

THE NEXT GENERATION OF
AUSTRIAN ECONOMICS



Joseph Thomas Salerno

THE NEXT GENERATION OF AUSTRIAN ECONOMICS

ESSAYS IN HONOR OF JOSEPH T. SALERNO

EDITED BY

PER BYLUND AND DAVID HOWDEN

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FOREWORD

LLEWELLYN H. ROCKWELL, JR.*

After Joey Rothbard's death, I flew to New York to organize the disposal of Murray and Joey's goods according to their wills. Books and papers went to the Mises Institute, of course, where they are the center of our library and archives. But my strongest memory, aside from ineffable sadness, was the printed document on the small table next to Murray's reading chair in the living room. It was Joe Salerno's doctoral dissertation.

To me, that has always symbolized Murray's relationship with Joe, whom he praised as a wonderful economist, and — perhaps almost as important in our times — as a brave fighter against error and sellout.

Joe has been a strong intellectual influence on the Mises Institute since our founding. How appropriate that he is also Murray's successor as our academic vice president.

Joe influences so much. The Mises University, the Austrian Economics Research Conference, and the Summer Fellows Program are all under his aegis, and much the better for it. Not only is Joe an important scholar, he is a teacher of the sort we would all have loved to have had. No one could be more patient, rigorous, detailed, and loving. Forget Mr. Chips. We've got Joe Salerno.

*Llewellyn H. Rockwell, Jr. is chairman and CEO of the Mises Institute, Auburn, Alabama.

INTRODUCTION

PER BYLUND AND DAVID HOWDEN

Ten years ago Joe Salerno inherited the Mises Institute's summer fellowship program from his predecessor, Jörg Guido Hülsmann. Generously funded by Peg Rowley, summer fellows are given time to study Austrian economics firsthand with some of the current masters. Not only is a sense of camaraderie inculcated amongst the participants, but they are also given access to the world's best Austrian economics library and other resources. Frequent visits by friends of the Institute give these young scholars the ability to ask questions about the theory and history of the movement, and give them an ability to become a part of its ongoing evolution.

Central to this fellowship is the mentorship of Professor Salerno himself. Under his stewardship the program has brought 138 students to the Institute's facility in Auburn, Alabama, from 2005 to 2013. These students have produced magnificent works central to Austrian economics during their summers in Auburn, and have gone on to take active roles in both the academic community and with private industry.

Perhaps more important than the careers that these young scholars have gone on to live is the enlightenment that they have shared with others through their daily lives. Using their argumentation skills fomented during their stays at the Mises Institute, these scholars have had their reach extended to others in subsequent encounters. We are all the better off for it.

The contributors to the present volume come from the ranks of PhD students, post-doctoral researchers and university professors. They have

reached out to others in a bid to have the truth of their studies heard by the widest audience possible. Professor Salerno's work in fostering debate and encouraging students during their summer in Auburn has no doubt been influential in spurring on this activism.

The present book is divided into three sections: money, policy and what we can refer to as mundane economics, the study of the basic, yet vital topics of the science. Each section represents an important area of Professor Salerno's own research and his imprint on each chapter should be apparent to the reader. Suffice to say, a brief overview of his contributions will assist the reader in seeing his impact on the development of these young Austrian scholars in particular, and on Austrian economics in general.

INFLUENCE ON MUNDANE ECONOMICS

Professor Salerno is one of the leading contemporary theorists in the Austrian tradition. A former colleague of Murray Rothbard's, Professor Salerno has made his unfading mark on the theoretical Austrian literature through several influential as well as highly provocative articles. He has also changed the landscape for Austrian theorizing and the self-perception of Austrians.

His perhaps most debated contribution is "Mises and Hayek Dehomogenized" (1993), an article that essentially rewrote the history and sociology of the Austrian school. Professor Salerno here argues that "the Mengerian tradition was developed in very different directions by his brilliant followers, Eugen von Böhm-Bawerk and Friedrich von Wieser, and by their own students and followers" (1993, p. 114). In fact, Professor Salerno argues, these directions constitute "very different paradigms." The former focuses on monetary calculation and resource allocation using actual market prices and comprises the social rationalism of Mises (Salerno 1990) and the judgmental entrepreneur (Salerno 2008b); one may also add the distinctly Austrian method of praxeology (see e.g., Rothbard 1951a; 1951b). The latter, in contrast, is a "general equilibrium tradition" (Salerno 2002) focused on the problem of coordination due to dispersed and tacit knowledge (see Hayek 1937; 1945) and much more inclined to quantitative analyses.

While only one of many influential contributions, the "dehomogenized" article represents Professor Salerno's contributions to Austrian theory well. His contributions to "mundane" theory are primarily in the form of integrating existing theories and prospective theoretical perspectives by offering reinterpreting and contextualizing commentary, comparisons, and theoretical extensions. While perhaps not as glamorous as producing

thousand-page treatises, this important integrative work is what produces a consistent body of theory that defines and furthers a tradition or school of thought.

Salerno's work has strengthened the Austrian theoretical tradition and helped identify precursors and "proto-Austrians." His work stretches beyond publishing in specifically Austrian journals and discussing exclusively Austrian theorists. Much thanks to Professor Salerno's work, we are able to trace the philosophical origins of Austrian thought centuries if not millennia back in time and can identify kinship with other traditions. To exemplify, Professor Salerno has pursued illuminating commentary on the legacies of Carl Menger (Salerno 2004; 2010a), Eugen von Böhm-Bawerk (Salerno 2008), Ludwig von Mises (Salerno 1995a; 1999; 2012), Murray N. Rothbard (Salerno 2006), as well as of the French Liberal school's Jean-Baptiste Say and Frédéric Bastiat (Salerno 1978; 1985; 1988; 1998; 2001), and has addressed the theoretical origins and shortcomings of opponents and competing traditions (Salerno 1992). Professor Salerno has also addressed traditions in monetary theory (Salerno 1991), but this work has come to be overshadowed by his important theoretical advances related to macroeconomics and money, especially monetary policy, business cycle theory (Salerno 1989; 2012b), and the calculation problem (Salerno 1990b; 1994b; 1996a).

MONEY AND POLICY

Besides his work on the more mundane aspects of economics, Professor Salerno has pushed forward the development of the one topic, besides method, that most separates neoclassical from Austrian economists: business cycle theory. This focus stems from the fact that the

Austrian theory [of the business cycle] embodies all the distinctive Austrian traits: the theory of heterogeneous capital, the structure of production, the passage of time, sequential analysis of monetary interventionism, the market origins and function of the interest rate, and more. (Salerno 1996b)

While this focus on business cycle theory has most recently been summarized in Salerno (2012), the bulk of his work on the topic has fallen into monetary theory and history. (Understandably so, as manipulations to the money supply as the root of economic disturbances remain the bulwark of the Austrian theory.) As the title of his most comprehensive book alludes

to (Salerno 2010b), the undercurrent of his life's work can be summed up in two words: "sound money." In this agenda, Professor Salerno can be included in a long line of great economists championing a solid currency for the economy to be built upon, starting with the Spanish scholastics in the sixteenth century, expanded upon by David Ricardo and his fellow "bullionists" in the early nineteenth century, and most forcefully and completely argued by Ludwig von Mises in the early twentieth century. According to Mises (1971, pp. 414–16),

the sound money principle has two aspects. It is affirmative in approving the market's choice of a commonly used medium of exchange. It is negative in obstructing the government's propensity to meddle with the currency system. ... Sound money meant a metallic standard. ... The excellence of the gold standard is to be seen in the fact that it renders the determination of the monetary unit's purchasing power independent of governments and political parties.

Professor Salerno has made available to his professional colleagues, students and laymen alike the true historical role and functioning of the "gold standard" (in its myriad forms). His work (Salerno 1983) on defining what a true gold standard entails has been instrumental in recognizing red-herring gold standards, imperfectly designed as they were, and which are commonly used to denigrate the usefulness of the "barbarous" monetary relic. His most comprehensive work on the topic (Salerno 1984), shows that the international gold standard is an oft-misunderstood beast because of the aggregative tactic the profession chooses to look at economic phenomena. Taking a more disaggregated approach to monetary and balance-of-payments theory allows one to see the true equilibrating mechanisms promoted by a healthily functioning gold standard.

Nor have these historical insights been merely apparent, allowing one to gain an understanding of a past disconnected from the future. In "War and the Money Machine: Concealing the Costs of War beneath the Veil of Inflation," Professor Salerno lays out a theory of war finance, showing that monetary inflation obscures the cost of war and contributes to the capital decumulation and wealth destruction that ultimately ensues. That war-time inflation paves the way to "economic fascism" should be more than apparent to the reader who considers the socialization of large swaths of the American economy that have taken place over the past fifteen years in the wake of the ongoing "War on Terror," an insidious undertaking with

an enormous price tag. With some estimates of the total cost of this war as high as \$5.5 trillion (nearly \$20,000 per American citizen) the role of inflation in financing this broad-reaching undertaking cannot be overstated (Eisenhower Study Group 2011).

Professor Salerno has been instrumental in demonstrating that Ludwig von Mises's contributions to the theory of money in the early twentieth century not only predated and were ignored by many mainstream economist, but is also far superior (Salerno 1994a). In light of this, it is to his credit that he has not ignored mainstream monetary theory completely. In Salerno (2006) he gives a "Rothbardian" analysis of the familiar equation of exchange. His insights allow the reader to see clearly and in a way that is not possible via the vacuous quantity theory that

the Quantity Theory of Money as expounded in terms of the Quantity Equation gets matters exactly wrong: it is not the flow of spending that determines the price level, given a level of output that is exogenously determined in some separate and mysterious real process. Rather the money prices and quantities of goods exchanged, which are codetermined in the overall market process, are the causal determinants of the spending flow. (Salerno 2006, p. 51)

Never content to rest on the laurels of his forebears, he has striven to improve upon the great works they have achieved. Salerno (1987) provides a better measure of the "true" money supply. Unsatisfied with the existing "M" expounded with near unanimity by the rest of the profession, Professor Salerno builds off Rothbard (1963, pp. 83–86; 1978; 1983, pp. 254–62) to provide a better answer to a seemingly simple question: how much money is floating around out there? Not only is the exercise admirable for its clarity, it also shows a dedication to truth seeking and an undogmatic approach to economic analysis. Though clearly following in the footsteps of Rothbard, Professor Salerno does not hesitate to correct the dean of the Austrian school in his previous attempts to define the money supply.

TO THE NEXT GENERATION

The contributions to economic science discussed above, although formidable, will not be Professor Salerno's greatest professional achievement. The thirteen contributors to the present volume have all learned from him, and there can be no doubt as to the influence he has had on their intellectual development. Just as Professor Salerno very clearly is influenced by

the Menger-Mises-Rothbard tradition of the Austrian school, each of these thirteen authors (as well as the other summer fellows under his tutelage, and the thousands of people who have listened to his lectures and read his works) can be considered an intellectual descendant of his. To introduce the adjective, we are all “Salernians” in some way.

Professor Salerno was not only present for the rebirth and revival of Austrian economics in the mid-1960s, he has been an important focal point of its continual growth over the ensuing decades. With this book, we present to him the evidence that the discipline is in good hands, and that his reach and influence has not only been wide, but also strong, ensuring its promulgation for another generation. It is with this contribution that his most lasting influence has been made, and continues to grow with each passing year. Thanks, Joe.

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I.

MONEY

THE QUALITY OF MONETARY REGIMES

PHILIPP BAGUS*

In this article I would like to continue in the tradition of Mises, Rothbard, and Salerno to analyze how sound monetary regimes affect the quality of money. The value of money, as of any other good, depends on its usefulness or quality in the eye of its user. Money's quality can be defined as "the capacity of money, as perceived by actors, to fulfill its main functions, namely to serve as a medium of exchange, as a store of wealth, and as an accounting unit" (Bagus 2009, pp. 22–23). Changes in money's quality affect the demand for money and, consequently, its purchasing power. The quality of a monetary regime, in turn, may be defined as the

*Philipp Bagus is professor of economics in the Department of Applied Economics I at Universidad Rey Juan Carlos, Madrid, Spain. Professor Bagus was a summer research fellow in 2006 and 2009. This chapter is an extension of the theoretical perspective developed in the article "The Quality of Money," for which he received very valuable comments by Professor Salerno. The author wishes to thank David Howden for excellent comments on the present article.

Joseph T. Salerno has not only been a very important mentor and friend for me. With his humor, positive attitude, and generous support he is a precious asset for Mises Institute summer fellows such as I was for two years. Thank you, Joe. With his articulate, intransigent and courageous support of sound money, he is an invaluable asset for the Austrian school. He not only always stands up to defend the theoretical advances of Mises and Rothbard, he also has added to the corpus of Austrian theory.

capacity of a monetary system to provide an institutional framework for a good medium of exchange, store of wealth, and accounting unit.

While the quality of a monetary system or regime is perceived subjectively by actors, there are several objective characteristics that tend to influence this perception. In a trial and error process actors normally do not base their perceptions of their institutional framework on poor whims, as they suffer the consequences of poor judgment. Guided by the objective qualities of monetary systems, actors tend to benefit as they can hedge against depreciation or gain from appreciation of the currency. They can protect their monetary wealth more efficiently. In this article we will analyze these objective qualities of “good” monetary systems.

Connection Between the Quality of Monetary Regimes and Money’s Purchasing Power

The quality of monetary systems has been neglected in the literature.¹ Comparative analyses of monetary systems from an institutional perspective are rare.² Neither do textbooks delve into the qualities of monetary systems, an exception being White (1999). Rather, monetary policies within the setting of our current fiat money systems are analyzed, sometimes enriched by a narrative of the evolution of some historical monetary regimes, yet without providing a comparison of them. The neglect of a comparison might be caused by the belief that we have found the best monetary system. Fiat monetary systems are controlled by a central bank and can be manipulated to provide a supposedly perfect money fulfilling its functions as a medium of exchange, store of value, and unit of account. Moreover, qualities of monetary regimes are hardly measurable or usable in econometric analysis which makes the question unattractive for modern econometric research. Recently, the financial crisis has led to doubts about the set up of the financial system and the monetary system in particular, which makes a comparative analysis of the monetary system timely.

¹Bagus (2009) discusses the quality of money in general. Bagus and Schiml (2009, 2010) and Bagus and Howden (2009a, 2009b) analyze the quality of the currency unit through the central bank’s balance sheet. Bagus and Howden (2011) point out that Iceland’s central bank adopted an explicit lender of last resort function that deteriorated the quality of Iceland’s monetary regime.

²The mainstream focuses narrowly on the aspect of central bank independence and mostly neglects all other aspects.

The quality of monetary systems influences the demand for money and, thereby, money's purchasing power. While much emphasis has been put on the quantity of money and its influences on money's purchasing power, money's quality, and the quality of monetary systems are equally important for money's price, if not more so. In fact, money's quantity may be interpreted as one of several characteristics that determine money's quality and the likelihood and capacity of monetary regimes to increase or decrease money's quantity is one of the important characteristics of the quality of a monetary regime.

Changes in monetary systems may lead to sudden changes in money's quality and purchasing power. More specifically, a change in the monetary regime may lead to a pronounced change in the valuation of money in relation to other goods. Imagine that actors regard the new monetary system as a worse provider of a medium of exchange, store of wealth, and accounting unit than the preceding system. Actors value money less intensely with respect to other goods. This may be illustrated by an example of an individual's value scale before and after the regime changes.

Value scale before regime change

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20 th	5 th \$10 bill
21 st	Hamburger meal
22 nd	6 th \$10 bill
23 rd	cheeseburger
24 th	7 th \$10 bill
25 th	Bottle red wine
26 th	Bottle white wine

In our example our person having seven \$10 bills in his pocket would not buy wine priced at \$10. However, she would give up one \$10 bill for a cheeseburger that she values higher than the 7th bill she owns. She would also spend the 6th bill for the hamburger meal valued higher. Let us look at the value scale of the regime change by which the perception of money's quality falls. The new monetary regime is in the eyes of actors providing a worse medium of exchange, store of value, and unit of account than the preceding regime.

Value scale after regime change

.	
.	
.	
20 th	Hamburger meal
21 st	Cheeseburger
22 nd	Bottle red wine
23 rd	5 th \$10
24 th	Bottle white wine
25 th	6 th \$10
26 th	7 th \$10

We see that goods tend now to be ranked higher on the value scale relative to money units than before.³ After the change, the person would give \$10 for a bottle of white wine. She would also buy red wine, cheeseburger, or a hamburger meal with \$10. The prices of these good would tend to increase. Without any increase in the quantity of money, money is valued less in comparison to goods due to the qualitative deterioration of the monetary regime. Money's purchasing power decreases. Brisk changes in purchasing power may be caused by a change in monetary regime. This gives us reason to analyze the quality of different monetary regimes and how changes to them influence their quality.

QUALITIES OF MONETARY REGIMES

Monetary regimes provide a framework within which money fulfills its functions. As the unit of account function is fulfilled by nearly all monetary systems equally well and it is impaired only in extreme situations, we will concentrate of the characteristics of good medium of exchange and store of value.⁴

³Salerno (2006, p. 52) refers in this context to "the relative rankings of goods and of money among market participants." This relative ranking is immediately and potentially strongly affected by changes in monetary regimes.

⁴As Röpke states, referring to the German 1922–1923 hyperinflation (1954, p. 121), money's functions often disappear in a certain order. First, money ceases to be used as storage of wealth, when actors start to think that it continuously will lose value. Second, when the fluctuations of the value of money increase and money loses its value faster, money loses its function as a unit of account. People started to calculate in other units. In 1923, they started to calculate in gold and even the German government calculated its taxes in gold mark. The last function that is lost in a hyperinflation is the function as medium of exchange. People progressively started to use foreign exchange to transact (Bresciani-Turroni 1968, p. 89). In November 1923, the mark was completely abandoned as a medium of exchange.

