1 Introduction

This second edition of *Modern Economic Regulation* has two aims. For those new to economic regulation, it aims to provide an accessible entry point to what is a highly technical and specialised area. It focuses on fundamental questions such as the following: Why do we regulate certain industries? What principles should guide economic regulation? Who should regulate? What have been the effects of regulation in practice?

For readers already familiar with regulatory theory or practice, the book aims to help navigate what is a large and ever-expanding body of theoretical research, and to draw on evidence, where available, of the impacts of regulation across a range of industries and countries. In essence, it aims to distil insights on which policies and strategies have 'worked', and which have not. As we will see in the chapters that follow, economic regulation is not a static area, either in theory or in practice. Indeed, despite expectations by some in the 1980s and 1990s that economic regulation would gradually be withdrawn over time in some industries, the size of economic regulators in many jurisdictions has expanded rather than contracted over the past four decades. Moreover, regulatory agencies have now been established in a great many parts of the world: economic regulation is now a global phenomenon.

1.1 WHY DOES ECONOMIC REGULATION MATTER?

All of the services discussed in this book are indispensable to modern life: we could not live as we do without them. One only needs to imagine a widespread failure in one or more of these industries – a prolonged electric power blackout, gas disruption, telephone or internet connection failure, water or sewerage contamination, payment systems failure or shutdown of a rail or aviation network – to appreciate their significance to individuals, societies and economies. Moreover, such services are ubiquitous – each day we consume at least some, if not all, of the services discussed in this book, not only directly as retail customers, but also indirectly through other products and services we consume that have been manufactured using, or enabled by, these services.

For many households around the globe, the proportion of average annual income which is spent on the consumption of services supplied by the industries described in this book – electricity, gas, water, wastewater, transport, payments, digital services and

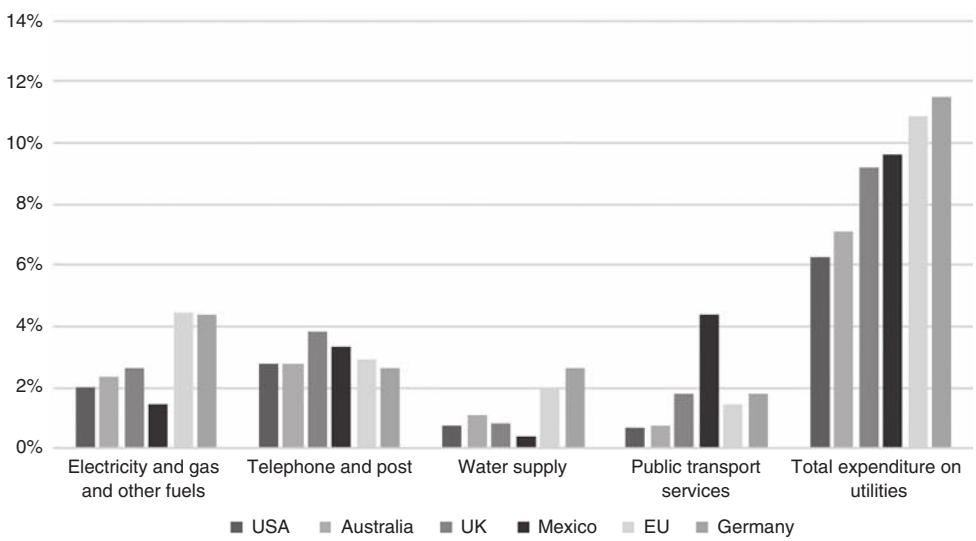

Figure 1.1 Average household expenditure on public utilities as a proportion of final household consumption expenditure in selected OECD countries in 2020. Based on author's own analysis of OECD data

telecommunications services – is significant. As shown in Figure 1.1, the average household in selected OECD (Organisation for Economic Cooperation and Development) countries spent between 6.3 per cent and 11.5 per cent of total household expenditure on utilities in 2020. These proportions are often significantly greater for those on the lowest incomes, while in developing countries a core challenge is to achieve widespread access to these essential services. Beyond the household, the secure, reliable and efficient provision of public utility services – the Internet, electric power, transport systems and clean water – is an extremely important contributor to the economic and social development and growth of countries. In most developed countries the value added of the public utility industries to gross domestic product (GDP) is estimated to be between 4 per cent and 6 per cent.[1]

While all these services are critical to modern life, they are typically provided by firms that occupy strong, and often monopoly, market positions. In some cases this is the natural result of the demand, cost and technological characteristics of the industry (such as economies of scale or scope, or network effects), while in others it reflects public policy decisions. If left unregulated, firms in such positions may exploit their power by charging excessive prices, reducing quality, or failing to invest and innovate. This can be inefficient from a social welfare perspective and harmful to current and future consumers of the services. This potential, coupled with the essential nature of the services they provide, has created longstanding questions for governments, policy makers and academics about how to most effectively guide and control the behaviour of public utility firms: How can we effectively regulate them?

