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ESTHER DUFLO: So actually a lot of themes are criss-crossing in this documentary. It's pretty well done for managing to bring many of those teams up. So before we sort of I summarize them, I'd like to have your impression of what are the themes that seem to be important in like how the students get educated, the government's decisions, the parent's decision, et cetera? Yeah, Ben?

AUDIENCE: Cultural preservation. I forget the other one. It was the Kurds, and who's--

ESTHER DUFLO: Just the rest of Turkey, mainstream Turkey.

AUDIENCE: --mainstream Turkey and how they're willing to preserve their culture, and how that spill-over effects [INAUDIBLE] how they operate [INAUDIBLE].

ESTHER DUFLO: Right, so one issue that is kind of there is whether the whole education is a way to mainstream the Kurds, which they are suspicious about. That's a good point.

AUDIENCE: Yeah, I was going to say infrastructure, so actually physically getting the schools becomes a problem. The guy mentioned like when it snows, it becomes hard for the children to get to school, so they fall behind. And they have the desire to become a boarding school, like religious schools actually in their village. But because they don't have that, it becomes difficult.

ESTHER DUFLO: Right. So there is a supply constraint. There are no schools in the villages and getting to them-- they go by bus, but even that is difficult, because infrastructure is difficult.

AUDIENCE: It can also to be hard to find justification for this education, because although some people argue that there is still value to it, even if girls or boys who get educated just come back to the village and live with their family, but a lot of people say, well, what

is the point?

ESTHER DUFLO: So there is a question of the benefits of education. Yaprak's parents, what do they think the benefit of education is for her? What do they expect from the education?

AUDIENCE: For her to come back and contribute to the family.

ESTHER DUFLO: Is it what they say, or is it someone else who says that? What do the parents say, the mom, and then Yaprak say it also.

AUDIENCE: Her mom said that she wanted her to become a doctor.

ESTHER DUFLO: Her mom says she wants her to become a doctor. She also wants to become a doctor. And in fact there is this debate where people are saying, well, what's the point of education if we don't have a job that will take into account this education?

And there's this other guy who says, well, even if she doesn't become a doctor, there are these other things. But it seems to have a little bit of a minority view in this. You don't see any anyone asking her the question, but she answers, saying, yeah, yeah, there would be some value. But there's somewhat of a debate there.

AUDIENCE: When you're talking about supply, there's a lack of supply of teachers over there. So in particular regions, like the eastern region for example, teachers have to go out into those cultural sort of things. They're coming from different regions where culture's different.

And then at the same time, they may not particularly be there. They're passing through. You mentioned that do we go to train or to get experience in this way and then move on. So there's not sustainability. When you think about teaching, it's important that teachers build relationships with students and really pour into them. But when they're in this like transit sort of mindset, it becomes a little hard to do that.

ESTHER DUFLO: Right, so that's another supply issue from the supply side is whether there are enough teachers. And then that kind of interacts like it was a cultural issue. Who were the teachers? I think you're making two points that are both important.

One is the point that the teachers who are coming to them may not be as motivated. They might not be accountable to the community. They might be difficult to discipline. They might not care. In addition, they might be the ones who are trying to teach in Turk and not in Kurd, and all of that. So that brings the cultural dimension. Yup?

AUDIENCE: Another thing I didn't realize whether or not they mentioned in that movie. But there's a problem if all these girls are actually living in those boarding schools for most of the week. And they're just going back for the weekend. You know, they don't have that sort of family [INAUDIBLE] that's going to actually give them more balance. So even though they'll be getting an education, there's a huge drawback for the fact that they don't have their parents right there and telling them what they have to do. And nobody really knows what that could cause in the long run.

ESTHER DUFLO: Like you guys, far from your families-- yeah, I think this sort of comes a little bit in [INAUDIBLE] when they have this debate about I think they would like to have the schools in their villages. That don't like to send the kids to boarding school. I think one issue is are the kids mature enough to manage in boarding school?

And the other which is in [INAUDIBLE] of that, are they going to become different? Are they going to absorb these values that these guys are not necessarily looking for? There might also be a slight conflict underlying this, where actually from the point of view of the Turkish government, who is trying to make the Kurds into regular Turks. It's actually a good thing to get them away from the families.

