Evolving State Capitalism: Federalism in the Indian Coal Industry

Rohit Chandra

Abstract

The coal industry has always been a site of federal contestation in India. After independence, the coal became essential for the realization of differing industrial visions of State and Central governments. Nationalization of the industry clearly tipped the balance in favour of the Central government. What used to be a very public and complicated political negotiation between the Central and State governments, eventually became an internal tug of war for the resources and redistributive potential of Coal India. But despite this politicization, Coal India has maintained consistent production growth, demonstrating the resilience and adaptability of state owned enterprises.

Work in Progress – Please do not cite

Please contact me at rchandra@fas.harvard.edu with any questions about this project

Disclosure

This paper was funded by the History Project and INET.

Project Framing

The following paper is a chapter of what will eventually be a book length project on the economic history of the Indian coal sector from 1960-2005. Using a state theoretic approach rooted in political economy, one of the goals of this project is to establish state-owned enterprises (SOEs) as a particularly adaptive form of state capitalism which helped the Indian state accomplish both economic and social goals in parallel. Given the persistence of SOEs in emerging economies, this form of enterprise has once again become the focus of debates on the nature of capitalism in developing countries. Should the state be involved in business? How do SOEs balance the profit motive with the larger social welfare objectives of the state? Are SOEs prone to political interference and can they maintain operational efficiency under such pressures? How are power dynamics in a federal state affected by the creation of SOEs? These are some of the questions I hope to answer using the case of the Indian coal industry, and in particular looking at Coal India, which has been the monopoly coal producing SOE in the country since 1973.

This chapter in particular will look at how the formation of Coal India changed the nature of Indian federalism by bringing political bargaining around the coal industry from the public sphere to within an arm of the state.

Sources – The New Sketch[1]

The majority of the sources used in this paper are either official government documents and reports, or material from The New Sketch.

The New Sketch, was an independently published weekly coal journal published out of Dhanbad (the heart of the Indian coal industry) from 1950 – 2005. I have managed to locate the majority of the issues from 1961-2000, which is perhaps the most comprehensive collection of weekly updates from the Indian coal industry. Many mining engineers I have spoken to who worked in the industry between 1960-1990 used to be regular subscribers to The New Sketch to keep abreast of local mining news in Dhanbad, summaries of technical trends in the industry, job opportunities, new machinery on the market and much more. The journal usually had six main parts: a lead article which often considered a key issue to the industry in depth, letters to the editor, advertisements for local businesses and mining machinery, an occasional summary of a technical article, tenders by mining companies for equipment, and job listings. The quality of the journal declines noticeably from the early 1990s onwards, because of its increasing irrelevance as the erstwhile private coal companies consolidated into one nationalized corporation which handled all the procurement, hiring and information dissemination internally. Nonetheless, the publication manages an impressive independent streak for a long period after nationalization (in the early 1970s), and outside of internal documents of Coal India and the Ministries of Coal and Energy are perhaps the best summary of trends in the industry. Consequently, I will be quoting/citing this publication liberally.

[1] More on this sources is given in Appendix A

The question of state-ownership of industry has been one of the defining economic dilemmas of the twentieth century. The combination of socialist and communist political ideologies in Europe with the rise of labour movements and widespread transitions to democratic politics meant that the logic of unfettered markets and private enterprise was perpetually being questioned, particularly in the developing world which was still evolving its institutional structures in government. However, with the end of the Cold War, and the relative failure of the import-substituting industrialization (ISI) model in Latin America, the question seemed to be more or less settled, particularly with the arrival of the ideas of the Washington Consensus. By the early 1990s, organizations like the World Bank were settled in their orthodoxy; the state should stay out of business, and at best should act as an arms-length regulator of business enterprise. However, not all countries stayed on this modernization-inspired route.

Reports of the demise of state-owned enterprise (SOE) have been greatly exaggerated.[2] In the last twenty years, emerging economies have perhaps offered the greatest counter-example to what had been considered the twilight of state capitalism, particularly in the energy sector (upstream and downstream). For example, China, India and Brazil have evolved robust economies which run dually on the engines of private and state-owned enterprises. From the 1970s onwards, Latin America was often considered the testing ground for many ideas on state capitalism. As Ravi Ramamurti's essay in <u>Privatizing Monopolies</u> describes, telecom and airlines were two of the earliest privatized industries, where public sector inefficiencies combined with rapid technological changed allowed private sector companies to significantly outperform their public sector counterparts.[3] However, this has been less true in energy related industries, which because of their strategic importance, and their more natural public good characteristics, have often been retained in the state's portfolio. Most developing country governments still own majority stakes in utilities, power generation, upstream fuel production, and oil refining.

State capitalism, despite its historically monolithic nature, comes in various forms these days. In their recent treatment of the subject, Musacchio and Lazzarini describe how the practice of state capitalism has changed globally, particularly in the last twenty years as governments have gradually reduced their shareholding and formal control over various branches of industry.[4] They argue that while direct ownership and control by the state has declined, states still exert major influences over industries through their minority shareholdings. The result has been a more collaborative form of state capitalism where there has been room for private sector entry. Rather than the traditional dichotomy of state versus private ownership, they advocate a more nuanced view of influence which depends on the minority/majority shareholding of the state in companies. Most countries were forced to make drastic changes to contractual and ownership structures to address the inefficiencies. The nature of these reforms is what defines new varieties of the practice of state capitalism.

---

[2] There is often a semantic disagreement on what state ownership actually means. For examples, is an SOE a company which has any amount of state shareholding? Or is it one with only majority state ownership? For the purposes of this paper, SOEs will be companies which have any amount of state-ownership. As some of the references will make clear, even minority ownership is often sufficient for the state to exert influence on companies, even if they do not have formal control over their precise actions. Such SOEs are often part of a larger narrative on state capitalism, where the formal control of the state has decline (eg. < 50% ownership), but the state's ability to facilitate and influence have remained.

[3] Ramamurti, Ravi. "The New Frontier of Privatization." <u>Privatizing Monopolies.</u> Ed. Ravi Ramamurti. The Johns Hopkins University Press: Baltimore, 1996.

[4] Lazzarini, Sergio and Aldo Mussachio. <u>Reinventing State Capitalism.</u> Harvard University Press: Cambridge, MA, 2014.

The Indian SOE system falls squarely within this typology in some ways. Until the early 1990s, India was a heavily socialist economy, with a high degree of state control and ownership of large parts of the economy. Precipitated by a massive balance of payments crisis in 1991, the Indian government was forced to take various measures (which had been planned for some time), to deregulate and liberalize the Indian economy. A large part of this was reducing the barriers to entry of various industries, and allowing private companies to compete against existing state corporations. Few SOEs were privatized outright, but rather the gradual introduction of private competition in many industries led to the slow demise of many state companies. Nowhere was this starker than the telecom industry, where in a span of 10-15 years, SOEs lost more than 80% of their market share to private operators. However, such drastic reversals in fortune did not happen in capital intensive industries.

Assuming away the political realities that are sometimes the immediate motivators for nationalization or privatization[5], one of the big theoretical problems in determining whether state ownership is desirable is the degree of coordination required in an industry. In his book Regulating Infrastructure, Jose Gomez-Ibañez proposes a compelling trade-off between coordination and competition that exists when countries are trying to unbundle and privatize formerly vertically integrated industries.[6] One of the main ideas here is that vertical integration tends to lead to better coordination. But the cost of greater coordination often ends up being declining efficiency since competition is limited, if not non-existent. Consequently, national priorities and goals often end up shaping where the government wants to be on the coordination vs. competition continuum.

One of the best examples of the applicability of this framework is the Indian coal industry, which itself has gone through the turbulence of both untrammelled private sector involvement and monopolized state-driven growth. While the industry has not quite settled down at the moment, tracking its evolution will give considerable insight into the nature of Indian state capitalism.

The coal industry has always been a site of federal contestation in India. After independence, the coal industry became essential for the realization of differing industrial visions of State and Central governments. Nationalization of the industry clearly tipped the balance in favour of the Central government. What used to be a very public and complicated political negotiation between the Central and State governments, eventually became an internal tug of war for the resources and redistributive potential of Coal India.[7]

---

[5] For example, in Latin America, many countries have repeatedly expropriated (and then eventually re-privatized) their oil industries to provide a source of liquidity for bankrupt national governments. Normally, such short-term political motives are not the only motivations for nationalization. Oil tends to be a notable exception because of the above average profits of the industry which provides an attractive target for cash-strapped national governments.

[6] Gomez-Ibañez, Jose. Regulating Infrastructure: Monopoly, Contracts and Discretion. Harvard University Press: Cambridge, MA, USA, 2003.

