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Yuriy Gorodnichenko on Inflation Expectations

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Webinar Transcript

Transcript:

Markus Brunnermeier: So welcome back everybody to another webinar organized by Princeton for everyone worldwide, we are very happy to have Yuriy Gorodnichenko with us, hi Yuriy.

Yuriy Gorodnichenko: Hello.

Markus Brunnermeier: Yuriy is from UC Berkeley and he is originally from Ukraine and his heart and mind is probably now in Ukraine, we're very grateful that he's with us and will talk with us about inflation expectations and hopefully we can also touch a little bit on the current circumstances, during our webinar here. So I will give a few opening remarks on inflation expectations. I would like to focus very much on the inflation anchor, inflation anchors, of course a forward looking concept depends very much on inflation expectations and the question is how long are inflation expectations anchored. And that depends; you know, the anchor holds as long as people think when inflation goes up, it's only a temporary phenomenon and will return back to the normal level. And if you have a strong anchor, then actually you can smooth out shocks, monetary policy can smooth out shocks, and that bounces back to have a lot of resilience in the system. Monetary policy can make the economy more resilient. But if you have a stretch it, and the anchor breaks, then actually resilience also breaks and then you have amplification going on and that's why you know, having a strong anchor is very important and re-anchoring once an anchor breaks is very, very important, and is very costly because you have to build up trust and reputation. Once you've lost the trust and reputation, it's very costly to generate access again. But the question is what actually stabilizes inflation and what constitutes an anchor, and you know we might ask: what's an anchor? An anchor essentially is actually some coordination of beliefs, that we all think that we will actually stick with 2% inflation, in the long run, we come back to 2% inflation. So it's a convention and has to be common knowledge among the people, or most actors in the economy, so it's all about higher order beliefs, that we also believe that the others believe that we will come back to this, and once you have disagreement about this or uncertainty, this is how the beliefs become so much more harder, much more difficult, to coordinate. So it's harder to coordinate. So the question is, is it more disagreements which matter, or is it more the uncertainty. And that's a picture I've also shown last week, where you see the mean expectations of inflation going up significantly. But also the disagreement, the most optimistic guy with the lowest expectations and the most pessimistic guy with the highest inflation expectations; that's widening too. On top of what between the two dashed lines that's a range of how much uncertainty there is in terms of inflation expectations. So this is data from the New York Fed which collects this data from households. Now, how can you stay in an

inflation anchor? What helps is to have a strong focal point. 2% or a strong focal point helps, and as I pointed out– so this slide is based on my presentation at the Jackson Hole meetings in 2021, it also helps not to have another focal point. So if there's a focal point 2%, but there's another focal point at 3%, then it's actually easy to jump from two to 3% so this creates you know easier jump, but if there's confusion, what the other alternatives would be and there's a lot of disagreement about alternative focal points, it actually stabilizes the current focal point, so the anchor will be stronger. So one has to be very careful not to say you know, there might be another focal point, so focal points are really crucial in order to understand inflation anchors.
3:48
Now, and, of course, as the trust in the Central Bank or the reputation of the Central Bank makes a huge difference, so if inflation spikes because of some policy mistake, that's much more concerning than if inflation spikes because of some exogenous shock, some geopolitical tensions, as we experiencing now, energy prices are going up; that might actually not ruin the inflation anchor as much as if it's seen as a policy mistake, so we have to the current circumstances where energy prices will go up even further given the situation we see in Ukraine, that might be seen as an exogenous shock and actually might not destabilize the inflation into as much as a policy mistake would be seen this way. Of course, we have also seen a new policy regime being established in August 2020, a monetary policy machine. And as long as the policy regime is very imprecise when you do average inflation targeting, you don't know how many months to average inflation targeting, it also makes it harder to have a clear inflation anchor. Now the other thing is going back to inflation expectations, more generally, what I find very fascinating is this concept of salience and I think Yuriy will tell us a lot about this. You know for citizens, how do they form inflation expectations? If you take a New Keynesian perspective it's all about staggered price adjustments: if I don't know when the others will– they will only adjust later, hence, I will not adjust the prices right away as well. So it's all about strategic complementarities across various firms or across various players in the economy that slows the whole adjustment down and also knowing that they can't adjust it, it also affects my expectations about the future. But if I take a more behavioral perspective it's the salience of certain prices and I don't know where this is coming from so milk, the price of milk, gasoline prices, in Germany, it's actually chocolate which matters a lot. I don't know why. And there are some like the field inflation, what people perceive as inflation is very different from what real inflation is and the question is, what is the energy price, why do they carry so much weight, what is the geopolitical situation again and why are certain prices much more flexible than others. So with these opening remarks, I'm just raising a lot of questions and hopefully Yuriy will reply and answer them all and here are the questions actually Yuriy put in the poll questions. He asked what sources do you use for your own inflation expectations: the media, professional forecasters, the government, or your personal shopping experience and actually for this audience, we have– it's probably not the case for the whole audience in the world– the media is about 25%, a quarter, the majority say professional forecasters, 40% almost rely on professional forecasters, government: 18%, and personal shopping experience 17%. So I'm not sure. Our audience is mostly economists, so it might be quite different from what we normally have to conduct a survey for the general public. But Yuriy will tell us about it. The second question is what's your guess about the annual inflation target for the Fed that tries to achieve on average in the very long run and 85% said 2%, so 85, a huge majority, think 2% inflation target, that’s what we will achieve. Then as few as 13% think it is 3%, and then 2% think the Fed tries to achieve on average 5% inflation, but the anchor seems to be still holding at least among professional economists. And what is the price of gas per gallon today? That's the question, then people answered the following: $2.53 it's about 5% said, $3.53 is about 47% said it, and $4.23: 33%, and $4.53 is 16 percent, of course, it depends, which part of the country in United States, you are because gasoline prices vary a lot. But the majority was in the middle of the range, between $3.53 and $4.23.

And that's you know what we think so let's see what Yuriy will tell us, he will solve all the puzzles and probably put it all in a bigger context compared to what I've raised here so again, thanks a lot to Yuriy for doing this, especially in these difficult times we're very grateful for that, thanks. The floor is yours.

