INTRODUCTION

This book is about attempts in Brazil to use its endowment of minerals as a tool for creating wealth and the evolution of the economic role of the Brazilian state. These topics are surprisingly intertwined. The focus is on political economy, rather than the extraction of minerals from the ground, because political economy impeded extraction. Substantive change in the political-economic institutions related to mineral extraction initiated Brazil's emergence as an industrial economy and as a global powerhouse in supplying iron ore in the second half of the twentieth century. These outcomes occurred nearly four and a half centuries after the first attempts of Europeans to realize wealth from the land's minerals. As one result of this process, the Brazilian state became the nation's largest industrial producer and commercial agent, as well as one of the world's prime examples of state-capitalism.

Copyright

The questions framing this study are: How did political-economic institutions shape efforts to exploit mineral resources within Brazil, and reciprocally, how did these efforts shape political-economic institutions? The interactions between the rules and practices governing property, business enterprise, capital markets and the state reveal themselves to be as important to mineral development as the structure of the individual institutions and as important as the presence of minerals. The argument developed here is that creating wealth from the subsoil required the coordination and accommodation of these institutions, and further, that the interaction between institutions and resources was instrumental in shaping the economic governance of Brazil. Understanding the institutional dynamics of the changing economic role of the state in order to extract minerals also sheds important light on two persistent questions of Brazilian economic history (as well as that of other 'late developing' economies): What were the impediments to the evolution of business organization practices that would have promoted large-scale, de-personalized private capital accumulation? And what were the parameters of the shifting divide between public and private spheres in economic activity?

The economic history of mineral rights is not widely studied, and the subject typically focuses on the establishment, rather than change, of property rights.[1]

In Brazil, the Portuguese established the principle that the subsoil was sovereign property early during colonial rule. After a gold 'rush' from 1695 until about 1750, ambitions of garnering mineral wealth continually fell short of miners' goals. From the late eighteenth century, government policy began to search for the means to vitalize mineral production. As miners juggled competing institutional and infrastructure demands with difficulty, their efforts presaged later activity and policy. In 1891, the federal government abruptly privatized mineral rights by attaching the subsoil to land, effectively transferring the subsoil and its contents to landowners. Privatization required significant changes to the definitions of two institutions: public domain and subsoil property. The motivation for these reforms was to promote economic modernity. Mining was only one of many arenas subject to modernizing efforts at the turn of the twentieth century, although historians have subsequently questioned the commitment to fundamental reform.[2] Change to subsoil rights achieved very limited success, and its reversal began in 1930. By 1942, after years of controversy and the shift of attention from precious to industrial minerals, state-owned enterprises emerged to mine and export iron ore and to produce steel in order to meet the superordinate goal of economic development. The new enterprises were the largest in Brazil at the time. They set the precedent for state capitalism in natural resources and mining, and Brazil became one of the world's major providers of iron ore and steel in a relatively short time frame. Although policy makers and legal authorities focused their attention on the property rights attached to the subsoil, competing institutional demands with respect to capital and various categories of property proved to be the binding constraints on mineral development. To meet goals for industrialization, without threatening long-standing arrangements that governed economic relationships extending far beyond minerals, the public sector entered into the business of industrial production and commerce.

Copyright

Although minerals have always lurked in the background (and sometimes in the foreground too) of Brazilian political economy, they have received surprisingly little historical attention. The neglect of the topic parallels the inability to develop a base of economic activity sustained by minerals. Non-renewable natural resources generate unique issues with respect to political economy and governance for a variety of reasons. The resources are natural and non-renewable, rather than produced and reproducible by identifiable actors. Because these resources are natural, this study belongs to the corpus of environmental history, as well as economic, business and political history. It is concerned with human interaction with the natural world in the effort to convert a raw material into a marketable commodity. However, in keeping with the norms of the time periods under examination here, the effects of exploiting the natural environment were not objects of consideration to decision makers or to miners.