[7] Coal India is the monopoly SOE that was formed in 1975 after the nationalization of the coking and non-coking coal industries in 1971 and 1973, respectively. It still exists to this day and is responsible for over 80% of the coal mined in India.

Introduction

On September 13-14, 1961, Vigyan Bhawan (the building housing the Planning Commission) in New Delhi was populated with some of the most powerful people in the Indian coal industry; they were present for a high-level meeting between consumers and producers in the industry. Sardar Swaran Singh, the Union minister for Steel, Mines and Fuel, presided over the event, and made an announcement which would unsettle many: the coal industry would have to reduce its monthly production by 300,000-400,000 tonnes[8] to cope with the shortage of railway wagons which prevented effective evacuation of coal. This in itself was a remarkable announcement given the ambitious production goals set forth by the Planning Commission in the Third Plan. It was effectively a concession that the coal evacuation infrastructure (primarily through railways) was lagging behind the industry's ability of extract coal from the ground. Already a scarce resource, this meant that there would be some form of rationing of coal consumption across the board. [9]

Most of the attending parties were unhappy with this announcement. But perhaps none more so than Dr. Bidhan Chandra Roy, West Bengal's Chief Minister.[10] Over the last six months, Dr. Roy had been engaged in increasingly heated negotiations with the Central government regarding West Bengal's right to mine coal independently of the existing legacy private operators, and the two dominant state owned enterprises (SOEs), the National Coal Development Corporation (NCDC) and Singareni Coal Collieries Limited (SCCL). Neither of these SOEs had established operations in West Bengal, and consequently, it was perceived that the state was not receiving a fair share of the benefits of its own resource endowment, especially considering its large established industrial base.

The existing legal framework[11] allowed private mining companies to continue mining coal on the leases that they maintained after Independence, but required Central government approval for any acquisition of any virgin coal bearing lands. Consequently, the majority of new coal leases were given to the NCDC, a Central government owned company formed in 1956 with the express goal of maintaining a regular supply of coal for Railways (also owned by the Central government). NCDC was considering expanding its operations to Raniganj (one of the most prominent coalfields in West Bengal), but the West Bengal government opposed NCDC's entry into the state, and filed a petition in the Indian Supreme Court asserting the state's right to develop the recently ceded zamindari estates.[12] These debates made it all the way to the Lok Sabha (India's lower house of Parliament), with Bengali parliamentarians being quite outspoken about the injustices perpetuated by the Central government during the planning process. Recently, Dr. Roy had even made a trip to Poland to try to establish technical partnerships with Polish mining companies independently of those that already existed with NCDC (24).[13]

These disagreements over coal between states and the Central government would only intensify later in the decade. At the core of these disagreements were conflicting visions of industrialization. The Central government had a unified, integrated planning approach to economic growth which included targets, quotas and allocations of resources for all states. States were expected to fall in line with the

[8] Average monthly production in 1961 was around 4,300,000 tonnes, so this was almost a ten percent reduction. (Monthly Coal Bulletin, 1961)

[9] The New Sketch. September 11, 1961 and September 18, 1961. Dhanbad.

[10] This itself was a major development, considering that Dr. B C Roy had been a prominent leader in the nationalist movement with the Congress party.

[11] Established by the Coal Bearing Areas (Acquisition & Development) Act, 1957, and the Mines and Minerals (Development & Regulation) Act, 1957.

[12] See Figure 2. In the top map, Raniganj and Dhanbad are the darkest coloured district.

[13] The New Sketch. August 21, 1961.

expectations of the Five Year Plans. However, some state governments had other ideas, which were often more ambitious. The problem was that they did not have legal right to the key resource lying within their state borders which would allow them to pursue this industrial vision: coal.

Eventually, the Central government would have to accede to some of these demands made by coal-bearing states. By early 1962, an agreement had been reached between the Central government and the West Bengal state government.

> Side by side with the proposed decentralisation of the National Coal Development Corporation's set-up, partnership agreements with several State Governments other than and in addition to the State Government of West Bengal are envisaged. These agreements with State Governments to exploit coal mines situated in their territories are expected to be patterned on the lines of the said recent agreement with the West Bengal Government. Setting up of Co-ordinating machinery at local levels of coal producing areas is also proposed. The other day Bihar's Dy. Minister for Irrigation and Power Mr. L N Jha told reporters that the decision of the Central Government to permit the West Bengal Govt. to enter the field of Coal mining had opened up a new opportunity for expansion and development of industries by State Governments. The agreement between the Central and the West Bengal Govts, he said, was being studies by the Bihar Government. He congratulated the Union Ministry of Mines and Fuel for allowing the West Bengal Govt to enter the field of coal mining in the public sector. Apparently the Bihar Dy Minister is immensely impressed with the implications of the agreement which are being so studied by the Bihar Govt with a view to introduce similar coal mining operations in the State of a Bihar on a priority basis.[14]

A Complex Political Skein

In the second half of the 1960s, the coal industry had started increasingly feeling the burden of the Central government's planning goals. The Third Five Year Plan (1961-1966) contained an optimistic and clear articulation of production goals:

> Production.—The First Five Year Plan did not contain any specific programme for coal production—the order of increase in demand was such as could be met by the capacity already established. On the basis of the coal requirements of the industrial and power programmes envisaged in the Second Plan and the traffic expected to be carried by the railways, a production target of 50 million tons was set for coal in the last year of the Second Plan. This meant an increase of 22 million tons over the level of production reached in 1955. The order of increase was such as could not be met merely by expansion of production from existing collieries; it required also the opening of new mines. Having regard to the capacity of the existing collieries to increase production and also to the policy of the Government, which reserved the establishment of new units to the public sector,

[14] Pg. 14. The New Sketch. September 19, 1962.

> 12 million tons of additional production were allocated to the public sector—2 million tons from existing collieries and 10 million tons from new collieries to be established in virgin areas—leaving the balance of 10 million tons to be raised by the private sector from their existing collieries and areas immediately contiguous thereto.
>
> While the expansion of the production from existing workings in both the public and private sectors did not present any serious difficulty**, the establishment of additional production from new collieries made the task of the public sector a formidable one**. New mines had to be established in practically virgin areas. Legislation had to be passed to enable the public sector to acquire new areas; and these had to be prospected in detail in order to prove the reserves and to select the blocks to be developed. In addition the public sector had to build up an organisation practically from nothing and there was a serious shortage of experienced technical personnel fitted to hold supervisory posts. This combined with initial difficulties in securing foreign exchange for the programme, resulted in rather slow progress during the early years of the Plan. The production achieved during the Second Plan has, therefore, to be viewed in the context of these difficulties. As against a target of 60 million tons, production during 1960-61 -has been 54.62 million tons. **Though the actual production has fallen short of the target, the public sector, which includes the collieries of the National Coal Development Corporation and the Singareni collieries, has established capacity for achieving a rate of production commensurate with the target set for it. In the last year production from the mines of the National Coal Development Corporation has increased rapidly.** It rose from a level equivalent to an annual rate of 5.3 million tons in the first quarter to the equivalent of an annual rate of 13.7 million tons in the last quarter as compared with a production target for the whole year of 13.5 million tons. The corresponding figures for the Singareni collieries are 2.4 million tons and 2.6 million tons against a production target of 3 million tons and for the private sector 43.8 million tons and 45.7 million tons against a target of 44 million tons. [15]

At this point, in the early 1960s, the Central government expected private companies to ramp up their production from existing mines, but understood that the bulk of the increased production would come from public sector coal companies. However, this transition was not nearly as easy as they might have imagined.

The multiplicity of actors involved in the coal industry in 1961 made its governance unusually complicated. For example, in the earlier conference, the producers were represented by at least three different associations: the Indian Mining Federation represented most of the smaller Indian companies running mines, the Indian Mining Association represented the larger managing agencies (eg. Bird & Co., Andrew Yule) and conglomerates (like the Tatas), and the Indian Colliery Owners Association represented zamindars and other landowners. There were more than 500 separate legal entities represented through these three groups.

