Environmental & Resource Economics
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Daly's Operational Principle of Sustainable Development and Impact of Environment Regulation on Firm's Competitiveness Part 4

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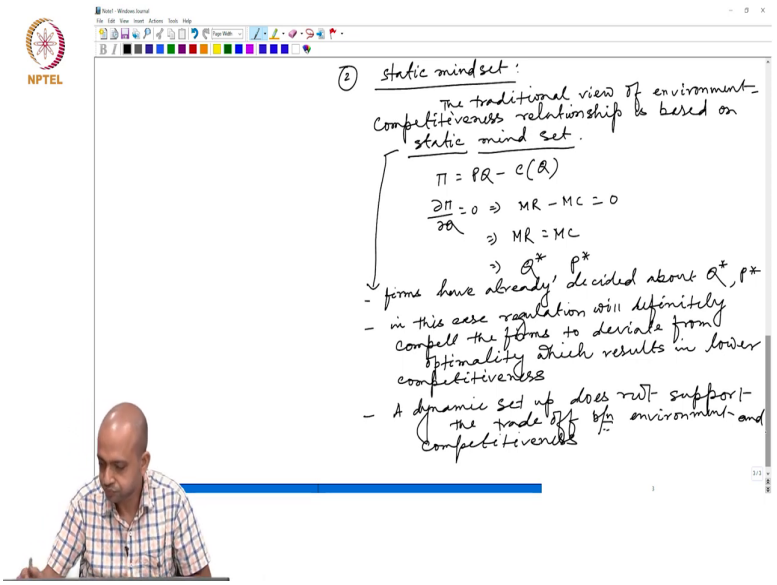

Then reason number two, static mind set. What Michael Porter said that when we think as per the traditional wisdom that there is a trade-off between environment and competitiveness, that traditional view of environment competitiveness relationship is based on a static mind set. So, that means, the traditional view of environment competitiveness relationship is based on static mind set, what is the static mind set?

The static mind set says that, we think the firm they have already identified the best possible ways of production, they have already identified the best possible technology and they have already optimized their quantity. So, that means, if we write a simple profit function for the firm minus cost, this is the profit.

So, del P del Q equals to 0 indicates this is T R, sorry M R minus M C equals to 0 and then M R would become equals to M C and that will result in the equilibrium or optimum level of output and that will also tell the firm what is the equilibrium level of price. So, that means, we think that all the productive units all the firms, they have already optimized their production process, they have already decided their equilibrium level of output and price.

Now, in this setup, once optimality is achieved, what we assume the static mind-set said that firms have already decided about Q star that means equilibrium or optimum price and P star. So, if equilibrium is already achieved any external force in the form of regulation obviously, will make them deviate from this optimality.

So, in this case, regulation will definitely compel the firm to deviate from optimality which results in lower competitiveness, but in reality these equilibrium concept a theoretically derived concept, in reality firms are actually, they are away from the equilibrium, they are always striving for this P star and Q star, because this optimization requires, how do you optimize.

This optimization requires infinite amount of information, information about the buyer, information about the quantity, information about the demand, information about input supply, so on and so forth. So, an infinite set of information is required for achieving this optimality, it is not only the availability of the information, the firms need to process all those information.

So, first of all the firms operate under incomplete information, all the information are not available all the times, even if it is available, they have a limited capacity to process. So, incomplete information and limited capacity to process those information, prevent them to achieve Q star and P star.

So, that means, it is possible that firms may not be aware of some better technologies to be adopted for production, which this regulation, once it is imposed that may help a firm identifying those better technologies and that is why their performance may increase and the traditional wisdom is actually not correct.

So, we need to apply a dynamic mind-set instead of the static one. So, firms should be dynamic, they should be always looking for better opportunities in terms of technology, input, market conditions, so on and so forth. Because the traditional mind-set that firms have already achieved this optimality we think that regulation is bad, regulation will only make them deviating from this optimality and that will result in lower degree of competitiveness.

So, that means a dynamic setup does not support the trade-off between environment and competitiveness, because in a dynamic setup, they are always looking for better opportunities. This is reason number two.

