[AUDIO LOGO]

FRANK SCHILBACH: All right, welcome, everybody. I'm Frank Schilbach. I'm a faculty member at MIT. And I teach behavioral and development economics. In particular, I'm interested in issues related to poverty, in particular, psychological issues, which I'll mostly tell you about next time on Wednesday when we talk about financial strains or people worrying about money, when we talk about sleep deprivation, and in particular, mental health.

Today, we're going to talk about behavioral development economics as a field overall. And I'm trying to give you a broad overview. Most of what I'm going to tell you is based on a handbook chapter on behavioral development economics with Michael Kremer and Gautam Rao.

So what's the plan? I'll give you a broad overview. And we'll kind of discuss a little bit what is behavioral development economics, a little bit of the history and how to think about this, and some caveats. Then we'll talk about one framework, one broad overview, and how to think about a lot of issues related to behavioral economics and development economics, which I'll call the Euler equation puzzle.

And then we're going to apply this to one specific topic, which is health, which you will, later in the course, talk much more about anyway. And then, time permitting, I'll also tell you a little more about time preferences and demand for commitment in part based on some work that I've done on that topic.

And then on Wednesday, we'll talk about the psychology of poverty, in particular, of the idea of the potential of psychological poverty traps. I know you have talked about poverty traps more broadly with Esther last week. And then we'll talk about three different topics that I have worked on. One is financial strain, which is the idea that people think a lot about money. Money is very much on people's minds and affects people's decisions, choices, and their productivity.

We'll talk about sleep deprivation. And this is the paper that I think you're supposed to read until Wednesday, as well as mental health, which is what I'm currently focusing my research on. But there's lots of issues and open questions that one might want to tackle.

Before I get started, any questions? OK, perfect. So when thinking about behavioral development economics, it's useful to take a somewhat broader historical perspective on development economics to try and understand where we came from.

And so if you go back decades, when you think about historical views of development in different fields, in sociology, but also in economics, there was this view and development that people were thought to be very different before and after the event of modernity. The idea there's a pre-capitalist versus capitalist society or tradition versus rationalism or mechanical versus organic solidarity. And there was this idea, there was modernization theory that viewed modernization as a process of radical social change, but also change in ways of thinking and seeing the world.

So the idea was we can look at poor countries in very different ways. And what we know about from economics in rich countries might not necessarily apply. So it's the idea that things are very different in poor countries among the poor. And so we first have to modernize the countries. And then afterwards, once things are modernized, we can apply traditional economics.

And development economics, in part at least, emerged as a critical response to this view. It's saying like, no, poor people are people like you and I. They make choices. They make productive decisions. They're very much like rational actors, and economists would model them.

And for example, farmers are viewed as, essentially, rational capitalists that may face some market failure or some other constraint. But people really are making choices like you and I, but they have certain different constraints. And so that view strongly rejects seemingly unfalsifiable cultural explanation, saying there's a Hindu rate of growth. And therefore, India is not growing as fast as perhaps some other countries in Asia. And it's very much modeling people's choices and decision-making as poor by deficient.

And this is this famous expression from Shultz in 1964 that's saying, is people are poor, but they're making choices. They're making rational choices. And we can apply the entire toolbox of economics, of macroeconomics, et cetera, to the applications of studying poverty.

And so this view started to change in the past two decades. So previously, people were saying, look, people react to incentives. People react to price changes and so on. And we're essentially modeling people strongly as saying, like, no, people are rational actors that optimize fully.

But with the rise of behavioral economics in other fields, other subfields of economics, in development economics, people started thinking about behavioral development economics and trying to model a more psychologically realistic view of human behavior in development economics as well. And that's to say, just like for the rich, there are systematic deviations from standard models in preferences, beliefs, and decision-making. For example, people might have social preferences, care about others. People might loss, might be loss averse and care more about losses than about gains. People might be present biased or present focused and so on.

And this is based on universal insights from psychology about human behavior. That's to say anybody has potential behavioral biases. That's true for the rich and for the poor. And let's try to understand people's choices better by using these insights from psychology and other fields in understanding people's decision-making.

And so most of the work that's in the handbook or people have studied so far is relying on universal insights from psychology about human behavior. That's to say, for example, social preferences, most people care about others in some ways. And that's not specific about the poor, about development economics.

Recently, there has been somewhat more increasing attention to differences in psychology across cultures and across the rich and poor. And that's what I'm going to talk about with you on Wednesday, which is about poverty might affect people's decision-making in ways that are specific to poverty, that could be treatment effects of poverty specifically. And then more recently is also interactions between behavioral biases with institutions or market specific to developing economies. You might say, well, everybody has similar behavioral biases. But if people are credit constrained or if people have other constraints or less guidance from institutions in their decision-making, then some of these behavioral biases might be more pronounced.

Let me stop here for a second. Are there any questions so far? OK. So then before I get into the specific material, let me give you a few caveats and common critiques of behavioral development economics upfront and some responses to that.

So one broad feature of behavioral economics more broadly is we're not trying to say, economics is stupid and doesn't have any applicability or like the models are wrong. Instead, what behavioral economics and behavioral development economics is trying to do is trying to attempt to augment and improve rather than replace existing models. That's to say, let's take some of the assumptions that people make in neoclassical economic models and then try to say, well, can we improve the predictability of our models, and perhaps resulting policies, by improving some of the underlying assumptions and trying to make them more realistic.

But that's to say, prices still matter. Incentives still matter, et cetera. Everything from economics applies. But perhaps utility function looks slightly different or people might have biased beliefs.

Behavioral developmental economics is also very much not denying the importance of institutions for development. In fact, you might say institutions are even more important. If people make potentially biased choices in various ways, well, then there's perhaps more of a role for institutions to try and improve people's choices.

As I said, it's not to say that real incentives and constraints don't matter. So it's not like anything goes and people are just irrational. There's a lot of structure and a lot of thought about carefully modeling people's behavior with a lot of discipline.

And number 4-- and this is particularly important for the next lecture on Wednesday-- nobody is trying to blame the poor for their poverty, for perhaps making mistakes or other choices that might be suboptimal in some ways, in part because usually, as I said, we're typically studying universal psychological factors that apply to anybody. And second, behavioral biases, or in particular, differences in people's utility function are not blameworthy in any way. It's to say, people might have reference dependent preferences. And that's just what their utility function looks like in any way.

And then, of course, there is the idea that poverty itself might cause some potentially suboptimal choices, again, which we'll talk about on Wednesday. Then you might say, well, isn't that a very paternalistic to be trying to tell people, and in particular the poor, what to do or not to do. And I think there is some truth to that critique in some ways. And they're saying, well, once you take a stance and say, well, people are making mistakes in their choices, people are often then engaging in potentially paternalistic policies.

The best of behavioral economics tends to have what's called libertarian paternalism. It's trying to, essentially, design policies, for example, defaults or other types of choices where you help people who have behavioral biases while not interfering with other freedom of choice overall. So if I set a default in certain ways and say if you don't do anything, you get into the right insurance plan that's best for everybody on average, then if you still want to opt out of it, then you can do that. So that's kind of like the best of, perhaps, what's called libertarian paternalism.