[15] "Minerals and Oil." Third Five Year Plan. Planning Commission. http://planningcommission.nic.in/plans/planrel/fiveyr/3rd/3planch27.html

The producer groups in particular were very well networked among local and national level institutions. With members like Tata Iron & Steel Company, Bengal Coal Co. Ltd. and Equitable Coal Co. Ltd., the largest and best established coal companies in India, the Indian Mining Association (IMA) controlled more than fifty percent of the coal production within India.[16] Leaders like J.R.D. Tata had been embedded in the larger nationalist movement, and were known to have the year of the political elite in the Congress party. In addition, the IMA's members also had major roles in local planning organizations, chambers of commerce, labour advisory boards, hospital committees, Coal Labour Welfare Fund Advisory Committees, railway user consultative committees, and state mining boards.[17] This created a business environment which was quite difficult for new entrants; the larger players in the coal industry had been embedded in all parts of the system for a long time, and displacing their influence was not trivial, logistically or politically. The managing agencies, in particular, were vertically integrated with downstream industries all over India, particularly in Calcutta. Their influence extended well beyond Raniganj and Dhanbad[18]. Consequently, it is no surprise that NCDC started its initial operations in greenfield states like Orissa Maharashtra and Madhya Pradesh, rather than attempting to enter the established eastern coalfields. A report commissioned by the Central government to review NCDC's performance in 1968 highlighted these difficulties:

> As a public sector unit, one particular feature of the NCDC that deserves to be kept in mind that, unlike many other public sector industries, the NCDC meets only a part, approximately 15% of total demand for its products. The rest of the supplies come from the private sector (with the exception of Singareni Collieries which produce about 4 million tonnes of coal). The competition in the production and supply of coal is particularly high, because as many as 800 different units are engaged in this industry. A large number of them (as many as 523) are small units producing small quantities of coal not exceeding 5,000 tonnes each per month. It is believed that besides the NCDC and Singareni Collieries there are only some 15 or 16 important companies which mainly contribute to the production of coal, coking and non-coking. In respect of non-coking coal in particular, the NCDC had undertaken expensive development in virgin and inland areas of Madhya Pradesh and Maharashtra. On the other hand, the competing collieries in the private sector, which had been working their mines for long years, found it easy and economical to step up their production in a relatively shorter time and without a large addition to the investment, by resorting to more intensive work in the mines, including permissible depillaring. The private sector was expected to raise its production from about 45 million tonnes in 1960-61 to 61.7 million tonnes in 1965-1966. Its actual performance was 54.1 million tonnes. As the overall demand had not risen as expected, a fierce competition emerged and NCDC as a relative newcomer into the field had difficulties in expanding its sales and production above the levels that it reached. It may, however, be stated, as mentioned to us by several knowledgeable

---

[16] In Coal Industry in India by A B Ghosh observes,
"A structural pattern seems to have emerged in the second half of the third decade continuing in the fourth decade of this century, viz. about ten per cent of the coal mines [the managing agencies] was producing nearly sixty per cent of the output; there was a steady increase in the number belonging to the group of largest coal mines; the number belonging to the next group remained more or less steady at around sixty producing about ten per cent of the output; the next group produced on average thirty per cent of the output with variations (though not steady) in the number belonging to it according to conditions of trade" (106).
[17] Indian Mining Association. Report of the Committee for the year ended 31st December, 1967. Calcutta, 1968.
[18] These are the established centers of coal mining in India

persons, tha there has not been any significant new investment in the private sector in recent years, except for some three or four units

When the present industrial recession is overcome and the economy of the country resumes its upward course towards rapid development especially in steel, engineering and thermal power generation, the demand for coal would rise. **While for some more years to come the private sector of the industry would continue to meet the rising demand, it is more likely that thereafter, and provided the economy picks up at the rate which is essential for our industrial growth, the NCDC could easily become the mainstay for meeting the increased fuel demand in the country. The more immediate problem before the NCDC, however, is to build up the sales in a competitive market.** (6-7).[19]

Coal merchants played an important, but often disputed role: they were responsible for transporting coal from producer to consumer, and often were also the ones who aggregated coal from smaller mines and sold it to larger consumers. Since the majority of mines were producing small amounts of coal, the merchants inspected quality, ensured secure long-term supplies to regular consumers (mainly steel, power and cement), and were often the wealthy middlemen who would supply credit to consumers in times of need. Consequently, they also had a lot of power in the system, since they could hold up supplies and mix in lower quality shales. The following letter to the editor of The New Sketch, illustrates their evolving role in the early 1960s:

Sir,

Right since the inception of coal industry, the coal merchants have functioned as a useful link between the producers and consumers and, acting as they do as del credere agents, have contributed much to the development of the industry, But the Government now seems determined to eliminate them. In June last the Coal Controller introduced a new scheme of distribution through dumps owned by a small number of dealers. About 50% of the total raisings of coal used to pass through the numbers big and small units of the Trade. Under the new scheme, this extensive business was snatched away from them and given to a few monopolists. We were told that this system would lead to a quicker turn-round of the wagons and thus ease the transport position. We pointed out the Ministry of Steel, Mines and Fuel and also to the Coal Controller that it was quite possible to achieve that object without robbing the coal merchants of their livelihood. But we never received any straight reply to that. Only a vague assurance was given us in April last by Sardar Swaran Singh, the Minister of Steel, Mines and Fuel, that the Government had no intention of ousting the coal merchants.

The Coal Controller, Mr. Zaman, however said at a recent press conference at Dhanbad that coal merchants were not necessary and that by November there would be none. His theory is that middlemen have no contribution to production and therefore the must go the way of the Zamindars.

I would not say any thing about Mr. Zaman's economic theory, except that its exponents were snubbed into silence by their betters a hundred years ago. But if what he says is any indication of the way the Government's mind is working, then there is a real danger ahead. The Commercial world is predominantly a world of middlemen who have invested large sums of money and built up their business

[19] Report of National Coal Development Corporation Committee, 1968. New Delhi, 1968.

> with years' strenuous labour. There is no analogy between the position of the Zamindars and that of us middlemen. Moreover the Zamindars have not gone away empty-handed. They have been paid compensations amounting sometimes to as much as twenty times their annual incomes. Should we middlemen be dispossessed and thrown out into the streets with our dependents and employees by an official order, with India still calling herself a Welfare State! I think the commercial community should seek a clarification of this point now on the eve of the general elections. Yours etc.,
>
> -D. S. Thaker, President, Coal Merchants' Association Jharia[20]

Even before nationalisation, smaller, local coal merchants were being eased out, with the government preferring a small number of players who could be more easily co-opted.[21] Unfortunately, the comparison between coal merchants and zamindars made earlier is a false one: coal merchants were not nearly as politically influential as zamindars, which is part of the reason that zamindars often received settlements and other benefits. As Francine Frankel describes, "The land reform laws bore obvious marks of political compromise. While they abolished the zamindari system, the provisions topped well short of expropriating the zamindars. On the one hand, the zamindars' proprietary rights were vested in the state governments; on the other, the zamindars were permitted to keep land in their direct occupation for personal cultivation and in most cases no ceiling was placed on the size of the "home farms" so retained" (193-194).[22] This pattern of selective compensation of politically salient elites would repeat itself during nationalisation.

Throughout the 1960s and early 1970s, India suffered from "coal famines" where industrial requirements could not be supplied by the industry.[23] This was particularly acute in West Bengal, where the industrial ambitions within the state were severely mismatched with the resource allocations prescribed by the Planning Commission via the Coal Controller. Oftentimes, this was not a production problem; mined coal would be lying available at the pithead but could not be evacuated because of wagon unavailability or poor scheduling and coordination with Railways. Since at this point, Railways was still the largest consumer of coal, and the main mode of coal transport[24], the power dynamics between two industries was always fraught. An article entitled, "The Problem of Coal Transport" captures this tension:

> ….It is also now stated that the Coal Controller's new scheme of monthly allotment comes into being from September 1. While these are welcome signs as against the wastage, pilot difficulties, demurrage charges and other anomalous positions state earlier in this forthright review of the situation, there are also a number of defects, deficiencies and shortcomings which require urgent and immediate attention. This is perhaps the main reason why the appointment of a three-man Parliamentary Committee was announced in the Lok Sabha on September 1 by the Speaker, Mr. Ananthasayanam Ayyangar to look into the

---

[20] Pg. 14-15, The New Sketch. August 28, 1961.
[21] Only larger coal merchant houses, like Karamchand Thapar and Naresh Kumar & Co. managed to stay in business, and are consequently still some of the largest non-government coal transporters today.
[22] Frankel, Francine. India's Political Economy: 1947-2004. Oxford University Press: New Delhi, 2005.
[23] This coincided with low growth rates in other commodities: foodgrains, cotton, sugarcane, and oilseeds.
[24] According to the July 1961 Monthly Coal Bulletin, 3,914,475 tonnes of coal were transported by rail while only 264,247 tonnes of coal were transported by road.

