[SQUEAKING]

[RUSTLING]

[CLICKING]

RICARDO J. CABALLERO: So today, my plan is to finish the open economy part of the course. And we will talk about exchange rate regimes. But before I do that, I need to finish a few things that we didn't in the previous lecture. And that will help as an introduction for the kind of things I want to talk about today.

And let me start just reviewing that last slide that we discussed, which is the Mundell-Fleming model. And the Mundell-Fleming model, essentially, is our old IS-LM model, in which the IS a little different because now we have a net export term, which is a function of new things like foreign output, foreign income, and most importantly, the real exchange rate.

And the real exchange rate itself, because of the UIP, uncovered interest parity condition, is a function of expected exchange rate, the foreign interest rate. And it also gives yet another reason for why the interest rate affects domestic aggregate demand. There's the traditional investment effect of an increase in interest rate, but we also get the appreciation effect of an increase in the interest rate, which is contractionary from the point of view of aggregate demand.

But this is like that without this extra net export term. And in this diagram, we have the same interest rate here. From this diagram, which portrays the uncovered interest by the condition, we can get, for any given international interest rate and expected exchange rate for the next period, we can get the current exchange rate, OK?

So that was our model. And we did a few experiments here. The first one was, well, what happens if the expected exchange rate goes up? The first thing is which curves move? Well, if the expected exchange rate goes up, then I know that, for any given interest rate, the current exchange rate will go up, OK?

I know that this curve, in other words, will shift to the right. Why do I know that? Well, because if the current exchange rate doesn't move by the same amount of respect to the exchange rate, now I'm going to expect-- I'm going to have expected capital gain or loss, which will be inconsistent with the previous parity of interest rate. So we have agreed that we had certain expected appreciation.

So let's make it very simple. Suppose that this interest rate happens to be equal to the international interest rate. Then we know that this exchange rate has to be equal to the expected exchange rate because you cannot expect an appreciation or depreciation of the currency if the interest rates are the same.

But if now the expected exchange in next period goes up, and if the exchange rate today doesn't move, that would mean that you expect also an appreciation of the currency, and which means that investing in domestic bonds would give you a higher return because the same interest rate plus expected appreciation. So we know that the uncovered interest parity condition will move to the right as a result of the increase in expected exchange rate.

But that also means that, at any given interest rate, you get a higher-- an appreciated exchange relative to the previous one before the increase in the expected exchange rate, which means that the IS will shift to the left. So if the expected exchange rate goes up, that leads to an appreciation, and that leads to contraction in aggregate demand. OK, good.

Next experiment was, well, what happens if foreign output comes down? Well if foreign output comes down, then this has nothing to do with the interest parity condition. It's not-- it doesn't show up in this expression. But it does shift this because it reduces our exports for any given level of interest rate and output. And so the IS shifts to the left. So that's contraction. That's the way you import the recession from the rest of the world, OK?

As I said before, people around Asia and Latin America are very, very worried about the-- actually, the Europeans as well because Germany [CHUCKLES] exports a lot to China-- are very worried about contractions in China and so on because, through that channel, it's contractionary as well. Now we're in the other part of the cycle because China is reopening. And that sort of gives lots of hope to Europe and so on. And that's one of the reasons why the euro has appreciated vis a vis the dollar recently.

And then the last experiment that I don't remember whether we finished or not-- I think I said it very quickly-- is, well, what happens if the international interest rate goes up? What moves? Well, the first thing that will move is this. This was a parameter, OK?

So what do I know? That if I keep the interest rate constant, and the international interest rate went up, what has to happen to the exchange-- and expected exchange rate hasn't changed, what has to happen to the exchange rate today to be indifferent between the two things, the two bonds? So this is an experiment.

Suppose you were at any domestic interest rate. We don't touch that. Now I increase international interest rate, and I say expected exchange rate is the same as it used to be. What has to happen to the current exchange rate in order to be indifferent between investing in the US bond or the foreign bond?

AUDIENCE: It has to go down.

RICARDO J. CABALLERO: Exactly. It has to depreciate. Why?

AUDIENCE: So that the uncovered interest parity [INAUDIBLE]

RICARDO J. CABALLERO: That's correct, but why is it that you need the exchange falls today in order to restore-- to have the interest parity condition holding? OK, so remember what happened is that you had the same interest rate. And now the international interest rate went up.

