

Fast Track:
State Capacity and Railway Bureaucracies
in China and India

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Abstract

How does the organizational structure of the state affect its ability to provide basic public goods, such as infrastructure? This dissertation compares China's and India's railway bureaucracies to show how bureaucratic structure plays a crucial role in shaping their ability to develop railway infrastructure. This dissertation draws on two years of fieldwork in China and India, including interviews with government officials, internal organizational policies, project-level documentation, construction site visits, planning reports, and corporate filings.

Chapter One lays out the empirical puzzle. Over the past two decades, the Chinese state has built the world's largest high-speed rail network while the Indian state has struggled to modernize its railway system. What explains the gap in state capacity for railway development between these two countries? This chapter introduces these cases and situates an organizational approach to understanding state capacity within the literature on the role of the state and economic development. Chapter Two directly compares the organizational structures of China's and India's railway bureaucracies. This chapter shows how China's railway bureaucracy benefits from a nodal structure that provides mechanisms for coordination and accountability while India's railway bureaucracy is hampered by a diffuse structure with overlapping and often conflicting lines of authority.

Chapter Three examines the organizational structure of Chinese state-owned enterprises involved in railway projects as well as other forms of infrastructure development. This chapter shows how these massive state firms are organized as a multi-level structure of parent firms and corporate subsidiaries. This industrial structure produces a system of "managed competition" that attempts to harness the forces of market competition while actively balancing resources and personnel across competing market players. Chapter Four examines the role of emotions in the

Indian Railways. Contrary to Max Weber's conception of the stoic civil servant, the professional lives of Indian Railway officers are suffused with emotions, including fear, frustration, and pride. This chapter shows how these emotions stem in part from the organizational structure of the Indian Railways itself, which contributes to an environment of bureaucratic rivalry and mutual suspicion. The final chapter concludes by discussing the relationship between state organizational forms and institutional context as well as the possibilities for organizational change.

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When we discovered a gang of monkeys had entered our Delhi apartment, my wife, Thalia Gigerenzer, was just as confused as I was about what to do next. “Where’s the badminton racquet?” she asked me. “Did we leave the windows open? How are there monkeys in our kitchen?” The immediate answer to that question was that yes, we did indeed leave the windows open. But the deeper answer was that we had chosen to embark on PhDs together at Princeton and to conduct fieldwork in places like China and India. It has been a long and often difficult journey, filled constantly with the question of what to do next. But I am so lucky to have shared this journey with someone as courageous and curious and beautifully attuned to the many small wonders of the world that we have encountered along the way. And now we have a small wonder of our own. Her name is Athena.

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Chapter 1

Introduction

The Empirical Puzzle

Two trains depart from their stations at the same time, one in China, the other in India.

The Chinese train, leaving from Beijing South Railway Station, accelerates within minutes to its top speed of 350 km/h. A seemingly endless blur of high-rise apartments whizzes by until the city skyline abruptly gives way to tall grasses and open fields. The ride is uncannily smooth given the dizzying speed of the landscape rushing past. A visitor from Germany or Japan might find the journey oddly familiar, down to the shape of the train itself with its distinctive curved snout strikingly reminiscent of that of a German ICE or a Japanese Shinkansen bullet train.¹ On the ride itself, passengers can find free WiFi, power outlets for charging laptops and phones, and a relatively clean and tidy interior. A slim LED ticker board above the doorway shows practical information, such as upcoming stops, as well as the current train speed, which serves little purpose beyond confirming what all passengers already know: that Chinese trains are indeed very fast. Four and a half hours later, the train pulls into Shanghai Hongqiao Station, completing a 1,300-

¹ Chinese high-speed train designs draw heavily on those of Siemens' high-speed trains in Germany and Japan's Shinkansen trains, down to the nose of the train cars.

km journey that used to take well over nine hours. To exit the platform, you insert your train ticket into an automated turnstile, just like the one for boarding the train at the start of the journey.² By the time you leave the station, the next high-speed train from Beijing has already arrived.

The Indian train, leaving from New Delhi Railway Station, departs two hours behind schedule, delayed for some unknown reason. As it slowly eases out of the station, people can be seen crossing the tracks, some carrying luggage, others carrying snacks or bottled water to sell to passengers. If you're seated in an air-conditioned car, much of the bustle and din outside has been sealed off. If you're seated in a non-AC car, there is nothing but a set of iron window bars that separates you from the booming sounds of the prerecorded train announcements and the sweltering Delhi heat. Hot food service is frequent and ample, provided by the uniformed staff of state-run Indian Railway Catering and Tourism Corporation (IRCTC). The train ride itself, though bumpy and halting at times, offers a respite from the grinding Delhi traffic and grants the patient traveler fleeting glimpses into village life in the countryside. More than sixteen hours later, the train pulls into Mumbai Central Railway Station. A similar distance between Beijing and Shanghai, the fastest train service between Delhi and Mumbai takes nearly four times as long, not accounting for frequent unplanned delays.

The evolution of China's and India's railway systems has proceeded along strikingly divergent tracks. As late as the early 1990s, China and India possessed comparable railway networks in terms of size and technology (see Figure 1). In fact, India's rail network, the vast majority of which was built during British colonial rule, arguably held a slight edge over China's overcrowded, rambling "green-skinned" trains, remembered fondly for leaving their passengers covered in coal soot by the end of the journey. Following a wave of reforms in the 1980s and

² Naturally, China has already begun experimenting with facial recognition-based platform gates for high-speed train stations, starting in 2017 with the Wuhan Railway Station.

1990s, both countries experienced a period of unprecedented social and economic transformation, lifting millions of ordinary people out of poverty and reintegrating a third of the world's population back into the global economy. These changes brought new opportunities for the railways, including vast new fiscal resources for investment in public infrastructure. Yet, this breakneck pace of growth also quickly strained China's and India's aging railway infrastructure to the breaking point.

Faced with these challenges, the Chinese state embarked on an ambitious program to modernize its railway system, starting in the 1990s. In 2008, China completed its first high-speed rail (HSR) line in time for the Beijing Summer Olympics.³ In 2011, China completed the Beijing-Shanghai high-speed rail line a year ahead of schedule with a budget greater than that of the Three Gorges Dam (Foster 2011). Since then, China has built the world's largest HSR network, stretching over 23,000 miles and running domestically produced trains at speeds reaching 217 mph (National Railway Administration of China 2020). China's conventional railway network has also grown rapidly, nearly doubling in size since 1990 to become the world's second largest after that of the United States (National Bureau of Statistics (China) 2019). China's railway modernization efforts have not been without major challenges, including a high-profile train accident near Wenzhou in 2011 that resulted in 40 deaths⁴ and the accumulation of debt levels exceeding CNY 5.5 trillion (US\$860 billion) (China Railway Corporation 2020).⁵ Yet, overall China's railway modernization program is widely viewed as a success by international observers.⁶ China's high-speed trains transport over two billion passengers each year and boast a 95% punctuality rate

³ Japan finished its first bullet train line in time for the 1964 Tokyo Summer Olympics, and Spain finished its first HSR line just before hosting the 1992 World Expo in Seville.

⁴ For an excellent English-language account of the crash and its repercussions, see Osnos (2012).

⁵ On China's railway construction debt problem, see Wu and Rong (2013).

⁶ U.S. President Barack Obama cited China's high-speed trains in his 2010 State of the Union address (Obama 2010). The World Bank has similarly praised China's high-speed rail program, in which it played a major role (Scales, Sondhi, and Amos 2012; Lawrence, Bullock, and Liu 2019; Ker 2017).

(Lawrence, Bullock, and Liu 2019). Once notorious for safety problems, China's railways have had no major accidents since 2011 (National Railway Administration (China) 2019b).

In contrast, the Indian state has struggled to expand and modernize its railway system in the face of growing demand as well as competition from roads and airplanes. Since 1990, India's railway network has grown by only 9%.⁷ Freight speeds average around 15 mph, which is only 34% faster than at the time of India's independence in 1947. India currently has no high-speed trains.⁸ Its only high-speed rail project in progress, a roughly 500-kilometer line connecting Mumbai and Ahmedabad being built with support from Japan, was originally planned to be completed by 2023 but has faced years of delays.⁹ India's congested and aging railway infrastructure has restricted population mobility, created bottlenecks in the economy, and caused a railway safety crisis with an estimated 15,000 deaths on railway tracks per year.¹⁰ While progress has been made in areas such as electrification and the launch of a new fast conventional train called the Vande Bharat Express, Indian railway officials themselves widely acknowledge that improvements have failed to keep pace with demand (Mohan 2001; Debroy et al. 2015). Rather than being the "forerunner of modern industry" as Karl Marx once predicted, India's railway system has become a key bottleneck to future growth.

What explains the gap in state capacity for railway development between these two countries? Why has the Chinese state managed to build the world's largest high-speed rail system

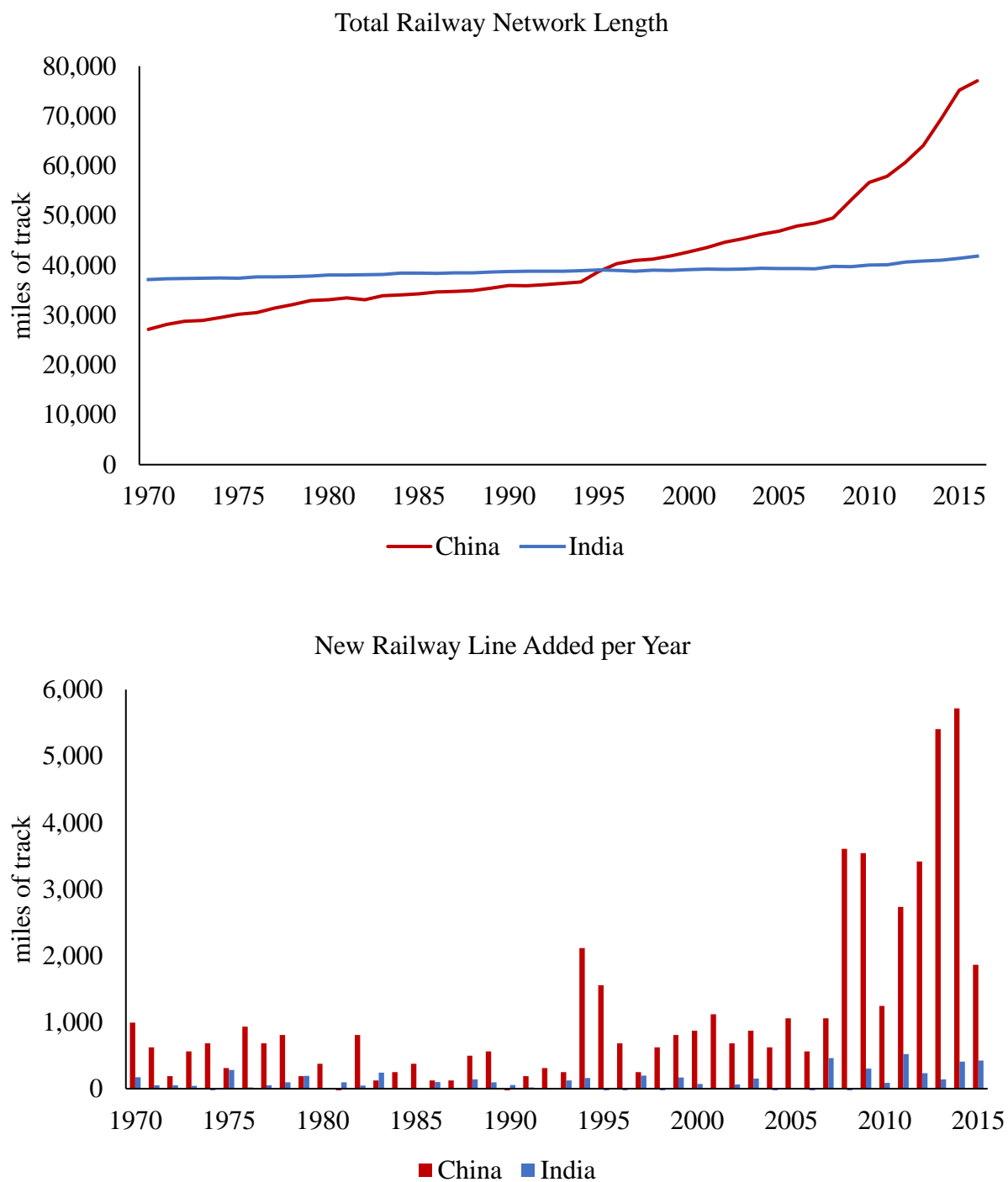
⁷ These figures are drawn from Indian Railway Year Books, which are published annually by India's Ministry of Railways and publicly available.

⁸ "High-speed rail" typically refers to trains that operate at speeds of 250 km/h (155 mph) or faster.

⁹ Japan has a long-standing development partnership with India through its main foreign aid and investment agency, the Japan International Cooperation Agency (JICA), which has been instrumental in other major Indian infrastructure projects, including the enormously successful Delhi Metro and the ongoing Dedicated Freight Corridor rail project.

¹⁰ From a 2012 Ministry of Railways safety report: "The estimation is almost 15000 persons get killed in such a manner on the entire railways system every year of which about 6000 deaths are only on the Mumbai Suburban System" (Ministry of Railways (India) 2012, 35).

Figure 1. Growth of China's and India's Railway Networks since 1970.



Source: China Statistical Yearbook 2017, Indian Railways Key Statistics 1970-71 to 2012-13, Indian Railways Yearbook 2015-16

in less than a decade while India's state-run railway system struggles to keep pace with growing demand? What lessons might these two countries hold for state-led development and infrastructure provision around the world, particularly in the Global South? This dissertation explores the empirical puzzle of divergent railway development in China and India to shed new light on several fundamental questions in development. What is the role of the state in development? Why are some states more effective at facilitating development than others? Why are some states more effective at providing public goods, such as roads and education, than others?

State Capacity, Development, and Infrastructure

The idea that the state might play a constructive if not critical role in supporting domestic industry and building physical infrastructure has a long and storied history. In 1791, Alexander Hamilton famously urged the United States Congress in his "Report on Manufactures" to actively support American industry in the face of British competition. In Hamilton's argument, a major reason for the U.S. federal government to support industrialization domestically was the mere fact that other states in Europe were already attempting to tilt the scales in favor of their own domestic industries, an argument that finds resonance in contemporary claims about "unfair" economic competition between the US and China.

In 1841, German economist Friedrich List published a landmark treatise on political economy, titled "The National System of Political Economy," in which he critiqued Adam Smith's vision of a liberal international system of trade. List argued that because British manufacturers had been given a head start in development by their own government, a system of ostensibly free trade would in reality favor British manufacturers, who naturally had a preference for supporting British industry. Thus, in the face of this inequality, other national governments would be justified in

actively supporting their own domestic industry, if only to even the playing field with the British. To this end, List proposed a “national system” of industrial development for the German states that included the formation of a pan-German customs union and a state-backed national railway system.

After the Second World War, a widespread global consensus over economic development emerged, centered on the belief that the state ought to play a key role in supporting national development. During this period, the United States built its vast interstate highway system and supported European and Japanese postwar reconstruction, in part through the Marshall Plan. The Soviet Union, the People’s Republic of China, and a newly independent India all embarked on a building spree, constructing monumental hydroelectric dams and steel plants that they believed would provide the basis for rapid industrialization and “catch-up” with the West. International development agencies, such as the World Bank, made it their mission to support large-scale physical infrastructure projects across the Global South, providing billions of dollars in loans and sharing valuable technical expertise.

The oil shocks of the 1970s began a decades-long retreat of the state in the economy, best captured by U.S. President Ronald Reagan’s iconic 1981 inaugural address in which he declared: “Government is not the solution to our problem; government is the problem.” Privatization and liberalization became the watchwords of the day with the United States and the United Kingdom leading the way. China and India embarked on a seismic reform process that gradually shed away some of the state structures of the Soviet-style command economy. International development and aid organizations, such as the International Monetary Fund and the World Bank, promoted a vision of minimal state intervention in what later became known as the Washington Consensus. The objective of aid and reform agendas was no longer improving the ability of the state to perform its

basic duties but rather to reduce the reach of the state overall and prevent it from encumbering productive market forces. For many, the collapse of the Soviet Union marked not only the “end of history” in terms of the ultimate triumph of liberal democracy but also the end of the idea that the state could and should actively support industrialization and economic development.

More recently, however, attitudes toward state intervention appear to be shifting once again. Terms like “industrial policy,” which had previously been dismissed as a failed idea from a previous era, have reemerged in policy debates around the world. In 2010, U.S. President Barack Obama gave a State of the Union address where he emphasized a return to manufacturing and state-supported infrastructure development domestically: “Next, we can put Americans to work today building the infrastructure of tomorrow. From the first railroads to the Interstate Highway System, our nation has always been built to compete” (Obama 2010). Most strikingly, he directly referenced China’s high-speed rail system as a benchmark for what he believed the US should aspire to: “There’s no reason Europe or China should have the fastest trains, or the new factories that manufacture clean energy products.” Already by this time, state support for domestic industry was reentering the political conversation in the US.

Several countries in recent years have adopted explicit industrial policy programs aimed at preparing their national economies for a new wave of technologically driven market opportunities. In 2011, the German federal government released *Industrie 4.0*, a strategic initiative for keeping German industries competitive in a new era of high-tech manufacturing (Horst and Santiago 2018). In 2014, India’s prime minister Narendra Modi launched the “Make in India” campaign to attract foreign direct investment and win over manufacturing supply chains. In 2015, China released its “Made in China 2025” (“中国制造 2025”) program, drawing inspiration from Germany’s national plan (Kennedy 2015). The Made in China 2025 program sought to make China a leader in ten key

industries, including information technology, robotics, and railways, provoking outrage from countries like the United States which viewed such direct state support as a form of unfair market competition.

Along with a renewed interest in industrial policy, there has been a new wave of programs aimed specifically at infrastructure. In 2021, the U.S. Congress passed the Biden administration's bipartisan \$1 trillion infrastructure bill, which included funding for the modernization of electrical grids, roads, bridges, and railways. In a speech announcing the bill, President Biden cited competition with China as a motivating factor behind the bill's design: "We've risked losing our edge as a nation, and China and the rest of the world are catching up and, in some cases, passing us" (U.S. White House 2021). A sense of global competition with distinct echoes from the U.S.-Soviet rivalry during the Cold War has driven a new arms race in state support for domestic industries.

In the same year, several other countries announced large-scale national infrastructure development programs. India's prime minister Narendra Modi combined a string of infrastructure initiatives into a \$1.2-trillion infrastructure program called *Gati Shakti*, which means "speed" and "power" in Hindi (Saxena and Chakraborty 2022). French president Emmanuel Macron launched the *France 2030* program, which aims to invest €30 billion in key sectors of the French economy, such as energy and transportation (L. Thomas and Van Overstraeten 2021). These programs are notable not only for their focus on a topic that had until recently seemed passe—namely, physical infrastructure—but also for their sheer scale and ambition. They were all clearly designed to send a loud message to domestic and international audiences.

Scholarship on the role of the state in development has similarly waxed and waned but on a slightly different timeline. Economic historians have long been interested not only in the run-up

to the so-called Industrial Revolution starting in English Midlands but also in the role of the state in shaping its differential spread around the world. Most notably, Alexander Gerschenkron's seminal work *Economic Backwardness in Historical Perspective* (1962) showed how states in Europe did not stand by idly as British industrialization took off and began to reconfigure the geopolitical order. Instead, European states such as France and later a unified Germany sought to compensate for their sense of relative "backwardness" by embarking on a process of active social transformation in an effort to "catch up" with the economic frontier. New institutions were formed and harnessed for the purposes of national development, such as large national investment banks that could provide long-term financing for new industry groups.

However, it was the rise of Japan and the so-called "East Asian tigers" of South Korea, Taiwan, Hong Kong, and Singapore that marked a watershed moment in research on the state's role in development. The stunning economic ascent of these countries—one from the ashes of wartime devastation, several others from a level of grinding poverty—revealed several things at once. First, non-Western countries could also industrialize and achieve high levels of development. Second, the process of development could happen on a much faster timescale than had previously even been imagined, taking place over the course of a few decades rather than a century or more. Third, the state could be a powerful force for bringing about this rapid economic transformation. The question then became: how?

This question, along with the spectacular cases of state-led development in East Asia, ignited a new line of research that coalesced around the concept of the "developmental state." Chalmers Johnson, in his seminal volume *MITI and the Japanese Miracle* (1982), highlighted the role of a particular Japanese superagency called the Ministry of International Trade and Industry (MITI) as the key driver behind Japan's stunning postwar economic performance. Johnson was

careful to distinguish between state intervention, which he argued all states do to varying extents, and the question of how and to what end the state intervened in the economy. A “developmental state” in his formulation was one where “the state itself led the industrialization drive, that is, it took on developmental functions” (p.19).

But what were the hallmarks of a developmental state, and what distinguished such a state from mere state meddling or intervention? A rich body of literature emerged, often leveraging comparative case studies to carefully tease out the key ingredients of such a state. Peter Evans (1995) emphasized the importance of both sufficient state autonomy from potentially distortionary outside interests and a degree of embeddedness in society, particularly ties to industrial capital, to inform state policies. Atul Kohli (2004) highlighted the role of state cohesion and the ability of the state to compel business groups to fall in line with national policy. Alice Amsden (1989) focused on the ability of states to selectively intervene in the economy through tools such as subsidies and tariffs to “get prices wrong” and create the necessary incentives for industrialization. Ironically, this wave of research on developmental states and the sea change in perspective that resulted in the World Bank’s (1993b) publication *The East Asian Miracle* all occurred before the most momentous story of state-led development of all: the rise of China.

Central to all these characterizations of state-led development is the notion of “state capacity,” a term that serves to both enlighten and confuse. Indeed, the term “state capacity” is notoriously slippery and has assumed several contrasting definitions across the social sciences. In one version, state capacity is narrowly defined as the ability of the state to extract fiscal resources from society. This view draws on a larger conception of the state and state formation as a process of mutually reinforcing coercive and extractive capacities vis-à-vis society, an argument most closely associated with Charles Tilly. Tilly (Tilly 1990) argued that states in Europe emerged

through interstate military competition where states, struggling to survive against their neighboring competitors, built up the administrative capacities of taxation and conscription. Much work in economics and a subfield of sociology called fiscal sociology takes this notion of state capacity as “resource extraction” from society as the primary dependent variable to be explained (e.g., Bräutigam, Fjeldstad, and Moore 2008; Besley and Persson 2009).

State capacity can also be something broader. Theda Skocpol (1985, 9) defined state capacity simply as the “capacities of states to implement official goals, especially over the actual or potential opposition of powerful social groups or in the face of recalcitrant socioeconomic circumstances.” Joel Migdal defined state capacity as “the ability of state leaders to use the agencies of the state to get people in the society to do what they want them to do” (1988, xiii), which he subdivided into the capacity “to penetrate society, regulate social relationships, extract resources, and appropriate or use resources in determined ways” (1988, 4). Michael Mann famously distinguished between two types of state power, despotic versus infrastructural. For our purposes, his definition of infrastructural power is closest to the notion of state capacity that I will use: “Infrastructural power is the institutional capacity of a central state, despotic or not, to penetrate its territories and logistically implement decisions” (Mann 1993, 59). Francis Fukuyama (2004, 7) argued that state capacity is “the ability of states to plan and execute policies and to enforce laws cleanly and transparently.”

One major theoretical problem that arises from the concept of state capacity is the difficulty of isolating the problem of implementation from the problem of policymaking itself. In other words, can the capacity of states to achieve certain policy goals be treated as independent of those policy goals themselves? If we aim to remain agnostic in our evaluation of the policy goals themselves and instead focus solely on the extent to which states are able to pursue those goals, regardless of

what they may be, we may find ourselves stuck with the impossible task of separating politics from the state when this is clearly never the case. The simplest and most profound problem is that the arrow of causality may run in the opposite direction: the capacity the state to achieve certain policy goals, or at least the perception thereof, may in turn influence the likelihood of pursuing those policy goals in the first place.

A classic example of this can be found with the popularity of distributional policies in India over investment in physical infrastructure. Distributional policies, such as water and electricity subsidies or farm loan waivers, are common and popular within Indian politics.¹¹ These programs are viewed favorably by voters and politicians alike for several reasons: their impact is clear and easy to observe, credit for enacting these policies can be easily attributed to specific politicians and parties, they offer the ability to target scarce resources toward politically important groups of constituents, and they have a proven track record that is familiar to everyone involved. Infrastructure projects, such as new roads and rail lines, are much less politically appealing for several reasons: they are costly in terms of resources, they have a high risk of failure, benefits are only realized after a long period of time, they may cause short-term problems, and they have little track record of success. As a result, Indian political candidates tend to prefer distributional programs rather than costly and risky infrastructural projects.¹² Political scientist Pratap Mehta (2003:138) noted that “there is little in the citizens’ experience of the Indian state that leads them to believe that the state will be a credible provider of social services.” Thus, it remains unclear to

¹¹ Examples are easy to find. In 2020, the Aam Admi Party in Delhi promised a set amount of free water and electricity to Delhi residents shortly before local elections (Mishra 2020). In 2019, the state governments of Uttar Pradesh, Maharashtra, Rajasthan, Punjab, and Karnataka all announced large-scale farm loan waiver programs (Phadnis and Gupta 2019).

¹² The Modi government is an exception to this trend, promoting infrastructure development as a signature plank in its policy program.

what extent India's inability to provide certain forms of basic infrastructure is a result of insufficient state capacity *per se* or a lack of political support for such projects.

Another related theoretical problem with the concept of state capacity lies with the distinction between the state's ability to plan and execute on policy on the one hand and the internal or external factors that constrain the state's ability to ultimately succeed in achieving its goals on the other hand. In his iconic work *Strong Societies and Weak States*, Joel Migdal lamented what he viewed as a set of dominant approaches to understanding the state that were "both too uncritical about the power at the top and too state-centered" (1988, xvi). Instead, he argued that the "ineffectiveness of state leaders who have faced impenetrable barriers to state predominance has stemmed from the nature of the societies they have confronted—from the resistance posed by chiefs, landlords, bosses, rich peasants, clan leaders, *za'im*, *effendis*, *aghas*, *caciques*, *kulaks* (for convenience, "strongmen") through their various social organizations" (Migdal 1988, 33). In other words, state capacity hinged just as much on the degree of resistance from social actors outside the state as it did on the activities of the state itself.

But Migdal was too narrow in his focus on the role of constraining factors on the state stemming from society. In fact, the constraining factors that limit state capacity can often be found within the state itself. For any given political leader's policy goals, there may be other political leaders who seek to alter or stymie them. For any state agency's policy mandate, there may be other state agencies that stand in the way, either through active countervailing actions or more commonly through mere passive noncooperation. For every commerce ministry official's efforts to boost industrial production, there may be an environmental ministry official withholding a key building permit. And for every environmental ministry official attempting to reduce air pollution,

there may be a commerce ministry official who lobbies political leaders on behalf of private industry for an exemption to environmental restrictions.

