



GREAT MINDS  
IN FINANCE

COLIN READ

# THE PUBLIC FINANCIERS

Ricardo, George, Clark, Ramsey, Mirrlees, Vickrey,  
Wicksell, Musgrave, Buchanan, Tiebout, and Stiglitz



Review by Bill Batt of Colin Read: *The Public Financiers: Ricardo, George, Clark, Ramsey, Mirrlees, Vickrey, Wicksell, Musgrave, Buchanan, Tiebout, and Stiglitz*. Palgrave-MacMillan, 2016.

Professor Colin Read gives us an eminently readable book about the leading economists responsible for developing the sub-discipline of public finance. It is part of a series of books the author has been calling the “Great Minds Series,” this one including Ricardo, George, Clark, Ramsey, Mirrlees, Vickrey, Wicksell, Musgrave, Buchanan, Tiebout, and Stiglitz. Given the book’s subtitle, one might have expected chapter-by-chapter treatments of those who have provided the logic and explanation of public sector finance. But this is hardly the case. The book has an historical arc and storyline that both describes each figure’s contribution to this growing subfield of economics and how each one has contributed to its growth. The integration of its material makes it both an interesting read and an understandable narrative of public finance for the past two centuries.

Each of the “great minds” contributions is explained in easily comprehensible terms, but they are short biographies as well. If anything, perhaps a bit too much attention is devoted to relating their personal family histories and life stories. (Do we really need to be told that Frank Ramsey was a cute child?) Yet, given their absence in other materials that students often read about their contributions, this book serves to make them all more human and I think this is a welcome complement.

The stories unfold roughly chronologically, but cross-references to other contributors already discussed, or yet to be, show that economics has had lots of cross-fertilization. Henry George’s name is referenced a lot, and in almost every chapter. The index cites him more than any other person. George is ignored in most economic literature; his mention runs like a mother lode throughout this book.

The book begins with Ricardo and then moves to George. But then there is a huge leap to the early 20th century British economists — among them Pigou, Edgeworth, Ramsey, Mirrlees, and Keynes, for example — and then to some American notables in the 1950s. The bridge was provided in good part by Richard Musgrave and James Buchanan, who separately discovered the work of Swedish economist Knut Wicksell (and some German scholars with whom both had earlier studied), to a wider audience. Discourse became more integrated as the post-second-world-war generation grew, and Read shows how common it has become for exchanges between nations and schools. The cross-fertilization of academic thought that had its beginnings first by intercontinental migration in the 19th century, then in the wake of war-torn regions in the 20th, is now so commonplace that it hardly bears notice. Read also references the evolution of different schools of economics — the Chicago School often called “market fundamentalism,” the Public Choice School at Virginia and Virginia Tech, and the Institutional Economics program at UCLA.

Parts of the book are mathematical, particularly when describing the work of Frank Ramsey, James Mirrlees, and William Vickrey. It is revealing that all three of these figures began their academic careers in mathematics and later became economists. Stiglitz also shifted from math to economics in his last year at Amherst. Georgists know Mirrlees and Vickrey for their advocacy of Henry George, but their Nobel prizes were not given for this work but for situations of asymmetric information and tax policy.

One learns from the book that economists' attention to the public sector is largely recent, the key turning point being the post-war American contributions of Musgrave and Buchanan. Charles Tiebout is mentioned perhaps because of his turn away from national economic policies to local affairs. Questions posed at this level had gotten little attention either in popular discourse or in the profession itself. That Tiebout died in 1968 at age 43 meant that he was precluded from Nobel consideration (as it must always be given to a living person). No other economist has been so honored for his work on local public sector challenges –though some are who call themselves micro-economists.

In fact awards for achievement here are increasingly hard to make, and recognition for recent breakthroughs have been ever more abstruse. The economics prize was only established in the 1960s, and by the Swedish Riksbank, unlike the original Nobels a century ago. A number of recent honors have gone to figures who are only secondarily economists, like Gerard Debra, Daniel Kahneman, John Nash, Herbert Simon, and Elinor Ostrom. With the neoclassical paradigm giving strong indication of disintegrating, identifying a narrow ongoing line of economic thought will be more and more difficult.

Some awards have been given for lifetime achievement more than for any particular insight – this is often said of Vickrey. And Stiglitz seems also to have contributed to so many areas that identifying one narrow discovery is unwarranted. Professor Read brings the narrative of his public financiers story full circle near the last chapter on Stiglitz explication of the Henry George Theorem. In doing so, he recounts the work of several figures he has earlier treated, all those mentioned in the book. They all made contributions, he argues, and it becomes clearer why George is referenced so many times in earlier chapters. The chapter on Stiglitz is really a testimonial to his work, and lists the honorary degrees, specially invited papers, conferences attended, etc., that he has received. His contributions run the gamut of contemporary economics. While based officially at Columbia University in New York, he is today just as much a citizen of the world, and he reflects in good part the evolution of the economic profession.

Professor Read has done a commendable job in bringing into focus the lineage of thought in the field of public finance that has not well been identified in other places. This is because the economic dialogue may at this point have run its course: public sector economics seems to be exploding in multiple directions. The single strongest theme running throughout the book is the continuing contribution and relevance of Henry George. Indeed, one could argue, his place in economics would be still stronger if the statistical and financial data were available to demonstrate the validity of Georgist

claims. Data on land prices and parcel use are still notably lacking or of poor quality.

The good news is that this trove of information appears to be growing. The power of computers, the growth of public records, and internet availability for international exchange are all making clear the cogency of arguments for collecting rents to finance the provision of public goods and services. As other proposals fail to demonstrate their promise, and the gradual growth of land value taxation experiences takes hold, the narrative that Colin Read provides in his newest book should make it worthy of notice.

There is an interesting coda to this review, beyond recognizing that this book is the sixth in his series on “The Great Minds of Finance,” and his eleventh in total. Having been a professor and dean of the School Economics and Finance at the State University of New York at Plattsburgh for over a decade, he has just this past November of 2016 taken a leap into politics to become the newly elected mayor of the City of Plattsburgh.

Review Read Public Financiers-2.doc

H. William Batt, Ph.D.

November 17, 2016

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By Colin Read

### *Editorial Reviews*

#### From the Back Cover

*The Public Financiers* is the sixth book in a series of discussions about the great minds in the history and theory of finance. While the series addresses the contributions of scholars in our understanding of modern finance, this volume addresses the development of public finance as a field of thought through the twentieth century.

Public finance received little attention from English language scholars until the latter half of the 20th Century. From that time the discipline blossomed, and new thinkers added substantially to existing study and research. New perspectives on rents and profits, the burden of public finance and the mathematics of optimal taxation introduced a new field of thought within public finance.

This book explores the great public financiers who brought the discipline back into popularity and described how tax systems can interact with economies with minimal distortion. It introduces the work of David Ricardo, Henry George, John Bates Clark, Frank Ramsey, William Vickrey, and James Mirrlees, who each added new insight to public finance. The book also examines the work of Knut Wicksell, Richard Musgrave, James Buchanan, Charles Tiebout and Joseph Stiglitz, who established how government can be designed to provide the public goods a modern economy demands. The author explains how the contributions of these great minds combined to equip modern thinkers with the intuition and knowledge necessary to account for and even drive the growing federal states of the 20th Century.

#### About the Author

Colin Read is a professor of economics and finance, former Dean of the School of Business and Economics at The State University of New York at Plattsburgh (SUNY), USA, and a columnist for the Plattsburgh New York *Press Republican* newspaper. He has a PhD in economics, a Juris Doctor (JD) degree in law, a Masters of Business Administration (MBA), a master's degree in taxation, and has taught environmental and energy economics and finance for 25 years. Colin's recent books include *BP and the Macondo Spill: The Complete Story*, *The Fear Factor*, *Global Financial Meltdown: How We Can Avoid the Next Economic Crisis*, *The Rise and Fall of an Economic Empire: With Lessons for Aspiring Nations*, *Great Minds in Finance: The Life Cyclists*, *Great Minds in Finance: The Portfolio Theorists*, *Great Minds in Finance: The Efficient Market Hypothesis*, *Great Minds in Finance: The Rise of the Quants*, and *Great Minds in Finance: the Corporate Financiers*.