But from the point of the view of the Kurd, that's kind of a way of following the exhibition. So that's one thing that goes with education, which you find in a lot of places. For example, there was a big education drive in Indonesia that I'm going to talk in a bit, which had exactly the same idea. Education is about imparting skills. It's also about imparting a world view. And therefore that creates conflict between the different people who have different ideas about what these worldviews should be.

AUDIENCE: Maybe also that those parents talked about the lack of [INAUDIBLE] practical things maybe teach about agriculture [INAUDIBLE]?

ESTHER DUFLO: Yes, so that goes back to what is the value of education? What's the benefit of education? So it comes back to well, fine, if she graduates and becomes a doctor, that's great. But if not, what has education brought? Maybe nothing. People might not necessarily see the value of the education that's imparted as being that great, unless you can make it to being a doctor, which would be great, but is a bit more of a leap.

AUDIENCE: I just have a question. So I figured how many children were in the household. My understanding is that they only send one to school, like the impact that has on the children who aren't in school. I know the mom at least said that she wasn't happy as she would like to be [INAUDIBLE] education [INAUDIBLE]. But is that mindset perpetuated because you have a child who's going to school kind of puts you in further [INAUDIBLE] your current circumstances, which could pose another problem.

ESTHER DUFLO: That's an interesting question. For example, the sister of this girl, Yaprak. what's her name? Was [? Meemet. ?] She wasn't in school, because she was too old to benefit from the compulsory education. So on the one hand, she gets some indirect benefits, [INAUDIBLE] benefits from the fact that Yaprak is educated. On the other hand, she also gets like these education envy, and feels that, oh, it would have been great if I could have been educated myself. So that's an interesting point.

AUDIENCE: We kind of spoke about this before, but just the idea of the value of education and what are the returns to it? So when you're most poor, you're just kind of raising everything higher. When you think about education, the returns are going to be much farther off.

This was sort of mentioned, but you get to a certain point and you need some education, then after a while, it's kind of like, well, you'll probably be more valuable if you just stayed home and helped out around the house. There's a dichotomy, I guess, between the social pressure for education and the home pressure to help your family out. We need to eat tomorrow, so this is a little bit more important. You'll be able to go to school when you feel like it, or when you get a little bit older. Or

maybe you won't need to go to school because we need a survivor now.

ESTHER DUFLO: Right, so there's another cost of that in the cost of getting yourself to school, and that now the government is paying for the bus, and is paying for the school, et cetera. But there is another cost, which is in economic jargon we call the opportunity cost, which is while you're in school, you're not helping out on the house. And that is something that is mentioned in the movie at some point, where they're saying, well, that's kind of one reason why people are not complying to the objectives. People are feeling that they are getting on their house.

And you said it exactly right. There is a trade off. Even if you don't bear the direct cost of schooling like is the case here, there is a trade off between the opportunity cost, when you're losing the value of the child work now, and the benefits that are far out in the future, potentially very far out in the future if you think that it's worth getting an education, only if you can become a doctor.

AUDIENCE: I was going to say, if the child goes back to the village, then they just wasted their time, essentially, if they weren't helping out.

ESTHER DUFLO: So that is the debate that they have at some point, which is at least some people feel that if you go back to the village, you just wasted your time. So the only value is to being a doctor. And at the same time they realize that it's not super likely that it happens. And then in general, if someone says that it's easier for men than for women to get jobs outside the village, there might be the other point I made earlier, that they might not want the girls to really leave to be outside the village. They might accept for them to leave to be a doctor, but they might be less likely to let them leave to man a register in a supermarket, which maybe is a job you could get with a good education without continuing.

And so if you're not going to leave the village to take that job, and they feel that there is no value in between, then you would have no reason to pay the opportunity cost. So that's where kind of this debate or tension comes up. Is any of it valuable? Or is it only valuable if I achieve a sufficient amount to really get like the lottery ticket of having a chance to become a doctor.

So what does this bring, this idea that the benefits of education may or may not be obtained from the first years of education? We might be able to obtain them only if we get enough education. What does that remind you of that we have seen?

It's that idea of the S shape. So the question, and here, again, at this level, as usual it's a question. Is there S shape in education? So are the first few years of education valuable, because you learn how to socialize.

