Petroleum Economics and Management
Prof. Anwesha Aditya
Department of Humanities and Social Sciences
Indian Institute of Technology, Kharagpur

Module - 03
Public Policies
Lecture - 12
Petroleum rents and taxes

Hi everyone, I am Doctor Anwesha Aditya, Assistant Professor in the Department of Humanities and Social Sciences of Indian Institute of Technology Kharagpur. I am your instructor for the course Petroleum Economics and Management. So, we are in Module 3 right now where we are discussing public policies ok. So, in Lecture 12 of Module 3 we are discussing Petroleum rents and taxes.

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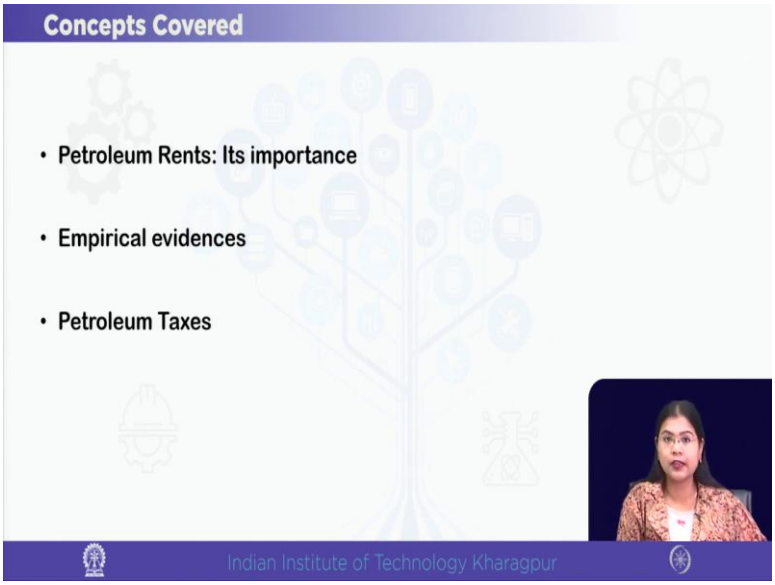

Now, what is the justification of this module? So, let us first discuss why we have included this module, because if you remember we have already discussed the importance of petroleum products in our life it is indispensable nature.

Now, petroleum is also something which revolves around lot of public policies tax policies because it is a very reliable source of tax revenue. So, we need to know the basis of taxation what is the motivation for imposing tax, how the tax rates are decided, how petroleum is a very reliable source of tax so, we need to know that. So, with this purpose

in mind we have come to Module-3 where we are going to discuss some policies of the government or any third party.

So, so far if you remember in Module-2 when we have discussed the basic of microeconomics concept like market we have already discussed the two sides in a market, the demand side, the supply side, we have discussed how the equilibrium is arrived at, we have also studied what happens to the equilibrium if there is some kind of shock, some natural calamity, some war, some pandemic so, we have already discussed.

And how the demand curve or the supply curve, how they will respond to the shocks, we have discussed in terms of elasticity, we have quantified the magnitude of changes in terms of elasticity and in the last lecture of the previous module we have also discussed the very important concept of revenue, but in that module if you remember we did not consider any type of intervention.

Now, in the very first lecture of that module we have classified market, markets can be of two types if you remember free market when there is no intervention by third party. So, in Module-2 we have studied the concepts under a free market where everything is left to the market forces of demand and supply.

So, the consumers and the producers they are taking the decision seeing the price as a signal and the price is determined in a market without any regulation by or intervention by any third party, but in reality we do see lot of regulations or interventions like there can be taxes and quantity restrictions. So, what is the motivation for doing that and how that is done so, this is the purpose of our Module-3.

So, now, we are no longer in a free market. So, if we classify market in Module-2 we have studied market under a free market there is no regulation, now there is the other type of market where there will be a third party intervention. So, market can be regulated also. So, that is what we are going to study in Module-3. So, where we are going to study regulation or some policy intervention by the government or any third party ok.

So, we have designed the module in such a way that first we will be discussing about some empirical evidences regarding the importance of petroleum rents and petroleum taxes and then we will be going to the issues of how tax is formed and how the post-tax

equilibrium is decided. We will be also discussing about other types of policies like subsidy or we will also discuss about the policies of price control or quantity regulation.

Now, how the outcome changes in terms of the market welfare. So, we will be also discussing about the concept of welfare in terms of surplus you will be studying about the very important concept of a consumer surplus, producer surplus and how those will change in the post-intervention period and we will compare with the pre-intervention period ok.

So, in the today's lecture what we are going to discuss is the importance of petroleum rent for the economies which are exporters of this very important product and we will discuss some empirical evidences and we will show the importance of taxes coming from petroleum products because we will see that a petroleum taxes are very reliable source of revenue.