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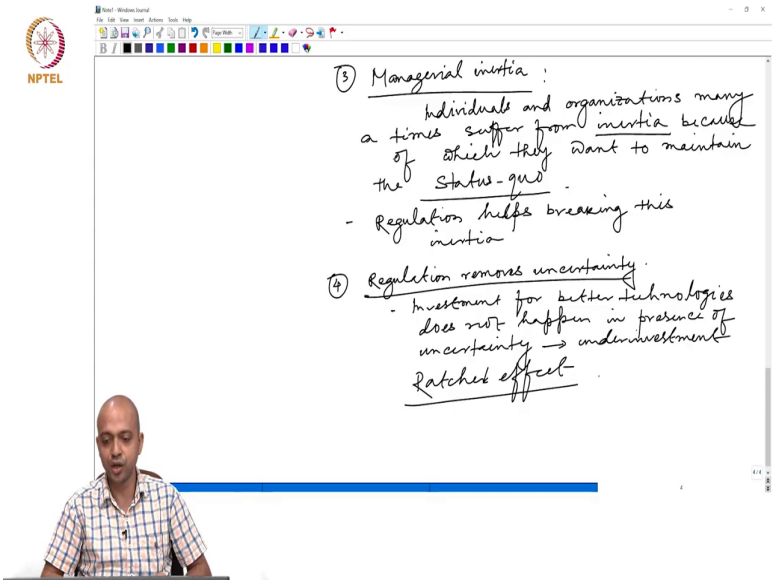

Then reason number three, it says managerial inertia Now, what is inertia? Many of you have studied moment of inertia in your 9th or 10th level physical science, what is that moment of inertia? It says that if a body is moving, if a particle is moving, then the particle wants to maintain its speed at same direction and if the body or particle is in its rest, it will try to maintain the same situation unless something externally imposed and which is externally imposed that is what we defined as force.

Same concept economist also borrowed then they said many individuals, many organizations they suffer from inertia, inertia means what they have been doing for so many years, they want to maintain the same standard in terms of production process, in terms of production technology, in terms of production amount, in terms of type of energies, so on and so forth.

That means, it says individuals and organizations, many a times suffer from inertia, because of which they want to maintain the status quo. So, this status quo is actually a behavioural anomalies, what does it mean? It says, when better opportunities are available, I am not looking for that, I am continuing with what I have been doing for so many years, because of my inertia, because what I think that the new initiatives, new avenues would be costlier, it would not be successful, there would be lot of risk involved in that so on and so forth.

So, there are many reasons that may explain status quo. But the fact is true even, in our own life also, many a times we think, we do not think about the new initiatives all the time, what we feel that old is gold that means, our traditional way of production is good, that means

firms they thing that our traditional way of production, the traditional technologies, they are all good and they are not motivated enough to look for better alternatives, because of this managerial inertia, they want to maintain the status quo.

Now, this regulation helps actually breaking inertia. So, once the inertia is broken, then they will probably look for better alternatives. So, regulation that means, may result in, may motivate the firms to look for even technological innovation, that will lead to more amount of output and lower level of pollution.

So, the third reason that Michael Porter put forward to support his hypothesis is inertia, managerial inertia, companies and organizations they suffer from this type of inertia and regulation helps breaking this inertia, motivate those firms to go for technological innovation that may result in more amount of output with lower amount of pollution. It is in number three.

Then reason number four is regulation removes uncertainty, what is this? It says once the regulation is imposed, then productive units they know, this is the standard that is going to be there in the market in the system for some time. So, that means, even if sometimes what happens, even the firms are interested for technological innovation, technological upgradation, they are not actually sure, what would be the demand from the market, what would be the demand from the consumers, what would be the demand from the policymakers.

So, if I am not sure, what would be the market standard about the process, technology, so on and so forth. I am not confident enough to put my money in research and development, because research and development is a risky activity. Unless I am not sure, that this is going to be the particular technology or the market will demand. This is going to be the standard of my emission that the policymaker would demand in the next 5, 10 or 20 years down the line.