These internal barriers to state capacity often stem from competition and rivalry among different actors within the state, actors whose active cooperation is often necessary for the successful implementation of a given policy. The ability for any subset of state actors to effectively block state action is a concept familiar to scholars studying the role of veto players in political institutions (Tsebelis 2002) and is analogous to Kremer's (1993) O-ring theory of development where even a single missing ingredient ruins the entire program.¹³ In India, Delhi's municipal governance structure serves as a vivid example. Delhi's municipal functions are distributed across an array of state entities with overlapping jurisdictions including a state-level government, three locally elected municipal corporations, a centrally appointed lieutenant-governor, and India's Ministry of Home Affairs, which controls the Delhi Police. Efforts by one state actor—to build new public bus depots, for example (Lalchandani 2010; Jeelani 2019)—are frequently blocked by others, resulting in frequent political gridlock and a lack of accountability as actors blame one another for policy failures (Heller, Mukhopadhyay, and Walton 2016).¹⁴ These problems may be exacerbated by political disputes or fragmentation but ultimately stem from certain structural features of the state itself.

The most helpful conception of state capacity that addresses some of these theoretical challenges is one more narrowly centered around the idea of “organizational capacity.” In the introduction to their edited volume, Miguel Centeno, Atul Kohli, and Deborah Yashar (2017, 8)

¹³ Weber (1976, 162) noted the trade-off between the *Köllegialitätsprinzip*, which emphasizes collective decision-making, and speed: “*Köllegialität* [...] almost inevitably means an inhibition of clearer, more precise, and above all faster decision-making.”

¹⁴ Blame-trading has been well-documented in other countries (Weaver 1986; McGraw 1991; Hood 2011; Strøm 2000; Gulzar and Pasquale 2017).

argue that “state capacity in and of itself is best understood when we exclusively focus on the organizational capability of the state.” Once the concept has been narrowed, it can be more precisely specified: “state capacity involves the bureaucratic, managerial, and organizational ability to process information, implement policies, and maintain governing systems” (9). This notion of “state capacity” as “organizational capacity” offers several theoretical advantages. It zeroes in on the problem of policy implementation as an execution or managerial issue as separate from the complications of political disagreement in the policymaking process. Put another way, it allows us to consider the question: “Conditional on relative political unanimity over the direction and design of certain policies, what factors shape the ability of state organizations to then implement these policies?” This conceptualization of state capacity also allows us to separate the external forces that might impede state action that Migdal emphasized on the one hand from the internal structural factors on the other hand that reduce the effectiveness of state organizations in carrying out their accepted responsibilities. With this emphasis on “organizational capacity” in mind, we can advance to the main argument of this dissertation.

The Argument: States and Organizations

My overarching thesis is a simple one: when it comes to state capacity, organizational structure matters. As mentioned previously, much existing scholarship on state capacity concentrates on either macro-level variables, such as regime type or the structure of center-local state relations, or micro-level characteristics of specific state agencies, such as the backgrounds of state officials or their recruitment and promotion process. While these factors certainly matter, I argue that the lack of attention to meso-level features risks missing a key part of the story of why some states or state organizations appear to be more capable of actual policy implementation than others.

In some ways, states are a special class of organizations. They lay claim to being the fundamental rule-maker and rule-enforcer over a given territory and national community. Their power is not only underpinned by violence, but they claim (or seek to claim) a monopoly on violence within their domain. These are the defining features of the classic Weberian state paradigm. The state is, in a sense, the meta-organization or über-organization that sets the playing field for all other organizations from corporations and universities to criminal groups and parent-teacher associations and comic book fan clubs. Take the modern private American corporation, for example. Its basic form and function—the titles of its executives, the rights of its shareholders, the ability to claim and retain earnings, the belief that customers and business partners have in its legitimacy and likely continued existence—are predicated on laws, courts, and an armed police force that is perceived to easily overpower anyone who challenges these social facts. The organizational structure of the state therefore undergirds the structure of all other organizations.

As special as they are, states are still organizations nonetheless and face many of the same basic challenges and operate along the same basic principles as many other types of organizations, particularly other large, complex organizations, such as corporations or universities. Thus, it would make sense to understand how states work and how they fail from an organizational perspective. In particular, it would be useful to understand how the state as an organization or interlinked set of organizations is structured and how this structure shapes its ability to accomplish its goals. That is what the chapters in this dissertation aim to do, using a comparative empirical analysis of state railway bureaucracies in China and India.

Previous work on state capacity has tended to overlook the important role of organizational structure. Scholars have tended to focus on particular features of state bureaucracies that draw heavily on Weber's ideal-type of a legal-rational state (Pritchett and Woolcock 2004; Rodrik 2008)

operating through “an extensive, internally coherent bureaucratic machinery” (Rueschemeyer and Evans 1985, 50). Scholars have also emphasized the importance of state cohesion because multiple state actors must often work in concert to achieve complex policy goals (Chibber 2002; Kohli 2004). In addition, the presence of other “Weberian” features such as meritocratic recruitment has also been associated with a state’s ability to facilitate economic growth (Evans and Rauch 1999). More recent work by McDonnell (2017) has highlighted the central role of a bureaucratic ethos in producing “islands of excellence” within low-performing institutional contexts (Geddes 1994).

Yet less attention has been paid to the structure of state organizations. The notion that states are organizations or sets of organizations is nothing new among political sociologists, particularly those who build on Weber’s conceptions of the state (Mann 1984; Skocpol 1985; Tilly 1990). Likewise, scholars of organizations have long recognized states as an important organizational subspecies (March and Simon 1958; Perrow 1972), albeit one with peculiar properties (Bourdieu 1994; Powell and DiMaggio 1983). And yet these areas of scholarship, which were at one time inextricably intertwined, have grown apart and failed to learn from another, to say nothing of the robust literature in the field of public administration (e.g., Rainey 2009; Wilson 1989). I argue that as with other types of organizations such as corporations, partnerships, non-profits, and research enterprises, the structure of state organizations—consisting of both the formal and informal relations between individuals and groups within these organizations—also matters and plays an overlooked role in shaping state capacity.

Why Railways?

Railway infrastructure development offers an excellent test of state capacity. First, the sheer scale of railway projects requires the mobilization of vast resources across the state, often reaching the

national level. These include long-term financing; vast quantities of raw materials, such as steel and cement; technologically advanced equipment, such as tunneling machines and track-laying machines; and labor, including engineers, managers, accountants, inspectors, and construction workers. High-speed rail projects in China, for example, typically involve financing on the order of billions of U.S. dollars and require years of planning and construction work to complete. The Beijing-Shanghai high-speed rail line alone cost more than the Three Gorges Dam (Foster 2011) and ranks among the largest state-driven infrastructure projects in history.

Second, railway projects are organizationally complex, requiring a high degree of coordination across a wide range of actors. These include the local and regional governments that are directly affected by the project. Approval or active cooperation is needed from various ministries and departments, ranging from utilities to environmental protection agencies. Work must be coordinated across an array of contractors and suppliers, including designers, civil engineering groups, safety inspectors, electrical and signaling specialists, and train manufacturers. Thus, railway projects offer a test of the ability of the state not only to marshal the sheer quantity of resources and personnel required to build a new rail line but also to coordinate the deployment of these resources across both public and private actors.

Third, railways are important to society. Despite the shift in many parts of the world to highways, trucking, and aviation, railways continue to play a central role in the social and economic life of many countries. Across the European Union, annual passenger train volumes exceeded 400 billion passenger-kilometers before the COVID pandemic (Eurostat 2022). In India, pre-pandemic rail passenger volumes topped 8 billion trips per year (Indian Railways 2021). In China, the average number of passengers transported by train reached over 10 million *per day* in

2019 (National Railway Administration (China) 2019a). Even in the US, while passenger volumes on Amtrak are relatively low, a significant amount of freight transport relies on railways.

Because railways matter socially and economically, they also matter politically. Politicians frequently jostle to bend railway projects to their liking, seeking to win a share of the funding, jobs, and economic benefits that typically come along with railway projects. Passenger service and passenger fares are particularly sensitive politically given their salience to the public and are frequently subsidized to win public support. Until recently, India's annual Railway Budget Speech was a highly anticipated and politically charged national event where new train services were announced that reshaped people's lives and reconfigured political alliances. The appointment of the railway minister in India was frequently a hotly contested political issue given the influence of such a position in providing public goods to key constituents. In China, prior to the construction of its high-speed rail system, the chaos and hardship of the yearly return migration by train for millions of passengers during Chinese New Year presented a distinct social risk to Chinese political leaders. To this day, train ticket prices in China are kept artificially low by Chinese railway authorities, even for high-speed trains, to satisfy public demand despite operating at a massive financial deficit (J. Wu 2013).

Fourth, railways are observable. Other forms of public goods, such as health and education, may be difficult to measure and evaluate. For example, gauging whether a state successfully provides public education entails relying on proxy measures, such as standardized exams, which themselves may be subject to debate. If educational test scores are rising, is this a marker of policy success or a sign of a system reorienting itself toward "teaching to the test," which may in fact detract from real educational goals? In contrast, the success or failure of railway projects is more straightforward. One can visit a train station, personally ride a train, and observe the journey time

and service quality. Moreover, in the age of social media, even the most heavy-handed efforts by the state to censor information cannot hide a major event like a fatal train accident. In 2011, when two high-speed trains collided near Wenzhou, China, killing 40 people, efforts by China's then-extent Ministry of Railways to cover up the accident and literally bury the wrecked trains underground were quickly uncovered, leading to a far-reaching investigation and ultimate dissolution of the Ministry of Railways (Dean and Shirouzu 2011; Osnos 2012). While there is always the risk that more subtle quality and safety issues persist undetected for years (see, e.g., Bingyang and Shiqing 2017), railway performance and quality offer a degree of objective observability not easily found in other policy domains.

Fifth, the provision of transportation infrastructure is arguably less politically controversial than other policy goals. Major policy issues, such as the role of the state in education or healthcare, are often divided along political or ideological lines, making it difficult to separate the effect of state capacity *per se* versus disagreement within society over the best approach toward tackling these problems. The construction and maintenance of physical transportation infrastructure, from highways and bridges to railways and shipping ports, appears to attract more widespread public support. For example, in the United States, federal initiatives to support infrastructure development have been launched and supported by both Republican and Democratic political leaders, demonstrating bipartisan support for a policy goal in the face of an otherwise polarized electorate (see, for example, the Bipartisan Infrastructure Law passed in 2021 under the Biden administration was originally planned by the Trump administration). In India, both major political parties have made infrastructure initiatives central to their political campaigning, such as the National Highways Development Project launched under Congress rule and the Gati Shakti initiative launched by the rival Bharatiya Janata Party (BJP). While differences often arise over the means,

including sources of financing and the role of public agencies in implementing these projects, infrastructure development as a goal offers a more useful analytical test of state capacity with less noise from political disagreements.

Lastly, railways have played an outsized role in the history of economic development and the formation of state power in many countries. Since the arrival of the first state-run railway lines in the early nineteenth century, many thinkers have recognized the important role of railways in national development. Karl Marx said that the development of railways in British India would necessarily bring about India's industrialization. Indeed, railways can be found playing a central role in the economic and political development of many countries, including the United States (Gordon 2016; White 2011; Wolmar 2012), Germany (Mitchell 2000), Russia (Marks 1991), and the British Raj in India (Debroy, Chadha, and Krishnamurthi 2017; Hurd 1983; Kerr 2001). Moreover, railway development has offered a useful lens for examining the state and society in other contexts. For example, Frank Dobbin (1994) compared the development of railways in France, the United Kingdom, and the United States to uncover the role of political culture in shaping the formation of central state institutions. Wolfgang Schivelbusch (2014) showed how the experience of rail travel itself transformed notions of space and time, contributing to a shift in expectations about the pace of progress and the relationship among citizens.

Why China and India?

At first glance, a comparison between China and India might seem like an odd choice given the obvious differences between the two countries. China, a single-party authoritarian state, may seem so different from India, a federal parliamentary democracy, that any effort to compare the two will descend into a welter of inextricably linked confounding factors (see Table 1 for a summary of

Table 1. Similarities and Differences between China and India vis-à-vis Railway Development.

	China	India
Similarities	<ul style="list-style-type: none">- State-run national railway systems operated by large bureaucracies- Railways are widely used, integral to economic and social life- Railway development is viewed as a key political priority- Period of rapid economic growth from 1990s resulted in:<ul style="list-style-type: none">o Greater fiscal resources for investment in railway infrastructureo Strain on existing railway system and demand for modernization	
Differences	<ul style="list-style-type: none">- Single-party authoritarian state- State land acquisition faces fewer challenges- Greater fiscal resources- Nodal organizational structure	<ul style="list-style-type: none">- Federal democracy- State land acquisition faces protests and legal challenges- Fewer fiscal resources- Diffuse organizational structure

similarities and differences between the two countries). Yet, I argue that despite these obvious issues, a comparison of these two countries makes sense analytically and offers several useful advantages.

Railways are particularly important in China and India today, forming the backbone of economic and social life in both countries. The railway industries in both countries have deep forward and backward linkages within their broader economies. Trains are a widely used form of passenger travel in China and India, particularly among their large migrant worker populations. Railways are also prominent symbols of state power and national identity in both countries. Chinese state media regularly tout the success of China's high-speed rail program to bolster the legitimacy of Communist Party rule while India's trains feature prominently in political speeches and Bollywood films. In both countries, the railway sector is almost exclusively administered by the central government through massive bureaucratic organizations.

China's and India's railway bureaucracies both score highly on many dimensions of Evans and Rauch's (1999) "Weberianness" index. Railway officials in both countries are elite civil servants who enjoy a "certain elevated 'ständische' social esteem" (Weber 1976:553) and form a tightly knit nationwide community. The prestige and stability of a career in the railway bureaucracy attract graduates from many of the top universities in both countries. Chinese and Indian railway officials are recruited through a competitive examination process and are motivated by long-term career incentives, including promotion based on standardized performance evaluations. The bureaucratic leaders of the Chinese and Indian railway systems have all risen through the ranks and spent most, if not their entire, professional careers within the railway sector. Outside experts I interviewed regard railway officials in both countries as highly competent technical experts. Indeed, as I will later show, India's railway bureaucracy is in many ways more Weberian than China's, presenting a puzzle for sociological theory given the greater effectiveness of China's railway bureaucracy.

Confounding Factors

At the same time, several potential confounding factors need to be addressed at the outset. I argue that, while significant, these factors fail to fully explain the gap in state capacity between China and India, leaving room for alternative explanations.

One factor is regime type. India's federal democratic political system can make coordination across multiple stakeholders more difficult. Institutional checks, such as political opposition groups and a relatively independent judiciary, can delay or block railway projects while providing safeguards for individual rights. China's authoritarian political system lacks these checks on state power. At the same time, it is important to note that authoritarian regimes are not

inherently more or less effective than democracies at providing public goods (Hanson 2015; Ross 2006; Lake and Baum 2001; Przeworski and Limongi 1993; Acemoglu et al. 2008; Leftwich 2005; Haggard 1990). All high-speed rail networks besides China's were built by democracies, including Japan, Germany, Spain, and France. The world's largest conventional railway and highway systems were built by the United States. Many authoritarian states fare poorly at infrastructure development, including China under Mao (Shapiro 2001). Moreover, the Chinese state is less centralized and coherent than is commonly assumed, riven by internal party factions (Lieberthal and Lampton 1992; Shirk 1993; Shue 1988; Lee and Zhang 2013; Cai and Treisman 2006), tensions between central and local governments (Zhou 2010; Cai and Treisman 2006; Y. Huang 1996), and resistance by powerful ministries and state firms (Yang 2004; Jefferson and Rawski 1994). The relationship between regime type and railway infrastructure development is not straightforward and depends on other factors that will be discussed later.

A second factor is differences in the land acquisition process. In India, disputes related to land acquisition are a frequent cause of delays for infrastructure projects (R. Singh 2012; Levien and Upadhyay 2021). Indeed, compulsory state land acquisition, often without adequate compensation or support, is a long-standing source of protests more generally in India (Levien 2018) where an estimated 50-60 million people have been displaced or affected by state projects (Chakravorty 2013, 122). While compulsory land acquisition by the state also causes frequent protests in China (Ren 2017), Chinese railway projects appear to be less affected for several reasons. Chinese high-speed rail projects have relatively low land requirements because they mostly run along elevated tracks or through tunnels.¹⁵ Opposition to land acquisition for railway projects in China tends to be concentrated in urban areas near stations where property market

¹⁵ China followed Japan's HSR strategy of spending more on elevated track to minimize land use requirements.

values are highest.¹⁶ While Chinese railway officials frequently complained to me that land acquisition was the most difficult part of railway projects, indicating that local residents can present genuine resistance to railway projects, local residents in China generally have weaker channels for recourse than in India.

A third factor is fiscal resources. Since 2008 when comparable financial data became available, China has invested over \$900 billion in railway construction, nearly ten times that of India's investment of \$95 billion over the same period.¹⁷ At the same time, it is interesting to note that even controlling for spending, Chinese railway projects yield greater results: China builds high-speed rail for roughly the same cost per mile that India builds conventional track. Also, it is important to note that India's railway system does have significant financial support from the Indian central government, receiving around 12% of total public capital expenditure, second only to the military. Indian railway projects, such as the Dedicated Freight Corridor and the Mumbai-Ahmedabad bullet train, that have received billions of dollars in financing still suffer from a slow pace of implementation. India's former chief economic advisor Arvind Subramanian (2018, 67) has argued that "the constraint on public investment in India, today at least, is not on resources but just the ability to spend well and spend quickly."

What This Dissertation Does Not Do

Several important issues and topics lie beyond the scope of this dissertation. First, this dissertation does not offer a monocausal explanation for differences in China's and India's abilities to build

¹⁶ Chinese HSR stations are increasingly located far from city centers, partly to reduce conflicts over urban land acquisition. For more on this phenomenon, see Dong et. al. (2021).

¹⁷ Railway spending estimates are based on China Railway Corporation annual reports, Chinese Ministry of Railway annual reports, Indian Union Budgets, Indian Railways Outcome and Performance Budgets, and the budget speeches of Indian railway ministers.

infrastructure, such as railways. As discussed earlier, many factors play a role in this observed divergence, and it would be fruitless to attempt to neatly disentangle the effects of any single factor. Instead, I aim to highlight several factors that may be underappreciated and show how they matter in this particular case and for the relations between states and development in the Global South more broadly.

Second, this dissertation does not provide a history of railways in China or India. Instead, this dissertation offers an analysis of a set of empirical cases in response to a theoretical question. There are several outstanding histories of railways in these two countries. The most complete single-volume treatment of the history of Chinese railways is Elisabeth Köll's (2019) *Railroads and the Transformation of China*. For a history of the Indian railways, see Debroy, Chadha, and Krishnamurthi's (2017) *Indian Railways: The Weaving of a National Tapestry*. For a historical overview of China's high-speed rail program, the single best volume is Zhenhua Chen and Kingsley Haynes (2015) *Chinese Railways in the Era of High-Speed*. For a more recent overview of China's high-speed rail system today, see the World Bank publication by Martha Lawrence, Richard Bullock, and Ziming Liu (2019) *China's High-Speed Rail Development*.

Third, this dissertation does not evaluate the effect of railway projects on society and assess whether the total social and economic benefits justify the enormous costs. Research by economists and economic historians have shown mixed results. Earlier work (Fogel 1962) suggested that railways offered little-to-no marginal economic benefit over existing transportation modes, such as roads and waterways. More recent work on the Indian Railways (Donaldson 2018; Fenske, Kala, and Wei 2023) and rail transport in the United States (Donaldson and Hornbeck 2016) has shown how railway infrastructure has historically contributed to economic growth by reducing transport costs, increasing property values, and encouraging urbanization. China's high-speed rail program

has received particular scrutiny, with some research demonstrating a strong positive economic (Zheng and Kahn 2013) and environmental (Nash et al. 2009) effect while other research argues that alternatives such as a faster conventional rail system would have been more cost-effective (J. Wu, Nash, and Wang 2014). This dissertation does not engage with this literature in attempting to evaluate whether railway projects are a net positive or net negative for society, which is a thorny analytical challenge given the difficulty of identifying the causal spillover effects of new railway lines on economic growth, particularly at the regional and national level. Instead, this dissertation sets aside this issue to focus on the question of capacity: regardless of whether these railway projects are ultimately good or bad, why are some states more successful at building them than others?

Lastly, this dissertation has differing scholarly aims than several other books on China's and India's railways. Xiao Ma's recent volume (2022) *Localized Bargaining: The Political Economy of China's High-Speed Railway Program* focuses on the issue of center-local state relations and how local governments in China seek to shape the construction of high-speed rail lines in their jurisdictions. Ma's volume is primarily concerned with explaining variation in railway development *within* China rather than between China and other countries at the national level, which is the focus of my dissertation. Sudhir Kumar and Shagun Mehrotra's volume (2009) *Bankruptcy to Billions: How the Indian Railways Transformed Itself* focuses on the story of reform within the Indian Railways under Lalu Prasad Yadav, who served as India's railway minister from 2004 to 2009. While this book provides a valuable insider account into the messy political process of railway reform in India, it is primarily concerned with chronicling a narrative of institutional change under a particular political leader. Linda Tjia-Nor's book (2016) *Explaining Railway Reform in China: A Train of Property Rights Re-arrangements* draws on detailed data and

interviews with Chinese railway officials to provide a definitive account of the political forces underlying China's railway restructuring in the post-reform era. While this dissertation builds on the excellent contributions these volumes have made to our understanding of the political economy of railways in China and India, I ultimately pursue a separate question all together, one focused on explaining China's exceptional capacity for railway development at the national level and why the Indian state has struggled to do the same.

Fieldwork and Sources

This dissertation draws on over 24 months of fieldwork in China and India from 2016 to 2019. I was primarily based in Delhi and Beijing but frequently traveled to other parts of both countries for research, including Chengdu, Shenzhen, and Hyderabad. During fieldwork, I conducted semi-structured interviews with individuals who had firsthand knowledge of China's and India's railway bureaucracies, including government officials, industry experts, local researchers, and members of trade groups.

Obtaining interviews with government officials proved extremely challenging, particularly in China. In India, I was able to enter the Ministry of Railways and talk my way into the building past the crowds of lobbyists and contractors who begged the receptionists to grant them access. One of my most helpful set of contacts in India was the leaders of Delhi-based Institute of Rail Transport, which included former Indian Railways officials as well as retired members of the former Planning Commission. It was through the generosity of the Institute of Rail Transport that I was invited to present my findings to an audience of current and former railway officials in the Ministry of Railways itself, which was an incredible honor.

In India, some railway officials regarded me skeptically, unsure whether speaking to an American doctoral student was worth their time. Yet time and again, I found that Indian railway officials were often eager, after some warm-up period, to share their personal experiences and frustrations of working in the bureaucracy. Some railway officials struck a nationalist tone, praising the pro-railway reforms of the Modi administration and lecturing me on Indian history. Others welcomed me, much to my surprise, and eagerly shared their most harrowing stories or long-held critiques. I had the privilege of accompanying one railway officer on a site visit to an ongoing construction site where a half-completed viaduct towered over a set of shipping containers converted into makeshift offices. One thread ran through all the Indian railway officials I spoke with: they all shared tremendous personal pride in their work as railway officers. Weber would have approved.

Chinese government officials were a different story. I leaned on every contact I had, including friends and family, but struggled for months to secure an interview. I even tried cold-calling and cold-emailing railway officials whose contact information I managed to glean from reports and websites. Of course, the ubiquitous Chinese messaging app WeChat and *guanxi* (Mandarin for “connections”) were the only way to access these individuals. Several Chinese university researchers were especially helpful, given the close ties between China’s railway bureaucracy and China’s academic community. Some interviews took me past defunct buildings of China’s former Ministry of Railways. Other interviews took me out to smaller towns where temporary headquarters were situated for an ongoing high-speed rail project. Traveling across China, one could not help but notice the telltale giant red banners with white lettering hanging over half-finished viaducts, announcing the name of the construction unit responsible for that project. I was fortunate enough to be invited to walk through an active construction for a high-speed rail

project where I saw massive concrete beds and steel girders piled on the ground like toothpicks cast aside by a giant. I saw parts of the gigantic prefabrication plants where infrastructure parts, such as concrete beds, are mass-produced on-site, a key part of China's ability to build so rapidly.

Beyond government officials, one of the best sources of information was from transport specialists at international development organizations, such as the World Bank, the Asian Development Bank, and the Japan International Cooperation Agency. Not only did these international experts have rare, direct experience working on Chinese and Indian railway projects, but they also offered a useful comparative perspective, drawing on their work across many countries. Moreover, these international experts also provided a helpful counterpoint to claims I heard from Chinese and Indian officials themselves. Some of the best written material on China's high-speed rail program comes from the World Bank, which provided loans to many of China's early high-speed rail projects.

I obtained qualitative and quantitative data from a range of official sources. The Chinese and Indian states, particularly their railway bureaucracies, have a strong tradition of detailed written documentation that proved immensely helpful in my research. In both China and India, the railway bureaucracies publish annual yearbooks with detailed information on ongoing projects, financing, and personnel. Both countries have state-run train booking websites, which provide the most accurate and up-to-date information on passenger train schedules and ticketing options. These sources alone provided a strong foundation for piecing together the railway sectors in both countries.

For the Chinese case, the most helpful data source I found was a set of railway project books published by China Railway Press (中国铁道出版社) and available to the public for purchase. For each major railway project, particularly high-speed rail projects, a railway project

book is compiled that provides extensive documentation about the project's overall parameters, timeline, financing, organizational structure, and engineering and construction process. Each book contains hundreds of pages, including technical diagrams, maps, and photos. I purchased and digitized more than a dozen of these railway project books and can share PDF copies upon request.

Another helpful set of sources for the Chinese case was internal Ministry of Railway and Chinese Railway Corporation (CRC) documents that I found in libraries, bookstores, online databases, and government websites. In line with many Chinese central state organizations, CRC regularly publishes sets of new policies, rules, and procedures in a systematized format with standard naming and formatting conventions. The CRC internal documents I collected contain detailed step-by-step instructions for various aspects of the railway construction process, including how to obtain project permits, how to carry out land acquisition and resident relocation, and how to evaluate the performance of railway construction projects. Moreover, project-specific documents such as environmental impact reports and feasibility studies can sometimes be found through public sources and offer valuable project-level information.

In addition, Chinese corporate financial filings and bond prospectuses provided a useful source of information on major state firms operating within the railway sector, including China Railway Corporation (CRC, 中国铁路总公司), China Railway Rolling Stock Corporation (CRRC, 中国中车), China Railway Group Limited (CREC, 中国中铁), and China Railway Construction Corporation (CRCC, 中国铁建). These financial documents include not only detailed corporate information but also industry-level data, such as market size and market growth. Bond prospectuses provided useful information for understanding how Chinese railway projects are financed, including funding sources and financing terms. I found most bond prospectuses and some

corporate financials through www.chinabond.com.cn, which is an important online clearinghouse for Chinese financial data.