We will begin with the characteristics of a good medium of exchange and the influence on it by a monetary regime. A good medium of exchange has low storage and transportation costs. Other properties are easy handling, durability, divisibility, resistance to tarnish, homogeneity, and ease in recognition. These properties hardly change today as paper-based fiat standards have eased the physical usability of the monetary unit, as well as the costs to provide it. In commodity standards these qualities may change when society switches from one commodity to the other. For instance, a change from a silver to a gold standard may imply an increase in the quality of money as gold is more durable than silver, which suffers from oxidation. A more relevant property of a medium of exchange is the number of users. More users imply more demand for the medium of exchange. As more people accept it in trade, the medium of exchange is more useful. Changes in monetary systems may increase the number of users and thereby the quality of the money. For instance, at the end of the nineteenth century ever more countries left their silver standards to adopt the gold standard. The increased use of gold as a currency increased its quality as money. Similarly a switch from Germany's Deutsche mark to the more widely used Euro or from national fiat currencies to a world fiat money increases the quality of money as a medium of exchange. The tendency of an increase in the quality of money as a medium of exchange is, however, counteracted by possible decreases in its functionality as a store of value.

Ironically, maybe the most important characteristic for a medium of exchange is the existence of ample non-monetary demand for the money as either a consumer good or a factor of production. The demand for other, non-monetary purposes assures that there exist unsatisfied wants which are intense and permanent (Menger 1892, p. 5). The non-monetary demand serves as "insurance" for the money holder as it stabilizes its value due to the constant demand.⁵ If the money is demonetized, in the worst case scenario, by the government or because people turn to another medium of exchange, it will still retain its use value. A money with a very low or no non-monetary demand loses almost all its value in a demonetization. Its value is totally dependent on the monetary demand for the good and the confidence in it. Its value tends to be more volatile than the value of a money that has a stabilizing non-monetary demand. If the insurance breaks away even without any change or expected change in money's quantity, its quality is reduced, leading to a tendency for its purchasing power to decrease. This is so, because

⁵The main disadvantage of Bitcoin is that it virtually lacks such an "insurance."

the risk of demonetization and a complete loss of value for money holders without a non-monetary demand insurance is greater than for a monetary unit with a use value. Without this insurance, the demand for money tends to fall, leading to a fall in purchasing power. Therefore, if there is a switch from a monetary regime with ample non-monetary demand such as a gold standard to a monetary regime without a relevant non-monetary demand such as a fiat money standard, the quality of the money regime is reduced, independent of (expected) quantity changes.

The store of value function is another important function of money. There are several characteristics of a good store of wealth.

One of its most important characteristics is the possibility of increases in its quantity. Different monetary regimes allow for different mechanisms to increase the quantity of money, thereby influencing money's quality. Thus, monetary systems may set strict and less strict limits for increases in the money supply. A switch from a monetary system that strictly limits the quantity of money and its possible increases to a monetary system that makes increases in the money supply more likely and less predictable implies a deterioration of the quality of money.

For the quality of the monetary regime the stability of the financial system it fosters is also important. There are monetary regimes that are more prone to generate business cycles, over-indebtedness and illiquidity than other regimes. Business cycles, over-indebtedness and illiquidity may provoke interventions and bailouts on part of the government or monetary authorities. In the wake of the bailouts the quantity of money is often increased, or even the quality of the monetary system is diluted. For instance, redemption into specie might be suspended or a new monetary order may emerge (e.g., the introduction of a world fiat money). Consequently, money's quality is affected negatively by a change toward a more instable monetary system.

The probability of demonetization is a related factor influencing money's quality. Some monetary systems are more prone to demonetization than others. Systems that come along with an instable financial sector may lead to collapse or public bailouts that endanger the confidence in the monetary unit. Another factor that affects money as a store of value is the potential for general manipulation by the government. Interventions by the government often decrease the quality of money in its own favor by increases in money's quantity or through a deterioration in the reserves backing it. A government could, for instance, confiscate the gold reserves of its fiat currency to pay for expenditures thereby decreasing the quality of money. Some systems are

less prone to government intervention than others where the government has a stronger foothold in the system.⁶ The more independent a monetary regime is from the government, the higher is the quality of the currency. A switch to a monetary system more dependent or open to interventions by a government means a deterioration of money's quality.

A 100 PERCENT AND FREE GOLD STANDARD

I will now analyze the quality of money in different monetary regimes.⁷ I will start with the highest quality monetary regime and work my way downward to systems of lower quality. In a 100 percent gold standard, only gold (or 100 percent backed gold certificates) is money and banks hold 100 percent reserves for their demand deposits. The following analysis applies *mutatis mutandis* to other 100 percent commodity standards such as a 100 percent silver standard.⁸ I picked the example of gold out for two reasons: the historic importance of the gold standard and its unique qualities.

A 100 percent and free gold standard offers all the qualities of good money. Gold has a relatively high value in a small size, thus reducing storage and transportation costs. It is easy to handle in exchange and easily divisible. It is homogenous. Its grade is easy recognizable and it is resistant

⁶Herbener (2002, p. 11) points out that the government is likely to use those footholds to switch to ever more interventionary monetary regimes:

Given any foothold in monetary affairs, the state would always move step by step to an inflationary monetary regime, the exercise of which would eventually cripple, if not destroy, the market itself. Given the power to coin gold, the state would come to suppress the coinage of private mints by waiving its mintage fee. Once securely dominant as a money producer, it would make its coins legal tender, leading to the possibility of seigniorage from debasement. Likewise, if the state had the power to issue money substitutes, it would suppress the issue by private banks by waiving the printing or accounting fees. Once securely dominant as a money substitute producer, the state would rescind redemption to capture the revenue from inflating the stock of its, now, fiat paper money.

⁷For an analysis of the devolution of monetary systems see also Hoppe's (1994) analysis. Hoppe shows how money and credit deteriorates as a result of government intervention. Rittershausen (1962, p. 334) and Veit (1969, p. 88) offer classifications of monetary regimes. Rittershausen focuses on the legal tender and emphasizes that systems where beside specie also bank liabilities are legal tender diminish the quality of the currency. His classification is similar to mine.

⁸Similarly, gold and silver may be in use simultaneously.

to tarnish. There exists a tremendous non-monetary demand for gold all over the world. Gold is also relatively hoardable as it can be bought and sold in large amounts without losses. Moreover, the production costs of gold are very high, as is the existing gold stock. Anyone can mint coins; the government has no foothold in the monetary system. Gold is, thus, difficult to manipulate by governments. Only by outright coin clipping or by changing the monetary regime itself can the government manipulate gold. Furthermore, these two kinds of gold manipulations can face strong resistance, as they are highly visible when gold is in the hands of the citizenry.

In addition, in a 100 percent gold standard there is unlimited and unconditional redemption. The banking system is *per definitionem* liquid; it cannot be brought down by a bank run, as there are 100 percent reserves. The economy and the government are less likely to have negative effects on the quality of money than in other regimes. This is so, because a 100 percent gold standard strengthens the economy and puts limits on the spending of government. As there is by definition no credit expansion and no artificial reduction of interest rates, there is no credit created business cycle. And as taxation is unpopular and government debt cannot be monetized but has to be paid out of taxes, government has to be fiscally more responsible. The tendency toward slowly falling prices in such a system when economic growth exceeds increases in gold production makes debts less attractive.⁹ Overindebtedness is therefore quite unlikely.

In a free 100 percent gold standard there exists also monetary competition. No one imposes gold as money and other monies can compete freely with it. The competition in the production of money ensures the quality of money. Bad money is pushed out of the market by good money (Hayek 1978, pp. 1–3).¹⁰ Only the money that best fulfills and keeps fulfilling the function as unit of account, storage of wealth and a medium of exchange prevails under free competition. There is no central bank, no monetary monopoly or legal tender laws. Hence, there will be a discovery process for the best currency. Different issuers in a trial and error process compete in offering currencies to their customers. Inefficient producers of money disappear. Only the efficient producers of money that produce money in a quantity and quality fitting consumers' wishes best will survive. As money

⁹For an analysis of growth deflation see Salerno (2003).

¹⁰For the advantages of currency competition see Klein (1974) and Vaubel (1977, 1988).

users usually prefer a stable currency, there will be a competitive process toward stable currencies.

Lastly, the monetary system tends to be stable. 100 percent reserves on demand deposits ensure that no bank runs on demand deposits will lead to a banking crisis. Moreover, there are harsh limits to other types of maturity mismatching, i.e., borrowing short and lending long (Bagus 2010; Bagus and Howden 2010). Borrowing short and lending long is a very risky business. Competitors, by assuming short-term debts and not rolling over the debt, might drive banks into bankruptcy. Speculators may also short bank stocks and try to instigate a run on the short-term liabilities of banks. Customers will attend those banks that limit this risky behavior. In short, in a free market maturity mismatching is strictly limited and there is no reason why banks would systematically err about the amount of short-term renewable savings. More importantly, the promoters of excessive maturity mismatching such as government guarantees for banks are limited, or absent, as there is no central bank that could roll over short-term debts nor credit expansion increasing constantly the money supply making a roll-over of short-term debts easier. The financial system in a 100 percent gold standard is, therefore, very stable. The chance that governments will be tempted to bailout the financial system diluting the value of money or the monetary regime is reduced.

FRACTIONAL GOLD STANDARDS

I will now analyze fractional reserve gold standards with different properties.¹¹ I will not explore every theoretical possibility but will concentrate on the historical monetary regimes. The first fractional reserve standard is a gold coin standard. In a gold coin standard banks hold fractional reserves and gold coins are in circulation. A gold coin standard contains the same properties in regard to its functions as a medium of exchange as a 100 percent gold standard. Gold is not perishable, homogeneous, has a great value in a small bulk, etc.

The main difference concerning the quality of the money, though, comes with money's function as a store of wealth. In a gold coin standard, money is easier to manipulate for governments than in a 100 percent gold standard, as the government typically holds the monopoly of the mint. In addition, banks are allowed to produce fiduciary media, i.e., money substitutes not backed by gold. The banking system does not necessarily have to

¹¹ Again, the analysis applies *mutatis mutandis* to other fractional reserve commodity standards.

hold 100 percent reserves, as credit expansion is possible. Credit expansion, by causing business cycles, weakens the economy and helps to monetize government debts. In a recession, there is the danger of government bailouts diluting money's value. Recessions may also be used as a pretext to increase government's foothold in the economy, for instance by installing a central bank. If a central bank is installed, the quality of money falls even more, as this agency is a foothold of the government into the monetary system that is likely to reduce the quality of money further.

Moreover, credit expansion serves as a promoter of maturity mismatching, i.e., borrowing short and lending long. In the case of roll over problems of short-term debts, banks may use their own deposits as a substitute for financing. In addition, credit expansion tends to increase the money supply which reduces the risk of maturity mismatching. The financial system becomes more unstable by the tendency for excessive maturity mismatching. This makes a government bailout implying a deterioration of the money standard more likely.

Furthermore, an important difference of a fractional gold standard and a 100 percent gold standard is the effect of increases in the quantity of money on its quality. When in a 100 percent gold standard new gold is mined, this gold naturally is of the same quality as the old money. The quality does not deteriorate. Yet, when in a fractional gold standard, the amount of fiduciary media, i.e., paper money, increases, the quality of the currency decreases, as there are less gold reserves per monetary unit. The reserve ratio shrinks and the average backing of the currency deteriorates.

GOLD BULLION STANDARD

The gold bullion standard tends to emerge from a gold coin standard. When in a gold coin standard, credit expansion creates recurrent banking crisis, and banks tend to press for the installation of a lender of last resort, the central bank. At the same time, banks are interested in a reduction of coins in circulation which is realized in a gold bullion standard, where the government does not mint coins. Typically, the gold reserves are centralized in a central bank. The currency is backed by gold bullion and the reserves centralized in a central bank. The currency can be exchanged against bullion at a fixed rate. Gold coins likely disappear from circulation.

In such a system the quality of money is reduced vis-à-vis a gold coin standard. It is more difficult to hoard gold as only bullion can be exchanged against currency. Due to the difficulties of redeeming and transporting bullion, less currency will be redeemed into gold and gold will practically

disappear from day-to-day transactions. Consequently, banks can reduce their gold reserves. This allows for greater credit expansion, which, via business cycles, weakens the economy and helps to monetize government debt. As banks tend to reduce their reserves, they become more illiquid. Greater credit expansion and the introduction of a central bank reduce also the risk of maturity mismatching. Excessive maturity mismatching adds to the instability of the financial system. The higher probability of bailouts and further denigration of the regime deteriorates the quality of the currency.

As there is a lower amount of gold in the hands of the public it is easier for the government to suspend redemption altogether without leading to a double standard and facing the resistance of people to hand over their gold. Thus, the government can manipulate the money and deteriorate the money standard easier.

GOLD EXCHANGE STANDARD

The next step down in the quality of monetary standards is a gold exchange standard. A gold exchange standard is a fixed exchange rate system like the Bretton Woods system. Currencies are pegged at a fixed rate with a main currency that can be redeemed into gold bullion. Only central banks can redeem one currency into gold bullion through the main central bank which was the case during the Bretton Woods era with the Federal Reserve System.

A gold exchange standard leads to a further centralization of gold reserves and allows the banking system outside the main country to expand credit on top of the main currency. The main banking system also is likely to use its privileged position in order to expand credit. The system sows the seeds of its own collapse if the main country expands credit, thus imposing a cost on the rest. The exploitation of this position will then meet the resistance of the other countries who start to demand redemption as happened in the case of Bretton Woods, when the French government demanded payment in gold.

As a consequence of a higher capacity for credit expansion, business cycles will become more volatile, harming the economy. In addition, monetization of debt on a larger scale becomes possible. Maturity mismatching increases and the financial system grows more unstable increasing the chance of diluting bailouts. The tendency toward price inflation also increases, which in turn incentivizes people to take on debts. The population's day-to-day connection with gold becomes looser and less resistance will be felt when the connection is cut by the government altogether.

It should be pointed out that becoming the main currency in a gold exchange standard may in some sense increase the quality of this main currency. It is very profitable to be an international reserve central bank (Rittershausen 1962, p. 408). Other central banks hold reserves of the main currency at very low interest rates. Other central banks must fear devaluations that would imply losses in their assets. When a currency becomes the main currency it implies therefore an increase in its quality. Other economic agents are more likely to accept and hold this currency.

Within these fractional reserve standards we may distinguish between systems where the unit of account and medium of exchange are separated and those where they coincide. In systems where unit of account and medium of exchange are separated, people calculate in a currency such as gold but pay also with another medium of exchange such as bank notes or deposits. These notes and deposits may have a discount in relation to payments in specie. Therefore, a credit expansion may lead to a higher discount leaving unharmed the integrity of the gold currency. Prices denominated in bank notes increase but not denominated in specie. If, on the other hand, bank notes and deposits have to be accepted at par due to legal tender laws, the quality of the system decreases. Credit expansion in this case cannot lead to a discount anymore but deteriorates the quality of specie as prices denominated in gold increase.

FIAT PAPER MONEY STANDARD

A brisk change in the quality of the monetary regime occurs when redemption is finally suspended altogether leading to a fiat paper currency. In a fiat paper money standard as the world has been on since 1971, not even central banks are able to redeem the currency against bullion. There is no guarantee anymore to receive any specific amount of gold for the currency. Hence, the quality of the money has declined.¹²

There is a wide divide between redeemable claims to gold as in the gold standards discussed above and unredeemable paper money. Unredeemable paper money presents a claim on something that is not specified. Fiat paper

¹²The fall in the quality of money helps to explain historical price inflations. When the U.S. went off the gold standard in March 1933, wholesale price soared 14 percent over 1933 and 31 percent by 1937. When the U.S. went off the gold reserve standard (the Bretton Woods system) in August 1971, wholesale price increased 4.35 percent during the rest of the year, more than 13 percent between 1972 and 1973, and over 34 percent between 1972 and 1974 (Hazlitt 1978, p. 76).

money fluctuates in value according to the holder's belief of what the fiat money will be able to purchase. This estimation may fall very low and easily to zero. It is completely dependent on trust. If trust evaporates its value may well fall to zero, without dramatic changes in the money's quantity.

The capacity of irredeemable paper money to serve as a store of wealth is dominated by this uncertainty. Nothing of this sort happens with a (convertible) money certificate that, for instance, can be exchanged at any moment against gold. As Rist (1966, p. 200) summarizes: "In short, convertibility is not a mere device for limiting quantity; convertibility gives notes legal and economic qualities which paper money does not possess, and which are independent of quantity." Therefore, when the redemption of bank notes and deposits in a gold standard is suspended, the quality of money, from one second to the next, is reduced (independently from what might happen to money's quantity).

Once redemption is suspended, there is no safety net for the value of the currency to fall back to. Money is not connected any longer with the industrial demand for gold. The "insurance" of a strong industrial demand for the money holder is gone.¹³

Production costs of new paper money are very low, increasing the likelihood of increases in the money supply. Moreover, as redemption is suspended, the last control against government manipulation is gone. The floodgates for governmental manipulation of the money supply are open. Now the only restriction for government is its own will to put a limit on the production of additional money. These limits are typically formalized through the statutes and mandates of the central bank.