> complaitns about railway wagon shortage. The Speaker in making the announcement referred to the fact that while the Minister in charge of production of coal complained against shortage of wagons for coal loading, the Railway Minister denied that there was any shortage at all. There must be some solution for this, Mr. Ayyangar said, and so he proposed to appoint a Committee of MP's to look into this matter. We welcome this appointment of the Committee of Parliament members because, apart from the merit of their independent study and finding, will at least suggest ways and means to put a stop the unedifying quarrel between two top-ranking Central Ministries (14).[25]

What emerges here is a complicated political skein. To maintain effective control over the industry, the government needed to exert influence over a diverse set of producers, an increasingly alienated set of coal merchants, and erstwhile landlords who were still politically influential in the coal-bearing regions. And even if these state-level actors could be co-opted, it did not preclude the possibility of contestation within the Central government between the Railways and Steel, Mines and Fuel ministries. Coordination in the industry was clearly becoming a bit of a problem.

Despite this, one of the saving graces of the Indian coal industry was its strong set of regulatory institutions. The Coal Board, the Coal Controller and Chief Inspector of Mines[26] were statutorily established roles which ensured order in an industry which was being drawn in many different directions by interest groups. The Coal Board was the apex body responsible for the administration of the coal industry. Policy decisions may have been made in Delhi at the Ministry of Steel, Mines and Fuel, but the Coal Board set prices, approved licenses, and was involved much more in the day-to-day oversight. The Coal Controller, on the other hand, was responsible for logistical coordination and coal conservation. Not to be misunderstood, coal conservation referred to the economical use of coal, ensuring that there was no waste or misallocation to industries which were not considered useful. The Coal Controller played an important coordinating function between the coal industry and Railways; since wagon availability and evacuation infrastructure was always in short supply, the Coal Controller was often involved in public debates with aggrieved producers and consumers. Finally, the Chief Inspector of Mines was the apex labour regulator in the mining industry. Responsible for not just coal, but all mines, they were responsible for maintaining standards for mine safety, and were expected to conduct random checks at mines to ensure that standards were being followed. The Chief Inspector of Mines had the power to shut down mines, but practically often had trouble enforcing all of their orders because of the increasing number of mines. But nationalization changed these roles considerably.

Nationalisation and Its Aftermath

In 1971 and 1973, the Indian Parliament passed two new laws which nationalized[27] the coal sector and transferred control of all coal mines to the Central government. The Coal Minister[28] at the time, well-

---

[25] The New Sketch. September 4, 1961.

[26] In the early 1970s, the Chief Inspector of Mines was renamed the Director General of Mine Safety, and formally became part of the Ministry of Labour.

[27] An interesting aside, which I do not have time to cover in this paper, is the exclusion of selected captive private mines from nationalization. The Tata Iron & Steel Company (TISCO) was one of the few such companies that benefited from this kind of preferential treatment. I have all kinds of interesting documents from the TISCO archives which show that the CEO of TISCO, JRD Tata, and both Indira Gandhi and Mohan Kumaramangalam had a close relationship, which was often symbolized by one of the two annually visiting the TISCO steel plant in Jamshedpur.

known communist leader Mohan Kumaramangalam, published a short monograph justifying the nationalization of the sector, in which he explained:

> Rational and co-ordinated development of coal industry consistent with the principles of mineral conservation has been the rationale behind the nationalisation of coal industry in many foreign countries as in UK, France and East European countries....
>
> The takeover of the non-coking coal mines was thus a response to the historical situation. Further inaction on the part of the Government would have meant permitting the continuance of unsound mining methods including slaughter mining, uneconomic collieries, mismanagement, unfair labour practices including underpayment of workers and malpractices in sales; and more than anything else it would have meant giving up the objective of establishment of a single authority, to whom the task of massive development in coal production as well as conservation and optimum utilisation of our coal reserves could be entrusted (51-52).[29]

Clearly Kumaramangalam used every possible opportunity to vilify private coal companies, and some of it was quite justified. Multiple committee reports had found private companies delinquent in delaying wage payments, underinvesting in capital, taking undue advantage of government subsidies and using legal loopholes to hire cheap contract labour.[30]

Mine owners who were dispossessed literally lost their assets overnight. In a familiar theme, a select few received compensation. Particularly in 1973[31], district collectors were already in touch with trusted government mining officials on how to go about dispossessing current owners. As soon as the order was passed, accompanied by police, these collectors and mining officials would raid the offices of most of the major mine owners and confiscate all their files and records. Police were posted around most major mines to prevent major unrest, although since this was a pro-labour move, it was mainly the managers and owners who were discontent. More than 800,000 people became government employees overnight. Trusted government mining officials became “custodians” of existing mines under a temporary body called the Coal Mines Authority Limited (CMAL). Within a few years, a formal holding company was created, called Coal India Limited (CIL).[32] Most of the top officials in CIL came from NCDC, but some were also inducted from the erstwhile managing agency coal companies.

---

[28] Given the increasing importance of power generation and coal in the Indian economy, the Ministry of Steel, Mines and Fuel was split up into separate ministries in the late 1960s.

[29] Kumaramangalam, Mohan. Coal Industry in India: Nationalisation and Task Ahead. Oxford & IBH Publishing Company: New Delhi, 1973.

[30] In particular, the Reports of the Coalfield Committee 1937 and Reports of the Coalfield Committee 1946, which were both high level committees set up by the central government to assess the state of coal mining in India. The latter report, also colloquially known as the Mahindra report, was particularly critical of the disarray in the Indian coal sector. Mohan Kumaramangalam tended to quote this report rather heavily in his justifications for the problems with the Indian coal sector.

[31] In 1971, only coking coal mines were nationalized, which affected a relatively small region of the country around Dhanbad which provided high quality coal to the steel industry. The 1973 legislation affected **all** coal mines in India, which covered a much broader spatial range.

[32] Personal Communication. Shyam K Chowdhury. July 20, 2013.

CIL was birthed during troubled times. The decision to nationalize was entirely political. Indira Gandhi, the Prime Minister, had estranged most of the establishment in the Congress Party in the early 1970s, and consequently had to seek support from a whole host of other political leaders who tended to be far more left-leaning, like Mohan Kumaramangalam. Since the stalwarts in the Congress were regional leaders, nationalization of industries was a convenient way of centralizing control in industries which tended to be dominated by state level actors. As described earlier, the multiplicity of actors in the industry made it quite difficult to navigate. But with nationalization, in one fell swoop the producer associations were made irrelevant (because the government owned all the coal mines), the coal merchants were marginalized (because the government was the main producer and consumer of coal), and most of the functions of the regulatory institutions were gradually absorbed within CIL.[33] [34]

This obviously alienated state governments completely. The fledgling projects that West Bengal and Bihar had imagined in the 1960s were also taken over by the Central government. So now there was no dispute over the Central government's control over the industry. However, the 1970s was also a period of severe industrial unrest. To allay these concerns to some extent, CIL started becoming one of the "model employers" in the industry. CIL built housing for its employees, invested in the construction of large hospitals and had its own small army of doctors who were full-time employees. But perhaps the biggest impact of CIL was its development of industrial townships in frontier areas. Whether it was Korba in Madhya Pradesh, Chandrapur in Maharashtra, or Talcher in Orissa, CIL brought roads, electricity and the Central government's vision of the industrial modern to areas which had never seen it before. Consequently, at least in the 1970s and early 1980s, getting a job at CIL was both lucrative and respected.

As the maps in Figure 1 and Figure 2 show, the locus of the coal industry changed considerably after nationalization. By the early 1990s, Madhya Pradesh, Orissa and Andhra Pradesh experienced much more production growth than the historical coal centres in West Bengal and Bihar/Jharkhand. In part, this was due to the politics of the latter two eastern states which tended to radicalize labour, and assert physical control over the industry, occasionally through criminal means. It is almost universally accepted that the criminalization of the coal industry expanded after nationalization.[35] In some ways, the political cost of nationalization was that the Central government often looked the other way when it came to petty and large scale coal theft, as it was an important source of electoral financing for local politicians.

There were two main reasons for the increased criminalization of the coal industry after nationalization. The first was due to a definitional shift which officially made many uses of coal illegal. The legislation that nationalized the industry also narrowly circumscribed the "approved end uses" of coal to a handful of industries: power, cement, steel, sponge iron and a few others which could be additionally notified by the Central government. Unfortunately, this definition completely ignored the extensive dependence of small and medium enterprises (SME) on the coal industry: brick kilns, glass factories and many other kinds of small industrial units scattered around West Bengal, Bihar and Uttar Pradesh in particular all became illegal users of coal overnight. While the exact intentions behind this definitional change are not

---

Mr. Chowdhury was Chairman and Managing Director of CIL in the mid-1990s, and had joined the coal industry a few years prior to nationalization.