I am not confident enough to put my money in this R&D activities. So, that means investment for better technologies does not happen in presence of uncertainty. So, there is lot of under investment. So, policymakers should bring in regulation, should not only bring in the regulation, they must also ensure that this is the technology, what we want, this is the emission standard that we want and this standard in terms of emission, this standard in terms of technology will be there in the market, in the system for quite some time.

Policymakers should not bring in the regulation, new regulation in every alternative day. They should not always increase the standard. Because if they increase the standard every alternative day, every alternative month, then what happens? There would be a tendency from the firm's point of view to underperform that is also known as a Ratchet effect.

What does it mean? It means when the standards keeps changing frequently, then individuals try to underperform. For example. I am saying, I am asking a student to read only one article per week. Then I see the students completed the reading. After three days only next week, I said no, no, not one, you have to actually read two articles per day. Once that is also done, next to next week, I say, you have to read four articles per day.

So that means I am changing the standard, I am changing the quantity of reading materials required from the students, every alternative week, then the students would be thinking, I should underperform, I should not reveal my true potential. Because if I my reveal my true potential, then the teacher or instructor is going to increase the standard.

Similarly, if the policymakers also keep on changing the regulation, every alternative month or every alternative year, then the firms would also think of underperforming, because they would think if we show our full potential, then the technological standard is going to be increased even further.

So, that means regulation, the regulators should not only bring regulation, but they must also ensure the same standard to be followed for quite some time. In that case, they will be able to remove the uncertainty completely and in that case, optimal investment will happen. That means the fourth reason what Michael Porter said that regulation removes uncertainty and in absence of uncertainty only the firms will go for optimal investment for better process, better technology and better products. So, this is reason number four, wherein we say that regulation removes uncertainty.

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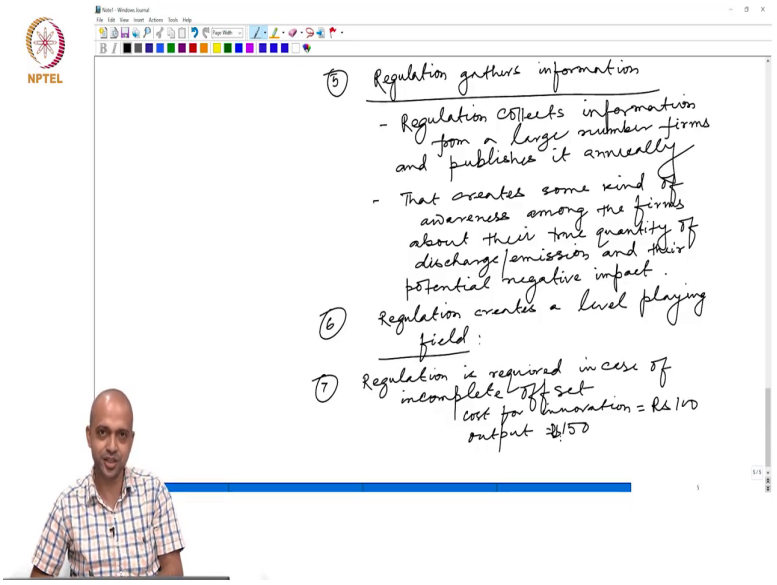

Then reason number five, regulation gathers information, sometimes some type of regulation, it requires gathering information from so many productive units and published annually. Let us say that there is a particular regulation, let us say releasing the toxic amounts produced by each and every firms in that case, what will happen, regulation will sometimes, regulation collects information from a large number of firms and publishes it annually.

Now, when that information is published annually, then that creates some kind of that creates some kind of awareness among the firms about their true quantity of discharge or emission and their potential negative impact.

So, without that type of publication, firms are actually not aware of, what type of toxic discharges they are releasing from their units, what type of emission they are discharging and what is the potential negative impact on the environment. So, even if this type of regulation is not mandating the firms for pollution abatement, simply by creating some kind of awareness, it is helping the firms to reduce their pollution.

So, that is why this gathering information which is required by some sort of regulation is also, one way to achieve the win-win opportunity, that means in one way to achieve pollution abatement that is what Michael Porter said.

