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ITU Workshop on Fiscal Incentives to Accelerate Digital Transformation of Data and Applications Over Telecommunication Infrastructure

Session 6: Research perspectives on challenges for the digital transformation

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>> Recording in progress. Recording stopped.

>> CHRISTOPH STORK: Perfect. Thank you. Good afternoon.

Can you hear me?

>> RAUL KATZ: Yes.

>> MARTIN EUCHNER: Yes, we can hear you, Christoph. Thank you very much. Sorry for the delay. There were some technical issues. Go ahead and start sharing.

>> Recording in progress.

>> CHRISTOPH STORK: Thank you. Welcome back after lunch break. This is -- I have to change something.

This is Session 6: The research perspectives on challenges for the digital transformation. And we are going to have three presentations. There will be Raul Katz, who is the President of Telecom Advisory Services and pioneer of measuring the impact of broadband on the economic and economic growth and taxation, and he will be presenting on the impact on economics and what the shrink between the different marginal variables.

The second presentation given by Philip Mader who is a multidisciplinary scholar of development, digital finance with many books and research papers to his name. And he will be answering the questions about links between money and macro economy and taxation and tax revenues. And also about the payment digitalisation and the impact on tax compliance and tax

efficiency and what potential evidence gives are that we will need to generalize some of the findings.

And my name is Christoph Stork. I partnered with ICT Solutions. I will be presenting on the regulatory issues and the entire value chain. And I will try to address level the need of the playing field, and whether there's a need for more regulation to ensure fair competition.

And at this stage I would like to hand over to Raul.

>> RAUL KATZ: Well, thank you very much. Let me just get my video on. And I'm going to share my screen, if I can. Can you see the screen?

>> CHRISTOPH STORK: Yes, we can see it. Thank you.

>> RAUL KATZ: Very good. Yeah. So, the question here is whether taxation can play a role in terms of accelerating the deployment of broadband particularly, and ultimately having an impact on economic growth.

And the issue is being raised in the particular context of the situation that we are experiencing in terms of the investment in telecommunications around the world.

These numbers show investment in telecommunications infrastructure per capita, that means per person, that includes both the fixed broadband and mobile broadband. And we rely on data from the ITU, as well as GSMA intelligence. And the way these numbers are normalized by population and if you look at it and highlighted in yellow in the time series going from 2018 to 2021, what you are seeing is the years where that investment has declined. Clearly, there are a couple of issues to mention. And one of them is the decline that you see in 2020, which is the COVID year where operators were particularly concerned about where spending in telecommunications was going to go and, therefore, how much they would have in terms of resources available for investing in network deployment.

As we all know a critical factor that drives the volume of investment is sales. And there is like some sort of a benchmark or parameter that says that roughly telecommunications operators invest 20% of their sales in capital, in terms of deployment of new networks, as well as other needs that require capital spending, buildings and the like.

If you see highlighted in yellow in 2020, around the world you see a particular decline in telecommunications spending per capita. And that is quite noticeable in some countries. But, more importantly in the developing world.

Why is the decline important in the developing world? Because these regions are dependent on investment to accelerate the deployment of networks and, therefore, the penetration or

the adoption of broadband in order to address the digital divide.

And why that decline has been less noticeable in advanced economies, well, particularly because in the view of operators, the advanced economies were more resilient in terms of facing the disruptions, the economic disruptions of COVID.

The other issue that is important to mention here is look at the difference between the investment per capita in North America and Western Europe relative to the amounts in the developing world. What we are realizing here is on one side the structural issue. Part of the -- and, as I mentioned before, part of the reason why the investment is so low in the developing world is the level the ARPUS, the average revenue per user. When the average revenue per user in the developing world is \$10, let's say, versus in the advanced economies where it could be roughly 40 to \$55, the resources are available per user in operators providing service in advanced economies is much larger. Since it's much larger, the resources available for networks is higher. That's not the case in the developing world. When operators are making \$10 per user and they have to, on the other hand, purchase equipment in the world market in dollar denominated currencies, that puts a strain on their ability to invest. So, that's structural. That's not something that we are going to change because the fact that \$10 is the average revenue per user in the developing economies is driven by economic growth.

But that being said, we still have an issue, particularly in light of declining telecommunications spending, we have a persistent digital divide. How do we address that?

The roundtable of economic experts that is convened by the ITU on a regular basis came up with a list of initiatives that could potentially address this. And I categorize them here in this chart around regulatory changes and fiscal changes.

And just to reiterate on the regulatory side, we have issues such as promoting infrastructure sharing, which allows for higher economies of scale in deployment of towers and any passive and even active components of the network.

And secondly, exploring new business opportunities that would increase that average revenue per user in terms of fintech services, e-commerce, new media platforms. The objective here is to see whether there's any possibility for the telecom operators to increase their revenues by promoting new services, which in turn would allow them to invest more on the deployment of networks. That's the second opportunity on the regulatory side, which it could be a regulatory, but it's more a business

side or supply side innovation.

And the third one is to see on the supply side business model, see another opportunities for changing the way by which services are being provided to populations in rural territories, and that could be community networks, microtelecos, wireless ISPs that realizing on analyzing spectrum.

In addition to that, and moving to the right-hand side, there are some fiscal changes that can be put in place. And one of them is whether we reduce the taxes that are imposed on telecommunications operators, that would increase the available capital that is invested in networks.

And I'm going to talk a little bit about that and this is less so over reiteration of the so-called laughter curve that says, basically, some of you might be aware of this, laughter economies on the conservative side of the spectrum in the United States that said, well, if we were to lower taxes on corporations, therefore, their investment and the potential economic impact is going to increase. It's more subtle than that particular formation.