[33] With the notable exception of the Directorate General of Mine Safety, which became part of the Ministry of Labour.

[34] Pg. 19. The New Sketch. June 25, 1973.

[35] Bharti, Indu. "Usurpation of the state: coal mafia in Bihar." Economic and Political Weekly (1989): 2353-2353.

well understood, the result was clear; there was no longer an open coal market and resource allocation had transitioned from market to administrative processes. If central planners did not officially allocate an industry coal, it inevitably would have to find extra-legal ways of obtaining fuel, or face bankruptcy.

To get a sense of the magnitude of alienation of SME coal consumers consider the following. In 1972 there were about 70 large glass factories in India, only 13 of which were fully automated.[36] The total capacity of these plants was about 215,000 tonnes of glass per year. Assuming the fully automated plants are running on electricity, it is likely that most of the others had less regular sources of electricity, and hence depended on coal as their primary energy source. Glass as an industry is incredibly energy intensive, because of the sustained high temperatures needed to melt the silica in sand and shape it. If we conservatively assume that about two-thirds of the plants are using coal, and that about seven tonnes of coal are needed to produce one tonne of glass[37], then the industrial requirement just for the glass industry is about one million tonnes of coal.[38] If we double this value to consider all other SME industries, then we get to about two million tonnes of coal, out of an annual production of about 75 million tonnes in the early 1970s. This is about 2.5% of India's overall coal production at the time.

Another important source of political patronage was the contracts and tenders floated by CIL. While the Government of India (GOI) may have owned the mines, and allocated their resources, there were some areas where the private sector had contributed to coal mining. For example, the removal of overburden (the non-coal portions of earth excavated during opencast mining) had usually been a scaled operation through private raising contracts because it was more an earth moving operation than mining. Since this was not part of CIL's core competence, it was deemed appropriate to contract out these operations. But outsourcing operations by CIL were limited to overburden removal until the mid-1990s when CIL started facing its major financial problems, and ended up receiving $1.5 billion dollars in consolidated loans from the World Bank, JICA and the GOI to restructure its finances. One of the methods CIL used to reduce costs was to increase its outsourcing operations beyond overburden removal to the operation of entire mines. Here is one labour leader's assessment of the practice in the early 2000s.

> But what is outsourcing? The outsourcing is nothing but use of private contractor s or companies in raising and loading of coal along with overburden removal. This is nothing but partial privatisation of coal industry through the backdoor. The government was in the beginning hesitant to resort to such backdoor methods of circumventing the nationalisation act but as the days are passing the process is being increasingly used and openly proposed as the way to make profit and make nationalisation a 'success', and the process is being introduced in at least three companies of the Coal India, namely, BCCL, ECL and CCL. Soon, outsourcing will be a major source of production and income. Now it is being openly proposed as the way of revival of the allegedly sick public sector and the reasons put forward cut at the very basis of the public sector. Before nationalisation most of the collieries were under raising contractors doing all the jobs from raising and loading of coal to overburden removal with some nominal

---

[36] "A Matter of Raw Materials?" Economic and Political Weekly 7.8 (1972): 441–442. Web.

[37] Recent estimates in the EU place the specific energy demand of glass at about 5 GJ/Mg in the late 1990s. Coal has a specific energy of about 24 MJ/kg. If we assume thermal conversion is 70% efficient, then the ratio of coal input to glass output is about 7:1 (with very conservative estimates).

[38] This is not a heroic assumption given how much of the industrial base at the time was still not connected to the electrical grid.

> owner at the top getting some amount without any role in production. With outsourcing even without disinvestment the actual control of the coal industry would pass to the contractors, a system that failed miserably in the coal industry leading to its nationalisation in the past to save the industry, country and definitely the workers, coal being the major source of energy in the country.
>
> The major ground for working outsourcing is the cheaper cost of production under a contractor compared to operations. This only means less payment to workers, much below the official rate, flouting the law taking advantage of the large army of unemployed. One of the reasons for floating the public sector was to provide fair wage to the workers who used to be given bare or minimum wage in the private sector. A wage board, etc, were created to force private sector to provide fair wage and the private sector was to emulate public sector. But in the name of globalisation and free competition in increasing unemployment with bargaining powers of labour sharply falling, public sector is to emulate private sector and bare wage is to replace fair wage and outsourcing to replace departmental operations.
>
> But this is not as per the spirit and letter of the Coal Mines Nationalisation Act (1973). The spirit and letter of the judgment of the Supreme Court on disinvestment of the oil PSUs has stressed that not only the expressed provisions of the act but also the implied one from the preamble is to be followed. The act is not only jugglery of words or technicalities but has a certain aim. So the spirit of the Coal Nationalisation Act is not adopting outsourcing, but fraud is being committed not by private owners but the management of the public sector. After the Nationalisation Act the government issued a notification in 1975 prohibiting contractual system in raising loading of coal and also overburden removal. The same rule still continues but now the government has started a contractual system without changing the rule, prohibiting it and creating a ridiculous situation where the Regional Labour Commissioner (Central), a government servant, is prosecuting the government without effect.[39]

Naturally, there was massive contestation on who would actually receive these contracts. Much of the regional political economy around coal from the mid-1990s onwards started shifting towards the private sector contracting around CIL contracts, rather than cornering jobs and benefits within CIL.

Yet another measure of federal contestation over the Indian coal industry is the political origins of the Cabinet minister overseeing coal and energy. This is particularly important post-nationalisation, because being the coal minister was not only a policy role overseeing private actors, but an active role in shaping the expansion, contracting, and appointment of executives of Coal India and the allocation of coal as part of India's larger industrial project. As we can see in Table 1, from the early 1980s onwards, the political control of the industry shifts east. Initially, technocratic ministers like T A Pai, and K C Pant run the sector. With strong connections to the Planning Commission, it was during the mid to late 1970s that the expansion of the technocratic base of the Indian coal industry took place. Extensive collaboration with Poland and the Soviet Union ensured that Indian mining technology shifted from the traditional base of underground mining to more economical opencast approaches (see Figure 3). But

---

[39] Roy, A. K. "Disinvestment and Outsourcing in Coal." Economic and Political Weekly 38.49 (2003): 5153–5154. Web.

from the early 1980s onwards, as the Congress' traditional base is slowly uprooted, the Coal Ministry becomes a reward for coalition partners. As P C Parakh's account shows, by the mid-late 2000s, the regionally powerful Coal Ministers are making all kinds of claims on Coal India through the ministry.[40]

The labour force at CIL started becoming increasingly politicized as politicians tried to make sure that their constituents and party workers received jobs in the company. This was particularly true in West Bengal and Bihar/Jharkhand, where for long periods the employment of the CIL subsidiaries in those states far exceeded what was necessary for coal production. Evidence began emerging about the increasing absenteeism and free-riding of certain groups of CIL employees.

Table 1 – Ministers of Indian Coal Sector Post-Nationalization

Period	Ministry	Minister	State
1971-1973	Steel and Mines	Mohan Kumaramangalam	Pondicherry
1973-1974	Steel and Mines	T. A. Pai	Tamil Nadu
1975-1976	Energy	K C Pant	Uttar Pradesh
1977-1979	Energy	P Ramachandran	Tamil Nadu
1980-1987	Coal and Energy, Railways and Programme Implementation	A. B. A. Ghani Khan Choudhary	West Bengal
1988-1989	Coal (MoS) [41]	C K Jaffer Sharief	Karnataka
1989-1991	Power and Energy	Arif Mohammad Khan	Uttar Pradesh
1991-1993	Coal (MoS)	P A Sangma	Meghalaya
1993-1995	Coal (MoS)	Ajit Panja	West Bengal
2001-2002	Coal	Ram Vilas Paswan	Bihar
2002	Coal	Lal Krishna Advani	Uttar Pradesh
2003-2004	Coal	Kariya Munda	Jharkhand
2004	Coal	Mamata Banerjee	West Bengal
2004-2006	Coal	Shibu Soren	Jharkhand
2011-2014	Coal	Sriprakash Jaiswal	Uttar Pradesh
2014 – Present	Coal	Piyush Goyal	Maharashtra

Until recent events brought the coal industry back in the public eye, for a long time resource contestation over coal had remained outside public view. Given the number of players that existed in the industry before nationalization, this development may have helped accomplish the goals of the larger industrial project that the Indian government had envisioned. The inevitable political jousting over the redistributive gains from CIL was a consequence of nationalization, but despite this politicization, the

[40] Parakh, P C. Crusader or Conspirator: Coalgate and Other Truths. Manas Publications: New Delhi, 2014.
[41] Ministers of State are often appointed as junior ministers in Cabinet.

company has managed to do a good job of maintaining production growth given the many constraints and external claims it has faced.[42]

[42] Figures 3 and 4 show some evidence of this.