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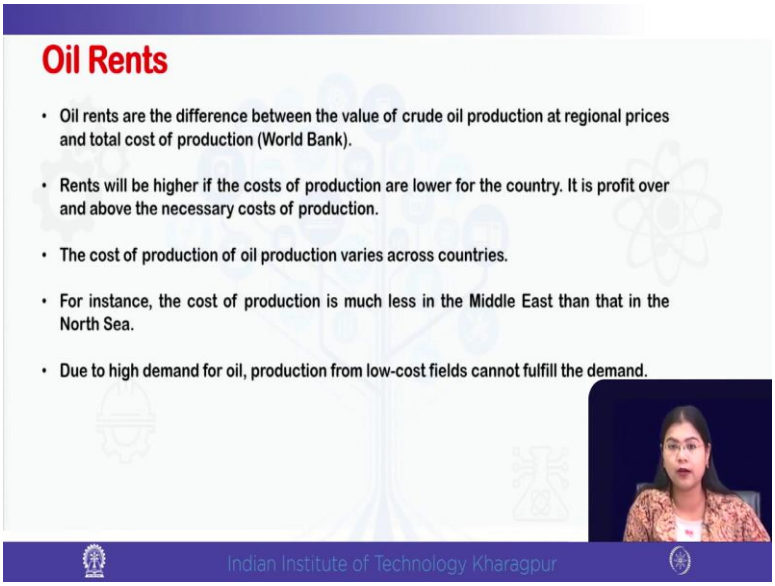

So, these are the topics to be covered in today's lecture now what do we mean by rent. So, first and foremost we need to know about rent. So, in the first in the previous lecture that is the last lecture of Module-2 if you remember we have defined about total revenue. The total revenue was what price into quantity of a product or total value of a product. Now, what is rent? Rent is the difference between the total value of product and the total cost of production.

So, we can be more specific and we can say that oil rent is the difference between the value of crude oil production at regional prices and the total cost of production. So, that is how the World Bank defines the oil rent. So, value of production minus the cost of production now; obviously, so; that means, what; that means, if the cost of production increases rent will fall.

So, in a another word we can tell that a rent is nothing, but the profit over and above the cost of production. So, if cost of production goes up so; that means, suppose we are extracting more and more oil from the same field so, we have to go deeper. So, cost of extraction or maybe the cost of refining can also increase if the oil quality is degraded therefore, if cost increases rent will fall.

And we can also see that the cost of production varies across countries; that means, the rent coming from oil will also vary across countries and region. For instance, we can see empirical evidences and we can find that the cost of production is less in the Middle East than that in the North Sea and that is; obviously, the reason of that the Middle East region or the Arabian countries they have a comparative advantage in petroleum products because their cost of production is less.

So, making them very much reliant on oil products because we will see with some data that these Middle East countries they enjoy huge amount of oil rent. Now, as the demand for oil increases, we have already studied the demand supply analysis and if demand for a product increases, we know that price of the product increases. So, due to this high price production from low cost fields cannot fulfil the demand so, we go on for exploring oil from other fields also. So, OPEC is not the monopoly supplier we do have non-OPEC suppliers also.

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So, we see that the companies the oil extracting companies they have to make lot of expenditure for exploring oil and sometimes there are dry holes which makes the extraction unprofitable, because if extraction increases cost of production increases. So, profits will fall therefore, if extraction goes up very high then oil production or oil extraction may become unprofitable also.

Now, we will see some data where we will find that the countries in the Middle East especially, they are very much dependent on oil rent because they are huge exporters of oil. We have already discussed that when oil was discovered suddenly in Saudi Arabia it was a very poor province in the Arab Ottoman region.

So, there was hardly any use of oil within the domestic economy of Saudi Arabia, but they found that there was a huge demand for oil outside Saudi Arabia. So, they became exporters of oil and they become very rich overnight you can say. So, these were the Middle East countries become heavily dependent on oil export and oil rent also.

So, we can find that in 1991 oil rent as a percentage of GDP of Kuwait, Saudi Arabia, Oman and Qatar was almost around 50 percent. So, see just very high share in GDP, I hope you know what GDP means. So, GDP is the gross domestic product; that means, it is the sum of value of production of an economy or country for a particular period of time.

Generally, we express it in annual value or we can also sometimes express it in quarterly terms also, but over the years compared to 1990 the economies have gradually started diversifying because too much dependence on a resource may not be very good, we have the concept of resource curse where we have this included in our syllabus we will be discussing about the concept of Dutch disease and resource curse.

The resource curse hypothesis tells that the countries which are heavily endowed with natural resource they are found to be not very good performer as far as the development yard sticks are concerned like for example, health, education or rule of law, they are not very good in terms of other aspects of development they may be rich but their level of economic development are not that high because it is not only important to be endowed with a resource.

But it is very important to manage the resource prudently, because often these countries lack the human capital also who can manage this extremely important resource prudently and if a country becomes too much dependent on the resource and the other sectors are not developed then sometimes the country will run out of the resource.

So, the famous example of this is Venezuela, what happened to Venezuela because Venezuela becomes so much dependent on oil. So, it did not develop the other sectors. So, when with a huge amount of fast rate of use of oil, it became very dependent on oil it ran out of oil at some point of time.