As a central bank can print an unlimited amount of money and bail out banks, moral hazard ensues. Maturity mismatching increases and reserve ratios are reduced. Credit expansion leads to more volatile business cycles harming the economy. The monetization of government debts by using the printing press has become easier. The financial system becomes even more fragile than before. Government bailouts become more likely and deteriorate the quality of money. As a consequence, money practically loses its function as a good store of wealth. Price inflation becomes a feature of everyday life. As people become accustomed to increasing prices, they start to incur more debt. Both the indebtedness and fragility of the

¹³One might argue that "*de facto*" redemption, i.e., interventions of the central bank selling its assets are an insurance. However, there is no legal insurance or security whatsoever that central banks will intervene at the point of time the money holder wants.

economy increase. Thus, at the instant the monetary system is deteriorated to fiat paper money system, the quality of money declines sharply.

SWITCHING MONETARY REGIMES AND MONEY'S PURCHASING POWER

Changes in the quality of money can be made within a certain monetary regime and by changing the monetary regime. Any move up the qualitative ladder explained above from the bottom to the top, i.e., from a fiat paper money, to a gold exchange standard, to a gold bullion standard, to a gold coin standard to a 100 percent free gold standard implies a substantial improvement in quality. Any move down the qualitative ladder implies a deterioration of the quality of money and a tendency for price inflation. Downward movements have been more common in history. Especially in preparation of or during war efforts, monetary regimes were often changed for the worse (Rittershausen 1962, p. 366).

Improvements in monetary regimes have occurred in history. For instance, resumptions of specie payments, i.e., a change from a fiat paper money to some variant of a gold standard have occurred in history at various times; especially when specie payment was suspended during war and later resumed. Examples are the resumption of specie payment in Great Britain after the Napoleonic Wars and after World War I, as well as the resumption of specie payment after the U.S. Civil War in 1879. When it is expected that specie payment will be resumed, people expect the quality of money to increase and money's price can rise immediately. This is probably one cause of the price deflation in the U.S. before the resumption of specie payment in 1879 (Bagus 2015). Another example is Peel's Bank Act of 1844 which prohibited the issue of unbacked bank notes. The failure of Peel's Bank Act was to not include bank deposits in the provision. The introduction of a 100 percent reserve ratio for demand deposits as well, would have increased the quality of the monetary regime strongly.

In general, however, the evolution has been downward from gold standards of a higher quality to gold standards of a lower quality and finally to fiat money standards. In fact, once we step down from a 100 percent gold standard, the seeds are sown for a progressive deterioration of the money regime. Government gets a foothold in the monetary system. Credit expansion by the central bank lead to excessive maturity mismatching, overindebtedness, and financial instability. In the crisis caused by these monetary regimes, bailouts tend to occur leading to higher government debts which are later monetized. In these crises the regime is also often denigrated. For instance, redemption of specie payments may be suspended in a banking crisis.

CONCLUSION

Beside money's quantity also its quality influences its purchasing power. In this paper we have analyzed the quality of monetary regimes which consists in providing an institutional framework for a good medium of exchange, store of value and medium of account. Changes in monetary regimes may lead to substantial changes in money's quality and thereby affect money's demand and purchasing power. The highest quality regime contains a 100 percent gold standard. Fractional-reserve gold standards contain the seeds of their own deterioration, leading via credit expansion to economic and banking crisis. Via progressive government intervention and centralization of reserves a gold coin standard deteriorates into a gold bullion standard and a gold exchange standard.

The switch from a gold exchange standard to a fiat paper standard is a watershed. There is no non-monetary demand for the money unit anymore. Its value is solely maintained by trust and confidence while the insurance of an ample non-monetary demand has vanished. Government and central banking control monetary affairs totally. Recurrent recessions and bailouts of the financial system become likely, deteriorating the quality of money. Future research may focus more on the qualities of different monetary regimes and how their switch affects the quality of money and also economic growth. A switch to a higher quality regime of money in a recession may positively affect confidence and economic growth.

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SUBJECTIVISM IN INTERNATIONAL ECONOMICS: WHY ABSOLUTE PURCHASING POWER PARITY DOES NOT HOLD

SIMON BILO*

Austrian economists have not ventured into the field of international economics very often and most of the exceptions wrote their work a long time ago. This is the case with the work on money and credit by Mises (1953 [1924], esp. pp. 170–86), Hayek’s discussion of monetary nationalism (1999 [1937], esp. pp. 61–73), Machlup’s

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I have known Joseph Salerno for about ten years. These were ten formative years for me — I was an undergraduate student in Prague back then; now I am teaching economics myself. Salerno played an important role in this journey of mine: he was my adviser in the summer of 2005 at the Mises Institute, he kindly agreed to write letters of recommendation for me when I was applying for graduate school, and we would see each other when the two of us were attending the Colloquium on Market Institutions and Economic Processes at New York University.

(1939, 1940) and Haberler's (1950) contributions, and Rothbard's brief discussion in *Man, Economy, and State* (2004 [1962], esp. pp. 828ff.).

Of the few recent contributions made to this field, two authored by Salerno (1994a; 1994b) highlight the subjectivist perspective that Mises (1953 [1924]) holds about the determinants of the purchasing power of money in geographically separate locations. Physically identical goods in different locations are different economic goods even if we assume away all transportation costs. Because people often value separate economic goods differently, prices of physically identical goods in different locations might vary even in general equilibrium.

The insight that there can be an equilibrium with different prices between physically identical goods in different locations is important from the perspective of the absolute purchasing power parity theory, which is one of the models that tries to explain foreign exchange rates. This theory assumes the law of one price and implies that equilibrium exchange rate must equalize prices of physically identical goods across different currency areas when the prices of the goods are converted into same currency. Currently available data, however, bring this idea of absolute purchasing power parity into question: the general consensus is that in spite of high variability of foreign exchange rates, it takes a number of years at best before the exchange rate adjusts to a deviation from parity (Rogoff 1996; Taylor and Taylor 2004). It is this "purchasing power parity puzzle" (Rogoff 1996) that Mises's subjectivist view on purchasing power of money can explain: if physically identical goods in different locations are different economic goods, it is not surprising that they have different price tags when the prices are expressed in the same currency and that absolute purchasing power parity does not hold. Yet, at the same time, there can still be a tendency toward equilibrium in the exchange rate between two currencies. The equilibrium exchange rate, however, does not reflect the purchasing power parity condition but rather the subjective valuations of goods in each currency area, given the prices of those goods in their respective domestic currencies.

In what follows, I develop the argument from the previous paragraph. I first review the insights of Mises and Salerno on the subjectivist theory of the purchasing power of money and then look at how these insights apply in the setting of two currency areas with a floating foreign exchange rate. In conclusion, I formulate the underlying subjectivist theory of foreign exchange rates.

SUBJECTIVE VALUATION DIFFERENTIATES PURCHASING POWER OF MONEY ACROSS SPACE

In the section on “Alleged Local Differences in the Cost of Living,” Mises (1953, pp. 175–78) stresses the importance of the position of goods in space when considering the valuation of those goods and their relative prices. He illustrates how important the location of goods is by comparing the prices in Karlsbad, a desired spa destination, and prices in other cities. While the same type of good costs more in Karlsbad than in other cities, the price difference is justified because goods in Karlsbad are perceived as different types of goods. In other words, “[i]f [person] has to pay more in Karlsbad for the same quantity of satisfactions, this is due to the fact that by paying for them he is also paying the price of being able to enjoy them in the immediate neighborhood of the medicinal springs” (Mises 1953, pp. 176–77).

To generalize the previous example, one can say that the position of a good in space matters — geographic location is an important characteristic of an economic good that can change one’s perception of this good, and consequently its value and price. Physically identical goods in different locations can then be priced differently even in equilibrium (Mises 1953, pp. 177–78; Salerno 1994b, pp. 251–52).

ARBITRAGE DOES NOT EQUALIZE PURCHASING POWER OF MONEY ACROSS SPACE

One can object that while the demand for goods might differ by location, the difference at least does not apply in the case of tradable goods, which can be easily transported from one place to another. The demand for apples in the city of Meadville in Northwestern Pennsylvania, for example, might be lower than the demand for apples in Manhattan, incentivizing suppliers to distribute apples accordingly and eventually equalize the prices of apples in both places. If the existing relative supply of apples in these two places results in lower relative price of apples in Meadville, this incentivizes entrepreneurs to ship apples from Meadville to Manhattan to equalize the profits from selling apples in the two different places. Assuming perfect competition and zero transportation costs, one might say that profits equalize when the price of apples in Meadville is the same as the price of apples in Manhattan.

However, since tradable goods are usually bundled with non-tradable complements as Rogoff (1996, pp. 649–50) and Taylor and Taylor (2004, pp. 136–37) briefly note, location also affects the prices of tradable goods.

Shelf-space, for example, is one such non-tradable complement: returning to the apple parable, a sufficient lack of shelf-space in Manhattan may fail to incentivize shop-keepers to supply enough apples to equalize prices between Meadville and Manhattan. In this case, the opportunity cost of supplying so many apples is too high; Manhattan shop-keepers would rather use the scarce shelf-space to offer other products while keeping the price of apples relatively high.

To generalize the example, one can say that tradable goods often need to be bundled with non-tradable complements when sold in specific geographic locations. Since these complements might be subjectively valued and priced differently across locations, opportunities to arbitrage price differentials across space are limited. This limitation might then lead to price differentials between physically identical goods sold in different geographic locations.

SUBJECTIVE VALUATION DIFFERENTIATES PURCHASING POWER OF MONEY ALSO ACROSS CURRENCY AREAS

The conclusion that physically identical goods can vary in equilibrium prices between different locations also applies to the case of two separate currency areas. This application suggests that foreign exchange rates do not necessarily correspond to the absolute purchasing power parity of the respective currencies. To illustrate this point, I will use a modified version of the previous section's apple parable.

Assume that there are only two places in the world: Manhattan and London. Each city has its own independent fiat currency so that people in Manhattan use the dollar (\$) and people in London use the pound (£). Let's assume an equilibrium where an apple in Manhattan costs \$6 and where a physically identical apple located in London sells for £2. Assuming away transportation costs, the absolute purchasing power parity theory says that the equilibrium exchange rate between dollars and pounds is \$6 per £2, i.e., \$3/£1. If the foreign exchange rate was different, the purchasing power parity theory suggests that this would create a state of disequilibrium with associated arbitrage opportunities that buyers and sellers will exploit until the exchange rate \$/£ is equal to the ratio of the price of apple expressed in dollars over the price of apple expressed in pounds.

However, the subjectivist insight proposed by Mises (1953) and emphasized by Salerno (1994a; 1994b) suggests a very different conclusion about the equilibrium exchange rate. Following the example, even if \$6 and £2 are the equilibrium prices of apple in Manhattan and London respectively,

the two prices tell us little about the equilibrium foreign exchange rate between dollars and pounds. The difference in geographic location means that apple in Manhattan and apple in London represent two different economic goods. The difference means that while \$6 is the price of an apple in Manhattan, we cannot necessarily infer from this that in equilibrium people are willing to pay the pound equivalent of \$6 for an apple in London. People might be paying more or less for an apple in London than its dollar equivalent, depending both on the demand for apples in London and on the prices and subjective values of complementary non-tradable goods necessary to sell apples in London. Assuming that the equilibrium price of an apple in London is £2, this implies the exchange rate \$/£ can be below or above the absolute purchasing power parity of \$3/£1.

Purchasing power of money is therefore unequal across currency areas in the same way it is unequal across different geographic locations within the same currency area. Goods with identical physical characteristics but different locations are different economic goods (Salerno 1994a, p. 107). In equilibrium, such goods can have different prices when their respective prices are converted into the same currency unit. As a result, equilibrium foreign exchange rate does not have to equalize the prices of goods across currency areas and therefore does not have to adhere to the absolute purchasing power parity condition.

FOREIGN CURRENCY IS VALUED SUBJECTIVELY AS A MEANS TOWARD GOODS IN ITS CURRENCY AREA

If absolute purchasing power parity is not the equilibrium condition for the foreign exchange rate between two currencies, what are the equilibrium conditions? It is important to realize in this regard that people demand money because it is medium of exchange (Mises 1953, pp. 30ff.) — a medium of directly purchasing goods in its corresponding currency area. Assuming that money does not have non-monetary uses, people value different currencies against each other depending on the economic goods they can procure with those respective currencies (Mises 1953, pp. 180–81).

The foreign exchange rate of a currency thus depends on the prices that people expect to pay for goods using the currency. If expected prices increase in one currency, demand for that currency drops at the foreign exchange market and its exchange rate becomes less favorable; if the expected prices decrease, the demand for the currency increases and its exchange rate becomes more favorable. In contrast to the absolute purchasing power parity theory, however, the relationship between the foreign

exchange rate between two currencies and the prices of goods that people using each currency can buy is qualitative and does not follow a pre-determined mechanical formula. The numerical imprecision of the law explaining determinants of foreign exchange rates is a necessary consequence of the fact that most of the goods that people buy with each currency are different economic goods that people value subjectively. People's subjective valuations therefore act as a filter for every price change of a good expressed in that currency: people ultimately decide to what extent the price change has an effect on their demand for the currency in question.

CONCLUSION: SUBJECTIVISM AND INTERNATIONAL ECONOMICS

In his 1994a and 1994b articles, Salerno restored attention regarding Mises's subjectivist approach to monetary theory and international economics. This approach helps us to understand why economists have been struggling to empirically confirm the absolute version of the purchasing power parity theory. They have been unsuccessful because the theory assumes the law of one price for goods that have identical physical characteristics but which differ in location. Because the difference in location means that these goods are in reality different economic goods, the law of one price does not have to hold and the absolute purchasing power parity can be violated even in equilibrium. The subjectivist approach to international economics thereby gives us yet another illustration of the importance of subjectivism in economics that was emphasized by Hayek (1952, p. 31).

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MONEY

DAVID HOWDEN*

Economists beyond a certain age will recall a simple mnemonic when listing money's main functions: "Money is a matter of functions four, a medium, a measure, a standard, a store." The four functions of the categorization of money are known today as the, (1) medium of account, (2) measure (or unit) of value, (3) standard of deferred payments, and (4) store of value. The rhyme alludes to the fact that economists thought that money served a somewhat broader role once upon a time than it does today.

The mnemonic also makes clear that money has several well-defined uses, unlike other economic concepts, like "goods" which have innumerable uses subjectively determined by their users, or a "price" which is the unique objective embodiment of these uses. In this way, money is special.

Due to good luck endued in him by his parents, Joe Salerno is of the age necessary to be included in the group of economists who cut their teeth in monetary economics by learning this rhyme. Unfortunately, he may well be old enough to have forgotten it, as well as where he left his glasses, his wife's birthday, their anniversary, and all sorts of other things important to his life!¹

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¹Amongst other things important to his life, I will take the liberty to include the first time Joe met me. By my "young" mind's recollection, this was at a dinner at a taco house in Auburn, Alabama, some balmy early June evening in 2008. This was the first of two summers I would

In this chapter I will revisit the use of this simple mnemonic to underscore what money is. I will then use these insights to augment Salerno's (1987) work on the "true money supply."

MONEY IS AS MONEY DOES

In an unsettling way, the old adage that "money is as money does" has a ring of truth to it. When defined, as it commonly is in introductory economics textbooks, as "the generally accepted medium of exchange," money can be a variety of goods, provided they meet three criteria: (1) that the good is used to settle exchanges, (2) that the good is the final means of settlement, i.e., not credit, and (3) that the economic community *generally* accepts such a good to settle exchanges. Economists then move on to a discussion of whether a "good" is a candidate for inclusion in the definition of *the* money supply when it satisfies all three of these conditions. The result is any of the common "M" measures of money.

While it is trivially true that money is as money does, there must be a better way to approach the problem. The old trusty mnemonic hints at how we can proceed.

In the common story of the origin and evolution of money, one central aspect is the reduction of transaction costs (i.e., Menger 1871, chap. 8, 1892). In a moneyless world there is a double-coincidence of wants problem, as elaborated by Jevons (1875, p. 3). As the scope of trades is limited and the costs associated with setting an agreeable price once trading partners do meet is high, there is an incentive for traders to use specific goods that are widely demanded to settle their transactions. As more individuals use these few specific goods to settle their exchanges, they gain a value for exchange purposes in addition to the value they possess for direct use. The process ends when one (or very few) goods begin to be traded solely for exchange purposes, and their acceptance is due to the knowledge that they can be easily traded with, and accepted by, another individual. Money is the outcome of this process, and it is also clear that whatever good is functioning as money will also be the generally accepted medium of exchange as a result.

spend at the Ludwig von Mises Institute as a summer fellow under the guidance of Joe. Thank you, Joe, for your intellectual encouragement, mentoring and, of course, friendship, over these past six years.

Money's use during its evolutionary process is clearly for exchange purposes but there is also an additional role of great importance. Mises (1949, pp. 244–51) sheds light on this by way of his equilibrium construct of the “evenly rotating economy” to demonstrate when money is *not* necessary. Only in a world of full certainty — one where all expenditures are known in advance, both in magnitude and timing — would money not be necessary. The reason comes from a simple opportunity cost analysis.²

Since money functions as the final means of settlement, it is also always and everywhere a present good. Indeed, money functions as the present good *par excellence* and as such yields no interest payment. Holding money will always force an individual to incur a cost in terms of the yield on whatever other best but foregone option is available to him. Rather than forego an opportunity by holding money, if the individual knew in advance what his monetary demands would be he would either lend his money at interest until it was needed, or would turn to the futures market to settle his future transactions at some discounted value in the present.

Depart from the perfectly certain world, however, and one runs into the intractable problem of how to best meet his future needs. As Mises (1949, pp. 14, 249) shows, money serves as a security hedge to guard against these uncertain situations. The key problem is that “[u]ncertain of what, when, where or the amount of future expenditures, individuals demand to hold an amount of money to safeguard against this uncertain future” (Bagus and Howden 2013, p. 236).