Colin Read is a professor of Economics and Finance, former dean of the School of Business and Economics at SUNY College at Plattsburgh, and a columnist for the Plattsburgh New York Press Republican newspaper. He has a Ph.D. in Economics, J.D. in Law, M.B.A., Master's of Taxation, and has taught environmental and energy economics and finance for 25 years. Colin's recent books include "The Fear Factor", "Global Financial Meltdown: How We Can Avoid the Next Economic Crisis", "BP and the Macondo Prospect" and a book on international taxation. He has written dozens of papers on market failure, volatility, and housing markets, writes a monthly column in a business trade journal, and appears monthly on a local PBS television show to discuss the regional and national economy. He has worked as a research associate at the Harvard Joint Center for Housing Studies and served the Ministry of Finance in Indonesia under contract from the Harvard Institute for International Development. His consulting company can be found on the Internet at [www.economicinsights.net](http://www.economicinsights.net). In his spare time he enjoys floatplane flying from his home on Lake Champlain that he shares with his wife, Natalie, daughter, Blair, and dog, Albert.

The Public Financiers

Ricardo, George, Clark, Ramsey, Mirrlees, Vickrey, Wicksell, Musgrave, Buchanan, Tiebout, and Stiglitz

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## Contents

List of Figures	viii
Series Preface	ix
Preface to This Volume	xiv
Introduction	1

### Section 1 First Forays into Tax Incidence and Public Policy

1 The Early Life of David Ricardo	7
2 The Times	14
3 The Theory	17
4 The Later Life of David Ricardo	22
5 The Early Life of Henry George	26
6 The Times	34
7 The Theory of Progress and Poverty	41
8 Legacy and Later Life	46
9 John Bates Clark in Defense of the Status Quo	49
10 John Bates Clark and His Times	58
11 Later Life and Legacy of Henry George	69
12 Later Life and Legacy of John Bates Clark	71

### Section 2 From Burden of Taxation to Optimal Taxation

13 The Early Years of Frank Plumpton Ramsey	75
14 The Paper That Spawned the Study of Optimal Taxation	85
15 A Short Lifetime of Contributions	91
16 The Premature Loss of a Great Mind	96
17 A Modern Extension - Vickrey and Mirrlees	98
18 The Early Life of William Spencer Vickrey	99
19 The Early Life of James Mirrlees	104
20 The Great Idea	113
21 Legacy and Applications	121
22 The Nobel Prize	127
23 The Later Years of James Alexander Mirrlees	129
24 The Later Years of William Spencer Vickrey	132

### Section 3 Divergent Arguments for the Public Sector

25 The Early Life of Knut Wicksell	137
26 The Early Life of Richard Musgrave	144
27 The Early Life of James Buchanan	150
28 The Great Idea of Knut Wicksell	164
29 The Times and a New Role for Government	169
30 The Great Debate Between Musgrave and Buchanan	174
31 The Nobel Memorial Prize for James Buchanan	180
32 The Legacy of Knut Wicksell	182

- 33 The Later Years of Richard Musgrave 185
- 34 The Legacy and Later Years of James Buchanan 187

#### **Section 4 Bringing it all Together - Voting with the Feet and the Henry George Theorem**

- 35 The Early Life of Charles Tiebout 191
- 36 The Early Life of Joseph Stiglitz 200
- 37 The Times of Charles Mills Tiebout 206
- 38 The Great Idea of Charles Mills Tiebout 208
- 39 Applications and Extensions 212
- 40 The Early Death of Charles Tiebout 215
- 41 The Henry George Theorem 217
- 42 The Prize and Legacy of Joseph Stiglitz 220

#### **Section 5 What We Have Learned**

- Conclusions 229
- Glossary 231
- Notes 235
- Index 242

#### **Figures**

- 1.1 Ancestors of David Ricardo 9
- 5.1 Ancestors of Henry George 27
- 9.1 Ancestors of John Bates Clark 50
- 13.1 Ancestors of Frank Plumpton Ramsey 76
- 18.1 Ancestors of William Vickrey 102
- 19.1 Ancestors of James Mirrlees 105
- 25.1 Ancestors of Knut Wicksell 139
- 25.2 Ancestors of Anna Kristine Margrete de Bugge 142
- 26.1 Ancestors of Richard Musgrave 145
- 27.1 Ancestors of James Buchanan 151
- 35.1 Early ancestors of Charles Tiebout 193
- 35.2 Immediate ancestors of Charles Tiebout 196
- 36.1 Ancestors of Joseph Stiglitz 201

### **Series Preface**

When one mentions the word "finance" to an interested and engaged listener, there can be a wide range of different reactions. The word may elicit a yawn from those who think of finance as the mundane process of ensuring their family savings will afford them the quality of life they had hoped for in their retirement. Students of finance, at college or in life, think of the term as a mechanism for a battle of wits, with buyers and sellers of securities pitting themselves against each other to see who can profit best from the same information. A banker might be reminded of the financial prudent practices one employs with shareholder and depositor money by lending it back out to trustworthy businesses in the region, hopefully to earn a profit. And tax accountants and lawyers may think of the myriad of ways a corporation can organize to maximize owners' profits and minimize risk. Most listeners would prefer to relegate the intricacies of finance to an expert, as they would their legal or medical affairs.

Most people use the terms economics and finance interchangeably. This misconception is understandable. The formal discipline of economics defines the laws or principles that govern the choices we make in meeting our needs. The term economics is derived from the Greek word "oikos", meaning environment but also referring to one's house or life. It is combined with "nomics" from the Greek word "nomos" or "law of", to label the social science that studies our decisions in furthering our own interests.

To most people, these "economic" decisions are primarily thought of as financial because they often involve money. Households attempt to manage their income and wealth to ensure they are able to consume, in the present and the future, in ways that allow them to thrive. Such careful financial decisions that will govern our consumption now and in retirement are so critical for our well-being that it is natural for most people to consider finance as economics even though, more correctly, finance is a branch of economics that has significant and increasing relevance in the day-to-day and livelihood-defining decisions of us all and in the very function of the economy.

The field of finance is not mundane or routine. The discipline explains how value is created or destroyed, how markets allow individuals and institutions alike to plan for the long term, and how entities can hedge the risk inherent in an uncertain world and over the business cycle.

This series describes the life, times, theories, and applications of the Great Minds who contributed to the modern formal study of

finance. Their collective contributions address the various interpretations of finance not through dry exposition and even drier equations, but through intuition and context, and a few equations and diagrams. Readers may be those interested in the fundamental underpinnings of our stock and bond markets, college students who want to delve into the significance behind the theories, and the experts who constantly look for ways to more clearly understand what they do so they can better relate to their clients and communities. The series provides important insights of Great Minds in finance within a context of their life and times. In doing so, I hope to bring life to the theories that are the foundation of modern finance.

This series covers the gamut of the study of finance, typically through the lives and contributions of Great Minds upon whose shoulders the discipline stands. From the significance of financial decisions over time and through the cycle of one's life, to the ways in which investors balance reward and risk, from how the price of a security is determined to whether these prices properly reflect all available information, and to the ways a corporation can create value and a market can measure it, we will delve into the fundamental questions and answers in finance. We will delve into theories that govern personal decision-making, those that dictate the decisions of corporations and other similar entities, and the public finance of government.

Some of the theories we describe may appear abstract and narrow. Others may seem obvious, once they are presented. A successful theory must be sufficiently narrow to make strong conclusions, but broad enough to be useful. A theory that is general to the extreme will draw weak conclusions of little utility. The best theories draw the strongest possible conclusions from the weakest set of assumptions. And a successful "unifying" theory in finance can replace a large number of lesser theories and concepts, just as physicists hold out for a unifying theory that can draw together their isolated understandings from a variety of specialties.

