

directly to the US petroleum trade position. So essentially, we include an interaction of the shock with a measure of net petroleum imports.

So this is what comes out from this first approach, essentially the sample split. Here we can see the response of US industrial production at the US CPI for thirty-six months after an oil supply news shock that increases oil prices by 10% on impact. And in the pre-shale period, so pre-2010, we basically recover again the familiar stagflationary impact.

So industrial production falls. It falls by around 0.5% at peak, and that materializes about a year after the shock. And we also document an increase in consumer prices. That impact materializes earlier, and the peak response is maybe around 0.3%. The pattern, however, changed starkly when we look at the impact in the post-shale period.

This is basically the blue line here. So here we can see then in the industrial production response reverses. So now we observe a positive impact of oil price increase on the US economy. The peak effect is around point five to one percent after this one after this ten percent oil price increase.

US consumer prices still increase, so there the response is not that different. Maybe it turns out to be a bit more persistent. Now, obviously, there are a lot of other things that happened in the US economy after twenty ten. So to understand whether that is really linked to the change in the petroleum trade position, now we show results from the second approach, where we include this interaction of the shock with the petroleum trade position, and we show two responses, one where we evaluate the effect at the average pre-twenty ten petroleum trade position, and one where we look at the more recent trade position in twenty twenty-five.

And we basically confirm these earlier results, so these are very similar to what we've just seen before in the sample split that, okay, before twenty ten, we have this deflationary impact, and after twenty ten, actually the US industrial production response flips, so it turns positive, while the US CPI response doesn't change all that much.

Maybe it turns out to be a bit more persistent. And coming back to the fact that there are other structural changes that could possibly explain this, in the paper, we also show that this result is robust to controlling for other sec-secular change that happened in the US over this time period. In particular, the energy intensity came down, that the services share of value-added has increased, that the manufacturing share has come down, as well as that a substantial part of this more recent period we were at the CLB.

So to basically assess this, we include additional interactions of our shock with indicators for these variables, and we show that our results when we look at the impact of the US petroleum trade position remains robust. Now, for now, we've just looked at the impact on industrial production but we actually find that this also applies to other parts of the US economy.

So here we can see labor market responses, and you can see here that the employment and unemployment rate responses also reverse when we look at the impact pre-twenty ten or at the twenty twenty-five US petroleum trade position. So before, again, as expected, oil shocks were negative for the labor market, so employment fell, unemployment rose, consistent also with the motivating chart that I showed you.

But in the more recent period now, we actually find positive effect on the labor market. The question then is, what can explain this change in transmission of oil shocks? Historically, oil shocks were thought to be adverse terms of trade shocks for the US economy. Meaning that basically when faced with higher oil prices, the terms of trade of the US would actually deteriorate because import prices would increase more than export prices.

This is what you can see here on the left. So in the earlier period, pre 2010, this was a substantial-- was, was associated with a substantial decline in the terms of trade. When we look in the more recent regime, actually, that, that response flips. So now actually these oil shocks propagate to the US economy as positive terms of trade shock, thus basically improving the US real purchasing power.

One way how basically this weakening impact of oil shocks or even a positive one could materialize, would be a mechanical trade effect. This is what we assess here on the right-hand side, and we show that basically that's not the case. So you can see the response of net exports over GDP, and that remains basically flat and pretty much unchanged in the two, in the two regimes.

So that can't account for basically this improved response of the US economy. Another explanation could be that maybe some regions, in particular oil producing states or sectors, now benefit so much that this drives the positive aggregate response. So this is what we investigate here. So here we can see the response of manufacturing employment in two sets of states.

On the left-hand side, you can see the response in oil producing states like Texas or North Dakota, and on the right-hand side in other states. And what we show is that pre 2010, in both of these states, manufacturing employment fell. But then evaluated at the twenty twenty-five petroleum trade position, we find that the, the sign flips.

Maybe the response is a bit stronger in oil-producing states, right? But, like, with the estimation uncertainty here, I think we can't reject the hypothesis that these responses are actually the same. So the stark result here is really if you look at the right-hand side, then also in other states, the response flips.

So this is not uniquely a phenomenon that we experience in oil-producing states. Turning to the sectoral explanation, right, you could maybe think that, okay, it's just the oil and gas sector that, that benefits so much, even though these, these cross-state results already suggest a bit that it can't be it.

But here we look into this further, and here we can see the, the responses of the oil and gas extraction sector. So these are again responses for employment, but it's actually similar if you look at industrial production instead. And you can see even before the oil and gas extraction sector was actually one of the sectors that benefited from higher oil prices historically.