[1] See Guthrie (2006), based on 2001 data from the STAN (structural analysis) database of the OECD.

1.2 WHAT IS ECONOMIC REGULATION?

The term 'regulation' is often used to refer to a range of measures and forms of intervention – introduced by the state or other actors (e.g. industry bodies) – which are intended, in one way or another, to guide or control the behaviour of a firm or individuals.

In this book, the term 'economic regulation' is used to refer to two broad types of interventions and policies. The first type of interventions focus on the *structure* of an industry: for example, by restricting the number of firms that can be involved in the supply of a service, requiring firms to vertically or horizontally separate different activities in a supply chain, or mandating that access to infrastructure facilities be provided to third parties. A second set of interventions attempt to guide or control the *behaviour* of firms in terms of their decisions in respect of pricing, investment, quality and coverage of service, as well as the terms on which access is provided to other firms, including competitors.

Of course, as we will see, many other public policies are directed at controlling or guiding the behaviour of firms, including health and safety policies, environmental policies and social policies. While these policies are sometimes considered to be examples of social regulation rather than economic regulation, such a sharp distinction is not easily made in relation to the industries discussed in this book. For example, it is not possible to talk about the economic regulation of the electricity, transport and water industries without considering environmental policies (where financial subsidies and incentives are frequently used to encourage more environmentally friendly production and consumption decisions), nor is it possible to consider gas or water regulation without considering health and safety considerations (as higher safety standards can impact on the costs associated with operating and maintaining these networks). Affordability and social inclusion policies, such as providing widespread access to certain services at 'fair prices', are also an important part of regulating the industries discussed in this book.

Economic regulation is therefore conceived broadly to capture both 'traditional' interventions – to control prices, entry, quality and other aspects of economic behaviour of firms operating in certain industries – as well as interventions that are intended to guide or compel firms in these industries, through financial incentives or disincentives, towards behaviour consistent with wider social or environmental policy objectives (such as incentives to encourage consumers to conserve water or energy, or to utilise particular forms of transport, or measures that penalise companies for not treating their customers fairly).

1.3 WHAT IS 'MODERN' ABOUT ECONOMIC REGULATION?

Economic regulation is not a new phenomenon. The first regulatory commissions were established in the USA in the late 1880s, and the subsequent expansion of electricity, gas, water, transport and telecommunications services in many other countries led to the introduction of a range of governance arrangements (including state ownership) to establish controls on the prices and quality of these services. Indeed, many of the issues addressed in this book have challenged regulators and policy makers for over a century. There is an equally long history of academic scholarship on the economic regulation of

the public utilities,[2] and many classic and newer texts cover some of the central issues in regulatory economics.[3]

Against this background, it would seem that there is very little 'new' to be said, and very little 'modern' about economic regulation. In part, this is true, and many of the *principles* of economic regulation discussed in this book remain as relevant today as when they were first established. However, the *context* in which economic regulation is applied is constantly changing, and this gives rise to new policy issues and areas of academic inquiry. Four contextual changes are particularly relevant to the chapters that follow: digitalisation; environmental and sustainability policies; increasing concerns about the affordability of essential services; and the influence of behavioural economics on regulatory theory and practice.

The first contextual change involves the significant advances in information and communications technology (ICT), sometimes referred to as 'digitalisation'. Digitalisation has transformed the supply of telecommunications services, where there is now not only a range of new services and applications offered, but a range of different networks supplying these services, such as cable networks, fibre networks and mobile networks. Digitalisation has also led to the emergence of whole new industries, such as digital platforms, and dramatically changed other industries, such as the payments sector. As we will see, this has raised fundamental questions about whether, and how, these industries should be regulated. More generally, all of the industries discussed in this book have been affected by digitalisation to some degree. For example: in the energy sector, consumers can now source or share energy through peer-to-peer platforms or better manage consumption in real time; in aviation, the development and use of remotely operated and controlled unmanned aircraft systems are expected to have significant impacts on air traffic management; while the movement towards so-called 'smart' networks allow for more effective management and control of transport and water systems.

The changed context for regulation also reflects increased community and political concern for the environmental impacts of the supply of some services, notably energy, transport and water services. In the electricity sector, this has led to a global policy focus on decarbonisation, which involves a shift away from heavily polluting forms of electricity generation towards cleaner generation produced from renewable or low-carbon sources. In the gas industry, policies are focused on a shift towards renewable gases such as biomethane (which combines methane, carbon monoxide, hydrogen and other gases) and low-carbon hydrogen. Policies in the water sector have become focused on ensuring sustainable water extractions, allowing for water trading, and ensuring high levels of wastewater treatment. Given these developments, some argue that, over the past decade,

[2] More than one hundred years ago, in May 1914, a special edition of the *Annals of the American Academy of Political and Social Science* titled 'State Regulation of the Public Utilities' considered many of the issues that are discussed in the chapters that follow such as: rate setting procedures; regulating quality of public service utility service; the independence of public utility commissions; and judicial review of regulatory decisions. See AAPSS (1914).