Of course, other highly liquid money substitutes can also serve this role to some degree. Rothbard (1962, p. 713) refers to these as goods as a type of “quasi money,” but to the extent that they are not perfectly liquid assets or the final means of settlement, they cannot function as “money.”

Thus, while a highly liquid very short-term bond may substitute for money in some ways, the fact that it is never the final means of settlement and is itself open to some degree (however small) of default risk forever trap it in the category of quasi moneys and stop it from claiming a monetary status. Chief among these quasi moneys in today's economy are

²Confusions suffered while interpreting the results of Mises' evenly rotating economy commonly center on misunderstandings of what role money is embodying within it. Specifically, it is not necessary for money to circulate as a medium of exchange but it is of importance that it exists to denominate prices (Howden 2009, 8 n.8).

money market mutual funds (currently amounting to about \$2.7 trillion) and liquid assets used as collateral by the shadow banking industry.³

In this brief discussion of the evolution and use of money there are several roles taking place concurrently. The most obvious one is the medium of exchange — a unit to transfer in settlement of pecuniary obligations. There is also the role of money in mitigating our felt uncertainty, however. In order to function accordingly, we must identify what the relevant uncertainties are that the individual will face.

Having already commented on the unknowledge of what, how much or when we will need purchasing power in the future, we can now comment on why money is held as a hedge against these expectations. After all, most individuals can and do hold a variety of liquid non-money financial assets to assist them with their future expenses, e.g., equities, short-term bonds or certificates of deposit. All of these non-money financial assets have a risk inherent in them which the money holder must overcome.

It is useful to think about financial assets in terms of two characteristics — when are they available, and what value they will have at that moment when they are used. The first criterion can be divided into two categories. A good is either a present good, i.e., it can be used at any time, or it is a future good, i.e., its value cannot be realized until some point in the future. The values in question also come in two distinct forms. A financial asset either trades at par or market value, with the latter fluctuating as per supply-demand conditions in the market. All financial assets can be classified according to these characteristics, as in Figure 1.

FIGURE 1: TYPOGRAPHY OF FINANCIAL ASSETS

		VALUE OF ASSET	
		Par Value	Market Value
AVAILABILITY	Present Good	Money	Equities
	Future Good	Bond	Future/Forward

³Notoriously difficult to define or measure, some estimates place the size of the shadow banking system in the United States at \$19 trillion as at year-end 2011 (Singh 2012). By way of comparison, the True Money Supply figure, defined in Salerno (1987) and elaborated on below, was substantially smaller at the end of 2011 — \$7.3 trillion.

In the scope of financial assets, money is unique. It is the only good that is available at a moment's notice and at par value. The par value nature of a financial asset comes from the fact that its payout is defined in terms of itself. One dollar held as currency or on deposit equals one dollar of purchasing power. Likewise, bonds are denominated in terms of money units (e.g., dollars), such that the purchaser receives a set nominal amount of said currency units upon maturity. In contrast, financial assets that trade at market value are purchased in terms of "shares" (or a claim to shares in the case of a future), with each share deriving its value from an underlying asset, whether it exists in the present or the future. When an individual buys a share in a company, the value is defined as a percentage of the company's future earnings stream, discounted to the present at an appropriate discount rate.

Equities and money are both present goods in the sense that their respective values, or purchasing powers, are unleashed at a moment's notice. The owner of equity is forever unsure of the value he will receive for the sale of his shares, however, as it is dependent on market conditions at the time of sale. The owner of a bond is assured the value of his asset, but only if he waits until maturity to sell it. (He can, of course, sell at any moment though the value he receives will be dependent on supply-demand conditions at the time, i.e., he will receive the market value at that moment in time, effectively making the bond an equity investment *ex post*.)

In a superficial sense, money is demanded because it is highly liquid. Yet this cannot be the sole reason money is demanded, as other financial assets such as equities and heavily traded debt securities are also highly liquid. Money is also demanded because its nominal purchasing power is guaranteed, as it is with bonds if we abstract from default risk. Thus, in some ways money exhibits features of equity securities (e.g., high liquidity) and other features more common in debt (e.g., par value redemption).

More to the point, money is demanded because of its uniqueness. Money is the only asset that is able to combine both features — par value and on demand availability — into one package. It is this combination that makes money such an exceptional, and also essential, part of a portfolio of financial assets.

MONEY AS MEDIUM OF EXCHANGE AND UNIT OF ACCOUNT, PRESENT AND FUTURE

Thus far I have been able to establish some characteristics of money without making reference to its specific functions. Actually, the causality runs the other way 'round. There are some specific roles needed to be filled in

the economy, and money (broadly defined for the moment) is the good that emerges to serve these roles. To understand why, consider two of the common functions of money in our introductory mnemonic. To jog the younger reader's mind (as well as Joe's): "Money is a matter of functions four: a medium, a unit, a standard, a store."

The obvious two functions that correspond to what any introductory economics course teaches us are those of the unit of account and medium of exchange. In one very important way, these two roles share a common link. They both perform their role in the present. Money serving as a numéraire to express prices allows for value comparisons in the here and now, and when we exchange money we settle our transactual obligations instantly. Thus, the unit of account and medium of exchange are both present functions of money.

Although we commonly think of money in terms of these present functions, is it also possible for money to have future functions? Again, returning to our mnemonic we see that the other two roles — the store of value and standard of deferred payments — are important roles that money is expected to perform at some future date. Whether money will prove itself to be a useful store of value will not be known until the future is revealed. Long-dated contracts can be defined in terms different than the common unit of account by the standard of deferred payments.⁴

Each of money's four roles has a temporal dimension, but they also have a common connection by the general category of use that they are satisfying. Generally speaking money is either used to *price* a good for sale (if one is the seller) or *exchange* for the good to complete the transaction (if one is the buyer). Figure 2 shows how money's four roles dovetail with the two criteria defining their demand. Money, by serving in any of these four functions, is demanded to set prices or exchange for goods, either now or in the future.

As previously alluded to, one monetary good need not serve all of these roles simultaneously. Historically, many goods have served as pricing units

⁴A weight of gold served this purpose for most of history, even when a different currency unit was used in exchange for more short-term oriented pricing. This changed in the United States starting with the Legal Tender Act of 1862 (which, despite a tumultuous start was finally ruled constitutional in the 1884 case of *Juilliard v. Greenman*, 110 U.S. 421). Despite contracting for settlement in a different good than was commonly used as the medium of exchange, legal tender laws effectively make the standard of deferred payments (as well as the other monetary functions) the same as the preferred money of the state. Since payment must be accepted if rendered in the legal tender, even a pre-agreed alternative cannot be upheld in a court of law.

FIGURE 2: MONEY’S FOUR ROLES REVISITED

		MONETARY USE	
		Pricing Unit	Exchange Unit
AVAILABILITY	Present	United of Account	Medium of Exchange
	Future	Standard of Deferred Payments	Store of Value

without also being exchanged to settle transactions. Although gold and other precious metals have commonly served as pricing units in recent history, accounts abound of other, less common goods, performing the same role. Cigarettes in POW camps (Radford 1945), large circular Rai stones on the South Pacific islands of Palau and Yap (Bryan 2004) and even slave women (*cumal*) in Early Medieval Ireland (Nolan 1926) are well-known (and well-used) examples provided by economists.

Likewise media of exchange are varied over history, though much less so than with the units of account. The reason for this is straightforward. As per Menger’s theory of the evolution of money, for money to achieve the status of the “generally accepted medium of exchange,” it must be broadly demanded throughout the economy. Together with some of the objective properties of precious metals (e.g., divisibility, durability, difficulty to counterfeit, etc.), metallic goods were used because of the assuredness that the recipient would accept them.

Pricing units need not be chosen mindful of this constraint. Instead they have been selected for criteria that include general knowledge of their value, constancy of value of time (or, at least, a non-volatility of value compared to the values of other goods), and ease of recognition. Divisibility has never been an issue for pricing units, as fractions of any unit can express value as well as any whole number. Fractions of women were used to define fines in ancient Ireland, though these prices were not paid with the aid of a steady-handed surgeon. Instead they were settled with another good functioning as a medium of exchange, at the going exchange rate of that good for women.⁵

⁵Although using fractions of women to pay fines could lead to more accurate convictions and judicious verdicts, as with King Solomon’s ruling to “split the baby,” as recounted in 1 Kings 3: 16–28.

Money's four roles are a direct outgrowth of the fact that what we call "money" is actually the combination of several functions commonly embodied in one good. Denominating the prices of all goods in terms of one good brings great computational ease when comparing the opportunity costs of alternatives. Not only is the calculation provided by money prices "a device for lowering transaction costs relevant to deliberate search," it is also the embodiment of a social arrangement allowing for spontaneous learners to easily recognize overlooked opportunities (Kirzner 1979, p. 150).

As an example, a simple economy consisting of ten goods to exchange against each other would have 45 "prices" if there was not a single good used to express their value with a common denominator.⁶ Using one of these ten goods to express all other prices results in only nine prices (with the price of the good in terms of itself, one, making an additional tenth "price"). In the modern economy, the number of goods is many orders of magnitude greater than this example. The average car, to take one small component of the vast number of goods produced in the American economy, has upwards of 15,000 separate parts. If these individual parts were transacted without a common pricing unit, there would be over 112 million separate exchange ratios! Since the automotive industry is less than 2.5 percent of the whole American economy, I leave it to the reader to consider the number of "prices" that could exist across the United States lacking a common denominator through the unit of account. Needless to say it is doubtful that such computational complexity resulting from direct exchange ratios would allow for anything more than a simplistic, nearly autarkic, economy.⁷

⁶An economy with n goods will result in $(1/2)(n-1)(n)$ direct exchange ratios.

⁷Confusions around the origin and emergence of money commonly treat the unit and account and medium of exchange interchangeably. David Graeber (2011) is unconvinced by Menger's evolutionary theory, relying on anthropological data that seems to suggest there was never a time when direct exchange existed, an important first step in the path to a money emerging as a form of indirect exchange. As proof, Graeber points to the lack of pricing boards showing prices expressed in terms of multiple goods. In this criticism, Graeber asks too much and too little. Too much because he extends what is really an example of a lack of multiple units of account as means to express prices to conclude that there was never a time with multiple goods functioning as media of exchange. On the other hand he asks too little by expecting there to be evidence of a primitive society expressing prices in terms of all, or many, other goods. Given the computational problems discussed above for a small economy not using a common unit of account, I would expect that this monetary function was eclipsed by one, or a very small number of, goods in anything more advanced than a very primitive society, thus explaining the lack of anthropological evidence from very early human developments.

Money may be a present good, but the people who use it are always future oriented. Thus there will be a necessary forward-looking perspective on each of money's two roles, in addition to their demands in the present.

The store of value, being the future extension of the medium of exchange role, is probably the simplest future-oriented function to understand. Money is demanded in the present to settle current debt and transactional obligations. However, due to the uncertainty inherent in the future, there will need to be a medium of exchange demanded today to fulfill requirements in the future. The exact dates and magnitudes of these expenses are as yet unknown, but the money saved today must retain its value, or purchasing power, until that unknown future date.

Thus, the store of value function is the other side of the medium of exchange coin. Economists often couch their discussion of the store of value function as if it was a way to transmit wealth to the future. Such an understanding of the role obfuscates the issue. Money is not demanded to transmit wealth into the future, although it can certainly perform this role. Almost no one holds a sum of money today because he is preserving his "wealth" for the future. After all, there is an opportunity cost to using money for this role given its lack of interest return. In its place, investment vehicles commonly perform this task.

Money serving as a store of value is more correctly thought of as the property whereby money will only be demanded today based on its expected purchasing power in the future. This future purchasing power will be determined by how well the medium of exchange preserves its value, i.e., functions as a store of value. Note that this is quite different from more typical discussions of storing wealth for the future in the general sense, something which is not unique to the monetary asset. We are here concerned with money's ability to preserve its value to be used in the future for monetary needs, which are, incidentally, the same category of needs that money is demanded for in the present as a medium of exchange.

The standard of deferred payments functions as the reverse side of the unit of account coin. It is the ability of a good to express the value of other goods, but over a longer time horizon than the standard unit of account. As an example of this distinction today, despite having lost 98 percent of its purchasing power over the last 100 years, the U.S. dollar has managed to do so with constancy. Each year prices increase by around 3 percent on average, notwithstanding some outlying periods. On a year-to-year basis the U.S. dollar performs well as a unit of account, and, e.g., a clothing shop, can take comfort in knowing the price tag made in one year will suffice for

the following year as well; menu costs are minimal. Over longer periods the dollar has performed terribly and lacking an alternative good to use as the standard of deferred payments, Americans have had to suffer the costs of hedging their bets on long-term contracts denominated in dollars.

When using the term “money,” what economists have in mind is actually any of the four specific roles performed by money. In this way, one reason that monetary economics has become so confused is that the very adjective in its title is ill-defined. Furthermore, with the exception of select works in the now well-aged “New Monetary Economics” literature (Black 1970; Hall 1982a, b; Greenfield and Yeager 1983), very few serious attempts have been made to look at money’s individual roles in isolation of their shared embodiment in a single good. General equilibrium models are at a loss to incorporate money since they have no scope for a medium of exchange. It has been difficult to integrate money into basic utility analysis since money confers no direct utility, unlike other goods. (And since utility analysis forms the bedrock of microeconomics, the economics profession has long grappled unsuccessfully at providing “microfoundations” for monetary economics.) In short, much has been lost by using one word — money — to describe four different functions.

MULTIPLE OR A UNIQUE “MONETARY” GOOD?

The source of the muddled state of present monetary economics stems, at least in part, from the simple fact that for the better part of a century, one good has served all four monetary roles. This is understandable given that the enforcement of legal tender laws effectively forces one good (i.e., the legal tender) to serve all roles simultaneously. Before the passage of such laws in the mid-nineteenth century, an American could purchase a home with a mortgage denominated in ounces of gold and furnish it with goods priced in U.S. dollars. Neither dollars nor gold would be needed to pay for either transaction, as silver could be exchanged at the market rate. With the advent of legal tender laws, prices could still be struck in any good, but the payer would always be able to use U.S. dollars in settlement. As a result, U.S. dollars became the dominant pricing unit, both for current and long-dated contracts.

Yet there is still another reason why one good would assume all roles concurrently. Consider the origin of the demand for money. Mises’s use of the evenly rotating economy illustrates that it is only the existence of uncertainty that makes money a necessity. Money need not exist as a medium of exchange, not in any abstract sense anyhow, since any contract can be

settled with a future if its magnitude and timing are known in advance (or an option if not even the timing is known).

Money is held to mitigate the holder from the uncertainty concerning his future transactions needs. In this way, one may get the impression that money's key role is the store of value —the ability for it to unleash purchasing power in the future. Such thinking is also erroneous, as there are several assets that can provide more-or-less good stores of value over time. (It is often recollected that one ounce of gold has purchased a good men's suit for hundreds, if not thousands, of years.)

The way that money insures the holder from uncertainty stems from its unique properties as a financial asset, as in Figure 1. It is the unique good that is redeemable at par value at a moment's notice. From this simple fact we can derive three important insights about what money is.

The first is that a good only functions as “money” when its two general functions coincide. Specifically, if a good is used as the pricing unit and is also exchanged to settle transactions, it will by necessity trade at par value. At the same time, since money is the generally accepted medium of exchange it will also be available on demand since the timing of future transactions cannot be estimated, evenly probabilistically, in the present. This is important to the extent that we can see why money takes on its specific role in the schema of financial assets, a position attributable to the specific monetary demands by individuals.

The second insight is that we can better explain what is *not* money. In short, any asset not trading at par value and available on demand cannot be so categorized. The reason is that it would negate the original reason why money is held — to mitigate uncertainty. Holding an asset as “money” even though it is not available on demand (e.g., a future or a bond) entails a degree of risk since there is no guarantee that the purchasing power will be available at that moment when the holder demands it. What good is a 30-year bond to the holder as money if he requires funds in ten years' time?

On the other hand, holding a good that trades at market value (e.g., equities) will give the holder no assurance that its value will be retained, either in whole or in part, at that moment when the holder needs it. Holding Enron shares may have seemed to satisfy an individual's demand for money superficially, but when it turned out that his shares were worthless, he moved on to satisfy this monetary role by means of another good.

Thus only goods available on demand and at par value can survive as money, and these two criteria are only fulfilled when a good is used as a pricing unit and as a medium of exchange simultaneously.

Finally, we gain some insight into better defining what *the* money supply is. Currency obviously fits the bill, but what of bank accounts? To the extent that they are guaranteed to be paid on demand and at par value, demand deposits also comprise an important component of the money supply. Herein lays two important caveats. Fractional-reserve banks do not necessarily come with either of these assurances. As recent events in Cyprus have made clear, fractional-reserve deposits are effectively equity holdings masquerading as money. When bank assets lost sufficient value to render them illiquid, depositors were paid out a corresponding fraction of their account's value, an event akin to receiving the market value of a number of shares. Alternatively, some fractional-reserve banks honor the par value redemption of their deposits, but only after the depositor incurs a waiting period to receive his funds. Such a condition is imposed in nearly all banking systems on redemption requests above a certain amount.

Historically, a similar condition was used liberally on fractional-reserve deposit accounts under the guise of the "option clause."⁸ This has since been heralded as a stabilizing force of free-banking systems lacking a guarantor such as a central bank to function as a lender of last resort (White 1984, pp. 28–29; Selgin 1988, pp. 161–62; Selgin and White 1994, pp. 17–26). Such advocacy gets the problem of stabilizing the monetary system exactly backwards. Solving the problem of banking instability by removing the on demand criterion, even if for only a short while, removes one-half of the key features making money so unique. It also removes one-half of the reasons why money is demanded.