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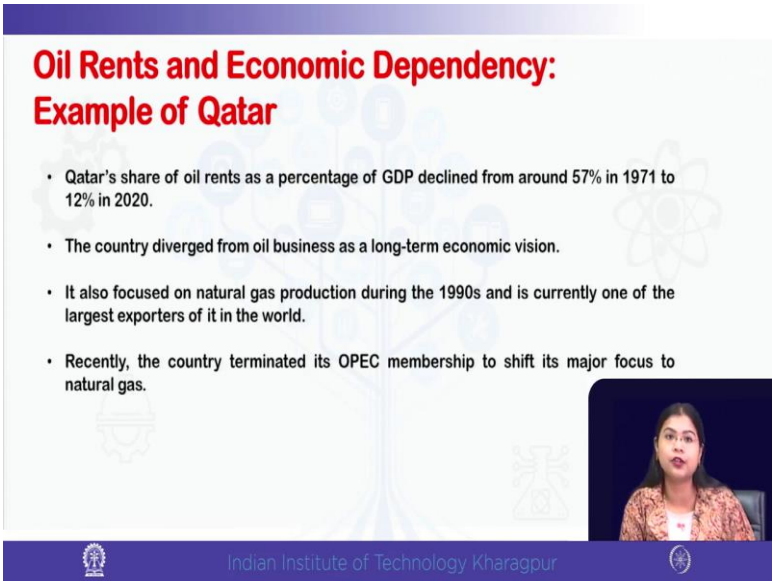

So, in that way Venezuela economy suffered a lot.

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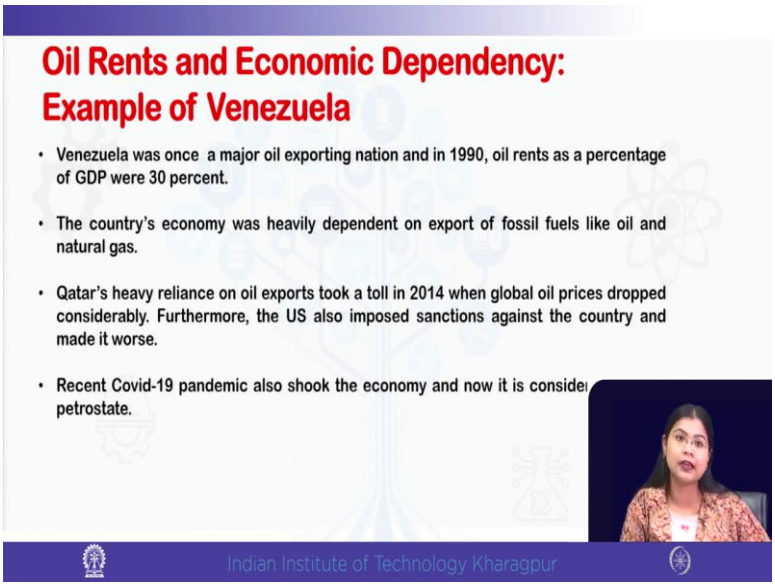

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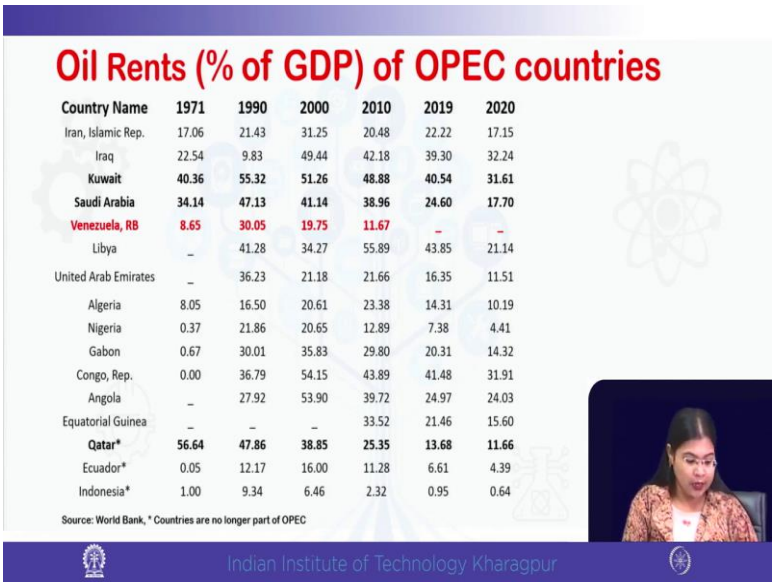

So, we can we will be showing these examples of oil rent as percentage of GDP of the OPEC countries you can see the Venezuela is highlighted in red and you can see the importance of oil in Venezuela and economy starting from 1971 and it gradually increased in 1990 it was around 30 percent.

So, starting from 8.65 percent in 1971 in 1990 Venezuela got his got its GDP of around 30 percent from oil rent. So, which is a huge increase, but then it started declining and

you can see in 2010 it declined to 11.67 percent, in 2019 it was just there are no values in 19 and 20 because Venezuela run out of oil. So, it could not export any oil and the currency also depreciated a lot.

So, we will be also talking about exchange rate policies towards the end of our course module if you see the module structure, we will also discuss the oil prices and it is relation to the exchange rate.

So, it is a typical example of the resource curse hypothesis you see. So, now, we will see the other examples Qatar also experienced a decline, Qatar initially you see Qatar in 1971 Qatar enjoyed huge amount almost 57 percent of oil rent, but we see that gradually the economy diversified. The third last column you see is correspond to Qatar.

So, Qatar economy was dependent on oil initially, but gradually the share in GDP of oil rent started declining. So, Qatar economy actually diversified. So, Qatar is given with an asterisk sign you see this star sign correspond to the countries which are no longer part of OPEC ok. So, Qatar, Ecuador and Indonesia are three such countries we will be also discussing about the market structure of OPEC in detail in the subsequent lectures. So, this data source is from World Bank.