And the other one is rebalance the fiscal framework. As we know here, the contributions that telecommunications operators make to the state treasuries either through, and I am referring less to corporate taxation, which is uniform across corporations, but more in terms of regulatory taxes or very telecommunication specific taxes, talking about, for instance, Universal Service Funds and the like, raises the issue of asymmetry, asymmetry in the sense that telecommunications operators as corporations are being taxed more in terms of their effective tax rate than corporations that are operating in other sectors of the economy.

So, net met in terms of the -- that meant in terms of the recommendations that the roundtable of economists made is, one, could we reduce taxation and not touch corporate taxes, because that's uniform across corporations, but look at other opportunities.

And secondly, could we actually address those asymmetries by, for instance, including the contribution of other players in the digital ecosystem that are benefiting from that infrastructure. You might be familiar with the discussion that is, actually, prevalent right now that has been labeled about as the fair share. And it relates to the fact that if OTT platforms are benefiting from telecommunications networks, shouldn't they contribute their fair share to, for instance, the deployment of -- or the funding of the universal service

as much as telecommunications operators. That's, as you know, that's pretty much in the public domain in terms of a discussion between the telcos and regulators as to whether that policy is right.

I'm going to focus more on the first item here on fiscal changes, reducing taxes. And if we take a step back from the issue at hand and look at what are the principles of tax policy, there are four elements that are critical to consider when we -- when policymakers address the issue of taxation.

One is understanding who is carrying the burden of taxation, whether it's consumers or producers, and how that is going to be affecting from an elasticity standpoint either production of the good or consumption of the good. And that's the second element of how would taxes affect a world of economies using in that area is whether there's any dead weight, whether, in fact, taxes would affect the way that production or consumption operates in a negative fashion, creating negative externalities.

The third is to see if there are some sectors of the social fabric that are being more affected by the interest in taxation. And then there's an issue of simplicity. This, regardless of whether we are talking about telecommunications or energy or any consumption goods, are principles that policymakers take into consideration.

But now let's go to the issue of telecommunications. And this, sort of, provides the theoretical framework within which we have analyzed the problem.

When you look at the investment, which is the second box going left to right on this flow chart, investment of CAPEX, that is being affected by a number of taxes imposed on the operators, whether this, as I mentioned before, a Universal Service Funds, regulatory fees that have to do with contributions to the operations of the regulator. That's what are regulatory fees. Spectrum payments. Duties imposed on the importing of equipment necessary to deploy networks, and even special rates.

Some countries or telecommunications carriers have to contribute on rates for the Red Cross or for enabling the blocking of phone calls from prisons to the outside world in order to limit crime. Those are unusual, but we have seen that experience in some countries.

And then we have the generic taxes which all corporations are -- have to face, and those have to be -- have to do with corporate taxation, so Social Security and labour taxes and VAT on equipment. And I'm differentiating those because the first

bubble refers to pretty much telecommunications, while the others are generic.

And then on the other right-hand side we have the taxes that are imposed on the equipment, on the devices that are being acquired by consumers, whether it's ICT on goods and service, VAT on ICT goods and services or the import duties on the acquisition of Smartphones and the like, special rates like activation charges.

Now, what happens is that the contributions -- the specific taxes on operators reduces the overall envelope of capital that they have to invest. And that's natural. That's the principle that the pretax amount of investment is being reduced because part of that envelope, that 20% of sales has to be contributed to the state. Therefore, there's less money to invest in deployment of networks, which in turn has an impact on adoption. Because I have less deployment of networks and, therefore, population that could benefit from new networks, particularly, let's say, in rural areas, would have those networks being deployed.

On top of that, if the devices, the acquisition of the service is more expensive by virtue of the fact these taxes applied to final consumers, that raises the barrier from an affordability standpoint, the price of acquisition of the device is much higher.

So, what we have modeled is what were to happen if we were to make some changes on the tax structure of the sector. We are not touching the generic taxes on operators because that would be against the principle of symmetrical treatment of different industries.

And the flow chart that we looked at was something that goes from left to right, how taxes have an impact on investment and, in turn, how investment has an impact on broadband coverage, because I have more resources to deploy networks. And in turn, how would coverage have an impact on adoption, and the same taxes have an impact on the services paid by consumers, and, therefore, increasing the barrier to affordability.

In turn, with adoption is higher or lower that has an impact on the overall economy. This is the research that has been conducted over the past 20 years that says faster -- higher adoption of broadband has an impact on the economy.

And these are the results of what we have estimated. And this is a paper that is in the process of being reviewed for publication in a peer reviewed journal.

And I am going to go left to right. what we do is, essentially, we took 108 countries. we build a panel for a

number of years. That gives us enough observations for the mobile segment. And we started calculating controlling for endogeneity, and reverse causality and factors of the life, how would this apply from left to right? And what we see is 1% reduction in regulatory fees is associated with the 3.6% increase in investment. So, clearly, there is an impact of a reduction of specific taxes on the amount of investment. That's the first thing.

If I have more investment, therefore, my CAPEX increases, that has an impact on coverage and there's lots of research that talks about that in terms of the impact of investment on coverage, either because there's lesser spectrum costs or other reasons. But the impact of CAPEX on coverage is clearly, clearly stated. And in my case is 1% increase in CAPEX translates between .24 and .66% in coverage gains.

By the way, just to go back to the initial causality, regulation also plays a role on investment. But we isolated that to focus on taxes. I mean, clearly, there's a lot of research that talks about the impact of competition on investment, spectrum management and other factors. But we took that to the side.