That means it's nothing moves. Now you prefer-- you were indifferent before. Now you would prefer to invest in the international bond. If I don't change the US rate, then I have to compensate you by some other means. The only way I can compensate you in this model, the only thing that's endogenous is by an expected appreciation of the exchange rate because that would give you a capital gain from holding the bond, the US bond, a currency capital gain.

Now, since the expected exchange rate is given, the only way I can give you that is depreciating the currency today. So then you can expect an appreciation tomorrow, from today to tomorrow. OK, that's the mechanism. OK, so that means that this curve here will shift to the right.

For any given interest rate, you need a-- sorry, to the left. For any given-- I made that mistake in the previous lecture as well. So for any given interest rate, this curve will have to move to the left, OK?

So if the interest rate doesn't change, and international interest rate is up, you need an exchange rate today that is lower than it used to be. So you can expect an appreciation from now to the next period, OK? So that's when it moves to the left.

Now, what happens? What else moves in that case? I remember when I'm asking the question, what else moves, I mean, when a curve moves, what you need to do is just take something as given and then see whether we get the same equilibrium output or not.

So I'll take an interest rate as given-- that's the easiest-- and then ask the question, well, will I get the same equilibrium output or not? If I get the same equilibrium output, that means the IS doesn't move. But if I get a different equilibrium output, it means the IS has moved because, for the same interest rate, I'm getting a different equilibrium output.

So what happens in this case? Does IS move or not? When IS star goes up? Going to simplify the question-- yes, it does. [CHUCKLES] Which way?

Will I get more or less output when the international interest rate goes up? And I'm taking-- look the kinds of things I'm taking as given. I'm also taking as given international output. So I'm not moving Y star. I'm not moving expected exchange rate.

And I'm asking the question, if the domestic central bank-- the Fed, in the case of the US-- does not change the interest rate, what happens to equilibrium output? Does it go down or up? If the international interest rate goes up, the domestic interest does not. What has to happen to the exchange rate? You answered it before.

AUDIENCE: Goes down.

RICARDO J. CABALLERO: It has to go down. That means it has to depreciate. What happened to net exports when the exchange rate depreciates? What does it mean that exchange rate depreciate, especially if you have the-- in this case, we have the price is completely fixed.

So now, if the nominal exchange rate depreciates, it means that the real exchange rate depreciates. What does that mean? What got cheaper? OK, you need in order to study for the quiz. [CHUCKLES]

Domestic goods are cheaper. So that means that-- and equivalently, foreign goods got more expensive. That means, for any given level of domestic interest rate, now there will be less imports and more exports.

That means net export will be more, which means the IS will shift to the right, OK? Good. So these things you need to control. I understand that it's a little confusing to think about exchange rates and so on.

So anything that happens here with the exchange rate is just a relative price. The more expensive are your goods, the harder it will be to sell them [CHUCKLES] and the more tempted you will be to buy foreign goods. That's what it does. So that's contraction, appreciation or contraction here or not.

Here, the story's a little different. It's all about equalizing expected returns. So you need to have a movement in the exchange rate today so that you are always indifferent between investing in one side or the other. It's about the return, the expected exchange in the exchange rate. So OK, good.

OK, I got this a little unclear, but [CHUCKLES] we'll keep trying. Is there anything particularly unclear? Or it's all a blur? [CHUCKLES] OK, got it.

Well, let me-- so all of this I describe here is allowing the exchange rate to move. We're saying, look, if we move something or the foreigners move something, then we ask the question, well, what does the exchange rate has to do today here? And typically, when that's done, we call those regimes floating exchange rate systems, meaning the exchange rate can float, can move around.

As interest rates in different parts of the world change, then the exchange rate moves around. We typically call that flexible exchange rate. I think the distinction is a lot harder to make in practice, but-- for reasons I'll explain later. But that's what is meant as a floating exchange rate system, one in which really you're doing-- each country is doing its own policies and so on, and exchange it does what it needs to do so the financial markets clear.

Many countries, however, do something which is the polar opposite of that, which is called a fixed exchange rate regime. So some countries really peg their currencies to a major currency. An extreme case is the eurozone, where they gave up their individual currencies and they have a common currency. So Germany and Italy have an ultra peg exchange rate because they have the same currency, OK?