8:29
Yuriy Gorodnichenko: Thank you Marcus. Well, while I'm trying to share my screen, I wanted to say this. First of all, thank you for inviting me, it also gives me an opportunity to take my mind away from what is happening in Ukraine and do something useful. I will also say that this audience is very different from what we have in the field. Can you see my screen? Great, alright. So thank you. I am from UC Berkeley and Ukraine, and I'll try to answer some questions that Markus raised in his opening remarks. Thank you for these very interesting questions. I also realized that this audience is very different from what you typically see among households and and for managers and this is a great question. What inflation expectations are– they obviously are very important, and there is a lot of discussion about that. We see inflation being very high by historical standards, we also see that inflation expectations are very, very high by historical standards. And so we have lots and lots of questions about what drives what. Is it the inflation expectations driving inflation or maybe the other way around, people are just reactive to what happens in the real world and that's why they increase their inflation expectations. And I'm very glad I have great speakers just before me, Ricardo and Alan, they talked about how we should think about the distribution of expectations. There is a new rise of inflation on the horizon, are we going to have a repeat of the 1970s? What policymakers should do about this, should we aggressively raise interest rates to fight inflation and have some risk of a recession, as a result of that well, maybe we should look for soft landing. So this stuff is extremely policy relevant, right, and we really need to understand how inflation expectations form, then you know what is the key driving force behind inflation, we have today. Now I want to say, this is not just about today, we know that inflation expectations show up in almost every dynamic macro equation we have. It shows up in the Phillips curve and consumption equation and investment decisions and the central banking decisions. But the one thing that I want to stress here is that when you look at the prices and wages, that's not the expectations of professional forecasters, or people like you and me. It's really the expectations of CEOs and managers. For consumption decisions here, inflation– that's not the inflation of inflation expectations of professional forecasters, or the Fed or financial markets, it's really expectations of households and so one thing I want to emphasize here from the get go, is that we have different expectations out there in the economy and should appreciate this this heterogeneity and the importance of this heterogeneity for policymaking and for macroeconomic dynamics. Now, I hope I convinced you, probably don't need much convincing, that inflation expectations are very important, and that will give you a summary of the state of knowledge we have about inflation expectations, so I'll give you three quotes from prominent central bankers. The first one is from Alan Greenspan many years ago when during an FOMC meeting he was talking about the risk of inflation and he said look inflation expectations are clearly very important, I don't know what it is exactly, but I know it is important, we need to figure this out. Some years later Ben Bernanke gave another major speech, and he says look, I know, inflation expectations are very important, especially for price setters and unfortunately full price setters, we have very little information, but we really need to do more research here to better understand inflation expectations. Janet Yellen, some years later, gave another major speech about the importance of inflation expectations. She says we really need to understand inflation expectations, and we really want to use them for policy. If you hear recent speeches by Jay Powell he is making similar remarks about inflation expectations that they're really important and we're watching them. Some sort of which is providing us with a key ingredient in policymaking. We always talk about how integral inflation expectations are, and Markus mentioned this in his opening remarks, but you know when you read these quotes

and kind of look at current discussions, you wonder how much we can learn about inflation expectations right. For what, like 30 years, there is this perennial question of what inflation expectations are, and it seems like we know very little.

13:43
Yuriy Gordnichenko: But this would be an unfair description, because since the great inflation in the 70s and 80s, we actually did a lot of research. We have much better data, we have much better models, we have much better understanding of what inflation expectations are and how we can use them for policy and the importance of expectations for inflation and more generally for other macroeconomic variables, how important they are for understanding the macroeconomic dynamics. Now to give you a kind of a brief overview of what we have learned over these many years is that we started with non-rational expectations, the idea was that there's some psychology out there, people are not particularly sophisticated. They use backward looking expectations, so we're basically treating those expectations as exogenous. That framework failed miserably and during in the 1970s, when it became clear that inflation expectations are moving and the people are not stupid, they actually very sophisticated, and maybe we went too far in another direction with that as well. Now, we will assume that people have full-information rational expectations, people know everything about the structure of the economy. They know the shocks hit in the economy, they can quickly calculate optimal response functions, not just for themselves, but also for everybody else and Markus was mentioning higher order expectations which means people can either aid forward or up. I don't know how to describe this, the theory, what is the best response for them, and you know it's it's an extremely useful framework because you can be right in this framework in only one way, but in some respects, as I will argue, this is not a very satisfactory framework for explaining micro level data. Now, so since then, people have been trying to find sort of compromise, the middle ground between these two extremes, where you know, on one hand, you have people being too stupid and on the other hand, people being too smart. And the two basic strategies are either to assume that there is an important behavioral element: that there is some cognitive limitations, there is some behavioral bias or behavioral constraint or there is some you know exclusive course though collecting and processing information, and this is why sometimes people choose not to know everything, and as a result, inflation expectations can deviate from what is predicted from full information rational expectations. So there is a lot of research, and you know, as I said, this is a very active research area and so that's why probably what I'm going to say is still going to be tentative and preliminary. But what is coming out from a lot of data work and theoretical work is that we see that FIRE is probably (Full Information Rational Expectations) is probably a good description of how people think about inflation in the longer run. So people eventually figure out the rate of inflation, they figure out nominal and real shocks. But in the short run, in the medium run, we see massive departures from full information rational expectations, so if you ask people about what inflation you expect, many people will say 10%, and we didn't have 10% and many, many years. Some people will say 20% and then…

17:14
Markus Brunnermeier: There's, of course, there was a famous Fed paper that came out recently– it's probably not presenting the whole of that but arguing that expectations are overblown and they're not really so important, can you have a quick reaction to that paper?

Yuriy Gorodnichenko: Yes, yes, so I will say more towards the end about the you-know-which paper. But in a natural– you know it's one of those challenges and expectations that it's clearly an endogenous variable, and so these causal statements about okay, we have a change in expectations coming from somewhere, from an original source of variation of this translates into actions. This is a huge challenge, but again we have some success in recent research suggesting that you can run randomized controlled trials or focus initial experiments and then you can have more clear and more conclusive evidence on the importance of inflation expectations. This literature is full of challenges, and one of them obviously is how you measure expectations. You have to ask people what you think is going to happen and there was a little resistance in macro to this kind of approach, for example Ed Prescott famously said we shouldn't ask people about expectations, because you'll get nothing, it's like utility, it doesn't mean anything. And you know his suggestion was that, instead of asking people to report their beliefs, we just look at the actions and then, once we have a model, we can filter this stuff through the model and we'll have model consistent expectations so we don't need an independent measurement of expectations. Now this is an extreme version, and there is a lot of follow up research in response to this line of reasoning and saying that expectations may be actually useful. What people say is not just cheap talk, they act on those expectations, and we know that, for example, these variables, at least at the minimum, are helpful in forecasting the actual dynamic of inflation so it's not just noise. Now, if we take this you know point aside and say okay, we believe that we can measure expectations with surveys, then the question is which expectations we should use and I told in the beginning, that we have explained inflation expectations showing up in many, many places in our macro models they are in the pricing equation, good pricing equation that should be expectations of managers, then you have asset pricing, this is financial markets. They also have professional forecasters and I am very glad this audience is so reliant on professional forecasters because that's not what most people do. And, you know when you look at the data, the differences between all these different agents is striking, for example, here in the blue line inflation expectations of households in the U.S. from the Michigan survey of consumers. The red is asset prices, the green is professional forecasters, and the black Olivier Coiboin and I have been writing a new survey of CEOs in the U.S. for the last three years, and so we have some data there as well. And so what is striking here in these early years of high and relatively volatile inflation, the difference between those different types of agents is pretty small. But then you have this massive departure, households consistently predict much higher inflation than professional forecasters of financial markets right, so those guys SPF asset prices they all predict inflation was going to be 2%, there is relatively little variation. The smoke leaves here basically liquidity shocks, if you remove down is going to be extremely stable. You look at households and it was not unusual to see inflation being expected to be 6% and there is a big decline and big increase, big decline, so there is a low volatility and there is low volatility. The level of the average is higher than the level of inflation expectations for professional forecasters and for financial markets. Now for firms it's kind of striking; when we launched this survey the CEOs looked like households, then they started to look like professional forecasters, and now they look even more like households. Maybe they exceeded households in their inflation expectations. And so it tells us that it's important for us to understand, not just what financial markets are thinking, probably they're rational players, they have a lot of information, there is low money at stake, and so there are huge returns to collect in the process and less amounts of information getting right these inflation numbers. But lots and lots of decisions are done on the ground by consumers and firms.