And in the more recent regime, actually, these benefits even became larger. But what's, what's super interesting is that we find broad-based impacts also on service providing industries, where the response also flips, and we, we provide evidence in the paper on broad-based gains in many sectors throughout the US economy.

So why then do oil shocks propagate so differently? The way we think about it is that higher oil prices are now associated with substantial income and wealth effects in the US economy, and these effects are distributed through market forces, through different sectors and regions. And this is what we show here.

So we look at the impact on the S&P five hundred, and we can see that historically that fell, the stock market fell after oil shocks. But now actually we experience a boom. And obviously this could explain this expansion that we observe and also stimulate consumption. And this is what we show on the right.

So also consumption increases in the more recent period. We do a back of the envelope calculation using estimates of MPCs out of stock market wealth, and that channel can account for about point two percent of higher consumption. So it seems that this channel is also quantitatively important. Another explanation could be that monetary policy responds now differently to these shocks.

So this is something that we're especially interested in, in the current environment. But it turns out that actually in the more recent period, monetary policy, if it all responds more forcefully to this shock, which would actually act against this more expansionary impact that we document. So you can see here the response of the one-year rate both in nominal and, and real terms.

And you can see that in the more recent period, we find a somewhat stronger response, even though it's not very precisely estimated. And this reflects the fact that now that oil shocks seem to pre-transmit to the economy more like demand shocks this is a easier situation for monetary policy because it's not faced with this standard trade-off of these supply shocks as before.

And now basically can respond to these inflationary pressures by raising rates more, and that could also explain the result that we don't find that much of a difference in the consumer price index across these regimes. In the, in the final part of the presentation, let's briefly revisit the implications for the 2022 oil episodes.

So here, basically, we compare the oil price relative to a pre-invasion forecast, and then basically we use our machinery to evaluate how this episode has affected US industrial production and other parts of the US economy under the propagation of oil shocks in 2021 as well as in the pre-2010 regime.

And we do find, had oil shocks still propagated in the same way as they did historically, actually, this episode would have been associated with a significant contraction in the US economy. Let me conclude. In this presentation, we have seen that oil shocks no longer hit the US economy the way they used to.

As the US became a net oil exporters, oil shocks actually became expansionary. We find that there are now broad-based income and wealth gains that support consumption and activity beyond oil. This does not mean that oil shocks are unambiguously positive, right? So there are still many firms and households that are adversely affected.

But obviously the aggregate impacts are interesting, and our evidence suggests that the historical experience may be a poor guide for how oil shocks affect the US today. Thank you.

STEINSSON: And our first discussant is Christiane Baumeister

BAUMEISTER: Okay. Well, thanks so much to the organizers for inviting me to discuss this this really nice paper. Now, given the recurrent turmoil in oil markets during the past couple of years this paper addresses a really topical question about the changes in macroeconomic consequences of oil supply disruptions for the US economy.

And the authors basically start from Jim Hamilton's famous observation that oil shocks precede recessions in the US, and they extend this to to the present. Now, what stands out to them is the fact that the Arab Spring in twenty eleven did not trigger a US recession. In fact the unemployment declined steadily, as you can see on the graph that I replicated from their paper.

And they conjecture that changes in the petroleum trade balance could have something to do with that, and they date twenty ten as an important turning point. So however there are also earlier episodes such as the Venezuelan crisis in two thousand and two and the the joint production cut by OPEC and non-OPEC member countries that also led to declines in the unemployment rate.

And that becomes even more obvious once we overlay this graph with the the real WTI oil price. And in fact what stands out here is this epic increase in of oil prices in the early two thousands that you can Well, I can point that you can see here. And that also didn't cause a recession.

And in fact, it was exactly this observation 20 years ago that triggered my interest and eventually led to my job market paper on the time-varying effects of oil supply shocks on the US economy. Now, a lot has changed since then. A lot of things happened, and so, the time is really ripe to revisit this question as the authors do.

Now, to further motivate their choice of an important change around 2010 the authors provide evidence that there was this steep increase in domestic oil production as a result of the shale oil revolution, accompanied by a, a decline in net petroleum imports that had started already couple of years prior to that and then turned negative in 2019.

And they supplement this narrative analysis with some more formal empirical evidence from an unrestricted time-varying proxy VAR. And Diego already showed us this picture here, which suggests that indeed oil price increases have become beneficial in 2015 with a rise in US industrial production.

And that basically raises the key question that the paper tries to answer, which is whether the US now responds to higher oil prices more like a conventional oil-exporting economy, where income gains from higher oil prices actually benefit overall domestic economic activity. And so my first inclination was to verify what the industrial production response actually looks like for a conventional oil-exporting country.