[3] Bonbright (1961) and Kahn (1971) are classic texts that cover many of the central issues in regulatory economics. Baumol, Panzar and Willig (1982) and Laffont and Tirole (1993) introduced new analytical dimensions to different aspects of economic regulation. Vickers and Yarrow (1988), Armstrong, Cowan and Vickers (1994) and Newbery (1999) examined the early impacts of restructuring and privatisation in Britain. Florio (2013) provides a spirited critique of restructuring policies, while Auriol, Crampes and Estache (2021) and Vogelsang (2021) provide recent analyses of regulation in the network industries.

the focus of economic regulators in some industries has shifted away from promoting competitive markets towards managing the transition to more sustainable forms of production and consumption of some essential services.

A third contextual change is increasing social and political concern about the affordability of some essential services. While issues of fairness and affordability have always been relevant to economic regulation, these issues are now at the forefront of debates about the need for, and approach to, economic regulation in many countries. This likely reflects three factors. First, that, as a result of restructuring in some industries since the 1980s, notably electricity and gas, the retail prices paid by consumers now more closely track changes in underlying wholesale prices. While this can be economically efficient, it can give rise to political and social concerns about affordability where sudden and significant increases in wholesale prices lead to major increases in retail prices (as occurred for energy prices in many countries in 2021–2022). Second, price rises are being driven by a need for substantial investments in network infrastructure, whether as a result of decarbonisation policies (such as in the energy sector), or to ensure system resilience in the face of climate change (as in the water sector), or to ensure widespread access to high-speed broadband and digital services. Third, in some countries the focus on affordability reflects a view that the restructuring of the public utility industries has either failed to realise the promised efficiency and performance benefits, or that any efficiency savings that have been realised have not been shared fairly with consumers in the form of lower prices or investments in networks. In essence, it is argued that the major beneficiaries of these policies have not been consumers, but rather the owners and operators of private utility firms. In some jurisdictions, concerns about affordability have encouraged movement towards increased community or citizen involvement in the ownership and operation of certain essential services, while in other jurisdictions 'reverse-privatisation' policies have been introduced, with the purported aim of making essential services more affordable and accessible to citizens.

A final contextual change impacting economic regulation is the increasing influence of behavioural economics research. As we will see in Chapter 7, a growing body of analytical work, as well as practical experience, has called into question some of the foundational assumptions of industrial organisation (theory) and economic regulation. This includes assumptions that all consumers are rational, well informed and 'active', and will take advantage of the choice available to them in competitive markets, and that suppliers in competitive markets will not collectively exploit consumer biases. These insights have significant implications for economic regulatory theory and practice, and regulators in a range of industries are increasingly using behavioural economics research to introduce policies that have the aim of making consumers more informed and active, and limiting the scope for behavioural biases to be exploited.

Modern economic regulation therefore raises a mix of new questions, arising from changes in context, technology and public policies, and older, more enduring questions. These include questions such as: How can a regulator incentivise regulated firms to behave efficiently? How can a regulator overcome problems of asymmetric information between itself and the firms it regulates? Is private or state ownership more efficient in reducing costs, improving performance and widening access to essential services? What

are the arguments for or against vertical integration or separation in different industries? What principles can be used to guide the access terms for the 'sharing' of infrastructure? What are the merits of different forms of price regulation, such as rate of return and price cap regulation? What considerations beyond efficiency does a regulator need to consider when setting or approving a rate structure? How can regulation impact on a firm's incentives to invest and innovate? Is it always possible to introduce sustainable and effective competition for all essential service industries? When is it more appropriate to introduce *ex ante* forms of economic regulation (i.e. up-front price controls) or rely on *ex post* competition or antitrust law? What are the pros and cons of alternative approaches to traditional economic regulation, such as those based around direct negotiation and agreement between firms and consumer representatives. Finally, there remain intensely practical questions about how the principles, or *theory*, of economic regulation can best be implemented in *practice* in different institutional settings, and specifically whether it is possible, or even desirable, to transplant the principles and approach to regulation used in developed and industrialised countries to the developing world context.[4]

1.4 STRUCTURE OF THE BOOK

This book comprises three parts. Part I considers the rationale for economic regulation, and the alternatives to standard economic regulation that have been proposed and tried in practice. Within Part I, Chapter 2 focuses on why certain industries are subject to economic regulation, and considers both normative explanations (Why *should* we regulate?) as well as alternative, more positivist explanations for the existence of regulation (Why *do* we regulate?). Chapter 3 considers various alternatives to the standard approaches to economic regulation that have been proposed and tried, including control approaches based around franchising or 'competition *for* the market', state ownership, negotiated agreements, as well as reliance on *ex post* competition law or, in relation to activities in which 'deregulatory' policies can feasibly be introduced, on the restraints imposed by competition itself.