22:04
Markus Brunnermeier: So Yuriy, can you tell us how far in advance, is this one year in advance forecast or…?

Yuriy Gorodnichenko: This is one year ahead forecast.

Markus Brunnermeier: And for the firms you survey– essentially, these are the CFOs or the guys will really set the prices for the products?

Yuriy Gorodnichenko: So this is a survey of CEOs and you know, sometimes it's a manager, and the founder, it depends who is available to answer these questions. Probably some of those people are going to be CFOs. I would be shocked if CFOs had these high inflation expectations. Now, they are probably reliant on professional forecasters and financial markets but CEOs have many, many issues on their plates, and probably they're– I won't say affected, but maybe less interested in knowing the numbers than CFOs. So it's very clear, there is a difference, and you know there's different players who have different expectations and they probably act on these expectations. I'll show you some evidence to support this notion, and so then we need to understand how households and to some extent firms deviate so much from SPF. What is the reason or reasons that makes them believe inflation is consistently higher or why it's so variable over time. Let me give you kind of an overview of what I'm going to say and then elaborate on each of those points and hopefully convince you that this is not entirely crazy. The first thing, which is going to be different between professional forecasters and households is that they have very different interpretations of shocks. Okay, so they will have a very different interpretation of shocks and to make this point further, they also have different sources of information. As I said, I was very happy to see that most people in this audience rely on professional forecasters but the general public is looking at highly salient prices. I learned, now that in Germany it's chocolate and in the U.S. it's the price of gasoline. It seems like everybody is really on the top of this price. But, most people rely just on the price of gasoline. Okay in the U.S. In Ukraine, it will be somebody, you know, you look at the exchange rate and this gives you sort of sufficient information about inflation expectations and the current inflation situation. And you know one, it's not the problem necessarily but it makes a little sense if inflation is low and stable you don't want to invest a lot of resources in collecting and processing information, you just need a quick and dirty way to get a sense, a measure of temperature in the economy, so to say, these prices are very easy to observe it's every corner in the U.S., you see the price of gasoline in other countries has made the exchange rate. I don't know Markus where you see the price of chocolate, probably in the store but…

25:12
Markus Brunnermeier: The question is, how do you coordinate on certain products? Is this just the social convention is this– Have you ever looked at that or…?

Yuriy Gorodnichenko: You know it's a great question, I think, ideally, it should be a price of something very easy to observe, a homogeneous good so you don't have to have questions about differences in quality, like you know you have a bunch of DVDs out there, but you know one DVD is valuable today, but then not valuable tomorrow and gasoline, milk, I realized chocolate, you know, maybe it's one of those commodities that is very easy to observe and then say okay, I can compare prices between today and yesterday and have a clear sense of where prices are going. Now what's striking is that this process typically accounts for a very small fraction of goods actually purchased by households, and so these prices are going to play this proportion our role and how people form expectations. Also, the low attention to the monetary and fiscal policy in general– so this is just to say that people have relatively little attention to the shocks, most of the shocks economists care about, so what happens with the economy if the government spends another trillion dollars? What will happen if the Fed raises the policy rate by 50 basis points? Most people don't care about this. I'll give some evidence and again I was very pleased that you know this audience firmly believes that the inflation target of the Fed is 2% at least their expectations are anchored and I'm very happy to be hearing this. But you will see that people are very, very different. The general public has very different perceptions. Also our models make very strong predictions about how people should respond to changes in inflation expectations. For example, the idea is if you have a depressed economy and you raise inflation expectations, that will stimulate the economy, because people through intertemporal substitution should start spending more now or you know they tried to buy more durable goods, while the prices for those durable goods are still low. In any case, this kind of response should help the economy to lift itself out of the recession and you will see that in the data these responses are much more nuanced. It's not that straightforward.

Markus Brunnermeier: So have you looked at second round effects, so it might be– so using the pay attention to monitor and fiscal policy, so it matters, why we have inflation. Well that leads to second sound effects or not or is it the case that they always want high wage compensation exposed, and then we get the second down effect, so the underlying reason why we suddenly have high inflation. You suggest that people don't really take this into account, prices went up, we would like to have high inflation, higher wages and then we get second round effects independently of what the underlying shock was.

Yuriy Gorodnichenko: Yes, Markus, it's a terrific question, the first round effects, relatively easy to answer, was micro level data because you have a well identified shock, you have the timing right and you see for a specific person is anything happening, and this is going to be a one limitation of what I'm going to say that we're not going to be able to see a major second round effects. Now, having said that, I should say that we have separate research, when we will get higher order expectations and strategic complementarity in choices and beliefs, and there is something like this going on, so you know my belief depends on what I'm thinking about what you are thinking. And you're going to do the same and our decisions are going to be kind of moving in lockstep. But you know if this is really important and the strategic complementarity it is so important, it also tells us that if nobody wants to raise prices because I don't think my competitors are raising prices or you know they're not going to change their beliefs, that much, it also tells us that probably tells us that rigidities are going to be stronger.