And the first country that came to my mind was Canada. So I just basically re-ran exactly that same model, so the unrestricted time-varying proxy VAR using data for industrial production and consumer prices for Canada. And this is what I found. So despite being a, a classic oil exporter throughout this entire period, we see that for the first 20 years, effects were contractionary and then only gradually turned positive since the early 2000s.

Then I was thinking, okay, let's look at a classical oil importing country, and Japan was my pick, which is known for its resource dearth. So, and I did that, and that's what I found. So, Japan actually benefited from oil price increases starting in the 1990s, so industrial production has been basically positive throughout.

Now the the red lines here indicate times when the these economies were constrained by monetary policy. So, they were effectively when monetary policy was constrained, sorry. So when they were effectively at the, the zero lower bound or interest rates did not move. And that suggested to me that probably what these countries have in common is effectively this constraint of of monetary policy.

And so I returned to the the evidence for the US because it seems important to disentangle the effects of the trade position from the zero lower bound, especially given that most of the shale the post-shale period overlaps with the ZLB period. So I first reproduced the the baseline results of the author.

So here you see the response of US industrial production at the 2025 trade position. Then, as Diego already showed us they also thought that it might be important to take the zero lower bound into account. And what they did was basically to interact or to construct an indicator for the zero lower bound and interact that with their oil supply new shock.

And that results in the, in the red line. So effects are already a little bit more attenuated, but they still point in the same direction. However, this does not go far enough because what we want to know at the end of the day is what happens if the ZLB interacts not only with the oil supply new shock, but with the trade position itself.

And if we do this triple interaction, then we see that we're basically having much smaller effects, more in line with the the response that we saw before, namely a decline in industrial production. So, so here you see the response of industrial production outside of the zero lower bound, so when monetary policy is not constrained.

So that means that the favorable effects that the authors find can at least in for a big part, being attributed to being a net exporter during the zero lower bound episode. Now, There the, the US is not the only country that has switched trade positions. So another very interesting case is the U- UK economy that has been a net petroleum exporter until 2012, and then switched to a net petroleum importer in 2013.

So, the opposite timing from from the US. So, once again, I just followed the the baseline analysis of the authors here and did a simple sample split, and this is what I find for industrial production in the United Kingdom. And so you see that there were contractionary effects in, during the time when the UK was a net petroleum exporter, and there are some medium around positive effects for the for the economy when it was a net petroleum importer.

Which is of course at odds with how we think about the, the trade position should influence economic activity. So it's contrary to what we would expect here. Now, That basically t-tells us that-- I mean, we could go further here and look also at the zero lower bound and whatnot.

But so that tells us that maybe just looking at the trade position is not enough. It doesn't tell the full story. Now, another thing now I'm getting a little bit more into the methodology of the

paper that the authors spend a great deal on in the paper, is to ask the question whether the oil supply news surprise series that they use for identification is actually predictable.

Because so, so they, they basically run some some tests, but then conclude this is not the case. But they're using mostly variables to test for predictability coming from the monetary policy literature. Now one of my talented grad students, Pascal Frank, recently developed a daily OPEC inflation a signal indicator from a large article of or from a large corpus of newspaper articles using large language models to classify inflationary pressure and to determine basically when that was associated with OPEC.

And so I took this daily OPEC inflation signal, and I regressed the raw oil supply news surprise series of the authors on it. And as you can see there is strong evidence for predictability here when we use the signal a day before the OPEC announcement. So, that just to sound a word of caution that it really matters when you test for predictability of these high-frequency instruments what type of variables you, you choose.

Now, there's also a recent paper by Cavalieri, Fanelli, and Giordgeev who propose a new bootstrap diagnostic for misspecification of models, among them whether an instrument that is used is is weak. And they apply that to Diego's original AER paper and show that basically using the first stage F-test is not sufficient to exclude that the instrument is weak.

They simply re-reuse his mo-moving glute, Moving block bootstrap replications and show that the the bootstrap distribution is non normal and conclude that the instrument is is weak. So I would encourage the authors to kind of like, maybe provide more evidence for the instrument that they're using now.

Now I have two more technical points on the proxy TVPSV model that casts some doubt on the reliability of the results obtained with that. The first one is that the independence metropolis step that they they use to obtain identifying rotations actually has an acceptance rate of below one percent when the standard is the standard rule of thumb is twenty to forty percent.

And so, my proposal there is that they should change the, the, the mechanism for generating those draws to improve the, the mixing. Now the other one is that there's evidence that these time-varying parameter models with stochastic volatility are not order invariant. There's evidence by Chan, and here I ran a couple of different orderings, and as you can see the results look quite different.