And then going to the third causality, if I have higher broadband coverage, that will have an impact on adoption and reduction in prices. And those are the two effects that 1% increase in coverage translated because there's more supply, 43% reduction in mobile service prices, and in turn a reduction of taxation on the acquisition of service by consumers has an impact on adoption because my affordability is higher.

And finally, if I have more adoption, then I have an impact on economic growth and I'm not going to belabor the point. We have done a number of research pieces published by the ITU on this particular causal chain.

If you go left to right, there's clearly a benefit of reducing taxes.

What are the conclusions and the implications of the research? Well, number one is regulatory fees, profit taxes and excise taxes seem to restrict capital investment. I'm not going to talk about corporate taxation or the generic taxes because I want to abide by the principle of symmetrical treatment of telecommunications players.

But if we go about specific taxes, if we are trying to improve that cap ex, going back to the pressure that developing countries particularly are facing, limit regulatory fees to a maximum of .5% of revenues, which is a benchmark that we see in advanced economies, makes total sense. The elimination of

sector specific taxes is also important. Not only about the principle of symmetry but also about the fact that we want to increase CAPEX and relative to Universal Service Funds, it should not -- the contribution should not exceed 1% of revenues.

Now, clearly that, puts us in the terrain of discussion of the fair share, which I'm not focusing on in this presentation.

On the taxes on mobile services, the point here is for consumers, we need to increase affordability and, therefore, value-added taxes are clearly a term that needs to be considered. Some countries consider mobile services as a luxury item. Therefore, they should abide by higher rate of value-added taxes. That's nonsensical in the context of how important mobile services are for welfare of the population.

And finally, the point of import duties, I think it is quite important. We have done research here not only along the lines of what I present before but even in advanced economies like the United States where we determine that a reduction on import duties and sales taxes has an impact on the level of investment. Not dollar for dollar, but sensible amount of investment.

So, those are my conclusions, and I am, obviously, open for questions later. Thank you.

>> CHRISTOPH STORK: Thank you very much, Raul. The questions and answers we do at the end of the three presentations.

I would like now to hand over to Philip.

>> PHILIP MADER: Hi. Am I audible? Okay. Great. Thank you. Can I get my slides up or have my slides up, please.

I'm going to take this ear piece off because it's very strange hearing myself talk.

Great. Sorry about that delay, everyone. Thank you. My name is Philip Mader. I am here to talk about mobile money, the macro economy and tax. Mobile money, of course, being part of what telecommunications firms provide at the moment. And I just want to at the outset thank a few colleagues of my who tricked to this presentation by in one case, actually, accelerating some of their research findings in order to incorporate them here.

So, I'm drawing very gratefully on members of my team in this presentation.

I lead a programme called DIGITAX, which is part of the International Centre for Tax and Development. The DIGITAX programme is about the intersection of digital financial services, digital IDs and tax, and we work across lower-income countries, but a particular focus on Africa, which are why some of the slides are focused on this part of the world.

I was asked in preparation for this to focus on two questions. And the first one being, what is the impact of digital financial services adoption on economic growth?

The second, what is the impact of digital financial services -- I will shorten that to DFS -- penetration and adoption on tax compliance and tax efficiency?

About that first question, the impact of DFS adoption and its effects on economic growth. I am drawing here on a literature review, which is based mainly on some of the papers that we uncovered in what is called an evidence gap map exercise. We, sort of, trolled throughout the entire possible world of research literature on this topic, on the topic of impacts of digital financial services, and out of those papers that exist, we looked at, for this particular purpose here, only at the ones that focus on impacts on the macroeconomy.

Now, in theory, the idea that DFS could enhance macroeconomic growth through three channels. Firstly through deepening capital markets and better financial intermediation. That means they move money to where it's supposed to go.

Secondly, through more effective macroeconomic policy transmission, so if the World Bank -- sorry, if the Central Bank decides something that it's more effectively transmitted into the economy. And thirdly through macro prudential benefits, that means, basically, lower risks of economic crises or financial crises due to better capital allocation and better risk allocation.

But some have also argued there's a theoretically a risk of greater financial instability as larger financial systems tend to be more crisis prone.

So, looking across the research evidence, then as I said, we are drawing on this evidence gap map, which is referenced at the bottom. There's a few caveats at first which is that firstly it's quite a limited evidence base. There is not much out there that really, in terms of research evidence, this is by the way from middle of last year, middle of 2021, that's when the evidence base is from. A relatively limited evidence base on DFS and the macroeconomy and a lot of it is not high confidence evidence. It's not very strong research.

It focuses mainly on a few countries in Eastern Africa, so quite limited geographic coverage. And this is a key point. If you find a correlation between some macroeconomic variables and DFS growth, it's not necessarily clear that you can infer causation, that you can say, well, it was the DFS growth that caused the macroeconomic growth.

So, with those caveats notwithstanding, we do see that some

studies can link DFS growth to economic output growth, so there is a, sort of, correlation link between GDP and digital financial services growth. Some studies suggest greater economic stability through risk sharing. That's particularly through the channel, for instance, that people, if there's an economic crisis in one country, they will send remittance, people living abroad will send remittances to that country and in that way, kind of, make the shock less severe.

And some studies, thirdly, also suggest that there are inflationary effects from mobile money, from DFS growth. So, actually, where there's more mobile money, this increases the velocity of money in the economy, that can lead to more inflation, but also can lead to more interest rates -- lower interest rates.

And this is just -- my newest slides have not been uploaded. I was told that the newer ones would be used. Make due with the old slides. That's okay.