Then reason number six, regulation creates a level playing, what does it mean? It means in absence of regulation, why the firms they do not go for pollution abatement or technological innovation, because they think since it is not mandatory for technological innovation and

pollution abatement, if I go for abatement and somebody else is not going for it, then the firm who is not going for pollution abatement or technological innovation will enjoy some kind of undue advantage.

That means the field on which different firms are playing is not levelled, somebody is going for a pollution abatement, somebody is not going for it. That is why the firm which is not going for the pollution abatement or technological advancement would be enjoying some kind of undue advantage.

But once this regulation is imposed, then all the firms they are subjected to same type of regulation, all the cement producing firms, they are required to meet only 20 Kgs of CO_2 per tonne of cement let us say. So, that means all the firms are playing on a field which is levelled, earlier it was not.

So, because of creation of this level playing field, the firms would automatically think of since everybody is subjected to same type of regulation, nobody is able to enjoy undue advantage, then let us go for pollution abatement. So, that is also another important reason, that regulation, environmental regulation creates a level playing field, all of them are playing on the same level.

In absence of regulation, that was not the case. If one particular firm goes for pollution abatement and related technological advancement that firm is going to suffer and the other one is going to enjoy undue advantages. So, that is why regulation creates a level playing field. That is another reason Michael Porter put forward another argument Michael Porter put forward to support his hypothesis.

Then the last one, regulation is required in case of incomplete offset, what is this? Michael Porter said that a regulation motivates the firm to go for innovation actually offsets the cost of abatement because, because this abetment, this innovation leads to a huge expansion of output.

So, if I spend 100 rupees for pollution abatement that means to go for better technologies, I will get 150 rupees output. So, that means, it is more than fully offset. So, regulation cost is 100 rupees, cost for innovation is let us say 100 and output equals to 150, rupees 150. So, that

means, it is more than fully offsetting and obviously, firms will immediately go for technological innovation because of this regulation.

But now suppose that regulation is motivating the firm for innovation, going for innovation, but the output is less than 100 rupees. So, that means, innovation results in less than fully offsetting amount of output. If that is the case, then why should the firm go for innovation.

The cost of innovation is 100. But I am getting only output by 90 rupees. So, that means it is less than fully offsetting, I still have to pay 10 rupees from my own pocket to comply with the environmental standard and related innovation, technological innovation. So, that is why Michael Porter said unless it is mandatory for all the firms to go for technological innovation, because that is the technological standards set by the regulator and policymaker, firm will never go for this innovation unless and until it is more than fully offsetting and there is no guarantee that innovation will always be more than fully offsetting.

There are cases, where the innovation will result in only partial offsetting. They will partially offset, your cost for such activities and in case of partial when the innovation is partially offsetting your cost of innovation, then regulation is actually required. Otherwise, they will never go for such activities.

So, these are the reasons, these are the important reasons Michael Porter put forward to support his hypothesis that environmental regulation motivates the firm for innovation and that innovation will result in win-win opportunity. So, what he did, he collected hundreds of case studies, from a dozen of countries to justify this argument, with all those cases, he actually showed that all these firms who actually complied with the environmental standard and went for technological innovation. They all enjoyed win-win opportunity.

But still, the other group of economists, they said that Michel Porter's argument was based on case studies, even though the number of such case studies were 100. Now, any hypothesis, which is based on case studies, you cannot generalize, because Michael Porter, he could not bring in a theoretical framework to justify his argument.

Unless and until an argument or a hypothesis is supported by a theory, you cannot generalize this. That is why the other group of economists what they did, they collected another 100 samples, another 100 case studies and they also proved that these 100 firms who actually went for technological innovation, they actually suffered from lower profit, lower financial

performance, lower competitiveness and they came up with an alternative simple theoretical model to show, if innovation was not profitable, before the imposition of regulation, it is still not profitable, even after imposition of the regulation.

And that is how they again challenged the Michael Porter hypothesis. How did they challenge Michael Porter hypothesis, what was their theoretical model that we will discuss in our next class. Thank you.