By focusing on the Great Minds in finance, we draw together the concepts that have stood the test of time and have proven themselves to reveal something about the way humans make financial decisions. These principles that have flowed from individuals who are typically awarded the Nobel Memorial Prize in Economics for their insights, or perhaps shall be awarded someday, allow us to see the financial forest for the trees.

While one might assume that every financial expert would be well versed in these fundamental theories of finance, such is not always the case. An investor can succeed through sheer intuition without having studied the insights of theorists over a century of financial discovery. Mathematicians and physicists are increasingly employed to develop techniques that recognize patterns in numbers with little regard or understanding of the underlying forces that explain these patterns. Furthermore computer experts can design algorithms that allow great banks of servers to constantly poke and prod the market to induce, and then profit from, movements in prices of stocks or bonds. By capitalizing on such shifts in prices milliseconds before others take notice, these algorithms can garner pennies, or fractions of pennies, at a time, thousands of times an hour, to yield huge profits.

These practitioners do not depend, or even care about the fundamental principles that drive markets and govern decision-making in the long run. To them, the long run expires within a week or a day. Such "technical analysis" is decidedly transient and short term. In fact, a steady and predictable investment opportunity based on well-known and well-understood information is simply insufficiently volatile to yield quick profits.

Unfortunately, such technical analysis, which depends only on price dynamics in the short term, has emerged as the lucrative Holy Grail of modern finance. It allows the most skilled practitioners to make money when markets are rising or falling. However, it reveals nothing about how financial decisions should be made in the long run to satisfy an economy's need for capital, investment, reward, and reduced risk. Nor does it make our economy more efficient. Rather, technical analysts devote a great deal of talent, energy, and effort as they clamor for others' pieces of a fixed economic pie.

The giants who have produced the theories and concepts that drive financial fundamentals share one important characteristic. They have developed insights that explain how markets can be used or tailored to create a more efficient economy. They demonstrate how individuals can trade risk and reward in the same way that a supplier might trade with a consumer of a good. They explain the reason for corporations, and also show why corporations can become too big. Through this process of analysis, all sides win. Greater efficiency is a tide that lifts all boats. These pioneers of finance explain how tools can be used to create greater market efficiency and even suggest the creation of new tools to create efficiency enhancements that may have proven elusive otherwise.

From a strictly aesthetic perspective, one cannot entirely condemn the tug-of-war of profits created by the technicians, even if they do little to enhance, and may even detract from, efficiency. The mathematics and physics of price movements and the sophistication of computer algorithms is fascinating in its own right. Indeed, my university studies began with a Bachelor of Science degree in physics, followed immediately by a PhD in Economics. However, as I began to teach economics and finance, I realized that the analytic tools of physics that so pervaded modern economics has strayed too far from explaining this important dimension of human financial decision-making. To better understand the interplay between the scientific method, economics, human behavior, and public policy, I continued on in my studies toward a Master of Accountancy in taxation, an MBA, and a Juris Doctor of law.

As I taught the economics of intertemporal choice, the role of money and financial instruments, and the structure of the banking and financial intermediaries, I recognized that my students had become increasingly fascinated with investment banking and Wall Street. Meanwhile, the developed world experienced the most significant breakdown of financial markets in almost eight

decades. I realized that this once-in-a-lifetime global financial meltdown arose because we had moved from an economy that produced goods to one in which a third of all profits by 2006 in the US were nebulous gains made in financial markets, with little to show but pieces of paper representing wealth that had value only the public ever remained ready to buy them.

I decided to shift my research from academic research in esoteric fields of economics and finance and toward better understanding of markets by the educated public. I began to write a regular business column and a book that documented the unraveling of the Great Recession. The book, titled *Global Financial Meltdown: How We Can Avoid the Next Economic Crisis*, described the events that gave rise to the most significant economic crisis in our lifetime. I followed that book with *The Fear Factor*, which explained the important role of fear as a sometimes constructive, and at other times destructive influence in our financial decision-making. I then wrote a book on why many economies at first thrive, and then struggle to survive in *The Rise and Fall of an Economic Empire*. Throughout, I try to impart to you, the educated reader, the intuition and the understanding that would, at least, help you to make informed decisions in increasingly volatile global economies and financial markets.

As I do so, I also hope to impart to you how individuals born without great fanfare can be regarded as geniuses in their lifetime. The lives of each of the individuals treated in this series become extraordinary, not because they made an unfathomable leap in our understanding, but rather because they looked at something in a different way and caused us all to forever look at the problem in this new way. Their combination of novelty and creativity is the measure of their genius.

### **Preface to This Volume**

This book is the sixth in a series of discussions about the Great Minds in the history and theory of finance. While the series address the contributions of significant individuals to our understanding of financial decisions and markets, this volume discusses the role and design of our tax system and the objectives of our governments that employ these public finances.

Public finance received scant attention among English-language scholars until the latter half of the 20th century. Suddenly, the discipline blossomed through the Great Minds of William Vickrey, James Mirrlees, and James Buchanan, who researched and reminded us of the Great Minds who came before them. They built upon the intuition of David Ricardo on rents and profits, the great debate between Henry George and John Bates Clark on the burden of public finance, and the elegant mathematics of Frank Plumpton Ramsey on optimal taxation. Together, their contributions established a new field of public finance.

Richard Musgrave helped introduce economic theorists and writers in German to us all, especially the ideas of the Swedish late 19th-century economist Knut Wicksell, whom the literature reinvented in the 1960s. Musgrave postulated various roles of government - public finance, remedy of market failures, the provision of public goods, and the distribution of income as legitimate goals of government that was fast-growing in developed countries following World War I. And Musgrave, Buchanan and Charles Tiebout showed how government operates, or should operate. Meanwhile, Ricardo, George, Ramsey, Vickrey and Mirrlees showed how we can fund these activities without creating other economic efficiencies. Finally, Joseph Stiglitz demonstrated that an optimal town can fully fund its public improvements through a 100% land tax. These Great Minds combined to create a new discipline and provided an explanation and perhaps even an impetus to the growing size and significance of the federal state in the 20th century.

### **Introduction**

Mark Twain once said that the only two things certain in life are death and taxes. The great philosophers knew this. Almost as soon as political philosophers provided a rationale for government, others began to debate the purpose and appropriateness of taxes. Soon economists began to assert not only what taxes ought to support, but who ought to pay these taxes, and why. Intertwined in this discussion are the ways in which government spends the revenues they raise, to provide for public goods or to redistribute income.

While there was a less expansive role for government in the 19th century, much of the populist debate then centered around public finance and the incidence of taxes. This debate continues, but the role of public expenditure now captures the attention of 20th- and 21st-century citizens.

The upward trend in public expenditure over time and with economic progress was first observed by the German economist Adolph Wagner (March 25, 1835-November 8, 1917). He noted:

The advent of modern industrial society will result in increasing political pressure for social progress and increased allowance for social consideration by industry.

Wagner hypothesized that economic growth is accompanied by an expansion of the range of economic responsibilities of the state, greater demand for income distribution, and increased need to police, protect, and regulate as the value of property and the size of the economy increases. With this tendency for larger government comes greater need to finance government. As government grows and there is an increase in the proportion of public finance, as a share of gross domestic product, there is also a rise in the level of interest in public finance.

There are a number of ways to view the tax and fee revenues that constitutes the source of public finance. Legislators and political scientists seek a tax that is easy to impose and reliably raises revenue. Economists may use taxes to deter certain activities, such as the consumption of vices, and may use subsidies to encourage the production of other goods. The tax system is thus employed to internalize externalities - the external costs on other parties for actions such as pollution. Public financiers must then determine the proper balance between the production of goods that only government can provide efficiently, and the raising of sufficient revenue to pay for such production.

We begin our discussion with the various theories of public finance through the imposition of tax or the issuance of debt, which is merely the delayed imposition of additional taxes to a later time. We also describe the processes by which we determine who ought to pay these taxes. We first describe the intuition of David Ricardo, an early 19th-century self-taught economist who became independently wealthy in the bond markets of London and then parlayed his fortune into extensive real estate holdings and a position in the British Parliament.