So, to our knowledge, this is just a little interlude because I think it's very of a lot of interest to people who study DFS, how mobile money transactions specifically are taxed. This is the focus of the research programme DIGITAX that I lead and the map on the right shows a little bit unclearly to our knowledge currently there are 12 sub Saharan African countries that apply a tax that is specific to digital financial services. Not generally corporation taxes, not excise duties on the airtime and so on. But specifically digital financial services mobile money usage.

And countries can do three different things. They can apply a specific tax on service fees, so they could take a percentage. They could apply a tax as a percentage of the service fee charge by the provider. Or they can apply as, for instance, Ghana did earlier this year, a percentage tax on transaction values. In Ghana the E levy is 1.5%.

And they can apply a tax -- as they can apply specific taxes based on mobile operators turnover industry specific. Rates, which transactions are affected, which transactions are exempted apply, varies across these 12 countries.

This is -- as I said, thank you to a particular colleague who accelerated some of the research that they were doing for this presentation. This is a quick comparison looking across countries that have applied and comparing countries that have applied taxes specifically to DFS versus countries in Africa that have not applied taxes specific to DFS and we find it's a mixed picture. It's really about a correlation rather than causation because as I said earlier it's hard to necessarily

infer what caused what. Though, in some cases we can guess that something caused something else.

In the first case, we definitely can think, well, if there is a mobile money tax, just looking at this top line here, more people report that mobile money is expensive, in their opinion. So, clearly, tax has an effect on price perception.

In the middle rows we can see a bit more of a mixed picture there. So, actually, the existence of mobile money taxes or the imposition of mobile money taxes, actually, correlates with higher account ownership. That is, in countries where DFS taxes are applied, more people tend to use mobile money. But we don't know which one is causing which there.

They do also, those are the red numbers, correlate with less frequent mobile money usage. Again, that's not particularly surprising if you impose a tax on something, people will use it less frequently. But they don't correlate, that's the line below. They don't correlate with people transferring less. It's just that people bundle their transactions, tend to bundle their transactions into fewer but higher value transactions when a mobile money tax has been imposed.

And right at the bottom you can see mobile money taxes don't appear to discourage Savings because money storage duration is, actually, quite a lot higher in countries that have mobile money taxes. And the usual amount of money stored on mobile -- in mobile wallets is also higher in countries with specific taxes on DFS.

But this is the big caveat. Again, we don't know whether it is governments in countries that have higher usage that tend to impose taxes or whether it's that high taxes do not tend to discourage usage or in some way they might be conducive to a system that then enables usage.

On the right side this is just briefly a, sort of, size comparison of different effect sizes. All this graph on the right is showing that the effect that we can see from mobile money tax on reducing the frequency of frequent usage, that is daily or weekly usage, we see quite a large reduction. And that's, sort of, a comparable effect size to some of the other effect sizes. It's quite significant.

So, has about the same effect as whether people live in rural areas or in urban areas.

The second question I was asked to talk about is the impact of digital financial services on tax administrations and tax compliance. And here, quite simply the point is, if you digitize tax systems, could that lead to more tax revenues or could it lead to better tax compliance?

So, in theory, the idea is that DFS can enhance tax compliance by reducing compliance costs, they save people money, they save people time, they save people accounting costs and doing their tax filing and their tax payments. And they reduce opportunities for corrupt behavior. So, basically, if you are not dealing with a person, if you are dealing with an IT system, it's pretty hard to bribe the IT system.

The findings in practice in terms of whether these theoretical benefits occur are a bit more mixed. They are not real but they are just more mixed. What some of the papers that including my colleagues have written find is that the e-payment option enhances tax compliance, if it is paired with e-filing. So, basically, if you do your taxes digitally, if you report your taxes digitally, you are also then more likely to pay your taxes digitally. But only if you do your tax reporting digitally.

It has, however, negligible to modest, that is zero or very small effects on tax revenue, and I will come to why that is the case in a little bit. Basically the existence of e-payment systems does not raise the amount of tax that people pay.

Now, reasons for this are firstly that there are constraints to the usage of e-services. E-services meaning e-filing of taxes and e-payment of taxes. Quite obvious social constraints, low education, different age groups will not be likely to use e-services. Some populations are not IT ready. There's also just a lack of awareness amongst some people that they can even do this. And we are talking about low-income countries in particular with these studies in Sub-Saharan Africa.

Also technical constraints, lack of connectivity, connecting, of course, to what Raul Katz just was talking about. And we shouldn't ignore the initial cost of adoption of particular technologies to the users. So, it can be costly to adopt something that ultimately might end up saving you some costs.

What some of the studies find is that training and technical assistance can increase compliance and usage of e-services for tax payment. But what they also find is that certain behavioral responses amongst users of services can undermine some of the positive effects that are expected from e-tax services.

So, when e-filing, it's been found that taxpayers often also will increase their deductions from taxes, while they report higher expenses than before. So, for example, in a paper authored by my colleague Julia Mascagni and some others, looking at the adoption of electronic sales registration machines,

which, of course, much more -- which, more accurately, register of income of firms, they say, we find a positive impact on tax revenue, which increases by at least 12% for income taxes and 48% for VAT. However, taxpayers respond by simultaneously adjusting both reported sales and costs, thus yielding net revenue gains that are proportionally lower than the increase in sales., basically, yes, we are reporting our sales information more accurately now, but we have an incentive to report higher costs.

Lastly, it's just, actually, a relatively small literature that's looked in detail at this argument of reduced opportunities for corruption, but there is some evidence from countries like Tajikistan, that's the main study, there are other studies in Central Asia that find there are fewer opportunities for corruption where e-systems are used for tax filing and tax payment.