But it's time to wrap up, so let me conclude. This is a very timely and relevant paper because it's really key to gain a better understanding of how the transmission of oil supply shocks to the U-U-US economy has changed over time. However, as I've shown you, not properly accounting for the ZLP is likely to overstate the role played by the US trade position, and it's also important to keep in mind that the US is still a net oil importer, and it's only the e-exports exceed imports only if we include refined products.

Now, one last thought. Conditional on being in a particular state, the model is still linear. So that means that if oil price increases are good news for the US economy now, then oil price decreases should be bad news. Thank you so much.

STEINSSON: Our second discussant is Johannes Wieland.

WIELAND: So thank you all for, for having me here and, and allowing me to discuss this super interesting paper. I think it's... The, the presentation was, was very clear what is this paper about. It looks like now all supply shocks emanating from OPEC countries are expansionary for the United States, that it's become a, an export of petroleum product, whereas before it was contractionary.

And that's not sort of mirrored by sort of a clear change in what's happening in the exports and, and the, the, the paper sort of interprets this then as these expansion effects coming from general equilibrium income or wealth effects since they seem to be broad-based across regions and, and sectors.

And so what I'm gonna focus my discussion on is, essentially I'm gonna question this interpretation. I don't think it's quite so clear what the mechanisms are that are sort of going on here. And so the way I'm gonna start is I'm gonna start with chain link GDP. This is my Y bar. This is gonna be the sum, sum of, you know, your, your consumption on domestically produced goods, your investment, your exports, and then maybe any value added from oil, plus government, which I'm not gonna talk about.

What I'm gonna focus on first is two questions, which is, just in partial equilibrium, what-- how do we expect these objects to move around as we get this, this oil price shock from, from OPEC countries? And how is it-- how should expectations change as the oil petroleum, the petroleum trade position changes and we produce more oil domestically?

And since the paper sort of emphasizes the, the income and wealth effects, I'm gonna take a model that sort of can, can speak to these issues, which, where I think the frontier right now is, you know, clear model we want in this job twenty-twenty three paper that focuses on, on energy market. I'm gonna add oil investments to that as well.

I'm not gonna walk you through all these equations here, but I want to sort of highlight what channels are actually, like, in the model, and then we can put some numbers on them. So here in my consumption function I have labor income, and the labor income we're getting primarily from the non-oil sector.

And as the relative price of oil, this is my PO divided by PH . As the relative price of oil goes up, the real labor income I'm getting from those sectors goes down. I can buy less goods. That's the real income channel, so we're gonna quantify that. Now, the oil producers, they're making more profits and, you know, households hold stocks, so they can get some more, more high asset values and dividends.

That's gonna be return, so we're gonna quantify that. That's in the consumption function. There's gonna be an expenditure switching effect. So maybe as oil prices go up, we're gonna, you know, drive our cars less. We're gonna take the bus and maybe buy an EV, so that's in there. And then we're gonna add the investment channel.

Here, I'm gonna think primarily about us investing into more oil rigs as the price of oil goes up. We can linearize this whole thing and then everything's gonna be just a function of how big is this oil shock? What are the sort of the shares of how important is oil in our economy and elasticities?

And so we're gonna put some numbers in these and, and see how big is this. Let me start with expenditure switching. What does that depend on? The first thing on the left here, this is how important is oil consumption by households in GDP. And that ratio is about half a percent. Now, how much of expenditure switching is going to go on depends on how elastic is your demand, and generally that's found to be pretty small.

So I'm going to take point one here from the literature. And then I have the size of the oil shock so the-- how big is this oil price change? I'm gonna take fifteen percent. That's from the paper, so the peak response. You put all these pieces together, you get point oh nine percent of GDP. So this expenditure effect is gonna be pretty small.

It's actually expansion, right? 'Cause you're switching towards the goods that are being produced at home. And note that this is also independent of the petroleum trade position, right? So we don't-- we will not expect this channel to kind of move around, again, at least in partial equilibrium.

Now let's look at the second channel, which is real income. This is households getting poorer based on their because the oil is now relatively more expensive. So again, I'm gonna have that fifty percent shock, the DPO. Now, what's gonna matter here is the labor share, since, since your labor income is getting poorer, so you can put some numbers on that. How important is oil in your consumption bundle?

That's about one percent. And then you're gonna have some numbers for MPC here, and I'm just gonna take the, the whole intertemporal MPC matrix that you get from a Hang model these days, and then you adjust for how much of that's gonna fall in domestic versus, versus foreign goods. And you, you put, put all that together and you get about minus point oh four percent of GDP.

So now this is contrasty. It's about four times as important as the expenditure switching effect, so this channel matters more, but it's still gonna be sort of, sort of pretty modest. And let's look at the third channel. This is one that actually will - change with how much oil is being produced domestically, which is sort of this asset price evaluation. So here again, we're gonna think about a fifty percent increase in oil prices.