29:26
Yuriy Gorodnichenko: You know one unfortunately implication of that is, going back to your opening remarks is, if you change the focal point then everybody can jump to the different equilibrium, and this may be a very bad outcome, this is why it's important to to keep inflation at 2%, not at 5%. Now let me elaborate on each of those points and, as I said, hopefully convince you that people differ from professional forecasters and we should take it seriously. This figure here shows the dynamics of perceptions and inflation expectations for professional forecasters as the Covid crisis was unfolding. You start with inflation to be an expected 2%, so their expectations are incorrect. That's great. It also expected modest growth of GDP. But then, as Covid started to unfold, their expectations for our became much more pessimistic right so going this direction you go down, and at the same time, why was their inflation expectations down so they they saw that you know, probably it's a mixture of shock to supply and demand, but the demand component probably dominated, and so they expected prices to fall. Now, you look at households and you see a very different picture. First of all, you start with a higher level of inflation expectations, but that in itself is not that surprising given that I, given the figures I showed you. What was most surprising is that these people started to move in this direction. Okay, so they believe the economy is contracting so they think there's a problem, but they raise their inflation expectations. Here inflation expectations for professional forecasters are falling, yet here, households are raising their inflation expectations. And one way you can rationalize this is to say, people have a stagflationary view of the world, I think, inflation is associated with

bad events and not surprisingly, they are going to raise their inflation expectations as business conditions deteriorate. But even saying this, I think this is not just about Covid, we can look at other episodes, other countries, and you will see a similar stagflationary view of the world for many, many households. For example, here, a picture for the U.S., just to set the benchmark, this is professional forecasters you, you have this big scatterplot where you take out time fixed effects, you look at the Cross sectional variation and here this theory saying, if you take a professional forecaster who predicts above average inflation, this person is also going to predict above average growth rate of output. Okay, so how can we think about this? These people probably think that inflation is largely demand driven and so it makes sense to have something like this, they look at households and you see a very different picture again, and the cross section bigger person who predicts above average inflation, this person is going to predict below average growth rate of output, so it's very stagflationary here. Now this is not just U.S., you can look at other advanced economies,and you'll see exactly the same teacher, these professional forecasters are from consensus economics. Every country has this very clear upward relationship: more inflation, more output, so inflation is demand driven. You look at households, everything is downward sloping. This is telling us that inflation is perceived to be stagflationary, it’s a bad event, the Covid is contracting. So we need to do some traction if you use other surveys– yes, Markus, question?

33:04
Markus Brunnermeier: Can you look within households what education people have? Are they more educated, more like the professional forecasters and does it matter whether I have a degree in economics or a degree in engineering? I don't know probably a lot of this data, but it will be interesting to see what a…

Yuriy Gorodnichenko: Yes, so you know, in general, people with higher degrees of education have better inflation expectations in the sense they are closer to 2%. I’m not sure in the surveys we collect information about the degrees, it will be very unfortunate that people with economics degrees believe that you know something like this is happening. It will be a failure of education in the U.S. and in other countries. I should also say that sometimes it's not just education. Michael Weber and coauthors, they have this wonderful paper about Finland, where they use IQ scores of men in Finland from the military resources. It's not related to Russia, you know, the regular procedure to measure IQ, make sure that the general scale of high IQs I guess. So they find that people with higher IQs have better inflation expectations and they have better relationships with the macroeconomic variables so they understand, for example when inflation is high it's a good time to borrow while people with lower IQs don't understand this. Once and I should say this, you know this is like our section, but you can also follow people over time and see if there are revisions in expectations, so within person are going to be moving with revisions and expectations for output growth and you'll find the same picture that so even within the person, you will have something similar qualitatively.

Markus Brunnermeier: Someone would like to know: you will talk about media and business media, I guess, as well, will you touch upon what's the role of media.

Yuriy Gorodnichenko: Yeah, so people listen to the media, and one of the fortunate things about the media is that they tend to have very low– I shouldn’t say very low– relatively low trust scores, so people get information from this, but they may discount this information handling. And one of the things which is really important for households is their personal shopping experience.

Markus Brunnermeier: So it doesn't really matter whether I'm a New York Times reader or a Wall Street Journal reader…

Yuriy Gorodnichenko: There's very little, very little, yeah so we found that nonpartisan newspapers, for example, you say today are more credible than New York Times, the Wall Street Journal in the eyes of the population, but they find that, for example, social media more credible as a source of information than the conventional media outlets.

Markus Brunnermeier: How do you measure credibility?

36:01
Yuriy Gorodnichenko: Well you asked questions like you know, give us on the score from one to 10 the credibility of various sources. So it sounds…

Markus Brunnermeier: It is a little bit shocking in a sense.

Yuriy Gorodnichenko: It is broken but it's probably a topic for another lecture. So you see the stagflationary view of the world, and you wonder, you know, if this really is stagflationary or something else is going on. And to answer these questions, we can look at other services, where people provide additional information and you see how this additional information correlates with what you see for inflation expectations and other measures of macroeconomic activity. This figure here comes from the Cleveland Fed, they have this wonderful daily survey when they ask people questions about inflation expectations is that a good time to buy goods, is it a good time to buy medical supplies and food, is it a good time to set aside money, this kind of things and it was striking that this daily frequency. See the moment Covid hits the U.S., inflation expectations start to really increase and people also have this much darker view of the economy, they don't want to spend, you see this red line is going on, people say we should be saving not spending. Now what was striking was that not only this kind of phase, these variables are correlated. Well, what was striking is that when the Covid pandemic people saw subsiding, their savings rate declined, so they said okay now's a good time to spend again and also the inflation expectations declined. So it's very clear from the micro level data that people believe that inflation is stagflationary, that it's a bad state of the world, it's not a good state of the world.

Markus Brunnermeier: And do you have data on this on the 2007-2008 global financial crisis, it was similar the inflation expectations went up significantly.

Yuriy Gorodnichenko: Yes, yes, and people equally so, so I mean there was clearly that recession happening. It's going to be bad so maybe there it is less surprising that you have high inflation expectations and very bad perception, so they coordinate. Here, with Covid, it was a little less clear what is happening is it's supply side or demand side.

Markus Brunnermeier: I should interject something from Phillip Hoffman who says that the ECB research shows that TV is particularly influential in Europe and social media less so, perhaps it also differs from country to country, to some extent.