There is a second way in which digital financial services could be relevant for increasing the tax net, increasing tax compliance, increasing tax intake and that's through digital financial services companies, basically, acting as third-party data providers. So, in theory, the idea is that if you have an entire -- an overview of the entire economy through digitalized payment systems, you can, basically, trace transactions much more clearly through the trail of mobile money data or other digital payments data and these money trails could enable a better identification of the tax base, could enable cross checks of tax declarations and tax payments, and could enable data-driven audits on specific firms.

The findings in practice about this are a little more sobering than in the last case. Firstly, data sharing agreements are often not in place. Data privacy can be a constraint or a legitimate concern. And it's just not always the case that telecoms firm will happily hand over their data to the revenue authorities at least at a level of disaggregation that would allow specific tracing for payments for tax purposes.

Secondly, and this is, actually, an even much more important factor. Revenue authorities, particularly in Sub-Saharan Africa, research finds again and again, just have a really limited internal capacity to make good use of data. They are understaffed, the tax administrations, they are unresourced in terms of IT resources. Some countries' revenue authorities only really started digitizing 5 to 10 years ago. So before that, everything was on paper, and not in terms of intellectual capacity, of course, but in terms of just the sheer number of staff that would be available for this, revenue

authorities often lack the analytical skills with which to analyze the data.

But even if tax administrations have this kind of data from mobile money providers and can analyze it, what matters still is that they can also use their findings from that to enforce. And in limited enforcement capacity is a problem for tax authorities throughout the continent of Africa. They have a limited ability to communicate with taxpayers, to reach out to them directly, and to credibly signal the threat of enforcement.

Revenue authorities throughout Africa, as we know, want to use digital financial services, the presence of mobile money to increase the perceived probability of being caught abating, in a way saying you never might know when big brother is, actually, watching your payments. So pay your taxes.

And they have been trying to use this perception to nudge taxpayers through things like messages that will report, we saw you made a particular payment, remember to register this with your tax returns. But findings from studies, also studies my colleagues were involved in it, ICTD, find really only a minority of taxpayers respond to these signals in a way that would increase tax revenue.

So, in summary, we find on the linkage between DFS and economic growth, there's not much robust cross-country evidence on which we could say anything and there are mixed results regarding the channels of capital markets deepening macro policy transmission and macro prudential effects. But taxes on DFS do appear to affect usage patterns and this may effect in a knock-on way, macroeconomic effect.

Secondly, this idea that tax compliance and efficiency can be improved through DFS growth, DFS as a channel for tax payments have negative -- not negative. Negligible or modest revenue effects and these vary depending on user attributes and behavioral responses. Not nothing but not as much as one would have initially hoped for.

And finally, DFS data for the purposes of tax administration is constrained in a lot of ways, above all by tax administration capacity, by data-sharing difficulties and by the enforcement capacity of tax authorities. That's the end of my talk. Thank you for your attention.

>> CHRISTOPH STORK: Perfect. Thank you very much, Philip.

We have to wait for our screen sharing to be active here. I will try to make up for the lost time. Both of the presentations absolutely fascinating. And providing us with extremely valuable tool for advising governments and policymakers and regulators. I tried to cut a bit short now,

the presentation, so we have still time for questions.

So, Raul was referring to the question that were raised in Europe, in Australia, in South Korea and whether the -- whether government and regulators need to be involved. Some say the big content platforms to be contributing to the digital infrastructure. Others in South Korea have lobbied to government to provide personal peering agreements, prescribing IP transit and dictating the prices for it. In Australia, telcos have complained that their revenues are declining. And I will try to focus now in the three steps on how to evaluate these type of claims with publicly available data.

The first one the revenues and profits are declining. We can see there's transition in the business models. Last 50 years, telcos have been providing last mile access and they still do this today. It's only the service changed. 1G, for example, broad voice, 2G brought SMS and everything since 2 1/2 G is about faster better data services. Clearly investment has gone into data services will be also where the revenues will be coming from in future. Which means in transition to a data centric model which is easy for some and more difficult for other operators, and therefore we see differences in financial performance.

Then we have some issues in mature markets, like in Australia and Europe. Remobile operators are complaining that data usage grows rapidly, exponentially but their revenues are not and these are figures for Germany. We can see that mobile data revenue grew by 566% between 2016 and 2021, with the revenues remained steady.

In the UK, revenues expressed in the percent (?) revenues. In the UK the ICT sector declined. While data traffic still increased once a month year on year.

And there are many factors for this. Sector revenues can declines through higher competition, for example. But they can also be remain steady depending on the product design. For example, if someone has a 300 gig byte data cap on forced package but all the users average 40GB in a month, then this person, this subscriber will not be moving to a higher package anytime soon. So, then the data traffic can be doubling and tripling and quadrupling before this subscriber would need to move to higher package. And in Germany, for example, most of the post made packages have unlimited data. So no matter what the consumption is, they will not be moving to a higher package unless there is new use cases. Unless lower latencies are required, faster transmissions are required, more products and services are being developed.

So, these mature markets won't grow anymore because there's no more new subscribers.

If an operator gains subscribers, it's mostly coming from other subscribers, and, therefore, the ICT sector overall isn't growing anymore, and the only way to grow the sector again to get back to the fundamental growth figures that we saw in the '90s and in the early 2000s for Europe and for Australia, one would need to have new services.

