MINERAL ECONOMICS AND BUSINESS

Prof. Bibhuti Bhusan Mandal

Department of Mining Engineering

IIT Kharagpur

Week 12

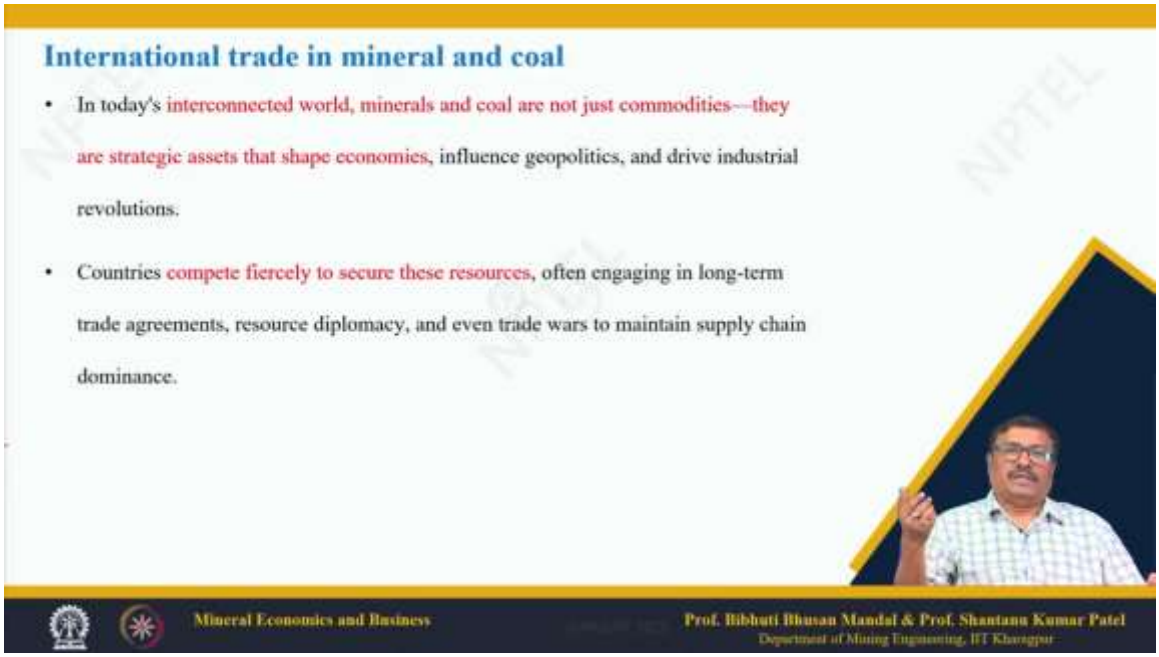
Lecture 60 : International trade in minerals and coal

Hello and welcome everybody to the last lecture of this course on Mineral Economics and Business. As you have seen this week, we are talking more about strategy, policy, and the future of the business—how it is going, and especially in the last lecture, we talked about the natural scenario, like how disinvestment, public-private partnerships, and outsourcing models work. Now, we will try to have a glimpse of international trade and business in minerals and coal—how it works and what the current position is. I will try to touch on that part before we come to the end of this lecture series. The concepts that will be covered in this last lecture are international trade, pricing, trade regulations and policies, bilateral and multilateral trade agreements, and sustainability in global trade.

Now, in today's interconnected world, minerals and coal are not just commodities. They are actually strategic assets that shape our economies, influence geopolitics, and drive

industrial revolutions. Now, all countries—especially those rich in minerals and those with big economies—compete fiercely to secure these resources.

Often, they engage in long-term trade agreements, conflicts, resource diplomacy, and even trade wars to maintain supply chain dominance in the market. Why does this happen? First, some nations sit on vast reserves. For example, Australia's iron ore reserves are huge.



China is very rich; they have not only coal and other resources, but they also have the largest rare earth reserves and the highest rare earth mineral deposits in the world. And Russia's coal reserve is But on the other side, Japan or South Korea, which are well known for their electronics and manufacturing industries, rely mostly on imports. They do not have their own resources. So some countries have huge reserves, while others do not.

This imbalance instigates international trade, creating mineral-rich exporters and resource-hungry importers. So, what are these trade wars and resource nationalism? Governments often impose export bans. You cannot sell it outside or impose tariffs on strategic minerals. For example, Indonesia's nickel export ban or China's restrictions on rare earth exports.