Part II of the book considers some of the principles that underlie modern economic regulation, and the five chapters which comprise Part II draw principally upon theoretical work on economic regulation. Chapter 4 begins by outlining some of the commonly accepted general principles developed in theoretical work relevant to the regulation of the core network activities of public utility industries. Chapter 5 builds on this discussion to examine the different forms of price regulation that are typically applied in practice, including rate of return regulation, price cap regulation and various adaptations to these approaches, such as earnings and revenue sharing mechanisms and approaches based on yardstick competition or benchmarking. It also considers approaches to price regulation that could be applied in settings where there is some competition, but an incumbent firm still occupies a strong position in the market. Chapter 6 examines the principles for regulating in competitive settings, such as where an entrant in a competitive activity in the production chain (such as retail services) requires access to the services of a core network

[4] See the excellent discussion of this issue in Laffont (2005).

operator (such as infrastructure), or where two competing networks need access to each other's services in order to provide an end-to-end service (such as two mobile telecommunications networks). Chapter 7 sets out some of the core insights from behavioural economics that challenge the standard assumptions about consumer decision making and firm behaviour, before considering the possible implications of these results for economic regulation. Chapter 8 considers the institutions involved in the implementation of economic regulation, with a particular focus on the independent economic regulators established in many jurisdictions over the past four decades.

Part III of the book focuses on the *practice* of economic regulation across eight industries – electricity, gas, telecommunications, payment systems, digital platforms, rail, aviation, and water and wastewater. Each industry chapter begins with a description of the economic and technical characteristics of the production and supply structure. Each chapter then discusses the general approach adopted to the regulation of the industry across different jurisdictions, such as what activities in the supply chain are subject to economic regulation, and what approaches to price and quality regulation have been applied in practice. Finally, the focus turns to the available evidence on the effects of regulation and restructuring policies in that industry, and to a discussion of some contemporary issues that are impacting on the regulation of the industry. In each chapter, boxes are used to present examples of specific applications, and adaptations, of some of the principles discussed in Part II in the industry discussed.

Chapter 17 draws out some general conclusions and themes from the book, including a discussion on the relationship between regulatory theory and practice. For all chapters, a list of discussion questions at the end of each chapter draws out the main themes.

Issues of Terminology

Before getting started, some brief remarks about the terminology used in this book are necessary. First, while the focus of the book is on the regulation of a range of industries that provide essential or critical services to modern life (energy, transport, communications, water, payments services and digital platform services), when referring to some regulated industries – namely the electricity, gas, water and wastewater, transport and telecommunications industries – the term 'public utility industries' is sometimes used. Second, while earlier texts used the term 'natural monopoly' to refer to all of the activities in the supply chain of particular public utility services (i.e. gas, electricity, water), this is no longer always appropriate; many jurisdictions have separated, or 'unbundled', activities in the supply chain that have the attributes of a natural monopoly from activities that are potentially competitive. Accordingly, the term 'core network' is used to refer to those activities that have attributes similar to that of a natural monopoly – generally the transportation element of the supply chain (e.g. assets such as pipes, cables, wires, rails and poles). A third terminological issue may arise from references to 'restructuring policies', a phrase used within this book to refer to various policies introduced, generally in the 1980s and 1990s, to change the structure of an industry. Although there is considerable variation across jurisdictions and industries, these policies typically: removed restrictions on entry, and introduced competition, at one or more stages of the supply

chain; required that an incumbent operator provide access to core network activities on non-discriminatory terms; and/or required the vertical and horizontal separation of incumbent public utility operators. These policies are sometimes referred to as 'liberalisation' policies or 'deregulation' policies in other texts.[5] Finally, the term 'jurisdiction' is used, rather than 'country', to refer to specifically autonomous geographical areas, such as the states or provinces within a federal country. This is important because, as we shall see, different jurisdictions (i.e. states/provinces) within a country such as the USA, Australia or Canada, or different Member States of the European Union, have often adopted different approaches to economic regulation.

[5] The term 'liberalisation' is avoided because it can have ideological overtones. The term 'deregulation' is avoided because it is not accurate that regulation has been fully withdrawn and replaced with competition. Rather, policies have generally introduced different forms of regulation and oversight of these industries.