And then, in fact, it's not true just to say that everything that's found in lab experiments is going to be important. There are some examples, which are discussed in the handbook chapter where some lab experimental evidence, in fact, does not seem relevant in the real world. And so there are some examples of that as well.

With that said, let me give you a brief overview before we then talk about the Euler puzzle. So what are the topics that behavioral economists or behavioral development economists have studied? You can think of this as three broad categories of different issues from behavioral economics that have been applied.

One is nonstandard preferences. We're going to talk about this in a second, which is to say, people might have a different utility function from the typical neoclassical model. People might have different time preferences. People have different risk preferences or social preferences.

Second, people's beliefs might be biased in certain ways that might be people have trouble engaging in Bayesian learning. Bayesian learning is really hard and figuring this out exactly is hard to do. People might be naive about their future behavior. They might be more optimistic about their own abilities.

They might be more optimistic about overcoming present bias in the future or about how good they are, for example, at dealing with temptation in the future. They might also have what's called motivated reasoning. They might want to think that they're better than they actually are. They might want to think that the healthier than they actually are because they derive utility from that. And that leads to systematically overconfident beliefs.

And finally, there's nonstandard decision-making, which is people might have limited attention or memory or mental accounting or default effects. You can think of this as anything that doesn't fit into one and two about preferences and beliefs. Even if you understand people's preferences and beliefs, people might still, for example, just not pay attention to certain options or they might react strongly to framing or default effects that can't really necessarily be explained by differences in preferences and beliefs.

Now what makes behavioral development particularly exciting? Well, I think there are different features of different fields that come together. On the one hand, there's development economics, which of course, you all are studying, which is the experimental approach to tackling high stakes and policy relevant questions in field settings. So that's still maintained.

But then there's influence from experimental economics, which are very careful procedures and methods and controlled lab settings to focus on mechanisms to measure beliefs, preferences, and so on very carefully to test specific theories about how people make choices. And usually that's in pretty somewhat contrived settings and experimental lab settings that you can't really necessarily replicate in the field. But behavioral development economics tries to use at least part of this in and transport it into field settings.

I think there's always going to be some compromise because at the end of the day, if you do a field experiment somewhere in rural India, it's not going to be as cleanly controlled as if you do like a lab experiment here at MIT or any other place. But the idea of carefully controlling the environment and people's choices and measuring beliefs, preferences, et cetera, is a pretty strong idea in behavioral development economics.

And then third, there are lots of ideas from psychology, other fields, for example, psychiatry, sleep medicine, et cetera that you can essentially use an arbitrage in some ways. That's to say, there's lots of interesting things that other fields have studied that you might want to bring into development economics. And usually, many of them are related to psychology.

There's also, more recently, work in sociology or anthropology, et cetera. There's essentially lots of ideas or novel concepts where you can write models about it. You can test these models and so on. So there's lots of space for creativity and novel ideas or insights. And these insights then can be applied to lots of different topics in development economics.

So here's a broad overview of this handbook chapter. And it's very long, so we didn't require you to read it. But if you're interested in any of the topics, hopefully, you can pick and choose what you're most interested in.

And so it's essentially organized by canonical topics of development economics as you will go through mostly in your class with Esther and Ben. Of course, not everything, but most of it. And so you can think of this as like using insights from behavioral economics and applying them to each of the topics in development economics.

So we're going to talk about the conceptual framework in a second. But then the topics to apply these insights to are health or health behavior, savings, risk insurance, technology adoption, and labor markets, as well as behavioral firms. And then there's like two broad other topics, which just don't fit quite into this. One is about social preferences, culture, and development. This is the type of work that Nathan [INAUDIBLE] and Ben [INAUDIBLE] and other people at Harvard are working on. And the psychology of poverty, which I'm going to tell you about on Wednesday.

Let me stop for a second before I get started. Any questions? OK, right.

So the starting point of all of this is that there are high returns to capital in many contacts. And so Esther and Abhijit have a very nice handbook chapter in the *Handbook of Economic Growth* that talks about different pieces of evidence. There is borrowing at high rates. People have borrowed 70% to 100% annual rates and more in many settings.

There's also some evidence, for example, from Chennai, where there are small scale fruit vendors in Chennai who borrow at daily rates of about 5%. So what they do is to have about 1,000 rupees of goods and fruits and vegetables that they're trying to sell on any day. They, in the morning, borrow these 1,000 rupees. And then in the evening, they pay back 50 rupees of that, which is 5% daily.

And they do that every day. And so that's like an extremely high interest rate, which suggests that if you're doing that, you must have really high returns to capital. On the flip side, there's high returns to small business grants. So there's randomized controlled trials where people are randomly given some money versus not. There's high returns to inventory, so some work by Michael Kremer and co-authors on that.

There's also a predictable large increase in prices between seasons. With these fluctuations of prices, if you just had a lot of money and perhaps storage capacities, then you could arbitrage, essentially, and make quite a bit of money. And Lauren [INAUDIBLE] was visiting us this semester-- and Marshall Burke and others have a very nice paper that discusses this issue.

Now you might say, OK, that's great, but what does this have to do with behavioral economics? Well, thinking about the Euler equation is quite helpful in some sense to say, OK, what does the neoclassical model have to say about explaining high returns to capital? So what is the Euler equation? I've talked a lot, so I'd like to hear from you.

Who's taking first year macro right now, or has taken? Yeah?

AUDIENCE: It's like your consumption today versus tomorrow based on your production of your assets.

FRANK SCHILBACH: Exactly. So the Euler equation, what it does it relates your consumption today to your consumption tomorrow, more precisely your marginal utility of consumption today to your marginal consumption tomorrow or in any future period. And as you say, it depends, essentially, on what are the factors that link these two. You said something about returns to capital.

AUDIENCE: Yeah, like how productive your assets are.

FRANK SCHILBACH: Exactly. So it's essentially about the return to capital, if you invest. If you don't consume today, you can save it in some ways and invest it in certain assets. So that's the return to capital. And then there is, as well, a delta. What is delta? Or what is this doing here?

So a delta is often also used for depreciation-- not here. Yeah?

AUDIENCE: Discounting.

FRANK SCHILBACH: Yeah, so the discounting rate. If you think about, should I consume today versus tomorrow? If you think about any marginal units that you might want to consume versus save, you either get your marginal utility of consumption today or you save it.

Now you can invest it. So we have, in some sense-- we wrote this more generally as like a production function you can invest it in certain ways into your capital stock. You might be buying machines or like invest it in your shop or the like.

And that leads to the marginal product of capital tomorrow times the marginal utility of consumption tomorrow, so whatever you additionally produce tomorrow, you can consume now. And that needs to be discounted because people might have discounting or different discounting between today and tomorrow. Is this clear what's here?

All right, so now I'm saying, it implies unrealistically high consumption growth rates. Why is that? So what did I tell you about F prime of K? Yeah?

AUDIENCE: It's really high so that in order to make up for the fact that [INAUDIBLE] for really more [INAUDIBLE] consumption to compete with that.