This forces importing nations to look for alternative supplies. For example, if you depend on Indonesia for nickel and they stop exporting it, you have to depend on others. Instead of having a single contract with one country, you should have contracts with several resource-rich countries. So if one resource is cut off, you can manage by sourcing from other countries.

So, there have to be provisions for alternative supply. And of course, if you have the resources or reserves in your own country, you must invest in domestic mining also. Now, this is about the pricing in minerals and coal. Now, this is mostly about the market-based pricing mechanism because it is now open trade. So, you can export and import all these things. So, it will definitely depend on the global pricing.

So, the price of any commodity for immediate or reflecting real-time supply and demand, these things will—because see now, if we have a shortage somewhere or somebody has cut off supply or some country requires immediately a huge amount of certain material. So, this will instantly start changing. You can see in the market that the prices are changing much more, fluctuating than ever before. Previously, certain things were slowly rising, rising, and rising, and then there was a fall, again a rise. So, this rise and fall cycle used to be long.

Nowadays, it can happen anytime, anytime. So, the fluctuations are too much and then very frequent. So, you can see on a daily basis also, depending on the global trade volume, the prices are fluctuating. And they are highly influenced by the short-term market conditions, like even the weather disruption somewhere, energy demand, or geopolitical events, war between countries, relations, diplomacy. So, that will change the supply and demand, and then it will also immediately influence the pricing.

This is common for commodities like thermal coal, iron ore and copper. I will give an example that in 2021, the spot price of iron ore surged above $2,000 per ton due to high Chinese demand and supply disruptions as well in Brazil. Demand in Chinese? ah ah China and supply disruption from Brazil. So, other countries which were try to export.

So, they had a they got this high ah price and ah due to this ah price surge above 200 dollar per ton. Now what are the contract based pricing mechanism? Do you need to be steady in the market? You want to run your for example, the steel or ah manufacturing industry ah as long as you want. So, you cannot so be you should not be so much affected by the immediate changes or too much fluctuations or disruptions.

So, we can have a long term contract. So, we can we can have fixed price prices that has fixed or linked to benchmark for a specific duration 6 months or even to 10 years. So, this

is common for coking coal iron ore or rare earth metals, where supply security is very crucial. So, buyers like the steel mills or the sellers, the mining firms, they will negotiate bulk deals based on past trends and future projections and they will go for a long term contract for supply to the buyers. For example, our steel makers in India have signed long term contracts with the Australian coking coal suppliers.

Why? This is to ensure a stable supply at predictable prices. Now there are also government-regulated prices. In some countries, the government directly controls the price of minerals to stabilize domestic industry. So, to provide protection to the domestic industry as well.

Now the methods used include subsidies and tax incentives to control domestic costs, price floors and ceilings to prevent extreme price fluctuations. For example, if you can import certain metals or minerals at a very cheap rate from outside, why should you buy from domestic suppliers? So, you may have to consider the taxes imposed or customs duties, something like that, which is difficult, but of course, you must closely monitor how the prices are fluctuating. So, your domestic market should have certain protection; this is to be completely safeguarded. Earlier, when we had state-owned public sector units, but nowadays, due to private sector partnerships and the open market, this has

become difficult, but we need to have a complete understanding of how the market is fluctuating and how we can protect our domestic market.

Now, there are state-owned enterprises controlling supply chains, for example, China's dominance in rare earth elements, as I said earlier. The Indian government sets coal prices through Coal India Limited for domestic consumption, preventing excessive reliance on expensive imports. So, we have our own, as we have learned in one of our lectures, how the coal grade is calculated and how the price is related to our course, or the grade of the coal. So, Coal India Limited controls that. So, in the domestic market, they know what the price of production from a particular company will be.

So, that way we can have control also through government regulated pricing mechanism. Now, the supply demand dynamics and what are the external factors that influence it. As I mentioned several times that geopolitical influence is a great factor. So, there could be a sanction like we are not going to send you or sell you certain mineral strategically. One country can fix these things or there could be restrictions on key exporters

There could be export ban as I said earlier the Indonesia's nickel export ban raised global prices by over 50 percent that is that could be because their own domestic need was more important to them. So, they will they the nickel export ban. So, naturally the other

people who are enjoying this material or importing nickel from Indonesia had tough time because the global price jumped above 50 percent. Then, we have so called resource nationalism. So, the governments restricting foreign access to critical minerals that means, the other parties cannot this is strategical I will I have my own critical minerals.