Now, most of the times, fixed exchange rates are a little weaker than that. For example, the Hong Kong dollar has been pegged to the dollar for a long time, for the US dollar for a long time. And I'll show you a few others. Many countries go through some phase where they tried to peg the currency, and it typically fails at some point. But they have periods in which the currency is pegged.

So let me-- suppose that you have a pegged exchange rate. Let me show you some features of it. Suppose you are in a peg or a fixed exchange rate regime pegged to another currency. And suppose this is credible. That's a big issue with fixed exchange rate, but suppose it's credible. There are some countries that have credible fixed exchange rates.

Well, if you have a fixed exchange rate with respect to some other currency, and it's credible, then you know the expected exchange rate is equal to exchange rate and equal to a constant. That's what it means to have a fixed exchange rate, OK? It's constant. But if this is constant, means you never can expect an appreciation or depreciation because it's constant. It's fixed.

And if you can't expect an appreciation or depreciation, then uncovered interest parity condition tells you that-- what does it tell you? That your interest rate has to be the same as the foreign interest rate. Why? What would happen in a credible peg, in a credible fixed exchange rate if the domestic interest rate is higher than international-- than the currency, the interest rate of the country you are pegging to?

What would happen? Suppose that-- I mean, a fixed exchange rate, and we have the same interest rate, and now, you unilaterally decide to raise interest rates. What do you think would happen with capital flows? What would you do to your portfolio?

If the exchange rate is pegged and is credible, it is as if they were issuing the same currency because it's the same-- it's a different currency, different name, but it has a constant in front of it, OK? So it's as if it was issued in the same currency. Two bonds that are identical and issued in the same currency cannot be paying different interest rates, because you would all invest all your money in the bond that is paying a high interest rate. And that's what happens here.

So it's-- mechanically, what would happen is, for some crazy reason, a country has a fixed exchange rate, credible fixed exchange rate decides to have an interest rate higher than the currency, the interest rate in the currency it's being pegged to, then you will see massive capital flows to that country. So there will be an enormous pressure for an appreciation of that currency. But what the central bank would have to do is start buying massive amounts of-- supplying massive amounts of currency for those that want to buy it because there would be an infinite demand for that, OK?

So in practice, what that means-- and sometimes you can do that for a little while, but not in a sustained manner. So what happens in practice is that, if you really have a pegged exchange rate, and you have free capital mobility, which is people can move in and out of your bonds-- China doesn't, for example. So it can allow itself to both control a little bit the currency and-- eh, eh be semi-pegged. And it still can move its domestic interest rate because they have capital controls.

But if you don't have capital controls, and people can move money in and out, it can do portfolio investment, as it happened with most of the advanced economies, then, effectively, you give up domestic monetary policy because whatever the other country does, the country you're pegging to does, you have to follow. So that's what it means. You peg-- you give up your domestic monetary policy if you choose to peg to another country.

A little later, I'm going to tell you why countries may choose to do that. But that's what you do. And the uncovered interest parity tells you that's what you do. You're not going to be able to deviate very significantly from the interest rate that the other country's setting if you want to maintain your fixed exchange rate.

Now, in practice, there are many hybrid regimes. There are very, very few pure float regimes-- a few. I mean, maybe five or something like that. So there are all sorts of degrees of exchange rate regimes which are hybrids between fixed exchange rates and fully flexible exchange rates.

Let me show you just a few randomly-- more or less randomly selected in*Bloomberg.* So there you have in white is the US-euro. That's a float. That's a cleanest float you can imagine. I mean, there is no-- then another which is a very clean float is the dollar-yen, Japanese yen.

Now, that's a currency that has that freely float. But if there is a major dislocation, central banks do intervene to [INAUDIBLE]. It means, in normal circumstances, they float. And the same is true with the euro. But if there's a big dislocation, some major bank collapses or something like that, then there are major dislocations in financial markets. They become very segmented. Arbitrage is not that easy and so on.

Then central banks intervene. But for the normal business cycle and so on, they do not. They don't intervene in the currency market. The intervene in different ways. And that's the reason-- I'll get there. And the other one is the pound. Now the US dollar versus the British pound, then it's also as a pure float.

These are also pure float. This is the US versus the Aussie dollar and against the Canadian dollar and against the Swedish krona. Those are pretty floating regimes. They are a little different from the previous ones I showed you because these are currencies that are much more prone to sell off during risk-off environments.