For the Indian case, I obtained written material through my contacts within Indian Railways, through the Ministry of Railway itself, and from the Railway Board website (<https://indianrailways.gov.in/railwayboard/>) where much internal Indian Railways documentation is posted publicly. Internal documents I collected through these sources included detailed organizational charts, handbooks of rules and procedures, regional bureau-level documentation of completed or ongoing projects, and policy announcements circulated to railway officials. One of the most useful set of documents was a series of commissioned reports on the Indian Railways over decades, culminating most recently with the so-called “Debroy Report” in 2015. These reports, often compiled by a special committee to investigate structural issues within the Indian Railway, provide insightful accounts of IR’s key challenges as well as recommendations for reform.

India’s Parliamentary documents also provided a critical source of data. In particular, India’s Parliament published a set of annual railway budgets known as “Pink Books” that include annual budgetary allocations at the railway project level. These Pink Books allowed me to trace the construction and financial progress of individual railway projects over time. One can easily see from the Pink Books how long many Indian railway projects take to finish and how volatile funding for individual projects is from year to year. Future studies may want to investigate the relationship between budget allocations for individual railway projects and shifts in political power in India’s Parliament.

Lastly, I had the privilege of being invited to examine archival records in the official library of India’s Ministry of Railways. I would frequently occupy a desk in the back corner and peruse

the towering shelves of musty and often deteriorating railway volumes, stretching back to the early days of the Indian Railways under British colonial rule. What I found in these volumes was remarkable. I discovered organizational charts that showed a distinct lineage with those of the contemporary Indian Railways. I found World War II-era data that showed the tremendous shock experienced by the Indian Railways during this time and the sudden shift in personnel from British to Indian officers. I found discussions of bureaucratic feuds among railway officers from the early days of India's Independence, feuds that continue to the present day. Each day in the Ministry library, I would stay until a worker with a strange fog machine would begin blowing a thick gaseous mixture through the library aisles. I was never asked to leave at this hour but felt it was better if I did anyway.

Chapter Overview

In the chapters that follow, I show how China's and India's state railway bureaucracies operate and how their organizational structure plays a critical role in shaping their ability to carry out their goals and the broader policy goals of the state. Chapter 2 presents a direct comparison between China's and India's state railway bureaucracies, showing how their differing organizational structures contribute significantly to their differential success in completing railway projects. Specifically, this chapter shows how China's railway bureaucracy conforms to a "nodal" organizational form where substantial decision-making authority is concentrated at the middle levels of the bureaucracy. I show how nodal structure and the key nodal actors within it, such as Chinese railway project corporations, enhance accountability and autonomy at the project level, ultimately contributing to the Chinese state's overall capacity to build railway infrastructure at scale. In contrast, I show how India's railway bureaucracy conforms to a "diffuse" organizational

form where authority and accountability are dispersed across many overlapping layers of officials and subgroups, which in turn hampers project work by constraining the ability of lower-level officials to make key project decisions without higher approval.

In Chapter 3, I focus on Chinese infrastructure construction state-owned enterprises (SOEs), which form important set of actors within China's railway bureaucracy and China's infrastructure development ecosystem more broadly. In this chapter, I show how the Chinese state attempts what I call a system of "managed competition" where the industrial organization of strategic sectors, such as railways and infrastructure construction more broadly, is divided among a limited set of similarly resourced state-owned competitors. While these state-owned firms compete for many of the same contracts at the national and international level, they are "managed" by a set of parent companies that redistributes resources such as equipment and management personnel in such a way as to ensure a robust playing field of potential bidders. The Chinese state's approach to key industrial sectors conforms to neither a standard market structure nor to the top-down statist approach of the Mao era but rather marks an effort to combine the advantages of both market competition and active state intervention to ultimately advance the priorities of the state.

In Chapter 4, I turn to the role of emotions and bureaucratic culture within the Indian Railways, drawing largely on in-depth interviews with officials across the Indian railway bureaucracy. In this chapter, I show how, contrary to Weber's original conception of stoic bureaucrats, emotions suffuse the professional lives of Indian Railways officers and play an intense role in their interpersonal relations. Feelings such as fear and frustration but also pride in the organization and in the nation are a daily fact of life for the men and women who form the civil service backbone of the Indian Railways. I show how these emotions are not merely arbitrary or individually idiosyncratic but rather a product of the organizational structure of the Indian railway

bureaucracy itself. The bureaucracy's diffuse structure ultimately reduces the agency of individual officers and compels them to "beg" one another for help in completing basic organizational tasks.

In Chapter 5, I conclude by discussing the implications of these findings for our understanding of state capacity, bureaucracy, and development, particularly in Global South contexts beyond China and India. I emphasize the importance of heterogeneity in considering the relationship between state organizational structure and state capacity, arguing that more research needs to be done to understand how factors such as institutional context and policy domain influence the relative effectiveness of certain organizational forms over others. I also consider the factors underlying organizational change and organizational learning, which have been under-researched in existing work on state capacity. Ultimately, state capacity is a feedback loop where a fundamental belief in the state's ability to improve the lives of its citizens is needed to begin the broader process of social transformation.

Chapter 2

The Organizational Roots of State Capacity: Comparing Railway Bureaucracies in China and India

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1. Introduction

How does the organizational structure of the state affect its ability to carry out official policies?

This question has long been dominated by the debate over whether more centralized or more decentralized structures make states more effective. Some forms of centralization can improve state cohesion and leverage economies of scale, but they can also create information and decision-making bottlenecks (Chibber 2002; Evans 1995; Kohli 2004). Some forms of decentralization can empower local institutions, which may be more responsive to local demands and conditions (Besley and Coate 2003; Oates 1972; Tiebout 1956), but this can also lead to counterproductive forms of competition (Cai and Treisman 2006; Treisman 2007). This debate has reached an impasse because it relies on a narrow center-versus-local view of state structure, overlooking the

complex, interconnected array of bureaucratic organizations that are integral to policy implementation.

This article proposes an alternative typology of state organizational forms that better accounts for the important role of bureaucratic structure in shaping state capacity: nodal versus diffuse forms. *Nodal* state organizational forms are characterized by a concentration of decision-making power in a limited number of key actors at intermediary levels within the state hierarchy. *Diffuse* state organizational forms are characterized by a dispersion of decision-making power across many overlapping lines of authority. Nodal forms of state organizational structure tend to enhance state capacity because they combine the coordination advantages of centralized structures with the accountability and autonomy of decentralized structures. Diffuse forms, in contrast, tend to undermine state capacity, because an overabundance of veto-wielding actors makes coordination more challenging and accountability less clearly defined.

These two contrasting types of state organizational form can enhance or constrain state capacity through three primary mechanisms. First, bureaucratic *goal alignment and accountability* are greater in nodal structures because policy outcomes can be more clearly tied to a limited number of key actors. In a diffuse structure with many decision-making actors and a profusion of overlapping ties among them, assigning credit or blame for policy outcomes to any single actor is more challenging. Second, the *coordination* of policy work across actors from local governments to other state agencies is facilitated by a small number of nodal actors in a nodal structure, while the lack of any such coordinating actor within a diffuse structure leads to organizational bottlenecks and conflicts. Third, *autonomy* is greater in a nodal structure, where midlevel actors are empowered to make implementation-level decisions whereas the many decision-making actors in a diffuse structure constrain the ability of lower-level officials to problem-solve on their own.

To show how this typology works in practice, this article compares two paradigmatic empirical cases: the state railway bureaucracies of contemporary China and India. China's railway bureaucracy is a paradigmatic example of the nodal form of organizational structure: decision-making power is concentrated in a limited set of key actors across the bureaucratic hierarchy. For most railway projects, a single nodal actor—the state-owned project corporation—is responsible for coordinating work and seeing the project through to completion. India's railway bureaucracy is a paradigmatic example of the diffuse form: decision-making power is distributed widely across many overlapping authority structures, including regional bureaus, functional divisions, and informal tenure-based hierarchies.

To be clear, I do not argue that the Chinese state is more effective at developing railway infrastructure than the Indian state solely due to differences in bureaucratic structure. The Chinese state has indeed managed to build the world's largest high-speed rail network in less than a decade, while the Indian state has struggled to modernize its own overburdened railway system. However, the Chinese and Indian contexts differ along many important dimensions, making it impossible to disentangle the effects of confounding factors such as regime type and financial resources. Instead, this article uses a comparative approach to clarify the specific mechanisms through which each type of organizational form shapes state capacity. Tracing the structure and operations of China's and India's railway bureaucracies in a detailed side-by-side manner allows for a more precise articulation of key processes than would a single case study.

This article draws on 24 months of fieldwork in China and India, including more than a hundred semi-structured interviews with railway officials and industry experts. I begin by summarizing the centralization–decentralization debate and show that this framework has reached the limits of its theoretical utility. I then outline an alternative typology of nodal versus diffuse

state organizational forms and show that this typology better addresses the relationship between state structure and state capacity. The rest of the article compares the empirical cases of China's and India's railway bureaucracies. I show how their differing organizational structures affect their ability to complete railway projects. I conclude by discussing whether and how these findings might generalize to other contexts, with implications for future research on state capacity.

2. The Organizational Structure of the State

2.1 The Centralization–Decentralization Debate

Existing work on state organizational structure has long been dominated by the debate over whether centralized or decentralized states are more effective at providing public goods and carrying out official policies (for an overview, see Mookherjee 2015). Work on the “developmental state” has emphasized the need for certain centralized state institutions to ensure cohesiveness in policy formulation and implementation across the state apparatus (Chibber 2002; Evans 1995; Johnson 1982; Kohli 2004). Centralization can also offer greater economies of scale and concentrations of resources not possible at more local levels (Bardhan 2002; Besley and Coate 2003). However, excessive centralization can diminish state capacity by creating decision-making and informational bottlenecks (Chibber 2002).

On the other side of the debate, certain forms of decentralization may improve the state's ability to implement policies on the ground because local institutions are more responsive to heterogeneous local conditions and needs (Besley and Coate 2003; Oates 1972). Decentralization can also streamline decision-making by reducing the need to wait for authorization from higher-level actors. Moreover, decentralization can foster experimentation and productive competition among local jurisdictions, an argument often associated with Charles Tiebout (1956). However,

these purported benefits of decentralization are not always realized. For example, Hongbin Cai and Daniel Treisman (2006) have argued that competition among local jurisdictions can also be counterproductive by encouraging local protectionism and a “race to the bottom” in tax incentives (see also Treisman 2007).

An alternative line of scholarship has challenged this centralization–decentralization dichotomy. Some scholars have argued that effective decentralization depends on the existence of certain centralized political institutions (Bardhan 2002; Blanchard and Shleifer 2001). Work comparing the divergent trajectories of Russian and Chinese decentralization has emphasized the need for a strong central authority that can push local governments to pursue growth-enhancing rather than rent-seeking forms of competition (Blanchard and Shleifer 2001; Montinola, Qian, and Weingast 1995). Even advocates of limited government have argued that successful decentralization requires strong centralized institutions for the enforcement of property rights (North 1990).

Ultimately, the centralization–decentralization debate suffers from two related problems. First, it assumes an overly narrow view of state organizational structure, primarily oriented along a vertical center–local axis. In reality, the distribution of power and the structure of authority relations within modern states are far more complex and multidimensional. Certain ministries, such as the finance ministry, may exercise outsized influence over others. Some institutions, such as central banks or intelligence agencies, may enjoy greater autonomy or have more direct ties to the president or prime minister’s office. A second and related problem is that the centralization–decentralization debate fails to take into account the broader array of bureaucratic organizations that are largely responsible for actual policy implementation. How these vast portions of the state

apparatus are structured and interact with one another is critical to the state's ability to realize its overarching policy objectives.

2.2 Bureaucratic Structure and State Capacity

A large body of scholarship has examined the structure of state bureaucracies and their effect on state capacity. The literature on bureaucratic politics has demonstrated the role that internal rivalries and bargaining among bureaucratic actors play in shaping policy decisions (Allison and Halperin 1972). Later work sought to understand how the organizational structure of these bureaucracies, including the relative positions of actors in authority structures and information flows, shapes how interagency dynamics manifest as policy actions (Bendor and Moe 1985; Hammond 1986).

Scholarship on China's modern state bureaucracy has shed light on a major organizational problem facing many state bureaucracies around the world: functional versus vertical organizational structures. During the Mao era, much of China's state bureaucracy was organized along dual "vertical" and "horizontal" authority structures, known as *tiao* and *kuai*, respectively (Mertha 2005). Local government departments, such as civil works bureaus, reported to their local governments as well as to higher levels of their functional area, up to their corresponding central government ministries (ibid.). However, this structure led to problems that are typical of such "matrix" organizational structures, including conflicts between overlapping reporting lines.

Starting with the reforms of the 1970s, parts of the Chinese state began a gradual shift away from the matrix structure to a "multidivisional" or "M-form" structure (Qian and Xu 1993). This structure, which came to dominate large American firms in the mid-twentieth century (Fligstein 1985), is characterized by a shift of authority away from the organizational center to more

autonomous, parallel organizational subdivisions. Indeed, some scholars have argued that China's shift toward a multidivisional structure contributed significantly to its rapid economic growth by encouraging competition among local jurisdictions (Qian and Xu 1993). However, a characterization of China's bureaucracy as multidivisional overlooks the important role of strategically positioned actors within the bureaucratic hierarchy who can coordinate and problem-solve across regional jurisdictions and functional domains.

2.3 Nodal versus Diffuse Organizational Forms

To address these issues, I propose an alternative typology of state organizational forms that better accounts for the structural complexity of modern states and their bureaucracies: *nodal* versus *diffuse* forms (Figure 1).

Nodal forms of state organizational structure are characterized by a high concentration of decision-making power in a limited set of key state actors. These *nodal actors* are state entities or even individual officials that operate with a high level of autonomy within a given policy domain and retain extensive connections across the broader bureaucracy, including with other nodal actors. In contrast with centralized state structures, such as Vivek Chibber's (2002) notion of a top-level "nodal agency," nodal forms of state structure concentrate authority not at the very top of the state hierarchy but rather among nodal actors at the middle levels of the state apparatus, such as ministries, departments, agencies, and state-owned enterprises. It is these underappreciated "middle managers" that occupy a crucial position within the state, close enough to the ground to understand the challenges of implementation yet high enough to reach across many parts of the state simultaneously.

Diffuse forms of state organizational structure, in contrast, are characterized by a dispersion of decision-making power across dense, overlapping lines of authority. Where the dual reporting structure of the matrix organizational form can yield an overlap between functional and vertical reporting lines, diffuse organizational structures can lead to areas of overlap among many cross-cutting reporting lines. As a result, each decision or task in the policy implementation process frequently requires the approval or cooperation of many state actors. This leads to a proliferation of “veto players” who each have the power to effectively block action (Tsebelis 2002). Because successful policy implementation often requires the joint execution of many smaller steps, the existence of many veto-wielding actors renders the implementation process highly susceptible to disruption, along the lines of Michael Kremer’s (1993) “O-ring” model of production. Importantly, the diffuse form is not merely political fragmentation, where power is divided among competing groups, but rather a structural condition of extreme interdependence among state actors.

While the effectiveness in practice of these nodal and diffuse forms likely depends on a range of factors, nodal forms of state organizational structure offer several general advantages for state capacity over diffuse forms. First, nodal organizational structures provide better mechanisms for *goal alignment and accountability*, because the success or failure of policy implementation efforts can be clearly tied to a limited number of key actors. In diffuse organizational structures, the large number of actors involved for each decision or task in the implementation process makes it difficult to ascribe credit or blame for outcomes to any particular actor. In the case of failure, state actors can resort to blame-trading, leading to a diffusion of ultimate responsibility (Weaver 1986).

Second, nodal organizational structures offer better mechanisms for *coordination* across the state. Nodal actors can integrate information and activities across multiple parts of the

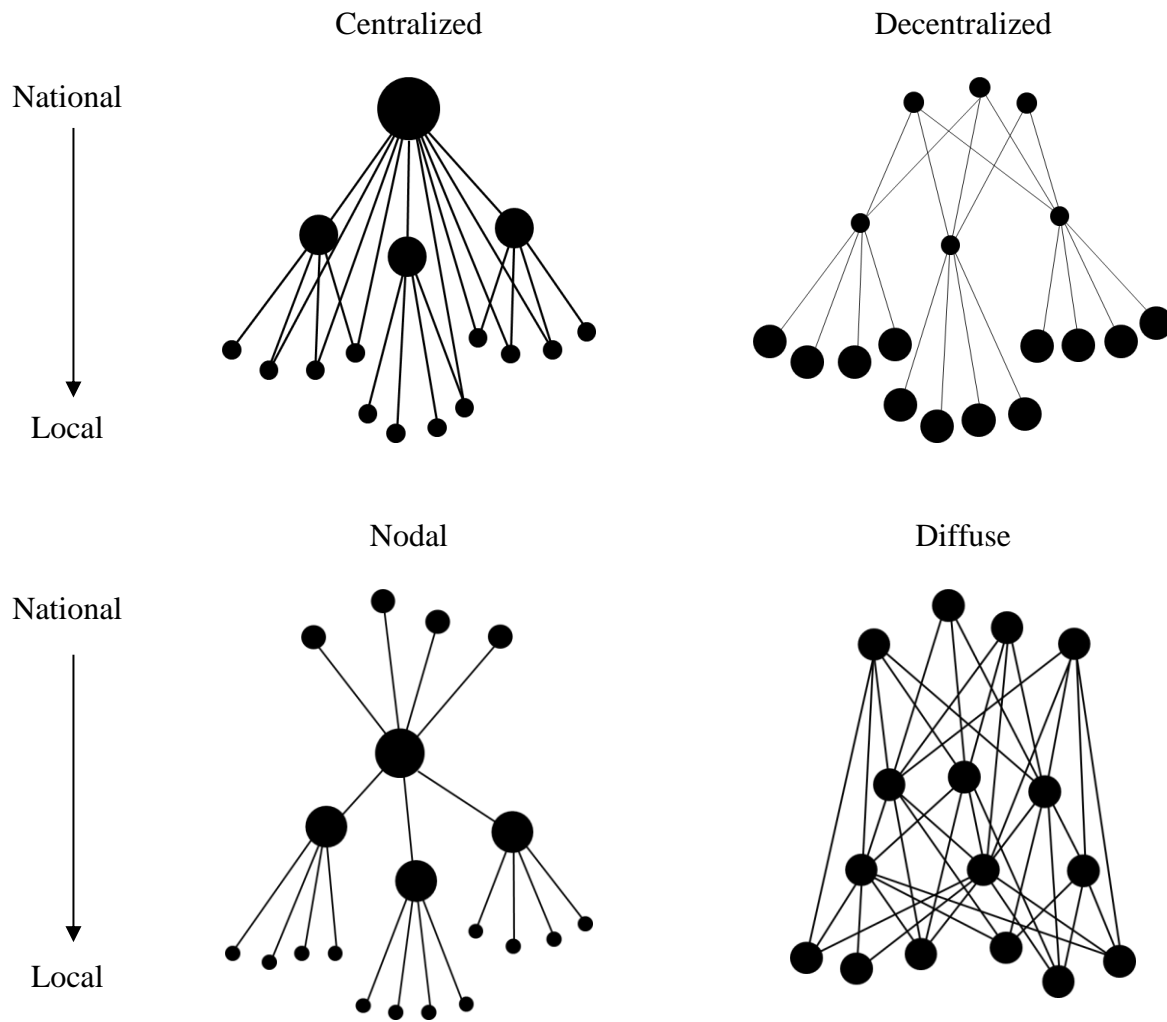


Figure 1. Stylized Representations of State Organizational Forms

Note: Circle sizes indicate degree of decision-making power for policy implementation.

bureaucracy and help resolve conflicts as they arise. Diffuse organizational structures, in contrast, lack any such mechanisms for coordination or conflict resolution. A lack of coordination between state organizations, or outright conflict between them, makes the execution of complex policy tasks even more challenging. Bureaucrats may find their greatest source of bottlenecks to be *other bureaucrats*, even within their own agency. Deeper conflicts can persist unresolved and impede bureaucratic functioning, requiring interventions by political leaders. Moreover, the coordinating role of nodal actors differentiates the nodal bureaucratic structure from the multidivisional form. Cross-functional and cross-jurisdictional nodal actors, which are absent from the multidivisional model, help coordinate the implementation of policies and projects that span multiple jurisdictions, such as regional infrastructure projects.

Third, nodal organizational structures provide greater *autonomy* to lower levels of the bureaucracy, resulting in more streamlined and responsive decision-making. Rather than waiting for approval from higher authorities, nodal actors at intermediary levels of the state can quickly adapt to changes in conditions on the ground. Diffuse organizational structures, in contrast, can produce many overlapping layers of rules and instructions that limit the autonomy of state actors. An overabundance of detailed rules and instructions, particularly from high-level actors far removed from the day-to-day problems of implementation, not only slows down administrative work by increasing compliance costs but also reduces risk-taking actions by bureaucrats who fear individual sanctions for potential rule violations.

Taken together, this nodal–diffuse typology offers several improvements over existing theories of the relationship between state structure and state capacity. The debate over centralization versus decentralization has shown there are trade-offs in adopting extreme versions of either approach, suggesting a possible inverted-U relationship between the degree of

decentralization and state capacity. The nodal structure offers a useful middle ground, combining the flexibility of greater decentralization with the coordination advantages of greater centralization. In addition, the nodal–diffuse typology marks a shift away from a top-down or bottom-up view of state action toward a more nuanced understanding of how power is distributed throughout the state more broadly, including across state bureaucracies. Building on work on bureaucratic politics and the rise of multidivisional organizational forms, this typology links the problem of bureaucratic structure with the problem of state structure. Lastly, this typology offers examples of the ways in which not only institutions but the very organizational structure of the state itself can be either “checking” (in diffuse forms) or “power-deploying” (in nodal forms), to borrow from Francis Fukuyama’s (2013) framing.

Two important qualifications must be made to this nodal–diffuse framework. First, these bureaucratic forms are not static but variable over time along a number of dimensions. For example, China’s political system has seen considerable shifts in power between central and local governments, between ministries and departments, and between Chinese Communist Party and state organizations over time. A primarily nodal bureaucratic structure can become more centralized over time, and vice versa. I discuss some factors that may drive these changes in the conclusion.

Second, the scope conditions for this nodal–diffuse framework are limited by policy area. Specifically, policy domains that involve the implementation of relatively “linear” projects—such as railways, ports, power plants, and physical infrastructure more generally—may benefit the most from the flexibility and coordination advantages of a nodal bureaucratic structure. Nodal structures may not work well in policy domains where constant feedback and dynamic readjustment are critical. For example, in regulatory policy spaces, such as environmental protection and financial

regulation, a diffuse structure may be more effective for sharing information across state entities and providing internal checks against corruption and regulatory capture. Indeed, the Chinese state's nodal structure in other sectors beyond railways may contribute significantly to its general strength in infrastructure development and its weaknesses in areas more susceptible to regulatory capture. Conversely, the Indian state's diffuse structure in sectors beyond railways, such as municipal utilities and power generation, may partly explain its broader weakness in infrastructure development, among other factors. A broader assessment of the bureaucratic structure of the Chinese and Indian states lies beyond the scope of this article but merits further investigation.

The rest of this article shows how these state organizational forms shape state capacity in practice through a comparison of the Chinese and Indian railway bureaucracies.

3. Case Selection and Methods

Railway infrastructure projects provide an excellent test of state capacity due to their scale, cost, planning complexity, and need for a high degree of coordination across many parts of the state, spanning both functional departments and governing jurisdictions. China's and India's railway bureaucracies, in particular, share several useful similarities that offer a degree of comparability. The railway sector in both countries is almost exclusively state-controlled. The railway bureaucracies in both countries are massive central-state organizations. Both share many Weberian features, including meritocratic systems of recruitment and promotion, officials with high levels of technical expertise who are motivated by long-term career incentives, and an operating model based heavily on formal rules and procedures.

However, I do not use a conventional "most similar" comparative research design (Lijphart 1971) because this article's aim is not to advance a monocausal explanation for differences in

railway outcomes between these two cases. Instead, the primary aim of this article is to explain how organizational structure shapes state capacity through a comparison of two empirical cases. Thus, I have selected China's and India's railway bureaucracies as cases because they represent paradigmatic examples of nodal and diffuse forms of state organizational structure, respectively. I use a two-case comparison to refine and articulate the salient features of each organizational type, both theoretically and empirically. To further leverage this comparative perspective, I conduct a parallel side-by-side comparison of the two cases at the level of specific causal mechanisms and pathways (Skocpol and Somers 1980).

This study draws on 24 months of fieldwork in China and India from 2017 to 2019, where I conducted over a hundred semi-structured interviews with current and former Chinese and Indian railway officials as well as industry experts. I interviewed railway officials at their workplaces and accompanied them on site visits. I was invited to present my work at India's Ministry of Railways. (No such invitation was extended to me in China.) During fieldwork, I reviewed thousands of pages of primary source materials, including detailed project documentation volumes, technical engineering manuals, procedural handbooks, state budgets, planning reports, environmental impact studies, bond prospectuses, and corporate filings. Most of these materials are publicly available. This study also uses a range of secondary sources, including international and domestic media reports as well as specialty railway publications.

4. State Railway Bureaucracies in China and India

This section provides an overview of the Chinese and Indian railway bureaucracies, highlighting key features that make them paradigmatic cases of the nodal and diffuse forms, respectively.

Section 5 provides a parallel comparison of these cases across three types of mechanisms that influence state capacity: goal alignment and accountability; coordination; and autonomy.

4.1 China's Nodal Railway Bureaucracy

China's railway bureaucracy exemplifies the nodal form of state organizational structure. At first glance, it may resemble a traditional bureaucratic hierarchy, with cross-cutting functional and regional subdivisions. However, a closer examination reveals a network structure where certain organizations and individual officials at the intermediary levels of the bureaucracy act as nodes of concentrated decision-making power and information flows. In many cases, a single key actor, such as a specific project corporation or China Railway Corporation (CRC) itself, serves as the principal nodal actor in coordinating work across the bureaucracy. This subsection describes these nodal actors and their role within China's bureaucratic structure in more detail.

The primary organization in the Chinese railway bureaucracy is CRC, a ministry-level state entity that operates China's national railway network (*People's Daily* 2013).¹⁸ CRC's headquarters in Beijing is responsible for overseeing train services and setting national policy in conjunction with the National Railway Administration, China's railway regulator (Figure 2). China's national railway network is divided into 18 geographical regions, each administered by a CRC regional railway bureau (Lawrence, Bullock, and Liu 2019, 8–9). These regional bureaus are responsible for day-to-day operations, and regional bureau chiefs enjoy a significant amount of decision-making power and autonomy within their sections of the network.¹⁹

¹⁸ The names of Chinese railway organizations may have changed since research was conducted.

¹⁹ Interview, Chinese railway engineering manager, December 22, 2018.