Ricardo was fascinated with the ways in which progress bestows greater value on land, without any required action by the landlord. He proposed a heavy land tax on such unearned income as a way to capture such windfall profits. A few generations later, Henry George, another self-taught economist, created a populist movement around the idea of a 100% land tax, and steep taxes on monopolies. In doing so, he spurred a backlash among the propertied and also from John Bates Clark, one of the founders of modern American economics. Their debate allows us to better understand the differing assumptions made on each side of this contentious debate.

These early treatments were interesting and intuitive, but they were insufficiently rich to draw more subtle conclusions that would be necessary as the share of public finance in the gross domestic product increases. By 1841 in Great Britain, and 1861 in the United States, relatively modest personal income taxes were imposed. But, by the beginning of the 20th century, these income taxes were beginning to exceed property and other taxes and fees. New models became necessary to determine what types of taxes can be most easily levied and which will distort the economy most negligibly.

Frank Plumpton Ramsey, a brilliant young mathematician and philosopher, produced the first formal model of optimal taxation. He demonstrated that a sophisticated public finance authority could impose a goods tax on various industries to reduce the distortions of monopoly production. Ramsey viewed the tax system as capable of reducing inefficiencies of other sorts, such as those which arise from private sector monopolies.

Twenty years later, William Vickrey observed that personal income taxes also create inefficiencies. Such taxes have the unfortunate consequence of discouraging the generation of earned income. Vickrey came up with a novel solution. If one could produce a tax schedule that individuals in each tax bracket could accept, without attempting to misrepresent their productivity and opt for a lower tax bracket, and a decreased contribution of their own effort, the public finance authorities could avoid the distortions of the income tax. James Mirrlees followed in 1971 with the mathematics that proved Vickrey's intuition. In doing so, Vickrey formulated, and then Mirrlees substantiated, the theory of asymmetric information and created a new strand of research in finance and economics.

While public finance is designed to address the expanding expenditure goals of government, we must also treat how to model the expenditures of government. First, Richard Musgrave described the range of legitimate roles of government. Then, in a book entitled *The Calculus of Consent* and in other writings, James Buchanan and his colleague Gordon Tullock described the motivations and calculations of elected officials. The question of what motivates production is easier to answer for the profit-maximizing private sector. However, the institution of government is political. If one were to impose the assumption of rationality in governmental decision-making, it might be in the rational, and some may say cynical, need of representatives to remain in elected office. Both Richard Musgrave and James Buchanan also reintroduced the public finance and public choice literature to a late 19th-century German economist, Knut Wicksell, and established the theory of public choice as a new and exciting field of study.

We end our discussion with a novel and fascinating conclusion drawn by Charles Tiebout. Under certain assumptions, a town can be viewed much as the private producer of a bundle of goods and services. The Great Mind Joseph Stiglitz then demonstrated that such an optimal town can be publicly financed by the land rents that can arise from the public goods the town provides. In doing so, we return full circle to the prophecies of Ricardo and George that a 100% land tax can fund at least one goal of government, that of the provision of public goods.

## **Section 1**

### **First Forays into Tax Incidence and Public Policy**

I begin with the wisdom of David Ricardo and the ways in which he provided material for both sides of a debate that raged between Henry George and John Bates Clark at the end of the 19th century. This great debate started with America's first populist economics movement, and ended with the embracement of the neoclassical model of economics. An ideological battle has ensued ever since.

## The Early Life of David Ricardo

David Ricardo was not the first political economist. But he was perhaps the first economist of the modern era. Where those who came before him, most notably Adam Smith (June 16, 1723-July 17, 1790), provided wonderful rhetoric with great flourishes of their pen, Ricardo was the first to convert intuition to a language that was amenable to mathematics and graphs. He also produced concepts that are still taught today - in almost precisely the same form as he had employed in his original presentations. While many have since attributed his ideas to other Great Minds such as Paul Samuelson (May 15, 1915-December 13, 2009), we can see so many roots of modern economics and public finance from his writings almost two centuries ago.

Once we understand his pedigree, perhaps his accomplishments appear at the same time all the more remarkable and predictable. For his story actually begins well before he is born. It is a story that overlaps with that of Franco Modigliani (June 18, 1918-September 25, 2004), who was to win the fourth Nobel Memorial Prize in Economic Sciences more than a century after Ricardo's death.

While Ricardo was born in London, his family had taken a circuitous route before arriving in the United Kingdom. His ancestors date back to before their expulsion as Sephardic Jews from Spain and Portugal in 1492. (The term Sephardic is derived from the Hebrew word for the nation of Spain.) Their expulsion occurred in the same year as Spain's Queen Isabella ordered Christopher Columbus and his ships, the Nina, Pinta and Santa Maria, to set sail on their voyage of exploration for the New World. As many as one-third of the crew of Columbus' ships were Jews. Other Sephardic Jews scattered across the Mediterranean Sea to other points in Europe.<sup>1</sup> Over generations, some remained in Spain and were forced to make a public conversion to Christianity, while continuing to practice their Judaism in private. Some of these Marrano Jews eventually made their way from Spain to Amsterdam, a trade-oriented city known, even in the 16th and 17th centuries, for its religious tolerance. Some did so by way of Livorno, Italy, across the Mediterranean, where a healthy Jewish community had lived for some time.

By the mid-18th century, the Ricardo family had migrated from Spain via Livorno in Italy, and they had subsequently established themselves in Amsterdam. Other Sephardic Jews were to remain in Livorno. From these ancestors came Amedeo Modigliani (July 12, 1884-January 24, 1920), the great 19th- and 20th-century sculptor and artist, and his cousin, the Great Mind Franco Modigliani (June 18, 1918-September 25, 2003), who was to be awarded the Nobel Memorial Prize in Economic Sciences in 1985.

Joseph Israel Ricardo, the grandfather of David Ricardo, was a stockbroker and leading figure at the Amsterdam Bourse. He and his family enjoyed a comfortable living. Joseph had many children, first as a product of his marriage to Hannah Israel, who died in 1725, four years after their marriage, and as a result of his subsequent marriage to Hannah Abaz (1705-November 19, 1781), whom Joseph married in 1727.

Two daughters and four sons resulted from Joseph's second marriage. Three of the sons also went on to become stockbrokers, including the youngest son, Abraham Israel Ricardo.

Born in 1733 in Amsterdam, Joseph's son Abraham first established himself in Holland, but by 1760 he had transplanted himself to London, England to help with the running of his father's expanding crosschannel business. He and his father had been investing heavily in what the father of political economy, Adam Smith, referred to as the English Funds, fueled by borrowing by England to pay to fund the Seven Years' War which had first erupted with France in 1756. Holland remained neutral during the war, and over the period it used its neutrality to expand trade significantly with England. Abraham Ricardo represented in London many Dutch interests over these war years.<sup>2</sup> He was an active and respected trader on the Stock Exchange of London who, like his father, amassed a considerable wealth.

Nine years after his arrival in London, Abraham met Abigail Devalle (1753-October 22, 1801), a young woman of 16 years of age - two decades his junior. Abigail was the eldest of eight children born to Abraham Devalle (1726-1785) and Rebecca Henriques de De Sequeira (1737-1787). The Devalles were well-established English merchants and importers, and central figures in the Sephardic Synagogue in London.

Abraham Devalle and Rebecca Henriques de De Sequeira, David Ricardo's maternal grandparents, had married on September 20, 1751.

Less than two years later, Rebecca had given birth to their first daughter, Abigail. Widely regarded as a beautiful child and young woman, Abigail was raised in the Synagogue and became acquainted with Abraham Ricardo not long after Ricardo became established in London's Jewish community.

Abraham and the 16-year-old Abigail married on April 30, 1769. Together, they had at least twenty children, of whom six daughters and nine sons reached adulthood, and fully two-thirds of the nine sons followed in the footsteps on their father and

grandfather and became stockbrokers.

The third child of Abraham and Abigail, David Ricardo, was born on April 18, 1772, shortly after his parents' third wedding anniversary. By this time, his family had achieved a modest degree of wealth in the financial and mercantile markets of London, and David grew up in comfortable circumstances, even though he received a common education at the neighborhood school during the lean war years, rather than the private education afforded others of his family's stature.