FRANK SCHILBACH: Exactly. So you can rewrite this. And this is a little bit fast here on the slide. But I think if you can write this to convince yourself-- for example, if you have log utility and F prime of K of 50% annually, which seems reasonable, and delta of 0.96, which is as you know people slightly discount the future about by 4% or 5%, then you get essentially a consumption, implied consumption growth of 44%.

And so you might say, well, is log utility the right utility function? You can have different utility function. If you have a constant into temporal elasticity of substitution, utility where sigma equals 2, you get something like implied consumption growth of 20%. But essentially, it implies very unreasonable increases or consumption growth in the future.

You might say, well, in one year, increasing your consumption by 20% or whatever, 40%, is not that large. But once you move that forward to 20 years, you get, essentially, people's consumption would explode. So something is not right here. So now what could we do to deal with this apparent puzzle?

AUDIENCE: [INAUDIBLE] at a discount rate.

FRANK SCHILBACH: Yeah, so I gave you like a discount rate of 0.96. But you might say, wow, why 0.96? That's not the right one. That's right. And that's one solution.

And what else could be done? Or what else we try and fix or change? Yeah?

AUDIENCE: Borrowing constraints?

FRANK SCHILBACH: Yes. So it could be-- which is related to this, but yeah, people might just not have any money. But using sometimes the Euler equation still needs to hold at the end of the day. But I'll get back to borrowing constraints in a bit.

What about the F prime of K? How can we get that down, perhaps? If I invest in my business and make a lot of money, what happens?

STUDENT: [INAUDIBLE]

FRANK SCHILBACH: Yes, I get taxed by either-- the government taxes might be really high or there might be some other informal taxes. Might be my neighbors, or my uncle, or my friends, or whatever, if I make a lot of money, perhaps they take it all away from me. And then I might not have that much left. So you might see that there's a high return to capital, but that return to capital does not go to me, so I don't have any necessary incentives to invest.

Now, this is a little bit some technical points. And I don't want to spend too much time on it. And maybe I will have some time at some point to talk about this in recitation.

But so the puzzle persists even when you have non-concave production functions. So one thing I told you to start with is, say, the production function is concave, which you know is a very reasonable assumption in many settings. But perhaps Esther was telling you last week, perhaps it's, in fact, non-concave.

And then you might say, well, what's going on then? Well, then you'll have, essentially, multiple steady states and sustained poverty below a certain threshold. But importantly, the observed initial conditions, in particular the steady state, also needs to be consistent with the model.

So the Euler equation needs to be satisfied, the first-order condition that I just showed you. And so it can't be that people are always in transition. It might be that some people are moving from one place to another, from one steady state to the other, but actually in steady state in the end, it must be that the Euler equation holds.

There's also some other implications. For example, poverty trap models suggest transformative effects of credit, which didn't seem to be the case in many settings, at least not for a large fraction of people.

Second, you might say, well, what about stochastic income and risk aversion? So it's not like-- what I had said, written down here, there's no risk in this model. And you might say, well, things are really risky. And if people think about investing in fertilizer, buying machines, and the like, maybe the rate of return is really volatile.

And so then, it might be just not worth investing. And so it turns out that once you write this down-- you can write down a model with several assets and risk for each of these assets-- you've got a stochastic version of the Euler equation and some more nuanced predictions, where essentially, it depends on whether the assets positively or negatively covary with consumption. And so can think about this model.

But I think one thing that then violates this model pretty starkly is the idea that if things were really risky, then people should anticipate that. People should have buffer stocks and should start saving, and make sure that they can deal with that type of risk. So you would essentially build up a large buffer stock to deal with these kinds of risks that might apply. And then if you have a large buffer stock that's safe, then your consumption should, in fact, not systematically vary with income or income volatility because you've essentially smoothed it out.

But when you look at how much people are in fact saving in many settings, and Esther will talk with you specifically in a lecture about savings, you will see that not a lot of people have precautionary savings or purchase insurance or the like. And so there seem to be a number of incorrect predictions.

And in part, liquid buffer stocks are even often modest, so people are not saving a lot. As I said, consumption often varies with income, including with predictable income. And then rainfall insurance increases fertilizer use, which seems to say, well, if that's really a big effect, people should purchase that. It's not consistent with people not purchasing that in the first place.

Now, if we make people, instead, impatient-- and I think that's what you suggested before-- then we can, perhaps, match these types of predictions. So what we need is something that creates a high effective discount rate. One brief thing-- people have also tried to look at kin taxes or other types of taxation.

It seems like while you can explain some of that puzzle, you don't get actually that far. So quantitatively, these numbers are not large enough to explain everything. But it's at least helpful.

So let's then say, let's change the time preferences. Let's say people's discount factor is actually much lower. I said 0.96 but it could be just 0.5. What about that?

Now, if you go back to our earlier equation, we say put in delta equals 2.5. Problem solved. Thank you very much. Yes.

STUDENT: [INAUDIBLE].

FRANK SCHILBACH: Yeah, so what you'll get, essentially, is-- so what that implies is-- you might say, today versus next year, maybe 50% is fine in some cases. That's warranted if you have a really high return.

But if you take that model seriously, and say what about in 10 years from now, what about in 20 years from now? What you get is essentially if you iterate this forward is to say you would be willing to give up $1 today for $1 billion in 30 years. And that's just clearly implausible or counterfactual.

So no one would own land, or get an education, or brush their teeth, for that matter. It's just nobody would invest in anything that's happening in the future. So essentially, what this tells us-- and this is, I think a key point about behavioral economics-- you can't just fix one parameter and say, look, here's some behavior that we can fix in isolation, and say, OK, now we're done.

One has to have a systematic and structured or disciplined approach to say, can we actually match several facts and the data? Does this seem to be broadly the right model overall? And so now, an alternative hypothesis that people have studied quite a bit is present bias, or present focus as people have called it, which essentially is the idea that you can separate the discount rate between today and tomorrow, or today and next year, from the long-run discount rate in the future.

That's to say I might be really patient between 10 years from now and 11 years from now. But I might be really impatient when it comes to today versus tomorrow or today versus next week. And this is essentially what people have called quasi-hyperbolic discounting.

You can see here how in exponential discounting-- this is the pink, or whatever color that is, line here. You can see essentially that the exponential discounting function-- it's very hard to create impatience in the short run and patience in the long run because the function just has does not have enough curvature. Instead, what present bias or quasi-hyperbolic discounting does-- so instead of having essentially delta being the short-term discount factor and the long-term discount factor, what quasi-hyperbolic discounting does is to say, let's add another parameter, which is beta.

And beta is the short-term discount factor and then delta is the long-term discount factor, so essentially trying to separate short-term and long-term discounting. And beta, then, is measuring people's present bias. Any questions on this?

So what I'm essentially doing is I'm saying, well, the Euler equation is mostly about the short run. And so now what I said before is, I need a really low delta to match this. But if I get a really low delta, I can't really match any long-run implications.

So now what the beta delta model or the hyperbolic discounting model does, it essentially says, let's just have two parameters that try to match the world better. One is about short-run discounting, so people are really impatient in the short run. And one is about long-run discounting.