Thus, deposits held in fractional-reserve bank deposits are a tenuous component of the money supply. Provided that the issuing bank can maintain on demand and par value redemption, there is no significant problem. Changing either of these aspects effectively removes the asset from the upper-left quadrant in Figure 1, and relegates the former "money" to some other financial role.

(RE)DEFINING THE MONEY SUPPLY

Defining the money supply is tricky business. This is so not least because of what criteria define monetary assets, but also because some of those assets are not capable of performing their jobs without serious caveats. I will close

⁸Checkland (1975, p. 85) describes the Scottish free-banking period as one of "continuous partial suspension of payments."

with some brief and sundry comments on Salerno's (1987) definition of the "true money supply."

In writing this pithy article, Salerno builds from the theoretical framework of Rothbard (1963, pp. 83–86; 1978; 1983, pp. 265–62) used to accurately define the money supply. In doing so Salerno diverges from Rothbard by excluding life insurance net policy reserves, owing to the fact that very few, if anyone, considers them to be part of the money supply. Since the supply in question is concerned with the "generally accepted" medium of exchange, Salerno excludes this component due the lack of perception that it is money on the part of money holders.

While this exclusion is warranted if one is concerned with money as the "generally accepted medium of exchange," it is unwarranted if one defines "money" under a different set of criteria. As money is demonstrated herein to be defined as "the unique financial asset that is available at par value, on demand," the inclusion of life insurance policy reserves is not only warranted, but necessary. Indeed, some works, e.g., Nash (2009), Lara and Murphy (2010), point to the use of life insurance policies as a bank account, and thus implicitly include these reserves in the money supply.

Salerno also excludes money market mutual funds (MMMF) because they are not instantly redeemable, nor are they par value claims to cash. While they may look like this at first glance, a MMMF is an equity claim to a managed investment portfolio of short-term, high-grade financial assets. Cases where these funds have "broke the buck," i.e., the net asset value of the underlying portfolio drops below the value of MMMF claims to the assets, have historically resulted in either the owners receiving less than the par value of their holdings, or a capital infusion from the fund's sponsors. Likewise, Salerno excludes short-term time deposits on the grounds that they are not available on demand.

More common attempts to define the money supply have suffered from an ad hoc approach, as is the case with the common "M" measures.⁹ Austrian economists have made great strides by realizing that the money supply can be defined by the two main reasons that money is demanded, whether to facilitate payments or to provide an uncertainty hedge. Most notably this approach follows Rothbard (1962, pp. 756–62) in defining the

⁹Alternative measures of the quantity of money run into similar difficulties. The "Divisia" monetary aggregates developed by Barnett (1980) use what are essentially the same types of money and money substitutes as in the more common M measures, though weighted by their expenditure share instead of evenly.

reservation demand to hold money separately from its exchange demand (Howden 2013, p. 21).

Ultimately, definitions of the money supply are tricky because they grapple with four problems at once. These four problems allude to money's four roles, as listed in the opening mnemonic. I will end this chapter with one approach to measure money, and draw one implication.

In one way, money defines prices that will need to be paid for with the medium of exchange. The stock of exchange media available to settle these prices is one "money supply." For simplicity I suggest we call this "exchange supply of money," M_x .

Money as used to price goods comes with one complication. At any given time there is a set of obligations priced in terms of the money unit that require the medium of exchange to settle (e.g., debts coming due). To this set we can include those goods desired (but not obliged) to be purchased, which are priced in the money unit and which the medium of exchange will be required to settle (e.g., consumers and producers goods). The sum of these prices, or units of exchange, comprises what we can call the "pricing supply of money," M_p . There is also a known amount of units of account that will arise at a future date, due to existing debt contracts yet to be fulfilled. The standard of deferred payments, thus, can also be defined with some degree of certainty in the present and we can call this the "future pricing supply of money," M_p' .

This approach to defining *the* money supply gives rise to several distinct quantities, only one of which has any bearing to the more commonly given measures. While the M_x supply is easily understood, both M_p and M_p' are determined not by any monetary factor, but instead by the demand of individuals to purchase goods and services (whether on the current spot market or on some futures market in the past). Readers will see an affinity between this approach and Salerno (2006), whereby prices are not the result of the demand for money per se (as is commonly extrapolated from the quantity theory of money), but are rather the result of the demands for goods and services which in turn create the pricing money supplies, M_p and M_p' .

One implication of, and benefit from, using several "money" supplies is that it allows for an alternative method to look at how the purchasing power of the medium of exchange fluctuates over time. If, e.g., $M_x < M_p$, the value of the medium of exchange must rise to clear the market. Since some of the prices that comprise the supply of pricing units of money, M_p , are fixed at a pre-defined value (e.g., those resulting from a previous debt

contract), either the prices of goods contained in M_p will fall, or the real value of the supply of the medium of exchange, M_x , will rise. Of course, these implications are just two sides of the same coin.

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HIGH-FREQUENCY TRADING: A NOTE ON SPOT VS. FUTURE TRADES, PROPERTY RIGHTS, AND SETTLEMENT RISK

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Textbook descriptions of financial markets draw a clear and seemingly unambiguous distinction between *spot* and *future* transactions. Whereas future transactions are often confined to derivatives markets, everyday trades on stocks, bonds or other assets are said to be spot. Furthermore, common descriptions of spot transactions usually do not distinguish between (i) the time a trade is agreed upon and (ii) the time it is paid for and delivered, as both are assumed, *by definition*, to take place virtually at the same point in time.

This chapter provides a theoretical investigation of high-frequency trading (HFT), which arises from the lag existing — even for seemingly spot transactions — between steps (i) and (ii). To this end, I shall redefine the dichotomy between spot and future transactions when the settlement of trades does not occur in real time but with a lag, and when this lag can be exploited by algorithms, computerized techniques or human decisions.

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High-frequency trading consists of trade exposures opened and closed between settlement dates by market participants ensuring that their net open exposure at the settlement time is zero (implying that none of the trades performed intraday are either paid for or delivered). HFT transactions are not akin, for conceptual understanding, to usual trades that would merely be executed “faster” or to positions being liquidated after a shorter period of time. One distinguishing characteristic of HFT activities is that they can be performed with virtually zero cash or securities’ holdings in the first place, as the trader ensures a zero net position at the settlement date.

This chapter investigates two questions. First, does HFT imply that intraday buy and sell trades are performed using temporarily *ex nihilo* created fiat money? Second, can the case where securities are agreed-upon but never delivered create multiple (therefore conflicting) but valid property rights on particular assets? The issue at hand resembles those raised by fractional reserve banking. Importantly, this chapter does not comment on the status of high-frequency trading under various legal systems or jurisdictions — this is left for future research — and instead focuses only on the theoretical conditions under which the above-mentioned consequences may occur.

If the above questions are to be given a positive answer, then serious consequences follow as regards intraday liquidity management in payment and settlement systems. An example is that of “failures to deliver” arising from high-frequency trading from naked short selling, whereby a trading institution is not able to deliver at settlement date securities it has been selling during the day.¹ Other consequences may relate to intraday collateral management, for instance in the case where securities are bought and delivered as collateral before the settlement of the initial purchase. Besides economics, ethical and legal issues raised by the potential over-issuance of property rights through high-frequency trading activities are akin to those raised by Mises (1996) or Huerta de Soto (2011) in the case of fractional reserve banking. An overview of Mises’s views on fractional reserve banking and monetary theory can be found in Salerno (1994).

Answering the above questions requires a careful analysis of the consequences of the lag between the time trades are agreed and the time they are paid for and delivered. I will show that, when clearing and settlement do not occur in real time, trades that are usually — theoretically and/or legally

¹On the extent of failures to deliver in the United States, see SEC Fails-to-Deliver Data: <http://www.sec.gov/foia/docs/failsdata.htm>

— described as *spot* must be treated as *futures* if a careful economic analysis is to be conducted. I also provide a criterion to distinguish between spot and future trades. Finally, I show that the over-issuance of property rights arising from HFT exists when transactions which should be treated as futures are legally or factually treated as spot.

The remainder of the chapter is structured as follows. First, high-frequency trading is described and is shown to be merely the exploitation of the lag between the time trades are agreed upon and the time they are settled. Its fundamental difference with other (“usual”) trading activities is also highlighted. Then, the distinction between spot and future transactions is refined. Trades on financial markets where settlement is delayed are shown to be meaningfully understood as futures. Finally, I define the conditions under which certain legal treatments of high-frequency trades as spot or as future transactions may lead to the over-issuance of property rights, thus give rise to liquidity risk in payment and settlement systems.

HIGH-FREQUENCY TRADING AS THE EXPLOITATION OF DELAYED SETTLEMENT

I shall start by examining the nature of high-frequency trading and the conditions under which it arises. High-frequency trading on an exchange platform consists of trades usually performed by computer algorithms so as to benefit from private information regarding the order flow or from small price variations over short horizons (ranging from a few milliseconds to a few hours). The major characteristic of high-frequency trading algorithms is that they ensure a virtually zero net open exposure at the end of each trading day, so that no cash or securities have to be physically delivered. High-frequency trading has recently become a sizeable phenomenon on financial markets, as it represents up to 70 percent of all trades on some organized stock exchanges (see Swinburne 2010).

I do not propose an extensive review of the literature (which can be found in Gomber et al., 2011). Most of the academic work revolves around the consequences of high-frequency trading on particular aspects of the price system, typically on the price formation mechanisms (bid-ask spreads, “price discovery” mechanisms, etc.).² For instance, one

²Another issue regarding high-frequency, which has been less dealt with in the literature, is the extent to which it is akin to insider trading, as some high-frequency traders benefit from their technological superiority to get market information (on incoming buy and sell orders especially) ahead of other market participants. This issue is not addressed in the present chapter.

oft-mentioned concern relates to the fact that high-frequency trading may amplify price volatility to the extent of triggering “flash crashes.”³ Among the main findings documented in the empirical literature are a reduction in trading costs and bid-ask spreads (see Brogaard 2010; Hasbrouck and Saar 2010) and a decline in short-term volatility (see Jarnecic and Snape 2014 or Brogaard 2011). Contrasting with the existing literature, this chapter focuses on an issue of a completely different order, largely neglected up to now. I do not focus on the empirical or theoretical consequences of high-frequency trading on particular aspects of the price system, but instead provide a theoretical analysis of high-frequency trading as regards property rights on cash and on traded securities. More precisely, do HFT activities lead to the over-issuance of property rights or to the *ex nihilo* creation of money?

An essential preliminary to be mentioned is a key institutional feature of present-day financial systems, namely the lag that exists on financial markets between the time trades are agreed (prices and quantities are decided upon) and the time payment and delivery actually take place. Whereas trade orders can be executed at any point in time during the trading day, clearing and settlement occur at one point only during the day, usually at the end of the trading session or up to T+72 hours. It is of utmost importance to highlight that such a time lag for so-called spot transactions is essentially *institutional*, i.e., that it does not primarily exist as a consequence of any physical or operational constraint. With the advent of computerized technologies at all stages of post-trade processing, real-time settlement (or quasi real-time settlement, as several actors have to be coordinated) could be a perfectly valid and implementable contractual or legal framework. For instance, real-time gross settlement systems (abbreviated RTGS⁴) exist for interbank payments — such as Fedwire in the United States and TARGET2 in Europe.

As a preliminary, I shall examine the extent to which high-frequency trades differ from other (“usual”) trades and show that high-frequency trading primarily exists as a consequence of delayed settlement. One key

³The most prominent example of so-called “flash crash” occurred on May 6, 2010, when the Dow Jones Industrial Average plunged by about 9 percent before recovering in a few minutes. High-frequency trading algorithms have been shown to play a role in the amplification of the drop (see SEC, 2010).

⁴A comprehensive overview of RTGS payment systems is provided by the Bank of International Settlements (1997).

theoretical question for my purposes is actually whether high-frequency trades are akin to “usual” trades that are performed faster (an asset being bought at some date and sold a short moment — from microseconds to several hours — later), i.e., trades that could be fully described in theoretical terms by the canonical description of exchange phenomena (see Mises, 1996, for example). I aim to show that high-frequency buy-and-sell trades cannot be understood theoretically as a combination of spot buy and sell transactions.

I shall begin with a mere description of the steps involved in any combination of spot buy and sell transactions. For trader A, a usual buy-and-sell transaction amounts to (i) agreeing with B on prices and quantities, (ii) paying the agreed-upon monetary units to B in exchange for the agreed-upon good, and at a later date (iii) agreeing with C on prices and quantities and finally (iv) delivering the agreed-upon good to C in exchange for the agreed-upon monetary units.

On the contrary, high-frequency buy-and-sell operations do not imply, at any time, either any disbursement of cash or any physical delivery of a security or good. This is due to the fact that steps (i) and (iii) occur between two settlement dates, so that the buy and sell transactions never have to be paid for or delivered. If a buy-and-sell operation is performed within a few seconds, or even within a few hours, it will never have to be physically settled. One characteristic of high-frequency trading is indeed that investment positions are held for short periods of time so that net exposures are virtually zero at the end of each trading day, when clearing and settlement occur. As a result, high-frequency trading activities can virtually be performed with zero initial cash and zero initial securities (neglecting trading fees or initial cash balances to be maintained at the exchange platform). One may thus move in and out of investment positions thousands of times a day without having either to pay for the securities it buys or to physically deliver the securities it sells. A trader who consistently ensures a zero net open exposure at the end of the trading day can perform his activities without any holding of either cash or securities in the first place.

It must be clear at this stage that the latter feature — the absence of any physical payment or delivery — exists only because of the delayed settlement of all trades. If trades were to be cleared and settled in real time, or in approximately real time, then high-frequency trading would essentially disappear as it would become impossible to trade without virtually any cash or securities initial endowment. What would remain would eventually be buy-and-sell trades that are executed “quickly,” but not high-frequency

trades. In order to further understand high-frequency trading, the legal consequences of delayed settlement have to be clearly grasped.

SPOT VS. FUTURES AND THE STATUS OF FINANCIAL TRADES

Given delayed settlement, can trades on financial markets be regarded as *spot* transactions? A clear understanding of the distinction between spot and future transactions is of utmost importance for my purposes, as each of these transactions implies different consequences regarding the property rights at stake. What is usually referred to as a spot transaction is a transaction where both (i) the agreement between two parties on prices and quantities and (ii) the payment on one side, the delivery of the agreed-upon goods on the other side (or clearing and settlement) occur virtually at the same time, meaning that the time span between steps (i) and (ii) is insignificant for human action and for economic theory. One can see that what is crucial to the definition of a spot transaction is whether settlement is delayed or not.

The dichotomy, however, is not as clear-cut as it seems. Strictly speaking, agreement on prices and quantities on one side, and payment and delivery on the other side, are very unlikely to occur at the exact same time in everyday exchanges. Think of a baker who gives a piece of bread to a customer and receives cash only a few seconds after both parties agreed on prices and quantities. Clearly, considering physical time, there is a lag between the agreement between the parties and the process of payment and delivery. Does this imply that this transaction should not be considered as spot but as future? Considering physical constraints, what lag is low enough so that a transaction can be considered spot and not future? One hour? Ten seconds? One microsecond? Phrased this way, the question is misleading and the distinction between spot and future transactions has to be rephrased. The relevant time to be considered is not the physical time but the time of human action. More precisely, one is faced with the problem of continuums in human action and economic behavior. Rothbard (2001, pp. 264–65) argues:

The human being cannot see the infinitely small step; it therefore has no meaning to him and no relevance to his action. Thus, if one ounce of a good is the smallest unit that human beings will bother distinguishing, then the ounce is the basic unit. ... If it is a matter of indifference for a man whether he uses 5.1 or 5.2 oz. of butter, for example, because the unit is too small for him to

take into consideration, then there will be no occasion for him to act on this alternative.

Similarly, if the lag between the time a trade is agreed and the time it is paid for and delivered has no relevance for human action, then it does not make sense to label as future a transaction where such lag is, say, of 10 seconds. Asserting that it is irrelevant for human action means that the buyer of the agreed-upon good does not and cannot engage in any other transaction or operation involving property rights on the good between the time prices and quantities are decided upon and the time payment and delivery take place. For example, the good bought cannot be pledged as collateral once its purchase is agreed but before it has actually been received. What fundamentally distinguishes a spot from a future transaction is not the physical time lag that virtually always exists (even if very short) between the time a trade is agreed and the time it is paid for and delivered, but whether this time lag is relevant and meaningful for human action. A similar argument has recently been made by Bagus and Howden (2012), who distinguish between demand and term deposits in the debate on fractional reserve banking.

Consider a trading platform with a low level of computerized automation, a relatively low speed of order execution (as compared to present-day speeds) and an end-of-day clearing and settlement. This is roughly akin to what used to exist about fifteen years ago before the tremendous technological improvements underwent by trading platforms. On such an exchange, a lag between clearing and settlement exists but it is essentially irrelevant for human action, as it cannot be exploited — or possibly very marginally. Thus, everyday transactions on such a platform can, without any major theoretical difficulty,⁵ be treated legally and conceptually as spot.