Now, the other example I just discussed about the Venezuela. So, in Qatar economy how the Qatar economy changed so, it diverts from oil business and it entered into the field of natural gas production and Qatar terminated its OPEC membership and it has shifted its major focus from petroleum to natural gas and is currently one of the largest exporter of natural gas in the world market of natural gas.

So, Qatar economy diversified it is no longer that much dependent on oil and it also terminated its OPEC membership. The other example I already talked about is Venezuela it got heavily dependent on oil and its dependency increased, but ultimately it ran out of its oil stock and the economy suffered a lot the currency depreciated so much the currency hardly had any purchasing power and then the COVID pandemic also disturbed the economy very much.

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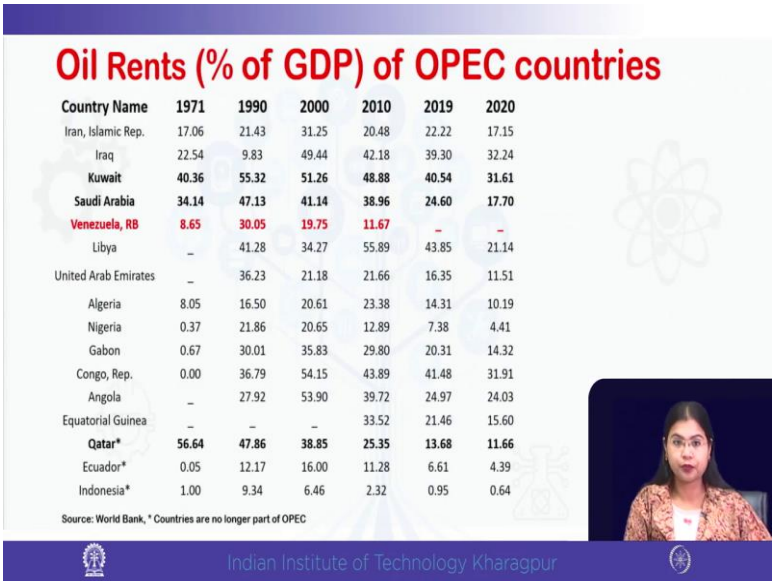

Now, you can see the other countries we find that UAE is also heavily dependent on oil rent in 1990, but see gradually the economy diversified in other sectors and the share of oil rent in GDP started declining thoroughly from 2000 onwards. We see also for Saudi Arabia the same thing in 1971 the share was 34 percent, but it also experienced initial increase, but then it declined.

So, in 1990 and 2000 it was greater than 40 percent, but then from 2010 onwards the Saudi Arabian economy started developing the other sectors and the share of GDP coming from other sector increased. I think in one of the classes we also discussed that we can divide the sectors into primary, secondary and tertiary sector.

So, natural resources actually belong to primary. So, agriculture, fishery, mining, natural resources they belong to primary sector. So, Saudi Arabian economy it was dependent on this primary sector, but gradually the other sectors also gained prominence.

So, in this way you see that most of the countries in the OPEC region they are dependent on oil rent, but they have gradually diversified and their share coming from oil rent in GDP started gradually declining and; that means, their other sectors are also now being developed which is a good sign.

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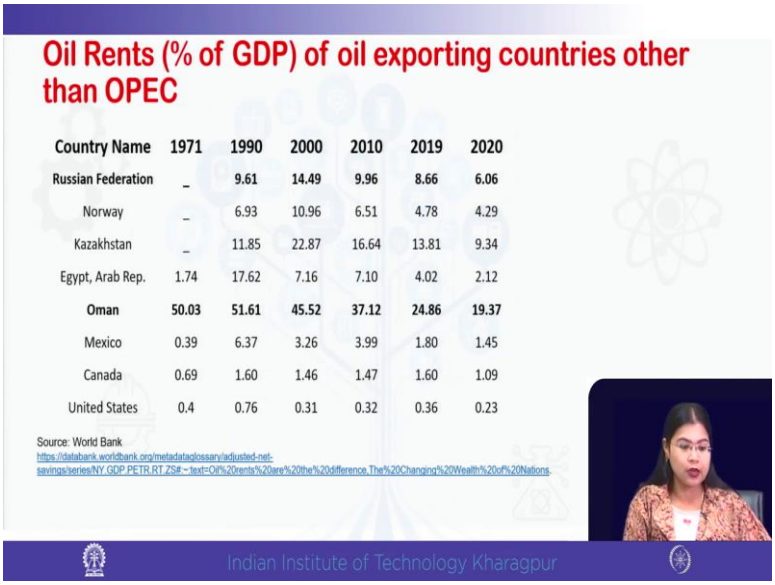

Now, we can see the oil rent as a percentage of GDP for the non-OPEC countries because time and again I am saying that OPEC is not the monopoly supplier it may be the leader in the world oil market, but we do have non-OPEC suppliers of oil because OPEC alone cannot supply the entire huge demand for oil.

So, the non-OPEC suppliers you see include the Russian Federation, Norway, Egypt, Kazakhstan, Oman, Mexico, Canada even US, US also supplies lot of shale oil we discussed about the shell oil and we will be discussing more about the shale oil revolution.

So, in these countries also the share of oil rent in GDP is quite less and mainly the countries are also diversifying like Kazakhstan was dependent highly, but then the share gradually started declining ok and for the US the share is quite less, Oman the share is high, but it is there is a steady decline.