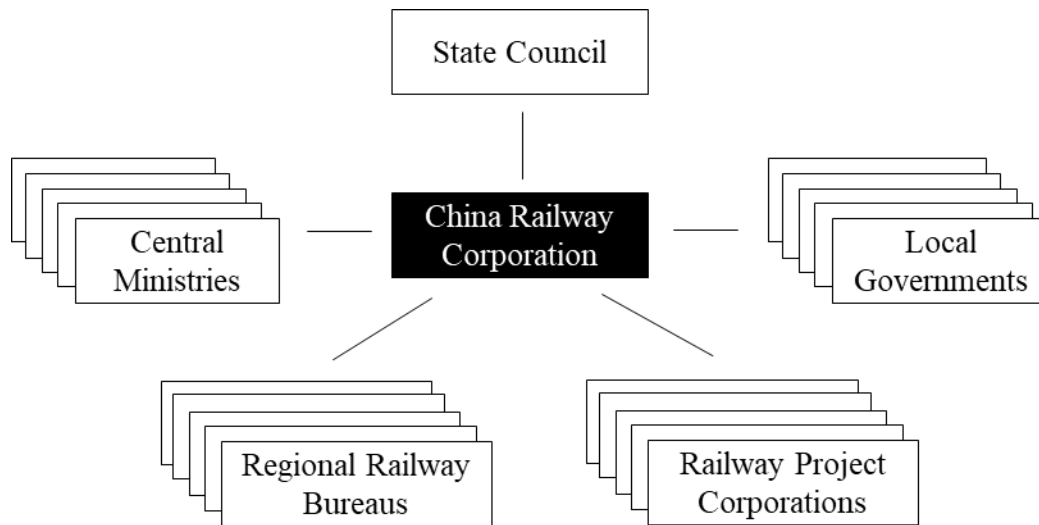


Figure 2. China Railway Corporation as a Nodal Actor within the Chinese State

Railway construction projects in China are carried out by a separate set of state entities called railway project corporations (Figure 3).²⁰ Typically structured as a joint venture between CRC and local governments, each project corporation acts like a general contractor, managing all aspects of a given railway project, including interfacing with higher-level ministries and officials, selecting and monitoring contractors, coordinating with local governments, managing project finances, and meeting project deadlines and budgets (China Railway Corporation 2015a). Each project corporation is led by a project manager, who oversees a tightly knit team typically consisting of 40–50 core staff.²¹ Project team members typically remain with the project from start to finish and reside onsite, often apart from their families, for the four-to-six years normally required to complete a project.²²

The archetype of a Chinese railway project corporation is the Beijing-Shanghai High Speed Railway Corporation, created in 2008 to manage the construction of the 1,300-kilometer high-speed rail line between China's two largest cities (Beijing-Shanghai High-Speed Railway Corporation 2014). It was formed as a joint venture between CRC and the province-level governments of Beijing, Shanghai, Hebei, Shandong, and Jiangsu (National Railway Administration of China 2014). The project corporation itself comprised approximately 100 staff who were responsible for coordinating all aspects of the project, from obtaining environmental approvals, to working with local governments for land acquisition and resettlement, to managing the bidding process for contractors (Beijing-Shanghai High-Speed Railway Corporation 2014). Primary construction work was divided into six major contracts awarded to state-owned civil

²⁰ In Chinese these are called railway joint-stock limited corporations (*tielu gufen youxian gongsi* 铁路股份有限公司). For clarity, I refer to them simply as project corporations.

²¹ Interview, Chinese railway planning official, September 22, 2017.

²² Ibid.

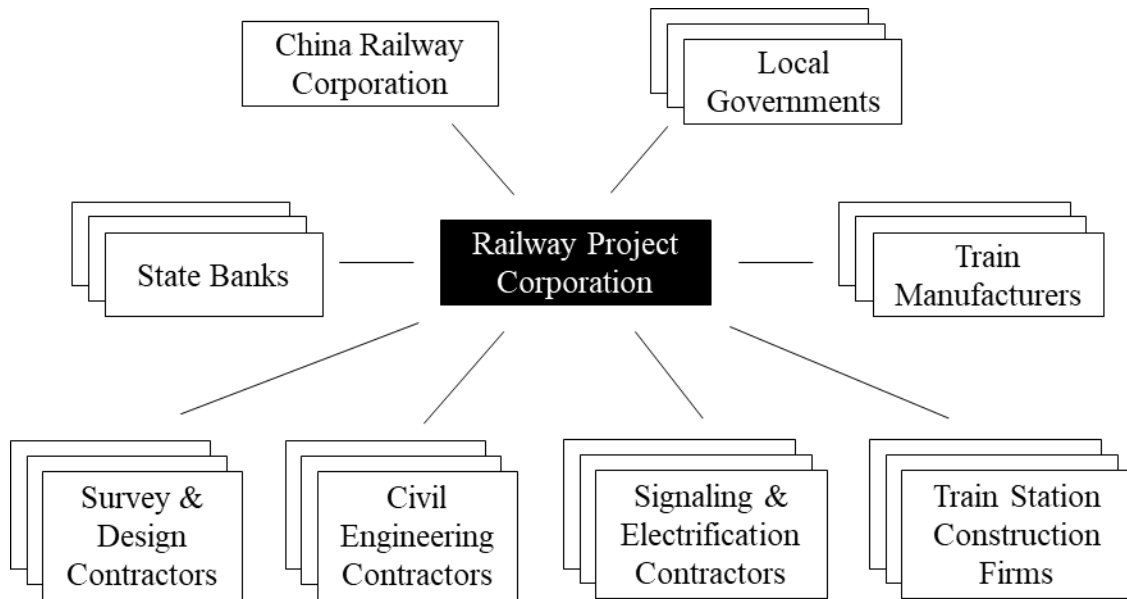


Figure 3. Chinese Railway Project Corporations as Key Nodal Actors

engineering firms through a competitive bidding process managed by the project corporation (ibid.). Ultimately, it was the project corporation that was responsible for completing the project according to the ambitious three-year timeline set by China's State Council.

State-owned contractors are another important set of nodal actors in the Chinese railway ecosystem. Contractors who work on railway projects are divided by functional specialty, such as survey and design work or civil engineering (Ministry of Railways, China 2009). Within any given functional area, state contractors tend to be limited in number (yet more than one, to avoid monopolies) and comparable in resources and technical capabilities (Chan 2022a). These contractors operate with a high degree of autonomy and compete for project work.²³ Contractors act as nodes by allocating work among their subsidiaries, coordinating with local government agencies, and reporting progress and challenges to the project corporation.²⁴ Once a project is underway, contractors are monitored and evaluated by the railway project corporation (China Railway Corporation 2018).

To summarize, China's railway bureaucracy is structured not simply as a top-down, centralized hierarchy but rather as a set of concentrated nodes of decision-making power and information flows. Nodal actors such as railway project corporations, state contractors, and the CRC itself play a crucial role in integrating project work across many parts of the railway bureaucracy and the Chinese state more broadly.

4.2 India's Diffuse Railway Bureaucracy

²³ Interview, former Chinese railway manager, September 18, 2017.

²⁴ Interview, Chinese railway project manager, January 22, 2019.

India's railway bureaucracy epitomizes the diffuse form of organizational structure, with many cross-cutting layers of authority. Even routine decisions and tasks often require buy-in from a wide range of departments, agencies, and individual officials up and down the bureaucratic hierarchy, each of whom can effectively block or delay action. This subsection outlines several of these cross-cutting authority structures that together lend India's railway bureaucracy its diffuse form.

The primary organization in India's railway bureaucracy is state-run Indian Railways, which operates India's national railway network under the auspices of the Ministry of Railways. The Railway Board in Delhi serves as the organization's bureaucratic leadership, working with India's politically appointed railway minister to oversee national railway policy and planning. Like the Chinese system, India's national railway network is divided into 18 geographical regions, each administered by one of Indian Railways' regional railway bureaus. Each regional bureau is led by a bureau chief who oversees departments specializing in train operations, maintenance, and construction projects within their section of the network.²⁵ Regional railway bureaus in India are also further divided administratively into sub-bureaus and train stations.

In addition to this "vertical" geography-based hierarchy, India's railway bureaucracy is organized "horizontally" across functional divisions, which include civil engineering, electrical engineering, and finance (Figure 4). Indian railway officials serve for the duration of their careers in one of these functional divisions, which originally stemmed from a need to ensure sufficient levels of technical expertise (Debroy et al. 2015). These functional divisions have been increasingly blamed for creating organizational "silos" and forming competing interest groups within the bureaucracy (90–92).²⁶ Indian railway officials tend to prioritize the interests of their

²⁵ In the Indian system, regional railway bureaus are called zonal railways, and bureau chiefs are called general managers. For clarity, I have simplified country-specific nomenclature.

²⁶ Interview, senior advisor to India's prime minister, July 6, 2018.

functional division over the goals of their regional bureau for a simple reason: individual promotions and transfers are determined by superior officials within one's functional division, not by one's bureau chief.²⁷ Chinese railway officials, in contrast, are promoted based on the overall success of projects and can move relatively freely across different parts of the bureaucracy, as long as they have a background in engineering.²⁸

Alongside these geography-based and functional structures, India's railway bureaucracy also follows an informal hierarchy of tenure-based seniority, per each official's recruitment year.²⁹ While seniority status retains some formal significance due to rules for promotion and retirement, its true importance lies in conditioning the interpersonal relations between railway officials in daily interactions. Indian railway officials are loath to challenge or confront their own subordinates when their subordinates have a longer service record in the bureaucracy.³⁰ Bureau chiefs occasionally find themselves in a position of authority over railway engineers with more years of service. This awkward dissonance between formal authority and informal seniority makes bureau chiefs reluctant to issue orders to some of their own engineers.³¹ The Chinese railway bureaucracy, by comparison, maintains relatively unambiguous lines of authority, as will be discussed in more detail later.

Each of these authority structures—geographical, functional, and tenure-based—offers a rational means of organizing India's railway bureaucracy on its own. But layered together, they form a dense thicket of power relations that intersect and, in many cases, clash. Individual officials are frequently torn between competing obligations or stymied in their work by other railway

²⁷ Interview, Indian railway deputy manager, August 22, 2017.

²⁸ Interview, Chinese railway researcher, December 13, 2018.

²⁹ Interview, former Indian railway manager, April 17, 2017.

³⁰ Interview, former Indian Planning Commission official, July 4, 2018.

³¹ Interview, Indian railway chief engineer, April 14, 2017.

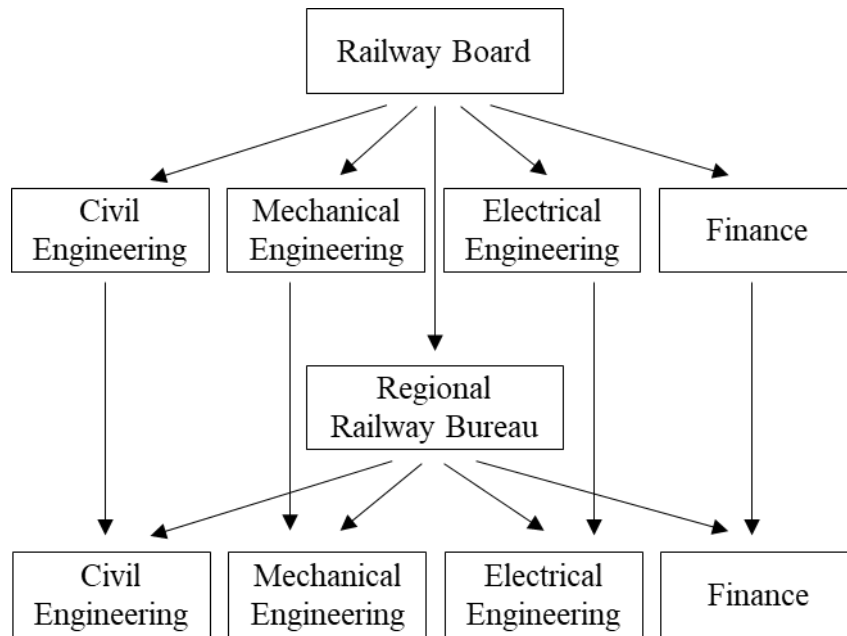


Figure 4. Functional Divisions within India's Railway Bureaucracy

Note: For clarity, not all functional divisions are included in this figure.

officials with opposing professional goals. The next section shows how these differing state organizational structures affect the abilities of the Chinese and Indian railway bureaucracies to implement railway projects.

5. The Effect of Organizational Structure on State Capacity

5.1 Goal Alignment and Accountability

The Chinese and Indian railway bureaucracies both have vast arrays of organizational subunits, each with its own objectives and areas of expertise. Ensuring that the goals of these organizational subunits align with overall state objectives while tying outcomes to specific actors is essential for the successful completion of railway projects.

In China's case, the nodal structure of its railway bureaucracy helps align the goals of various officials and agencies with the overarching goal of completing railway projects. Ultimate responsibility for Chinese railway projects lies with a handful of key nodal actors who are able to weigh trade-offs between various project goals, such as increasing expenditures to accelerate construction work or decreasing expenditures to remain within budget. Moreover, these nodal actors are able to integrate work across disparate groups into a coherent project-wide effort. In the end, this nodal structure enhances accountability by clearly tying a project's overall success or failure to a limited number of sufficiently empowered key actors.

The Beijing-Shanghai High-Speed Railway Corporation is a good example of how the nodal structure helps with goal alignment. As the primary state organization responsible for implementing the Beijing-Shanghai high-speed railway project, the project corporation served as the principal nodal actor across local governments, state banks, and contractors (Beijing-Shanghai High-Speed Railway Corporation 2014). Each of these actors had its own goals: local governments

wanted to minimize their own costs associated with the project; state banks wanted to ensure the timely repayment of loans; and contractors sought to keep their own operating costs low and construction delays to a minimum (*ibid.*). The project corporation played a central role in balancing these often-competing demands to achieve the overarching goals of the project.

China's nodal structure also strengthens accountability by placing ultimate responsibility for a project's success in the hands of a single actor: the project corporation. This plays an important role in the management of contractors, which may number in the dozens: bridge engineering contractors, tunneling firms, electrical signaling specialists, and so on. As several international experts with experience working on Indian railway projects explained to me, Indian Railways and its contractors often trade blame for construction delays.³² Such blame-trading is not possible in Chinese railway projects because Chinese project corporations have the authority to select or remove contractors. Thus, even when a contractor is the direct cause of a delay or a safety problem, this is treated as a management failure on the part of the project corporation for choosing an unqualified contractor in the first place.³³ For example, in the Shanghai-Kunming high-speed railway project, quality issues with a tunnel segment caused by several contractors resulted in harsh sanctions not only for the contractors but also for the project corporation itself, which was charged with "management failures" (China Railway Corporation 2017).

Chinese railway project corporations are linked directly to the success or failure of their projects through formal and informal means. Formally, each project is assessed by CRC along a set of standardized performance measures, including engineering quality, construction safety, adherence to project timelines, financial management, and adherence to environmental policies

³² Interviews, railway specialist at a multilateral lending institution, April 14, 2017; railway specialist at a multilateral lending institution, March 14, 2018.

³³ Interview, Chinese railway manager, December 22, 2018.

(China Railway Corporation 2015b). A project's overall score, weighted across these metrics, is then used to determine the financial compensation and promotion prospects of every member of the project corporation. Quality and safety issues are weighted particularly heavily, and major problems (such as a train accident resulting from subpar construction) can result in the barring of entire project teams from railway work. Informally, members of project corporations are tied to their projects through their professional reputations. Members of successful project teams are actively recruited for new projects, often with higher positions.³⁴ For particularly challenging types of projects, such as ones involving tunneling through mountainous terrain in southwest China, entire teams from previously successful projects are sometimes requested.³⁵

The diffuse structure of India's railway bureaucracy, in contrast, generates conflicting interests across different parts of the bureaucracy and reduces accountability by dispersing responsibility across a wide array of actors. Without nodal actors to weigh trade-offs between project goals, different departments and individual officials unilaterally pursue their own organizational subgoals at the expense of the overall project. Furthermore, overlapping authority structures make it difficult to resolve conflicts between competing interests within the bureaucracy. With many actors able to block project work but few able to resolve disputes, accountability for project outcomes is weakened as blame for problems or delays is shared across many actors.

This is most clearly seen in the conflict between Indian Railways' functional divisions. Railway infrastructure projects in India are carried out by regional railway bureaus, which in turn divide project work among their various functional departments. However, these functional departments have their own interests and goals. For example, civil engineering departments are evaluated on their ability to complete projects as quickly as possible, while finance departments

³⁴ Interview, Chinese railway planning official, September 22, 2017.

³⁵ Ibid.

are evaluated on their ability to keep project costs within budget.³⁶ These two goals are often in tension: meeting project deadlines may require greater spending on personnel and equipment, thereby risking going over budget. In a nodal structure, there would be a single nodal actor to whom both departments report that would settle such conflicts. In the Chinese case, this is the role of the project corporation and its head, the project manager.

The diffuse structure of India's railway bureaucracy, in contrast, provides no clear mechanisms for resolving conflicts between departments, frequently resulting in organizational gridlock and project delays. In theory, the regional bureau chief would be the logical "nodal actor" with the authority to manage such disputes. However, in practice, regional bureau chiefs are often powerless to intervene in interdepartmental disputes because their authority is undermined by the functional division system. Performance evaluations by superiors in the same functional division carry far more weight in promotion decisions than evaluations by regional bureau chiefs.³⁷ As a result, bureau chiefs lack the authority to stop their own finance officials from blocking budget requests from engineers. Because the entire railway bureaucracy is divided into functional divisions—even the Railway Board has seats allocated by functional division—there is almost no higher authority who can usefully mediate these disputes, except at the highest levels of the bureaucracy.

Indeed, some divisional conflicts within Indian Railways reach the highest levels of the organization. A well-known example is the long-standing tension between the electrical engineering division and the mechanical engineering division. The electrical engineering division has played the lead role in India's effort to convert existing railway lines from diesel to electric. However, this work was deliberately obstructed by mechanical engineers, who felt increasingly

³⁶ Interview, Indian railway finance official, August 22, 2017.

³⁷ Interview, former Indian railway manager, July 11, 2018.

marginalized and lobbied against funding for electrification projects.³⁸ The mechanical engineers ended their opposition after they were given a prestigious project of their own: India's first high-speed railway.³⁹ Electrical engineers then retaliated by delaying the launch of a new train model developed by the mechanical engineers (Das 2019). In the end, without a clear mechanism for aligning goals and resolving conflicts, India's railway projects suffer from frequent and persistent organizational disputes.

5.2 Coordination

Railway projects require a high degree of coordination across a wide array of actors. This includes coordination not only within the railway bureaucracy but also across ministries, departments, and agencies throughout the state more broadly.

In China, railway project corporations play a crucial role in coordinating project implementation across many state entities (Figure 3). Project corporations coordinate financing with state banks, land acquisition with local governments, and construction work with contractors (China Railway Corporation 2015a). They obtain permits and approvals in close cooperation with environmental agencies and local utilities (see e.g. China Railway Engineering Design and Consulting Group, 2016). For the Beijing-Shanghai high-speed railway, the main project corporation had to coordinate with a lengthy list of government bodies: the National Development and Reform Commission, Ministry of Science and Technology, Ministry of Public Security, Ministry of Finance, Banking Regulatory Commission, Ministry of Land Resources,

³⁸ Interview, former Indian Railway Board member, August 11, 2018.

³⁹ Ibid.

Transportation Ministry, Ministry of Information Industry, State Grid Corporation, and more (Beijing-Shanghai High-Speed Railway Corporation 2014, 25).

Work across all these areas must be finely synchronized given their interdependency and the heavy financial cost of even minor project delays. For example, project corporations must ensure that bridge and tunnel construction by contractors is completed at the same time as land acquisition work performed by local governments.⁴⁰ This ensures that tracklaying, electrification, and signaling can be completed as a single step. If a project encounters delays in land acquisition along one segment, the project corporation must quickly redirect contractors to continue work on a different segment.

CRC also plays a crucial coordinating role within the railway bureaucracy and across the Chinese state more broadly (Figure 2). Within the railway bureaucracy, CRC manages the allocation of resources and personnel across regional bureaus and railway project corporations.⁴¹ While these organizations operate relatively autonomously, CRC occasionally intervenes to ensure that competing interests, such as the distribution of shared maintenance costs, do not undermine the overall functioning of the railway system.⁴² CRC also plays a coordinating role in research and development. During the early years of China's high-speed rail program, China's then Ministry of Railways (CRC's predecessor) arranged partnerships between Chinese firms and foreign suppliers to facilitate the transfer of high-speed rail technology from industry leaders such as Siemens and Alstom (Gao, Li, and Zhen 2016; Wang 2012). The Ministry of Railways also worked with the Ministry of Science and Technology to establish specialized railway research centers at Chinese universities (Gao, Li, and Zhen 2016; *Xinhua News* 2008).

⁴⁰ Interview, Chinese railway manager, December 22, 2018.

⁴¹ Interview, Chinese railway researcher, September 12, 2017.

⁴² Ibid.

One of CRC's most important roles is coordinating railway project work with local governments. During the planning stage, CRC's managing director personally meets with the party secretary of each affected province to agree on future railway projects.⁴³ In face-to-face, closed-door meetings, the managing director and local government leaders negotiate project terms, including track alignment, station locations, and each province's financial contribution.⁴⁴ To monitor progress and resolve interagency conflicts, CRC often creates a project steering committee, known as a "leading small group" (*lingdao xiaozu* 领导小组), from key stakeholders such as local government leaders and department heads. Once project work is underway, much of these coordinating responsibilities with local governments shifts to the railway project corporation. High-profile disputes do still emerge, such as a widely covered disagreement over land acquisition for the Wuhan-Guangzhou high-speed railway (*People's Daily* 2009). Yet overall, the nodal structure of China's railway bureaucracy reduces the risk of disruptive conflicts and facilitates the integration of project work across many parts of the Chinese state.

The diffuse structure of India's railway bureaucracy, in contrast, makes coordination across state actors difficult and prone to delays. This can be most clearly seen in the fragmented process for environmental approvals. In India, railway projects typically require environmental permits from numerous central, regional, state-level, and local environmental agencies, including the Ministry of Environment and Forests (C. D. Singh 2009). The diffuse structure of the bureaucracy prevents any single official or set of officials from being sufficiently empowered to convene or liaise directly with these various environmental agencies.⁴⁵ Instead, this work is delegated to

⁴³ Interview, Chinese railway researcher, September 18, 2017.

⁴⁴ Ibid.

⁴⁵ Interview, Indian railway project manager, April 17, 2017.

lower-level railway bureaucrats, who must submit applications sequentially and wait months for each decision.⁴⁶

This diffuse structure makes coordination difficult even among railway entities. Rather than meeting formally to coordinate project work, Indian railway officials often resort to ad hoc bargaining with their colleagues, offering favors or promises of future accommodations within their areas of discretion. In many cases, however, they lack any meaningful leverage and are reduced to “begging” their colleagues to cooperate.⁴⁷ In interviews, Indian railway officials frequently expressed frustration at being powerless to convince other railway officials to complete tasks critical to their jobs.⁴⁸ This lack of coordination slows project implementation, as vital steps are mired in lengthy negotiations or blocked entirely.

Examples of this bargaining and begging can be found throughout the Indian railway bureaucracy. Finance officials wield outsized influence through their power to approve or deny spending requests. Other railway officials, even bureau chiefs, are mindful of the power of the finance officials within their own bureaus and thus careful to maintain good working relationships.⁴⁹ But in interviews, many railway officials from other functional divisions expressed resentment over needing to personally beseech financial officials for approvals, which frequently caused project delays.⁵⁰ In some cases, this lack of coordination within the railway bureaucracy leads to problems with safety. In one incident in 2017, failure to coordinate a suspension of train operations with maintenance work caused a train derailment that resulted in 23 deaths (Hasan and Hizbullah 2017). In this case, as in many others, the diffuse organizational structure of Indian

⁴⁶ Interview, Indian railway infrastructure director, April 21, 2017.

⁴⁷ Interview, Indian railway chief engineer, April 14, 2017.

⁴⁸ Interview, Indian railway manager, July 11, 2018.

⁴⁹ Interview, former Indian railway manager, August 10, 2018.

⁵⁰ Interview, Indian railway deputy chief engineer, August 22, 2017.

Railways kept parts of the bureaucracy separated, without any regular channels for feedback and communication.

5.3 Autonomy

Railway projects often require modifications and improvised problem-solving during the course of implementation. Sufficient autonomy among key actors allows faster and more flexible decision-making in response to unforeseen project challenges.

The nodal structure of China's railway bureaucracy provides significant autonomy for key actors at the middle levels of the bureaucracy. An industry-wide framework of rules and procedures formulated by CRC and China's National Railway Administration emphasizes standardized management practices and technical specifications that serve as implementation "blueprints" for railway projects. Within this general framework, nodal actors enjoy significant leeway in making project-level decisions, guided by these project "blueprints" and high-level goals rather than detailed rules and commands.⁵¹

This high level of autonomy applies to several sets of nodal actors in China's railway bureaucracy. Project corporations enjoy significant scope in project-level decisions, such as selecting and removing contractors, altering track alignment, or modifying budgets, all within a prescribed range.⁵² In many cases, final authority rests with the individual project manager, which enables more responsive decision-making without a wait for higher-level approvals.⁵³ Besides

⁵¹ Interview, former Chinese railway manager, September 18, 2017.

⁵² Interview, Chinese railway researcher, September 12, 2017.

⁵³ Ibid.

conducting project evaluations and inspections, CRC rarely intervenes in day-to-day implementation work, leaving project corporations relatively free to problem-solve on their own.⁵⁴

Chinese state-owned contractors also act as nodes that enjoy significant autonomy for their sections of projects. For example, civil engineering contractors are typically awarded construction work for sections of track ranging from 50 to several hundred kilometers in length. Each contractor has the freedom to complete its section however it deems fit, as long as overall specifications and timelines are met.⁵⁵ These contractors often further subdivide work across their own teams and act like project corporations “writ small.” Project corporations do closely monitor their contractors through specialized supervisory firms and a standardized performance evaluation system.⁵⁶ But in general, they refrain from meddling with the day-to-day work of their contractors, except in rare cases when an emergency intervention is deemed necessary.⁵⁷

The diffuse structure of India’s railway bureaucracy, in contrast, creates many overlapping layers of detailed rules, even for trivial tasks, leaving railway officials little room for autonomous decision-making. This can be seen most clearly in the intricate sets of rules that govern India’s regional railway bureaus, known as the Schedule of Powers.⁵⁸ These rules, printed in volumes running hundreds of pages in length, delineate in exacting detail the legal scope of authority of each category of railway official for each task within the bureau.⁵⁹ Authority for routine spending decisions is tightly controlled, down to the level of individual food items and office supplies. For example, spending on catering equipment is capped at \$6,800 per year, and purchases of milk and

⁵⁴ Interview, Chinese railway project manager, January 22, 2019.

⁵⁵ Interview, Chinese railway researcher, March 29, 2018.

⁵⁶ Interview, railway specialist at a multilateral lending institution, March 14, 2018.

⁵⁷ Interview, Chinese railway accountant, December 20, 2018.

⁵⁸ Interview, Indian railway chief engineer, April 20, 2017.

⁵⁹ Examples in this paragraph are drawn from the Model Schedule of Powers published by India’s Railway Board (2018), which serves as the template for India’s regional railway bureaus.

eggs must not exceed \$1,300 per event (Ministry of Railways, India 2018, E26–29). Spending on rubber stamps and embossing seals is limited to \$14 per item (C7). Each of these spending limits is further segmented by officer grade.