The whole picture changes with technological improvements when high-frequency trading arises, i.e., when the lag between the time trades are agreed upon and the time they are paid for and settled can be meaningfully

⁵In a world where the automation of stock exchanges through computer systems is low or inexistent, i.e., where high-frequency trading or multiple intraday transactions on the same security are virtually not possible, treating as spot a transaction that is technically future (with a maturity of a few hours up to 24 hours) may only matter in case of bankruptcy — for example, if bankruptcy is declared between the time a trade was agreed and the time it was supposed to be paid for and delivered.

exploited. More precisely, a security that has been bought at some point during the day can then be re-sold before being first physically received. Faced with the above-outlined continuum problem, I explained that the distinction between spot and future transactions is to be expressed not in terms of the physical time between agreement and settlement but in terms of time meaningful for human action. Therefore, if high-frequency trades are to be understood as trades that are agreed upon but never paid for and delivered, they can no longer be understood as *spot* transactions and can conceptually be defined more meaningfully as *future* transactions. Future transactions differ from spot transactions in that they are agreed in the present but paid for and delivered at a future date, so that the time lag between the agreement on prices and quantities on one side, and the clearing and settlement on the other, is no longer irrelevant for economic and legal theory. In terms of property rights, spot and future transactions are different *in esse*. Spot transactions are the exchange of property rights over present goods, whereas future transactions are the exchange of *claims on* property rights on *future* goods.

If it is clear that high-frequency trades are to be considered as futures, what about trading positions that are kept open until the settlement date, i.e., transactions that will indeed be paid for and delivered? An important issue to highlight is that nothing makes it possible to distinguish *ex ante* a high-frequency trade from any other trade. When a buy or sell order is executed on the market ("execution" here referring not to the fact that a trade is paid for and delivered, but merely to the fact that a buyer is matched with a seller, i.e., that an agreement on prices and quantities is reached), nothing makes it possible to identify trades of two different types as there cannot exist prescience, at least for an external observer, about whether the position will be liquidated or not before the settlement date. All trades are potentially high-frequency trades *ex ante*. When there is no real-time settlement, *all* trades must therefore be regarded as futures in the first place, so as to account for the institutional lag between the time of order execution and the time of clearing and settlement. Indeed, the possibility that a particular trade be high-frequency always exists before the settlement time. In this context, trading positions that are left open over at least one settlement date can be considered similar to future contracts that are kept until maturity, whereas trading positions that are liquidated before settlement date are akin to future contracts that are never delivered.

LEGAL TREATMENT AND CONSEQUENCES FOR PROPERTY RIGHTS

All transactions that are usually regarded as spot in economic analysis have been shown to be better understood as futures. Moreover, I explained how different are the implications of spot and future transactions in terms of property rights. Following the above analysis, one needs now to investigate how various legal or contractual arrangements may result or not in the over-issuance of property rights or in the *ex nihilo* creation of fiat money. Can one think of cases where such over-issuances from high-frequency trades exist because of the lag between the time trades are agreed and the time they are cleared and settled?

First, if all trades on financial markets are to be seen as futures, it must be emphasized that future transactions do not entail any over-issuance of property rights. When one sells at some date a security to be delivered in the future, it does not matter at all whether he actually owns the security in the first place. To understand this, the distinction between a present good and a future good must be restated. What is exchanged in a future transaction is a claim on a future good against a claim on future money. One must emphasize that only claims are exchanged, so that no property rights on present money or securities are exchanged (or involved in any way). Therefore a future transaction, if properly dealt with contractually and legally, is not and cannot imply any over-issuance of property rights. The only point in time where property rights on actual physical securities and on money matter is at the maturity date, i.e., when the future transaction has to be settled. The same reasoning applies for any trade (including high-frequency trades) correctly understood as a future trade. When a security “is bought” during a trading session, what is actually bought is a claim on a future security to be delivered at the settlement time (say, the end of the trading day). Similarly, what is sold in such a transaction is not present money but a claim on future money. If all trades on financial markets are to be treated legally and contractually as future transactions in this precise sense, then high frequency trading does not imply any over-issuance of property rights. A high-frequency trader would then be perfectly akin⁶ to a trader on futures markets who buys and sells contracts on oil, currencies

⁶One slight difference is that one party usually has to pay a present premium in order to enter a future transaction. This, however, is not a necessary element of a future contract. The only payment that a high-frequency trader has to make — like any other trader — is the trading fee to the exchange platform.

or whatever securities but consistently unwinds his positions before the maturity date (i.e., never gets delivered with the underlying assets nor pays for any of these assets). Such traders consistently trade claims on future goods but never wait for the maturity of the future contract. This cannot lead to the over-issuance of property rights. In such a case, it is likely beneficial to market liquidity, similar to dealers in futures markets providing liquidity to end-user investors.

Alternative theoretical cases shall nevertheless be considered. Up to now, I have explained without further explanation that high frequency trading does not imply the over-issuance of property rights if trades are “treated legally and contractually as future transactions.” Such a proviso is of the utmost importance. Confusion may indeed come from the fact that what has been here described as future transactions is usually, in textbook explanations of the phenomenon, described as spot transactions. What if trades that are factually futures (as they are paid for and delivered only at an end-of-day settlement date) were to be treated legally and contractually as spot? Or, in other terms, what if an inconsistency in the legal framework exists, so that delayed settlement is the norm for transactions legally treated as spot? Once again, I shall make clear that the issue whether trades are treated as future or as spot under various legal systems or jurisdictions is complex and is not discussed in the present chapter, as my focus is on economic theory only.

In this case, a high-frequency trader buying a security during the day (to be delivered at the end of the trading day) could possibly engage in other operations involving property rights on a present security — not only claims on property rights on future securities — for example by pledging this security as collateral. Until either the settlement date or the date the position is liquidated, there would be two seemingly legitimate owners of the exact same security. This case would clearly result in an over-issuance of property rights that are not backed by actual physical securities. This is reminiscent of “circulation credit” or “inflation” in Mises’s sense (Mises 1981; Salerno 2000). Similarly, assume that a seller is able to use intraday the cash he is supposed to be delivered only at the settlement date — for example to repay a maturing debt — then such cash must be considered as *ex nihilo* created fiat money, as no one renounced yet to this quantity of money in the present. Once again, this would merely be an over-issuance of fiat money, which may have serious implications for liquidity risk in payment and settlement systems in a stressed environment.

CONCLUSION

This chapter provided a theoretical examination of high-frequency trading, focusing on whether it creates either additional property rights that are not backed by physical securities or *ex nihilo* created money. This is likely to occur as high-frequency traders can buy and sell large amounts of securities without virtually any cash or securities endowment in the first place. One key feature for a theoretical understanding of high-frequency trading is that it exploits the lag between the time trades are agreed and the time they are paid for and settled. In turn, high-frequency trading as it is currently practiced would essentially disappear if clearing and settlement were to be implemented in real time.

Whereas the time lag between the execution of a trade (i.e., the matching of a buyer and a seller) and its settlement has long been virtually irrelevant for human action as it could not be exploited — or only to a very limited extent — the advent of electronic trading platforms and of computerized trading algorithms enabled exploiting this lag to a greater extent. What used to be considered as spot transactions without any major conceptual difficulty can no longer fit the stylized description of a spot transaction, i.e., a transaction where payment and delivery occur virtually at the same time as the agreement on prices and quantities. Given that powerful computer techniques enable exploiting smaller and smaller lags (nowadays a few microseconds), the dichotomy between spot and future transactions has to be re-thought. Faced with the continuum problem, I argue that the distinctive criterion which ultimately matters is not the physical time lag that almost necessarily exists between trade agreement and delivery, but whether this lag is meaningful for human action — or, eventually, for algorithms executing models designed by humans. In that regard, all transactions usually regarded as spot have to be treated conceptually as futures with the advent of high-frequency trading techniques (of course, as long as the *institutional* lag between trade execution and delivery is maintained).

Turning to a legal analysis of high-frequency trading, I show that — in a system where settlement is delayed — the issue whether an over-issuance of property rights exists ultimately depends on whether it is treated legally as spot or future. If high-frequency trades are properly dealt with as futures — i.e., not as an exchange of property rights on goods, but as claims on property rights on goods — then no such consequences follow. This implies, for example, that traded securities cannot be pledged as collateral before they are physically delivered. On the contrary, if high-frequency trades are

treated legally, contractually or factually as spot, then there exists over-issuance of property rights, even though it is for short time periods. This gives rise to liquidity risk in payment and settlement systems.

Following the above analysis, two research directions are to be outlined for future work. First, I set a theoretical framework indicating under which legal arrangements high-frequency trading may or not lead to the over-issuance of property rights. A survey of the existing legal frameworks in the United States or in Europe would be highly valuable as a complement. Second, from a theoretical perspective, the framework set out above could be extended to the study of another controversial market practice, namely naked short-selling. Naked short-selling occurs when a security is shorted before being first borrowed or located. A legal issue therefore is whether it is fraudulent in that one is selling something he does not own in the first place. This practice could be fruitfully analyzed not as the shorting of a security but as the shorting of a claim on a security, therefore as a future.

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II.

MUNDANE ECONOMICS

UNSUSPECTED ORIGINS OF MODERN AUSTRIAN ECONOMICS: THE HISTORICAL SCHOOL OF ECONOMICS ON CAPITAL AND ECONOMIC CALCULATION

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The Historical school of economics does not enjoy the best reputation among present-day economists, but especially the Austrian school appears to be out of sorts with its former adversary in the *Methodenstreit*. It seems fair to say that David Gordon's (1996, p. 7ff.) account, according to which the members of the Historical school bluntly rejected economic laws like the principle of supply and demand, is generally accepted among Austrian scholars today. In the English-speaking world, Friedrich von Hayek, Joseph Schumpeter, and Ludwig von Mises are mainly responsible for this state of affairs (Hodgson 2010, p. 296; Grimmer-Solem and Romani 1998, p. 268).

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I attended the Mises University in 2007 and was a summer research fellow in 2008. The present chapter is an outflow of my introduction to and study of German economic thought between 1800 and 1950, which I became interested in while a summer fellow at the Mises Institute under the direction of Professor Salerno.

I do not try, in this chapter, to overturn this negative judgment. However, I would like to point out that there are some elements in the body of Austrian Economics that definitely stem from the Historical school. Surprisingly, the Historical school acts as the model for Mises's capital concept and, by implication, for his economic calculation argument against socialism. Mises's discussion of the fundamental difference between capitalism and socialism does not, or not only, rest upon praxeological reasoning. In fact, the same praxeological laws apply in both capitalism and socialism. In order to make his case, Mises has to presuppose several *historical* institutions that only exist in developed and monetized market economies. In this context, he draws on concepts developed by the Historical school. It was not necessary for him to acknowledge his debt to this school — and possibly he was not even aware of it — because he could act on the authority of Carl Menger, at least regarding the capital concept they both employed. Carl Menger himself, however, derived the capital concept on which Mises would later rely directly from Richard Hildebrand, a member of the Historical school. Like in monetary theory (see Gabriel 2012, p. 41), the influence of the Historical school on Mises concerning capital theory was an indirect one — via Menger.

The present chapter starts, in section 2, with a short presentation of how Menger, in 1888, changed his point of view on capital, and continues, in section 3, with the demonstration that Menger, in adopting the new and different view, made a step toward the Historical school. Section 4 traces this historical point of view on capital in Ludwig von Mises's writings. It cannot be said that section 5 demonstrates, once and for all, that Mises implicitly admitted that economics is, in some sense, a historical science. But it tries to indicate the difference he made between praxeology and economics. The former he calls the *general* theory of human action, but the latter he does not consider to be entirely free from historical preconditions. Finally, section 6 contains a short discussion of Albert Schäffle's analysis of economic calculation as a central institution of capitalism. Apparently, Mises argument against the feasibility of socialism was at least foreshadowed by a member of the often ridiculed Historical school.

CARL MENDER ON CAPITAL

Carl Menger changed his point of view on capital theory considerably between 1871 and 1888 (Schumpeter 1997, p. 187; Braun 2014). He did not discuss capital very deeply in his *Principles* (Stigler 1937, p. 248), but to the extent he did, he advocated a capital theory that is concerned with

production. His capital theory was connected to his vision of the production process as divided into several successive stages, where consumer goods result from the successive processing of combinations of higher-order goods to lower-order goods. Menger (1871, p. 155) says that one possesses *capital* if one “already has command of quantities of economic goods of higher order ... in the present for future periods of time.” By adding this aspect to production theory and associating it with capital theory, he laid the groundwork for Austrian capital theory as developed by Böhm-Bawerk (1930), Friedrich von Hayek (1941), and Ludwig Lachmann (1978).

It is seldom recognized that by 1888 Menger had changed his view. In a long article on the subject — *Zur Theorie des Kapitals* (A Contribution to the theory of capital) — Menger proposed a radically different vision of the scope of capital theory. Streissler (2008, p. 371) is of the opinion that, by writing his article, Menger only made a prepublication attempt to refute the theory of Böhm-Bawerk. However, it seems more probable that Menger turned against *all* capital theories — including his own one — which have been developed by economists in disregard of everyday language use and established business practices. At the very outset, he declares that it is

a mistake that cannot be disapproved of enough when a science ... denotes completely new concepts by words that, in common parlance, already describe a fundamentally different category of phenomena — a category that is also important for the respective discipline — correctly and properly (Menger 1888, 2).

It could be suggested that he was referring mainly to Böhm-Bawerk's theory in this quote. However, there is every indication that Menger also implicitly revoked his earlier point of view. For the common parlance concept of capital is not identical with his own one from the *Principles* at all. In Menger's (1888, p. 37; emphasis added) words, the common parlance view has nothing to do with the production process or the different orders of goods:

When businessmen and lawyers speak about capital, they do mean neither raw materials, nor auxiliary materials, nor articles of commerce, machines, buildings and other goods like this. Wherever the terminology of the Smithian school has not already penetrated common parlance, *only sums of money are denoted by the above word.*

He hastens to add that capital only embraces sums of money that are *dedicated to the acquisition of income*, and that “sums of money” not only refers to plain money, but to the *monetary value* of all kinds of business assets in economic calculation.

Menger thus switched sides in a debate that seems to be as old as economics itself. Does the term “capital” refer to a *production factor* or does it refer to the organization of the market economy by calculating entrepreneurs who maximize the monetary yield on their *financial capital*? At a first glance, the distinction between these two viewpoints does not seem to create a great problem. To give an example, even Mises (1949, p. 260 ff.) contains traces of *both* concepts of capital. He reserved the plain term “capital” for the economic calculation of entrepreneurs but, for lack of a better term, he referred to the produced goods of higher orders as “capital goods.” The next section will demonstrate, however, that the two sides of the term capital do not fit together harmoniously; rather they roughly correspond to the two sides of the *Methodenstreit* between the Austrian and the Historical school of economics. Menger’s earlier concept was elaborated to Austrian capital theory, whereas his concept of 1888 turns out to be the one endorsed by the Historical school.

THE HISTORICAL SCHOOL AS THE SOURCE OF MENGER’S LATER VIEWPOINT ON CAPITAL

The first thing that must be mentioned is that Gustav Schmoller, Menger’s principal opponent in the *Methodenstreit*, was quite happy with Menger’s later standpoint on capital theory. In his *Grundriß der allgemeinen Volkswirtschaftslehre*, Schmoller (1904, p. 180; emphasis added) appreciated Menger’s step toward the common parlance concept of capital:

Where one has provisions of goods in mind that technically serve further production, one *may* also use the term capital; often it will be better to say acquisitional wealth. *All in all it seems to me to be the right thing to return, with C. Menger, to the capital notion as established in business life.*

In fact, it can hardly surprise that Schmoller welcomed Menger’s shift of opinion. In his 1888 article, Menger clearly adopted the viewpoint of the Historical school of economics.

It is easy to demonstrate this point. When Karl Rodbertus (1843, p. 23ff.) made, probably for the first time in the history of economic thought (Jacoby

1908, p. 27), the distinction between social and private capital — between capital as a production factor and capital as a means of acquisition and calculation denominated in money — he ascribed each term to a distinctive problem area. For him, social (or real) capital is a universal, absolute, and pure concept that can be defined independently of time and place. It is the capital concept that *he* thought is apt for economic science. Private capital, on the other hand, only has relative importance. It results “from the arbitrary ingredients of a *historical* state of affairs. It would disappear if profit-yielding property disappeared” (Rodbertus 1843, p. 24, n.; emphasis added).

In other words, the capital concept which Menger used in his *Principles* and which later Austrians like Böhm-Bawerk, Hayek, and Lachmann adopted (and which relates to Mises’s “capital goods”) can be found in any economic system and in any time period. Individuals in isolation, like Robinson Crusoe, employ higher order goods in the same way as a socialistic and a capitalistic society does. It is a general theoretical concept and independent of historical factors. Monetary calculation, on the other hand, which is the background of Menger’s later (1888) capital concept, is only a *historical* phenomenon. It is neither part of Robinson’s island nor of a socialist society. It only appears in a developed and monetized market economy where property rights to the means of production are enforced. Later on, German economists like Adolph Wagner generally referred to this concept of capital as the *historical-legal* one (Jacoby 1908, p. 28).

That Carl Menger adopted the viewpoint of the Historical school becomes even more obvious when one compares his 1888 article with what Richard Hildebrand had written five years earlier. Hildebrand, a member of the Historical school teaching in Graz, Austria (Schulak and Unterköfler 2011, p. 25), had written a book on monetary theory that contained one chapter on capital. There, he clearly foreshadowed Menger’s later position. First of all, like Menger (1888), he rejected the efforts of economists to create capital concepts that deviate from common parlance. Hildebrand (1883, p. 72, n. 35) counters the

idea that the capital concept is open to arbitrary terminology at all, or that science, in a way, has to create or invent the concept in the first place. To the contrary, the concept of capital ... is a fact that is already given by economic life.

Second, Hildebrand’s positive view of the common parlance concept unsurprisingly coincides with Menger’s. He (1883, p. 74, n. 35) states that

“capital indeed can only be thought of or imagined as a certain sum of money,” and, like Menger, he immediately adds that capital also comprises real assets in so far as they have or represent monetary value.