Yuriy Gorodnichenko: I will not be surprised to know that. You know people gather information from a variety of sources in some countries, Facebook is a big deal, in other countries, it will be another social media in some countries, you know in Germany, for example, lots of people use cash, which is relatively unusual. And why they do this, I don't really know, but it may be one of those focal points when all people agree. Let's watch TV and get information from that, or maybe let's talk to each other on social media and get information from that channel. Now, this stagflationary view of the world. This is important because inflation expectations are high now. Okay, people have this very negative view of the economy and you hear this in the media that we have a boom in the U.S., but people have a very gloomy economic outlook, they're very unhappy, and this will be one way, how we can rationalize this. Unemployment numbers are so low, we see GDP growth at record rates and somehow yet people are very unhappy, so inflation expectations will be one explanation. Sensitivity to salient prices: I will start by saying that you know it's impossible to prove anything beyond reasonable doubt in macroeconomics, we can broaden our CTO and stuff like this on a global scale, or country level scale, and that's a good thing, just to be clear, we don't want to experiment on countries. But you know, sometimes observational evidence is so striking that it's hard to discount this and say well it's just a correlation. You kind of wonder if it's causal or if it's something very important there. And the figure here shows inflation expectations for households, this is the blue line and the price of gasoline in the U.S., this is the black line. And what is striking here is that starting somewhere in 2000, year 2000, there is an astonishing correlation between the price of gasoline and inflation expectations, not just at low frequencies, but also high frequency, for example, there was one months where the price of gasoline increased a lot. This was one month when inflation expectations showed up by like 2 percentage points, going back to your earlier question Markus. Great recession: huge increase in inflation expectations, huge increase in gasoline prices, yeah so the prices collapsed, inflation expectations collapsed. In 2014 when oil prices collapsed, gas prices fell along. There was a huge decrease in inflation expectations, so you got on one night, this has to be something real given this correlation.

41:12
Markus Brunnermeier: The gasoline: how big in a consumption basket is it?

Yuriy Gorodnichenko: According to the survey of consumer expenditure, about 5%, people spend roughly $2,000, which is a lot of money, so when the price of gasoline falls by 50%, it's as if you write the check to most households equal to $1,000. Very significant. Now, if you look at more recent times, you see similar correlations. Prices of gasoline go down, inflation expectations go down, price of gasoline increases, inflation expectations increase, and during the Covid crisis, it's the same story. Inflation expectations, the blue line; the black line is the price of gasoline, and they're moving very strongly, and now we have really high prices of gasoline in the U.S., again, I was very happy to see that most people are aware of that. Because you know when you often want to shade politicians, you ask them what's the price of milk or you know some particular item that many people buy and they usually have no idea what is going on and that will be assigned to those people I detached from reality. It is very clear that the economists in this audience are not detached from reality, they know the price, so yes, you pass that test. But what is striking here also is that SPF, their professional forecasts still really have sensitivity, because they look at many more prices in the economy, they have a lot more information, they probably have a better sense of shocks hitting the economy, so it makes perfect sense that there is some difference, but what is striking is there these differences are so big now, professional forecasts are saying inflation is going to be basically 2%, households say it's 5% or higher.

Markus Brunnermeier: So can I suggest something a little bit bold? Would you use the strategic reserves in the United States in order to control inflation expectations and hence positive impact. You know, monetary policy, I mean it's a little bit of a crazy thought, but we have strategic reserves, if gasoline prices go out of hand and there might be second hand effects on inflation expectations and we can use it as a teaching oil reserves essentially to...

Yuriy Gorodnichenko: Markus, I would say it's not entirely crazy and to my great surprise, there was a discussion in Congress about reducing gasoline taxes temporarily. The Federal gasoline tax is about 20 cents per gallon, there's also a tax at the State level, so you can play with those numbers and you can reduce the price of gasoline so that, maybe the Fed can buy a network of gas stations and sell cheap gas that will be another solution. But you know in other countries, it doesn't have to be gas like you know if you're a small open economy, your exchange rate is the most important price, and very salient, very visible and so their monetary policy can have much more control. And, to some extent the Fed is also controlling this, so the dollar appreciates it will make the dollar, it will kind of indirectly reduce the price of oil, as determined in the global markets.

44:32
Markus Brunnermeier: Would you also go so far– let's suppose we impose price controls, nobody's arguing for that I guess seriously, but you would target gasoline price controls, because it has a bigger impact than price controls on some other aspects, or is this…?

Yuriy Gorodnichenko: Yes, that would be another way to control prices, but you know obviously the challenge is that if you do this, it's so convenient, it will be so popular it will be impossible to remove it and so it's going to hurt us later it will help us now but hurt us later. So I hope I convinced you that the price of gasoline is a strong predictor of inflation expectations in the U.S. I understand other prices, maybe salient prices, may be other strong predictors so if inflation expectations, may be determinants of inflation expectations. But again, the key contrast here is that professional forecasters have a very different view of how this works, and we should appreciate this difference. Low attention to monetary and fiscal policy: alright, so this is my favorite part because. I realized from the survey everybody believes 2% is the inflation target of the Fed, but I'm very grateful to people who said that the inflation target of the Fed is 5%, you are more like normal people, you think inflation is much higher and you know the Fed has started getting a higher rate of inflation we're in the survey of CEOs before the Covid crisis and asked this managers to tell us what they think inflation expectation, i'm sorry inflation target of the Fed is. And to a great surprise, only 25% of people give us a number between 1.5 and 2.5, okay they're average is you know most relevant probably for the U.S. economy, then we have lots of people who are kind of too low or too high, but most of all, I have people who have explicitly said I don't know, and then 20% gave an answer, which was basically incomprehensible and we take it as an answer we don't know so roughly 50% of people explicitly said we don't know when only a relatively small fraction of people had the right inflation target. Now for households it's even more extreme. You have lots and lots of people who basically say inflation is 10% or above or they explicitly say we don't know. And, in itself, this is not a problem, maybe it's a sign of success. Keynes famously said that I want to make economic policy as boring as dentistry, and you know you go to a dentist you don't need to know what he or she does to you exactly just know it's going to be okay, and you trust that person. Maybe we are at this stage, we have years of stable and low inflation and maybe not surprisingly, we have this wall of inattention to monetary policy, it also gives us some challenges, because if you want to communicate with the public to move their expectations, it's very hard, because they don't know who is talking and what they are trying to communicate. I'm sure many people will know who Jay Paul or Christine Lagarde. So you know when you see them on TV or in social media, you will know why you need to listen to them, so that's going to be a challenge. But on the other hand, it creates this space for maneuvering, that the Fed, the ECB, they can do some aggressive policy to help the economy or help financial markets without igniting inflation expectations, simply because people don't pay attention. Okay, eventually, obviously, they will start paying attention, but in the short term, they don't have to.

48:30
Markus Brunnermeier: So there's a question from Laura Allen: she would like to know whether there's a lot of hidden information, so people feel there's a lot of hidden information, so the official numbers are not so relevant anyway, for their own consumption. Did you ask anything along that line?