And so now, we are able to at least, perhaps, better measure why people do not invest in the short run today. But perhaps, then, we don't get these counterfactual implications for the future. Any questions?

And that, in fact, helps us address quite a few of these puzzles. Present-focused agents will rapidly spend down liquid assets, becoming effective liquidity constraints. So that's to say liquidity constraints are in some ways like an equilibrium outcome, or are endogenous, in a sense.

It's not they fall from the sky. Of course, sometimes there shocks. But people can, of course, affect how much liquidity they have.

And in fact, liquidity constraints are very much a sign of present bias or of, essentially, present focus preferences. And so the result is people will be liquidity constrained. And then might not be able, precisely because of liquidity constraints, to make higher-return investments.

Now, then, people-- at the same time, they might build up a stock of illiquid assets that's paying off in the distant future to essentially constrain themselves from spending it down. So there's some interesting work on, for example, cows. Why do people hold cows as opposed to other types of assets? Well, it's perhaps because their indivisible and illiquid, in some ways, at least.

Then, they will leave high rates of return investments on the table if they're essentially effectively to the liquidity constraints. If you don't have any money and I offer you a high return investment that you might be able to engage in, like say fertilizer, but you can't do that if you don't have money. And then you might leave out high returns to capital. And then, you also might not be able to smooth consumption, as consumption will move with income shocks, even with predictable income variation.

Now, one key parameter here is, then, the sophistication of present bias actors that will determine the degree of procrastination and demand for commitment devices, which I'll talk about in a bit. So the model-- it looks like we can explain a lot of stuff. We can, in some ways, help explain the Euler equation puzzle.

It turns out that's actually somewhat more complicated in many settings. But is the intuition, clear how present bias might help with dealing with the overall Euler equation puzzle? Any questions?

All right, so now, another approach-- and one thing I've done now so far is to say, well, what about discounting where discounting might be different? Another approach might be to say, there might be other things in people's utility function that's different, for example, loss aversion. Well, how might loss aversion help?

Loss aversion is the idea that people care more about losses than they care about gains. And so if I think about investing in capital or investing in certain assets, what I need to do is I need to take some money today, and I get some gains potentially in the future. But I might also get some losses.

And so if I'm loss averse, A, I don't want to invest today because I actually have to give up some money today and there's potentially some losses in income or consumption in the present. But also, in the future, if there's risk, that might amplify the effect that risk has on people's choices. But I might be really worried about a bad harvest.

I might be really worried about other bad shocks in the future because that might imply not only is my general consumption going down, but perhaps the investment in fertilizer is also going down. And then, my consumption in the future is going down plus my consumption in the present. And if I'm loss averse, I might put a lot of weight on that.

So there's some interesting work, partially on lab experiments and lab evidence. People have been trying to take some of that into the field, including Michael Kremer and coauthors, as well as Kevin Carney and others, trying to understand, is it the case that people are not investing in certain assets if people are loss averse? And then that has some implications.

For example, perhaps you can provide insurance or other types of ways of helping people mitigate shocks. And that might lead to at least partially closing this gap. And so that's a broad overview of the topics of the broad puzzle as a whole.

Now you can see how we can invest. We can think about all types of topics and development economics as an application of this Euler puzzle. You might say, health behavior or health investments could be really high investments in people's future.

These are high-return investments because if you fall sick, you might have large income losses and the like, which you really would like to avoid. When you think about savings, people could save a lot, and often have high returns to savings in various ways, or perhaps not. And the question is, why not?

People could invest in insurance. And insurance would really have high returns because often, when they're not able to mitigate shocks, that's really costly. In particular to technology adoption, which surely we'll talk about, why are people not investing in fertilizer?

Why are people not investing in other types of technologies? Does this have to do with whether people are present biased? Does it have to do with people are loss averse or the like?

Now, then, there's other types of explanations, which we'll talk about a little bit when it comes to health, which is beliefs. Maybe people don't know that the returns are high. Or people might have trouble learning from their neighbors or the like.

But broadly, I think the idea that there's high-return investments that you could take advantage of, and people are not doing that as much as we perhaps would like them to or that would perhaps be good for them, trying to understand this apparent decision of here are high returns, should you invest or not? And if not, if it looks like people should be investing and people are not doing it, why is that? Or what can we do to help understand these issues?

And that's not to say that people are making mistakes per se. It might well be that their preferences look in certain ways, that it's very reasonable not to invest if you're loss averse. Because you just worry that if you incur losses, that's really costly for you.

So we're trying to just better understand. And then based on that improved understanding, trying to see can we improve policies to try to understand people's decisions. Any questions or comments? Yeah.

STUDENT: [INAUDIBLE]. So maybe it's not the [INAUDIBLE] preferences. Maybe it's the fact that they need to eat two times a day. So it's not how [INAUDIBLE]. So in the short run, the [INAUDIBLE] want money because they have less money and they have to eat.

FRANK SCHILBACH: Yeah, so why is it that people are not holding assets? Why are people not saving? And Esther will talk about savings, I think, in a few lectures.

And so one important issue is that even if you're very poor, the Euler equation should still hold. What does that say? Well, that's saying, even if you're very poor, you should think about should I eat today versus should I eat tomorrow.

Now, you might say, people are having so little money that they're not able to even save anything. But in particular, actually, the paper by Colin, Mullainathan, and Roth is making these calculations for food vendors that say, if you are paying 5% of your inventory as a rate of-- if you're paying 50 rupees every day as interest, that implies, essentially, that your rate of return of any additional savings, if it's just 1 rupee every day, would be extremely high. So sometimes you still have to trade off today versus tomorrow.

And in many situations, in particular when you talk about nutrition, it's not that people are-- in many places, for example in India-- it's not that people are starving per se, in the sense that they can't afford enough consumption. And they often, for example, drink a lot of tea. You might say, what if you had one tea lasts for the next 30 days, that costs five or 10 rupees?

You would be able to save a lot going forward because you are essentially avoiding the high interest that you're paying. So essentially, even if you're at very low levels, you still trade off consumption today versus tomorrow, even very small amounts, especially for divisible investments, you should be able to make. And then if the rate of return is really high, you would be able to increase your consumption quickly over time.

The same is true, for example, for fertilizer. Fertilizer is divisible, so fertilizer doesn't really fit the poverty trap model. So you should be able to invest very small amounts, and then increasingly increase your consumption and output over time. Any other questions?

OK, so then let's talk about one such application. So one broad fact-- and again, very surely you'll talk about this later in the classes-- that people are under-investing in preventative health. And so you can think of this as a really high return investment opportunity because if your kids get sick, if you don't invest in, say, deworming, if you, yourself get sick, you forgo a lot of income.

And that's a very high return investment. For example, Michael Kremer and co-authors have shown that the rate of return on deworming children is extremely high. But for many types of preventative investments-- vaccinations, deworming, bed nets, water treatments, hypertension, et cetera, we observe relatively low rates of investments.

And there's different types of stylized facts that we have seen. They have low willingness to pay for preventative health. There's high expenditures for treatment of acute conditions.