Now we have to sort of capitalize that, and there's gonna be two things going on. There's gonna be the oil firms, so this is the oil firms that they make higher profits, right? So those prices are gonna go up. On the other hand, we're gonna have some firms that are gonna consume oil, and they are gonna have higher costs, so their price is gonna go down.

So we have to trade these things off. So y-- at the end of the day, what you need is you're gonna have some net exposure here. These are the guys that make profits. These are the, the guys whose costs go up. And you sort of pick some numbers based on cost shares. You get about two percent for the oil producers and minus one point two percent for the oil users.

And so this is the part that's gonna move around with how much oil you produce domestically, right? So that omega here is gonna be the share. That's the thing that move around. How much of oil are you producing domestically? And I'm gonna vary that between one-third and one. That's sort of roughly, I would say, the right numbers for thinking about US varying.

Nothing here is gonna depend on the exact numbers. Now you have to capitalize this because asset markets are forward-looking. This is a persistent shock. And when you sort of put the sell numbers on this, you get a capitalization factor of about, about eight. Then you apply your MPC. I'm gonna take that from Tucker Wright Zelauff and Simsek.

And then again, you do an import adjustment. What you get, you get a channel that actually does vary with the import shares. So if you produce only one-third domestically, you contract by .004 percent. When you produce everything domestically, you expand by point six percent. So, so you get a sign switch, but again, these numbers are sort of pretty modest. Okay?

And then we look... the last analysis on investment. Here again, I have my fifty percent shock, and I'm gonna have an investment elasticity that I'm gonna take from Christiane's work here at Brookings, about point seven. That's the largest number I can think of. So generally here I'm trying to make these numbers big.

Then you need to multiply that by how important is oil investment in GDP. And again, it's gonna vary how important is the oil sector. If you don't have any oil sector, obviously you don't have any investment. It's gonna peak you at about half a percent of GDP when you produce everything domestically.

And so then you get numbers from point o-two to point o-six as you become sort of, of, as you produce everything domestically. So you put all these things together, what you do get is that you are switching, sort of, from contraction to expansion effect when you add these four channels in partial equilibrium.

But if you compare that to kind of the numbers that, that the papers find, these are all are might too smaller

And so at the end of the day and so there's sort of a puzzle here. So how can we reconcile these, these, these different numbers? And so you can say, well, I think this model is sort of very silly. You know, maybe I'm not putting the right numbers. So let me show you some evidence that's sort of in line with the numbers I'm putting up here.

And I think actually very consistent with the mechanisms that the, the paper emphasizes. And I'm gonna focus here on asset prices and loan investments because those are the ones that move around with the input here So here, this is the-- Here I'm running the same state-dependent local projection, where I take the response of all investment relative to GDP.

And the red solid line here, this is at the twenty twenty-five position. So this is where we are a net exporter. And then the pre-twenty ten position, that's the blue line. So the, the solid lines are from the data. The dashed lines are my back-of-the-envelope calculations. They actually line up pretty reasonably, same order of magnitudes And then we can do a, sort of, a more complicated exercise, but I think still very much in line with, with all this for, for asset prices.

So here what I'm doing is I look at these, at the daily oil price move on the OPEC basket trades, and that's Diego's data that he kindly shares. And I'm, I'm looking at how, how this can affect his oil portfolio, how does that return change relative to what you would just expect from its market beta?

So this is its abnormal return, right? And from that, you're gonna get that, you get about one percent increase in oil prices translates to about point four four percent sorry, point four four abnormal return. Now, that's not quite speaking to the model. You need to sort of convert that now in by the exposure of that oil portfolio.

If you pick sort of, based on the, the sector mapping, you know, how important is oil revenue in the value of this portfolio, and how, and the ratio of revenues to, to market cap, you get a capitalization factor of about two years or eight quarters, which is pretty much exactly what the partial equilibrium calculation was, and that's the red dashed line that's showing here.

So again, it lines up very much with with, with these numbers. And again, I think that's a sense of validation for, for the, the mechanism that the paper shows. But that does suggest that at least the partial equilibrium numbers are still gonna be, be modest. And so that brings me to, to, to the final point is that if we think these partial equilibrium numbers are, are reasonable, and there is some validation for them, and then the, the IO effects are much larger, then we have to have pretty sizable general equilibrium multipliers to put these things together.

Now, you can scale this down, IP moves about more than GDP, but the, the general equilibrium effects, the general equilibrium multipliers you need are still pretty large. And so I think that's sort of the puzzle here, which is clearly there can be a partial equilibrium effects are missing here, right? So, so that, that's one that's one possibility.