The analysis in this book draws heavily on the 'new institutional economic history'. Loosely defined, institutions are the 'rules of the game'.[3] While the term has an impersonal and abstract tone to it, institutions represent the understandings that individuals have reached through innumerable interactions, often over long periods of time and subject to evolution. They reflect the accumulated agreements about norms and practices of social interaction. With all of their ambiguities, institutions identify the parameters of interactions among actors, and they regulate those interactions. Institutions take many forms, including specific organizations, social custom, or laws and government. They shape and govern behaviour and reflect the interests of the participating actors. Institutions are negotiated outcomes that represent an accumulation of myriad transactions. Negotiations may be formal or informal; they may also be among parties of relatively equal influence or among unequal parties (coercion). The outcomes fall on a continuum of possibilities, strongly influenced by interest group activity and political strength.

Neo-institutional scholarship concentrates on interactions among private sector actors. This literature postulates the state as an important tool for shaping and enforcing institutional arrangements and also as a tool of interest groups. States provide the forum for negotiating many institutional constraints (legislatures specifying laws); they also provide the infrastructure to regulate interactions and enforce agreements among private parties as well as between private parties and public authorities. Latin America has provided a prominent setting for these studies, even if most of their authors have their intellectual homes in the US.[4]

Copyright

Property rights are a fundamental theme of the new institutional economic history; they are taken as a crucial element in determining the trajectory of economic growth and business development. The underlying tenet of current research is that well-specified property rights are a prerequisite for sustained economic growth and market formation.[5] The literature assumes that effective property rights delineate the limits to owner autonomy with respect to asset use, transformation and transfer. Effective rights do not easily give rise to counterclaims on property that render autonomy uncertain, and clear procedures exist when counterclaims arise. Law (common or statutory) specifies and protects property ownership and use.[6] While paying lip service to the diversity possible in specifying property rights, there is an impressive dearth of research observing specific features of property rights that prove to be ineffective.

Contracts operationalize property rights in transactions between economic actors. Whether formal or informal, contracts serve to specify the terms of exchange transactions and to anticipate problems of contingent claims that may arise in the process of exchange. The evolution towards more sophisticated forms of property rights and larger, more complex organizations requires more complex contracting. However, asset specificity (the ability to reallocate or transform

assets/property) and asymmetric information impose constraints on the ability to specify complete contracts. 'Complex contracts are invariably incomplete, and many are maladaptive. The reasons are two: Many contingencies are unforeseen (and unforeseeable), and the adaptations to those contingencies that have been recognized for which adjustments have been agreed to are often mistaken.'[7] The judicial system may offer one avenue for settling disputes about contingencies that disrupt contracts. Judicial remedy is limited by the confidence the parties put in the courts, the ability of courts to deal with complex problems expeditiously and by their costs. Therefore, as contracts become more complex, the parties develop incentives to build in credible commitments that bind them to the terms and intent of their contract and to peaceful extra-judicial settlement.[8]

The physical characteristics of different types of assets shape feasible structures for their rights. Land and financial assets are the types of property whose rights have been most thoroughly studied. These assets have an important characteristic that eases their understanding. They are nearly infinitely divisible, yielding large samples of transactions that demonstrate their dynamics. Therefore, analysts can observe institutional development in the daily practices of multiple small and large economic actors. The few recent studies of Brazilian institutional economic history share this characteristic.[9] In contrast, the case of minerals in the formation of a large-scale industrial base presents significant difficulties.

Copyright

In sub-surface mining, asset specificity and asymmetric information are particularly vexing problems. Mines seldom can be converted to other uses of equal economic value, and mine owners closely hold information about the likelihood of finding minerals or other resources. The number of actors was small in Brazil. Relatively few cases had large impact and they did not occur along a smooth time path. In short, mineral-related transactions were lumpy. As a result, establishing rights to minerals had particular conceptual and practical difficulties, with respect to uncertainty and asymmetry of geological knowledge, high fixed costs and time dimensions. Causality was bi-directional; the specific nature of the iron ore deposits in the Minas Gerais region of Brazil (the central locus of early mining) both constrained institutional responses, and the ability to extract those deposits was constrained by institutions. These characteristics challenge both methodology of the new institutionalism and the understanding of historical experience.