That's what they said in the movie. You learn how to socialize. You learn family planning. You learn maybe to read the instruction in the packet of fertilizer for when you come back to the farm. So there might be reason to think that even the first years of educations would be valuable.

Or is it the case that the first year of education are not really valuable, that the only thing that's worth it is a college education. And the first year of education, all that gives you is the option value of going to high school and college if you want to. The latter case is a case where there is an S shape. So unless you get enough education, it's not worth it. At the former case is a case where there is no S shape.

And so one empirical question is whether it's actually an S shape or it's actually not an S shape. Another empirical question, of course, is the value of education, whatever the shape the overall level of the benefits. And the third question is what people are thinking? Because even if it's in fact linear, if people think that it's actually S shape, then it's going to influence their behavior. And it's going to influence the choice that they are making.

So for example here, they have all these discussions about is it even worth it to send the kids to school or not. And they never question the fact that it would be great if she could become a doctor. But they might question the fact that there might be a value of anything below being a doctor. Is there anything else that comes out of this? Yeah?

AUDIENCE:

I think Ben might have talked. I heard him say something about cultural-- but just the idea of the head scarves, the preventing of the girls from going to school, and

then the idea of Kurds being assimilated as opposed to being integrated in a way that helps them maintain their culture. Again, that's something that would deter me from going to school.

ESTHER DUFLO: Right, so that's kind of the convex combination of the two points, Ben's point and the point about once you send them to boarding school, they're not under your thumb. You can't check what they are doing anymore, which is reinforcing in Turkey that's it's not allowed to wear a head scarf in school. So from the beginning, there is a conflict there. Is school aware of indoctrinating the kids away from what you would like, under the guise of providing them with valuable skills in the labor market? And there is certainly some amount of that, to be honest, that's actually said by them.

The only thing we missed from the movie-- well, we might have missed a bit more-- but the only piece we missed that I remember and is worth pointing out is the woman with the hair like that who speaks with this very posh English accent, the columnist from *The Economist*. She has the last word. And she mentions one thing that might be worth pointing out, which is this is compulsory education.

This drive to compulsory education was very much of a top down intervention, was done without any consultation, or anybody, which is done. And the way the schools are run is run in this completely centralized way, with a centralized curriculum, with the teachers appointed from the center, the kids driven to boarding school, et cetera. And she says that that's not going to work, that people are not going to accept or not going to really be in the mood or thought to be really groovy about the whole education thing, unless they're given some autonomy in running the schools.

So that's an important point, because that's the point that many people make, that any effort at top down education will meet some resistance from the people. They might still go because they have to go, but the parents won't be very engaged. The children won't be very engaged. The teachers might not be very engaged. And nothing will happen.

So we keep that in mind. I'm channeling her, because I want to keep that in mind as

we have the discussion. Because this tension between education, board-funded top down, and education, emerging from the bottom up, is one of the central debates in education.

So I think you guys said a lot of the things that I wanted to touch on. Let me kind of make sure that we have everything together. So the stories of a Kurdish girl who goes to boarding school after education was made compulsory until grade eight. So many important themes appear in the movie.

I think we mentioned them. One are all the questions about the supply of education, so that seems to have been a constraint before this big education push from the Turkish government and still is a constraint. There is no schools in the remote villages. The roads are bad.

Transportation is difficult. There is a shortage of well-trained teachers. Therefore there is a large class size, and the teachers are moving, what you were saying about the teachers coming from far away not being necessarily the best teacher, most motivated teacher.

For part of the international community, these types of constraint are the only thing you have to worry about. I think you guys have all seen a picture of a little African girl in a village saying, that if only she had a school, she would study until she would become a doctor. So there is a whole branch of the international community, governments, et cetera, for whom the only problems with education are supply problems, and if only we could get rid of the supply problem and make sure there are enough well-trained teachers, then the kids would go to school. They would learn something in school. And they would all be very educated.

So the problem is a problem of fixing the supply constraint. But what we see in the movie is that these are not the only constraints. So the reason why it's relevant is that a lot of the international community, a lot of the policy was in aid. And the policies implemented by the government have that flavor in mind, which is let's fix the supply problem.