Or we need to revise our view of sort of what, what reasonable general equilibrium multipliers are. And I want to sort of emphasize at some level this, what I'm saying here is really no news. So these ideas that it's difficult to sort of quantify the mechanisms are some of the work by Jim Hamilton, Boskin and Kelly, and have made sort of related points.

But I see that sort of as an important sort of step or an important agenda for future work is to resolve this issue. And I think the estimates that this paper provides are gonna be an important input to that because they can help us think about what mechanism can work sort of across the board for, for all of them.

So that's it. Thank you.

STEINSSON: Okay, so we'll open it up for questions and let me start with Jason.

FURMAN: So I thought this was a terrific paper and a terrific discussion. And had sort of a question about, you call twenty ten to the present the shale era, but it feels very different the beginning of that era than the end of that era. Things like the Baker Hughes drill rig count went up quite a lot in the oil shock in two thousand and eleven.

It didn't go up much in twenty twenty-three, and it hasn't gone up much this year. And so I was wondering, you know, is that different financing, different expectations of it? If you look at US oil supply, you could sort of tell it's an elastic story back then. I think you can tell that story less well now.

And so isn't this two different periods? And then conversely, on the ZLB explanations, it also was ZLB then. The last two twenty twenty-two and this year have not been ZLB, but you see

the same responsiveness. So what does that say about the ZLB hypothesis for the discussion?

STEINSSON: John?

HALTIWANGER: So I think it's good to see that profession's still very much struggling on what the impact of oil price shocks is on the economy, both, both the direction and and transmission.

No, no, that's part of the point. But so, I wanted to-- I wanted to add another, a-another channel that I think might be missing. It's, it's related to work that Steve Davis and I did actually now some time ago, but in, in the era where we were very interested in the impact of oil price shocks on recessions.

We found it was really important to look inside sectors that-- and, and it's-- what did we find? There are some firms inside sectors that are-- that, that do much worse relative to other firms. And, and this is an a-- There's, there's lots of reallocation that occurs. The, you know, the classic case is obviously automobile producers.

The, those who are producing big gas-guzzling cars, don't do so well, the others do, do much better. But we actually found this in, in lots of different sectors. And this turned out-- Bringing those reallocation effects turned out to be really important to understand the aggregate effect because because indeed, in these sectors where there was all this reallocation that occurred, oftentimes there was a spike in job destruction.

It took a while for the job creation to kinda kick in. So I sort of, you know, that may have changed over time, too. Just what's, what's the nature of the within sector sensitivity of reallocation to oil price shocks?

STEINSSON: Jonathan Pingle.

PINGLE: Yeah, the y-you know, so the wealth effect consumption impulse is a little surprising.

And I say it's surprising because we tend to see with energy price increases, shifts in commuting patterns. And you did even this year you know, significant shifts from people driving to using public transportation, which implies that at least for a lot of households, it is a negative shock.

But, you know, then thinking about it, you know, if the channel is equities, you know, ten percent of households own eighty percent of all the equity market wealth. I mean, is the-- Is some of this shift you've seen a, a change in terms of trade, or is it a change in inequality and patterns of wealth?

STEINSSON: Bob Gordon.

GORDON: Traffic gridlock. Apparently, the taxi driver didn't use AI to find the right route. There, there's been too much emphasis in what I've heard so far on whether the US is an importer of oil or an exporter of oil. The two right measures to understand the impact of oil

shocks were put up by Joanna in his second discussion, and they are the percent increase in the price of oil and the share of oil in domestic consumption.

So what is the difference between the oil shocks of the 1970s and the oil shocks to- like, in this year of 2026? It's hard for you people who are so young to remember that oil was at \$2 a barrel in 1972, and the price of gasoline was 25 cents a gallon. By 19-- by 1975, that oil per barrel had gone from two to 12, and the price of gasoline had gone from 25 cents to \$1.25.

That's a five-time increase in gas, six times increase in oil. Do I need to say more? This year, going from three to \$4 for gasoline was an increase of a third, not a factor of six or five. So that's the huge difference between the 1970s and now. We don't n- it's not important whether we're an e- we're an exporter or an importer because the effect on the domestic economy works through the price affecting real income, and that of course depends on the percent increase.

So the two elements are, what's the percent increase? And the second element is, what is the share of oil in domestic consumption? That's fallen by half since the 1970s. So you've got both those elements in Joanna's model are right there, showing you that the impact of oil shocks today should be maybe a 10th or an eighth of what they were in the 1970s.

Last point, and this is a broader point about macroeconomic analysis. We hear all the time about productivity shocks being a big source of business cycles. And the most frequent example given is the big oil shocks of the 1970s. But the oil shocks of the 1970s or today are not productivity shocks in the US economy.