Despite its usefulness, the new institutionalism also brings theoretical and methodological limitations. One divergence from mainstream neo-institutional scholarship in this study is the inclusion of non-human actors: iron ore deposits and the state. This book posits that the state is simultaneously an actor, a tool for interest groups and an enforcement agent.[10] The effort to develop iron ore production of industrial scale resulted in a fundamental transition of the economic role of the state. This outcome resulted from the decision to develop through the medium of a state-owned enterprise, one of the strongest forms of economic intervention. Doing so initiated the state in the role of an important actor in pro-

duction and commerce, at the same time that the state's more usual activities of regulation and mediation grew stronger. Development economists have studied the economic role of the state in detail. In addition to the nature and scope of regulation, state-owned enterprise (SOE) has been an important, if controversial, tool for managing development. However, business and economic historians of the developing world have generally neglected these firms and their origins.

In addition, rather than limiting this analysis to a single institution, interaction among different institutions provides a key to understanding how complex institutions change over time in this project. Different categories of property – familial, business, subsoil – carry distinct considerations, and these categories are not mutually exclusive. The preponderance of the property rights literature has assumed a dichotomy between individual and corporate ownership structures. This assumption is at odds with Brazilian history.[11] The literature ignores *familial* property, a form that has been mandated through Brazilian history.[12] Further, protection of existing accumulations of property could prevent the division of fixed real assets (such as mineral veins). The effects of these constraints for Brazilian business practices are crucial for understanding this history. The consideration of multiple institutions also complicates our understanding of the process of institutional change. If institutions represent the cumulative result of the actions and interests of actors, then changing institutions needs to accommodate both existing and new interest groups.

Copyright

Researching institutional change, incorporating the implications of multiple institutions, non-human actors and the multiple roles of the state has methodological implications for this study. The theoretical and econometric models used by the new institutionalism have difficulty incorporating the multidimensionality of institutional interaction, and have given rise to its most effective criticism.[13] As a result, methodological constraints are powerful determinants of the application of neo-institutional analysis. A strange dichotomy divides the literature between large, generalized questions and topics that are very narrowly defined.[14] They take advantage of nearly infinite divisibility appropriate to the standard tools of econometric analysis: model specification and accumulating large data samples for empirical testing. These studies gain much of their strength from applying either very generalized or narrowly defined institutional arrangements to a small range of often-repeated actions in a manner that can accommodate divisibility. However, their usefulness is limited by not explaining clear avenues of causality (in the overly generalized studies) or by explaining very narrowly defined and not readily replicable circumstances of narrowly defined institutions. These studies have not addressed the large-scale industrial transformation that occurred in the middle of the twentieth century in many economies.[15] To do so requires a more multidimensional approach than recent methods support.

In the case of mineral extraction, in which scale matters and economic importance is high, the repeated actions of economic actors are not available for

analysis.[16] The economists' tools of precisely parameterized models reflecting narrowly defined questions do not allow for an understanding of the messy realities of institutional interaction and path dependence (historical specificity). Further, data availability hinders the possibility of empirical analysis of the optimum rate of resource extraction (to test the desirability of policy options at different times).[17] Here, economic concepts combined with historians' tools allow a broader insight on the political-economic question of the development of the role of the Brazilian state within the productive economy. The quantitative data appropriate to the questions of each chapter (analyses of laws, land sales, concession-granting and equity-market data) present sufficient constraints that econometric testing would obscure, rather than clarify, their implications. These data present pictures of circumstances that can be understood most clearly through narrative analysis in conjunction with documents from archival sources, government and company records and the very active business press of the period. The historical approach allows for the nuanced and widely considered study of a case that is important both to the theories of institutions and to the history of Brazil.