But if one looks into the international global value chain, we can see that it's still growing. This is valuable data from the GSMA reports from 2008, 2016, and 2021, always displaying the data for one year backwards. And we can see that the total value of the internet value chain grew by 465% and connectivity grew by 331%. Mobile operators saying declining revenues and it's partly true, like, for example, in the UK but clearly other markets are still growing. And these kind of markets, there is not formal penetration which are not mature yet but on a global scale this claim could not be substantiated.

Looking into the profitability, and this is now for -- also for global data, there's excellent data available from Stern University, very detailed evaluation of all the different businesses of different sectors. And here we group the sectors across the value chain and we can see that the connectivity sectors, the telecom wireless and telecom services have among the highest enabling margins, the highest return equity and the lowest cost of capital. So clearly the connectivity segment is very profitable.

So, the question is why are COs then complaining if this is the case?

And the other aspect is that the international internet value chain is, actually, value soaken. Where the content produced by users is providing the content that would be demanded and would be supplied through platforms like YouTube and social media. And that this is, like, there's a mutual dependence and if demand becomes valuable -- I'm sorry, if content becomes available and it's demanded, then everyone benefits. The telcos as well as the content access providers and all the other players in the different segments.

And the varied report from 2022 elicits these things and caps shouldn't be unfree writing on the networks of telcos and they shouldn't be made paid access to these networks because users generally can carry the end user cost for access to network and this is the business that (?)

Moving on, but what is clear is that this enter dependent international value chain means that cooperation is needed

across the different segments. And co-investment may be required, but this could be like investing into video compression algorithm, investing into content delivery networks, under C cables, satellite systems, the whole range. And each of the segments has their own investment opportunities but also their own investment risks.

The question is how can we measure, whether we make progress towards the restoration of internet.

And we know that one needs data symmetry for Zoom calls like we are on at the moment. And for mobile we see higher download and upload speeds and for fixed the same applies. And this is based on detailed data which also provides subnational datasets. And at the same time we need low latency for 5G applications and mining sector, in hospitals, telemedicine, gaming. There's many virtual reality, augmented reality, all of these technologies require low latencies and we can see that these latencies are around 40 milliseconds and 25 seconds fixed but actually they should be for this application below 10.

So, then we created an index to measure this and this index is based on absolute values. So if you have 100% in this index, then you are doing extremely well on all of these indicators. And if you are zeros, then you are not doing very well.

For upload speeds if you have having -- then the essential industry doesn't matter any-month. You would have enough speed for any time of AR or VR application. And below 10 megabytes zero -- for latency, 0% is higher than 50 milliseconds and 100% if it's 5 milliseconds or better. Or affordability, 20GB per month expressed as GNI capital per months. If it's more than 5%, 0%, if it's less than 1%, it's 100% of index, and then we head into national cybersecurity index can have trust in using it.

And this shows the figures for the index across various regions. And these regions are average regarding faster internet latency, affordability, and service acutety index. This is not based on performance with other countries. In relation to them, there's no country ranking in that form. But if you have (?) tells you how good you are in terms of generating the next generate or internet access.

Using the data from our paper of 2020 as another example of how to use data for research. It found that 10% higher broadband penetration would lead to 2.46% additional economic growth. And if a ply this to Kenya, based on text to GP ratios I can then generate the additional GP, additional text variants and also based on other papers additional jobs.

So, these type of affect size that's come from economic

models are extremely useful for the policy context. And we can see that there is a direct impact of sector and indirect sector. And now I'm going to share quickly another map side to show you actively. Based on these effect sizes that we got from all cats. We calculated a system that shows the direct impacts and the indirect impacts of texts. In the case of Kenya, if I remove 20% excise duty. Supposed to be for services that are harmful for the population, like gambling, (?), tobacco. In many African countries excise duties on ICTs. If I remove this 20% excise duty then I have less in taxes overall. So I lose half of my direct taxes. And the sector has, of course, more growth and there's more personal income taxes, there's more VAT, there's more corporate income tax because profit is going to be higher. And I can see all the impacts.

But then there's the impact on the wider economy or the foregone GDP growth and here I can apply the effect sizes from all paper. And I can see removing this taxes will, actually, yield more jobs and more tax revenue in the medium to long-term.

If I want increased taxes by 5%, I would, actually, have less taxes. And all this data are linked on here, resources. The ITU paper, for example, if you click here, it will come up. The effect sizes for the demand necessity comes from GSMA paper. Connectivity index. All the data is referenced.

And if I take now, for example, a country like South Sudan and reduce taxes here by 10%, I will see that I am, actually, making less taxes. I would lose money. I may have some drop but I will lose taxes value for the state. And this is to do with the low tax to GDP ratio. And this is something that Philip addressed that with a digitalization and digital tax collection mechanisms, we could be increasing the tax of GDP ratio and then become more effective in connecting taxes and we would have also then better effect sizes by dropping taxes.

These are all my comments. And would I like now to ask the audience or the participants online to pose their questions.

>> CHRISTOPH STORK: Can you see the questions in the Q&A window? I think we got already two questions.

>> CHRISTOPH STORK: Okay.

>> You need to click on the Q&A, I think.

>> CHRISTOPH STORK: Excellent presentation, Raul. Just a small question. Telecom taxes are an important source of revenue for many countries. So, how to convince that a reduction in telecom taxes, which is a fruit ready to be plucked. Will need to economic returns in the long run. Any studies to substantiate the economic returns?

Raul, you must be muted.

>> RAUL KATZ: Yeah. Thank you for the question. Yeah. I think that's the bottom line of the analysis, which interestingly enough, Christoph's presentation on his modeling exercise somewhat addressed that. But nevertheless, I think that in all my work over the years relative to this issue of taxation, one of the barriers I have seen, let's call it an institutional one or the cross-ministerial agreement. And, unfortunately, taxation pertains to generally ministries of finance, which do not necessarily see in line relative to the objectives that ICT ministries or economic development or social development ministries look like.