They had nothing to do with productivity in the US economy. They were a decision by OPEC to restrict supply. So it is a complete misnomer to call them productivity shocks. They are price shocks. They work through a decline in real income, a decline in consumption, and the effect through demand channels on GDP and not supply channels.

STEINSSON: Gian Maria.

MILESI-FERRETTI: So this is along the lines of Jason's point. I wonder how much of the size of your effect depends on what happened in twenty fifteen, where when you had basically an oil price collapse and a collapse in investment in structures. So the impact on demand that many people thought would be positive, I remember Olivier was talking about a shot in the arm to the global economy coming from the decline in oil prices, ended up not really materializing because of this huge decline in investment.

And the reaction now to the move in the oil price in the other direction hasn't been as strong. But I wonder whether that affects the magnitude of the effect you get on GDP. Well, on industrial production.

STEINSSON: Katherine Abraham.

ABRAHAM: Somewhat in the same spirit as Jonathan Pingle's comment. I wonder if in, in trying to unpack where these effects are coming from, it might be useful to think about who it

is who's being affected how. The, the paper does make the point that not everyone benefits when oil prices go up.

Some people are just paying more for stuff. It would be, be helpful, I think, to figure out, you know, who's benefiting from-- who's being hit hard by higher prices, who's benefiting from higher stock prices, and whether the plausible marginal propensities to consume out of higher asset prices, the negative impact on real consumption of higher prices for the groups that are affected meshes with the estimates that are-- you're getting with the more aggregated equations.

STEINSSON: Don Kohn.

KOHN: So I, I was wondering about another aspect of the monetary policy other than the ZLB distortions. And that is when these shocks occurred in the '70s and even in 19-- '99, 2000, the Fed was fighting inflation, expectations weren't anchored. And it's not until really until much later that the monetary authorities could say, "Well, expectations are anchored.

We can look through the price level shock and let that feed through the, feed through the economy and not fight it." So I wonder whether-- And this is an example would be 2008 while I was inside, when there was this huge increase in petroleum prices and the Fed did not react despite a lot of pressure to do so.

The ECB did react, so it seemed to be still reacting to the price shocks. But I do think the-- there was - there's been more looking through since 2010 than, than before.

STEINSSON: Samantha Gross.

GROSS: Hi. Thank you. Not a macroeconomist, but a very oily person, so I have a couple of questions along those lines. The first is the symmetry of this.

You also, especially since the United States is such a large producer, can think about the impact of price declines and how that flows through the US economy, and I'd be very curious if there's any symmetry here. A good example to look at would be during the mid-2010s when OPEC kept production quite high to try to sweat out the American producers.

It didn't work, but we had a, a time of very low prices, and it'd be interesting to see how that played out as well. A second question that I would have would be the impact of the declining influence of OPEC on some of your results. When you're thinking about the impulse here it looks like you're thinking a lot about OPEC announcements, which do still matter, but they matter less and less over time as OPEC's overall influence on the oil markets declines as the US and other producers have increased their production.

Thanks.

STEINSSON: Okay. I was gonna ask one thing and then turn it over to the authors. So building on Christiane's really awesome discussion I was thinking, you know, for some of these countries like Canada and the UK it seemed, you know, Canada's next door to the United States was maybe very affected by what happens in the United States.

The UK is surrounded by lots of countries that are extremely import dependent. So I was wondering whether that played some role in... I don't think that can explain everything that, that you said, Christiane, but maybe it plays some role. Anyway, let me turn it over to the authors and then we might have some time for a second round after that.

STOCK: Okay. So let me say a few things and then pass it down the table. So first, I just wanna thank both of the discussants. We wanna thank both of the discussants. They put in a ton of work, and these were really insightful and helpful comments. I'm just gonna make a, I'm just gonna make a, a few points.

I can't, I think I have to respond to Christiane's comment on weak instruments which I think is a completely fair comment, and I think we need to use a method developed by Montiel, Oleas, Stock and Watson to deal with that. And that was, that was on the list, and it's still on the list.

Okay. So, I think the, the interaction with monetary policy, this is really an important feature. And so, a, a ongoing theme is that the effect throughout this literature, this is not us, but throughout the literature, is that the the, the, the numerical calculations, such as Johannes just went through, historically have just not been big enough to really e-explain how substantial all of the empirical estimates of monetary-- of oil price shocks are on the economy.

And as Johannes pointed out, this goes back to the '80s and the '90s. This is just a known puzzle. So we don't solve that puzzle. And I think the discussion was really clear in articulating that. The ZLB issue. So we have a particular hypothesis, which is that we kinda used to be like Europe is, and we're just importers, and we're kind of now more like Norway or Russia or Saudi Arabia, and we're exporters.