So, the countries are realizing that there is a need to diversify and otherwise the countries will also be suffering like Venezuela suffered. So, you can also check the data we have provided the links so, those who are very much interested they should go and check the database. So, there are other very much other relevant important data also due to time constraint we are not able to present all data ok.

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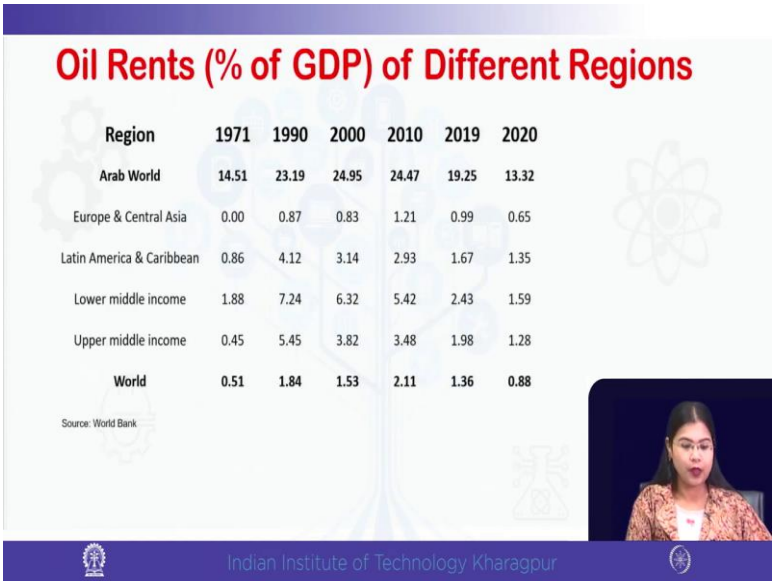

Now, region wise also we can divide the entire world and we can show the share of oil rent in GDP for across regions and we see that once again the Middle East countries or the Arabian countries they have a huge share compared to all other regions, but once again you see it started increasing from 1990, but then it declined towards 2019 and 2020.

For the world as a whole also it is increased, but again from 2019 and 2020 the oil rents as a share of GDP is declining, for the Latin American region lower middle-income countries in between there was increase in share of oil rent in GDP, but again these countries also experienced a decline and the share of oil rent in GDP for Europe and Central Asia it is not very high same for the upper middle income countries also.

So, we see that the Arabian world at the Middle East countries are mainly dependent on oil rent for their GDP a large part of GDP comes from oil rent, but the good sign is that the countries are also now diversifying.

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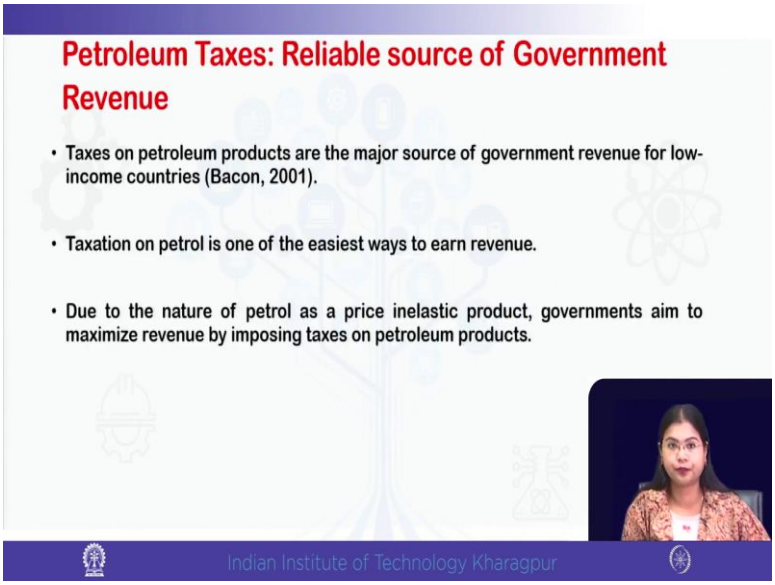

Now, the other part of our lecture today is regarding the petroleum taxes, because as we have told that petroleum is a very reliable and important source of tax revenue because it is being inelastic in nature. So, if taxes are imposed on petroleum products we know that inelastic nature means if price increases quantity demanded will fall, but by less than proportionately.

Therefore, the policy maker or the government knows that even if taxes are imposed on petroleum product given that there is no easy substitute or cheap substitute of petrol in the near future in the very short run. So, quantity demanded may fall, but by less than proportionately therefore, the tax revenue collected by the government will increase.

So, due to this inelastic nature of petroleum products it is a very important and reliable source of revenue. So, now, we will be studying the empirical evidences we will see across countries how the revenue of a government across countries are dependent on petroleum product.

And another also another good point about taxing petroleum product will be from the environmental point of view because in the subsequent lectures when we will be discussing about the post-intervention outcome in a market, we will see that a taxation policy reduces the quantity of transaction whereas when we subsidize the quantity of transaction increases.

Therefore, if we want to limit the resource use from the point of view of sustainability from the point of view of environment then tax will; obviously, be a preferred policy over subsidy we will study that in detail ok. So, from the point of view of environmental gains also petroleum taxes may be good in the long run because that will discourage consumption and that also ensures a huge amount of stable revenue earning for the government.