So it's not the case that people spend nothing on health or can't afford any of that. But as I say, people spend a lot on acute conditions, but much less on preventative prevention of those. And in part because people spend so much on acute conditions, there would be a really high return of prevention because you could, perhaps, avoid some of these acute conditions.

And then third, there's high sensitivity of health investments to price and convenience. So if you just change the prices a little bit, people's investments seem to change quite a lot. And so the [INAUDIBLE] from a recent also handbook chapter by Pascaline Dupas and Ed Miguel, an overview where we see people's demand for different health investments at different prices.

And what you see is, A, the fraction of people who demand these investments at positive prices tends to be often quite low compared to what you think, given the returns. And second, the price sensitivity seems to be high, as in the slopes are very steep. So once you go from, say $0.50 to $1 to $2, the investments tend to fall a lot. Yeah.

STUDENT: Of those [INAUDIBLE] facts, how unique are the developing countries? Because all 3.6 [INAUDIBLE] also is appropriate for the United States.

FRANK SCHILBACH: Yeah, that's a great question. So the question is, is this specific to developing countries or is it true anywhere else in the world? And I think that's an important general question about-- and maybe I should have started with that in some ways-- to say that's precisely what I was trying to say earlier about we're trying to study universal factors, the psychological factors that affect people's behavior.

They might be more pronounced in certain ways in poor settings. For example, if you don't have, say, health insurance or other types of medical treatments that are free for you, then maybe your individual choices become more important. I think you're exactly right, that people have low willingness to pay for preventative health in many settings.

People often spend a lot on acute conditions. The sensitivity of health investments of price and convenience might be more specific to poorer settings. But it's a very good point.

It's by no means that we're trying to say that this is only the case-- this is unique to, say, poor settings. But rather, we're trying to say that this is an important issue that we observed. That might also be true-- and in this case, it's the case-- that might also be true in rich settings, but using, then, insights from behavioral economics might be able to help with that. Does that make sense? Yeah.

STUDENT: This I think applies both here, and also to the general proposition of [INAUDIBLE]. How do you separate a present bias story for [INAUDIBLE] too much from a story where I don't have much information [INAUDIBLE] eating unhealthily. I just don't, because everyone around me is young. I don't know how bad diabetes might be. So I continue to eat like a beast.

FRANK SCHILBACH: Yeah, that's a good question. So the question is, how do we separate preferences from information? It might well be that you observe these types of choices, it looks like people don't care about the future, but in reality, it might just be that people don't know that the returns are really high, and therefore, they don't invest.

But if you only told them, they would invest. And I'll actually get back to that in a second. In some ways, I think that's partially, I think, where the literature in part is going.

Many people have studied, to start with, preference-based explanations and studied last beliefs. But I think people more and more are increasingly interested in beliefs. Bear with me for a couple of slides and I'll get to this.

So overall, here I'm saying by the the information part, many people do-- so one answer to your question is, many people may say that they believe in a biomedical explanation. So it's not clear that people necessarily think that, say, deworming or bed nets or the like don't work. But I'll get back to that in a second.

Now, you might say, there might be some-- so there's one thing that I need to say, is to say that small and time-limited incentives for vaccination or other types of incentives for, say, collecting HIV tests can lead to large changes in behavior. So not only is it the case that people are price sensitive. If you vary prices at regular rates and give some discounts, people are price sensitive, but it's also once you provide incentives, when you say, OK, I'll give you a bag of lentils for vaccination, people react a lot to those types of incentives.

Now, you might say, is there a knife-edge balance between costs and benefits of prevention? Maybe people are just all really indifferent. It could be lots of people are indifferent at this specific price. That seems unlikely because there's lots of variation across people. And that seems to be quite unlikely that's the case for everybody at the same time.

So now, you might say, maybe present bias can help. And this is the traditional preference-based explanation. Maybe we can make some progress with that.

And there's two ways in which present bias might generate under-investment. One might be procrastination. This is to say, oh, I'm going to go to the doctor next week. I'm going to go to the dentist next year, and so on, and so forth. And then next year comes, and you never actually do it.

The second explanation might be-- and this is what we discussed before-- which is liquidity constraints, which is to say, I just don't have any money right now and I can't invest right now. And the reason for that is because I was present biased yesterday or two days ago, and I spent too much money on other things. And now, I can't invest.

And that also explains, potentially, the high price sensitivity. If you give it to me for free, yes, sure, I'm going to do it. But once you charge me some money, I might not be able to do it because I just don't have any money available.

So then, it turns out-- so on the one hand, we can explain quite a few things. So present bias and procrastination can explain essentially, there's immediate utility costs of many different investments. For example, hassle costs of going to the doctor, walking to a faraway water source, using somewhat inconvenient chlorine solution, changing your diet, learning painful news about your health status, and so on.

All of these kinds of investment have some immediate cost. You have to invest in it in some ways and incur some costs in the short run that leads to potential benefits in the future. Now, you might say, then people might just procrastinate.

Notice that that actually already requires some assumption about people's beliefs. That is to say, not only do I have to say next year, I'm going to go to the doctor, but I also need to think that I'm actually going to-- so if I am fully sophisticated, and I know that next year I'm also going to procrastinate, models have a hard time explaining sustained procrastination. That is to say, I cannot just fool myself every-- if I'm sophisticated, if I have rational expectations-- I cannot just fool myself over a period and say, next time I'm going to do it.

So it requires already some naivete or some wrong beliefs, in some ways, about my future behavior. Otherwise, you just will not get sustained procrastination.

Now, that can explain things like time-limited incentives or the effects of those, the effects of reducing hassle costs, for example, water dispensers, or the like. Notice that you would not procrastinate an acute condition, since the benefits are actually immediate. So that actually fits in some ways, as well, since people seem to actually make those.

Now, then, as I said, present bias can lead to liquidity constraints. And that's actually an important point. It's not to say that liquidity constraints and present bias are different types of explanations. It's precisely people are liquidity constrained because they're present biased. And then the question is, perhaps, how can you help people save more differently, or invest in insurance, or the like.

Now, one thing I want to point out is that these present-biased explanations also have lots of limits. So it's not like you can actually explain that much. And this is what the question that was just came up was about, as well, which is to say you might be able to explain certain behaviors where there is no deadline.

If you ask me go to the dentist, and there's no deadline, I can go to the dentist next year, and the next year, and so on, I can procrastinate forever, if I'm sufficiently naive. That's to say, I'm really sure next year, I'm going to go to the dentist. And next year, I'm, like, actually, not this year. I'm going to procrastinate for another year, and for another year, and for another year.

You can get really large welfare losses, potentially, if there's no deadline or no fixed point where I say, OK Frank, today you go to the dentist or never again in your life. Even if I'm present biased, I would probably go to the dentist because I know that the costs of not doing it are very large. But if I can fool myself every year to say, I'm going to do it in the future, that might lead to large welfare losses.

On the other hand, when you see one-shot investments with deadlines, if you say today, you're going to vaccinate your kids or never again, present bias does actually not explain very much. It doesn't have a lot of bite. Why is this?