So for example, a lot of African countries have gotten rid of school fees completely to make sure school was free. You go to a country like Kenya, and there is a school every 25 meters, because every community who wants a school can get one. So there is plenty of schools. In some sense, one could say too many schools in that the class size is actually quite small at the top.

And in India, it's the same thing. India is debating a right to education, where if you don't have a school right near your village, you can get one. But what we see in the movie is that it's not the supply constraint, not having a school near you, et cetera, is not the new problem.

In fact, Turkey is not only building schools, and building these boarding schools, and having kids travel in minibuses to go to the school, they also made education compulsory. And if the only problem was supply, then making education compulsory would not be necessary. You would put the schools there and people would be delighted to go. And you wouldn't need any compulsion.

In fact, Turkey decided that the only way that they could get a fast increasing education was to make education compulsory. So implicitly, there is the argument that, well, maybe people would not want to go to all the schools. So there must be a demand constraint as well. There must be a lower demand for education.

So what constrained them? We mentioned that. One is no economic resources. So they don't have money.

So this in principle, the direct cost of education can be compensated by making education free by paying for books, by paying for transportation. But there is also the need for child labor. It was mentioned in the movie. The kids who are in school are not helping on the farm.

Then there is the need to get married, which was mentioned by Yaprak's sister. She says, now I need to get married. And you can be married and in boarding school. In principle you could, but it's not very frequent that you would be both married and in boarding school.

So this is not a cost effect. This is something which is more about culture. Maybe the husband wants a young wife. Or there is something different than just a strict opportunity cost effect. Like, why do they think that it's important to get married early instead of continuing schooling?

So these are only important because they're mentioned. And there are the benefits. Is it useful? Or is it useful only if you get enough education? If it's useful, do parents know that it is useful? What do they expect of education? Do they expect that education is making their child generally better at living their life? I'll do they see education as-- the woman employs a term that is interesting-- it's almost like a foreign currency.

So people see your education diploma. Do you see that as something that if you get enough of it, you can actually sell to the market? What is enough? Is it a foreign currency that you could get a few cents of and that would be good enough? Or is it a foreign currency that you need a big packet of to be worthwhile?

And in the movie, what was interesting was is that we saw different people having different views about whether it is a foreign currency, that is, you have to take it elsewhere to benefit from it? Whereas you could also benefit from it just in your general my life, with having fewer, healthier children, being more socialized?

I think it's again Yaprak sister who sees another advantage of education for girls in that it is going to increase her bargaining power within the family. Since traditionally girls are quiet and don't say anything and men have all the power, and if girls get education, that is going to improve their bargaining power within the family.

And that is something that girls may find very attractive and their future husbands might find less attractive. And here the question is what are the fathers going to think? Yaprak's father, on the one hand, probably he has in mind the value of keeping the girls in their place.

On the other hand, he likes his daughter. So there is probably a conflict within him between the fact that as a man, he doesn't want to conflict with his wife, so we

would rather the woman being lower down, but as a father probably likes his daughter more than his son in law, who doesn't even exist yet. So there might be a conflict here in his preferences which might easily lead him to say, fine, she should get an education or no, we want to move forward.

And what is interesting in the movie is that he clearly sees himself as a bit of a [INAUDIBLE] leader and a modern character. So he seemed to have concluded this debate from his point of view to say that OK, I'll send her.

AUDIENCE: I have a question. I'm wondering with that attitude if it's sort of like we'll just indulge the girls for a while and let them go to school, but we know secretly that we're still going to take the power we have and not actually concede anything and respect the fact that they [INAUDIBLE].

ESTHER DUFLO: Right, so there might be a little bit of that. So just to repeat the question, the question was, are they just indulging them for a little while and then going to bring them back in line? And then education is more like it's not seen as an investment anymore, but more consumption value for the girl, since the government is providing it for free and she's kind of a bit too young to be really helpful in the farm.

Let's get her get an education, but we kind of know that at the end of the day, it's not going to change her life. And we certainly maybe hope that it's not going to change her attitude. What's interesting is that if this is what people had in mind is that that's clearly not her view. So that might be a little bit of disconnect here, which would be in her advantage in terms of when she gets the education.