LUDWIG VON MISES ON CAPITAL

As opposed to nearly all other Austrian economists to the present day, Ludwig von Mises did not follow Menger’s discussion of capital as contained in the latter’s *Principles*, but was oriented toward the 1888 article on capital theory. This shines through, for the first time, in his treatise on *Socialism* where he explicitly refers to Menger (1888) and states:

[W]e must first ask what significance is attached to the term [capital] in business practice. ... The concept of capital is derived from economic calculation. Its true home is accountancy — the chief instrument of commercial rationality. Calculation in terms of money is an essential element of the concept of capital. (Mises 1951, p. 123)

In his *Human Action*, Mises went a step further and not only stuck to the monetary notion of capital, but explicitly rejected the social (or real) capital concept. He (1949, p. 262) called it a confusion to argue, as some economists do,

that “capital” is a category of all human production, that it is present in every thinkable system of the conduct of production processes — i.e., no less in Robinson Crusoe’s involuntary hermitage than in a socialist society — and that it does not depend upon the practice of monetary calculation.

So in fact, without admitting it though, Mises adhered to the capital concept developed and called for by the Historical school of economics. He did not follow the early Menger or Böhm-Bawerk, who had assigned capital theory to the analysis of the production process; he rather built upon Menger’s later article which was, as shown above, a concession to the Historical school.

THE HISTORICAL CHARACTER OF ECONOMICS — ACCORDING TO LUDWIG VON MISES

Why did Mises rely on the *historical-legal* capital concept? After all, Mises argued that economics is a part of the more universal science praxeology, and that praxeology is the science of *every* kind of human action (Mises 1949, p. 3). According to this classification, no historical relativity is

involved in economics, and therefore the real capital concept, which can easily be reconciled with every individual human action like it is done in Crusoe economics, seems to suggest itself. However, it is often overlooked that economics is not identical with praxeology, even in Mises's own thinking.

Whereas praxeology, the general theory of human action, "can be precisely defined and circumscribed" (Mises 1949, p. 235), the scope of economics can not so easily be demarcated. Its relationship to praxeology is not a simple one, and especially its area of application is not easy to determine.

The specifically economic problems, the problems of economic action in the narrower sense, can *only by and large be disengaged* from the comprehensive body of praxeological theory. (Mises 1949, p. 235; emphasis added)

And here comes the main point. Other than praxeology, which is general and absolute, economics is bound to special preconditions and, consequently, is not a general theory in the same way as praxeology. This claim is emphasized by Mises himself when he adds that "*in this disengagement [of economics from praxeology], historical and conventional aspects cannot be ignored*" (1940, p. 226; emphasis added).¹ The historical relativity of economics, which Mises admits in these few words, manifests itself a few lines further where he says that economics and catallactics are "the analysis of those actions which are conducted on the basis of monetary calculation," and that the analysis of socialism, where monetary calculation does not exist, "is possible only through the study of catallactics, the elucidation of a system in which there are money prices and economic calculation" (Mises 1949, p. 235).

In short, economics itself does not deal with *all* human actions in *all* kind of societies, but only with human actions that are directly or indirectly connected to money prices and economic calculation. It is true: in order

¹I quote from Mises's *Nationalökonomie* because the same passage in *Human Action* does not seem to make sense: "Accidental facts of the history of science and conventions play a role in all attempts to provide a definition of the scope of 'genuine' economics" (Mises 1949, p. 235). The same is true for the third edition.

to do this adequately, economics presupposes a *general* theory of human action — praxeology — but it is not identical with it.²

It should be remembered that Mises's (1951) famous argument according to which a collectively planned society is not feasible is also based on *historical* institutions. Without exchange between money and producers' goods, he argued, prices of these goods cannot be determined and consequently economic calculation becomes impossible in socialism. This argument is not based on praxeology alone, but it presupposes, for the market economy which serves as benchmark, the existence of money, monetary calculation, and property rights to the means of production. It was this aspect of capitalism that Mises focused on, and from this perspective it becomes clear why he adhered to the *historical-legal* capital concept. This kind of capital does not exist in socialism, and therefore it could help to distinguish *capitalism* from any other economic system.

THE ECONOMIC CALCULATION ARGUMENT AS FOUND IN ALBERT SCHÄFFLE'S WORK

That Mises's use of the capital concept endorsed by the Historical school is no coincidence is apparent when reading the approach of earlier members of this school to the question of economic calculation. In this regard, especially Menger's predecessor on the chair of economics in Vienna, Albert Schäffle (1823 — 1903), must be mentioned. It has been noted before that Schäffle at least hinted at the difficulties a socialist society would face when allocating the available resources to the myriads of different uses. Schäffle is cited for having argued, in Hodgson's (2010, p. 300) words,

that a system based on calculations concerning labour time faced intractable problems, including the heterogeneity of labour and the inaccessibility of relevant data, and would undermine individual incentives.

Apparently, Schäffle had at least a sense of the calculation problem of socialism, although, according to Hodgson at least, he primarily seems to

²Joseph Salerno comes to a similar conclusion concerning another important economic concept: The *entrepreneur-promoter* does not exist under all circumstances, either. The entrepreneur-promoter "cannot be defined with praxeological rigor; it can only be identified by a historical judgment" (Salerno 2008, p. 195).

have aimed at the well-known incentive problem. Huerta de Soto (2010, p. 100) goes a step further and imputes to Schäffle the demonstration

that, without imitating the system of price determination found in market processes, it would be inconceivable that a central planning agency could efficiently, in terms of both quantity and quality, allocate society's resources.

However, neither Hodgson nor Huerta de Soto argues that Schäffle has anticipated Mises's argument in the proper sense. They merely concede him to have sensed the difficulties of organizing production without the help of economic calculation.

It does not become clear, in their short remarks, how close Schäffle actually came to deal with questions that later became central for the Austrian school. In his *Kapitalismus and Socialismus*, a book which Hodgson and Huerta de Soto do not analyze and which has not been translated into English, Schäffle demonstrates that he was well aware of the problem that has to be solved by any economic order. In this, he partly anticipated Leonard Read's famous story *I, pencil* where it is shown that even in the production of such a simple thing as a pencil more or less the whole world participates.

The social character of the human economy shows that everyone, from morning to night, depends on the work of the whole humanity. I wake up in the morning and put on a dressing gown: the wool it consists of has been grown, years ago, in Australia; it has been shipped to Trieste by Dalmatians, freighted to Moravia by Italian workers and the staff of the Austrian railways, spun and woven there with the help of English machines, and dyed with African colors. (Schäffle 1870, p. 103)

Confronting the complicated relationships of the modern production process, Schäffle (1870, p. 105; emphasis added) uttered the question: "*The economic miracle of the much discussed division of labor — by which means is it accomplished?*"

So he clearly posed the question that Mises would answer in his discussion of the possibility of economic calculation under socialism. Furthermore, he was well aware of the fact that the socialist authors had either not realized that socialism has to solve this problem or had provided merely superficial solutions. This becomes clear in the second edition of

Kapitalismus und Socialismus which was part of a larger work on the social sciences. First, Schäffle pointed out that socialism must think of something that could substitute private entrepreneurship:

With the abolition of private capital as the profit-oriented director of the economy, the difficulty occurs to achieve productivity, which was aspired by private capital in its own interest, in the same or even a larger and progressing measure, so that the fairer distribution of the created wealth does not end up with less to distribute than the present-day market. (Schäffle 1881, p. 317; emphasis removed)

Therefore, he continued, socialism must find a means of minimizing costs. But “[h]ow are the [socialist] managers of the production process supposed to determine the ‘socially required’ amount of costs?” (Schäffle 1881, p. 317). This would be a very difficult task, he noted, as the ‘socially required’ amount of costs depends on numerous and variable factors. Socialist theorists deceive themselves as long as they ignore this problem:

In my opinion, socialism exposes itself to a fateful and economically cardinal calculation error as long as it does not try to contrive ways and means which guarantee, in a better way than the current competition among capitalists does, that no arbitrary measure of “socially required” amount of labor is found and asserted for the determination of exchange value, but the one that is as low as possible from a social and evolutionary point of view. (Schäffle 1881, p. 318)

How deep Schäffle actually analyzed the whole question of economic calculation in socialism is difficult to tell. He wrote several books, like *The Quintessence of Socialism* and *The Impossibility of Social Democracy*, touching on this topic. Hodgson (2010), who analyzed them, has not found a systematic treatment of the issue. *Kapitalismus und Socialismus*, from which I have quoted above, is a treatise of more than 700 pages and consists of public lectures Schäffle had given in Vienna. Therefore, it does not contain a systematic line of argument. Schäffle neither comes up with a proposal for the organization of the production process under socialism nor does he outrightly deny its possibility. He rather seems to advocate a mixed economy as he does in his other books (Hodgson 2010, p. 311). However, a profound judgment can only be made after a thorough study of all of his works which include, next to his lengthy monographs on socialism, several multi-volume textbooks on economics and sociology.

At this place it suffices to register that Albert Schäffle, a member of the Historical school, came close to seeing the problem of economic calculation under socialism. Whether he analyzed it satisfactorily is not top priority. One must not forget that, unlike Mises and Hayek, Schäffle wrote decades before the Bolshevik Revolution and had no real-world example of socialism to consider. Furthermore, he mainly wrote before the neoclassical revolution, thus lacking the apparatus necessary for the dismantling of Marxist theory (Hodgson 2010, p. 306). At any rate, Schäffle and the Historical school can be shown to have points of contact with Austrian Economics, whatever the methodological differences may be. Whether these links are worth a closer inspection and whether modern Austrians can profit from it cannot be foretold. For my part, I believe that the comprehensive rejection of a whole school of thought will rarely be justified.

CONCLUSION

Streissler (1990, p. 31) has called it a myth that the early members of the Austrian school elaborated their novel insights independently of and in contrast to German economics of their day. I would not go so far as to maintain that the fundamental opposition between the Austrian and the Historical school is also a myth. At any rate, I tried to show in this chapter that at least some caveats must be made. Although he did not stress this point, even Ludwig von Mises, the father of the *general* theory of human action, in some of his theoretical arguments presupposes the existence of *historical* conditions and institutions. The connection to the Historical school can best be seen in the fact that both Menger and Mises employed its capital concept. Mises's argument on the impossibility of economic calculation under socialism is based on it, and it even seems that the argument naturally flows from it. At least one member of the Historical school, Albert Schäffle, was led to similar, though less elaborated and precise views concerning the role of economic calculation in capitalism and socialism.

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THE REALM OF ENTREPRENEURSHIP IN THE MARKET: CAPITAL THEORY, PRODUCTION, AND CHANGE

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Modern economic theory tends to treat production, the process of generating valued consumption in a market, as a function carried out within firms and so out of reach for the general market (Coase 1937). Firms are seen as “black box” generators of output from inputs in accordance with a calculable and formalized “production function,” and both inputs and outputs are exchanged at competitive money prices in market transactions. The market, consequently, is seen as simply a means for efficiently allocating resources through the price mechanism. The development and production of the specific goods and services that are directly valued by consumers is considered of much lesser import.

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I had the great pleasure and privilege of being a summer research fellow in 2009 and 2010, and a postdoctoral research fellow in 2012. This chapter is an extension of the theoretical perspective developed in my dissertation at the University of Missouri, which was originally developed while a summer fellow at the Mises Institute and with the help and encouragement of Professor Salerno.

In contrast, Austrians emphasize the causal processes in the economy and therefore pay much attention to production — the way value is created through consumer wants satisfaction — and capital theory — how factors are utilized to support production. Austrians recognize that the specialized market process consists of and is dependent on an intricate structure of productive resources. This structure supports roundabout production processes that exploit productivity-enhancing uses of non-permanent intermediate (produced) goods. Such an advanced production apparatus is dependent on the specific uses of capital goods that facilitate taking factors of production through stages aimed at eventually satisfying consumer wants.

This distinctly Austrian perspective on the market as a process of *production* is the subject for this chapter, with specific emphasis on how changes to the economy's production apparatus or capital structure are brought about. The aim is to elaborate on the implications of the market's capital and production structure and thereby illustrate a specific theoretical problem that is conspicuously missing in the Austrian analysis. I draft a solution to this problem by addressing potential remedies made available by market actors exercising productive entrepreneurship. In this sense, the essay elucidates a realm for entrepreneurship within production and capital theory.

PRODUCTION AND CAPITAL STRUCTURE

Capital goods can be defined as “the produced goods that must be combined still further with other factors in order to provide the consumers' good” (Rothbard 2004 [1962], p. 299). These intermediate or “produced” goods that can only indirectly satisfy consumer wants are “a *necessary way station to increased consumption*” (Rothbard 2004 [1962], p. 966; emphasis in original). Seen as a whole, they compose “an intricate, delicate, interweaving *structure* of capital goods” (Rothbard 2004 [1962], p. 967; Lachmann 1978 [1956]), a *production* structure that in its current length and form is configured to satisfy wants already anticipated by entrepreneurs.

A production structure is composed of specific capital goods, themselves a combination of other capital goods and original factors. It is assembled and configured in a specific way for a specific purpose (Lachmann 1978 [1956]) and operated by specialized labor. Production is temporally dependent since it must be carried out in time. Carrying out a production process with already existing, supporting capital goods takes time, as does the production of the capital goods used in the process. The

existent production structure was brought together and configured in the past, and is used and operated in the present to produce consumers' goods available in the future.

Time, therefore, is both a limitation and a factor of production: due to its irreversibility, it "puts the future services of certain resources beyond our reach in the present and so makes it impossible to anticipate their use" (Hayek 1941, p. 52). In other words, we cannot conceive of specialized production without capital. Even acknowledging that there is a capital structure supporting production in multiple stages ultimately appears insufficient for us to fully understand the production process. For this reason, a theory of production is of limited use without a capital theory that also includes action and so explains the structure's *dynamic*: how and why the production structure has taken a certain shape and how and why the structure changes over time. As we will see, the Austrian conception of production subject to the heterogeneous structure of productive capital indicates a problem related to the structure of tasks in an economy's production apparatus. This problem does not exist for Robinson Crusoe but is potentially crippling in a specialized market, and it requires entrepreneurship and integration to be solved.

ROUNABOUT PRODUCTION WITHOUT EXISTING CAPITAL

Imagine that a person P , in a world without existent capital, decides to manufacture a product A with the intention of making it available for consumers in the open market. To the extent the production process requires (or is more productive with) capital, these capital goods must first be produced. Regardless of the complexity of the specific production process, the only possible way of realizing production of A is to first produce the necessary intermediate goods such as tools and machinery, and then, at a later time and using the intermediate goods, produce A . To make this happen, P therefore accumulates the resources necessary, gets busy creating the means to carry out the production process, and then produces the end product.

Due to P 's productive endeavor to establish the necessary structure for their envisioned production process, the world now has capital. This capital gives P a competitive advantage in the market by creating a unique production capability (Barney 1995; 1991), which increases in the overall valuable output in the economy. The direct effect of the "advancing capital structure increases the *marginal* productivity of labor" without requiring an increase in "the labor energy expended" (Rothbard 2004 [1962], p. 578).

The capital created is essentially an extension of and therefore facilitates more productive uses of labor. In this sense, the investment creating “*non-permanent*” resources enables us [the market] to maintain production *permanently* at a higher level than would be possible without them” (Hayek 1941, p. 54, emphasis in original). Overall, *P*’s endeavor has brought about a situation where the original factors — land and labor — are used more efficiently toward satisfying consumer wants than was the case before. Production has become more roundabout.

The value of this better use of original factors is measured by the subjective valuations of consumers who benefit from this production. As Austrians have known since Menger (2007 [1871]), the market value of the capital produced is derived from consumer benefits. This means the value cannot be established until consumer valuation of the end product has been revealed through market action (purchases of the product). The market value of the produced capital — the indirect means to satisfy consumer wants — is equal to their contribution to the value consumers ultimately place in the consumption good produced (Mises 1951 [1936]; Rothbard 1987).

The temporal sequence of actions within the production process is then exactly the opposite of how its value is derived. Production begins with the extraction of the highest-order goods from their natural state and the production of intermediate or capital goods, and continues through the stages to eventually produce the lowest-order good offered to consumers. Upon consumers’ decision to purchase the lowest-order good at a certain price, the market value of capital goods is established by imputation “upstream” through the higher orders to the highest order and original factors (Menger 2007 [1871]). There can be no capital that is not preceded by production, and there can be no specialized, roundabout production without the existence of capital.

ROUNABOUT PRODUCTION IN THE SPECIALIZED MARKET

Let us now turn to analyzing a specialized market economy with existing advanced production structures, as does e.g. Rothbard (2004 [1962]) and Coase (1937). We assume a market with highly specialized production with a capital structure that is well configured to satisfy consumer wants. As capital is heterogeneous, by which is meant that it “is not an amorphous mass but possesses a definite structure [and] is organised in a definite way” (Hayek 1941, p. 6), the capital structure entails both productivity gains and high costs of adjustment. As the market data change, the existing capital

structure will be misaligned to real consumer wants. In this sense, the specialized market place is very fragile to (unanticipated) changes.

This problem is partly recognized in the Austrian business cycle theory, but it is scarcely elaborated. Rather, it is acknowledged that the realignment process of the market's capital structure, from the anticipated and prepared-for market situation to the new and revealed situation, *takes time*. This is undoubtedly true, and this process is carried out by entrepreneurs (broadly defined), who are "eager to earn profits, appear as bidders at an auction, as it were, in which the owners of the factors of production put up for sale land, capital goods, and labor" (Mises 1998 [1949], p. 335). Time-consuming and costly realignment follows (cf. Williamson 1985, pp. 21–22).