Figure 1: State Level Coal Production (1951-2010)

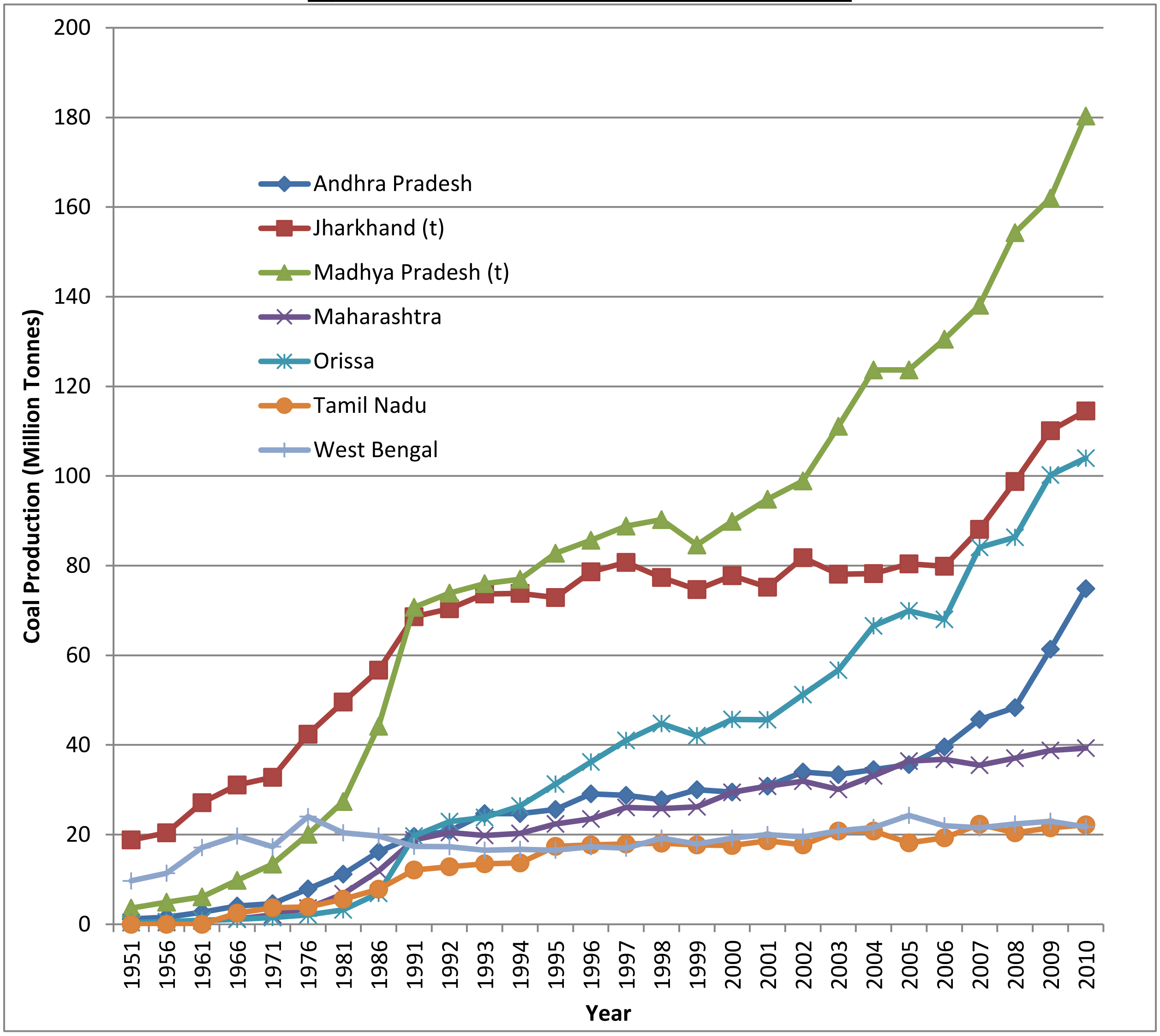
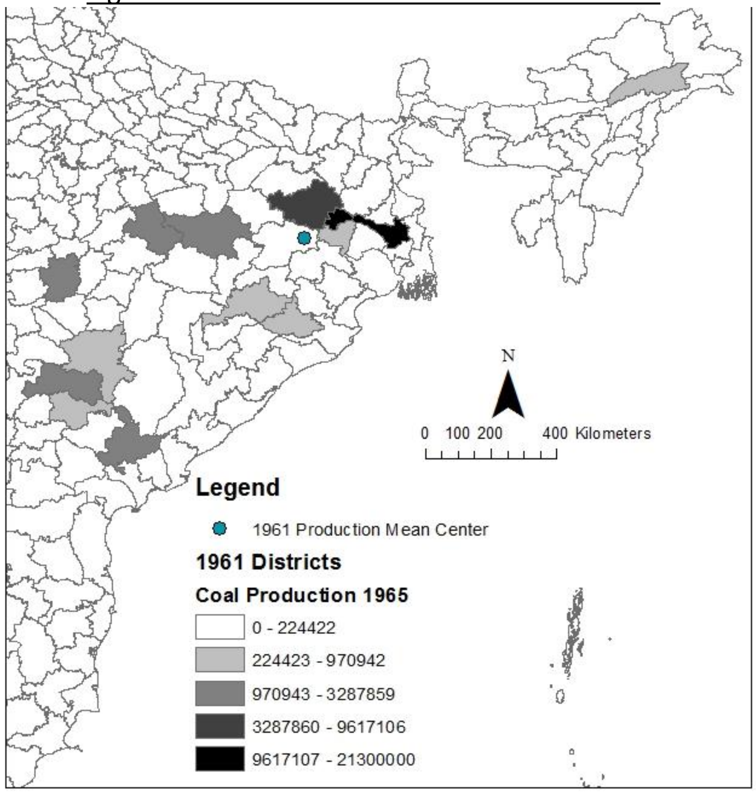