Yuriy Gorodnichenko: Well, we didn't ask them about conspiracy theories and like you know, is the government taken by somebody? And there is a secret Chamber which produces fake numbers? But I will say this, you know we asked people to tell us the weights for different groups of goods that they use to calculate their perceived inflation numbers so, for example, we know the price of gasoline; gasoline accounts for 5% of the consumption basket for a typical household. So we can ask this person, you know, how much inflation is accounted for by changes in price of gasoline and the typical response will be something like 20%-25%, so much, much higher. People also include the asset prices as something that goes into their notion of CPI. The price of a new house, the stock market, they all say it's in there. And so to some extent we have inflation and all of these variables, stock market is booming, asset prices are super high, but people don't understand that it's not the purchase of the new house, it's their rent that accounts, and so it creates the disconnect that people have consistently much higher inflation expectations, than professional forecasters. Now, one thing which is very cool: with the surveys that you can notice the real time, and you can see people actually responding to policy actions and we see how much reaction, you can get from you know some policy announcement, there was a famous talk by Jerome Powell, at Jackson hole, where he announced their average inflation targeting and, you know, he is a great communicator. I really admire him. He laid out in very simple language saying you know this was what that means for you in terms of inflation. And I guess, like many people in this audience, I was watching his talk very, very carefully and taking notes; okay, this is what is going to happen, I actually have a variable rate mortgage or maybe a fixed rate mortgage. But then you can, in real time, ask people questions: so have you heard this announcement? Did you understand this announcement? If we explained to you the difference between an average inflation target and conventional inflation targeting, would you get it, and maybe change your behavior? And we find from the service that people in here about this announcement, they didn't understand what Powell was talking about, and even if you give them a little bit of information, nudge them into understanding what this means, they still fail to fully grasp the implications of this new policy regime. Now, this was not a relatively high frequency like immediately after his talk, just before his talk, but even one year later, when we do these surveys, people still don't know we have this new policy regime and they fail to realize what this means for inflation.

51:45
Markus Brunnermeier: Did you also ask mortgage brokers who we're going to tell you how to monitor…?

Yuriy Gorodnichenko: No, Markus, unfortunately, you know, it's relatively easy to construct surveys of households, they’re relatively cheap. Reaching out to CEOs is extremely difficult, because you have to penetrate through layers of secretaries, assistants, you know so many filters, it takes forever to talk to somebody. The same with mortgage brokers, so financial intermediaries, like bond traders. But I hope there will be some survey, where people can at least elicit beliefs from these important players and see if they think differently. I'm sure the bond traders and mortgage brokers know all about this.

Markus Brunnermeier: So Giorgio Primiceri would like to know, is it possible that people with inflation expectations that are off are the same people who don't really make important economic decisions, because of the hand to mouth agents, but say in our models?

Yuriy Gorodnichenko: It is certainly a possibility, you know inflation expectations when most of the Euler equation matters only to the extent that you can intertemporally substitute right, then, so if you have no resources, then it doesn't matter. And one may hope that there is this magical marginal consumer who is making the right decisions, and you know, maybe there is something like this out there, but if you have 80-90% of the population who doesn't know this, I don't think it's a good sign for our models.

Markus Brunnermeier: Are you building new models with people whether or not they have correct expectations or how would you build these models if you were a theorist?

Yuriy Gorodnichenko: You know I think one lesson I learned from looking at history was that in the 50s and 60s, there was this view that people know nothing. It was kind of a focal point of those models at the time when I swing to another extreme, people know everything. And we try to find that middle ground and the problem is, if you have something in the middle, we will have a little discipline, so I'm still trying to find the balance between being flexible, and you know having some discipline on this models, but I'm sure if not me, somebody else is going to come up with a successful model. So Jay Paul, you know, it was striking, you know this was one of the biggest announcements out there in recent history about monetary policy, no reaction, that was amazing. Now, as I told you, the last point was what happens with choices right, so, as you know, there were questions you know, maybe we have those expectations but it doesn't matter because people don't usually use them. When it's important anyways they don't act on these expectations, and you know, some people believe the earth is flat, and you know locally it's a good approximation and doesn't really matter for this person in the big scheme of things, maybe it's the same deal with inflation expectations. It's not important, and as I said in our previous exchange, the main challenge is that if you want to see the effect of inflation expectations on say consumers spending and you have to obviously worry about endogeneity, so many things are happening at the same time, how much you consume depends on what you think is going to happen to you tomorrow, in a month, in the year, not just inflation expectations, but you know many, many other variables. And so creating an exogenous variation here in inflation expectations is a huge challenge, and this is one of the reasons why we have you know which paper about the importance of inflation expectations. Saying that it's not terribly important or just an object floating around in our models with no real bite. And I can understand how we can be frustrated with inflation expectations or in general expectations being so endogenous and so hard to measure. How we can address this: it's a huge challenge, where we have to rely on natural experiments, changes, for example in tax rates on gasoline, and say well here's an endogenous change in the price of gasoline, let's see if it's going to change the expectations. I have a project, where we look at disruptions of oil refineries when the price of gasoline locally can increase for largely idiosyncratic reasons and see if people change the expectations, if they change their consumption decisions. Well, if you take this route, you are at mercy of these strange events and you can't really give this in other contexts, in other countries, in other times, and so it kind of limits the usefulness of this exercise. But if you can run a randomized control trial, then you can do this anytime, anywhere, and repeat these experiments again and again and again, and have some confidence that you will find something meaningful. Now I never said that I will run experiments in my life, I was trained as a macroeconomist, so you know how to run a VER, how to write VSG, and how to solve it. I was never taught how to run an experiment, but I'm grateful to my colleagues in Berkeley that they gave me some pointers, what I should do, and that was very instrumental for me and so just to keep everybody on the same page, I wanted to outline a few steps here to make sure we understand what has happened in our RCTs. The first stage is preliminary. Say you have 10,000 people, you ask them what inflation expectations you have, then you flip a coin and create two groups randomly chosen: a treatment group and the control group. The control group is told nothing and the treatment group is told something about inflation, inflation targeting, some policy action or some actual fact about the data. You can’t lie to people, but you can tell them a selected set of facts. Then you measure expectations again, and if you see any systematic difference between the two groups, you know it has to come from the treatment because there's two groups, otherwise identical right they have the same distribution of age, education, IQ, everything is the same, the only difference is the treatment, and then you follow these people over time and see if they change their behavior: if they change their consumption, if they change the employment, if they change their portfolio allocations, you can look at lots and lots of choices that people make in their lives. Now tracking people is expensive right, so this is not an easy exercise, but if you're a central bank, if you know some government body or a big research institute, this is a rounding error in your budget, you can still do this. And so, then when you compare the choices of households or CEOs or anybody else you're interested in. If you see any difference in consumption, you know it has to come from this treatment. And through this channel when you measure the expectations, you know, on impact, how they change their beliefs and so that was the main the main channel of this treatment effect. And let me show you, you know what you can find in this experiment so I’ll give you one example, but you will find some similar in other contexts as well, you can tell people anything you want in terms of treatments, you can tell them about the Fed inflation target, you can tell them about the inflation forecast from professional forecasters, from your peers, from from professional forecasters and you can the lots and lots of things. You can also tell people about forward guidance, you can tell them all the Fed promises that the interest rate is going to be such and such in two years or such and such in three years and see if people react to that information. It doesn't have to be about monetary policy, it can also be about fiscal policy.