When David was a young boy, the family suffered the years of the 4th Anglo-Dutch War that ran from 1780 to 1784. The Dutch had been the prevalent economic power in the 17th century, but Britain grew rapidly in power and influence in the mid- to late 18th century, in equal parts because of its alliance with the Dutch and its prominent role as the engine of the Industrial Revolution. English economic and military ascendancy led to a growing resentment among the Dutch. A Dutch treaty with a recently independent United States increased the tensions between the two former European allies. In an effort to restrict trade with the United States, the British exercised its new-found economic and military clout by attempting to convert the Dutch Republic to a British protectorate. The two nations each diverted considerable resources to achieving a doubling in the size of their respective seafaring fleets at that time, even if, after four years of conflict, the war ended in a stalemate.

Once peace was restored, David Ricardo resumed his education with his father's relatives who had remained in Amsterdam. While there, David was expected to learn the family financial trade and custom between the two nations, the Dutch language, and Jewish traditions in preparation for his Barmitzvah at the age of 13.

After a few years of religious and formal education in Amsterdam, David returned to his family home on Bury Street in London to continue his apprenticeship in the family business. The family then purchased a new home in Bow, about a mile north of the Thames River, and only a couple of miles from London's financial district at that time, and much closer to the heart of London.

In their new and prominent neighborhood, the 20-year-old David Ricardo met the eldest daughter of a well-known surgeon, Edward Wilkinson (1728-November 4, 1809), and his wife Elizabeth Patterson.

The daughter, Priscilla Ann Wilkinson (November 5, 1768-October 17, 1849), was raised as a Quaker to her devout family. The ensuing courtship and marriage of David Ricardo and Priscilla Ann Wilkinson, on December 20, 1793, was the cause of discord among the Ricardo family over issues of religious faith and David's break from the Jewish Synagogue and community in London.

The breach of faith between David and his father, instigated by his mother, was not permanent, although it did last until David's mother died in 1801 - almost a decade after David's marriage.<sup>3</sup> To be fair, however, the Wilkinsons were equally troubled by the youthful exuberance of David and Priscilla, and they also temporarily refused to support the young couple. Fortunately, David was already financially secure, and he did not need to rely on the wealth of his family.

It seems likely that Ricardo's separation from his faith was not caused entirely by his marriage to Priscilla. Like many intellectuals in that era, David Ricardo had already discovered the Unitarian faith, and he was attracted by both its liberalism and its intellectual leanings. Quakers had dissented from the more hierarchical leanings of the Catholic Church and the Church of England. Those who dissented still further often found themselves embracing Unitarianism. Many religious, philosophical, and economic liberals questioned the dictates of organized religion and embraced the Christian theological movement that asserted God is one entity, in contrast to the Holy Trinity, which defines God as being embodied in The Father, The Son, and The Holy Spirit. Unitarians accepted Jesus as the son of God, but they regarded him as a prophet rather than a god in his own right. Unitarians also rejected original sin and predestination, and permitted the Bible to be read in a metaphorical rather than a literal manner. As a consequence, it was considered one of the most liberal of all Christian churches, and permitted a diversity of interpretation and thought among its followers.

Then, as now, it was not unusual for liberal Christians to attend services with Quakers or Unitarians, as both religions espoused a substantial level of religious tolerance. Indeed, David's wife continued to attend Quaker gatherings, and she certified the birth of some of her children in the Quaker fellowship. By contrast, David remained uneasy with any religions that were more organized and hierarchical than Unitarianism.

David held considerable sway over the lives of his younger brothers, and many of them were to follow his example and marry out of their Jewish faith. His brother Moses (November 13, 1776-March 7, 1866), for example, married Fanny Wilkinson, one of Priscilla's younger sisters, and became a partner in surgery with one of Priscilla's brothers, Josiah Henry Wilkinson. While this generation of Ricardos and Wilkinsons were close and intertwined, the generation did not typically retain close relationships with their respective parents. They had busy careers, cared for large families, and were distracted by many events at the national scale that shaped their lives. One of these, the conclusion of the Napoleonic Wars, was soon to determine Ricardo's fortune.

At the end of the 18th century, England was fearful of the prospects for a conflict with France. The French Revolutionary Wars from 1792 to 1803 transitioned into the Napoleonic Wars from 1803 to 1814. Fearing an invasion by Napoleon, militias formed in England, including in the Royal Lambeth Volunteers in the Ricardos' neighborhood just south of the Thames River and the financial district in London. When the Ricardo family moved farther east in London, to Bromley, David took a commission as Captain in the Bromley and St Leonards Corps on August 17, 1803.<sup>4</sup> His brother was the Corps surgeon. He also served with James Mill (April 6, 1773-June 23, 1836), the father of John Stuart Mill (May 20, 1806-May 8, 1873), an economist and the

eventual co-founder of classical economics as inspired by David Ricardo.

In Bromley, South London, the Ricardos lived a comfortable, almost rural existence at that time. However, by the spring of 1812, the large Ricardo family, which had grown to include three boys and five girls, moved to an estate in the fashionable West End of the City at 56 Upper Brook Street, off Grosvenor Square. Ricardo commissioned Samuel Pepys Cockerell (1753-1827), the famous English architect who was a great-great nephew, and namesake, of the well-regarded diarist Samuel Pepys (February 23, 1633-May 26, 1703) to remodel his house, which had been built in 1729. This house was to be Ricardo's home for the rest of his life.

In the year that the Ricardos moved to Grosvenor Square, one of the most influential economists of the day, the Reverend Thomas Robert Malthus (February 13, 1766-December 29, 1834), had joined the King of Clubs, an exclusive club that met in London during this period. Already by this time, Ricardo had been drawn into membership of a scientific society called the Geological Society of London. Successful in business by the time he was in his thirties, Ricardo became a lover and patron of the humanities and sciences societies and, increasingly, this new social science of economics. Ricardo was nominated to the King of Clubs on June 7, 1817, and had helped found the Political Economy Club in April of 1821.<sup>5</sup>

page 13 missing

## 2 The Times

Prior to the theories of Ricardo, the economic landscape had been shaped by Adam Smith's observations. Ricardo had been first exposed to Adam Smith's 1776 *Wealth of Nations* in 1799, when he was in his early twenties. Smith's writing gave Ricardo a context from which to organize his own observations of the functions of the market. Also, from Smith and Malthus came the notion of the law of natural prices, which Ricardo later repealed.

Ricardo also weighed in on the role of the money supply. In response to the mounting costs for England in their campaigns of the Anglo-French Wars and the Napoleonic Wars, Ricardo observed that the efforts by the Bank of England to suspend the convertibility of bank notes into gold, which was arguably intended to induce inflation, would also reduce the wealth of those who had purchased government bonds. By then, Ricardo was both a large trader and holder in bonds.

Ricardo responded to what he viewed as institutional market manipulation by writing his first article, 'The Price of Gold', which he published anonymously in *The Morning Chronicle* in 1809. He bolstered his noninterventionist argument a year later with his publication of the pamphlet *The High Price of Bullion, a Proof of the Depreciation of Bank-Notes*. This publication was to be most influential in the government circles in 1810. Over the first decade of the 19th century, Ricardo had become an advocate of a movement called The Bullionists, who argued that a gold standard ensures a steady money supply and moderated inflation. By this time he had developed what we now know as the Quantity Theory of Money. Such a quantity theory is intended to hold in check those who would seek to inflate the money supply to afford the government more resources with which to purchase arms, and a greater latitude for borrowing as it lowers the real value of government debt outstanding. Ricardo and the other Bullionists remained concerned about the debilitating effect such manipulations may have on the integrity of financial markets.

Members of the House of Commons under the influence, and perhaps the financial advice, of Ricardo created the controversial and famous Bullion Report to the British House of Commons that reflected Ricardo's views. Ricardo followed up the report in his follow-up pamphlet, *Reply to Mr. Bosanquet's "Practical Observations on the Report of the Bullion Committee,"* published in 1811, which helped hold sway by diverting the British Treasury and Bank of England from their inflationary inclinations.