And that's the reason you see these spikes here, OK? This was COVID-- biggest spike. You didn't see it in the dollar-euro and so on and so forth. So these are currencies that are free floaters, but they're very exposed to risk, the risk environment in the market. But it's still they're free floaters.

The Swedes are a little bit more independent-minded. But they do control a bit more of the currency. But still, I consider those free floaters.

These are currencies that are a little different. This is the Brazilian real. The ZAR is the South African Rand. And this is the Colombian peso. And you see several things here. They do move, so they have a big component of flexible exchange rates.

They do intervene a lot more, though, because they are exposed to much more risk-off type environments and so on and they need to intervene fairly frequently to control movements in the exchange rate. But you also see a trend in these things. So their currencies are becoming chronically weaker relative to the dollar.

And the reason for that is because there are countries that have higher inflation. So if you want to maintain the real exchange rate constant, and you have higher inflation than the other country, then your nominal exchange rate has to be depreciated, because your prices are rising at a faster pace than the other one.

Well, if the exchange rate was not appreciating on-- depreciating on average, then it would mean that you were becoming more and more expensive, OK? So that's the reason countries that have higher inflation, they tend to have these trends as well, OK? But it's still fairly floating.

Here, these are all currencies that are, to a different degree, targeted, in the sense that they're contained in terms of they're not free to float at will. The scale here will mislead you. If I had put it in the same scale as the euro-dollar or the euro-yen and the dollar-yen or the euro-yen as well, then these things would have been-- looked very small, OK? So I should have put a real floater there so you would have seen that these guys are moving a lot less.

And these are different kinds of countries. This is the Hong Kong dollar that, for all practical purpose, is pegged. This little wiggles is just technical things that happen overnight and stuff like that. But they're pegged to the dollar, OK? So the Hong Kong dollar is pegged to the dollar. And that means they really don't have independent monetary policy relative to the US, vis a vis the US.

This is the CNH. This is the Chinese renmimbi. And it's a currency. Again, I should have put it with a real floater there. It's a lot more controlled. So it moves around, but in a much tighter range. And they are thinking about exchange rate. When part of their policy programs and so on, the exchange rate is something they are thinking about.

This one here, the blue one, is an interesting one. That's the Singaporean dollar. And the Singaporean dollar, they have a very interesting regime. They have a target zone, meaning they let the exchange rate move within a range only.

But it's not pegged against a single currency. It's pegged against a basket of currencies. And the recipe is secret. So everyone is always guessing what they're doing and so on. They do change the weights a little bit to keep the markets confused. But the currency is very stable.

We all understand it's a weighted average of the euro, the renminbi, and the dollar. But they don't disclose exactly the thing. But you can filter out what they're doing. And they keep things in a range, and they occasionally change the slope of that range. But it's very regulated in that constraint.

And in fact, they state their monetary policy in terms of the effects. They said, that's our policy. Interest rate is whatever it needs to be, so the exchange rate remains in that range. That's the way they state the monetary policy. They don't even think about-- so I let the markets determine the interest rate. We determine the exchange rate here in that range, and it's a narrow range.

Again, I should have put a real floater that you would have seen that. OK, so the point is that everything goes. There are all sorts of arrangements happening around the world.

These are different kind of currencies, no? This is the Turkish lira and the Argentinian peso. I think, through this sample, this has been called pesos. Since they have this very high inflation, they keep changing the name of the currency and so on because you have to remove zeros from things. But I think, through all that period, this is still the Argentinian peso.

So I mean, look at the scale, though. [LAUGHS] So you cannot see it, but all-- these two countries are all the time fighting against the exchange rate. In fact, Argentina today has, like, five different exchange rates. There is the official exchange rate. There is the blue exchange rate. There is the purple exchange rate. There are all sorts of things.

You should never pay with a credit card if you go to Argentina if you do tourism, because you don't want to pay the official exchange rate. You can get three times that in the blue market. They don't call it the black market. Since everyone does it, they think blue is fine.

So there are all sorts of exchanges. But still this is the official one. And even the official one you see sort of as completely exploded. The Turkish lira looks pretty good here just because I put it next to the Argentinian peso. Otherwise, it also would look pretty bad.

But most of these countries are all the time paying the exchange rate because they use that to stabilize inflation. The whole thing breaks up. And then, boom, they go through big spikes. You see this, for example. They're trying to stabilize-- there you see that they're trying to stabilize the currency. They're not floating there, that range. They were a little successful and [WHISTLES] And that happens all the time today.