59:44
Markus Brunnermeier: Can you also do like QE, is it different?

Yuriy Gorodnichenko: You can do QE too, they will ask you what is QE. Yeah so you know one challenge when you do this experiment, when you do these treatments, you have to provide information in a way that is understandable for the general public, so you can’t use jargon, you have to explain what CPI is, what inflation is, what deflation is. So, I should say when you do these treatments and you see some reactions in the beliefs of those people, it's already a violation of full information rational expectations we give them publicly available information, you can go to any website and find inflation numbers, so we can Google inflation target of the Fed and how they keep talking about this, all the time, so it has been in the public domain for so many years, everybody should know these numbers. And yet we will find that beliefs respond very strongly to these treatments so for us it's already suggesting that there is a violation of this full information rational expectation. Now, let me go back to this equation, and say you know what happens if we treat people with forward information with inflation and I'll show you the results for the case when we tell people the actual inflation numbers so, for example, you tell me well you know inflation forecast is 5%, I will tell you or your perception of inflation is 5%, that will do you know the actual numbers 2%, and we see how you change your beliefs. This is going to create this exogenous variation and then we track your time and see if you change your consumption. This is where you find purchases of your food, and this is in the Nielsen service, so this is not just survey answers, you have a home scan, and so we know actual purchases of these households. You can also use a survey to measure this paper, and you will see a high consistency in there as well, but this is telling us that if you exogenously increase inflation expectations people, at least in the short term buy more food. Okay, so this is to some extent, consistent with the Euler equation, we usually have when we think about the effects of inflation expectations.

Markus Brunnermeier: Can you talk about the size of the coefficient?

Yuriy Gorodnichenko: Oh yeah, it is very large, so you raise inflation expectations by one percentage point and people by half percentage spend more than half a percentage, so it is a lot, and you look at other types of goods and their response, maybe during the year too. I think it's significant, not just statistically, but economically and on the other hand, you look at purchases of durable goods, you ask people: did you buy a car, did you buy a house, did you buy an expensive appliance and here it's very clear, you raise inflation expectations and the frequency of this purchases declines by a lot. So people are less willing to buy cars, they are less willing to buy houses and one way, you can rationalize this is this stagflationary view of the world that you change, not just beliefs about inflation, you change beliefs about other variables, and so through this reduced form relationship, then it translates into lower consumer spending. But in our models, typically this channel that you know you change beliefs about inflation expectations, and about other variables would still mean that you should spend more on durable goods. It's a good time to buy a car. The price is still low, income will be behind the future, you should be buying cars, should be buying houses. It's not true in the data. And so, one of the policy implications is that if you have this idea that you can raise inflation expectations and everybody is going to be happy and start spending. Maybe it's not such a great idea, this kind of policy can backfire and when we say this now when inflation expectations are running so high, and actual inflation being so high that people have this dark view of the world, it seems some was drawn from consumer spending.

1:04:06
Markus Brunnermeier: So, even though you would expect the opposite, especially if the interest rates there's low. So there are some questions in the audience, perhaps I can throw this in there, especially on durable goods, they would like to know more and does it matter how you fund/finance yourself, so you go into a mortgage or you go into some funding, did you look at that and then another question about the randomization: is it really fully randomized if you tell one group that gets information, did you the other group which didn't get the information that you know, should have gotten information, but you didn't give it to you, it's like a placebo, you tell them this is a placebo or not so, how do you deal with us placebo pill and…?

Yuriy Gorodnichenko: Yeah so with placebo, you know the way I describe this usually is you flip one coin and you create your two groups, but in practice, you can create 100 groups or 10 groups and when we do this experiment, one of the placebo groups will tell people something which is irrelevant, but has 2% in it. So we can say you know the speed of earth increased by 2%, or the population growth rate is 2%, over some number of years. And so we see if people respond to 2% in some way, and there is some reaction to this that is called the entering effect, that is small and short lived, if you're tell people about inflation, you see much stronger reactions.

Markus Brunnermeier: Andrey Alexandrov has an interesting question, do you look at people's expectations about their wage growth, did you look at wage growth expectations as well.

Yuriy Gorodnichenko: Markus it's a great question and you know, very often, we go back and kick ourselves and say we wish we had that question. With these experiments you do it, you get the results and then later, you realize you miss something, and you have to redo everything. And so we are now doing a survey when we asked people about wages and inflation expectations at the same time, and I know there are other teams out there doing these experiments, so you know, in a few months we'll probably have an answer, maybe in a few weeks, who knows. But that's a great question, because then you can directly look at price wage spirals and how they happen, why they happen, and it also relates to the earlier question about second order effects and second round effects. So I was talking a lot about households, where firms are, you know, there's somewhere in between I don't have time to cover this in great detail, but the general idea is that these guys are somewhere in between households and professional forecasters, they are not as informed as professional forecasters but they're not as uninformed as households, somewhere in between. And again using the randomized control trials, we know when you provide these managers with useful information about inflation targets or prices or anything that may help them in their decision making, we see that managers respond to this information, they change employment, they change investment, they change the composition of their employment, they change prices. So it is very clear that people act on expectations, we have to, if we want to affect the economy expectations, it's going to be challenging because people don't listen, but conditional on making this connection, reaching out, then you can actually do something good for the economy, at least in principle. And in my remaining time I'll just really briefly say you know where we are and Markus you should tell me if I answered your questions and maybe some of them.

1:08:00
Markus Brunnermeier: We will have a few more questions perhaps towards the end. I would like your lessons for macroeconomists.