Figure 2: Indian Coal Production: 1965 and 2007



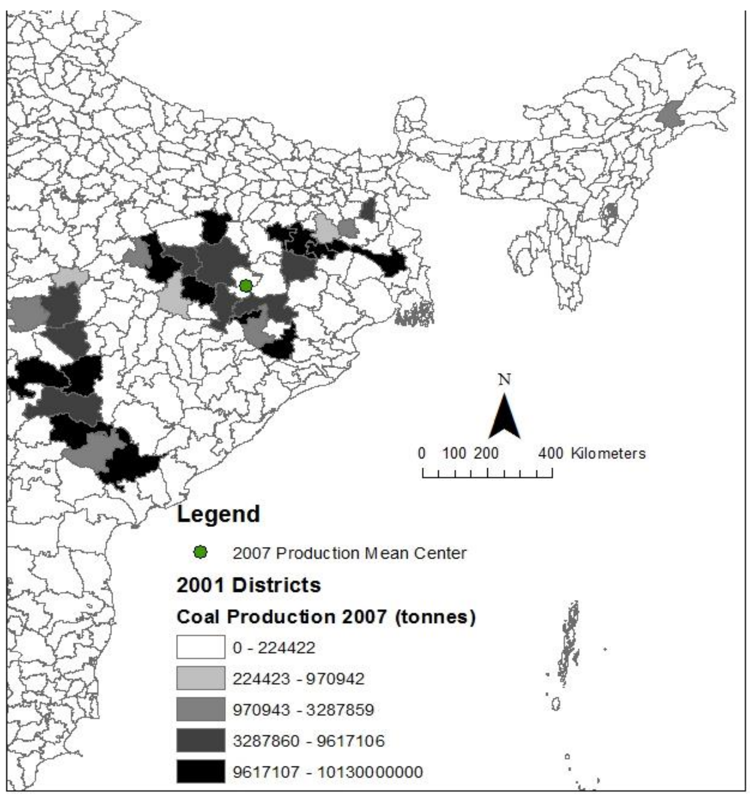


Figure 3: Technology of Coal Production

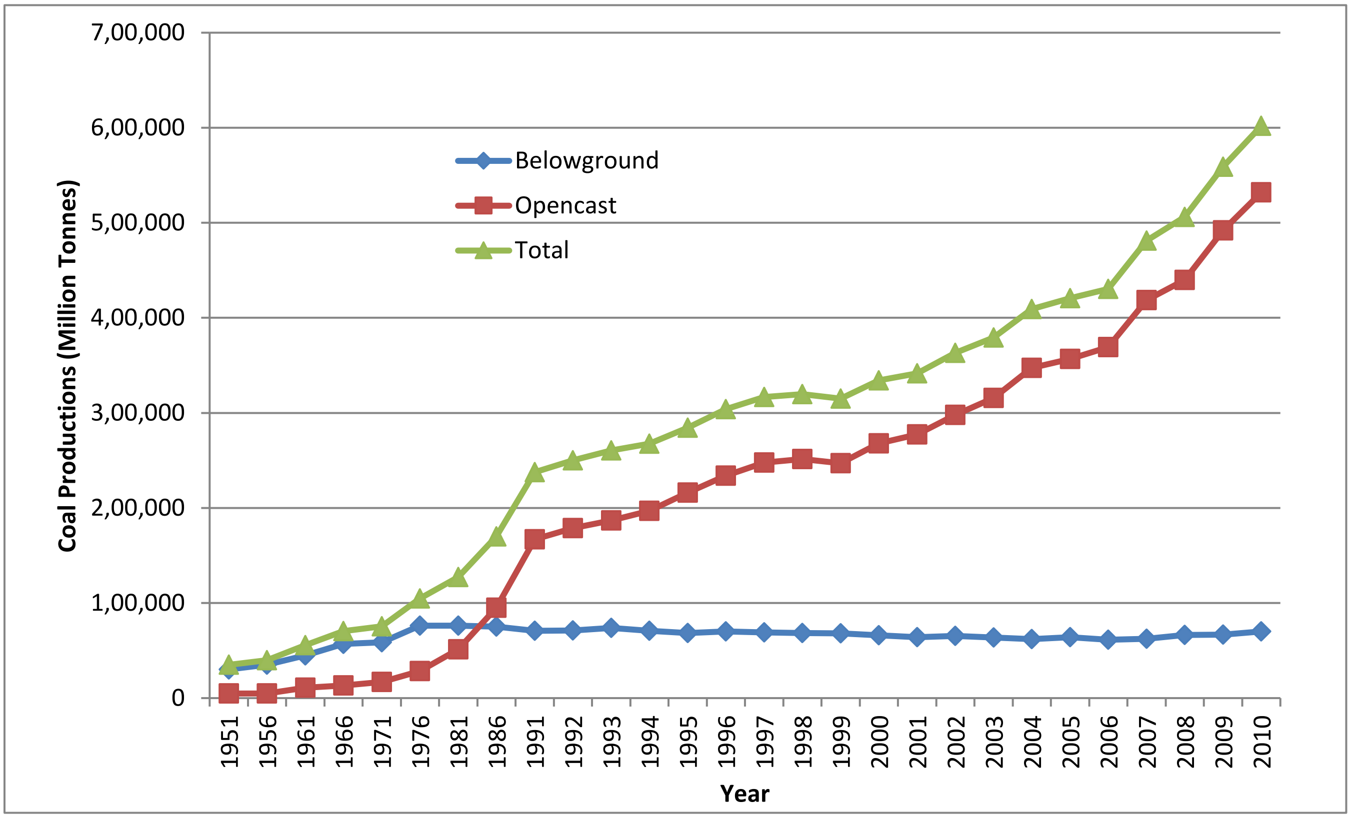
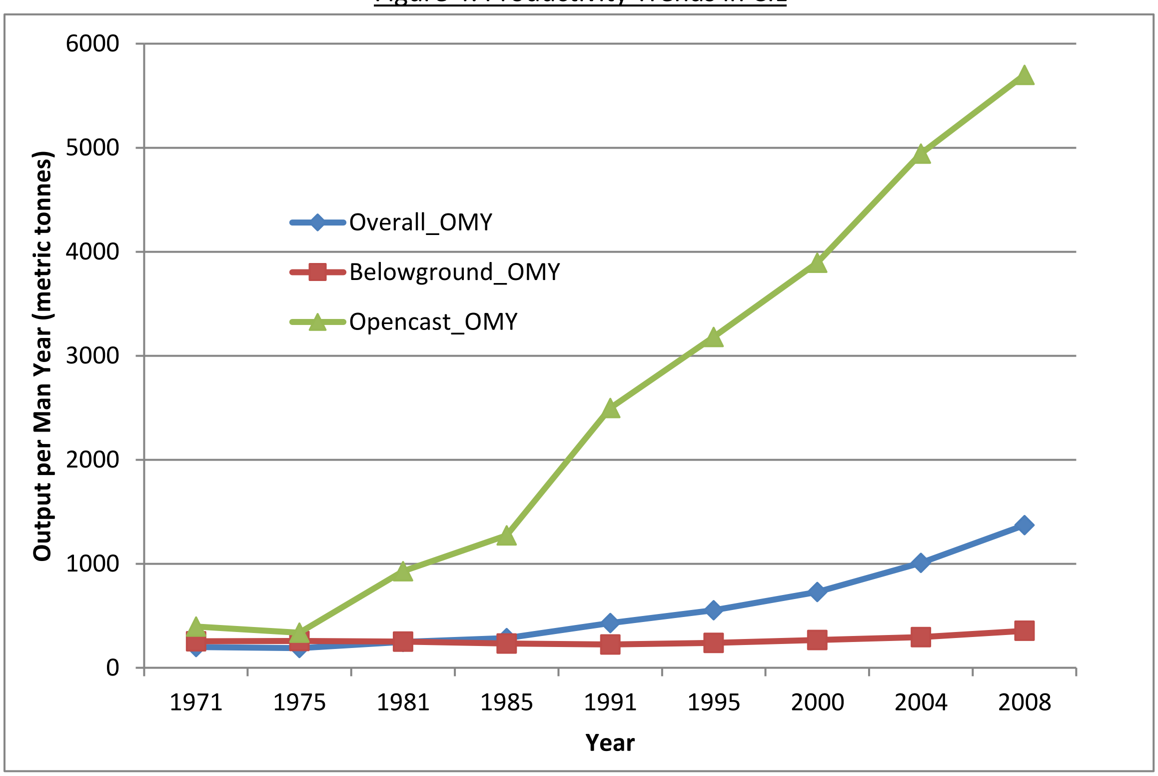


Figure 4: Productivity Trends in CIL



Appendix A – The New Sketch

The New Sketch was a weekly pamphlet which summarized developments in the coal industry in Dhanbad, and broader trends in the industry. It was published out of a small office (appropriately called The New Sketch Press) adjacent to the Indian School of Mines. In Dhanbad, the Director General of Mines Safety, the Indian School of Mines, and the main offices for Bharat Coking Coal Limited (one of the largest coal companies in the region), are within five kilometres of each other. There is also an unusual concentration of private companies who provide machinery, tools, safety equipment and other goods necessary for the mining of coal.

The Indian School of Mines, Dhanbad, has about forty years of this document available in its library (1965-2005), with some small gaps in between. Many of the older generation of coal mining professionals I have spoken to, who have worked in the industry both before and after nationalization have vouched for the credibility of The New Sketch. They characterize it as being a must read for anyone involved in the industry before the mid-1990s, when specialized trade journals start coming out displacing this periodical.