The latter have an interest in maximizing penetration and, therefore, economic welfare, as we might expect. Ministries of finance have to deal with issues in a much shorter term that have to do with collecting money for the budget.

Now, that being said, and this is something that I didn't mention, you know, taxes are supposed to fund the provision of services to the population. So, I don't want to get into the discussion of whether, in some cases, we should reduce taxation that would ultimately impact the provision of services to the population, because that's an essential part of government's responsibility. So, that's an important caveat or premise to raise.

That being said, where do you find the equilibrium and that's the core of your question where you are, basically, saying, if I cut taxes in the short term, particularly on the specific taxes, that would have an impact, not only on growth, but on welfare in the longer term.

In general, what we see and what we have seen throughout the research, is that, first thing, the reduction in taxes do not increase, let's say, on CAPEX and deployment and benefits on a dollar for dollar. The way operators tend to behave is that a reduction of taxation of \$1 would tend to result in 85 cents on investment downstream. 85 cents is still an important amount of money. So you flow it down the causality chain that I outlined and I say, I'm going to have an economic impact that is sizable over time.

So, it's somewhat of a short answer. I think that Christoph's modeling is interesting in the sense of trying to model these optimal points of taxation reduction with a maximization of economic growth over time.

Again, one might say, let's reduce taxes completely. I am talking about specific taxes. I am not proposing that. I'm saying, let's align ourselves to the benchmarks that exist in advanced economies and proceed from there and see what the

economic impact is going to be.

But I think that your question somewhat raises the opportunity of even doing some further research that would help policy makers look at the trade-offs of what it means over the long run and short run as to what are the benefits of reducing taxes.

I think that the last comment that I want to say is the long run and the short run. Implicit in your question is some of the effects that I am presenting have a lag of two, three, years and sometimes the political electoral cycles which are directly linked to budgetary constraints are much shorter term than the one to two years that we are talking about. So, that's another issue of the complexities that we are dealing with when it comes to defining policies in the field of digital services.

Thank you.

>> CHRISTOPH STORK: Follow-up question to this topic. And this is whether there's any examples for where taxes have been decreased and one could see the impact on the economy.

>> RAUL KATZ: Yes, yes, there are. We haven't, actually, flushed it down over time. We, obviously, when we analyze the 108 countries, we could link the causality chain going from tax reductions at the front end to impact at the back end.

Can we do a cause and effect on a particular country per se? Generally our research is focused on large data panels where you see what the larger effects are, controlling for fixed effects and the like. But nevertheless, I think that I will have to think about specific countries where we have seen that kind of a game -- that kind of a move and what the impact has been. I see it more on the large panel studies that we tend to deal with.

I don't know whether the other panelists have an answer to that question.

>> CHRISTOPH STORK: Philip?

>> PHILIP MADER: Sorry. Was there a question addressed to me?

>> RAUL KATZ: No. No. I was wondering -- (Overlapping speakers).

>> RAUL KATZ: I'm sorry.

>> PHILIP MADER: Just a very general observation. I mean, I can't help but get the impression that there's a, sort of, implicit assumption in the way -- you know, behind this, this event that taxes on the telecommunication sector so generally be reduced. And I do understand that they serve an important role in economic development and have a certain kind of public goods function.

At the same time UN if you put yourself in -- and as Raul was already very clearly saying, if you put yourself in the shoes of an African ministry of finance or a South Asian ministry of finance, probably for that matter, any ministry of finance, the lower-income countries, the lower tax GDP ratio, the more strong this incentive will be. There's really an important pressure to tax anything that shows above average profitability. And it's true that taxing the telecommunication sector or taxing mobile money out of existence would benefit no one. At the same time forgoing tax revenues from profitable activities in this sector would also mean not having revenues, which then could be invested in public goods that benefit everyone from education to infrastructure improvements, to healthcare and to the sort of things that let us manage the next pandemic or that, perhaps, create digital literacy so people can engage with technologies more effectively.

And I want to offer the observation in response to the question about, is there any particular country, there is a particular country which is, kind of, treated as the avatar of digital financial inclusion in Africa, and that's Kenya. And Safaricom is Kenya's quasi monopolistic telecommunications provider and mobile money service provider, and it's become East Africa's largest company by stock market valuation. It is the single largest company in East Africa, Safaricom. It's a subsidiary of Vodafone. And for the last 10 years straight been Kenya's number one taxpayer on its profits, and including in one year contributing more than 15% to Kenya's national tax budget.

Again, it's really important also not to neglect the importance of taxing financial -- digital financial services and telecommunications companies if it is healthy to do so, because these tax revenues are really hard to raise in other ways. And anybody says well telecoms should not be taxed, should be taxed less I say that's a valuable argument but I want to hear what you think should be taxed more instead.

>> Could I make a point to the chair. I thought that was an examining example about Kenya. We should remember as well that countries that attack everything that has -- Kenya has also introduced digital services tax, so the challenge for governments in emerging markets is, of course, to fund public services and, you know, the model where they continue to increase taxes on sectors that have a fiscal presence don't expand the base beyond those sectors to companies that provide services digitally from outside the jurisdiction is, you know, (?) returns eventually as everything goes online there will be

nothing left to tax and successful companies out of business.