Well, present bias-- usually people think that people's present bias is about 0.7, or 0.6, or the like, which is to say I discount everything that's in the future by about 30%, 40%. But if I have a rate of return of, say, 500% or something on investing in my children, then present bias doesn't get you very far. It's just not large enough to create large welfare losses.

So there would need to be something that's essentially-- that can't be deadlines. And it needs to be something where people are naive in some ways, people have wrong beliefs about their future behavior. So I think that's quite important to understand, that while it's tempting to say, present bias helps us solve the Euler equation puzzle, in some ways you actually have to be quite sophisticated.

The models are complicated. And you have to be very specific to be able to match the data that we see. And it actually matters quite a bit what some of these small details are.

Now, next, then, is biased beliefs. And I think this is in part where some of the frontier is in behavioral development economics, not only when it comes to health, but also, say, technology adoption or other types of issues, which is to say learning is really hard. Learning about health, in particular, is really hard.

So trying to understand, for example, whether a certain medication works, whether you got better if you got therapy or other types of drugs-- the reason why that's hard is because lots of health conditions are self-limiting. For example, I have some work on psychotherapy. And it turns out that, in fact, depression, even if not treated, often remits.

Remission from depression is actually quite high. So if you look at people who are depressed last year, a large fraction in many settings-- 50% or more-- are actually not depressed anymore, regardless of whether they saw treatment. They might get depressed again in the future. But in fact, remission from these types of conditions is, in fact, quite high.

Now, if you have gotten treatment-- suppose I went to a therapist and got treatment-- and I thought the therapist was great and I got better, how do I know whether that was because of the therapist? Or because I got better anyway, and it's just nice to chat with the therapist. It's extremely hard to actually learn this on their own.

And that's true for many other conditions. If you think about other health conditions that you might have, you kind of know there were RCTs or trials that showed that whatever antibiotics, et cetera, are effective. But can you actually tell yourself?

Even things like the COVID vaccine, you might say, on the individual level, it's actually very hard to learn this on your own. Of course, you can see larger, broader data where you see people who got vaccinated versus not got sick versus not. And that helps you learn whether it's, in fact, effective.

But if you think about just from your individual level, what you observe around you without necessarily having access to broader data, learning about health conditions, about the effects of health treatments, is very hard. So people might have essentially inaccurate beliefs about health investments. And there's actually, surprisingly, little good evidence about that, about what exactly do people believe.

It's kind of hard to measure in some ways. And that's partially what the reason for that is. But partially, I think people have just not studied it as much as perhaps they should. So trying to measure, understand the role of beliefs, and measuring the returns to health investments, and trying to understand why they believe what they believe is quite important. Why are they not learning from others or other data that might be available?

And then, there's another factor that's really difficult or interferes potentially with people's correct beliefs or people's learning, which is motivated beliefs. This is what I mentioned earlier already, which is the idea that people derive utility from thinking that they're healthy, that they're good looking, that they're smart, that they're funny, and so on. Because this is essentially their self image.

They like to think they derive utility from a good self image of themselves or thinking that their future is bright. And a lot of health information, of course, is potentially negative. So if I don't do anything, I might say, I'm really healthy. Why should I see the doctor? I'm doing just fine.

So people try to fool themselves into being healthy, potentially. This is not specific at all to poor settings, again. But that might be also interfering with people's learning.

People might be systematically overoptimistic about the health status. Or they might want to believe my children are going to be happy, and healthy, and so on anyway because they want to believe that. And that then lowers the return to potential investments because you're going to do fine anyway.

And why worry about bad things in the future if that makes me unhappy and worried, which I wouldn't like to do. And so there's a literature on that that's relatively small, but I think it's quite important. And it might actually explain quite a bit of interfering with people's learning about health and health conditions.

And then, maybe more radically in some way-- here you might say, people might just underestimate the rate of return in certain ways. But you can have a neoclassical framework of here's the rate of return, that's the perceived rate of return, and that's a little bit lower. But people might just also have very different mental models of the world.

People might just have the wrong theories of the world. They might not even think of certain types of investment as health investments. They might not even think that certain types of factors affect their choices.

And there's some really interesting work by Josh Schwartzstein and coauthors on saying people might just have very different models of the world. It might be that certain factors might not even enter their decision making in certain ways. That is to say, I might not even think-- so for example, when people are allergic against certain types of food, you might get headaches or other types of-- you might be really tired on some days.

But if you don't pay attention to the food that you eat, if you don't make that mental connection between your allergies-- or, say, gluten, or whatever types of allergies that you might have-- and your decision making, you're never even going to pay attention to those types of factors. And if you never pay attention to those types of factors, how are you going to ever going to learn that certain food is bad for you or good for you? Somebody might point it out for you.

Somebody might say, actually, you could have this allergy. And then you might want to experiment. But as long as nobody pointed out to you or explains to you what factors might affect your utility or your future health and so on, then there's no chance to actually learn on your own.

And so they might be broadly incorrect-- so there might be just-- say people might miss certain factors. People also might have just very different mental models. People might be very, very superstitious.

There might be religious or other types of beliefs and other traditions. Where if you think about it, if you grow up or live in a village somewhere in rural areas, how do you know that modern medicine is better than the healer in the village? Or how do you know that I should not believe in witchcraft?

That's a serious question. It's very hard to actually-- somebody needs to teach you that or you need to learn it in some ways. And you need to actually believe that. And maybe-- of course, for you guys, this is clear. You have taken a biology or learned about medicine, and so on, and so forth.

But without necessarily being exposed to all of those kinds of scientific studies, it's not obvious what the right model of the world is from a person's perspective, in particular in rural areas with less access to, say, good medical or other types of information. And so there's some really interesting work by Nava Ashraf and others on, for example, maternal risk in Zambia and widespread belief about marital-- not martial, marital-- infidelity, and complications during childbirth. And so there, if you think that this has to do with infidelity, you can see then how people are very hesitant to learn about other things of what's going on because essentially, there's widespread beliefs about other factors. And those are actually very hard to refute in some ways.

So I think in some ways, you might have biased beliefs in a structured way and a neoclassical way, where we say people make choices. There's an Euler equation and people make choices like anybody else. But their beliefs might be biased in certain ways. And we can put this into our Euler equation and change it or then match it in some ways, by having essentially lower perceived rates of returns.

But if people have incorrect mental models, they might make choices just very differently. And the Euler equation, in some ways, doesn't even apply in some ways, and people make choices in very different ways. That's a more radical deviation, if you want, from neoclassical economics, but I think extremely interesting to study. Questions on this?

All right, no question either means everybody is really confused or everybody understood. So hard to tell, especially with masks. Yes.

STUDENT: I was wondering if you see any heterogeneity in terms of people's willingness to pay and how much they're willing to invest, or if people that are educated in biology, or something like this might be--

FRANK SCHILBACH: So can you repeat the first part of the question?

STUDENT: If there's any heterogeneity that we see in terms of willingness to pay or people's willingness to invest in their health.

FRANK SCHILBACH: In terms of how much they know about biology or other types of medicine?