So here if we're thinking of these bargaining power issues and this potential conflict withing the father between his goal as a husband where he wants to keep the power, and his goal as a father, where he would like probably her to have some power, is that that may change with economic goals in the society and what are the opportunities he sees for her to do something with the education. If the society's completely paralyzed, then in a way the benefits of education are very high for her, so he has less of a reason to want to go to it.

AUDIENCE: Just from watching the video, it seems like it is possible for them to combine both the cultural values and the value of education. Like for instance, clearly it is a male-dominated society, but here we watch the scenes where there's a bunch of men, sitting around, and they're talking the value of education. It's still the women who are serving them tea or whatever it was. And they still see the women, the girl who is getting the education, she's still helping with the children and all that. So it seems like--

ESTHER DUFLO: Yeah, it is possible that even with the education they are still going to maintain the differences. What is interesting is that there is a level question and a slope question, which is it is possible that the girls have so far to go that getting an education wouldn't be sufficient to make them become equal. But that would still go in that direction. And at least some of them seem to have the hope that it would bring it in that direction. But you're right.

So those are the expected benefits of education. And then there is what worries them about the schools. We've mentioned the culturalized assimilation, the fact that it might be like a covert way to assimilate them to a culture that's not theirs, and the fact that maybe there are no benefits, the fact that just if sending the kids away is not a very good thing. Potentially they are worried about them.

So these are the demand issues. So the demand issues are a little bit tricky, because depending on how this thing balances out, what are the benefits they see versus the feel they have versus the immediate cost of not having the kids on the farm. Or the decision of sending the kids or not sending the kids is not obvious, even if education is free. And making education compulsory, of course, pushes them in that direction.

So is benefits of education that are touched upon in the movie are of different kinds. There is this foreign currency idea-- you get a job. You get a higher wage. They hope that the girl is going to be a doctor. So the issue is can everybody become a doctor? And probably not.

So even though they don't say it in the movie, they must have in the corner of their

mind that they're not quite sure that she's going to make it. They sort of say it, but they're not quite sure it's going to make it. And that uncertainty and the fact that the objective is so hard certainly has some impact in how serious it is to take the whole thing.

And then there is the possibility that just getting an education would help in your job, doing your job better, even if your job is to be a farmer, coming back to the farm. And nobody seems to really say that. It's only mentioned in a negative way, which is if only they taught something useful like home economics then maybe we would be able to have some benefits of this education. But that's not what they are doing. And so maybe education is useless or is seen as being useless at the lower level.

Then there are the non-monetary dimensions of getting an education. Girls will become more socialized. The family planning, they'll have more friends and know how to interact with people in the city, et cetera.

And then there is the idea of learning things that you can teach others. So the one guy who has an college education in these men's discussion, he goes and say, well, let them get an education, come back, and teach us some stuff. And so this is the external spill-over value of education, which is the opposite than the one that Ben had mentioned, which was the education envy. But it's the idea that if I get an education, if there is some benefits, for example, I learn how to read the instructions on the fertilizer package, maybe I learn to use new technology in agriculture, not only it can be useful for me, but potentially it can be useful for others. So if that is the case, a village might decide to focus on the smartest kids on the block and make sure that they at least get an education so that everybody benefits.

So those are kind of the benefits of education. So one empirical question is what are the real benefits of education? The other empirical question is what are people perceive to be the benefits of education?

Another thing that he touched upon in the movie is this top down versus bottom up. So here the government is trying a big top down approach, trying to do it very fast-- putting all the money from the top, making it compulsory, which is the ultimate top

down, and instead of supply-drive policy, has been, as I was saying, popular in many countries. Many African countries-- Kenya, Uganda, Ghana-- have recently, relatively recently, in the last 10 years or so, have adopted free primary education and moving to free secondary education now. India, as I was saying, has a right to education, which actually allowed people, in principle, to sue the government if they don't get a school.

So the supply drives have been the main education policy say in the last three decades. The Millennium Development Goal specified that every child should get at least a basic education, basic goes to nine years of education. What is interesting is that there is no mention anywhere that they should actually learn anything in those schools. It's sort of assumed that if they get nine years of education they'll get something out of it. But as we'll see, it's a pretty big assumption.

