

Preface

“Remember the Austrians” or “What Does Catallactics Have to Do with Civil Engineering?”

The title, “Purposeful Engineering Economics,” was chosen to emphasize the importance of the intentions behind any economic action. To explain this idea adequately requires investigation well beyond engineering economics, *per se*. In fact, much of the narrative will range over a wide subject area to draw from works in sociology, philosophy, political economy, history, and even religion for background materials. I am not aware of any previous attempt to “explain” engineering economy this way.

This book is intended primarily for instructors of engineering economy classes, particularly those for civil engineering students. It is assumed that the instructor will be well versed in the methods of engineering economy but is interested to include the wider perspective of catallactics in the course. This book will suggest ways to do this; it is not intended to replace a basic engineering economy textbook.

Although I am not an economist, I created and taught a course on economics and risk for almost 20 years. For many years before that, I maintained an abiding interest in the literature of the Austrian school economists, obviously not a common interest for engineers. Several private foundations provided enough support for the development and continued revision of the CEE course known as “Economy and Risk” as well as several associated case studies. This decade-long relationship produced numerous published articles on subjects as varied as water quality control programs, the transcontinental railroads, and the course content itself. The latest presentation of this material was at an international meeting concerned with water resources and other environmental issues.

I had planned to include a section titled “It All Started with Ayn Rand,” but that statement is not really true either chronologically or personally. So, when I recently saw a movie called “Remember the Titans,” I promised my class that I would use “Remember the Austrians” as a title in the book, instead.

Later, I realized that this title is more than just a play on words because there seems to be a more meaningful similarity. If you remember the movie, it is about bringing together disparate groups to reach a goal. That is also what Austrian school economists worry about—the coordination of individual efforts based on subjective values so that all participants can remove their respective “felt uneasiness” by purposeful action; they feel better after the action. This coordination problem will have a prominent place in this narrative.

As for Ayn Rand, long ago a friend gave me a copy of “The Fountainhead” and said: “You’re an engineer, you’ll enjoy this.” Eventually, I read my way through her novels and nonfiction. Buried in the reference section of a collection of essays called “Capitalism, the Unknown Ideal,” there is a citation of Ludwig von Mises’ treatise “Human Action”. (I always say that I am probably one of the only two engineers who have ever read that 900-page book, and I have done it twice!) That was the book that introduced the Austrian School of economics to me. I subsequently read my way through a lot of that literature by Mises, Hayek, and others, eventually finding current adherents such as Sowell and Williams, among others. Even now, as this is written, I am finding additional adherents to the more modern, American branch of the Austrian tradition, especially O’Driscoll, Rizzo, Kirzner, Lachman, and Vaughn.

Mises explained the situation this way: “The cornerstone of the Austrian school is the subjective value marginal utility theory. This theory traces all economic phenomena, simple and complex, to the actions of individuals, each undertaken as a result of personal subjective values.”

The second half of the title, “What Does Catallactics Have to Do With Civil Engineering?” is a question I have often been asked by friends, faculty members, and manuscript reviewers. Other similar questions I am asked include the following: What are you talking about? Why is this important? What does it have to do with engineering? What does it add to an engineer’s education? One reason for this book is to convince at least some readers that ideas such as subjective value and marginal utility do have a significant relationship to civil engineering.

My interest in catallactics did not really begin with “The Fountainhead.” Several personal experiences contributed to the desire to write this book. The first incident that I can remember was when I was a 17-year-old high school student. Our “Problems of Democracy” teacher made an indelible impression when he said in class that “even if the tax rate was 99 %, he would continue to work to get the last 1 %.” Now, even a 17-year-old who has never heard of economics will realize that his statement just does not sound right, but would not know why. One objective of my course has been to help college students understand the “why” as an individual subjective value decision.

Another incident occurred only a few years ago when a recent graduate of our undergraduate engineering program wrote to tell me that she had been in a meeting with the supervisors in her engineering firm and she was the only one who knew what “Present Value” meant. This was discouraging because they were apparently trying to work out a cash flow analysis for an engineering project.

A final “tipping point,” to use that overused idea, has been the misquoting, or even ignoring, of the US Constitution by several high-ranking members of our

Congress. Two recent incidents stand out: one referring to the “health and welfare clause” and the other crediting the 14th Amendment [1868] to the Founders. These are among the reasons that I give each of my students a pocket copy of the US Constitution, like the one that Peter Jennings carried around, as part of my courses. Another reason is that the economy and risk class has a component that addresses “current issues,” and among the issues considered have been various governmental activities and Constitutional debates surrounding them.