Certain departments within India’s regional railway bureaus also have their own similarly exhaustive Schedule of Powers. One such schedule lays out itemized spending limits for flower vases, pen stands, and ink cartridges, differentiated by officer grade (Northeast Frontier Railway 2014, 53). Layered on top of these rules are a set of industry-wide General Rules from the Ministry of Railways that are also overly detailed and constraining. They even include *rules about rules*, such as rule 2.02(b), which specifies that all railway officials must be able to produce a copy of the General Rules when ordered by a superior officer. Together, these many layers of detailed rules ultimately stem from, and further exacerbate, a climate of distrust and concern about corruption, which will be further discussed later.

As a result, Indian railway officials are often forced to either seek time-consuming approvals from higher authorities or follow these intricate rules and procedures, which not only causes delays but also compromises project quality. One railway official explained that he often felt compelled to “do the correct thing rather than the right thing,” rigidly adhering to bureaucratic rules rather than making decisions he knew would be more beneficial to the project.⁶⁰ When selecting contractors, officials stick to formal procurement rules that require contracts to be awarded to the lowest bidder even when the quality and value of other suppliers are known to be superior.⁶¹ In land acquisition work, Indian railway officials follow a statutory formula for compensation rates even when they know it grossly underestimates land values—which often

⁶⁰ Interview, Indian railway project manager, April 21, 2017.

⁶¹ Interview, Indian railway construction engineer, April 14, 2017.

triggers protests and causes project delays.⁶² Limited autonomy results not only in exasperated bureaucrats but also in difficulties with completing railway projects.

Before concluding this section, the issue of corruption must be addressed. More space for autonomous decision-making also means more room for the potential abuse of power. Corruption is known to be widespread in both the Chinese and Indian railway bureaucracies. In China, a large-scale corruption investigation and a major high-speed train accident in 2011, culminated in a lifetime prison sentence for then railway minister Liu Zhijun and the dissolution of the Ministry of Railways (Tjia 2016). In India, the railway sector consistently ranks near the top for number of corruption-related disciplinary actions, even after accounting for its size (Central Vigilance Commission, India 2018).

While both countries have institutions for combatting corruption in the railway sector, in India these institutions are frequently abused in ways that undermine the functioning of the bureaucracy. Corruption investigations in India's railway bureaucracy are often "weaponized" to carry out personal vendettas among officials.⁶³ Anyone targeted by a corruption probe becomes "a passenger in his own position," in the words of one interviewee, effectively sidelined for the duration of the investigation.⁶⁴ Other officials avoid working with that person for fear of becoming targets themselves. The "fear of being questioned" hangs like a sword of Damocles over every Indian railway official, producing a "chilling effect" that stifles risk-taking and reinforces rigid rule-following.⁶⁵

China's railway bureaucracy, in contrast, appears to be relatively effective despite widespread corruption, mirroring the paradox of high corruption and high performance found in

⁶² Interview, Indian railway infrastructure director, April 21, 2017.

⁶³ Interview, former Indian railway manager, August 9, 2018.

⁶⁴ Interview, former Indian railway manager, September 19, 2018.

⁶⁵ Interview, Indian railway manager, August 22, 2017.

China more generally (Ang 2020; Rothstein 2014; Wedeman 2012) as well as other parts of East Asia (Khan and Sundaram 2000; Wedeman 2002). The Chinese railway bureaucracy's nodal structure may partially explain this puzzle in the railway sector. Clear lines of accountability, as described earlier, force actors in China's railway system to ultimately deliver on concrete project results, even if there is some diversion of resources along the way. In addition, China's anti-corruption institutions, such as the Central Commission for Discipline Inspection, seem more concerned with high-level graft and rarely interfere with day-to-day project work.⁶⁶ While a more precise discussion of the relationship between performance and corruption lies beyond the scope of this article, the cases of China's and India's railway bureaucracies suggest that organizational structure may play an instrumental mediating role.

6. Conclusions

This article has presented a new typology of state organizational structure—nodal versus diffuse forms—and has shown how these contrasting organizational forms affect the ability of states to carry out policy goals. I examined the specific mechanisms by which this occurs through a study of two paradigmatic empirical cases: the state railway bureaucracies of China and India. Using a side-by-side comparison, I showed how the nodal structure of China's railway bureaucracy facilitates the completion of railway projects by providing mechanisms for coordination and accountability while the diffuse structure of India's railway bureaucracy hinders railway work by

⁶⁶ Interview, Chinese railway accountant, December 15, 2018.

making these same processes more difficult. These findings suggest that the organizational structure of state bureaucracies plays an important yet under-studied role in shaping state capacity.

This article also sheds light on the important mediating role that bureaucratic organizations play in center–local state relations. State bureaucracies often span multiple levels of governance and serve as important sites of interaction between the central state and local governing institutions. As the Chinese and Indian cases show, the relationship between central and local state actors can vary dramatically in their bureaucratic configuration, ranging from a more top-down approach, as in Indian Railways, or a set of center–local joint ventures, as in China’s railway project corporations. Future work on center–local state relations would benefit from a closer examination of bureaucratic organizations as a key area of interface.

Several related questions must be raised. First, how do state organizational forms interact with the broader structure of the state? The Chinese state is “unitary” in structure: nearly all lower levels of government are appointed by the next-higher level in the state hierarchy, culminating in central party-state control in Beijing. This unitary state structure supports China’s nodal railway bureaucracy by providing instruments, such as personnel appointments, for ensuring cooperation by local governments and other state agencies. In contrast, the Indian state is a “federal” political system, where subnational governments are elected locally rather than appointed centrally. This exacerbates the problems of India’s diffuse railway bureaucracy by limiting channels for compelling cooperation by other state actors.

Second, where do state organizational forms come from, and how do they spread between and within countries? Scholarship on policy diffusion (e.g., Dolowitz and Marsh 2000) points to imitation and learning as one such set of processes, such as China and India’s imitation of the Soviet planned economy or late Tokugawa and Meiji Japan’s careful study of European institutions.

Coercion is another, such as legacies of colonial rule. State organizational forms can also emerge through less directed processes, such as the gradual accumulation of many layers of political compromises (Mahoney and Thelen 2009).

Finally, state structure itself is endogenous to state capacity. The creation, adoption, or spread of new state organizational forms often encounters staunch resistance from existing stakeholders, and the Chinese and Indian railway bureaucracies are no exception. China's former Ministry of Railways famously resisted reform efforts by Chinese Communist Party leaders for years, until a major train accident and corruption investigation finally ousted the railway minister. While many of the structural problems of India's railway bureaucracy described in this article are widely recognized by the Indian railway officials I interviewed, efforts at organizational change face resistance at every level of the bureaucracy. Ultimately, a deeper form of state capacity—the ability of the state to change itself—requires further research.

Chapter 3

Inside China's State-Owned Enterprises: Managed Competition through a Multi-Level Structure

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Introduction

China's state-owned enterprises (SOEs) matter more than ever. As some of the largest companies in the world, making up 92 of the Fortune Global 500 (Kennedy 2020), China's SOEs form the backbone of the Chinese economy, making up roughly a quarter of GDP.⁶⁷ While China's dynamic private firms tend to dominate news headlines, it is China's SOEs that run key sectors from energy to telecommunications and build most of China's modern infrastructure. These same SOEs are also major players in China's efforts to exert influence abroad, including infrastructure projects associated with the Belt and Road Initiative (BRI). The scale and reach of China's largest SOEs, not to mention their influence in shaping China's domestic politics (Ye 2019; He 2019), render

⁶⁷ A World Bank estimate placed the share of China's GDP in 2017 attributable to SOEs in the range of 23–28% (C. Zhang 2019).

them a geopolitical force in their own right. Moreover, SOEs lie at the heart of China's industrial policy and technology upgrading efforts, featuring prominently in the "Made in China 2025" program (Zenglein and Holzmann 2019). Yet, despite their far-reaching global impact, China's SOEs continue to be understudied.

This article sheds light on the internal structure and operations of China's powerful central SOEs (known as *yangqi* 央企) and their system of "managed competition". While mega-mergers and consolidation among China's central SOEs have received significant attention (O'Connor 2018; Leutert 2016; C. Li 2016), a closer look inside these corporate giants reveals an elaborate multi-level structure of parent companies and subsidiaries. It is often the subsidiaries that are the primary operating entities, vying directly for business and carrying out project work with a significant degree of autonomy. Their parent SOEs play a coordinating role, reallocating resources and managerial personnel across subsidiaries to maintain a balance in competitive capabilities across firms. Through this multi-level structure, China's SOE system attempts the difficult balancing act of harnessing the forces of competition while intervening to ensure a robust field of competitors.

To understand how China's approach to managed competition works in practice, this article takes an in-depth look at China's infrastructure construction sector where this system can be seen most clearly. This sector is dominated by two large SOEs, China Railway Group Limited (CREC) and China Railway Construction Corporation (CRCC), currently the 42nd- and 51st-largest companies in the Fortune Global 500, respectively (Fortune Magazine 2020). Formerly part of the Ministry of Railways, CREC and CRCC are not only the principal builders behind China's high-speed rail system but are in fact the main civil engineering firms for many types of infrastructure projects, including highways, subways, bridges, tunnels, and buildings. CREC and CRCC are also

major players in BRI projects abroad, from high-speed railways in Malaysia and Saudi Arabia to highways and subway lines in Kenya and Pakistan.

This article begins by describing existing work on China's SOEs, which is often framed by the question of whether China's SOEs are moving toward a private-sector model or returning to a more statist approach. This article then describes an alternative approach I call "managed competition", which fits neither model but better characterizes China's current SOE system. The next section shifts to an empirical case study of CREC and CRCC, drawing on interviews with dozens of industry participants and experts as well as thousands of pages of project documentation, contract records, bond prospectuses, and other corporate materials gathered during a year of fieldwork in China. A detailed examination of these firms shows how managed competition works in practice, including key processes such as the performance evaluation system and the allocation of management personnel. This article concludes by discussing the implications of this system of managed competition for China's domestic economy and China's influence on the global stage.

China's SOEs: Beyond "state versus market"

Much research on China's SOEs is framed around the question of whether China is moving toward a more market-oriented model or bringing back elements of its former statist approach. A wave of SOE reforms in the 1990s and 2000s led some observers to believe that China was heading toward a more market-oriented economic model (Prasad and Rajan 2006; Lardy 2014; Lau, Qian, and Roland 2000). Scholars pointed to the receding role of SOEs in the economy, giving way to a dynamic and rapidly growing private sector (Lardy 2014). At the same time, SOEs themselves were being restructured in ways that resembled their private sector counterparts. In the late 1990s and early 2000s, a wave of "decoupling" separated administrative entities from the Chinese

Communist Party (CCP) or the Chinese state bureaucracy and converted them into more autonomous “corporations” (C. Li 2016; Aivazian, Ge, and Qiu 2005). Subsequently, many SOEs listed shares publicly on the Hong Kong and Shanghai stock exchanges, although in reality this mainly served to bring in passive private capital while preserving state control (Y. Wang 2015). Following a new set of corporate laws in 2002, the corporate governance structures of China’s SOEs began to resemble those of the private sector, including the formation of corporate boards and external directors (Rosen, Leutert, and Guo 2018).

More recently, however, analysts have observed several trends that suggest a possible return to elements of the statist approach of the pre-reform era. The first trend is a wave of mega-mergers among central SOEs that began in the early years of the central State-Owned Assets Supervision and Administration Commission (SASAC) in the early 2000s⁶⁸ and has accelerated in recent years (Leutert 2016; Yu 2019). The second trend is an increase in references to the centrality of the state’s role in the economy in official discourse, signaling a continuing if not expanding role for SOEs (Lardy 2019, 19–20). While China has begun to soften its official rhetoric on industrial policy after international backlash to its “Made in China 2025” program (Martina, Yao, and Chen 2018), there is little indication that the substance of China’s push for greater state involvement in core sectors of the economy has changed. The third trend is the rise of party cells within private firms, including some foreign firms (N. Thomas 2020). While this shift does not directly affect SOEs, it has been interpreted as a possible reassertion not only of the state but specifically party control in all aspects of the economy. While the question of whether China’s SOEs are moving toward a more market-oriented or statist approach can provide a useful framing, it runs the risk of

⁶⁸ To be certain, China has been consolidating SOEs and trying to build national champions since at least the early 1990s, if not earlier. See Nolan (2001b).

overlooking major changes in the structure and operations of China's SOEs that do not fall neatly within either paradigm.⁶⁹

Managed competition

The usefulness and dangers of competition feature prominently in Chinese state discourse. On the one hand, competition is seen as a useful tool for motivating improvement and innovation in both government administration and commercial activity. On the other hand, “vicious competition” (*e'xing jingzheng* 恶性竞争) or “excessive competition” (*guodu jingzheng* 过度竞争)—such as unsustainable price wars or wasteful overinvestment—are seen as harmful to industry stability and society at large. Thus, China's leaders have a preference for what is often referred to in official language as “orderly competition” (*youxu jingzheng* 有序竞争), particularly in critical sectors of the economy such as energy and industrial goods.⁷⁰

The idea of “managed competition” has been previously discussed in the scholarly literature on China's SOEs but never formally defined. Scholars have observed that competition within strategic sectors—such as defense, telecommunications, and commercial aviation—tends to be limited to a small number of core SOEs (Pearson 2005; Naughton 2010; Nolan 2001a). Margaret Pearson (2005: 316) used the term “structured competition” to describe a set of unwritten “normative preferences” for the “state-driven creation of market structure”. Barry Naughton (2010: 448) used the terms “managed competition” and “structured competition” to describe the Chinese state's “precarious balancing act” between harnessing the productive forces of market competition

⁶⁹ To be sure, some scholars have long advocated for a shift away from this dichotomy, e.g., Nolan and Wang (1999).

⁷⁰ One of the earliest uses of the term “orderly competition” in official discourse was in a 1993 State Council resolution on financial system reform (State Council 1993).

and ensuring that state firms ultimately serve the “public interest”. Beyond China, the idea of managed competition has a history in the post-World War II development experiences of several East Asian countries, including Japan and South Korea (Kushida and Oh 2007). Bai Gao has traced a connection between Japan’s postwar industrial strategy of “organized competition” (B. Gao 1997, 51–56) and China’s current preference for “oligopolistic competition” in the train manufacturing sector (B. Gao 2016, 81).

Building on these ideas, I argue that China’s current SOE system is best characterized as a system of “managed competition”, which can be understood as consisting of two complementary parts. First, there is an effort to ensure that there exists more than one viable SOE in each sector and that there is meaningful *competition* among these SOEs within the domestic market. This contrasts with the pre-reform system of sector-level state monopolies, which suffered from weak incentives for innovation and soft budget constraints (Kornai 1986). Second, competition among SOEs is *managed* through the reallocation of personnel and resources across firms to ensure a core set of competing firms with relatively similar capabilities. While the idea of limiting competition to a handful of firms with sufficient scale and capabilities has been previously discussed (Pearson 2005; Naughton 2010; Nolan 2001a), less attention has been paid to the process of active balancing. In order to maintain a robust level of competition and prevent any single firm from becoming too dominant, several levers are used by state agencies and SOEs to ensure that there are multiple, similarly capable competitors in a given sector. These levers include management reshuffling, controlling access to financial resources (e.g., state bank loans), reallocating material resources (e.g., machinery and equipment), sharing intellectual property and technical know-how, and demand-side balancing (e.g., through the awarding of contracts for public projects).

Multi-level structure

At the heart of China's system of managed competition is a multi-level structure for SOEs consisting of parent SOEs and multiple tiers of subsidiaries. At the highest level, there are typically a limited number of large first-tier parent SOEs within a given sector. Each parent SOE oversees a set of second-tier subsidiaries that tend to be relatively similar in size, structure, and capabilities. It is these second-tier subsidiaries that are the key operating actors, enjoying significant autonomy and competing with one another directly for business. Parent SOEs “manage” competition among subsidiaries in two ways. First, they monitor the performance of their subsidiaries and hold them accountable through a formal evaluation system. Second, they allocate management personnel and redistribute resources across subsidiaries to maintain a balanced playing field, ensuring that all subsidiaries remain similarly competitive and that no subsidiary becomes too strong to dominate the market or too weak to survive. Second-tier subsidiaries are often large corporate “groups” (*jituan* 集团) themselves that in turn oversee their own sets of third-tier subsidiaries. These third-tier subsidiaries, however, are not autonomous corporate entities and function more like departments or branches of the second-tier subsidiaries.⁷¹

One forerunner to this multi-level structure was the “general corporation” (*zonggongsi* 总公司) system of the 1980s (C. Li 2016). During this period, industry-wide umbrella SOEs were formed to provide a degree of coordination across production units but were also seen as another unnecessary layer of bureaucracy (C. Li 2015, 49–56). Another forerunner was the “group company system” (Hassard, Sheehan, and Morris 1999; M. W. Meyer and Lu 2005; Morris, Hassard, and Sheehan 2002; Hassard et al. 2010), also known as “enterprise groups” (*qiye jituan*

⁷¹ There may be more tiers of subsidiaries, but a three-level structure is common.

企业集团) (Nolan and Wang 1999; C. Wu 1990; Nolan 2001a, 2001b), that began in the steel industry in the early 1990s. These enterprise groups consisted of a parent SOE and a set of subsidiaries that were “connected through capital” (Nolan and Wang 1999, 189). Subsidiaries were “responsible for their profits and losses”, operating with “some degree of management autonomy” and “free to look for markets anywhere” (Hassard, Sheehan, and Morris 1999, 71). At the same time, subsidiaries maintained “a fairly close relationship with the parent company”, which in turn retained ultimate control and allocated personnel across subsidiaries (Hassard et al., 1999: 71).⁷²

While some features of these early SOE systems have continued to the present, there are important differences with today’s multi-level structure. One difference is the role of the subsidiaries. When enterprise groups first emerged, group subsidiaries were “mainly supplier firms” to the parent company (Nolan and Wang 1999, 189). Today, however, the subsidiary SOEs are the primary business operators and are often corporate groups themselves with their own networks of subsidiaries and suppliers. Another difference is the role of the parent SOEs. China’s earlier push for enterprise groups focused on generating sufficient economies of scale to produce “national champions” in the mold of Japan’s powerful business conglomerates (Nolan 2001b). While the fostering of national champions remains a key goal (Lin and Milhaupt 2013; Yu 2019), the role of parent SOEs has evolved to include both a unified outward-facing profile and the active management of “internal” competition within the industry.

⁷² There is also a parallel with SASAC itself, which can be regarded as another level in China’s multi-level SOE structure above the first-tier parent SOEs. Central SOEs under SASAC ownership enjoy a relatively high level of autonomy in their operations and are largely responsible for their own profits and losses. SASAC plays a monitoring and coordinating role, allocating top managers across the SOEs under its control in conjunction with the party’s Central Organization Department (Brødsgaard, 2012, 2020; Leutert, 2018; Leutert and Vortherms, 2021; Lin, 2017). Parent SOEs thus function in part as “mini SASACs” with one key difference: the corporate leaders at the top of parent SOEs tend to be industry experts, often rising through the ranks in their sector (Lin, 2017), whereas SASAC itself does not necessarily possess this domain expertise.

This section has provided a brief sketch of China’s multi-level SOE structure. The next section looks in detail at how this works in practice through the case of China’s two main infrastructure construction SOEs.

Case study: China’s infrastructure construction SOEs

A three-level structure

Much of China’s modern infrastructure, including its high-speed railway system, has been built by a set of infrastructure construction SOEs with a three-level structure (see Figure 1).⁷³ The first level consists of two large SASAC-owned parent SOEs: CREC and CRCC.⁷⁴ CREC and CRCC were formerly part of the Ministry of Railways with roots extending back to the Railway Corps (*tiedaobing* 铁道兵) of the People’s Liberation Army during the Chinese Civil War.⁷⁵ As part of a broader wave of administrative “decoupling” in the late 1990s and early 2000s (C. Li 2016), these civil engineering organizations were separated from the Ministry of Railways and converted into autonomous SOEs.⁷⁶ Today, CREC and CRCC are sprawling conglomerates with a global presence, playing a key role in BRI projects from highway construction in Kenya and Bangladesh to railway development in Serbia and Indonesia. Because both CREC and CRCC are publicly listed on the Hong Kong and Shanghai stock exchanges, they are often referred to as the “share companies” (*gufen gongsi* 股份公司) in the industry shorthand.

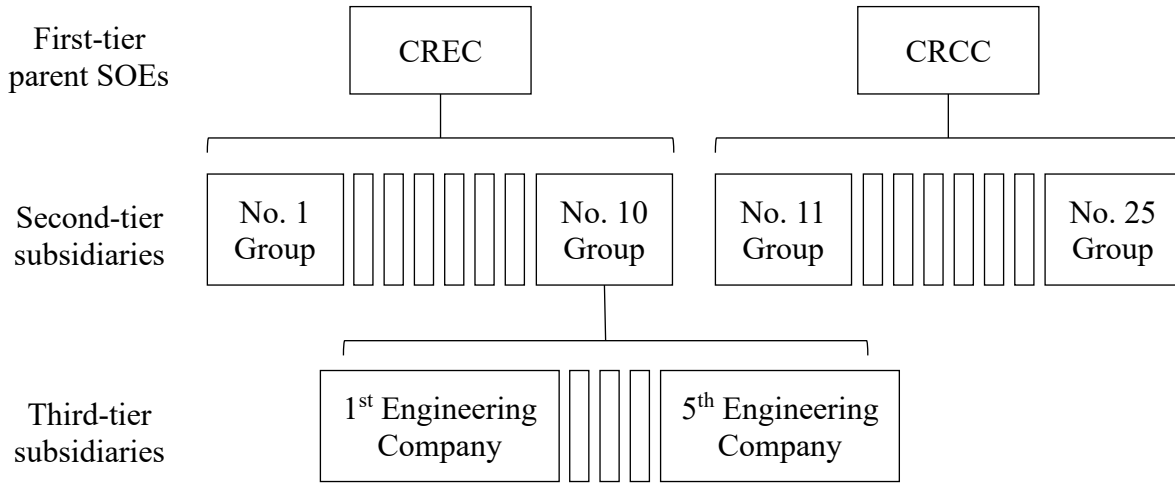
⁷³ On the role of these firms in China’s high-speed rail program specifically, see Chan (2022).

⁷⁴ Although CREC and CRCC both have the phrase “China Railway” in their names, they are separate organizational entities from the company China Railway, which is also a central SOE and is the primary operator of China’s national railway system.

⁷⁵ The military legacy of China’s state-run railway sector continues to shape its culture to the present day, which is known for being closed off to industry outsiders. For a history of China’s railways, see Köll (2019).

⁷⁶ On China’s railway reforms, see Tjia (2016).

Figure 1. The three-level structure of China's infrastructure construction SOEs.



Notes:

Non-core subsidiaries are not shown in figure.

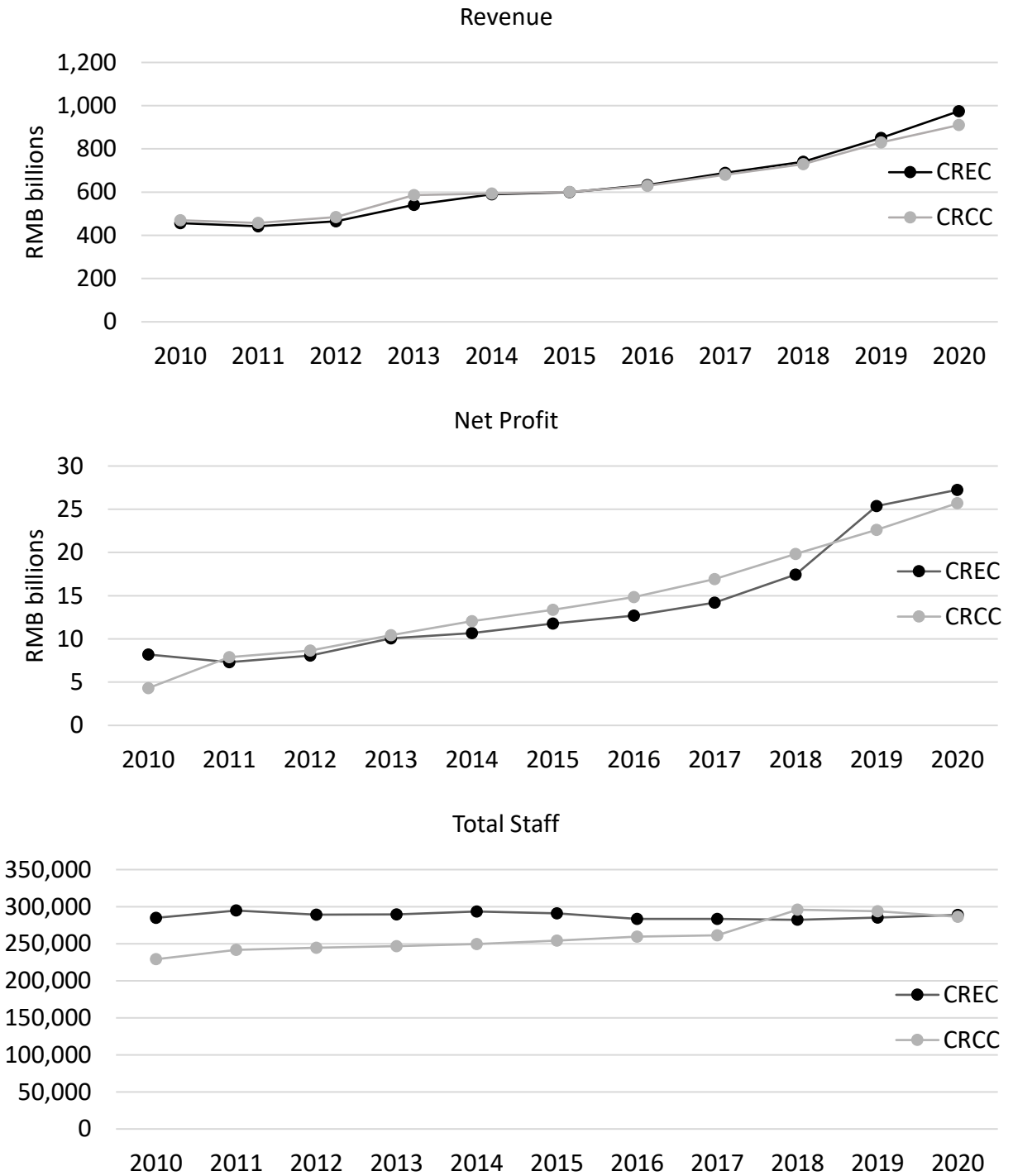
Already at the level of the parent SOEs we find some indication of managed competition at work: CREC and CRCC are strikingly similar on a range of dimensions and remain relatively balanced over time as the industry's two main rivals. CREC and CRCC each have annual revenues of approximately US\$120 billion and a total staff of around 280,000 (see Figure 2). Indeed, CREC's and CRCC's annual revenues remain remarkably similar over time, staying within 10% of each other from 2010 to 2020. Their net profits and number of employees also remain comparable to each other over time. While direct evidence for active balancing between CREC and CRCC is lacking, their remarkably convergent growth trajectories in a rapidly changing industry suggest some degree of intervention.