Kenya has a really interesting approach in that they have stayed to broad the base on tax digital service providers. We heard number of arguments here yesterday, sort of, warning emerging markets of that approach, but what else are they supposed to do? They always approach clearly is not going to provide extra revenue for emerging markets. To my mind, they have to broaden the base. Thank you.

>> CHRISTOPH STORK: Sorry. So, the STS debate we need to exclude from this debate because it was addressed by a different panel. And that's a very complex topic.

But the key aspect here is should the ICT sector be taxed differently from other sectors. And, for example, we try to get the also here that presented a paper that shows that the ICT sector in Africa is taxed higher than mining sector and mining sector is extracting limited resources from the ground. And one would expect that the mining sector is taxed high. But the ICT sectors the input sector and the same is true for the financial sector. So, by taxing these two sectors, both would be reducing economic growth and job creation. And that is the main aspect that comes out from the work that Raul did and his team that we can show what the impacts would be on average if you increased taxes or lower taxes over the overall economy, not just the ICT sector.

So, for the DST question. We can't address them here.

There were two more comments, one from Pakistan, Ms. Obaid Malahat, asking about the low ARPUS, and that's a valid point. The ARPUS may be lower, but at the same time, the EBITDA margins are much higher, like the MBB in Nigeria, MBB in -- Safaricom very high margins, very high in equity. And, yes, voice and messaging use more in the transition through data (?) will take longer. But that is not what's important. What's important is the profitability which guides investment.

There's another question from Telefonica, Mr. Fug, talking about the NRAs and obligations and we have seen how this can back fire, for example, in the case of South Korea where the regulators then insert itself and prescribes that peering is no longer allowed. And IP funds need to be negotiated between all ISPs and then even prescribing a price for it, and that led to less investment, not more investment in the sector. So, there are repercussions for this as well.

So, for all of these decisions regulate or not regulating whether it is fair or not in the value-ad chain, it needs to be accessed by data and corroborated and evaluate carefully.

Time for last question or last comment.

>> RAUL KATZ: I want to make a comment relative to ARPU first rates. I would agree with your comment. However, what drives CAPEX is sales, and all our modeling indicates that, actually, the most important variable driving capital investment in year 1 is sales, in year T minus 1. And that's research that has been done in other industries as well. Financial planners of companies sit down and say, well, how much have we made last year and how are we going to define our investment for next year they see less profitability on either year or more sales.

You might argue does that make sense, since CAPEX, actually, comes above the line -- below the line after free cash flows, presumably. But nevertheless, that's the way the corporate behavior is handled.

So, even if you were to say 55% on an ARPU of \$10 is less than 35% on an ARPU of 40, that's the proportional impact.

So, I don't know to what extent that comment will be applicable to the issue at hand. Just to comment on that one.

>> CHRISTOPH STORK: I am excited about the new paper and I hope it will be released soon. Because it shows us the links between cash flow from revenues and CAPEX and that's fact we didn't have so far. And, for example, in Kenya, the excise duty is 20%. That means that the mobile operators have 20% revenue and therefore will also then invest a whole lot less. So, Kenya is therefore, short changing itself.

I think we are way above our time. I would like to hand --

>> CHAIR: Yes, correct. There is one more question from the room from India, if you allow. And then we will see how long we the break is, if we have any break at all. Maybe just straight start with the last session and then go into closing. Thank you.

>> INDIA: May I have the floor?

>> CHAIR: Yes.

>> INDIA: Of course, I wanted to ask question from Raul, but then meanwhile Christoph answered that about ARPUS.

Often it is said that ARPUS -- DSBs have been saying ARPUS are low, ARPUS are low. And even economists have placed a lot of value on ARPUS. But in India, I would say there is an evidence that all those companies, which have higher ARPUS in maybe around 10 years ago, they have vanished. Say, ARPU cannot be straightaway in a very simplistic manner used as a measure where if some company have a very high ARPU, then it may be having, say, maybe some surplus for investment, because maybe I have very limited number of customers. And I may have a very high ARPU. But it will not be material enough for investment.

So, you require that kind of mask. And, of course, partly

that was answered by Christoph. So I just wanted to add this portion. Maybe for information for more empirical analysis by Raul because all of us respect his research. So, this is an input from India, that not necessarily if you have an ARPU you will have money to invest. Thank you.

>> RAUL KATZ: Thank you.

>> CHRISTOPH STORK: If you compare, for example, G in India to tell us in Canada, you will find that Indian customers get a whole lot better deal. They get 120-megabyte for dollar and in Canada you get barely one gigabyte for the dollar. And, of course, Canada has also different costs, the infrastructure costs more, salaries are higher. It's a whole range of factors that lead to having higher prices than India. So, therefore, it's profitability measures and cash flow measures that term CAPEX levels best, would I think.

Thank you very much to the audience. Thank you very much, Raul. Thank you very much, Philip. It was an exciting session. And I am looking forward to reading your papers. And I would like to hand over to Martin.

>> MARTIN EUCHNER: Yeah, thank you, Christoph, for this interesting insights into new findings from research and this domain, I think that was quite a lesson.

So, Ladies and Gentlemen, we are over time. And we are going -- running slowly late here on this Friday. I'm not sure. That's a lot of information. The question is, do we want to have a very short break and then continue straight or do we omit the break and run with the final session and then straight into the closing? I expect that we probably finish here between 5:00 and 5:30 somehow, in that time hour, depending on the timing or arrangements in the last sessions or so. But that is roughly our plan.

So, five minutes, is that okay to take a glass of water or breathe some fresh air? Yeah. Let's reconvene here at 4:00. 4:00 sharply for the last session. Short break.

>> Recording stopped.

(Session was concluded at 15:55 CET)

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