So, tax petroleum being inelastic in nature is the main reason for the huge amount of taxes imposed by different country governments on petroleum products. So, for the low income countries mainly Bacon, 2001 pointed out that petroleum taxes are major source of government revenue it is one of the easiest way to earn revenue ok.

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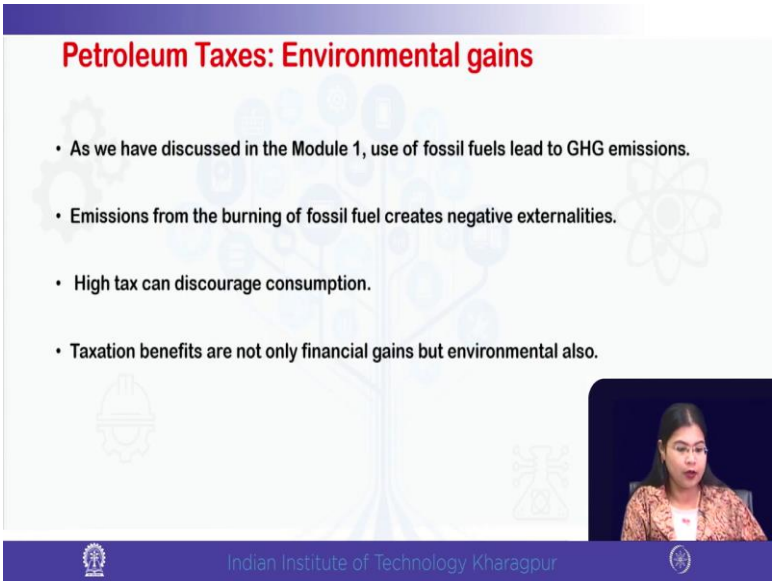

So, and we have also discussed about the point of view of environmental gains because if you remember in the very first module we have talked about a sustainability and we have talked about how burning of fossil fuel leads to greenhouse gas emissions right. Because we have discussed that in the primitive era we were dependent on the sustainable sources of energy.

But with industrial revolution we started getting dependent on fossil fuel, but this use of fossil fuel leads to huge amount of greenhouse gas emission which is mainly responsible for climate change and a global warming. So, if we have any such policy in place that

discourages huge amount of use of such fossil fuel that will be good for the environment from the point of view of sustainability.

So, emission from the burning of fossil fuel can create negative externality. So, what is externality, externality is something when action of one economic agent affects the cost or utility of another economic agent. So, in case of negative externality if the fossil fuel is burned so, the cost to the society is greater than the private marginal cost.

Suppose, if I am using a car that is generating a pollution. So, that pollution is not directly taken into account by me I am not spending any additional amount for that, but it is posing cost for the society as a whole. So, this is an example of negative externality.

So, high amount of tax on fossil fuel use can limit the consumption of such fossil fuel limiting the greenhouse gas emission and controlling negative externality. So, we will discuss these things in greater detail. So, tax benefits are not only financial gains, but also the environmental gains as well.

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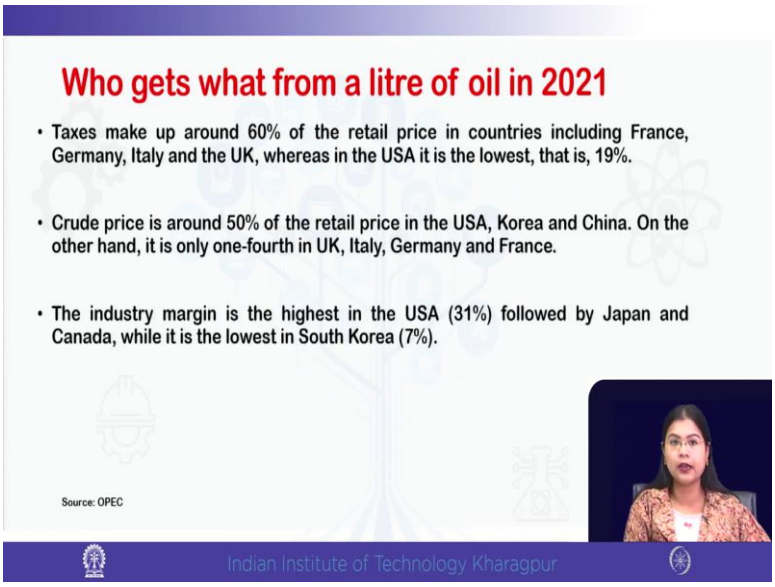

Now, we can see with data that taxes around of 60 percent made up of the retail price in countries including the developed countries also you will be surprised to see that around 60 percent of the retail price of oil is made up of taxes even for the developed countries like say France you see.