And so that's going to be changing these underlying dynamics in a fundamental way. And that-- But that's only based on, you know, evidence from the 2010s, and these things are relatively slowly moving, and that's not a lot of time series evidence. I think on the ZLB in particular, I think Jason made a really - Jason Furman made a really important point, which is that, you know, the 2010s was confounded by the ZLB, but the 2020s has not been confounded by the ZLB.

Now, that's only my five-year or so time series evidence, which is not a ton, but it is the case that we really didn't have, you know, didn't see a big contraction after Ukraine. And I mean, who knows where we are, right? You know, who knows what's gonna be the real, you know, the you know, the year-long or 12-month impact of the Iranian oil price shock Iranian war oil price shock, but certainly we're not seeing that yet.

And that, that's not in our dataset but the Iranian one is not in our dataset. But but I think that that would-- I would pose that as some, you know, at this point, still like anecdotal evidence that it's more than just the ZLB. Let's see. Let me-- I think actually John Haltiwanger made a really great suggestion of sort of more detailed within sectoral diagnosis to try to figure out what these mechanics are. I think that's a terrific suggestion. And maybe I'll just leave it leave it at, leave it at that. And Diego.

KÄNZIG: Great. Yeah. Let me also start by thanking our discussants. Let me maybe just offer a few more thoughts on the role of the CLB. So I think this was super interesting to see these results.

I would caveat a little bit because obviously over this short sample, triple interaction is hard to estimate. Some things that we have tried to address this is basically to stop the sample in 2019 and see whether basically there we get an even bigger response than if we include the entire sample, and that's not the case if at all.

If you do the entire sample, our interaction is even bigger. So that's maybe one thing that could also speak a bit to that. And I think the cross-country comparison was incredibly insightful. I would love to see even more countries because especially Canada, I mean, there are spillovers that John mentioned.

Japan is a very special case as well. For the UK, I was surprised to see the results because there is a paper by Bjornan and Skretting in the JIE where they actually show that response is fairly stable for the U- UK, so I think that would be important to revisit. But especially looking at Europe or other countries like that, I think that would be very insightful maybe in a panel to see basically how that plays out.

Another thought, like on the asymmetry, this came up also in Christiane's discussion. I think Johannes also gave us his feedback. It came up today in the discussion. We think it's a super important point. Again, obviously, you're demanding a lot from the data if we're trying to estimate this, but we did, and actually it turns out to be the case that, like, if you look at shocks that go the other way around, the entire thing flips.

I mean, it's, it's more noisy, it's less stable, but at least that's sort of consistent with our interpretation of indirect GE effects that explain sort of this change in the, in the response. On, on Jonathan's point on the consumption response, so we, we actually also look at different consumption categories and, like, one where the response doesn't change a lot, which is actually consumption on energy and related items, so that's actually fairly stable.

And then basically one question, how basically this, this could propagate, even though not everybody holds stocks, is I think through indirect effects on the labor market, right? Because most of us work, and if we're not getting laid off or maybe there is even like gains in terms of labor income, then that obviously can benefit a broader set of people than just people who are heavily invested in the stock market.

On Bob Gordon's comment basically what matters for the propagation of oil shocks I think we completely agree that basically the extent of the increase in oil price as well as basically the, the oil share, this is important stuff to look at. One thing that we want to see, because the way we normalize is that the impact effect is like 10%, right?

But then it could be that maybe in the new regime, actually the response of the oil price is more persistent than it used to be. So the cumulative effect on oil prices is different. But actually that, that turned out to be not the case. So actually, if you look at the oil price response also dynamically, that's fairly comparable across these two regimes.

So that can't mechanically explain sort of any difference. And on the role of the oil share, we also tried to include that as an additional control interacted with the shock, and that also

basically didn't it didn't basically kill our results of the important interaction with the petroleum trade balance.

And then there was the comment on the incidence. So we completely agree. Maybe in the next paper we write, we're going to study the distributional impacts of these shocks. I think that would be fascinating to explore. That's beyond the scope of this paper. I think that's, that's all I have to say.

STEINSSON: Okay, we have a few minutes if anybody else has questions?

AUDIENCE: One dimension is what the effect is on our trading partners and how that comes in through our exports. And one experiment that I've done is take, Find out which countries in the world are net importers, exporters, and what their shares is of US GD- US exports. Take the inner product of those two columns, and it turns out that our exports are not very sensitive to the price of oil.

You'd think it would-- the price of oil going up would hurt the rest of the world. Well, not so much. That's a... And that result will never be published.

STEINSSON: Response or... Yeah. Yeah. Okay. So, maybe we should just stop here and we will reconvene at 2:30.

STOCK: Thank you.