So, I will try to mine it with our own complete government control and we will not give the others to invest or mine and then take it outside. So, that could be that that is an extreme case and we know this is a resource nationalism. So, the US China trade war which is now very apparent nowadays initiated by the so called well known reciprocal tariffs that is I am imposing tariff on the import from other country and the other countries also doing the same thing for my exports. So, the ah the reciprocal tariff imposed heavy duties on steel, aluminium and other raw materials. So, this led to higher production cost globally trade diversions and the supply chain realignments that means, disruptions and then you are rerouting this thing.

So, this will affect the pricing of essential minerals like the rare earths and aluminium in near future. What are the there are logistics and transportation cost also the freight charges changes port handling fees and the insurance they will significant they are they significantly impact mineral pricing. Now there is there are measures for shipping cost influencing bulk commodity prices. If that changes depending on the business strategy

of the shipping companies, then that will definitely make lot of change in the commodity prices, because that will add to the price of ore or the coal. For example, rising freight rates due to global supply chain disruption in 2021 led to higher coal import cost in India because coal say you are buying from Australia, but if the shipping cost goes high then the total landing cost in India went high in 2021.

The World Trade Organization rules on mineral and coal trade that plays a crucial role in regulating the international trade and minerals by enforcing rules on tariffs, subsidies and trade barriers. So, if you are having a agreement. with ah in line with WTO, then you have to follow them. Sometimes seriously jeopardizing national interest. So, we need to be very careful about the general agreement on the tariff and trade.

They prohibit export restrictions, but allow exceptions for environmental protection and national security. But we need to be very first thing knowledgeable and careful about this when you are making any contract with any other companies or international and previously I have seen personally people were also not when you are in a public sector unit then you are not even conscious about the cost part. So, forget about the international trade. So, now being ah a professional

Working in companies that are globally connected, which are very much involved in the new requirements of efficiency, productivity, and the new style of business also. We need to be more aware of what is happening worldwide, not only the cost but also the rules and regulations. What kind of facts are happening in the whole world that can affect the business of which I am a part? So, like the disputes over mineral export restrictions, for example, have led to major WTO rulings, such as China's rare earth export restrictions, which were deemed illegal. Different contracts, different agreements.

If someone is trying to violate or somebody is interpreting that your export or import is not legal enough, in that case, there will again be supply chain disruptions. Now, the bilateral and multilateral trade agreements. The free trade agreements reduce trade barriers and impact mineral and coal markets, which are usually affected by trade barriers. So, they will lower tariffs on mineral exports and improve market access for energy resources. For example, the Regional Comprehensive Economic Partnership.

So, they impact coal trade between Australia, China, and Asian nations. These are actually a kind of group of countries. So, they will have their own agreements. Instead of having completely open trade, we can have small groups and then exchange between ourselves to reduce trade tensions. Or, say, for example, the United States-Mexico-Canada Agreement.

They influence the steel, aluminium and rare earth exports. So, they have their own agreements to control the pricing. Our agreement in India with key trading partners like India, Indonesia, this is also a part of comprehensive economic cooperation agreement. So, Indonesia is India's largest coal supplier. Now, see the agreement ensures lower tariffs on thermal coal imports.

And India-Australia ECT, Economic Cooperation and Trade Agreement. This provides duty-free access to Australian coal and critical minerals, lithium and cobalt. Also, we have the India-Japan CEPA, Comprehensive Economic Partnership Agreement. Again, this strengthens the supply chains for rare earth elements and encourages investment in clean energy minerals. Now, what are the sustainability and ESG in global trade?

What are the environmental concerns in coal exports? Now, the coals carbon footprint is under scrutiny with global regulations pushing for cleaner energy. that means, you are trading more in coal that means, you are also creating problem the more carbon footprint and then we the there are emission regulations. So, the EU CBAM will impose carbon pricing on coal imports. China is also implementing stricter coal emission standards.