Theories of public choice provide the prism for understanding the evolution of the economic role of the state by considering the interaction between collective and individual interests.[18] When economic activity generates externalities (benefits that extend beyond those accruing to the provider) the incentive of any private sector economic actor (person or enterprise) to engage in that activity diminishes, because of the benefit that actor cannot capture. If the externality, or collective good, is sufficient, then the state, as the public authority, may step in to provide it. Conflict over the public provision of a good or service is often fraught with political competition. Strong interest groups identify externalities that they have no incentive to provide, or cannot capture, and they attempt to influence the state to provide for their collective creation. Once decided upon, the state can provide goods and services through a variety of arrangements. State-owned corporate enterprise, operating in the economic marketplace, is only one of many possible arrangements.[19] The implementation of Brazil's first large-scale iron ore projects relied on state-owned enterprise in order to accommodate a range of competing economic and political goals.

Copyright

This book's focus on the political economy and institutional accommodation to initiate industrial-scale iron ore mining defines its scope. A general history of mining or of the iron and steel industry in the twentieth century are (potentially rich) projects left to other scholars.

The argument of the book impinges upon many topics that are crucial to understanding Brazil's history and its current reality. It also raises issues that continue to impact resource use in Brazil and throughout Latin America. At the beginning of the twenty-first century, Brazil is one of the world's largest providers of iron ore, one of the most sophisticated producers of steel and is energy self-sufficient. Efforts to achieve these goals began as early as the seventeenth

century. Difficulties in bringing together the resources, technology and capital were frustrated repeatedly by the desire to not challenge the accepted underpinnings of society and economy. The resolution of these issues required Brazilians to face questions regarding the boundaries between public and private property, forms of governance and economic participation. The pendulum of political and economic support for public enterprise oscillates with circumstance. This book offers a detailed and long-term case study of one of the largest and (perhaps) most successful public enterprises of the developing world. The global economic crisis of the first decade of the twenty-first century brings the issues considered here back to prominence.

The book's organization reflects both chronology and thematic issues. After a chapter to establish the historical context, Chapter 2 delineates the legal history of mining. Readers uninterested in the topic or in gaining insight on the interaction between law and economic concerns may wish to go directly to Part II, which analyses the historical trajectory of the subsoil and its development in three chapters. The first two efforts that the state brought to the topic, an early attempt to develop local industry within Brazil as the colonial era ended at the beginning of the nineteenth century and the subsequent benign neglect in the hope of attracting foreign capital and technology through the remainder of the nineteenth century, are explored in Chapter 3. Chapter 4 analyses the first major change in subsoil rights, privatization in 1891. The chapter considers the effects of the privatization and the impediments to fuller mining development, as interest shifted from precious to industrial metals. The successful organization of iron ore mining into a large-scale industrial endeavour is the topic of Chapter 5. The concerns of the chapter are the historical path by which this outcome arose and the effects for the Brazilian economy with respect to the introduction of state capitalism, capital markets and the structure of business organization. The chronological story beyond the launching of industrial iron ore receives only sketchy attention here because the early transformation set the broad parameters of subsequent development. Inserting the history of developing iron ore production into the broader perspectives of Brazilian history is the task of Part III with chapters on two especially pertinent themes. Chapter 6 asserts the tight and pragmatic relationship between mining development and economic ideology. Chapter 7 articulates the precedent that iron ore development set for the subsequent history of petroleum and for economic governance, and it offers a brief consideration of the retrenchment from state capitalism during the second half of the twentieth century. These chapters build the argument that the practices governing many different categories of property, capital markets, business structure and economic governance evolved together in order to turn Brazil into one of the major global providers of a basic industrial commodity, iron ore, at the same time that they structured the Brazilian economy.

Copyright