The second level in this multi-level SOE structure consists of CREC's and CRCC's subsidiaries. These subsidiaries are the primary operating companies in China's infrastructure construction sector, carrying out the actual construction work itself and competing directly for project contracts. Across both CREC and CRCC, there are 25 core infrastructure construction subsidiaries along with a set of non-core subsidiaries that include survey and design firms, machinery and equipment manufacturers, and financing and real estate groups. Table 1 provides a list of the 25 core subsidiaries and a summary of their key characteristics. The names of core subsidiaries follow a numerical naming convention that reflects their historical roots as engineering bureaus within the former Ministry of Railways. The first ten subsidiaries (No. 1 Group to No. 10 Group) belong to CREC, and the last fifteen subsidiaries (No. 11 Group to No. 25 Group) belong to CRCC.⁷⁷

These core second-tier subsidiaries are similar in size, resources, and capabilities. As Table 1 shows, their numbers of employees, annual production capacity, total assets, and even

⁷⁷ For clarity, I refer to core second-tier subsidiaries with the naming convention "No. X Group". Their English names are inconsistent across official documents.

Figure 2. Revenues, net profits, and total staff for CREC and CRCC, 2010-2020.



Source: Company annual reports.

total pieces of construction equipment all lie within a narrow range with no single firm appearing exceptionally strong or weak. As parent SOEs, CREC and CRCC play a crucial role in assuring that competition among these subsidiaries remains robust and relatively balanced through the redistribution of resources and personnel. One means of achieving this is through investment by parent SOEs in the acquisition of certain types of expensive machinery on behalf of subsidiaries. Another perhaps more important means is the sharing of technical expertise and construction know-how by parent SOEs across subsidiaries. For example, in the early years of China's high-speed rail program, second-tier subsidiaries were often paired with foreign firms such as Germany's Max Bögl Group and the Obermeyer Group to learn construction techniques for ballastless track and specialized railway switches (Wuhan–Guangzhou High-Speed Rail Corporation, 2012). This knowledge was then diffused across subsidiaries via formal technical manuals as well as informally through the circulation of personnel between firms. The net result of this large number of similarly well-qualified subsidiary competitors is not only a competitive bidding market for construction contracts but also a deep reserve of “interchangeable parts” should one firm need to be replaced for any reason after project work is already underway.

Core second-tier subsidiaries are sizeable SOEs in their own right, each employing over 10,000 staff. Structured as corporate groups (*jituan gongsi* 集团公司), these second-tier subsidiaries oversee their own set of subsidiaries and branches and operate with a significant degree of autonomy. Second-tier subsidiaries are not limited in their geographic scope and bid on project contracts across the country and around the world. Table 2 shows a sample of Chinese domestic railway projects and the second-tier subsidiaries that were involved in their construction. From this table, we can see that the location of projects and the geographical headquarters of their construction firms are not related. Indeed, every second-tier subsidiary has a presence in multiple

Table 1. Core subsidiaries of CREC and CRCC.

Subsidiary Name	Parent	Chinese Name	Headquarters
China Railway No. 1 Group	CREC	中铁一局集团有限公司	Xi'an
China Railway No. 2 Group	CREC	中铁二局集团有限公司	Chengdu
China Railway No. 3 Group	CREC	中铁三局集团有限公司	Taiyuan
China Tiesiju Civil Engineering Group	CREC	中铁四局集团有限公司	Hefei
China Railway No. 5 Group	CREC	中铁五局集团有限公司	Guiyang
China Railway No. 6 Group	CREC	中铁六局集团有限公司	Beijing
China Railway No. 7 Group	CREC	中铁七局集团有限公司	Zhengzhou
China Railway No. 8 Group	CREC	中铁八局集团有限公司	Chengdu
China Railway No. 9 Group	CREC	中铁九局集团有限公司	Shenyang
China Railway No. 10 Group	CREC	中铁十局集团有限公司	Jinan
China Railway No. 11 Group	CRCC	中铁十一局集团有限公司	Wuhan
China Railway No. 12 Group	CRCC	中铁十二局集团有限公司	Taiyuan
China Railway Bridge Engineering Group*	CRCC	中国铁建大桥工程局集团有限公司	Tianjin
China Railway No. 14 Group	CRCC	中铁十四局集团有限公司	Jinan
China Railway No. 15 Group	CRCC	中铁十五局集团有限公司	Shanghai
China Railway No. 16 Group	CRCC	中铁十六局集团有限公司	Beijing
China Railway No. 17 Group	CRCC	中铁十七局集团有限公司	Taiyuan
China Railway No. 18 Group	CRCC	中铁十八局集团有限公司	Tianjin
China Railway No. 19 Group	CRCC	中铁十九局集团有限公司	Beijing
China Railway No. 20 Group	CRCC	中铁二十局集团有限公司	Xi'an
China Railway No. 21 Group	CRCC	中铁二十一局集团有限公司	Lanzhou
China Railway No. 22 Group	CRCC	中铁二十二局集团有限公司	Beijing
China Railway No. 23 Group	CRCC	中铁二十三局集团有限公司	Chengdu
China Railway No. 24 Group	CRCC	中铁二十四局集团有限公司	Shanghai
China Railway No. 25 Group	CRCC	中铁二十五局集团有限公司	Guangzhou

Notes:

The English names are inconsistent across official corporate documents. The English names here have been translated from the original Chinese and modified for clarity.

* Abbreviated by author. Full name: China Railway Construction Bridge Engineering Bureau Group. Formerly, China Railway 13th Bureau Group.

Sources:

Company annual reports, company websites.

Table 1 (continued). Core subsidiaries of CREC and CRCC.

Subsidiary Name	Staff	Third-Tier Subsidiaries	Production Capacity (RMB billion)	Total Machinery	Total Assets (RMB billion)
China Railway No. 1 Group	25,354	N/A	N/A	7,834	50
China Railway No. 2 Group	20,000	24	100	N/A	90
China Railway No. 3 Group	26,000	18	40	5,754	20
China Tiesiju Civil Engineering Group	23,214	20	NA	9,800	N/A
China Railway No. 5 Group	21,000	18	70	8,680	52
China Railway No. 6 Group	13,622	17	40	7,029	N/A
China Railway No. 7 Group	16,000	12	NA	8,300	N/A
China Railway No. 8 Group	11,000	9	65	6,000	N/A
China Railway No. 9 Group	11,000	6	50	7,200	20
China Railway No. 10 Group	15,000	19	50	N/A	20
China Railway No. 11 Group	18,600	14	70	N/A	55
China Railway No. 12 Group	21,000	16	100	10,070	51
China Railway Bridge Engineering Group*	15,000	13	50	N/A	49
China Railway No. 14 Group	15,000	N/A	N/A	N/A	54
China Railway No. 15 Group	19,000	15	60	N/A	37
China Railway No. 16 Group	17,000	N/A	N/A	17,300	61
China Railway No. 17 Group	21,207	15	60	N/A	53
China Railway No. 18 Group	20,000	12	80	11,000	44
China Railway No. 19 Group	16,741	14	40	9,127	52
China Railway No. 20 Group	20,000	19	70	5,300	45
China Railway No. 21 Group	14,000	16	40	4,137	36
China Railway No. 22 Group	12,000	14	40	N/A	37
China Railway No. 23 Group	10,400	14	50	1,597	30
China Railway No. 24 Group	11,000	11	60	9,200	27
China Railway No. 25 Group	12,000	10	30	7,800	20

Notes:

The English names are inconsistent across official corporate documents. The English names here have been translated from the original Chinese and modified for clarity.

* Abbreviated by author. Full name: China Railway Construction Bridge Engineering Bureau Group. Formerly, China Railway 13th Bureau Group.

Sources:

Company annual reports, company websites.

parts of the country through third-tier subsidiaries based in different locations and through various “regional operations command posts” (*quyu jingying zhihuibu* 区域经营指挥部) or “regional headquarters” (*quyu zongbu* 区域总部). For example, the second-tier subsidiary No. 15 Group, which is headquartered in Shanghai, has five third-tier subsidiaries based in Xi’an, Shanghai, Chengdu, Zhengzhou, and Tianjin as well as 12 regional offices distributed across the country.

Lastly, the third level of this multi-level SOE structure consists of another level of subsidiaries below the second-tier subsidiaries. Each second-tier subsidiary has its own set of core engineering subsidiaries with numbered names (e.g., 1st Engineering Company, 2nd Engineering Company, etc.) as well as several auxiliary subsidiaries. These third-tier subsidiaries are referred to as third-tier companies (*sanji gongsi* 三级公司) or engineering companies (*gongcheng gongsi* 工程公司) and function like departments or branches of the second-tier subsidiaries, receiving work assignments rather than competing directly for business. Taken together, the operation of this three-level structure can be summarized as follows: first-tier parent SOEs are responsible for high-level coordination, second-tier subsidiaries are the primary industry operators, and third-tier subsidiaries provide support. Indeed, this division of labor across SOE levels is frequently emphasized in corporate documents and speeches.⁷⁸

Performance evaluation and accountability

CREC and CRCC’s core second-tier subsidiaries are monitored and assessed for their work on railway construction projects through a formal performance evaluation system called the “railway

⁷⁸ For example, a 2020 CRCC bond prospectus states: “The shareholding company coordinates. The corporate groups carry out the main work. The third-tier companies provide support.” (CRCC, 2020).

Table 2. A sample of Chinese railway projects and their construction SOEs.

Construction Firm	Headquarters
Beijing-Shanghai High-Speed Railway	
China Railway No. 17 Group	Taiyuan
China Railway No. 1 Group	Xi'an
Sinohydro Group	Beijing
China Railway No. 12 Group	Taiyuan
China Railway No. 3 Group	Taiyuan
China Communications Construction Company (CCCC)	Beijing
Zhengzhou-Xi'an High-Speed Railway	
China Railway No. 1 Group	Xi'an
China Railway No. 3 Group	Taiyuan
China Railway No. 7 Group	Zhengzhou
China Railway No. 12 Group	Taiyuan
China Railway No. 16 Group	Beijing
China Railway No. 23 Group	Chengdu
China Railway No. 25 Group	Guangzhou
China Railway Electrification Bureau Group (EEB)	Beijing
China Railway Construction Electrification Bureau Group	Beijing
Hangzhou-Ningbo High-Speed Railway	
China Railway No. 3 Group	Taiyuan
China Railway No. 17 Group	Taiyuan
China Railway No. 24 Group	Shanghai
China Railway No. 5 Group	Guiyang
China Railway Electrification Bureau Group (EEB)	Beijing
China Railway Signal & Communication (CRSC)	Beijing
China Tongguang Electronics Co. (CTGC)	Beijing
Shijiazhuang-Taiyuan High-Speed Railway	
China Railway No. 12 Group	Taiyuan
China Railway No. 11 Group	Wuhan
China Railway No. 17 Group	Taiyuan
China Railway No. 16 Group	Beijing
China Railway Tunnel Group (CRTG)	Guangzhou
China Railway No. 5 Group	Guiyang
China Railway No. 22 Group	Beijing
China Railway No. 20 Group	Xi'an
China Railway Construction Bridge Engineering Bureau Group	Tianjin
China Railway No. 1 Group	Xi'an
China Railway Electrification Bureau Group (EEB)	Beijing
China Railway No. 6 Group	Beijing
China Railway No. 8 Group	Chengdu

Notes:

Project sample is based on available data.

Sources:

Chinese railway construction project engineering compendia.

construction firm credit evaluation” (*tielu shigong qiye xinyong pingjia* 铁路施工企业信用评价) system.⁷⁹ Twice each year, China State Railway Group Company (China Railway) publishes credit evaluation results for each firm in the form of an A, B, or C letter grade.⁸⁰ The distribution of these grades is generally fixed: the top ten firms receive As, the lowest three receive Cs, and all other firms, which include the vast majority, receive Bs.

While this grading system bears some resemblance to the performance evaluation system used by SASAC,⁸¹ the railway credit evaluation system is significantly more complex and tailored specifically for the railway sector. Credit evaluation letter grades are derived from a numerical scoring system. Each firm starts with a base score and then has points deducted for “harmful actions” (*buliang xingwei* 不良行为) according to a lengthy schedule that describes each type of “harmful action” and its corresponding penalty. Minor violations, such as failing to adhere to the latest version of the project design blueprints, may result in a one- or two-point deduction whereas major problems, such as a train accident due to poor construction quality, can result in an automatic C grade regardless of numerical score.⁸² Bonus points can also be earned for positive actions, such as outstanding railway standardization practices.

Table 3 shows the credit evaluation grades for core second-tier subsidiaries from 2013 to 2020. As can be seen in this table, credit evaluation grades for each subsidiary vary over time. While some subsidiaries tend to receive more As, such as Tiesiju Civil Engineering Group and No.

⁷⁹ The word “credit” here does not refer to financial borrowing although it is the same Chinese word for financial credit, as in “credit card”.

⁸⁰ Credit evaluation results are published on the China Railway website: <http://www.china-railway.com.cn/zyyw/tljs/xypj/> (accessed 17 July 2021).

⁸¹ SASAC uses broader measures that apply across industries, such as economic value added (EVA). For an overview of SASAC’s performance evaluation system, see Du et al. (2018).

⁸² These strict accountability measures for infrastructure construction have roots in a 1999 nationwide inspection campaign by the State Council after a spate of high-profile accidents due to poor construction quality, see Yang (2004: 189).

Table 3. Railway construction firm credit evaluation results, 2013-2020.

Subsidiary	2013 H1	2014 H2	2015 H2	2017 H1	2017 H2	2018 H1	2019 H1	2019 H2	2020 H1	2020 H2
China Railway No. 1 Group	A	B	B	B	A	A	A	N/A	A	C
China Railway No. 2 Group	B	B	B	A	B	B	B	B	B	B
China Railway No. 3 Group	B	B	B	A	A	A	A	A	A	A
China Tiesiju Civil Engineering Group	A	A	A	A	A	A	A	A	A	A
China Railway No. 5 Group	A	A	A	A	B	B	A	B	A	B
China Railway No. 6 Group	B	B	B	B	B	B	B	B	B	B
China Railway No. 7 Group	B	B	B	A	B	B	B	B	B	B
China Railway No. 8 Group	A	B	B	B	B	B	B	B	B	B
China Railway No. 9 Group	B	B	B	B	A	B	B	B	B	A
China Railway No. 10 Group	B	A	A	C	B	A	B	B	B	B
China Railway No. 11 Group	A	A	A	B	A	A	A	A	A	A
China Railway No. 12 Group	A	B	A	A	A	B	A	A	A	A
China Railway Bridge Engineering Group*	N/A	N/A	B	A	B	B	A	B	B	B
China Railway No. 14 Group	B	B	A	A	A	A	A	A	B	C
China Railway No. 15 Group	B	A	B	C	B	B	B	B	B	B
China Railway No. 16 Group	A	A	A	B	B	B	B	B	B	B
China Railway No. 17 Group	A	B	B	B	B	B	B	A	B	B
China Railway No. 18 Group	B	B	A	B	B	B	B	B	A	B
China Railway No. 19 Group	A	A	B	B	B	A	B	B	B	B
China Railway No. 20 Group	B	B	B	N/A	C	B	B	B	B	B
China Railway No. 21 Group	B	B	A	B	B	B	B	B	B	B
China Railway No. 22 Group	B	B	B	B	B	B	B	B	B	B
China Railway No. 23 Group	B	B	B	B	C	B	N/A	N/A	N/A	N/A
China Railway No. 24 Group	B	B	B	B	B	B	B	B	B	B
China Railway No. 25 Group	B	B	B	B	B	C	B	B	B	B

Notes:

H1 and H2 refer to the first and second half of the calendar year.

Data not available for all years.

Only core subsidiaries shown. Credit evaluation scores are also given for other Chinese construction firms not shown here.

* Abbreviated by author. Full name: China Railway Construction Bridge Engineering Bureau Group. Formerly, China Railway 13th Bureau Group.

Sources:

China Railway website (<http://www.china-railway.com.cn/zyyw/tljs/xypj/>).

11 Group, it is uncommon for any firm to consistently score at the top or bottom of the rankings. Even relatively strong performers can suddenly receive a C grade due to an accident, as was the case with No. 1 Group in 2020. This remarkable balance in credit evaluation grades over time suggests that competition among second-tier subsidiaries is managed not only in terms of resources and capabilities but also in terms of final results.

Managerial appointments and career paths

Within CREC's and CRCC's multi-level structure, a similar leadership arrangement is replicated at each corporate level, one that mirrors that of other Chinese SOEs and other parts of China's political system. The top leader is the company's party secretary (*dangwei shuji* 党委书记), who is also the chairman of the board (*dongshizhang* 董事长). The second-in-command and head of day-to-day operations is the general manager (usually titled *zongjingli* 总经理), who is also the company's party deputy secretary (*dangwei fushuji* 党委副书记). Just below the general manager are several deputy general managers (*fuzongjingli* 副总经理), which typically includes the chief engineer (*zonggongchengshi* 总工程师).

For each corporate level, leadership personnel appointments are made by a specialized personnel department in the next corporate level up in the hierarchy. The leaders of second-tier subsidiaries are appointed by the parent SOE's Party Committee Cadre Department (*dangwei ganbubu* 党委干部部), also referred to as the Human Resources Department (*renliziyuanbu* 人力资源部). Likewise, the leaders of third-tier subsidiaries are appointed by the corresponding

personnel departments of second-tier subsidiaries one level up.⁸³ At the parent SOE level, the leaders of CREC and CRCC themselves are appointed by higher levels within the state and party hierarchy, including SASAC and the party's Central Organization Department.⁸⁴

The career paths of subsidiary leaders typically follow either a “single-group track”, rising up through the ranks within a single corporate group, or a “multi-group track” involving transfers across multiple subsidiaries. This single- versus multi-group track career progression mirrors that of Chinese SOE leaders in other industries (Lin 2017). An example of a “single-group track” career is that of No. 2 Group's top manager Yuanfa Deng, who served as a deputy chief engineer of a No. 2 Group subsidiary before rising to the position of general manager and eventually party secretary of No. 2 Group itself (CREC 2008). An example of a “multi-group track” career is that of former No. 13 Group head Yongjun Jiang, who served as a deputy general manager of No. 6 Group and general manager of No. 20 Group before becoming No. 13 Group's party secretary. Regardless of career path, managers at any level of CREC or CRCC share one common characteristic: they are nearly all engineers by training, often spending their entire careers within the railway or construction industry.⁸⁵

Chinese infrastructure construction SOEs abroad

While much attention for Chinese projects abroad focuses on China's large parent SOEs, a closer look reveals the important role that their multi-level structure plays in international projects. In the

⁸³ For example, see the June 2021 announcement by No. 12 Group's Party Committee Cadre Department of the new management team for its 3rd Engineering Company (China Railway No. 12 Group Third Engineering Co. 2021).

⁸⁴ This is in line with leadership appointments for other SASAC-controlled SOEs more generally. See Brødsgaard (2012), Leutert and Vortherms (2021), Li (2016), Liu and Zhang (2018).

⁸⁵ Over 70% of the top executives of China's largest industrial SOEs have an undergraduate degree in engineering or the natural sciences (Lin, 2017: 115).

case of CREC and CRCC, their core second-tier subsidiaries are again the primary builders while the parent SOEs play a coordinating role and may take the lead on interfacing with foreign governments and foreign firms. For example, CREC's work on Indonesia's high-speed rail project is mainly carried out by its second-tier subsidiaries, including No. 3 Group, No. 4 Group, China Railway Electrification Bureau Group, and China Railway International Group (CREC 2021). In 2021, CREC established an Indonesian regional office to serve as an "operation platform for major projects" and a "sharing platform for CREC's secondary units" that "will perform the functions of leadership, organization and coordination, business management, operation and development, performance management, compliance risk management and tax planning" (CREC, 2021).

CREC and CRCC's relationships with foreign governments can vary in terms of which corporate level in their multi-level structure is involved.⁸⁶ Sometimes the host country will contract with the parent SOE, as was the case with a 2008 mining and infrastructure project in the Democratic Republic of the Congo involving CREC. At other times, the host country will contract with a CREC or CRCC subsidiary that specializes in international work. For the Hungarian–Serbian railway project, Serbia's Ministry of Construction, Transport, and Infrastructure contracted with China Railway International Group, a CREC subsidiary. Occasionally, the host country will contract directly with second-tier subsidiaries themselves, as was the case in a 2017 road-building deal between Guyana's Ministry of Public Infrastructure and No. 1 Group.

In fact, second-tier subsidiaries can play a very active role in international projects, establishing a long-term presence in certain regional markets. No. 18 Group, for example, has a strong presence in the Middle East and played a key role in building the Mecca–Medina high-speed railway (Z. Wu, Han, and Zhang 2018). No. 18 Group also has an established presence in

⁸⁶ CREC and CRCC's international contracts in this section are drawn from a database of original contract documents involving Chinese firms abroad collected by Gelpert et al. (2021).

West Africa, winning a joint bid to build a light-rail system in Nigeria’s Kano state (Reuters 2016) where it worked directly with Kano state political leaders (China Railway No. 18 Group 2019). The World Bank has long recognized the importance of these subsidiaries and often identifies them individually when debarring Chinese contractors for poor business practices, such as No. 23 Group in Georgia (World Bank 2019a) and No. 1 Group in Pakistan (World Bank 2019b). While the activities of second-tier subsidiaries tend to receive less attention, their actions have broader repercussions for China’s reputation abroad.

It is worth contrasting the geographical specificity of second-tier subsidiaries’ operations in domestic versus international markets. While second-tier subsidiaries are relatively location-agnostic within the Chinese domestic market and bid on projects across the country, there are several factors that contribute to “stickier” geographical relationships in international markets where a single second-tier subsidiary may operate in the same country or region for years, as is the case with No. 18 Group in the Middle East. First, the complexities of operating in international environments—including language, local market knowledge, differing political systems, and cultural know-how—along with competition from local and international players make it challenging for more than one Chinese SOE subsidiary to enter and remain viable within a given foreign market. Second, SOE subsidiaries that remain in one geographic location over years benefit by gaining market knowledge and establishing local relationships. Third, China’s push for SOEs to compete internationally may still be in its early stages. As more SOE subsidiaries look to sources of growth beyond China, their geographical scope may expand internationally as it did domestically during the early decades of SOE reform.

“Managed competition” in other state-controlled sectors

Besides infrastructure construction, a similar system of “managed competition” can be found in other state-controlled sectors, albeit with variation in the number of parent SOEs, their comparability in terms of size and capabilities, and the degree of specialization among them. Like the infrastructure construction sector, China’s petroleum industry is also dominated by two similarly sized central SOEs, China National Petroleum Corporation (2020 revenue: RMB 2.09 billion) and Sinopec (2020 revenue: RMB 2.10 billion),⁸⁷ along with a third, more specialist firm, China National Offshore Oil Corporation (CNOOC). A similar duopolistic structure appears within certain subsectors of China’s defense industry, such as land-based systems where two major parent SOEs each oversee a collection of second-tier subsidiaries: China North Industries Group Corporation (NORINCO) and China South Industries Group Corporation (CSGC). However, in the case of land-based arms, there is a persistent imbalance between the two primary competitors: NORINCO tends to be about twice the size of CSGC by revenue (Tian and Su 2020). Similar imbalances can be found in other sectors. For example, China’s telecommunications sector is dominated by three central SOEs, but the leading service provider—China Mobile—has long held twice as much market share as each of the other two, China Telecom and China Unicom.⁸⁸

Variation in SOE structure across state-controlled sectors is driven by several factors. In some cases, the persistent dominance of one SOE over other competitors may be the result of legacy decisions by state regulators. China Mobile’s dominance in the domestic telecom market stemmed in part from its inheritance of mobile communication assets during the transition from fixed-line to cellular telecommunications services (Z. Liu and Whalley 2011; J. Zhang and Liang 2011). In other cases, industry structure may be the result of fragmented interests among state regulators. China’s train manufacturing sector was dominated for years by two parent SOEs: China

⁸⁷ Revenue data from corporate annual reports.

⁸⁸ Based on subscriber numbers from corporate annual reports.

South Locomotive and Rolling Stock Corporation (CSR) and China North Locomotive and Rolling Stock Corporation (CNR). Efforts by SASAC to merge these two SOEs into a single firm faced resistance from the Ministry of Railways, the National Development and Reform Commission, and the Department of Commerce who all feared that a monopoly would cause train manufacturing prices to surge (D. Huang 2018).

Conclusion

Peering into the internal structure of some of China's most prominent SOEs reveals a system that conforms neither to the image of state firms as the lumbering giants of the pre-reform era nor to the profit-maximizing model of private firms. Instead, China has pursued a different path altogether, attempting to leverage competitive forces within a state-managed system. This article has shown how this system of managed competition operates in practice through a multi-level structure comprised of parent SOEs who play a coordinating role and subsidiaries who compete directly for business. While there are clear echoes of the industrial policy experiments of other East Asian countries with its emphasis on "national champions" and control of the "commanding heights", China's SOE system retains its own distinctively Chinese characteristics.

How effective is China's system of managed competition in terms of the productivity and competitiveness of Chinese SOEs? What are the implications for China's economy and the rest of the world? Executed properly, China's system of managed competition may be able to achieve the "precarious balancing act" (Naughton 2010, 448) of fostering vigorous competition while supporting broader public goals. Indeed, an optimistic interpretation might view this SOE system as not only the foundation for China's entire domestic economy but also a key instrument for

carrying out China's foreign policy goals, particularly under the BRI. This is certainly the vision articulated in China's official state and party discourse.

At the same time, China's system of managed competition faces many potential risks and challenges. If the "managed" aspect of managed competition becomes too dominant, true competition and performance-based accountability may be undermined. In a classic case of soft budget constraints (Kornai 1986, 1979), uncompetitive subsidiaries may come to rely on bailouts from their corporate parents.⁸⁹ Moreover, a carefully designed system of managerial and firm-level incentives is worth little if it is riven by corruption and political cronyism.⁹⁰ As with so many policy questions, success hinges on the basics of sound implementation and enforcement.

Ultimately, the answers to these questions lie beyond the scope of this article, and much more research on China's SOEs is needed. More in-depth case studies of particular SOEs and SOE-dominated industries are required to better understand the internal mechanisms of China's approach to managed competition. Quantitative studies of China's industrial programs using new econometric tools that better account for effects on downstream industries can shed light on the question of efficacy.⁹¹ Moreover, industrial policy has come back into fashion around the world, partly in response to China's own state-led modernization push (Aiginger and Rodrik 2020; Chang and Andreoni 2020). A better understanding of China's experiences may offer a useful point of reference for other countries attempting state-led industrial programs of their own. These issues are all the more pressing as China's SOEs appear poised to further expand their domestic and global influence.

⁸⁹ China's industrial policy failures in the automotive sector are one example of this type of problem. See Huang (2002) and Thun (2005).

⁹⁰ Even a subtle preference for relying on one performance measure over another can allow personal bias to corrode a seemingly meritocratic system. See, e.g., Du et al. (2018).

⁹¹ On new econometric tools for studying industrial policy, see Lane (2020).