And now, obviously-- I mean, look at the size of this. This is an appreciation of the dollar, so it's a depreciation of the Argentinian peso. What do you think is happening here? It looks very smooth, by the way. It's not that it's moving around. It's just [WHISTLES] What do you think is happening. Very high inflation, in the thousands. And that's what is happening here.

But again, this is a hybrid system. They try to stabilize frequently the exchange rate. The thing goes, and then they stabilize it again and so on and so forth. But you can't fight just having much higher inflation than the rest of the world. You have higher inflation, then there's no way around that your currency is going to depreciate. They try to, but they can't.

Anyways, so let me go back to this model and think a little bit more about the decision to have one kind of exchange or the other one and therefore everything that goes in between. So remember, just to remind you, that that's the model we have. So let me think about policy first, and then let's think how do you deal with policy in the different exchange rate regimes. And then we'll see why would countries would want one thing or the other.

So suppose a country is in a recession. We're in this model. And suppose that we are in the flexible exchange rate regime. So what should the fiscal policy do? Suppose you are in a recession. What should fiscal policy do?

There's nothing unique of closed economy here-- in open economy. In closed economy, you would have given me the same answer. If you are in a recession, what will you do with fiscal policy? Have expansionary fiscal policy, increase [INAUDIBLE]. So that means you move the IS to the right.

Nothing changes in the open economy. You keep doing that. The only thing that you get is a little smaller multiplier because part of that will go to imports. But still, it moves you in the right direction, OK?

And yes, and countries rely on other countries doing also their own expansionary fiscal policy. But suppose we're talking about a recession that is unique to this country. Then you're going to do an expansionary fiscal policy.

What would the central bank do? In closed economy? What--

AUDIENCE: Drop interest rates.

RICARDO J. CABALLERO: Drop interest rate. Well, in open economy, it does the same. You just drop the interest rate. It turns out that will depreciate your currency, which will help you, [CHUCKLES] as well.

So it's very expansionary because of that, because your currency depreciates, so net export goes up as a result of that. So you get the investment kick. You lose a little bit because part of it goes to imports. But then you also get the effect of net exports that comes from the exchange rate, OK?

So monetary policy is a great policy in open economy because it gets reinforced by the exchange rate. It's even better than fiscal-- other things equal, when you compare the two. The two policies lose power relative to the closed economy because the multiplier is smaller. But the difference is that the interest rate policy gets an extra kick that comes from the depreciation of the currency. So it's a very powerful tool.

So that's what you do if you have a flexible exchange rate. And that's what countries do in practice when they are free-floaters. Suppose you have a fixed exchange rate regime. And it's a credible fixed exchange rate regime.

Then I asked you, again, the question, what kind of fiscal policy would you run in that country? The same, expansionary. That's what you would do. And it's effective, as it was in closed economy, a little less because the multiplier is a little less. That's it. But no difference in the analysis.

In fact, fiscal policy has exactly the same effect as fiscal policy in the flexible exchanges in this case because I haven't moved the exchanges in any event, in either of the two cases. What should the central bank do? That's a trickier question.

AUDIENCE: If there's a [INAUDIBLE] does central bank know naturally what the foreign country's doing?

RICARDO J. CABALLERO: Yes, central bank knows. So it will have too much. Yeah, exactly. So the central bank cannot do anything. I'm saying suppose it is an [INAUDIBLE] recession. This country's in recession. Now it wants to use his policy tools to deal with that.

It has fiscal, but it doesn't have monetary policy. Unless the cycle of the other country coincides with your cycle-- so it's a global recession or something like that-- then you're doomed because other country's doing the monetary policy for what they're doing, what they need, not for what you need. And therefore, you don't have monetary policy.

So that's a costly thing of a fixed exchange rate. We already said, but now we're making it very concrete, because we are in a recession, and you realize now that you don't have a tool that you had before. So that's a cost of a fixed exchange rate.

Here is an example. Here, what I'm plotting is the policy rate in the US. That's the blue one. And that's the policy rate in Hong Kong. Very small difference, but you can see that-- these are technical things. But you can see that Hong Kong has to follow the US, essentially. It's exactly the same shape.