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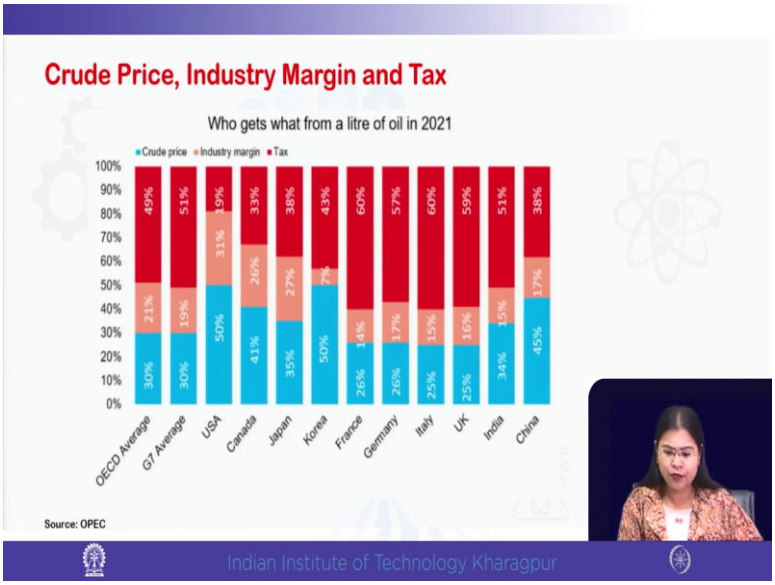

So, in this figure what we are plotting is the division of the retail price of oil in terms of the crude oil price, industry margin and tax. So, you see. So, this data from OPEC we can find that in France taxes include almost 60 percent of the retail price whereas, the crude oil price is only 26 percent. So, India is also quite high you can see it is 51 percent, but there are other developed countries also which out way India ok.

So, you can see a very high share of taxes in the retail price of oil for Germany, Italy and US even the OECD average is overall OECD is Organization of Economic Cooperation and Development countries so, for the OECD average country so, OECD include the mainly the developed countries the rich countries. So, the average for them is around 49 percent so; that means, in retail price 49 percent is tax and the crude price is only 30 percent and the 21 percent is the industry margin.

So, we can see that industry margin is quite low for all the countries presented here, taxes are quite high and the retail price is also low in many countries like France, Germany Italy, UK, India everywhere you see even the OECD average the taxes exceed the crude oil price in the retail price of petrol that is a very interesting observation.

So, if you know compare with China, for China it is till less means the crude price is greater than the tax price, but for many of the developed countries it is very interesting to note that many of the developed countries also are dependent on oil for their tax

collection it is not only the developing countries like India and China, but many developed countries are also dependent.

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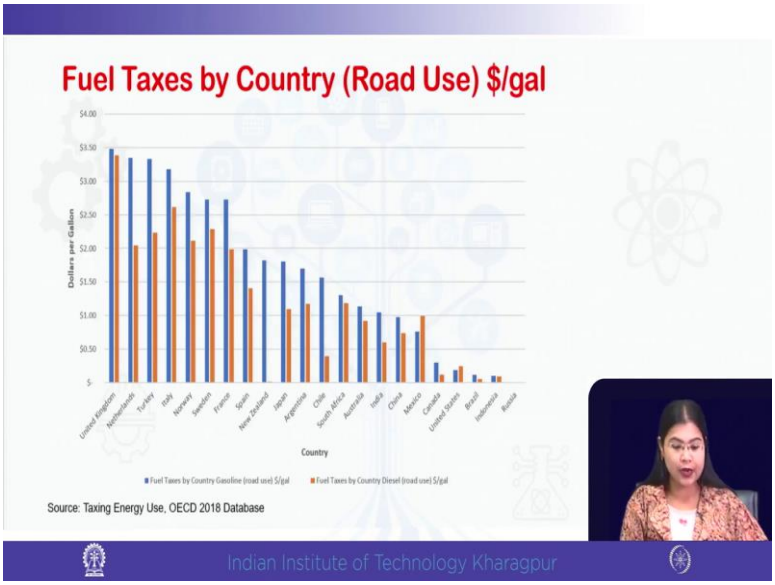

Now, we can also see the fuel taxes by country road use ok and we can see we can compare with petrol and diesel petrol means gasoline and diesel and you see again gasoline or petrol is also a reliable source of tax revenue than diesel. So, both have high amount of tax both petrol and diesel, but petrol or gasoline has even higher amount, you can see the data for UK and many countries, only US is an exception in US the fuel tax on diesel is greater ok.

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So, we can conclude that fuel tax in dollar per gallon is highest in the UK followed by Netherland and it is very low in Brazil, US, Indonesia and almost 0 in Russia. So, European countries the developed countries in Europe they have levied the most tax on petroleum products and as we have just pointed out that in US the tax on diesel is greater, I think in US. And we can also see Mexico in these two countries US and Mexico the tax on diesel is greater than the tax on petrol or gasoline.

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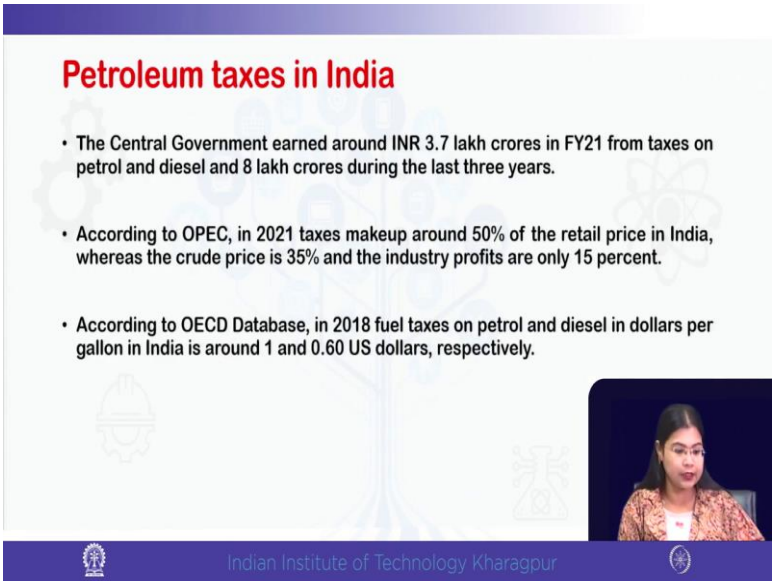

In India also the tax amount collection from petroleum products are quite high the central government earned around 3.7 lakh crores in financial year 2021 from taxes on petrol and diesel and almost 8 lakh crores during the last 3 years.