And there are certainly some clear signs success of these big supply drives. Between 1999 and 2006, the enrollment rates have increased, in Sub-Saharan Africa from 54% to 70%, in East and Southeast Asia from 75% to 88%. These are primary schools only. Secondary school enrollments have also increased, even though secondary school is much more expensive, much more difficult to do for governments.

So worldwide, there are still a bunch of millions of kids who are not in school, but much less in 2006 than they were in 1999. So is it all worthwhile? That's the question that Easterly is asking in the reading for today. And what is his answer? His answer is not that graph.

AUDIENCE: I thought education in itself, an increase in education, is not going to cause and increase in growth.

ESTHER DUFLO: Right. He is saying it's useless. And how does he explain that despite the fact that it's used less people have still done it? Yeah, go ahead.

AUDIENCE: [INAUDIBLE].

ESTHER DUFLO: Go ahead, go ahead.

AUDIENCE: I was going to say because the increments in the [INAUDIBLE].

ESTHER DUFLO: Exactly. So what Easterly is saying is that you guys have been fooled by this graph. These are countries-- USA, Romania, Paraguay, Venezuela. And these are the average years of schooling of the population. And this is the log output per worker, relative to the US. So everybody is negative because the US is a richer country in the world.

And what you can see here is that there is a pretty strong correlation between the log output per worker and the years of schooling. Countries which have more years of schooling are also richer. So one could conclude from there that year of education increases income. And people have certainly drawn this conclusion. What is his point about this graph?

AUDIENCE: I'm not sure this is the point but, it's the idea of mobility bias. We have more education, perhaps that's because we have some sort of mobility. I mean, I don't know if this is--

ESTHER DUFLO: This is countries.

AUDIENCE: --in the national sense.

ESTHER DUFLO: Think of it's like he made this argument, not for a person, but for a country. What's different about these countries as well?

AUDIENCE: They also have more greed. Their GDPs are higher, so they have some more opportunity for school.

ESTHER DUFLO: Yes, they are more flourishing for younger people. We run this graph with the number of football team you have. You would have a lot of zeroes. It wouldn't be such a good graph. But you would have the same relationship that places that play American football are also richer. And we don't think it's because of American football. Or I mean I don't think so. You may have a different view.

So that correlation is not very informative. So what he's suggesting is to say, so let's

not look in levels. Let's look in differences.

And I couldn't find such a nice looking graph for differences, but here is one. Now we have the difference in human capital from it's 1990 minus 1965. It's a difference in the log other ideas of education.

And now we put the log difference in income. You could do it in level log, except that doesn't matter. What's relevant in this graph is you get a big cloud of points and a completely horizontal line.

So if I can say this graph in words, what this is saying is that the countries which have increased the most the average years of education of their labor force, are the countries which have put more and more kids to school have not become richer.

So you compare in the Easterly reading, he had a comparison between different African countries which had made different levels of progress-- so I think, so for example, Ghana versus Madagascar, and saying that Ghana has increased education more, Madagascar increased education more, and Ghana is not going faster than Madagascar. Actually, I don't think that's true anymore. I think subsequent to that, Ghana has increased quite good and quite a bit faster than Madagascar. But that's, let's say, was the point, were the keys at the time.

So now we interpret him saying, well, when we take the difference out, now we are at least seeing what has been the effort terms of increasing the years of education, versus the gain in terms of increasing the GDP. And we see no effect. So the level relationship was all coming from this bias In fact, there's no effect of the years of education.

And the bias in the level of regression are some form of the ability by us as USA which countries have more education, because it takes money to have teachers. They can afford it. Or maybe they choose to be educated because when it's more worthwhile to get an education if you can do something with that education. So that comes back to this argument of what's the point of getting an education if you're going to come back to the village anyway?

So if education allows you to take advantage of the opportunities that are afforded by economic growth, then you're going to be more willing to get an education if you think that the country is going to grow a lot. So for all these reasons, and you would expect more education in rich countries, not because education causes growth, but because growths cause education.

So his conclusion is that internationally driven investment to education were a waste, that education is actually useless. Now there's a bunch of problems with his argument, because in a sense what he is saying is that I don't see any evidence across country that there is a lot of increase in GDP coming from increasing education. But the issue is we don't know why these countries increase education. We don't know what would have happened if they had not increased education.