Countries like Japan and South Korea are reducing thermal coal imports to reduce their carbon footprint. So, that means it is not only that I have used resources, but some other

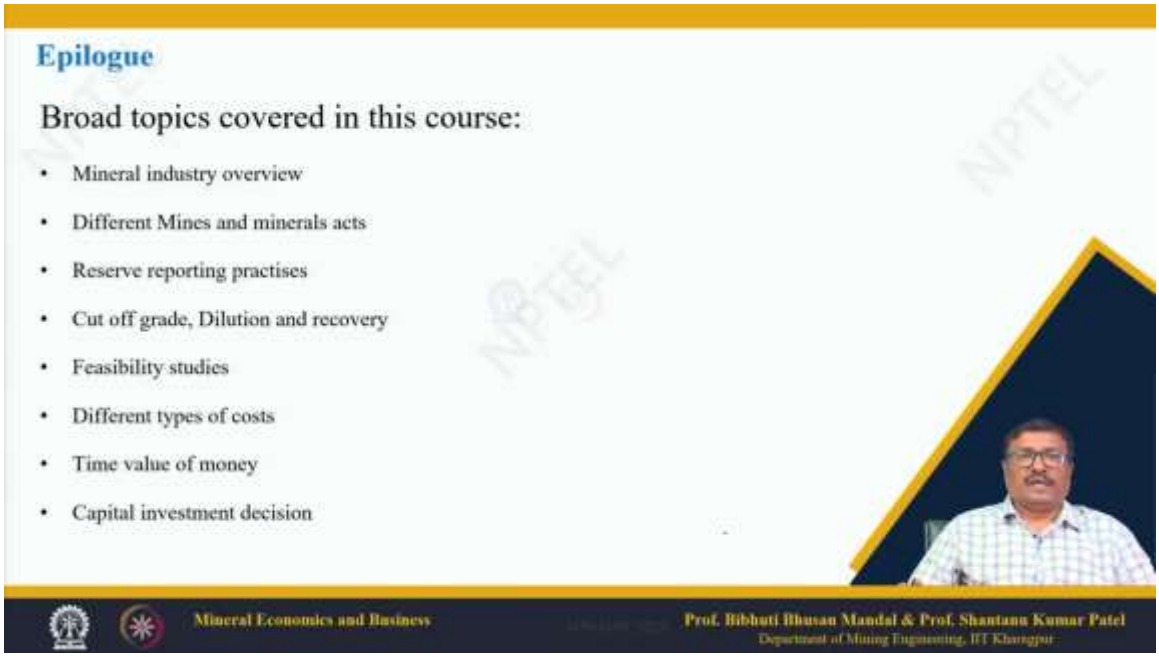
countries also have huge demand. So, I will be supplying to that. It is also highly influenced by global regulations on environmental emission standards. Because the whole globe is trying to shift toward renewable and clean energy. That means more export and import of this coal is discouraged overall.

Now, the ethical sourcing of minerals and responsible mining practices. Now, many industries demand traceable and ethically sourced materials, knowing where they have been purchased from. Like in the Democratic Republic of Congo, miners are using child labor. So, if you are importing cobalt from Congo, you are indirectly encouraging child labor. Remember that.

Now, the environmental damage that lithium mining causes, or the illegal mining and deforestation for gold or rare earth elements, wherever they are. If you are encouraging this, you are encouraging environmental degradation, child labor, or environmental damage. So, we must have traceability of origin—where it is coming from, how it is mined, not just purchasing from the market. It has to be known, like in food items, where it has come from, what the constituents are, whether it is organic or not, like that. So, where it has been sourced from.

So we must have the due diligence guidelines for the minerals for a responsible mining initiative and for responsible mining assurance certifications. We also need India's sustainable mining initiative to promote ESG compliance in the mining sector. With 60 lectures in this course, we have finally reached the end of this course. We have tried to cover broad topics which are essential for an undergraduate course on mineral economics and business. And we have tried to cover major topics like the mineral industry, whether