Chapter 4

Emotional Bureaucrats: The Paradox of Weberian Bureaucracy and Emotions in the Indian Railways

Introduction

The absence of emotion is central to Max Weber's conception of the modern bureaucratic ideal-type. According to Weber (1978, 978), "Bureaucracy develops the more perfectly, the more it is 'dehumanized,' the more completely it succeeds in eliminating from official business love, hatred, and all purely personal, irrational, and emotional elements which escape calculation." Weber viewed emotions as not merely superfluous but in fact fundamentally antithetical to the rational functioning of bureaucratic machinery, which must operate "according to calculable rules and 'without regard for persons'" (1978, 975).

Yet, in practice, the professional lives of bureaucrats are suffused with emotion. Inspired by Arlie Hochschild's (1983, 1979) seminal work on emotional labor, a large body of scholarship has shown that "emotions are an integral and inseparable part of everyday organizational life" (Ashforth and Humphrey 1995, 98). Indeed, some scholars have questioned the antagonistic relationship between emotion and rationality in organizations. For example, Putnam and Mumby

(1993:41) argue that “[b]ureaucracy perpetuates the belief that rationality and the control of emotions are not inseparable but also necessary for effective organizational life.”

I argue that emotion and Weber’s rational-bureaucratic form are not only inseparable but that, paradoxically, the imposition of Weberian rational bureaucracy can produce the very emotions that it seeks to eliminate. The depersonalization of the individual bureaucrat, the strict enforcement of bureaucratic rules, and the fostering of a bureaucratic ethos based on hierarchy and protocol are examples of bureaucratic social processes that in fact generate emotions such as fear, helplessness, jealousy, and pride. These emotions produced by the structural features of Weberian bureaucracy, in turn, undermine the efficient functioning of the organization itself in contradiction with Weber’s original theory of bureaucracy.

I use the case of the Indian Railways, one of the largest contemporary state bureaucracies in the world, to investigate the relationship between emotions and Weberian bureaucracy. Building on fieldwork conducted over two years in India, including interviews with railway officials and the examination of organizational records, I show how the day-to-day work of Indian Railways officers is deeply imbued with emotions, which are in many cases generated by structural features of the bureaucracy itself. The welter of bureaucratic rules that govern even the most minute decisions of Indian Railway officers is designed to minimize the role of personal discretion in line with Weber’s original conception of rational bureaucracy. Yet, this thicket of rules along with the fragmented organizational structure of the Indian Railways severely restricts limits the ability of Indian Railway officers to act or request action from other parts of the organization, generating feelings of helplessness and powerlessness. The abuse of anti-corruption tools, which were originally designed to enforce strict adherence to bureaucratic rules, produces a pervasive culture of fear where individual officials are wary of taking risks that may support the broader aims of the

Indian Railways but expose the individual bureaucrat to investigation, particularly by other bureaucrats seeking to carry out personal vendettas.

I then show how the emotional products of bureaucratization in the Indian Railways such as helplessness and fear undermine the work of the organization itself. Whereas Weber argued that greater depersonalization and rationalization in the bureaucracy improves organizational capacity, I show that in the Indian Railways such efforts frequently backfire by inflaming counter-productive emotions that reduce individual motivation and hamper the ability of the organization to achieve its broader goals such as the maintenance of existing track and construction of new railway lines. The paradoxical relationship between emotions and bureaucratic rationality has implications far beyond the context of the Indian Railways. In particular, this study complicates sociological theories of development and the state which have long stressed the importance of pursuing Weberian bureaucratic forms as a necessary path to development.

Emotions and Bureaucracy

The antagonism between emotions and their loftier counterparts, reason and rationality, has a long history within the Western philosophical tradition extending back at least to Seneca and the Stoics. Drawing from Greek and Roman philosophy, Weber (1978:225) famously argued that bureaucracy and the gradual disappearance of emotion go hand in hand as the rise of bureaucracies leads to “the dominance of a spirit of formalistic impersonality: ‘Sine ira et studio,’ without hatred or passion, and hence without affection or enthusiasm.”

Georg Simmel also saw the decline of emotions as a necessary response to the overwhelming stimuli of modern life, captured above all by the “blasé outlook,” or an “indifference toward the distinctions between things.” Indeed, there is a strong resonance between this “blasé” response to

modernity and the similarly blasé attitude we so frequently encounter with bureaucrats. According to Simmel (1950, 414), the overwhelming stimuli of modern life “appear to the blasé person in a homogenous, flat and grey colour with no one of them worthy of being preferred to another.” This flat affect describes well the response of bureaucrats to the myriad personal crises of their “customers” whose problems are treated with a seemingly casual indifference by the gods of officialdom who wield the power to dispense—or withhold—life-altering state actions.

More recent work on emotions in organizations builds on Hochschild's (1983) seminal work *The Managed Heart*, which linked the alienation of the “emotional labor” of the postindustrial age with the self-alienation of Marx's industrial workers. Hochschild (1983:8) documented the ways in which the artful smiles of flight attendants were “an extension of the make-up, the uniform, the recorded music, the soothing pastel colors of the airplane décor, and the daytime drinks, which taken together orchestrate the mood of the passengers.” Hochschild built on the insights of Erving Goffman who highlighted the many small social performances that constitute the self. Subsequent studies, primarily of service-sector workers, have shown how displays of emotions—and repressions of “genuine” inner feelings—constitute a core part of contemporary labor. In the words of Ashforth and Humphrey (1995), “emotions are an integral and inseparable part of everyday organizational life.”

While drawing on these insights, this study takes a different approach to the study of emotions in bureaucracies and organizations. Weber and Simmel saw the decline of emotions as a necessary if not inevitable part of the process of modernization and bureaucratization. However, as this study shows, nothing could be further from the truth. Indeed, I show how bureaucracy itself generates emotions and makes bureaucrats more emotional, not less. Hochschild and scholars studying emotional labor viewed emotions as tools within organizations and the workplace, a resource to

be used or exploited often for pecuniary reasons. Instead, I show how emotions in bureaucracies are not something to be repressed but rather drive social action itself. Emotions are not another component of the work but rather intrinsic to work itself, in turn shaping and defining the organization. In particular, this study traces the complex relationship between organizational structure, emotions, organizational culture, and organizational effectiveness. I show how the highly personal emotions of the Indian Railways shape the culture of the organizations and how these emotions and the resulting organizational culture are themselves the product of structural factors, particularly the self-perpetuating divisions within the Railways and the organization's convoluted lines of authority.

Bureaucracy in Contemporary India

Weber, with his lofty ideals for how states should function, obviously never met an Indian bureaucrat. While the problems are legion and painfully familiar those who must suffer the capricious lethargy of these lumbering institutions, several themes loom large in previous studies of Indian bureaucracies and bureaucrats. There is the classic tension between bureaucrats and the politicians they report to. Jauregui's (2016) ethnography of Lucknow police officers showed the extent to which the police are used by local politicians and VIPs to settle personal and political scores and maintain their hold on power. Police officers who refuse to comply can be threatened with "transfers" by local politicians. Anand's (2017) work on municipal water politics goes one further by showing how deeply symbiotic the relationship between bureaucrats and politicians can be, with public service workers often colluding with party agents to selectively provide—or withhold—basic water services for city residents.

This problem goes together with a chronic lack of resources within Indian state organs and a reliance on jerry-rigged or “*jugaad*” solutions to accomplish everyday tasks. Jauregui’s police officers, lacking sufficient official vehicles at their disposal, frequently commandeer private vehicles, using their position of authority to make up for a lack of resources to carry out their job. Indian Administrative Officers are miniscule in number compared to the large populations under their authority and the myriad tasks they are responsible for from resolving local disputes to dealing with land registration.

Another major theme in studies of Indian bureaucracies is the powerfully constricting rules and procedures bureaucrats must typically operate within, evincing a lack of trust in individual discretion and reducing bureaucrats, especially those on the front lines, to mere cogs in a machine. Mangla's (2015) comparative ethnography of primary education in Himachal Pradesh and Uttarakhand showed how the latter state’s “legalistic” model of bureaucracy based on strict codes and hierarchies prevented flexible decision-making by frontline staff and, consequently, reduced school attendance. Similarly, Aiyar and Bhattacharya's (2016) study of education block officers in Bihar and Adhra Pradesh showed how such bureaucratic straitjackets make bureaucrats feel powerless and unable to provide crucial informational feedback.

Gupta (2012) study of development officers in rural Uttar Pradesh demonstrates how, contrary to Weber’s vision of bureaucracy, “bureaucratic action repeatedly and systematically produces arbitrary outcomes in its provision of care.” This arbitrary action, so starkly unaccountable to the very people it purportedly serves, has devastating consequences, particularly when certain bureaucratic visions of society take precedent over the needs of the people as documented in Ghertner's (2015) work on slum demolition.

Indian bureaucracies are also frequently rife with intra-organizational factionalism. Work by Adler (2014) and Sheikh and Mandelkern (2014) has highlighted the combative nature of bureaucratic operation within the Delhi Development Authority (DDA) where departments compete aggressively for resources and decision-making authority, undermining the overarching mandate of the organization. Frequently in such scenarios, only an appeal to the highest echelons of authority—in the case of the DDA, the Vice Chairman—can plausibly resolve such deep-seated internal enmity.

Finally, there is the classic problem of short tenures and high turnover for key officers, especially for Indian Administrative Services (IAS) officers as observed by Iyer and Mani (2012) and Doron and Jeffrey (2018) in their study of municipal sanitation in India. Such short tenures allow officers to advance their careers and quickly progress through the hierarchy but produce little investment in the long-term initiatives required to bring about systemic change. These themes, brilliantly captured in previous work on Indian bureaucracies, resonate deeply with my findings of the inner workings of the Indian Railways.

Methods

This article draws on interviews conducted with Indian Railways officers as well as industry experts and researchers over the course of two years based primarily in Delhi. I chose to study the Indian Railways as an organization because of its crucial role in the country's social and economic life and its sheer scale as a sprawling state bureaucracy and one of the largest non-military employers in the world. My decision to focus on interviews with officers stems admittedly in part from language issues—my Hindi is limited, and all Indian Railways officers are fluent in English (their entrance exam is conducted in English). But I also wanted to focus on the officers because

they captured the puzzle of the Railways as an organization most strikingly given the quality of their individual backgrounds and experiences in contrast to the dysfunction of the overall organization.

All the officers I met were clever and often witty and curious, hailing from educated backgrounds including some of the top institutions of higher learning in the country. They expressed to me a powerful personal commitment to the work of the Railways and the development of their country. I am also aware of the biased sample of my interlocutors who were sufficiently open-minded and curious to meet a complete stranger from a foreign country. I met with Railway officers mostly in their offices, sometimes during national holidays when they were still in the office preparing a presentation for their superiors at Rail Bhavan. Often connected tenuously through the recommendation of a prior interview—I began by cold-calling officials in Rail Bhavan where I eventually talked my way in—I had to convince many initially skeptical Railway officers that I was sincere in my research efforts and worth their time. And every time, as we began to wade into the oft-asked question “what ails the Railways?” to which every Railways officer has a slew of ready thoughts, our interviews, which often stretched on for several hours and included copious servings of chai and biscuits, seemed to become almost therapeutic for the officers, granting them an opportunity to finally vent their frustrations to an attentive audience.

Thinking through my own positionality, I recognize several advantages and disadvantages to my identity. On the one hand, my outsider status as a foreigner who appeared non-Indian—I am Chinese-American and was sometimes asked if I was from India’s northeast region—helped place me outside the social hierarchies that come with having an Indian surname that might be pegged to a specific region or caste. My worries about being viewed suspiciously because I looked Chinese—a fierce border war in 1962 between India and China and China’s support of India’s

archrival Pakistan make for a tense relationship between the two countries, which reached a new low during the course of my fieldwork with a high-profile Doklam border standoff in 2017—were quickly swept aside by the openness with which many officers treated me in sharing the details of their work. Indeed, some officers even expressed the hope that the experiences they shared with me might ultimately be conveyed as a message to the powers that be as a spur to reforms.

The main disadvantage as an outsider was my lack of initial entry points into the Railways as an organization and my inability to pick up on some of the casual conversations among the officers, which typically took place in Hindi. Ultimately, the product of my research reflects both the additional openness and acceptance with which my interlocutors engaged with me and the limitations of my observations into the broader social world of these officers.

Indian Railways: Emotional Bureaucrats and Weberian Structures

Fear of “Being Questioned” and Risk-Taking

The most powerful and frequently cited emotion, raised unprompted in nearly every discussion I had with Indian Railways officers, was fear. Countless times, I was told by officers that they were perpetually “afraid of being questioned” for making decisions that might be construed as corrupt or otherwise in violation of the rules. Two major central government oversight agencies were frequently cited. The first was “Vigilance,” which is the set of anti-corruption institutions covering all Indian central government agencies and headed by an independent Central Vigilance Commission (CVC). Empowered through the Prevention of Corruption Act of 1988 among other pieces of legislation, India’s anti-corruption institutions were designed to perform the admirable and necessary task of combatting public corruption through embedded anti-corruption teams and Chief Vigilance Officers within major central government agencies including the Railways. The

second was the Central Bureau of Investigation (CBI), a central government agency similar to the American FBI with the power to investigate national-level crimes including corruption cases.

However, these anti-corruption institutions have been turned into powerful weapons to carry out personal vendettas and exert power over others, creating an atmosphere of constant fear. The destructive consequences for individual officers under investigation are severe. As several former Railway officers explained to me, the work of any officer under investigation grinds to a halt as all other officers are afraid of working with him and becoming “tainted.” Investigations frequently take a year or more, during which time an officer becomes a “passenger” in his own position unable to carry out any work and unable to progress up the ranks of the organization. Cases can even be lodged after retirement and reach the members of the Railway Board, the apex of the Railways bureaucracy.

What is harmful for individual officers is even more destructive for the work of the organization, a problem highlighted in numerous high-level government reports (Debroy et al. 2015; Tandon 1994; Mohan 2001). This “fear psychosis,” as one former Railway officer referred to it, is deep-seated and pervasive, hampering the work of the Railways because officers are afraid to take risks that might speed up work yet leave them vulnerable to “being questioned.” One senior officer working on the high-profile Dedicated Freight Corridor project described the fear of a potential CBI investigation as having a “chilling effect.” This same officer said this resulted in a culture where Railways staff “do the right thing rather than the correct thing,” by which he meant following the rules rather than doing what was best for the project. As a result, Railways officers “stick strictly to the rules even though this causes delays.” Another former Railways officer confirmed to me, “If you make a decision that is a loss to the Railways, even if it actually helps, it may be seen as corruption.” A high-level advisor to the Prime Minister noted that this problem is

not unique to the Railways but applies across all government agencies after the Prevention of Corruption Act of 1998. This advisor said the fear of an investigation made everyone “risk-averse” because government officials do not want to be accused of “something bad,” yet “many actions have unforeseen consequences that might only appear 20 years down the road.” Rather than taking such risks, officers opt to tread lightly in all professional interactions, careful to avoid antagonizing a co-worker lest they initiate a corruption inquiry.

Railway officers provided two concrete ways in which this fear hampered the effectiveness of the organization. One is the dilution of the career evaluation and promotion system. Officers receive periodic performance reviews from their superiors called “Annual Performance Appraisal Reviews” (APARs), which form a key component of their permanent career record and are used to determine promotions. However, these reviews are not confidential and can be viewed by subordinates who, if dissatisfied, can launch a complaint to a supervisory body such as the anti-corruption team. Because superior officers fear becoming the target of any complaint, everyone receives the maximum performance score—a five out of five—rendering the entire evaluation process useless, according to a deputy chief engineer I interviewed at a regional railway bureau. A former high-level officer in the Ministry of Railways confirmed that everyone received an “outstanding” on their performance reviews, which resulted in a tenure- rather than merit-based system of promotion. Another former senior officer explained to me that as a result, all the officers at the top of the hierarchy were “yes-men” who simply played it safe throughout their careers while all the risk-taking officers had been culled through corruption investigations.

The second way in which this culture of fear slowed down the work of the Railways is in land acquisition. Land acquisition is a frequent cause of delays for railway projects as well as other infrastructure projects, particularly when disputes over compensation and land rights wind through

lengthy court cases (Comptroller and Auditor General of India 2014; R. Singh 2010, 2012; Wahi et al. 2017). A senior Railways officer working on the Dedicated Freight Corridor project explained to me that pricing formulas for assessing land values are often far below market values, which leaves landowners facing compulsory land requisition deeply dissatisfied. Yet Railway officers are loathe to raise compensation values for fear that “people will question your actions” and ask “why you favored one place over another.” Another former Railways officer confirmed to me that because Railway officers are “scared of being accused of corruption,” they settle for the court option, which is significantly more time-intensive but removes individual responsibility from the officers.

“Bureaucrats are Beggars” and Feelings of Powerlessness

The flip side to this pervasive fear is an abiding sense of powerlessness vis-à-vis other members of the bureaucracy. I was surprised to discover the extent to which the experience of bureaucrats themselves mirrored the experiences of average citizens dealing with state bureaucrats. The bluntness and indifference, the Simmelian “*blasé* outlook,” that we are so familiar with as “end-users” of public services struggling to obtain a document or certificate from a government bureaucrat also characterizes the experience of bureaucrats themselves in the Railways in their interactions with one another.

The most striking example of this is the relationship between civil engineers who work on construction and the infamous “finance guy” in the accounting side of the same organization who is tasked with ensuring projects remain within budget. There exists an inherent tension between the mandates of these two sides of the organization: the civil engineers on the construction side

are assessed on the basis of length of track completed whereas the accounting staff are assessed on the basis of cost savings. But rather than coordinate with each other in pursuit of common organizational goals, each bureaucrat treats the other as if they were emissaries from different countries. Budgetary requests are submitted by civil engineers to their respective finance departments for approval. These requests are then frequently denied due to petty issues such as missing sections, resulting in another round of revisions and reviews. According to a member of a finance team at a regional railway bureau that I spoke with, the fault lay with the civil engineers who *knowingly* submit incomplete paperwork in their haste to move projects along quickly. The irony is that the finance team's chronic rejection of budget requests causes delays which result in escalating costs and the construction team's attempts to speed through paperwork produce further delays. The most shocking aspect of this dynamic is that each side treats the other at arm's length rather than sitting down together to work through issues.

Another example of this is the arm's length relationship between the construction team and the traffic team, which manages the day-to-day operations of trains on existing lines. The construction team sometimes requires the assistance of the traffic team, which has the authority to create "blocks" of time during which train traffic is halted or diverted and work can be carried out on operating lines. The traffic team sometimes requires the assistance of the construction team to conduct repairs of existing track or build a second track. Yet both teams treat each other as if they worked in completely separate organizations. As one traffic officer explained to me, requests by the traffic team of a regional railway bureau are routed through the Railway Board and the central government's Planning Commission in Delhi and then transmitted back to the construction team of the same regional railway bureau. This lack of coordination or even outright conflict can have deadly consequences such as the 2017 Utkal Express accident where a failure to coordinate

between the maintenance team and traffic officers led to the deaths of 22 passengers (The Indian Express 2017).

“Bureaucrats are beggars.” This is how one civil engineer described to me the position of Railway officers and their lack of power in the thicket of rules that define their working environment. Many Railways officers complained to me that they had originally joined the Railways as engineers to do engineering work but instead found themselves becoming full-time experts in filling out paperwork. They bemoaned the countless intricate rules they had to follow and how other members of the organization such as the “finance guy” could hold up an important project seemingly on a whim by citing a lack of adherence to a specific rule. Weber’s hopes that a structure of impartial rules could reduce the frivolity of personal discretion runs up against a contrasting reality: rules actually increase the power of the personal. As a result, bureaucrats are reduced to begging each other for approvals—or at least for someone to not block their work. One civil engineer stressed the importance of maintaining good relationships within the Railways to minimize the risks to a project—and to oneself—of opposition within another part of the organization. Documentation from the construction of the Koraput-Rayagada railway line completed in 1998 also complained that the “relationship between executive and finance came under strain” and that project delays worsened as “matters got bogged down in correspondence” (South Eastern Railway 2002).

The source of this powerlessness lies in the very organizational structure of the Railways. At the level of regional railway bureaus, the finance team is headed by a Financial Advisor and Chief Accounting Officer (FA&CAO) who is ultimately accountable not to the heads of the regional railway bureau, who are the Chief Administration Officer of Construction (CAO/Construction) and the General Manager (GM), but to an independent Financial Commissioner, who sits on the

Railway Board. This separate chain of command was a deliberate creation of the British during colonial rule as a means of checking railway spending. But the result today has been the division of the organization into two mutually antagonistic components with mechanism to ensure cooperation on the common work of the Railways as a whole. When I asked several civil engineers why they did not simply report the obstructionism of the finance team to their superiors, they explained that this would damage the relationship. They reserved such actions for extreme circumstances, instead preferring to simply suffer through the hassle of multiple rounds of paperwork.

Jealousy, Rivalry, and “Nuisance Value”

The Indian Railways as an organization is divided into multiple groups and loci of power that often compete by blocking each other's work out of jealousy, territoriality, or in retaliation for a perceived personal slight. One well-known set of divisions among Railways officers is the cadre service system, which produces endless conflict and has been noted in numerous reports (Debroy et al. 2015; Mohan 2001; Tandon 1994). Railway officers join the organization as part of a service cadre based on technical expertise such as the Indian Railway Service of Electrical Engineers (IRSEE), the Indian Railway Service of Mechanical Engineers (IRSME), and the Indian Railway Traffic Service (IRTS). Originally created by the British to ensure specialized technical proficiency, these service groups have solidified over time into interest groups with their own “empires”. To this day, the balance of power within the Railways, especially at the level of the Railway Board members including the Chairman, must undergo a delicate negotiation across the various service groups who are sometimes portrayed as encroaching on each other's turf (Arora 2018).

These various jealousies and rivalries have manifested themselves through deliberate obstructionist actions that delay critical railway work. The seemingly uncontroversial effort to electrify the railway system, in line with other modern railway systems around the world, was originally opposed by the Mechanical Engineers (IRSME), who were later given the Mumbai-Ahmedabad high-speed rail project as a form of compensation, according to a former member of the Railway Board. In the construction of the Koraput-Rayagada rail line, a special organization was formed to carry out construction work but was sabotaged by other officers who worried that this new organization would become a separate locus of power within the Railways, resulting in a delay of two years (South Eastern Railway 2002).

Another set of divisions lies between the Railway Minister, a political appointee, and the Railway Board, a committee of top-level bureaucrats who oversee most of the regular work of the organization. A recent clash between current Railway Minister Piyush Goyal, who supported the rollout of a new European-standards train control system, and the Finance Department of the Railways as well as members of the Railway Board who opposed it ultimately had to be settled by the Prime Minister himself (Jha 2018; Dastidar 2018). In the construction of the Konkan Railway in the 1990s, a dispute between the Railway Minister and the Railway Board over the use of optical fiber cables resulted in the suspension of work in the middle of implementation and was nearly escalated to the President of India (Konkan Railway Corporation Limited 1999).

At a more granular level, the ways in which these rivalries and vendettas are meted out are referred to as “nuisance value.” Nuisance value, as explained to me by one officer and corroborated by others, is the power to cause problems and delay the work of others. Because “time is the most important resource” in the work of the Railways, the power to delay translates into a form of leverage over other officers. As another officer explained to me, one had to be careful how one

conducted work, being sure not to personally upset other officers. Otherwise, there would be a cycle of “action-reaction” where one’s actions might provoke potentially devastating bureaucratic retaliation by another officer such as an anti-corruption complaint. Another former Railways officer explained to me that an excessive amount of time and energy is spent on these kinds of “bureaucratic games” rather than on the actual work of the organization. Indeed, these distortionary power “games” were cited not only within the bureaucracy but widely across the political-bureaucratic nexus where Members of Parliament and Members of Legislative Assemblies also deliberately stall ongoing projects such as the high-profile Dedicated Freight Corridor.

While these emotional flare-ups and acts of internal sabotage may appear to be contingent on the specific personalities and relationships at play, this damaging pattern of jealousy and rivalry can be traced back to structural factors within the bureaucratic organization of the Railways itself. The cadre divisions discussed earlier which fragment the identities and allegiances of Railway officers are reified by a segmented leadership and promotion structure that prioritizes within-cadre rank over general aptitude and performance. The chronic tensions between the Railway Minister and the Railway Board are partly the product of an ambiguous division of responsibility between the political and bureaucratic leadership of the Railways. Ultimately, the ease with which personal enmities can translate into consequential bureaucratic violence stems from the disproportionate veto powers embedded within the labyrinth of rules and procedures of the Railways that essentially arms every bureaucrat with a nuclear button.

Prestige and Hierarchy

Despite the many structural disfunctions that plague the organization, my interviewees frequently cited the pride they held in their work and in their position as elite civil servants. One Railway

officer who worked for thirteen years in the country's northeast region where transport connectivity is limited recounted the pride he felt upon completing a new railway line to a village. "It changed people's lives," he explained to me, because "suddenly you could sell to a much bigger market." Another Railway officer who had worked in Mumbai breathlessly recounted a story of how he managed to resolve an environmental issue that threatened to terminate a major project. When he had heard that environmental clearance for a major project might be revoked by an activist Supreme Court justice who had flown in to personally inspect the project's impact on a wildlife reserve, this officer felt "completely crestfallen." But when he managed to negotiate an agreement that included the provision of additional protections for wildlife along the railway line and the creation of a special fund by the Railways for the maintenance of the wildlife reserve, he felt an overwhelming sense of relief and pride that he had managed to rescue a project he had felt so personally committed to.

The officers of the Indian Railways are acutely aware of their prestigious social status as elite members of their nation's civil service. Indian Railway officers share many markers of prestige with other elite "Group A" civil service groups such as the Indian Administrative Service including recruitment through a highly-selective exam and interview process, special state-provided perquisites such as housing and medical services, and secondments or appointments to other high-level positions within the Indian government, in international organizations such as the World Bank, and in the private sector such as seats on corporate boards. A number of Railway officers are members at exclusive members' clubs such as the Civil Services Officers' Institute (CSOI) and the Delhi Gymkhana Club where I had the fortune of being invited by some of my interviewees. As one former Railway officer explained to me, there are three members' clubs for Railways officers, but the more prestigious CSOI and Gymkhana can take years or even decades

to join. Some applicants are granted membership after they have already passed away. The active presence of Railways officers within these rarified circles is both a testament to and a reinforcing factor behind their broader social prestige.

Within the Railways, hierarchy and seniority are powerful social norms. Promotion through the organization primarily depends on tenure within the Railways. Indeed, the combination of minimum tenure requirements and a mandatory retirement age of 60 produces a frantic race to the top of the hierarchy and short tenures at senior positions such as membership on the Railway Board as the combination of these two factors results in a narrow career window. Railway Board members and General Managers who head regional railway bureaus frequently serve in their positions for a year or two before retiring, leading to high turnover and a lack of long-term investment.