Ricardo was subsequently encouraged by his friend, James Mill, and also by Thomas Robert Malthus, to document his economic intuitions in a more complete manner. As a result, he followed up his works on the gold standard and the money supply with his March 1814 papers which dealt with profits accruing to capital, and then with his February 1815 publication influential *Essay on the Influence of a Low Price of Corn on the Profits of Stock; Shewing the Inexpediency of Restrictions on Importation*. He followed these up with his most well-known publication, entitled *On the Principles of Political Economy and Taxation*, published in April of 1817. This determined the principles by which a nation's product is divided between workers, capitalists, and landowners.

These years in the 1810's were productive for Ricardo, both financially and philosophically, but they were not without controversy. At the middle of the decade, in June of 1815, the Battle of Waterloo was fought to end the Napoleonic Wars once and for all time - and Ricardo's actions around this event were to attract considerable criticism.

Ricardo was 43 years old when the Battle of Waterloo was fought. One of Britain's most defining battles, it began on Sunday, June 18, 1815, in Waterloo, just a few miles south of present-day Brussels in Belgium. The British and Prussian armies, led by the Duke of Wellington, defeated Napoleon that day. The battleground was defined by Napoleon as part of a strategy to prevent the allied forces from invading France from Belgium. It marked the end of Napoleon's rule, and the beginning of a long period of peace for Great Britain. Just the year before, Britain also signed a treaty bringing to an end the War of 1812 with the United

States. Following the battle, King Louis XVIII was restored to the French throne and Napoleon was exiled to Saint Helena, where he was to die six years later.

The lead-up to the battle was causing consternation and disruption in England's financial markets which were increasingly nervous about the outcome of the war with Napoleon. To reduce his own financial uncertainty, Ricardo had created an information network to provide timely financial market to its subscribers from which he and his closest colleagues could profit, much in the manner of Michael Bloomberg in the 21st century. Ricardo's network informed him that the battle was coming to an end well before the information was widely available. Commentators at the time argued that he had traded on this private information in such a way as to imply to those with less information that Napoleon had won the battle. The resulting panic drove down the price of bonds, to which Ricardo responded by purchasing bonds, consistent with his observation that markets overreact to news. Once news of the Allied victory at Waterloo became known to the financial markets, the value of bonds that Ricardo had bought rose dramatically. In Ricardo's obituary in *The Sunday Times* on September 14, 1823 it was concluded that Ricardo earned perhaps a million pounds sterling in his trades that week.

As a result of these actions Ricardo had instantly achieved lifelong financial security. He subsequently retired and invested in real estate, with one of his more notable acquisitions being Gatcombe Park in Gloucestershire, a property which was more recently purchased by Queen Elizabeth II and is now occupied by her only daughter, Anne Princess Royal (Anne Elizabeth Alice Louise, born August 15, 1950). His financial security also afforded Ricardo increasing amounts of time and effort to devote to economics and politics.

### 3 The Theory

Ricardo invested his new-found substantial wealth in a way that was entirely consistent with his economic observations. He developed a personal theory of rent based on his observation that the growth of population, as famously espoused by Thomas Robert Malthus, puts increased pressure on the land around a city to expand cultivation. Ricardo noted that an improving society commands an increasing share of productive soil, and, in the process of progress, drives up the price of all cultivatable soils. The largest profits then go to those soils of highest fertility, while only insignificant profits accrue to land of marginal fertility at the lowest extent of cultivatable land. In any regard, those who work the land receive a competitive return sufficient to attract the units of farm capital and labor. These factors do not capture the rents that accrue to land owners because, unlike land, the resources like labor and capital are easily replicated.

In the creation of his theory of the distribution of returns to factors of production, Ricardo was the first to introduce into a formal model a concept that has represented the foundation of classical economics. Ricardo also introduced the notion of diminishing marginal returns -meaning that only the most fertile land receives the highest product. Land of decreasing fertility earns decreasing returns to its fertility, until the most marginal land receives a return that falls to zero. Meanwhile, the other factors receive their competitive return.

Note that these returns to land are also affected by the level of demand. If demand was so low that only the most fertile land would be employed, its return, or rent, is zero, even though the laborers who work the land must still be paid their subsistence wage. But, as demand increases, substandard land that previously could not justify even a zero rent becomes economically viable. Meanwhile, the return on the most fertile land increases commensurately. Ricardo described the expansion of the use of land as "the gifts of nature which exist in boundless quantity".<sup>1</sup> But, as population grows, or the price for which the population is willing to pay for the fruits of the land grow, so do the rewards to land.

Through this analysis, Ricardo diverged from the prevailing view asserted by Smith more than forty years earlier. Smith had believed in the existence of 'natural' prices for the various factors that sum to represent the price of a commodity. Ricardo argued that the price of a fixed resource is unique in that its reward is in the form of the residual claim of any surpluses after the prices of the other variable factors of production are deducted. In effect, a high price of corn caused the high rents observed on some land, not the other way around. The prevailing theory he repealed was that the high rent of land produces the high prices for its product.

In addition, as demand increases and the amount of land in cultivation increases with it, these surpluses to land represent an ever-increasing share of the price of the agricultural product.

Ricardo also turned his eye to the return on other factors of production. Smith, and his contemporary, Thomas Robert Malthus, had argued that the natural wage rate was enough to ensure that workers could maintain a sufficient income to ensure subsistence. Ricardo allowed the wage rate, and the rate of return on capital, to adjust upward to increasing demand. He had in mind the notion that, as a society develops and accumulates greater amounts of capital, the labor that works the capital becomes increasingly productive. Hence, labor's wage, in proportion to its productivity, on the margin, also rises. In advancing this argument, he was describing the process that the Great Mind John Bates Clark would reinvent seventy years later in his establishment of the classical theory of production.

Ricardo recorded his postulates in his most well-known treatise, his *Principles of Political Economy and Taxation*,<sup>2</sup> published in 1817. Ricardo begins with his reformulation of a labor theory of value. He first outlined his assumptions:

- There are two sectors of the economy.
- Each sector has the same wage rate and the same profit rate.
- Capital employed in production is made up of wages only.
- Each production process may use differing types of equipment as capital in different proportions.

From this basic model, Ricardo defined rent as the "difference between the produce obtained by the employment of two equal quantities of

pages 19 and 20 missing

outgoings, but also this additional one of the tax. This part of the tax does not fall on the landlord, nor on the farmer, but on the consumer of raw produce.

There can be little doubt but that if a tax were laid on rent, landlords would soon find a way to discriminate between that which is paid to them for the use of the land, and that which is paid for the use of the buildings, and the improvements which are made by the landlord's stock. The latter would either be called the rent of house and buildings, or on all new land taken into cultivation, such buildings would be erected, and improvements would be made by the tenant, and not by the landlord. The landlord's capital might indeed be really employed for that purpose; it might be nominally expended by the tenant, the landlord furnishing him with the means, either in the shape of a loan, or in the purchase of an annuity for the duration of the lease. Whether distinguished or not, there is a real difference between the nature of the compensations which the landlord receives for these different objects; and it is quite certain, that a tax on the real rent of land falls wholly on the landlord, but that a tax on that remuneration which the landlord receives for the use of his stock expended on the farm, falls, in a progressive country, on the consumer of raw produce. If a tax were laid on rent, and no means of separating the remuneration now paid by the tenant to the landlord under the name of rent were adopted, the tax, as far as it regarded the rent on the buildings and other fixtures, would never fall for any length of time on the landlord, but on the consumer. The capital expended on these buildings, &c., must afford the usual profit of stock; but it would cease to afford this profit on the land last cultivated, if the expenses of those buildings, &c., did not fall on the tenant; and if they did, the tenant would then cease to make his usual profits of stock, unless he could charge them on the consumer. Ricardo had clearly made the distinction between land itself and capital upon the land. His tax on land itself would be designed to strictly tax land profits, but not discourage the fixtures and capital that are associated with the land.