According to the OPEC data in 2021 taxes consist of around 50 percent of the retail prices of oil in India whereas, the crude price is 35 percent and the profit margin is only around 15 percent and according to one OECD database in 2018 the fuel taxes on petrol and diesel in dollar per gallon in India was around 1 and 0.60 US dollar.

So, we can see that the countries not only the developing countries like India or China even the OECD countries the European countries have very high amount of taxes on petrol and for most of the countries apart from US and Mexico the taxes on petroleum product is greater than diesel. So, if we compare between petroleum products if we compare with petrol and diesel the taxes on petrol are greater than the taxes on diesel.

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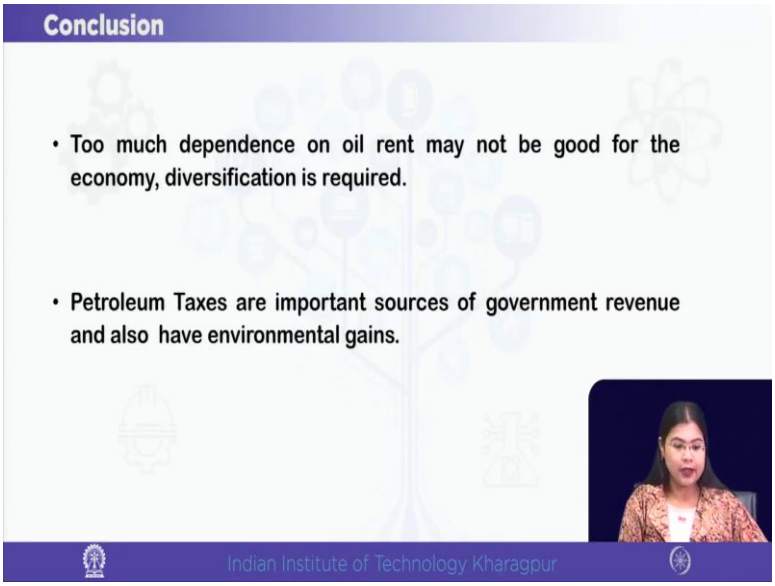

So, what we conclude is that though the oil rents as a percentage of GDP were very important for the Middle East countries, but the countries gradually have started diversifying mostly after 2000 which is a good sign otherwise the countries can also run into a problem like Venezuela. So, too much dependence on oil may not be good. So, at some point of time the country should diversify should develop the other sectors. So, managing the rent or the wealth earned from petroleum product is very important.

So, it is not only important to enjoy the rent from oil this very important resource the countries which are endowed with the resource they enjoy huge amount of rent, but it is very important to use the rent efficiently. So, the country should diversify should not be entirely dependent on oil and we also saw that how petroleum taxes are reliable sources of government revenue not only for the developing countries.

But also, for the developed countries and we also discussed that it is not only a good source of revenue for the government, but petroleum taxes can be good for environment also because they can limit the consumption of fossil fuel by discouraging high amount of consumption by putting a tax therefore, it has environmental gains also ok.

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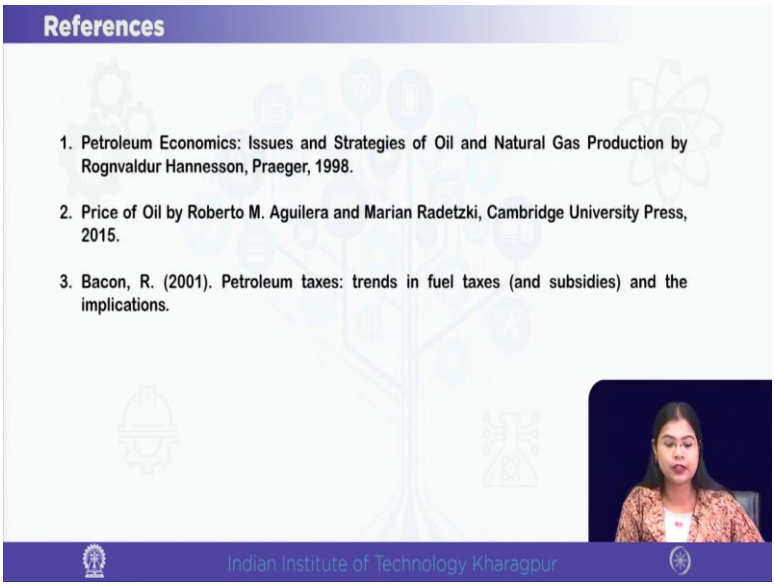

So, with this, we finish today's discussion. So, we follow the two petroleum economics books and you can also refer to the work of Bacon 2001.

Thank you very much we will meet in the next lecture.