So for example, many of the African countries that increased education the most also had severe civil war subsequently. It is possible that education caused the civil war, but it's not very likely. It is more likely that the social tension that preexisted in the country caused the civil war. One possible answer to the social tension may have been, well, let's try and get people an education. Yep?

AUDIENCE: This is interesting because I guess in our standard macro classes, you look at a factor of A as a multiplicative factor that increase in GDP. And typically, maybe I'm thinking about it wrong, you look at that as if you have increased education, it could be worth more innovation. If you have the technology, you still go for the forms or operating a computer. And education helps facilitate that group. So I'm a little confused as to how you make this conjecture.

ESTHER DUFLO: So that's an interesting fact. I think in a sense, in your macro class you may have been interpreting this graph. And there is certainly a lot of theories for why education would be good for growth. So one of them is the one you point out. This is the externality argument that we were making about the movie. One person who is educated can figure out some technology, and then everybody can use the technology. So they are all these spill-overs, which is why we would get this pretty strong relationship between education and income.

So there a lot of theoretical reasons to think that there could be a macroeconomic relationship between education and income. And in fact, we see one, which is why everybody is happy thinking education is a good thing. What Easterly is saying is just commenting on this graph, which is he doesn't see a relationship. Because when he does, the relationship in differences now between growth and education and growth and income, he doesn't see the relationship anymore.

AUDIENCE: How long is that?

ESTHER DUFLO: That's 1990, 1965, just about 30 years. Yup?

AUDIENCE: I have a question. In Easterly's paper, he mentions the productivity factor. And he says that only a small percentage of this is accounted for by [INAUDIBLE] capital and by machinery and other forms of capital. What is the rest of it? Like, what is productivity in that case?

ESTHER DUFLO: So that's an excellent question. The answer to this question is that's what I do what I do and not macroeconomics. If you're looking at growth across country, and you're trying to account for the growth in an pure accounting sense, which is to say, so imagine that you each country is a big machine. Think of a country as a machine.

So there is a machine. There are some people to operate the machine, labor. And there is some human capital to think about how to operate the machine. And then there is some spunk.

So think of a macroeconomy as that. In letters, we write it as an A multiplied by K , that's the capital, to some power, multiply by L to some power, multiply by human capital to some power. That's your macroeconomic model of an income.

We can observe K to some extent. What's the capital in the economy? We can observe L to a pretty good extent, how many workers there are in the economy. We can observe H to some extent, what is the the human capital, usually measured with education. And the rest spunk is what we don't observe.

Now we can say, well, let's look at what share of the level of income of the country,

differences in income across country, are what share of differences in growth across country are explained by those factors. And the answer is not very much. So the answer is that we use factors such as capital, labor, and human capital, measured in this way. We don't explain much of the gross differences across country.

This is one of the reasons why, which when you look at growth and you look at the differences in human capital, there's just no relationship. There's a bit more with physical capital. And the rest is like, we don't know.

So technological progress is just a fancy term for we have no clue what the hell is going on, which is to me saying that well, if we have no clue what the hell is going on, then it means that we need to go beyond thinking of the economy as one big machine. And we need to start to understand what is happening. Look at micro level. That might start giving us a sense of what might actually be going on.

Because technological progress is not just how good is the chip in your computer. You think of this as, as I was saying, the spunk, how people interact, all of that. So in your macro class, you either saw this graph and commented on it, or you may also seen a graph where you have growth on the left hand side and level of education. You do see a strong relationship between growth and level. These countries which had more education in 1965 have grown faster between '65 and 1990.

But what Easterly objects to that is that yes, of course. Because if you anticipate growth, that's how you're going to decide to get education. Because education becomes more worthwhile. So that does not tell me that education is worth anything.

So that's where we are with the macro data. And my bottom line is not that your macro class is wrong or that your macro class is right. My bottom line is we just don't know by just looking at these data. We don't have enough data points. And anything could have happened.

In the countries which were about to have wars may have invested more in education perhaps as an attempt to not have those wars. Who knows. So in order to answer the question of what's the benefits of education, we need to look at specific examples.

So ideally, I would have liked to look, for you, at the example of Turkey, because we just saw it in the movie. But I don't have it. So we'll be looking at the example of Indonesia. So if we are looking at the effect of supply-driven expansion, there are some arguments where one could see that it's not going to work. And these are arguments that Easterly is making. And we kind of all saw them in the movie.