STUDENT: Yeah, or I guess even more generally in the data, if we see that most-- everyone is like this or maybe there's some--

FRANK SCHILBACH: Yeah, I think that's a good question. So I think in general, education and health are very much correlated, like in the US and any other place. Rich people and educated people are a lot healthier.

And there's lots of work in health economics on the health education or health income gradient. But of course, that comes along with-- being rich or educated comes along with lots of things. Comes along with health insurance. It comes along with access to doctors. It comes along with peer effects of other people who have access to doctors and talk about health, and so on.

I don't know good studies, but I might be the wrong person to ask, about specifically isolating the causal effect. What if you taught a class of, say, biology or medicine, et cetera? And what are the returns to doing that?

There's lots of information interventions that people have tried to do. I talk about this somewhere in the slides. I think I may have skipped it. Here.

Information interventions can have large impacts on health outcomes in some contexts, but not in others. So if you look at this handbook chapter by Pascaline Dupas and Miguel, that talks about that. And it's somewhat puzzling overall why that is.

And it might have to do precisely with differences in backgrounds or differences in type of information. It might also have to do with motivated beliefs. In some cases, people don't even want to learn because they want to think they're healthy.

But I would start here, with that handbook and trying to understand that. But that's the right thinking, saying, can we teach people overall? Or can people learn about different mental models of, say, medicine?

And you have to think, then, a lot about trust and about ways of being compelling. Because again, if there's a healer in the village, and a traditional doctor, it's actually very hard to figure out who's competent. And why should you believe the traditional doctor versus not?

So let me then briefly talk a little bit about time preferences and specific measurements. So far, we talked about essentially the Euler equation puzzle and some applications to health. Now, we talked a lot about time preferences and how time preferences might be able to explain certain phenomena.

And now I want to talk a little bit specifically about, how do we actually measure this? And how we actually make progress on this? And what are some of the limits of the literature overall?

As I said, Esther will talk later about savings, as well, in a later lecture. And she will actually talk about quasi-hyperbolic discounting, but mostly focused on savings behavior, and particularly, why do people not save as much as they could? And what does, for example, providing savings accounts to people do, et cetera?

I'm going to talk about something specific, which is about the measurement of time preferences and then demand for commitment, which I'll talk about in a second. So as it turns out, there's no commonly accepted and easily implementable approach to measuring time preferences, in particular in field settings. So you might say, there's different approaches that people have taken.

There are broadly three approaches. One is-- and there's a long literature on this-- about offering people a choice between monetary payments today or sometimes in the present versus the future, or at different points in time. That's to say I'm asking you, would you like to have $100 now versus $200 in the future, or tomorrow, in 5 days, in 10 days, or next year, and so on. And using those choices I can then calibrate or elicit what your preferences are.

Because then I essentially say how much more do you prefer money now versus in the future? And does your impatience vary across time horizon? That is to say, if you're impatient from today versus tomorrow, are you also impatient from a year from now versus a year from now plus one day? And then I can try to understand what does your discounting function look like.

Now, the issue with that is that choices over money may not reveal time preferences because the marginal propensity to consume does not equal 1. That is to say, if I give you money, you might not use that money to actually consume. You might just save it or you might just borrow differently, and so on.

So what I'm estimating is actually not people's time preferences, but rather something that has to do with the interest rate or people's liquidity constraints. There's a long literature on that and people are trying to address that. So there's a very nice review by Cohen et al. that discusses that issue.

Second, you might give people choices between consumption, for example, between food that you eat at certain points in time, or between drinks or whatever, or between effort at different points in time, where I say, would you rather do some work right now versus next week? And the next week, I ask you again, would you like to do work next week and then two weeks from now? And I can also ask you today about work next week and in two weeks from now. And by looking at your choices over time and how they vary, I can then elicit people's time preferences.

Now, that's conceptually the right object to elicit. That's what you want to measure because that's essentially affecting people's utility right away. There's two issues with that. And I've spent a lot of time trying to do this in various setting, including actually in the sleep paper that I think some of you might have read already.

And so one issue is that people might change their behavior outside of the experiment. For example, if I ask you, would you like to have food today versus next week, or next week versus two weeks from now, once you show up next week in my experiment, you might have eaten already versus not. And that confounds, then, what I'm trying to estimate.

Or if I ask you, would you like to exert effort today versus next week or in two weeks from now, you might also change whatever effort or types of activities you have in the rest of your life as a response to my elicitation. So I have to get you in a setting where I'm closely controlling what you're doing, ideally all day, and then try to measure your choices and then measure also what you're doing outside of the experiment. And you can see how that's tricky to do.

If you have people in the lab for two weeks entirely, you could do that pretty easily. But if people go about their lives in field experiments-- you cannot spend seven hours eliciting time preferences-- then it gets very hard to do. This tends to be logistically quite challenging, and in many cases, relatively hard to do, in part because there's also a lot of comprehension issues. It's hard to do specifically.

Now in addition, people have done self-assessed survey answers. They essentially just ask you, how likely are you to delay gratification on a scale from 1 to 10? Or how willing are you to wait for good things that happen to you in the future?

Now, that's a self-assessed answer. That might actually have a lot of information because people know actually pretty well what kinds of choices they make. We're back.

However, of course, these are like self reports. And economists are very notoriously skeptical of self reports, and sometimes for good reason. Because there might be demand effects.

You might want to tell me that you're really patient and look good in front of the experimenter. But they might have also other issues, such as social image concerns or the like. You might want to think of yourself as a patient person, which in reality might not be true.

And so then, what you're telling me might not necessarily reflect how patient you actually are, but what you'd like yourself to be. And so there's no easy answer here what to do. I think in some ways, if you asked me five years ago, I would have said this is the right thing to do. This is conceptually the right object to elicit.

Right now, I'm much less convinced of that partially because people have trouble logistically actually implementing it with high comprehension rates. So I think by now, I would say, maybe having a combination of those measures actually measures things pretty well. You can try to do convex time budgets in some ways that elicit these choices, but you want to be careful with making sure that people actually understand what they're doing. Any questions on this?

So now, this is about time preference, if I wanted to estimate specific time preference parameters. If I wanted to know what is your beta and your delta and the utility function, that's what I want to do in some way, at least approach 1 and 2. Now, another way to do this is to say, how do we measure whether people are present biased?

We can offer people commitment devices. What's a commitment device? Here's a definition-- it's an arrangement entered into by an agent who restricts his or her future choice set by making certain choices more expensive, perhaps infinitely more expensive.

What does that mean? That's a relatively convoluted definition. Essentially, it's to say present bias preferences are time inconsistent. That is to say, if I am present biased, I want a lot of utility right now or I want to eat donuts or not exercise so on right now.

But in the future, I would like to do it. I would say, next week, I'm going to exercise a lot. I'm going to get up at 6:00 in the morning, write a poem, and go running. Now, if next week comes at 6:00 AM, I might just want to sleep and have no interest in doing so. So my preferences are inconsistent. That's to say my plans change even if nothing else changes, there's no information, or the like.

And so different selves want different things for themselves in the future. And in particular, people, present biased individuals, want themselves to be more patient in the future. They realize that in the future-- sophisticated individuals realize that they're impatient in the future. And they want to then change their prices or restrict their options in the future in an effort to change their future behavior.