Moreover, seniority based on recruitment “batch” or class trumps formal reporting hierarchies, often undermining the authority of senior leadership. One former Railway officer explained to me that the Principal Heads of Departments (PHODs) are subordinate to General Managers (GMs) but in reality may be more senior than GMs according to tenure and batch recruitment year. For example, a GM may be from the 1980 batch, but his head of electrical engineering may be from the more senior 1978 batch. As a result, the GM has little ability to compel his subordinate to follow his orders and must instead resort to cajoling and persuasion. The power of seniority was strikingly evident to me in my observations of interactions between officers of different ranks. An interviewee might wave off a subordinate with barely a glance during my interview but then interrupt our discussion to answer a call from a senior officer, which often consisted of a one-sided monologue from the more senior officer punctuated by the repeated “hain ji sir” of acknowledgement from the junior officer.

Conclusions

It was nearly a century ago when Weber, inspired by European and especially Prussian bureaucracies, proclaimed the impending dominance of emotionless, impersonal bureaucrats. Today, we find in much of the developing world (and perhaps the developed world as well to some extent *contra* Weber) the opposite sociological phenomenon, where the proliferation of bureaucratic forms renders the public agents tasked with carrying out the work of the state into something very different from cogs in a machine. Instead, I find in my fieldwork studying the Indian Railways that an increase in the “Weberianness” (Evans and Rauch 1999) of the state—from the hardening of rules and procedures to the establishment of monitoring and auditing apparatuses designed to root out private interference in public matters—engenders a dizzying array of emotions that deeply affect the work of the organization and its cultural milieu. The fear, jealousy, rivalry, distrust, and pride that suffuses the professional lives of Indian Railways officials is not merely an additional layer of bureaucratic operation but rather endemic to nearly every aspect of their daily work.

Several questions follow with implications for the sociology of emotions in organizations and the role of organizational structure in the state. Why have efforts to “bureaucratize” the state and attenuate the personal and emotional element in the work of public officials backfired so dramatically in cases such as the Indian Railways? How might the emotional energies of ambitious, career-driven personalities be re-channeled toward more productive and cooperative activities that support the overall aims of the organization? This paper has focused on tracing how structure affects emotions and organizational culture, but how might a shift in culture lead to a change in organizational structure? As the social and environmental stakes grow exponentially with India’s rapid economic growth, the role of the state in effectively intervening becomes increasingly urgent.

Understanding how state bureaucracies might become more effective in their essential public missions, including the powerful role of emotions in shaping state organizations, is crucial to current scholarship on the state as well as addressing pressing contemporary social issues.

Chapter 5

Conclusion

On August 15, 2021, the 75th anniversary of India's independence, Prime Minister Narendra Modi announced the launch of a national infrastructure program called the Gati Shakti National Master Plan that would invest 100 trillion rupees, equivalent to about US\$1.2 trillion (Prime Minister's Office 2021). This massive infrastructure campaign seeks to upgrade transportation and connectivity throughout the country, including railways, roads, ports, and power transmission. A central aim of this effort is to modernize India's economy in the face of competition from its neighbor and geopolitical archrival, China (Saxena and Chakraborty 2022). Indeed, as tensions grow between China and the West over issues such as Taiwan, India has made a concerted effort to win over parts of the global manufacturing supply chain that China has long dominated. With the disruptions caused by fluctuating COVID lockdown measures in China and heightened geopolitical fears after Russia's invasion of Ukraine, many observers are closely watching to see if India might be able to capitalize on efforts to diversify manufacturing capacity away from China (Dhume 2022).⁹² Improved infrastructure is seen as central to this effort.

⁹² Apple's manufacturing supply chain is a key litmus test of these potential shifts. While over 95% of its products are manufactured in China today where it has a deep reservoir of suppliers, Apple has announced a major effort to diversify production away from China to countries, such as India and Vietnam (McGee 2023).

However, despite the vast ambitions of this plan, the question of implementation and state capacity remains. Can India build the highways, railways, and ports needed to convince multinational corporations to set up shop in India? Can India repeat the story of China's transformation from a sclerotic economic backwater to a global manufacturing powerhouse? Key to this will be whether the Indian state can effectively deliver on the monumental goals it has set out for itself on infrastructure development. From bureaucratic organizational structure to interagency coordination, from the streamlining of permitting processes to the relationship between Delhi and state governments, this effort will be a full-scale test of India's state capacity with tremendously high stakes for the future of its 1.4 billion citizens, more than half of whom are under the age of 25.

Beyond India and China, there is even more at stake. The state provision of basic public goods and services, including physical infrastructure, underpins modern life. The vast unevenness in the abilities of states to carry out these essential functions, particularly across the Global South, is a key driver of global inequality across nearly every social and economic measure. The lack of a well-functioning municipal water treatment system contributes to high levels of waterborne illness. The absence of usable roads and highway connections leaves local residents excluded from regional or global markets. The construction of a new subway system can enable workers living in one part of a city to suddenly access potentially higher-paying jobs in another part. Estimates of the global infrastructure gap—namely, the amount of investment in infrastructure needed to meet expected rates of global economic growth—fall in the range of \$15 trillion through 2040 (Global Infrastructure Hub 2017).

Understanding the factors underlying this variation in state capacity—both across states and within states—is an important first step in addressing this pressing global issue. This

dissertation has sought to break this problem down into more concrete components, leveraging insights from several previously separate lines of scholarship including organizational theory, the sociology of emotions, and work on the Chinese and Indian states. Detailed empirical case studies of Chinese and Indian state organizations lie at the heart of this dissertation, illustrating the many ways in which the state can succeed or fail in its efforts to carry out its goals, even with sufficient resources and political support. These case studies also serve to humanize an otherwise machine-like view of the state, particularly state bureaucracies, a phenomenon that is in many ways a deliberate effort by states to ensure impartiality, objectivity, and consistency in the application of official policies. Inside the hulking office buildings, behind the plastic service windows, we find a hive of social activity, individuals with personal and professional goals, with ambitions and vendettas, who carry out the often unseen and unappreciated work of the state. After the politicians have made their speeches and cut their ribbons in front of flashing cameras, it is these civil servants who are ultimately responsible for making it all happen, translating political promises into something real.

State Organizations in the Global South

More attention should be paid to the organizational structure of state bureaucracies, not only in China and India but across the Global South more generally. As this dissertation has shown, state bureaucracies rarely conform to a Weberian ideal-type of smoothly functioning nested hierarchies, cleanly and objectively translating the goals of political leaders into state action. Not all bureaucracies are created equal, and across the diverse array of bureaucratic forms found “in nature” exist an equally wide range of bureaucratic effectiveness.

What is important to bear in mind is that there is no “one size fits all” solution to the problem of bureaucratic organizational structure. Instead, this problem is better addressed through the metaphor of the “ecological niche” where certain types of state organizational forms may be more or less effective for certain environmental conditions. These conditions include the broader political system they operate under, the quality and structure of other state institutions, the policy goals they aim to address, the skill and training of the personnel who ultimately form the flesh and bones of the organization, and the social, material, and political resources at their disposal. A useful comparison may be made to the commonplace observation in the business world that small, lean start-ups are more adept at pioneering novel and disruptive business ideas whereas large, bureaucratic corporations may be more adept at ensuring quality and reliability for complex products, such as aircraft or semiconductor microchips. Likewise, within state organizations, we occasionally find the analog of the start-up in the form of a smaller, nimble, tightly knit team, such as the National Security Council of the U.S. White House, designed to quickly respond to emerging security or foreign policy crises. Or we might find the analog of the wide-reaching bureaucratic giant, such as the National Health Service in the United Kingdom, whose citizen-facing surface area is vast and quite literally vitally important.

The question then becomes whether such relationships between environmental conditions and bureaucratic forms can be identified and exploited to improve the effectiveness of policy implementation. In the execution of large-scale, linear infrastructure projects such as railways, this dissertation has provided evidence that nodal forms of bureaucratic organizational structure may be more effective. By concentrating decision-making power to a certain extent within the middle levels of the state bureaucracy, projects like the construction of new railway lines may benefit from the balance between autonomy and control afforded by such a structure. At the same time, whether

these advantages are predicated on a certain form of broader institutional structure remains a question to be further explored. It may be the case that the advantages of nodal organizational forms for infrastructure projects only hold for other country contexts where the political system is dominated by a more unitary structure, which include not only authoritarian countries such as Vietnam and Iran but also democratic ones such as the United Kingdom where the party in power has both legislative and executive control.

Developing countries face the particularly vexing challenge of poor policy implementation combined with high levels of corruption. As discussed previously (see, e.g., the last section of Chapter 2), the relationship between bureaucratic effectiveness and corruption is not straightforward. While many country-specific campaigns and international development efforts strive to minimize corruption partly as a means to improving bureaucratic effectiveness, cases such as China's high-speed rail program show how the relationship between corruption and state capacity may not necessarily be purely oppositional in nature. From a policy standpoint, the question then becomes whether certain changes in organizational structure may reduce the corrosive effect of corruption on state capacity even when such efforts do not actually reduce absolute levels of corruption itself. In the Chinese case, we saw how a tight personal linkage between bureaucratic leadership and project outcomes may have a mixed effect on corrupt behavior among state officials but can at least ensure sufficient accountability such that project outcomes are ultimately achieved in spite of the negative distortions and leakages caused by corruption.

Indeed, developing countries not only suffer from the scourge of high levels of corruption but also frequently face what I call the "double curse of corruption": not only does corruption erode state capacity but efforts to combat corruption also frequently further degrade state capacity

by reducing trust and slowing down the course of regular bureaucratic activity. To use a medical metaphor, it is as if a patient with a debilitating autoimmune disorder were treated with a potent cancer drug that produced severe adverse side effects without even addressing the original illness.

The case of the Indian Railways serves as a cautionary example of this “double curse.” Anti-corruption efforts, such as the whistleblower system for launching an investigation into a colleague and a highly intricate system of rules designed to prevent bureaucratic abuse, are not only ineffective at curtailing corruption in the Indian Railways, which frequently ranks among the highest sources of corruption complaints among all Indian state institutions, but also tie the hands of well-meaning railway officials who are going about their ordinary work. The result is a pervasive atmosphere of fear and frustration among Indian Railway officers that limits the kind of professional initiative and ambitious risk-taking that is often needed to push a project across the finish line (as discussed in Chapter 4). The lesson for other countries and organizations in the Global South is not to simply do away with anti-corruption efforts altogether but to recognize the potential spillover costs of certain policies that may not produce a headline-grabbing failure but rather gradually, even imperceptibly, accumulate to degrade the basic functioning of the state.

States and Organizations

More work should be done to integrate research on states and research on organizations. While these two areas of scholarship tend to remain separate (with the exception of the field of public administration), historically studies of states and organizations were deeply intertwined. Max Weber, of course, viewed organizations, particularly bureaucracy, as central to the functioning of the modern state. For Weber, the rise of rational bureaucracies was not a phenomenon unique to states but rather in line with a broader trend across much of modern society: “The development of

modern forms of organization in all fields is nothing less than identical with the development and continual spread of bureaucratic administration. This is true of church and state, of armies, political parties, economic enterprises, interest groups, endowments, clubs, and many others. Its development is, to take the most striking case, at the root of the modern Western state” (Weber 1978, 223). Mary Parker Follet, the early twentieth century pioneer of modern management theory, applied insights into the nature of power and authority to corporations and the state alike: “To confer authority where capacity has not been developed is fatal to both government and business” (Metcalf and Urwick 2003, 89). Herbert Simon’s seminal work on organizational behavior in the 1950s sought to devise an organizational decision-making framework that spanned both public and private organizations, citing examples as varied as corporations, public health administrations, and local school boards (Simon 1997, 37).

This dissertation encourages a reintegration of these two areas of research. On the one hand, scholars of state capacity have much to learn from a rich body of literature on organizations that interrogates the relationship between organizational form and organizational effectiveness. This dissertation has shown how insights from organizational studies, such as work on network forms and corporate bureaucracies, can shed new light on issues pertaining to state capacity that extend beyond the Weberian paradigm. On the other hand, scholars of organizations have much to learn from the study of states as interconnected, complex organizations. The problems that state bureaucracies face, such as interagency coordination and the mismatch between authority and accountability, are also commonly found among large non-state organizations. Thus, detailed case studies of state bureaucracies can yield theoretical insights that extend to other types of complex organizations.

A refocus on states as organizations also offers greater analytical leverage by treating the state not as a set of abstract political principles but as a concrete, interconnected system of power and informational relationships. This stands in contrast to the current obsession with “institutions” in scholarship on the state, which has muddled the meaning of what states are and what they actually do. The rapid ascent of “institutions” as a concept of scholarly focus among economists and political scientists, perhaps most closely associated with work by Douglass North, has helped by expanding work in these fields beyond a narrow conception of the state as merely a coercive, mafia-like organization that accomplishes little more than the extraction of resources from society.⁹³ However, the definition of institutions remains vague and often varies significantly across authors and contexts, a problem that has been called out repeatedly (Przeworski 2004; Hodgson 2006). State organizations, instead, can be identified, mapped out, and traced. Studies can be conducted on specific state organizations, such as railway bureaucracies in the case of this dissertation, that can reveal the detailed mechanics of state capacity: how do they function in practice and where do things go wrong? This is not to say that the vast and growing literature on institutions is not warranted in its own right but rather that a renewed examination of the organizational properties of states may yield new avenues for understanding.

Rethinking Weber

This study contributes to a growing movement to rethink Weber’s theory of bureaucracy. India’s railway bureaucracy is arguably more Weberian than China’s more personalized railway bureaucracy. Yet China’s railway bureaucracy is more effective despite—or even because of—

⁹³ Much work on state capacity across the social sciences is still too heavily focused on this conception of the state and its ability to tax or extract resources rather than its ability to provide useful public goods (see, e.g., Besley and Persson 2009; Campbell 1993).

this fact. Scholars have questioned central features of Weber's bureaucratic ideal-type. For example, rule-based administration was excluded by Evans and Rauch (1999, 751–52, footnote 7) from their Weberianness index because it “might be a double-edged sword, enhancing predictability and efficiency up to a certain point but producing rigidity and organizational sclerosis when carried further.” Certain forms of corruption may be advantageous because they circumvent bureaucratic red tape (Leff 1964; Bardhan 1997; Huntington 1968) and reduce transaction costs (Hoang 2018). This would help explain the paradox of high corruption and high capacity that I found within China's railway bureaucracy, which has been observed more generally in China (Rothstein 2014; Ahlers 2014; Wedeman 2012) and other East Asian states (Wedeman 2002; Rock and Bonnett 2004; Khan and Jomo 2000).

Rather than reject Weber's theory, this study encourages us to reconsider the complex relationship between bureaucracy and state capacity, particularly outside of the West. Pritchett and Woolcock (2004) warn developing countries against “skipping straight to Weber” by superficially mimicking formal bureaucratic structures in developing states, a tendency they call “isomorphic mimicry.” By attempting to merely appear Weberian and then engaging in “premature load bearing” whereby still-weak state structures are overwhelmed with political demands, developing states may in fact be creating more problems rather than solving them (Andrews, Pritchett, and Woolcock 2017, 54). Erin McDonnell (2017) has shown how working outside formal Weberian structures might help foster a bureaucratic ethos, particularly when surrounding state organizations are lacking such a culture of impartiality and public service. There may be issues with timing and sequencing, akin to the sequencing debate over democracy and development (Carothers 2007; Berman 2007; Mansfield and Snyder 2005; Bhagwati 1992). We may come to discover a Weberian Kuznets curve where organizational effectiveness declines before improving as one moves further

along the Weberianness scale. Ultimately, the paths to Weberian bureaucracy are likely varied and nonlinear.

Moreover, there is likely no single organizational form that is best suited for all goals and contexts. Thus, it may be more useful to turn the problem on its head and ask: how might the effectiveness of state organizational forms depend on context? Might certain forms of bureaucracy be more effective for certain types of policy goals or within certain institutional settings and less effective for others? For example, nodal forms of bureaucracy may be well-suited for physical infrastructure projects but less effective for other functions such as financial regulation or public health, which require distributed flows of information. The Chinese state's information-sharing problems in the early stages of the COVID-19 coronavirus outbreak reveal the perils of a nodal structure where intermediary nodes such as local governments can restrict the flow of public health information to national authorities (Y. Gao et al. 2020). Nodal forms of bureaucracy may also be particularly well adapted for China's political and historical context given the disciplining role of the Chinese Communist Party and China's history of bureaucratic administration (Brown and Xie 2015; Zhao 2009, 2015) but less so for other countries with differing political systems or political norms. The relationship between organizational structure, their broader institutional context, and the ultimate policy goals they aim to achieve is an area that deserves further attention, particularly in understanding the factors underlying variation in state capacity across the Global South.

Organizational Change and Organizational Learning

While this dissertation has concentrated on the issue of state organizational structure and its relationship to state capacity in a static sense, there remains the deeper question of where state organizational forms come from in the first place and how they change. The sources of state

organizational forms can vary significantly, and some patterns are well-known. In some cases, states actively seek to emulate what they view as successful models in other countries. For example, India (Mastny 2010; Mansingh et al. 2009) and China (Kaple 1994; Köll 2019; H.-Y. Li 2006; CIA 1959; Westad 1998; Ghosh 2018) both drew heavily on the model of the Soviet command economy, including the rigidly centralized structure of the Soviet bureaucracy (Yergin and Stanislaw 2002; Westad 2005). In other cases, state organizational forms are imposed top-down, sometimes by another state. Thus, colonial legacies are a major source of state organizational forms, which can persist for decades or even centuries after colonial rule has officially ended (Kohli 1994; Matthew Lange, Mahoney, and Hau 2006; Steinmetz 2014; Jalal 1995; M Lange 2009). While conducting archival work in India, I was astonished by how much of the bureaucratic structure established by the British Raj remained unchanged to the present day, down to the titles of civil servants such as “district collector.”

The processes by which organizational forms spread or diffuse between and within states is less understood. Here, broader work on cross-country diffusion in general may offer some tools for understanding how organizational forms arise and spread among states. For example, sociologists have sought to explain the convergence of certain organizational forms around the world (J. W. Meyer et al. 1997; Powell and DiMaggio 1983; Reinsberg et al. 2019). There may be processes analogous to the phenomenon of convergent evolution in biology where states gravitate towards similar organizational forms because they tend to be most effective for a common set of state goals or environmental factors. Centralized hierarchical structures may indeed offer the most effective means of maintaining control in, say, authoritarian states or in states pursuing a singular goal, such as defending militarily against an active foreign invader. While a functionalist explanation such as this may offer insights into why some states come to look similar to one

another over time, the opposite question is equally urgent: why does variation in state organizational forms around the world persist? Existing work on policy diffusion offers several possible avenues for understanding when and why organizational forms spread, such as theorization (Strang and Meyer 1993), individual change agents (Strang and Soule 1998), and economic competition (Shipan and Volden 2008).

Tucked within the broader question of organizational change is the thornier question of what prevents state organizations from changing and reforming themselves even when the problems and solutions are all already widely understood. For example, many of the organizational problems within India's railway bureaucracy are widely known among Indian officials themselves. A steady stream of government reports has been repeating many of the same recommendations for decades.⁹⁴ The problem therefore may not be a lack of knowledge about which reforms are needed but rather how to make the changes everyone agrees should be made. A recent World Bank (2016:1) report captures this broader shift in emphasis from "getting policies right" to a recognition that "[t]oo often, government leaders fail to adopt and implement policies that they know are necessary for sustained economic development." The obstacles that states face in bringing about organizational change may vary widely, from disagreements among political leaders over the direction or means of bringing about state reform to obstruction by interest groups, including segments of the state bureaucracy itself.

Yet, organizational learning and internally driven self-adaptation are possible. In some cases, the process can be rapid by historical standards. The breathtaking pace by which late-Tokugawa and Meiji Japan learned and absorbed Western technical and organizational knowledge in the late nineteenth century stands out as perhaps the most striking example in recent historical

⁹⁴ One report on India's railways included a list of recommendations from previous reports that had been frequently repeated but never implemented (Debroy et al. 2015, 194–230).

memory (Gordon 2003; Smith 1988; Jansen 2000; Saxonhouse 1974). In other cases, it may be a slow and halting process spanning decades or even centuries, as was the case with the rise of a professional, federal bureaucracy in the United States across the nineteenth and twentieth centuries (Carpenter 2001). In the case of contemporary China, two relatively recent examples of organizational learning deserve special attention.

In the first example, China learned from Japan. As China's reform efforts were beginning to accelerate in the 1980s, Chinese officials looked abroad for new models of economic organization, desperate to move beyond the sclerotic top-down command economy they had previously borrowed from the Soviets. In 1984, for the first time in decades, China opened a new domestic infrastructure project to bidding from international contractors, partly at the urging of the World Bank which had come to play an instrumental role in advising China on its search for new economic models (Gewirtz 2017). Specifically, China was preparing to build a new hydroelectric dam in Yunnan province that would later be called the Lubuge Dam (鲁布革水电站). A Japanese civil engineering firm named Taisei Corporation won the primary contract and taught Chinese project managers a new approach to implementing large-scale projects called the "contract management system" (People's Daily 1987), which proved wildly successful in reducing costs and accelerating project completion (World Bank 1984, 1993a).

The Chinese central government then launched a nationwide campaign to spread this new project management model to other sectors (People's Daily 1987; State Council (China) 1984), including the railway sector where it has become the overarching framework for all new rail projects. This case of learning on the job marks an example of what Albert Hirschman (2015) called "trait-making" whereby a country or organization does not merely take on project it believes it can already do well but rather uses new and challenging projects to bring about a deeper

organizational change. The case of the Lubuge Dam was all the more remarkable given that the teacher in this case was none other than Japan which had only a few decades ago invaded China.⁹⁵ The early years of China's reform period proved to be a unique political moment when China was able to overcome previously insurmountable obstacles including political ideology and the specter of history itself to bring about transformational change in the organizational structure of the state.

The second example, remarkably, is one where China learned from India. After giving a presentation at India's Ministry of Railways, I was approached by several Indian Railway officers who wanted to share a story they had been personally involved in. In the 1990s, China's Ministry of Railways sent a delegation to India to study India's recent success with containerization. India had been ahead of the curve in recognizing the importance of container shipping as a transformational technology for all forms of freight transport, particularly in its use for inter-modal shipping. India's Ministry of Railways sought to capitalize on this innovation by forming a special-purpose state-owned enterprise called Container Corporation of India (CONCOR), which provides transport logistic services. As Indian railway officials recounted to me, Chinese railway representatives diligently studied and took notes on India's containerization program during their visit and brought their findings back to China. To the surprise of these Indian Railways officers, their Chinese counterparts quickly adopted and implemented many of the key organizational features of India's containerization program, even improving upon them in some areas. While Chinese official state media often portray India as an economically backward country with little

⁹⁵ In my interviews with Indian Railway officials, many lamented the lack of learning from outside the organization, much less from other countries. At the same time, the example of China and the Chinese high-speed rail program looms large in the imagination of many Indian officials I spoke with, much as Japan's experience had once stood as a model for Chinese reformers.

to offer China in the way of new technological or organizational approaches, in practice Chinese officials seemed more than willing to learn from any country's example, including India's.⁹⁶

Thus, beneath the problem of state capacity lies a deeper problem of meta-state capacity, by which I mean not merely the capacity of the state to carry out policy goals but the capacity of the state to change itself. What are the social and political factors that must line up to create a moment where organizational change is possible? What role do specific actors play in driving change, from political leaders at the top to low-level bureaucrats and members of society more broadly? In attempting to understand the structural drivers of potential change, one must not forget the powerful role that accidents and events can play in realigning political priorities or concentrating public attention on a particular organizational problem. The 2011 high-speed rail accident near Wenzhou marked such a moment for China's railway sector, creating an opening for drastic organizational change including the dissolution of the previously politically untouchable Ministry of Railways.

State Capacity and Politics

Lastly, state capacity cannot be separated from politics (Rothstein 2011; Centeno, Kohli, and Yashar 2017; Leftwich 1995; Kohli 1987). The inability of the American state to reform its healthcare system (Quadagno 2010; Beckfield, Olafsdottir, and Sosnaud 2013) or gun control policies (Celinska 2007; Yamane 2017) stems less from the organizational capacity of the U.S. government *per se* and more from political factors, such as divisions within the electorate and the outsized influence of interest groups. The rapid implementation of China's high-speed rail program

⁹⁶ To be sure, there remains a strong bias in China towards emulating U.S. institutions, from intellectual property legal codes to military command structures. The bias toward copying the United States was often justified to me by Chinese interviewees as "learning from the best," even when the lessons of other countries may have offered a better contextual fit.

has also been driven by broader political objectives including the need to generate employment, utilize excess capacity in industrial sectors such as steel, and stimulate economic growth through fiscal measures.

At the same time, state capacity also affects politics by shaping the very set of policy options under consideration *à la* Lukes' (2005) second dimension of power. This can generate a causal feedback loop between political demands or expectations and state capacity. For example, patterns of clientelist exchange in democracies may persist in part because voters have little faith in the will or ability of politicians to carry out broad-based, programmatic policies (Keefer 2007; Robinson and Torvik 2005). The Indian state faces deep-seated public skepticism towards large-scale infrastructure projects due in part to a poor record of timely execution for similar large-scale projects (Mehta 2003).⁹⁷ As a result, Indian voters often favor proven policies with immediate results, such as farm loan waivers or water and electricity subsidies, despite their lower long-term social returns (Baskaran, Min, and Uppal 2015; Alkon and Urpelainen 2018). In contrast, China's proven capacity for railway development, along with the tremendous material and labor resources mobilized for such megaprojects, made the expansion of China's high-speed rail network the ideal target for a \$600 billion fiscal stimulus package following the 2008 global financial crisis (Bai, Hsieh, and Song 2016; Elliott and Yan 2013). More work remains to be done to understand the complex interactions between politics, state capacity, and organizational form.

⁹⁷ Mehta (2003:138) has argued that "there is little in the citizens' experience of the Indian state that leads them to believe that the state will be a credible provider of social services."

The Path Forward

In October 1978, China's top political leader Deng Xiaoping made a historic visit to Japan, becoming the first high-ranking official from the People's Republic of China to do so. Among other goals including the normalization of relations between the two countries, Deng sought to find the “magic drug” for modernization, referencing the famous Chinese myth of Xu Fu who traveled to Japan in search of the elixir of life (Vogel 2019, 338). In a video clip released by Chinese state media at the time, Deng can be seen riding a Japanese bullet train, known as the Shinkansen. In the grainy footage, one can just make out the trace of a smile on Deng's face as he eagerly watches the Japanese countryside fly by at dizzying speeds. When asked what he thought, Deng replied in his customary measured yet to-the-point manner: “It feels fast, like someone in a rush.”⁹⁸ In that moment, one can see the seeds of ambition taking root: namely, for China to modernize like Japan did and perhaps have a Shinkansen of its own.

State capacity, bureaucratic structure, organizational forms—these matters are not nearly as exciting as a ride on a high-speed train. Yet these fundamental elements of modern life that we tend to take for granted in the industrialized world matter tremendously to the lives of millions of people across the Global South and their hopes for a better future. In the end, the question we should be asking is not whether the state should play a role in our lives or how large or small the state should be, but rather how we can improve the state's ability to carry out its essential functions and ultimately improve our lives.

⁹⁸ The original Chinese: “我就感觉到快，有催人跑的意思。”

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