So Hong Kong doesn't have independent monetary policy, OK? Again, those are technical gaps and not really-- just look at the shape. It's exactly the same, not moving around. So Hong Kong doesn't have monetary policy, period. Not something they have. If they get a recession that has to do with their own cycle and that is not a result of something that is happening in the US, they don't have the tool to deal with that.

Of course, during COVID, and during the global financial crisis, they were aligned. So they [CHUCKLES] would have moved in the same direction. That worked. But if there is a shock that is Chinese-centric that is affecting Hong Kong, the US monetary policy is not going to react to that. And that that's a problem for Hong Kong.

Still, they choose to do it. A good question is, why? Always there is politics. There is more than the kind of thing. But there are also economic arguments for why you may want to do these things.

Another situation that I mentioned happens all the time, every other day in Argentina, for example, is speculative attacks on the currency. So you want to have a fixed exchange rate, but the markets don't believe you, that you're going to be able to keep it there. And so what happens? So look at this equation here. Suppose that you have a fixed exchange rate, but now the market thinks you're not going to be able to sustain it.

So that means suppose that this guy starts going down. This happens, again, in Argentina, every other day-- probably today, every single day. They want to say that they want [INAUDIBLE] exchange rate, but the markets don't believe you. And they expect your currency to lose value in the next few hours, in the case of Argentina. So this guy is going down. [WHISTLES]

What happens to the current exchange rate? So expected exchange goes down. Everyone expects your currency to drop. What will tend to happen to the currency today, to the Argentinian peso today?

AUDIENCE: It also drops.

RICARDO J. CABALLERO: It drops. But if you have a fixed exchange rate, you can't let it drop. And so if you're going to maintain an exchange-- a fixed exchange rate, and now you have a speculative attack, people think your currency is going to drop. And you want to maintain your peg. That's called defending the peg.

If you want to defend the peg, then the only option you have as this guy is dropping to keep the exchange rate is to raise interest rates a lot. That's the way you fight-- the main way you fight it. I mean, you fight it by closing capital accounts and so on, but that's the last resort. You first try to fight it with monetary policy.

So if this thing is dropping, you fight it by increasing interest rate a lot. And that's the way you stabilize the currency. But what happens when you raise interest rates a lot to defend the parity, the peg? What is the problem of that?

AUDIENCE: Increases output.

RICARDO J. CABALLERO: Yeah, you generate a domestic recession because just to defend your currency, your peg, you had to raise interest rates a lot. So it means you're going to have a recession at home, OK? So that's another problem of fixed exchange. It's a problem-- that's not a problem for Hong Kong.

It was in 1997. They did have a speculative attack despite the fact that they had twice the number of reserves relative to their money base. But still, they had speculative attack. But it rarely happens in Hong Kong.

In Argentina, again, every other day, but in-- same in Turkey. In Turkey, it's every 15 days. But it's happening all the time. So that's a problem, as well, because if you have to spend a lot of energy defending your peg, then you're going to be causing lots of recessions at home just to stabilize the currency, OK?

Thus, bigger economies say, well, OK, well, Argentina, Turkey, and so on, but these are bigger boys. Here we have-- this is the ERM crisis. So before the euro, more or less, the eurozone plus the UK had a system called the ERM-- EMS, ERM.

ERM is the model. Anyway, EMS is European Monetary System. ERM is Exchange Rate Mechanism, or something like that. And they're both linked. But let's call it the European Monetary System.

And the basic idea of the European Monetary System was that they behave very much like Singapore with respect to each other, meaning they allow themselves to move around, but only in narrow bands. The countries that have the more stable domestic monetary position, like France, [INAUDIBLE] Germany, the Deutschmark, and the French franc, where they have is bands of 2.5% up and down. And they move within those ranges. They didn't have a full peg, but they allowed themselves to move a little bit.

Portugal, which was a little-- had a little less discipline, they had 5% for each side and stuff like that. But the point is they would have narrow bands, OK? And they moved around in those narrow bands, and they kept their-- kept it for quite a while before the euro.

Now, here the whole system came under a speculative attack. What happened around there? You probably have no idea. [LAUGHS]

AUDIENCE: Maybe the end of the Cold War?

RICARDO J. CABALLERO: Well, it's really linked to that, yes. Yeah, it's the German reunification. So what happens is, when East Germany and West Germany unify, they had to have a massive fiscal policy, massive expansionary fiscal policy. And that big expansion put lots of upward pressure on German interest rates. And that led to big appreciations of the Deutschmark.