Justification for incorporating catallactics in engineering education comes from a recent National Academy of Engineering report, “Educating the Engineer of 2020” which stated: “Engineers must learn...basic micro-economics, the setting of prices, the determinants of market value, and so forth.” Because “...the best engineering solutions can emerge only in the context of market prices and market forces.” Therefore, “...engineers need market prices, not black-and-white regulations, to make correct, ‘unwasteful,’ economic decisions, and engineers should inject themselves forcefully into this very public debate.”

My argument for including the “Economy and Risk” course in an undergraduate curriculum has been that to work for the public good, civil engineers must favor economic efficiency and optimum allocation of scarce resources and that resources, including fear, are always in scarce supply. To accomplish these objectives, the engineer should have an appreciation for the subjects of economic action as best defined by the Austrian economists. They really do not need to know macroeconomics of any variety. My view, supported by Austrian theorists, is that macroeconomics and “econometrics” are fallacious.

This book is organized to follow a particular engineering economy textbook (Thuesen & Fabrycky) used in my classes, although an instructor could easily use a different text. It gives suggestions for applications of Austrian economic principles to several topics of engineering economy. It also includes a section describing basic elements of Austrian economic theory and references for further study. An example set of learning objectives for a course incorporating these principles is appended.

The main objectives of my course are to study cash flow (engineering economy) supplemented with economic fundamentals (e.g., supply and demand analysis) and risk evaluations. The course is informed throughout, both explicitly and implicitly, by references to Austrian school philosophy best represented by the work of Hayek and Mises and including others such as Rothbard and even Menger, himself.

The course is intended to be more than simply cash flow; four elements were interwoven to construct it: fundamental economics (catallactics, a non-mathematical branch of the social sciences); engineering economy (cash flow); risk and uncertainty in decision making; and current events (political economy).

Work in the class should progress from the ideal world (no inflation; no taxes) to the study of the same cases including effects of depreciation, taxes, and inflation. Several example cases are investigated for “sustainability” concerns as well as the effects of government policies on project acceptability.

To return to the question: Why is this manuscript titled “Purposeful Engineering Economics”? My dictionary defines “purposeful” as “having a purpose; intentional” and “purpose” as “a result or effect that is intended or desired.”

So, the “intent,” herein, is to present a supplement to the traditional engineering economics textbook that elaborates the *consciousness* behind the mathematics of the decision process. Such *consciousness* is a capacity of an individual; as such its content is unknowable to anyone except that individual. Rothbard said that individuals do not behave like billiard balls; their actions do not follow physical laws, they are purposeful, mind-driven.

Acting individuals are attempting to achieve their particular goals in a world filled by uncertainty. Their actions cannot be predicted; to make such a claim is, according to Hayek, the “fatal conceit” of social engineers and planners. According to O’Driscoll and Rizzo, actions occurring through “real time” encounter constantly changing information as actors discover new knowledge amid the uncertainty. No one, not even the acting individual, can foresee the future state of knowledge. Hayek called the attempt to do so the “pretence of knowledge” in his Nobel Prize acceptance lecture.

It has been my intention, both in class and in this book, to give engineering students an appreciation of these Austrian insights so that they can take a more critical view of accepted knowledge. It is my hope that readers of this slim volume will also find something of value.

Acknowledgments

The collection, organization, and presentation of this material have taken a very long time. Many individuals have contributed to it, most without being aware of doing so. Hundreds of students have attended my classes, answered survey questions, or offered constructive criticism.

For many years, I have been fortunate to have been the Edward A. Daylor Endowed Professor at Villanova University, a position that provided time and resources for independent scholarship, much of which has led to this project. The Carthage and Sarah Scaife Foundations also provided support for the development and publication of course materials, particularly several case studies.

Several reviewers, unknown to me, have offered suggestions for improvements to the text. While I have not always followed them, these suggestions have made the project more complete.

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My wife, Donna, consistently supported the development of the manuscript, read several drafts, and offered many insightful suggestions that made it much better than it would have been. Without her encouragement, there would have been no manuscript.

Thus, the work you see had many contributors, but any errors of fact or interpretation are mine. I only hope that some instructors will be encouraged to incorporate Austrian concepts in their future classes.

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