But while Ricardo was the first to describe a non-distorting tax and differentiate between productive and non-productive profits, his work remained unappreciated, and perhaps even actively ignored, by a young discipline and by the landed class with whom he rubbed shoulders at their estates.

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229:

### Conclusions

Public finance was not a recognized discipline among English-speaking finance scholars until the latter half of the 20th century. Since then, the Nobel Memorial committee has offered a multitude of awards to living scholars who have improved our understanding of whether government efficiently taxes and spends, and how that efficiency might be enhanced.

The public sector is rife with complications that are not found in its private counterpart, which should come as no surprise. The public sector is often expected to cope with precisely the types of goods and services which the private sector cannot efficiently provide. Such public goods - public education, non-excludable aspects like scenic vistas, local history, and the airways - can only be provided by the public sector without introducing serious inefficiencies. Still other goods are characterized by decreasing per unit costs, perhaps because they have a high fixed cost, but very low marginal costs of production. The private sector can only profitably sell such goods if it restricts supply and enjoyment to ensure there is a sufficient difference between the good's price and its marginal cost. Natural monopolies often are characterized by the degree to which its price well exceeds its variable costs. Finally, there are goods so rife with externalities that the public as a whole enjoys benefits which the private provider cannot capture. For instance, a private firm that creates significant jobs in a new town cannot enjoy the increased land prices that will result from its investment. Only the public sector has the power to tax to pay for many of the infrastructure investments that give rise to such increases in land value.

Because the complexity of the public sector dwarfs what we generally assume for the private sector, we cannot expect quite the

## Glossary

Agency Theory  
Asymmetric Information  
Calculus of Variations  
Commodity Tax  
Conspicuous  
Consumption  
Constant Lump-sum Tax  
Constant Returns to Scale  
Conventional Wisdom  
Corporate Finance  
Decreasing Returns to Scale  
Diminishing Marginal Returns  
Discount Rate

Study of the ways in which a representative (agent) of a principal balances the interests of the principal with his or her own interests.

Study of decision-making when the various participants have differing levels of information.

A technique that optimizes the path of a function, usually over time.

A tax on the price of a good.

Consumption for the purpose of impressing those who witness the consumption as a method to expand social standing.

A tax imposed equally on all taxpayers.

A scale, or size, of production in which the declining effects of increased production on average fixed costs are balanced by the increasing effects of variable costs on increased production. In this region, average costs remain approximately constant for a small increase in production.

Theories and hypotheses that are generally accepted as true, whether valid or not. The term was coined by John Kenneth Galbraith to denote widely accepted theories that may nonetheless be inaccurate.

The study of the creation of value within a firm.

A scale, or size, of production in which the declining effects of increased production on average fixed costs outweigh the increasing effects of variable costs on increased production. In this region, average costs fall for a small increase in production.

The economic phenomenon that increased activity yields smaller benefits than previous activity yielded. The rate by which future earnings or costs are translated to the relevant present value. Often, this discount rate is determined by the weighted average cost of capital of the corporation.

Diseconomies of Scale  
Distribution of Wealth  
Dynamic  
Model  
Earned Income Tax Credit  
Economies of Scale  
Edgeworth Box  
Elasticity  
Enlightened  
Self-interest  
Externality  
Flat Tax Frictionless  
Gilded Age  
Hamiltonian  
Henry George Theorem  
Incentive  
Alignment  
Incentive  
Incompatibility  
Income Tax  
Increasing  
Returns to Scale

A region of production that provides increasing marginal costs for an increase in production than the average costs of

production. This is the region of production for the firm that results in lower cost efficiency.

The pattern by which the wealth of an economy is distributed across its population.

A model that shows the evolution of the system over time.

A rebate in taxes, or a payment to a taxpayer whose income is at least partially earned.

A region of production that provides lower marginal costs for an increase in production than the average costs of production.

This is the region of production for the firm that results in greater efficiency as output is expanded.

A construct that allows the direct comparison of the utility of two individuals and the regions of resource reallocation that can increase the utility of one individual without decreasing the utility of the other.

The sensitivity of a commodity to a change in a factor such as price.

The ability of a decision-maker to balance his or her self-interest with the long-term interests of others and hence his or her future interests.

A benefit or cost incurred by another, beyond the transactions of decision-makers and beyond the factors incorporated into the price system.

A constant proportional tax on income.

The assumption that economic exchanges can proceed without artificial impediments such as transactions costs.

The post-Civil War era in the United States that showed great economic growth but also heightened income inequality.

A functional that can be optimized by careful choice of the path of an underlying function.

A result that demonstrates a 100% land tax can just fund the costs of public goods that enhance and are capitalized in property value.

The creation of a compensation scheme that induces an agent to act in the best interests of the principal.

A gap or difference in what is best for the principal and the incentive that directs the actions of an agent.

Public finance revenue raised from a tax on taxpayer income. A region of production that results in marginal costs for an increase in production that are lower than the average costs of production. This is the region of production for the firm that results in increased efficiency with increased production.

Infinite Time Horizon

Interest Rate

Intertemporal

Lagrangian

Marginal Theory of Productivity

Marginalists

Methodological

Individualism

Monopoly

Monopsony

Neoclassical Model

New Institutional Economics

Non-excludability

Non-rivalry

Optimal Size

Pareto

Optimality

Pigouvian Tax

Public Finance

Public Goods

Public Infrastructure

A planning horizon for economic decisions which lasts forever.

The return that must be offered to attract financial capital.

A modeling technique that includes the evolution of economic decisions over time.

A function that can be optimized by the choice of variables subject to constraints.

A theory of production that is determined based on the increase of production on the margin.

Those who argue that economic decisions are based on the last units of benefits generated or costs incurred.

A theory that relates causal accounts of social phenomena to the motivations of individual agents.

A firm that is the sole producer of a good or service.

A firm that is the sole purchaser of a factor of production such as labor.

A mathematical model of the economy and production that assumes all actors are fully rational and informed and concludes that market-determined transactions are efficient.

The revival of an approach to decision-making based on more nuanced and less technically sophisticated descriptions of economic interactions.

The quality of a public good that makes it difficult or inappropriate to exclude those who might wish to enjoy consumption of the good.

A good that may be enjoyed by one consumer without preventing simultaneous consumption by others.

A scale that balances the marginal benefits with the marginal costs of increased size.

A condition in which it is impossible to reallocate resources to make one person better off without making at least one other

person worse off.

A tax that exactly apportions to the cost of consumption or production of a good, service, or factor the externalities it induces.

The analysis of financial structure used to fund government. Goods that are non-rivalrous and/or non-excludable.

Those elements of investment that can simultaneously be enjoyed by producers and/or consumers.

Rent-seeking

Ricardian Equivalence Theorem

Social Darwinism

Static Model

Surplus

Theory of the Firm

Time Value of Money

Transactions Costs

Utility

The concentration of effort to secure individual gain even if it results in an equivalent loss by others.

A theory that increased government spending through debt financing will not increase the overall level of economic activity because the debt requires increased savings which detracts from consumption.

A social equivalent to the Darwinian notion of survival of the fittest among species.

A model that is analyzed and optimized at one point in time. The difference between the economic benefits enjoyed and the costs incurred.

The economic study of how firms create value and profit.

The value placed on a present stock of wealth, income, or costs, compared to a future amount.

The various fees, costs, or obstacles that arise in the facilitation of trade or a transaction.

An economic measure of human happiness arising from consumption.