And the other countries tried to fight it because it had to be in this very narrow band. But they were experiencing these big speculative attacks. And so they had to raise the interest rate enormously. The UK tried to do it for a while and, essentially, said, ah, we give up. And then they abandoned the system.

The French tried to stay in there for quite a bit, OK? You can see the French franc. They didn't move. They didn't move. But it was extremely costly for them because the interest rate has to go up a lot. And so they got into a big recession and so on. Eventually, the whole system broke up, broke down. I mean, everyone left.

And eventually, they rejoined, but now in the euro. And the euro is a little different because, in the euro, you gave up-- there's no space for speculative attacks, because it's a single currency, OK? So that's the most extreme form.

Speculative attacks nowadays in Europe happen through different means. It's the-- well, anyways let me not get into that. But here you have-- so I'm saying having a fixed exchange rate is not easy, even for countries that have sort of very well developed financial markets and so on and so forth.

Now, it would seem, given all that I said, that-- I mean, there is no reason to have a fixed exchange rate. It is something-- you give up an instrument. And on top of that, you're subject to speculative attacks all the time-- not all the time. Well, it depends on how bad you are. But you have to be very well behaved, because otherwise, you're subject to speculative attacks all the time.

So why not do flexible exchange? Why-- what is wrong with flexible exchange rate? Well, I think the main problem of flexible exchange rate is that it tends to move a lot. I mean, we know that it moves a lot more than fundamentals, meaning productivity is a little higher in one country than in the other. Demand is a little higher than a country. But the exchange rate moves a lot more than those little differences justify.

And the reason-- one way of understanding this is the following. And this will serve as an introduction to the next topic of the course, which will be asset pricing and things like that. So let's look at-- revisit our interest parity condition, but now let's not assume that the next-- the expected exchange rate is fixed. I mean, that was an assumption just to make our life simpler, but it needs not be. So that's the uncovered interest parity condition is this.

Well, you see, I can replace this guy here for what will happen next period. It's the same thing shifted by a period with an expectation there. So E t plus 1 expected-- this guy here is equal to 1 plus expected domestic interest rate one period from now divided by 1 plus international interest rate expected one period from now times the expected exchange rate for t plus 2, two years from now.

And I can keep doing this. I can replace this by something equivalent to that with all the subindex shifted by one year, blah, blah, blah, blah, blah, blah. And so I can end up writing this exchange rate as this product of lots of things that can happen in the future, the monetary policy path at home, the monetary policy path-- not the next period, the path for years to come, of a monetary policy in the other country. And there is always an expected exchange rate at the end there that is free, that can move around.

So the problem of this exchange is that the future matters too much, in a sense. And people have lots of imagination, so all sorts of weird things they imagine. And when people have lots of imagination, then these things are moving a lot. And that's the reason you see enormous fluctuations in nominal exchange rate.

Now-- and that's a problem. It's a problem to have a very volatile exchange rate because it makes transactions more difficult. I mean, if the price of things are-- relative price of things are changing all the time, it's a little bit more difficult to plan. Financial investments become more-- because you get all this exchange rate volatility in between.

So that's one of the main reasons you would prefer, if you could, to have a more managed exchange rate. It's because you don't want this all this artificial volatility that comes from behavioral traits and things of that kind, OK? That's the main reason.

Look at this example, for example-- example for example, sorry about that. But this is Russia during the war. This was the ruble, the Russian currency. And when they invaded, of course, this thing collapsed. The currency collapsed, OK?

And this period is a little longer than you think. But it collapsed for quite a while. And then it recovered a lot-- actually overshot and came down. So this is not because the central bank said, we're going to devalue the currency or anything. It's just people said, well, this is a country going into war. It's going to be a mess, [MUTTERS] So all that future I talk about, essentially, destroy the currency, OK?

Now, a lot of that recovery happened there not because people now began to see the future as a better future or anything like that. It's because they have to hike interest rates massively. They were around 4% or 5%, and they had to go to 20% interest rates to defend the exchange rate.

Remember I told you, you have a speculative attack, and you have enormous pressure on your currency. Well, the main tool you have to offset that is to raise interest rates. So they hiked interest rates massively. They did a lot of other things as well. They put capital controls on lots of things. But this was the main thing they did.