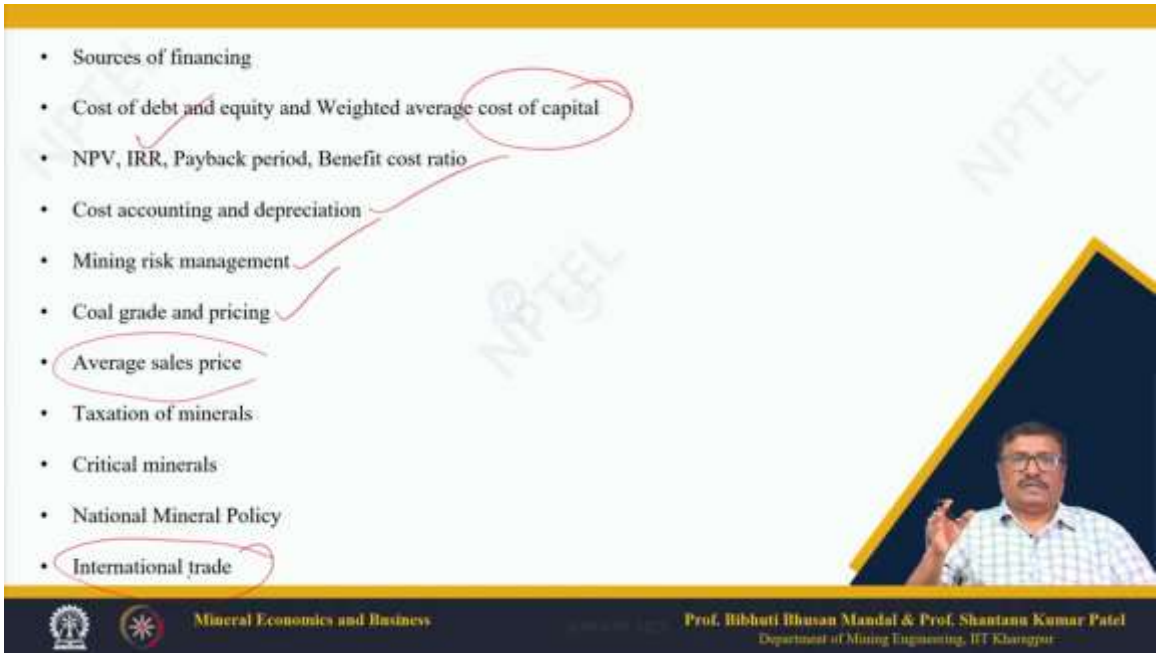
it is global or Indian. We have touched on the Mines and Minerals Act, very important reserve reporting practices, cut-off grade, dilution, and recovery.



We have discussed feasibility studies, different types of costs, time value of money—a key concept—and capital investment decisions, which are very important nowadays. We have talked about the sources of mine financing, cost of debt, equity, and the cost of capital. We have discussed net present value, internal rate of return, payback period, benefit-cost ratio, cost accounting, depreciation, depletion, amortization, mining risk management, investment risk, running the business, coal grade, and pricing. We talked about the average sales price—how it is fixed in our country—the different taxation on minerals, critical minerals, the National Mineral Policy, and today, in the last session, we talked about international trade. So, rather, we need to be more conscious and alert nowadays about global trade and business, not just as professionals, but also to understand how economics is influenced by global trade and global events, which is very important.

As you already know, artificial intelligence, blockchain, and automation will greatly influence our efficiency and the business itself, and it will definitely have something to say about the sustainability of our business. This will also be influenced by strategic trade shifts. This will dictate the future of global mineral markets. Even business analytics in

mining, for example, will be largely influenced by artificial intelligence. Now, the fluctuations in demand, which I said are highly fluctuating—more frequently fluctuating than ever before.



So, for that there will be more speculative trading now. There will be more macroeconomic factors like the inflation, cost surges, interest rate changes, they continue to drive the unpredictable pricing in mineral markets. So, the cost models our ah the the futuristic the predictions, they need to be more efficient, more practical depending on the new parameters which are added to the business. We also have day by day more stringent environment policies in most of the countries. There are huge mining reforms like I have said or different strategy of business and our critical mineral strategies.

They are redefining the trade regulations our and our way of doing business to increase

safe reliance and to maintain the sustainability. These are certain key factors which are going to influence the future or a they are going to determine the future of mineral economics. Being a professional you should be aware of all these things and keep in touch with these factors, so that you become successful. I wish you all ah very ah successful professional life ah in in mining where the mineral economics understanding of mineral economics and business is going to help you a lot.

For this particular lecture like the last one ah you also can see you may like to see the websites of the World Trade Organization, International Energy Agency, IEA website, OECD reports also. and the lme that you should constantly watch also i have ah ah told you about the references whenever i have taken in lecture or professor patel has ah talked about a topic everywhere at the end of the lecture we have added references we you can go through those books or reference items and the website that we have mentioned And in this ah particular ah series of lectures the topics that we have covered are more than sufficient for the undergraduate course on Mineral Economics and Business. And in future I I hope that this is going to help you in understanding the mineral economics much better and make you a more successful ah professional mining engineer. Thank you very much.