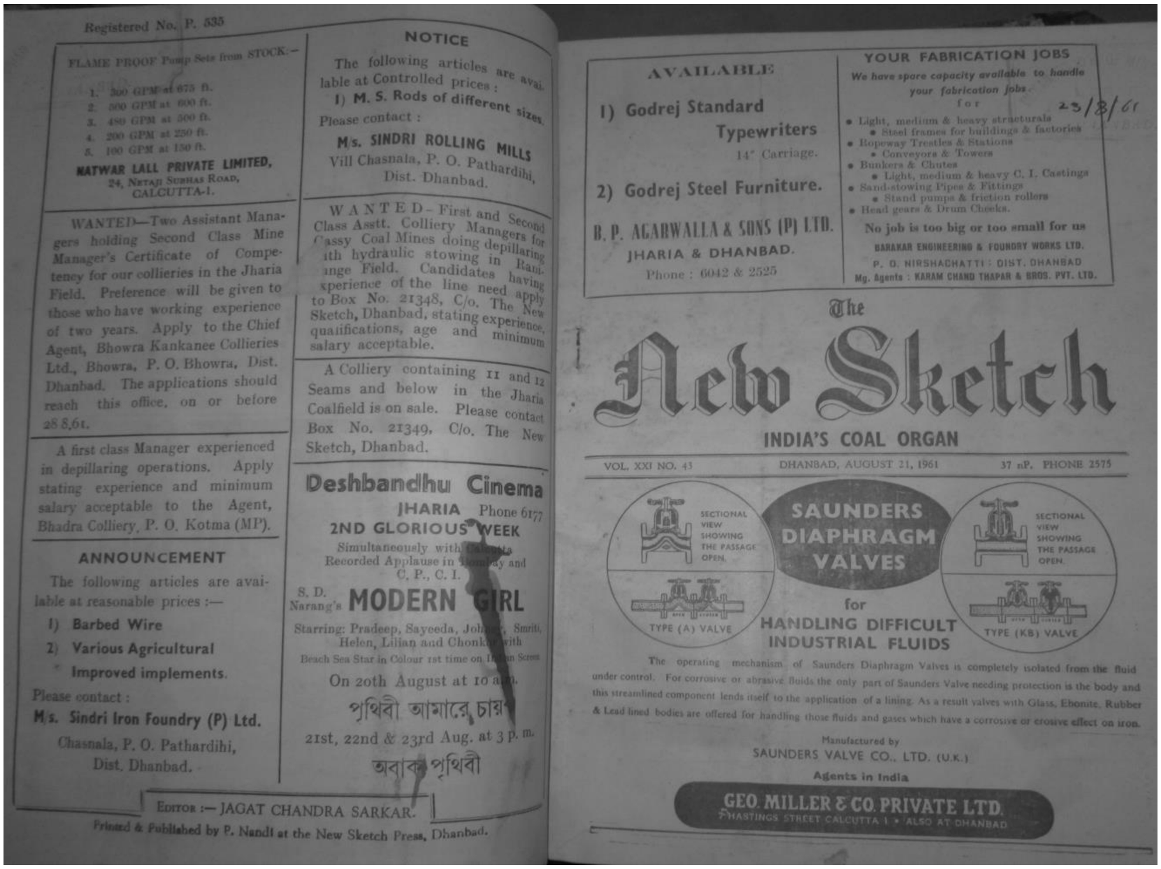
The New Sketch is an interesting combination of material. As you can see from the picture on the next page which summarizes its front page material, it is clearly financed primarily by advertisements from two kinds of businesses; local businesses in Jharia and Dhanbad, and businesses that hope to supply machinery and specialized goods to mining companies. The first few pages after the advertisements and job postings are always an opinionated commentary on some issue of contemporary relevance to the coal industry. Obviously, there is a pro-industry bias in this writing, but there is a fairly measured consideration of facts before the authors, generally former professionals from the industry, jump into their analysis. At one point, the journal hires a correspondent specifically reporting from Delhi on Parliament debates and legislative issues which pertain directly to the industry.

After the opening 3-4 page essay, the journal usually covers smaller news related to regional developments in various mining areas or collieries. These news items are usually half a page in length, and cover everything from merchants, labourers, local Dhanbad politics, technological improvements occurring in certain mines, and the transfer and appointment of various important positions in the industry. Although the focus certainly is on Dhanbad, usually there are at least a few stories about other regions as well. In particular, the coverage of interactions of high level officials with politicians is quite well covered, so the policy angles are quite well covered.

The quality of this publication remains quite high even after nationalization, until the 1990s, where it is clear that the publication quality decreases with deteriorating quality of writing, much less care put into basic layout, and fewer advertisements. This is also the period in which commercial magazines start taking off in India, so there are likely new trade journals coming up in the coal sector, based out of Kolkata and Delhi which made The New Sketch less relevant. Also, with the nationalization of the sector, manufacturers of mining products did not require as much advertising of their goods because they had to appease their one main customer: the Government of India through its various Coal India subsidiaries.

One of the unique aspects of The New Sketch was that almost every week, it would publish one abbreviated academic paper at the end of the pamphlet, which was relevant to the coal mining industry.

I am not sure how it chose which papers to publish, but one would imagine with the Indian School of Mines nearby, it would tend to pick articles which were of practical importance to those in the industry. For understanding the dynamics of the industry before and after nationalization in 1971 and 1973, this source is invaluable, and it will be one of the main primary sources I use for my analysis of the period between 1947-1991.



Registered No. P. 535

FLAME PROOF Pump Sets from STOCK:–

1. 300 GPM at 675 ft.
2. 500 GPM at 600 ft.
3. 480 GPM at 500 ft.
4. 200 GPM at 250 ft.
5. 100 GPM at 150 ft.

NATWAR LALL PRIVATE LIMITED,
24, Netaji Subhas Road,
CALCUTTA-1.

WANTED—Two Assistant Managers holding Second Class Mine Manager's Certificate of Competency for our collieries in the Jharia Field. Preference will be given to those who have working experience of two years. Apply to the Chief Agent, Bhowra Kankanee Collieries Ltd., Bhowra, P. O. Bhowra, Dist. Dhanbad. The applications should reach this office, on or before 28.8.61.

A first class Manager experienced in depillaring operations. Apply stating experience and minimum salary acceptable to the Agent, Bhadra Colliery, P. O. Kotma (MP).

ANNOUNCEMENT

The following articles are available at reasonable prices :—

1) **Barbed Wire**
2) **Various Agricultural Improved implements.**

Please contact :
M/s. Sindri Iron Foundry (P) Ltd.
Chasnala, P. O. Pathardihi,
Dist. Dhanbad.

NOTICE

The following articles are available at Controlled prices :
1) **M. S. Rods of different sizes.**

Please contact :
M/s. SINDRI ROLLING MILLS
Vill Chasnala, P. O. Pathardihi,
Dist. Dhanbad.

WANTED - First and Second Class Asstt. Colliery Managers for Gassy Coal Mines doing depillaring ith hydraulic stowing in Raninge Field. Candidates having xperience of the line need apply to Box No. 21348, C/o. The New Sketch, Dhanbad, stating experience, qualifications, age and minimum salary acceptable.

A Colliery containing 11 and 12 Seams and below in the Jharia Coalfield is on sale. Please contact Box No. 21349, C/o. The New Sketch, Dhanbad.

Deshbandhu Cinema
JHARIA Phone 6177
2ND GLORIOUS WEEK
Simultaneously with Calcutta
Recorded Applause in Bombay and C. P., C. I.
S. D. Narang's **MODERN GIRL**
Starring: Pradeep, Sayeeda, Johnny, Smriti, Helen, Lilian and Chonki with
Beach Sea Star in Colour 1st time on Indian Screen
On 20th August at 10 a.m.
পৃথিবী আমারে চায়
21st, 22nd & 23rd Aug. at 3 p. m.
অবাক পৃথিবী

Editor :— JAGAT CHANDRA SARKAR.
Printed & Published by P. Nandi at the New Sketch Press, Dhanbad.

AVAILABLE

1) **Godrej Standard Typewriters**
14" Carriage.
2) **Godrej Steel Furniture.**

B. P. AGARWALLA & SONS (P) LTD.
JHARIA & DHANBAD.
Phone : 6042 & 2525

YOUR FABRICATION JOBS
We have spare capacity available to handle your fabrication jobs
for
- Light, medium & heavy structurals
- Steel frames for buildings & factories
- Ropeway Trestles & Stations
- Conveyors & Towers
- Bunkers & Chutes
- Light, medium & heavy C. I. Castings
- Sand-stowing Pipes & Fittings
- Stand pumps & friction rollers
- Head gears & Drum Cheeks.

No job is too big or too small for us
BARAKAR ENGINEERING & FOUNDRY WORKS LTD.
P. O. NIRSHACHATTI : DIST. DHANBAD
Mg. Agents : KARAM CHAND THAPAR & BROS. PVT. LTD.

23/8/61

The New Sketch

INDIA'S COAL ORGAN

VOL. XXI NO. 43 DHANBAD, AUGUST 21, 1961 37 nP. PHONE 2575

SAUNDERS DIAPHRAGM VALVES
for
HANDLING DIFFICULT INDUSTRIAL FLUIDS

SECTIONAL VIEW SHOWING THE PASSAGE OPEN.
TYPE (A) VALVE
SECTIONAL VIEW SHOWING THE PASSAGE OPEN.
TYPE (KB) VALVE

The operating mechanism of Saunders Diaphragm Valves is completely isolated from the fluid under control. For corrosive or abrasive fluids the only part of Saunders Valve needing protection is the body and this streamlined component lends itself to the application of a lining. As a result valves with Glass, Ebonite, Rubber & Lead lined bodies are offered for handling those fluids and gases which have a corrosive or erosive effect on iron.

Manufactured by
SAUNDERS VALVE CO., LTD. (U.K.)
Agents in India
GEO. MILLER & CO. PRIVATE LTD.
HASTINGS STREET CALCUTTA 1 • ALSO AT DHANBAD

First pages of The New Sketch

Appendix B – Map of Major Coalfields in India