Yuriy Gorodnichenko: Alright. So you know we have this great framework in macro full information rational expectations. It's a major achievement, and we should all be grateful for people who develop this, but I think, at the same time you look at the survey level evidence and you see that the world is not that simple. Right so Yogi Berra, famous baseball player, said, if the world were perfect, it wouldn't be. Right, so it's still good to be true, but have a perfect world, we will, I agree with him, it will be nice to have FIRE, but I don't think it's true. We need to find some alternatives, some compromises. I don't think we necessarily have to abandon rationality, but you know some information rigidity of course may be a good way forward, so that we can kind of keep all people happy. I think one challenge here in terms of future work and this goes back to your earlier question Markus where we are in terms of modeling, I think one issue here is that we have theory head of measurement, we have so many theories of how people can form expectations but we don’t really test them that well and I think a lot of work that we need to do is about you know, doing the work that surrounds the situations between theoretical and empirical work to make sure that you know we have a model which is consistent with the data. There is some discipline from the data and we keep it there, until we have some convergence. We also need more service in more cities, because I think this is the only way to prove anything beyond reasonable doubt and convince people who wrote you-know-which paper that inflation expectations are important or in general, inflation expectation or in general expectation so important. And the very last slide is about lessons for policy. I think it's very striking that policymakers talk about inflation expectations all the time and yet the public is relatively unaware of what is happening in the policy world. There is massive, massive inattention you know people have a very limited span of attention. You should really communicate in tweets like 144 characters and maybe a little more, this is how it should be done, I guess. We should also appreciate that there is lots and lots of friction, so people are inattentive for a reason. Sometimes they just lack education, sometimes it's like you, sometimes it just doesn't pay me to pay attention to anything because inflation is not a big deal for me anyways, you know how much difference it makes for a typical person 1.9% inflation makes relative to 2.1% inflation, very little. So it's not the biggest factor for them. They see a lot of heterogeneity in beliefs, so it is understandable there are lots and lots of possibilities for misinterpretation. When you say raise inflation expectations, people may say you're doing something crazy, you should not be doing this. We don't want to have more information. So, in terms of communication, I think this research suggests that you have to have simple and direct messages, you have to give a perspective, you say look we're doing this for xyz reason or reasons and going to focus on maybe on targets, instead of instruments, you know there's a lot of talk about we're going to do this so that was Fed funds rate on this or that policy rate, but we should be clear with the general public what we want to achieve. And they probably don't care what you do, they will care if it's QE changes and Fed funds rate or quantitative tightening and they don't know this and we knew the measurement for sure, and we need the– I think if we want to really influence the public opinion– we have to have sustained information campaigns, because people forget this message is very quickly, so I'll stop here.

1:12:01
Markus Brunnermeier: Thanks a lot Yuriy, so we have a number of questions. I would like to touch upon, sorry I can’t cover all of them. One is that we have all this research from Ulrike Malmendier and Stefan Nagel on depression babies and on that people that lived through the 70s, have different inflation expectations. Do you think that we lived through the global financial crisis with low inflation has an impact on… and people who live through it and people who didn't live through it, so can we distinguish that? Can you elaborate on that and you also highlight very much the gasoline price methods, a lot, but it could also be that focusing on the attention to what you mentioned on that slide that the used car price jumped significantly, totally in the news all the time, and probably most people pick that up. Are there some other products which are just moving very erratically, does it make a difference whether everything moves in the same pace and nothing stands out and people ignore it, and suddenly you have one product which jumps a lot and that essentially shifts all inflation expectations across all the products? I mean it's highly speculative but perhaps you have some insights on that too.

Yuriy Gorodnichenko: Markus I'm going to say you know I really believe in this lifetime experiences shape and expectations. I lived in Ukraine for many years, I lived through hyperinflation, 10,000% in one year. I'm always worried about inflation, I know it can happen, probably, it will not happen in my lifetime again. But you know it has happened, and so I'm always worried that you know something bad can happen. Why people focus on some particular prices, I don't know why we create this flow, you know where these focal points come from. It's easy to imagine that you know, in some countries, that maybe the price of coal. Right, so you look at Chile, it's a big you know, industry and people are watching that particular price, and so you can have a story about that. Presumably, it has to be some sort of related to the fundamentals, otherwise you're wasting your time. And I think for U.S. households, if you have a limited span of attention it makes total sense for you to look at the prices of gasoline. I know it’s historically highly correlated with inflation. It's extremely easy to observe, it's a homogeneous good, you do these purchases very frequently so you can basically have a real time estimate of inflation from the prices of gasoline. Can you move the focal point? I don't know, it's hard to tell, I wish I could do it.

1:14:46
Markus Brunnermeier: Well, that leads me to the final two questions. Perhaps I do one at a time, one is you know we are going out through a green restructuring of the whole economy and that will, of course, mean that one thing– you know, we move away from cars, which use gasoline, we move to electricity. Do you think– will the focal point jump if nobody… or if everybody has an electric car no I would stick with gas prices as our focal point?

Yuriy Gorodnichenko: I wish we had all electric cars. We use public transport and you know the assumption. You compare inflation expectations, so with Europeans and Americans and Europeans are much less sensitive to the price of gas they're still sensitive but not as much as people in the U.S. And one story is that in Europe, people rely on other means of transportation, public transportation in particular, and you know, once you create this disconnect then the fluctuations and commodity prices are going to be less important for you when you're thinking about inflation expectations and inflation.

Markus Brunnermeier: Let me throw a final question at you: can you compare the U.S. and emerging economies, so we touched a little bit on this, but he thinks of Argentina. Is the gap between households and professional forecasters smaller in emerging economies, because it's just way more at the forefront of people's thinking or in U.S., you can forget about it. I call it worry free inflation, because it's 2%. But if it's jumping a lot, you'd have to be at the forefront of your mind and effect yeah…

Yuriy Gorodnichenko: Absolutely, absolutely there are a lot of, as I said, you know I'm from Ukraine and when inflation was high, you would wake up in the morning you read your inflation numbers, you go to bed, and the read your inflation numbers during the hyperinflation. You know the names of the central bankers; they're like rock stars. You tried to hear every word, they say you talk with your neighbors, with your friends about what this means for prices going forward. And so, this in attention, it's really state dependent, we have a luxury in advanced countries that we didn't have inflation highly variable for so many years that for most people, it's not just an important subject, it doesn't really matter. While you'll go to emerging economies Argentina, Ukraine, Mexico, where you have bouts of inflation and memories of this are still very recent. People are really much more attentive to inflation and they don't rely just on one price; they have a much broader view of what is happening with prices in the economy.

Markus Brunnermeier: And finally, just a side comment, some people argue, you know high inflation, because economists think high inflation means high demand and means high GDP growth. For many people, inflation is saying about the quality of the government or you know how well the country is run. And I guess for the household it's much more high inflation is a sign of weakness not having a bustling economy and that might explain why what you've shown us that the professional forecasters are so different in terms of and households competitive.

Yuriy Gorodnichenko: It's certainly possible because you know you look at high inflation numbers and it feels he can control this, it's a problem, so there is something wrong with the leadership. It's possible.

Markus Brunnermeier: Very good, very insightful, thanks a lot, Yuriy, it’s great to see your perspective and all your research puts nicely together here and give us the insights what drives inflation expectations and what more has to be done, and I hope, everything is going okay in your home country and our thoughts will be with Ukraine coming months.

Yuriy Gorodnichenko: Thank you Markus.

Markus Brunnermeier: Thank you, thank you, thanks again and next week, we will have Arvin Krishnamurthy talking about the lessons from QE we have learned from the last X years about QE. Hope to see you again, and thanks bye.

Yuriy Gorodnichenko: Thank you.