For example, maybe I want to set myself incentives to engage in certain behaviors because I know I want to set myself incentives to exercise. So I tell somebody else, every time I exercise, pay me $10 or I can give that person money, with the hope that in the future I'll change my behavior. Notice that that requires sophistication.

You need to know that you're present biased in the future. So you need to understand your behavior, as well. Let me tell you-- yeah.

STUDENT: Wouldn't that also require some sort of [INAUDIBLE]?

FRANK SCHILBACH: Say that again.

STUDENT: Wouldn't that also require some effort in the present?

FRANK SCHILBACH: Well, it depends. You could just say-- for example, I could tell Ed, next week I'm going to have a draft of this paper. And if not, I'm going to pay $100. Here's my credit card and you can make some expense for something that I don't want.

I don't need to do anything right now. I'm just saying next week, I'm going to work really hard on my paper. And if I don't do it, I'm going to lose $100 to the Pro Smoking Association or something.

And so now, there's no effort right now. It's just to say next week if I don't do it, bad things will happen. If Ed is ruthless and implements, then I might change my future behavior because I know next week, I'm going to slack off or not work on my draft.

But not right now. I don't do anything. So some commitment devices are-- there different types of commitment devices. But some are essentially to say purely, you're going to just try to change future prices to affect your behavior.

So let me briefly tell you a little bit about this. I know I've five minutes left, so let me briefly tell you about this. So one example about commitment contracts from a paper of mine is about drinking in Chennai.

These are rickshaw pullers in Chennai, where a large fraction of low-income men drink daily. They spend high fractions of their income on alcohol. There seem to be severe consequences, at least reported by people, for these men and their families in terms of health, in terms of money that's available to them, and so on.

And lots of people say they want to drink less. So they say they want to change their future behavior. But everybody drinks a lot, or many people drink a lot, in the present. Here is a fraction of people who are inebriated or drunk during regular work hours during the day. About half of them seem to be inebriated or drunk during regular work hours.

And so what I then did is I did a field experiment for three weeks with these drivers where everybody would come to the office between 6:00 and 10:00 PM. I did a short survey under breathalyzer tests, and people were given financial incentives for sobriety for some random subset of individuals. And then I wanted to measure people's demand for commitment.

As I said, if you just ask people, most people say, yeah, yeah, I would like to drink less. But of course, that's the right answer, in a sense, in terms of the socially desired answer. So I wanted to have hard evidence on that.

So what I then did is offer people dominated contracts of the following sort-- so people were given the choices between either incentives for sobriety-- that's to say, every time you show up, you get $1 regardless of how drunk you are. Then there's a breathalyzer test, and anybody who is sober with a blood alcohol content of 0 gets another dollar. So 60 rupees is about $1.

So that's just straight up incentive. You get $1 for any time in addition, if you are not inebriated, if your blood alcohol content is 0. And option B-- this is what you see on the right side-- is people get payments regardless of their blood alcohol content.

Now, they're given three choices. These are different rows, row 1, 2, and 3. So the first choice where people choose between incentives and the outside option of 90 rupees, notice that is not demand for commitment.

Because people are-- you might choose that option even if you just don't want to change your drinking. You might just think it's a good deal. Next week, I'm going to drink less.

It's not because I want to change my drinking, I just have plans to not drink very much. So now, choosing option A is actually a good deal because most of the time, I'm going to show up sober anyway. So I'm going to choose option A.

But then in particular, option three that people were offered is to say, you get either these incentives of 60 rupees if you show up and are drunk, 120 rupees if you are sober and show up, or the other option is any time you show up, you get 150 rupees anyway.

Now notice, if you choose now option A, that's a dominated contract. That's a contract that's worse in terms of study payments. You're always going to get less money regardless of how drunk you are. Even if you show up sober all the time, you're going to get less money.

So now the only reason-- that's essentially a commitment contract. The only reason why we would choose this option, option A, is because you want to set yourself incentives to drink less in the future. And so that's essentially the idea of this experiment, or of eliciting commitment contract, is to say you reveal people's preferences to change their future prices. Are people willing to give up money in some ways to change their prices and affect their behavior in the future?

So let me skip some of this. People have very high demand for these incentives. We look at over there, about a third to half of people are willing to give up a substantial amount of money to receive incentives for sobriety.

Now, let me skip this. So that's the case, so now, we have shown that people have demand for commitment, where this literature, in some ways, is that people often then engage in commitment devices. So people demand commitment devices, but then they actually fail.

So in my case, in my paper, what happened is that people, in fact, were showing up sober at 6:00 PM or 7:00 PM at the study office. They demanded these commitment contracts. They were actually drinking less during the day, but then they were substituting into drinking more later at night.

So that didn't help, either. So as a policy, that's not working. As a proof of concept that self-control seems really important for people's behavior, that's really helpful, but it's not really a useful policy that actually helps people reduce their drinking overall.

And similarly, I've written down some open research questions, but broadly, there's a notion that many people often demand commitment but then don't follow through, the reason being that they essentially are partially naive in some ways. They think that great, I have some self-control problems. Let me purchase this commitment device.

But then they overestimate how useful that commitment device is in the future, and then fail, and actually are potentially worse off than if they hadn't even purchased a commitment device in the first place. So there's a very nice paper by Liang Bai and co-authors about low demand for commitment devices for health visits in India, where demand for commitment is relatively low overall. But even among people who demand commitment, few people follow through.

So where is this literature? The literature essentially is somewhat inconclusive in a sense, to say there's proofs of concept of high demand for commitment in some settings. But in other settings demand for commitment is, in fact, quite low.

So one broad question is, why is that? Why is there so much variation? And more broadly, how can we design commitment contracts, in particular in development policy contexts, that are actually useful and help people improve outcomes?

We have shown, as a proof of concept, that people have self-control problems. But we have shown much less that these are actually useful policies that we can do to improve outcomes. And there are some questions-- commitment savings accounts-- could those be helpful and the like? But how can we modify these types of contracts to help people improve outcomes?

And so that's where this literature is. I think it's a really interesting, exciting literature, but it's a little bit stuck at this point in trying to understand. So beyond showing that people have self-control problems, how do we actually help people do better?

And there could be interesting things to do. There's some work on, for example, incentives to sleep, incentives to do therapy or at least try therapy, incentives for sobriety in other settings that have more sophisticated measurement devices, and the like. And then showing that this is actually a policy, in some ways, that can help people do better would be the next thing to do.

So then, as I said, the handbook chapter has lots of other exciting topics. My favorite are 6 and 8, perhaps. One is about technology adoption, which is about behavioral social learning.

How do people learn? And what things interfere with people's learning decisions? As well as A, behavioral firms that say, it's not just people or consumers are potentially affected by behavioral biases, but also firms, in particular shopkeepers-- so types of businesses that might make potentially wrong decisions.

As I said, in the next lecture, we're going to talk about the psychology of poverty, in particular about financial strain, sleep deprivation, and mental health. I'm a little bit over time. So I'm going to stop here. Happy to chat more after lecture, or of course, next time. Thank you so much.