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## Index

agent, 42, 62, 66, 86, 127, 129, 130, 165, 179,216, 222, 231,232, 233  
Akerlof, George, 204, 221  
Alchian, Armen, 215  
Arrow, Kenneth, 71, 86, 93, 94, 111, 112, 128, 148, 160,204,208  
assymmetric information, 3, 115,117, 128, 129, 221, 222, 231  
Atkinson, Anthony, 122, 124, 125, 126, 205, 217  
Battle of Waterloo, 15, 16  
Bilmes, Linda, 220  
Bohm-Bawerk, Lugenevon, 140, 164, 183  
Buchanan, James, 3, 132, 135, 150, 151,152, 153,154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 168, 174, 175, 176, 177, 178, 179, 180, 181, 186, 187, 188, 189, 199, 206,207,211,212,213, 214,215,218,219, 230  
Calculus of Consent, 3,163, 176, 188  
Calculus of Variations, 92, 93,231  
Clark, John Bates, 2, 5, 18, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 71, 72, 73, 85, 109, 133, 135, 147, 148, 149, 164, 183, 202, 218, 230  
Coase, Ronald, 176,207, 211  
Cockerell, Samuel Pepys, 12  
commodity tax, 87, 89, 90, 98, 113, 114, 121, 123,124, 125, 126, 231  
congestion pricing, 132  
Congregationalist Church, 49, 50, 52, 54, 58, 59, 60, 61, 69  
Constitutional Economics, 162, 163, 180  
Conventional Wisdom, 155, 161, 231  
Darwin, Charles, 46, 47, 59  
Debreu, Gerard, 86, 160, 208  
Demsetz, Harold, 215  
Diamond, Peter, 95, 113, 121, 122, 126, 129, 130, 204  
diminishing marginal returns, 17,87, 231  
Diseconomies of Scale, 232  
Earned Income Tax Credit, 119,120, 126, 232  
Economies of Scale, 38, 232  
Edgeworth Box, 175, 232  
Edgeworth, Frances Ysidro, 42, 44, 46, 114, 129, 149, 175  
Einstein, Albert, 85, 91, 97  
Fisher, Irving, 13, 41, 71, 92, 93, 114, 182, 183  
free rider problem, 206, 217  
Friedman, Milton, 71, 148, 160, 176, 182  
Galbraith, John Kenneth, 224, 231  
George, Henry, 2, 3, 5, 19, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 54, 55, 56, 57, 58, 60, 61, 64, 65, 66, 67, 68, 69, 70, 73, 85, 87, 89, 90, 98, 99, 100, 104, 109, 135, 149, 156, 157, 167, 189, 199, 206, 207, 211, 213, 217,218,219,221,230,232  
Giddings, Franklin Henry, 54, 55  
Hamiltonian, 124, 232  
Hammarskjold, Dag, 143  
Harden, Garrett, 159  
Hayek, Frederick, 187  
Henry George Theorem, 189, 211, 213, 217,218, 219  
Hodgskin, Thomas, 19  
  
Jensen, Michael, 130  
Jevons, William Stanley, 42, 140, 166, 167  
Kaldor, Nicholas, 110  
Keynes, John Maynard, 13, 71, 81, 82, 86, 92, 94, 95,109, 110,137, 149, 170,172, 176, 183  
Knight, Frank, 160, 161, 177  
Lagrangian, 88, 89, 116, 118, 123, 124,233  
life cycle hypothesis, 93  
Lindahl, Erik, 143,171  
Losch, August, 209  
Low, Seth, 55, 56, 69  
  
Malthus, Thomas Robert, 12, 14, 15, 17, 18, 19, 35,36,37,139

marginal product of labor, 63, 67  
marginal rate of substitution, 117, 118, 119,211  
Marginalists, 42, 43, 139, 183, 233  
Markowitz, Harry, 148  
Marschak, Jacob, 148, 149, 169  
Marshall, Alfred, 42, 43  
Meckling, William, 130  
Menger, Carl, 42, 140  
mercantilist, 24  
Mill, John Stuart, 12, 34, 35, 42, 61, 81, 162  
Miller, Merton, 22  
Mirrlees, James, 3, 95, 98, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 117, 120, 121, 122, 123, 124, 125, 126, 127, 129, 129, 130, 131, 135, 204, 205, 218, 221, 222, 230  
Modigliani, Franco, 7, 8, 22, 93, 95, 128, 148, 160, 204  
monopolies, 2, 3, 32, 33, 36, 37, 38, 39, 40, 47, 58, 61, 64, 85, 87, 88, 89, 90, 98, 155, 156, 167, 181, 214.221.229.233  
monopolist, 38, 87, 89, 90, 166  
Morgenstem, Oskar, 44  
Musgrave, Richard, 3, 39, 135, 144, 145, 146, 147, 148, 149, 164, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 185, 186, 189, 199, 205, 206, 207, 208, 209, 210, 212, 213, 215, 218, 230

neoclassical model, 5, 25, 73, 180, 206, 208, 209, 222, 233  
Neumann, John von, 44, 91, 92, 94  
New Institutional Economics, 207, 233  
Nobel Memorial Prize, 7, 8, 71, 86, 91, 92, 93, 94, 95, 98. 110, 111, 112, 113, 115, 127, 128, 130, 132. 143, 148, 149, 165, 180, 181, 204, 221, 224, 229  
non-excludability, 170, 208, 229, 233  
non-rivalry, 170, 171, 208, 233  
Ohlin, Bertil Gotthard, 143  
On the Origin of Species, 46  
Ostrom, Vincent, 215,216  
Pareto efficiency, 121, 174, 175, 176, 233  
Pareto, Vilfredo Federico Damaso, 175, 176  
Pigou, Arthur Cecil, 86, 92, 137, 149  
Pigouvian tax, 92, 233  
Progress and Poverty, 19, 22, 40, 41, 42, 43, 44, 45, 46, 54, 56, 57, 60, 65  
Public Choice Theory, 3, 150, 161, 163, 165, 174, 189, 191, 230  
Quantity Theory of Money, 14, 182  
Ramsey, Frank Plumpton, 2, 3, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 109, 110, 114, 121, 122, 135, 149, 166, 205, 218, 230  
random wralk, 110  
rate of time preference, 93  
Rawls, John Bordley, 101, 102, 124, 132, 162  
rent-seeking, 163, 234  
returns to scale, 87, 121, 210, 218, 231

Ricardo, David, 2, 3, 5, 7, 8, 9, 10,11, 12, 13, 14, 15,16,17,18, 19, 20, 21, 22, 23, 24, 25, 34, 35, 42, 45, 64, 73, 98, 135,139, 140, 149, 155, 164, 182, 218, 219, 230  
Robinson, Joan Violet, 109, 204  
Ruml, Beardsley, 148  
Samuelson, Paul, 7, 71, 110, 111, 149, 171, 176, 203,204, 209, 210, 211, 212, 215, 220  
Seelye, Julius Hawley, 53, 54  
Sephardic Jews, 7, 8  
Smith, Adam, 7, 8, 14, 18, 19, 22, 23, 24, 65, 124,162, 208  
Social Statics, 47  
Solow, Robert, 92, 93, 94, 111, 204  
Spencer, Herbert, 43, 47, 59, 60  
Sraffa, Piero, 78, 109  
Stiglitz, Joseph, 3, 71, 98, 122, 124, 125, 126, 189, 200, 201, 202, 203, 204, 205, 211,213, 217, 218, 219, 220, 221, 222, 223, 224, 225, 230  
Stockholm School, 137, 143, 171  
Stolper, Wolfgang Friedrich, 209  
Structure, Conduct, Performance Paradigm 215  
surplus, 18, 24, 32, 36, 42, 43, 64, 65, 67, 155, 234  
Theory of Clubs, 211, 212, 214

Thompson, William, 5  
Tragedy of the Commons, 159  
Transactions Costs, 232, 234  
Tullock, Gordon, 3,162, 163,174, 175, 176, 188  
Veblen, Thorstein Bunde, 54, 207  
Vickrey, William, 3, 95, 98, 99, 100, 101, 102, 103, 114, 115, 117, 121, 127, 129, 132, 133, 135, 218, 221, 222, 230  
voting with the feet, 189, 206, 211, 213, 217  
Wagner, Adolph, 1, 170, 171, 177, 189  
Walras, Leon, 42, 175, 183, 208  
Weber, Alfred, 169  
Wicksell, Knut, 3, 135, 137, 138, 139, 140, 141, 142, 143, 149,161, 162, 163, 164, 165, 166, 167, 168, 169, 171,177, 180, 182,  
183, 184, 217, 218, 219, 230  
Williams, John Burr, 22, 44  
Williamson, Oliver, 207  
zoning 211,213, 217,219