And so they dragged the recession-- the economy into recession for war-related reasons and because of the monetary policy response they had to do with that, OK? So that's an extreme case of a war. But that's the kind of things that can happen in a floating exchange rate.

Even when-- I mean, the main constraint in Argentina and Turkey and so on is reserves. They don't have enough reserves. So if you have to defend your currency by intervening in the FX market, if you don't have enough, then you're not credible. I mean, if you have massive capital outflows, and you have a few billion dollars there, it's not going to work.

That's not the case of Russia. They had massive amount of reserves. So that was not the issue. It was all about expectations of things that happen in the future. It was all about these kind of terms, OK? Anyway, so that added to the cost they had.

So how do we choose these things, then, in practice? Again, there are lots of things. And politics play a role and so on. But there is a case-- so again, I would put it even the other way around. I think that, if you could, you would like to have a fixed exchange rate. If you could, you would like to have a fixed exchange because then you remove all this spurious noise that happens every single day because of exchange rate volatility that complicates your life.

So when can you do that? Well, first, you can do it with respect to some other country where the shocks are very similar because if you know that-- say your Mexico, but-- or the north of Mexico, something like that, and you know that all your shocks are really shocks to the US. Then the US can do the monetary policy for you because you have the same shocks. [CHUCKLES] I'm exaggerating.

So if you are very similar, then it makes sense to have a fixed exchange rate because why pay for all that volatility when you're going to be doing the same policies in both countries, more or less at the same time because you're exposed to the same shocks? So that's one thing. That's one reason why the eurozone is the eurozone, because there are European countries that have very similar business cycles and so on.

Germany is a little different. That's the reason they always have some problems. I mean, the north and the south, they're a little different. But they're much more similar than other countries. And so that's what they have one.

Another option is when you have lots of fiscal capacity because, if you have lots of fiscal capacity, then the cost of not having monetary policy is not that large, because you can fight your business cycle with fiscal policy. That's the case of Hong Kong, for example. Hong Kong-- Hong Kong, first of all, is not subject to speculated attacks because they have massive amount of reserves.

So anyone that dares attacking them is going to lose their shirt. So they're safe. Soros tried many years back, and he didn't do as well as he did attacking the British pound. But they also have lots of fiscal resources, so they can fight their domestic recessions and so on with fiscal policy.

The other factor, which also applies to Hong Kong, if you have very flexible factor markets. So if wages move very easily, prices move very easily domestically, then you don't care about having a fixed nominal exchange rate because a fixed nominal exchange rate is not the same as a fixed real exchange rate, which is what you really need to move around. If your prices are flexible, it doesn't matter that the nominal exchange doesn't move, because the prices are moving around. And so you still have lots of flexibility in the real exchange.

And that's the reason I would say-- it's one of the reasons-- political reasons, as well-- but why they can afford it. I think, in the case of Hong Kong, it's the other way around. There were some political reasons. And then they built a system so that it's a coherent system because they have lots of fiscal capacity, they can defend the currency well, and they have very flexible market.

This is-- well, again, this is what I said before. If you-- this is what I said before. If you don't like that noise, if you-- especially if you're going to be trading a lot with people and so on, in Europe, many people cross the border many times a day, and you want to go shopping one way or the other. It's a pain if the exchange rate is moving all the time. It's much easier if things are stable.

And the same applies to financial transactions. People have deposits in different banks and stuff like that. It's better if you don't have all that fluctuation. And in the case of the euro area, they decided that the advantages of having a very fixed exchange rate were more than the cost for individual countries of not having independent monetary policy. It's still a work in progress. They're building that. It's not finished, but they're working at it.

The other reason why countries fix exchange rate-- and that's the Argentinian reason and so on-- is when they have no control on inflation, they have no credibility. And so if you peg to another currency that has credibility, then the idea, the hope at least, is that you will inherit the credibility of the other currency. And that's what they tried to do.

Argentina had a currency board like Hong Kong for a while. The whole idea was to control inflation. Well, let's peg to someone. And if the markets believe you, then it would work because then you inherit the credibility of the-- you're saying, when you take a fixed exchange rate, I'm not going to run monetary policy, which is the main source of inflation.

So I'm going to let the credible country run the monetary policy for me. And that's what gives you credibility. As long as somebody believes it, you're not going to [LAUGHS] quit the thing. But that's the reason countries do it, often to stabilize inflation, as well.