There was the point about the teacher quality. If the teachers don't care because they've just been spar shoted by a central government to the community exactly as you were saying, then the level of education is not going to be very good. If the parents don't care and just do it because they have to do it, then they are not going to put pressure on the teachers to actually deliver.

And they're not going to put pressure on the children to actually learn. So the | case is the point that you were making earlier, where the children are all alone in boarding school, and nobody's looking after what they do. And potentially, they learn nothing, or they might learn to do all sorts of bad stuff.

So if parents do not think that schools are delivering anything useful, then they won't pay attention. And finally, children, if they also don't care, won't pay attention. So these are all theoretical arguments. I'm not saying they are correct. But these are the types of argument that Easterly is making.

So how would we know whether or not there is a benefit of education? So as I was saying, I don't you want to interpret the cross-country evidence. I think it's very difficult to interpret. So I want to focus on one country, and this one company that did almost the same thing that Turkey did. And fortunately for us, they did not a few years ago, but many years ago.

So now we can look at those kids as they are in the labor market. And we can see

whether it was beneficial for them to be sent to these schools. So that country is Indonesia. Indonesia is an oil-producing country. So when there was a big oil shock in 1970, starting in 1973, for Indonesia, it was actually good news. Because there were producing oil, so they became richer.

And they decided that they were going to use this oil money to build a lot of schools. Basically, all the oil money the first few years went into building tons of schools. Tons means they build almost 62,000 schools all over the country. But particularly in places which had a low education enrollment. So it's your ultimate top down.

Furthermore, what is interesting in relationship with Turkey is that they had exactly the same objective, which is they wanted the kids to learn Bahasa Indonesia. That's the language for the country, even people in the outlying island and stuff like that. And they wanted everyone to learn the state ideology, which was the Pancasila. It's kind of halfway between an ideology and a religion that [INAUDIBLE] was keen on.

So it was entirely pushed by public effort. If it was going to fail, then this was going to fail. And what do we see? So these graphs are the number of schools that were built in the region. And this is the difference between the education of the young cohort who benefited from the school, and education of the old guys who didn't benefit.

So you see that in general, it's always positive, because education went up over time between the younger and the old. That makes sense. But it is also increasing in slope, that is, places which got more schools got more years of education. Maybe that's not surprising, because that's almost a mechanical result of putting schools.

But this graph is an interesting one. I'm now looking at the wages of people in 1995, difference between the wages of the young, minus the wages of the old. Now it's all negative, because old people have more experience and tend to make more money. But what is interesting is not the negative thing. It's the slope again. The slope is again positive.

So it is saying that compared to the old guys, the young people benefit more in

places which build more schools. And it's very difficult to think of a story why would this be the case, except that the benefit is from the education. So it seems to be the case that parachuting more schools to communities increase the years of education, increase wages. And that seems to imply that education increases wages.

And in fact, if you put two and two together, you find that the effect of education on wages is about 8%. You can use similar experiments to look at the non-monetary effect of education. So Taiwan around the same time, little bit before, also did a top down drive to increase education.

What they did is compulsory education. And what you find in 1968, and what you'll find is compulsory education in Taiwan led to an increase of education. That's not surprising but also a reduction in infant mortality in places where education increased more as a result. So again, these are the non-monetary benefits.

Nigeria did the same thing as Indonesia for the same type of reasons. They used their oil money to build schools. Again, they built more schools in some regions than some others. And again you can compare the changes in infant mortality, and infertility, and in wages in places where they built more schools and in places where they built fewer schools.

And the more schools they built, the higher the education, the higher the wages, the lower the infertilities, the lower the infant mortalities. So the bottom line, when we do look at specific top down policies is that they actually are useful, that it seems to be that there is a returns to education, corresponding to about 8% increase in wages for every extra year that you spend in school.

So when we look at this thing in detail and we answer these questions, we see yes, there is a benefit of education. What we are going to do next is to say, well, is the benefit as high as it could be? And that's where we are going to see the limits of these kinds of things, having to do with the quality of education, the motivation of the teachers, the motivation of the parents, et cetera, which we'll do next time.