Yet this problem does not arise only when the market process is affected by abrupt and/or unanticipated exogenous change such as the expansion of credit by banks and the subsequent distortion of market prices. In fact, *any* reconfiguration, elaboration, or expansion of the capital structure, whether as a reaction to changing consumer preferences or as a means toward increased productivity and economic growth, is subject to what we can describe as a "specialization deadlock": production structure based inertia to which both market actions and actors are subject.

A specialized market consists of production processes that encompass many stages and where the stages are carried out separately by specialized labor operating specialized capital structures configured to facilitate this particular (and perhaps similar) stage. While there may be several uses for specialized capital, each of the uses tends to be highly specific and the capital goods are therefore very limitedly substitutable in the market. To the degree capital traded in the market has undergone a particular transformation by being irreversibly combined into a non-decomposable unique (or uniquely aligned) capital good, there is no existent market for the produced means of production. New capital goods exist in a non-salable state to the degree their uses have no or very limited substitutability and lack obvious substitute uses. Whether or not a market for specialized capital goods emerges depends on the competitive discovery process (Hayek 1978) as entrepreneurs imitate and attempt to surpass the original entrepreneur's successful production achievement (Bylund forthcoming; 2011).

While the uniqueness of particular capital goods in specialized production may severely limit their markets (both in terms of demand and supply), this may not constitute more than a temporary problem. The problem emerges as specialized capital is utilized in roundabout production processes

under intensive division of labor. Assuming a market with entrepreneurs alert to and ready to adjust errors and misalignment through arbitrage (Kirzner 1973), and therefore an equilibrating market process, the market should soon approach stasis.

Entrepreneurs, eager for profit, will bid for capital and labor factors that they perceive to be undervalued or in otherwise suboptimal use. Provided entrepreneurs do not commit more errors than successful adjustments, and provided consumer preferences do not frequently, radically, and unexpectedly change, a market without innovation has limited opportunity for growth and productivity increase. In fact, even allowing for innovation of capital goods, which can be usefully thought of as finding new productive combinations of land factors and existing capital (Schumpeter 1934 [1911]), will not facilitate economic growth through productivity increases unless there is also a corresponding intensification in the division of labor. As Mises (1998[1949], p. 164) notes,

The division of labor splits the various processes of production into minute tasks, many of which can be performed by mechanical devices. It is this fact that made the use of machinery possible and brought about the amazing improvements in technical methods of production. Mechanization is the fruit of the division of labor, its most beneficial achievement, not its motive and fountain spring.

The truthfulness of the temporally dependent order in Mises's claim can easily be shown, as we shall see in the next section.

THE SPECIALIZATION DEADLOCK

Consider the specialized market in the previous section. Assuming the market is minimally regulated and therefore without artificial barriers of entry, we can assume with Rothbard (2004 [1962], p. 369, fig. 41) that the rate of interest income for capitalist investments in each production stage will be approximately the same. Entrepreneurial arbitrage will see to it that this holds true within one production process as well as across parallel, competing processes. Alert entrepreneurs will discover and correct through arbitrage any "errors" revealed by above-normal returns in any process or stage. Profitable (successful) undertakings tend to be imitated and loss-generating (unsuccessful) are abandoned by entrepreneurs eager to earn profits, which suggests an equilibrating process consisting of continuous adjustment through correction (Shane 2003). This, in turn, suggests that markets are

effectively created for specific capital goods utilized in production processes as entrepreneurs set out to imitate and emulate processes that earn profits (Stigler 1951; Bylund 2015). The economy in this sense functions as a continuous “discovery process” where competition for profit is the driving force toward better alignment between the totality of the production structure and consumer wants (Hayek 1978).

Along the lines of this reasoning one can develop a theory of strategic management based on the resources used within the firm, as has been done by Barney (1986; 1991) and others. The incentive of any firm (or rather, its owners and management) is here to strive for including and utilizing as rare and unsubstitutable resources as possible that are still valuable in production. The rarer and less substitutable (and imitable) the resources, the longer a firm can stay ahead of its competition and earn above-normal profits — competitors are simply unable to emulate the capital recipe of success. But it should be noted that while this competitive advantage may last for some time due to the unavailability of necessary resources for competitors, it will eventually be undermined by the discovery of better processes or alternative implementations of the same process.

The reason for this is that capital goods are produced and non-permanent. Even in situations where a certain capital good cannot be imitated or emulated (however unlikely this scenario is), it must be reproduced when it is used up or expired. The serviceability of capital can be extended through investments in maintenance, upkeep, and repairs. Still, capital is ultimately consumed during the production process, which means the owner of a unique capital good used in profitable production must at some point invest to extend its productive life. In a specialized market economy, any such reproduction must to some degree depend on the availability of market for materials, parts, etc., — the higher-order goods used in production of the capital good. It is therefore an impossibility that a certain resource combination — a particular capital good — is non-reproducible over time.

But even so, as Mises shows in the quote above, capital is ultimately dependent on division of labor preceding its development and use. Only through the splitting of tasks can capital goods be (1) innovated and (2) utilized in new processes. The former holds true simply because new specializations (that is, a more intensive division of labor) are necessary in order to produce a new type of capital good, at the very least in the tasks of combining factors or configuring an existing capital good. The latter is illustrated by Mises’s example of mechanization of the minute tasks that are made into

separate tasks only through the splitting of existing, more broadly defined, tasks.

Consider a production process in our previously assumed specialized market that is dedicated to the production of bread. It consists of the following division of labor: a farmer produces wheat, a miller produces flour, and a baker produces and sells the bread. Each stage uses capital: the farmer uses a plow in the spring and sickle in the late summer, the miller uses milling stones, and the baker uses an oven. One can imagine making this process more roundabout through the innovation of new capital goods to support either of the stages, e.g. a tractor for the farmer or a blender for the baker (Böhm-Bawerk 1959 [1889]). But no such capital can be made available for the farmer or baker without an innovative entrepreneur figuring out the full production process for that specific capital good. This amounts to a much greater undertaking than the error-correction type of arbitrage provided by Kirznerian entrepreneurs (Kirzner 1973; 2009).

An alternative is to make the bread-producing process itself more roundabout through the insertion of more narrowly specialized labor: splitting a task into several (Smith 1976 [1776]; Bylund forthcoming). The splitting of a task is different from simply “adding” labor power. The farmer can “hire” labor workers to carry out the same tasks as he is already carrying out, which increases output through increasing the volume of labor being used in the process. As these workers need to be paid — and likely monitored (Alchian and Demsetz 1972; Williamson 1993) — it is not obvious that this is a profitable investment for the farmer. Where an increase in the number of workers leads to diminishing returns, the farmer is likely to make a loss on invested funds.

The alternative is to engage in intensifying the division of labor, which, as suggested in the Mises quote above, entails taking an existing task and dividing it into a number of more narrowly defined tasks. In the case of the bread production process, this amounts to replacing one of the existing stages with several new and separate tasks in the same way a hypothetical original production process was split from self-sufficiency toward specializations in farming, milling, and baking.

Where a market stage already consists of easily separable tasks, such as the plowing, sowing, watering, and harvesting of farming, specialization may not be more than a minor change. For instance, a farmer having hired labor workers may assign specific tasks to different workers and thereby simplify specialization. This must be preceded by increased density of labor factors (Durkheim 1933 [1892]) and can be facilitated by coordination

through centralized ownership (Stigler 1951). As this type of “marginal” or incremental specialization can be rather easily brought about, it may not constitute an economic problem of production. In fact, such productivity-increasing measures should be easily discernible for the actors themselves: we know that “work performed under the division of labor is more productive than isolated work *and that man’s reason is capable of recognizing this truth*” (Mises 1998 [1949], p. 144; emphasis added). This is not a *division* of labor as much as it is a rational (re)allocation of labor input across already existing chores. But this means it also cannot constitute a problem for competing farmers, who as (or even more) easily can institute this type of division of labor by imitation or emulation. So we may, for the sake of simplicity, assume that such comparatively simple opportunities have already been exploited. Indeed, we can think of the inefficient use of laborers on the farm as an “error” to be corrected by the alert farmer.

This leaves the type of *disruptive* specializing that suggests a new production sub-process to replace a commonplace and standardized task carried out by market actors. We can now begin to discern the problem, since all the “low-hanging fruits” in terms of productivity-increasing allocative measures are easily exploitable and so should tend to already be exploited. What remains is the unintuitive or highly coordinative task-splitting that requires foresight, investment, and perhaps development of new types of capital goods to be realized. Add to this situation how within-stage (horizontal) competition should tend to standardize the procedures used and therefore effectively produce market standards around best practices. This is the process through which markets are created, which was explained by Stigler (1951). While the market may not reach a general equilibrium, it can easily be seen how its competitive process brings about standardizing at the production possibilities frontier. At this point, further specializing should seem unattainable if at all advantageous — much like splitting the task of “driving a taxi” into the more specialized tasks of driving straight, driving around corners, and going in reverse.

Further advances in productivity requires the adoption of a more intensive division of labor — the further splitting of existent tasks — and the use of (new) capital to replace labor with automatic execution of newly identified and separated “minute tasks.” The market, in other words, finds a state of rest in the sense of a highly restricting inertia — if not impossibility — of adopting further productivity-increasing measures. Specialization cannot go further through incremental adoption of better utilizations of labor. Whether or not market actors have exhausted all opportunities for

further incremental improvements to production processes, the market is in a specialization deadlock.

BREAKING FREE FROM THE SPECIALIZATION DEADLOCK

So far we have considered production in the market: while not all actions necessarily take place independently and under the price mechanism, we noted how markets are generated as new production structures are imitated by competitors (Stigler 1951; Bylund 2011; forthcoming). For all tasks carried out in an economy's production apparatus, therefore, there is semi-standardization within the limits of substitutability where the price mechanism is applicable. In other words, there is a tendency toward standardization of best practices through competition as improvements are all but universally implemented through profit-induced imitation in the open market.

So far we have not made any assumptions about who brings about or profits from the adjustments made in the market. The reason for this is that opportunities for incremental changes to the production structure are neither difficult to discover nor to implement or observe /imitate. This suggests the function of adjustment can be carried out by most or all market actors and without much foresight, coordination or investment. Indeed, the farmer who hires labor workers and assigns different responsibilities to them is engaging in (a weak form of) specialization and division of labor, but in such a mundane fashion that it is of little analytical importance. These tasks were already carried out — they may even have been identified as separate such — and the increased density due to increased volume of available labor facilitated an “obvious” opportunity for “specializing.” Rather than each labor worker switching between the same or similar tasks, each worker could save time and energy by streamlining their work and so focusing on a single or only a few tasks serially divided among them (Smith 1976 [1776]). This type of improvement in productivity is, indeed, within the limits of man's capability of reason. In fact, we might expect the common worker, knowledgeable of the production process as well as the “particular circumstances of time and place” (Hayek 1945, p. 521), to identify and act to implement such productivity-increasing measures.

But this only augments our perception that the specialization deadlock is an economic problem. It should furthermore be an increasing problem as a market becomes more intensely specialized, since specializing increases heterogeneity and therefore lowers the overall density of workers carrying out similar tasks in the market place. As opportunities for specializing

are exploited, taking specialization even further may necessitate much less obvious changes — and coordination. So far in our discussion, we have not included more than minimal coordination in the market place, primarily through the price mechanism and simple agreements.

Consider the case of the tractor noted above. In order to provide a tractor in this market, actors need to break free from the specialization deadlock. This is a problem of innovation, coordination, and capital investment, since it includes the insertion of a new productive sub-process to produce a higher-order good (the tractor) to be used in farming. This sub-process requires its own division of labor to carry out tasks specific to tractor production. In this case, this is a novel process the tasks of which may not have been more than limitedly known. But this need not be the case: we can easily imagine splitting the existing tasks into several independent subtasks. The solution is however found to be the same: innovation, coordination, and capital investment are necessary for the implementation and thus realization of the new tasks and thereby the more roundabout production structure.

It is not within the scope of this chapter's discussion to specify the exact nature of implementing such improvements to the production structure. This has been done elsewhere (Bylund 2011; 2015; forthcoming), so it should therefore be sufficient to point out that this is the role of the innovative and imaginative entrepreneur. But it should also be noted that there can be no blueprint for the implementation (realization) of such novel production processes that introduce a radically intensified division of labor since their functioning is strictly unknowable — detailed information about the intricate workings of a previously unseen sub-process is revealed only through its implementation process. For this reason, the entrepreneur can only guide the project and must rely on the decentralized problem-solving or proxy-entrepreneurship of employed workers (Foss, Foss and Klein 2007). This appears to require an integrated production structure, which is commonly referred to as a firm.

IMPLICATIONS FOR ECONOMIC THEORY

What has been drafted above suggests that production theory is incomplete without both capital theory and entrepreneurship. This may appear obvious to Austrians, but the entrepreneurship aspect appears often missing or lacking in discussions on capital theory. Rothbard's discussion on production theory in *Man, Economy and State* can serve as an illustrative example.

Rothbard here provides a groundbreaking discussion on production theory, but his discussion on the effect of saving on the economy's production stages is severely lacking. Increased saving, states Rothbard, shifts "investment further up the ladder to the higher-order production stages." And further: "Simple investigation will reveal that the only way that so much investment can be shifted from the lower to the higher stages ... is *to increase the number of productive stages in the economy*, i.e. to lengthen the structure of production" (Rothbard 2004 [1962], p. 519, emphasis in original). Perhaps this is a necessary conclusion, but as we have seen in this chapter, increasing the number of production stages implies the splitting of tasks and, essentially, breaking free from the specialization deadlock of the existent capital structure. We can hardly assume that this process is automatic or immediate (and it is of course unlikely that Rothbard would rely on such an assumption).

But even if we allow this process to be time-consuming, any production process must already encompass a full-length process with stages covering the production distance from virgin land to consumer. A more roundabout production process does not add stages to the "top," but must split a stage into several or insert a new sub-process in-between or to assist existing stages. This has implications for the income accruing to factors and capitalists involved in each stage, since a "local" intensification of the division of labor by splitting one stage into many necessarily disrupts production.

Rothbard seems to assume a preexisting market for each production stage, which suggests standardization and substitutability throughout the market and thus somewhat accurately determined market prices. From the perspective of Rothbard's discussion, it may not be limiting but useful to rely on analytical aggregates and talk of "readjustment." But "readjusting" the production structure to new levels of saving is a much messier process than the type of arbitrage-like allocative adjustment we discuss above — and much messier than is shown in Rothbard's analysis. Changes to the length of the production structure means the structure is *disrupted* by an imaginative entrepreneur, which has implications throughout the "intricate, delicate, interweaving *structure* of capital goods" (Rothbard 2004 [1962], p. 967). It is insufficient and potentially misleading to assume changes in the savings rate reallocates "capital" within the production process (and therefore across the production apparatus' existing stages). More realistically, productive investments can fundamentally change production

processes by splitting or inserting stages, and this can bring about important changes to the economy's capital structure.

It is furthermore insufficient to treat the entrepreneur as simply the discoverer of price discrepancies who then acts to shift factors from one production process to another to better account for their “real” value (Rothbard 2004 [1962], p. 511; cf. Kirzner 1973; Sautet 2000). As Rothbard (2004 [1962], pp. 858–59) puts it:

to view entrepreneurship as simply the founding of new firms is completely invalid. Entrepreneurship is not just the founding of new firms, it is not merely innovation; it is *adjustment*: adjustment to the uncertain, changing conditions of the future. This adjustment takes place, perforce, all the time and is not exhausted in any single act of investment.

But as we saw above, while adjustment takes place “all the time” it can and does take place *within the limits of the existing division of labor intensity*; “adjustment” is unable to deal with the specialization deadlock and therefore excludes disruptive innovation. In other words, it does not include “breaking free” from the deadlock through revolutionizing the production structure, which necessitates realizing an innovative splitting of tasks — which in turn requires integration (a firm) (Bylund 2015). Entrepreneurial adjustment ensues upon and as a consequence of disruption, but it is limited to corrections given the existing production or capital structure and incremental improvements to it.

In this sense, we have drafted a scope for entrepreneurship with the help of capital and production theory that both confirms and challenges Rothbard's analysis. It confirms Rothbard's focus on adjustments, which are carried out “all the time” through the market's competitive discovery process and “is not exhausted in any single act of investment.” This can potentially be seen as a “Kirznerian” type of entrepreneurship (Kirzner 1973; 1979; 1999; 2009). Yet Rothbard, by not including the type of disruptive entrepreneurship that can be found in e.g. Schumpeter (1934 [1911]), sees no significance in organization or its function in the market. He therefore does not recognize the causal relationship between the division of labor and the creation of capital that Mises notes and that we here found to suggest a solution to the interlocking compatibilities of the production structure that we refer to as the “specialization deadlock.”

In fact, it appears Rothbard in *Man, Economy and State* fails to recognize the great importance of the division of labor for production and

capital theory as well as for the evolution of society. This chapter attempts to show, in line with Mises's view (Mises 1998 [1949]; Salerno 1990) as well as Rothbard's later and more astute understanding (Rothbard 1991), how the importance of the division of labor hardly can be exaggerated, but that it in fact can be used to explain the process of capital creation.

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“MISES AND HAYEK MATHEMATIZED”: TOWARD MATHEMATICAL AUSTRIAN ECONOMICS

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In his introduction to the second edition of Rothbard’s *Man, Economy, and State*, Professor Salerno (2004) argues that Rothbard’s purpose in writing his treatise was *not* to develop a heterodox school of economics and break with the prevailing body of thought. On the contrary, Rothbard examined contemporary literature and attempted to integrate this literature with his own views. As Salerno shows, Rothbard believed that his treatise could draw other economists to the ideas that used to be part of the mainstream in the not-so-distant-past. We now know that Rothbard did not succeed in this and that as of today, there still is a communication gap between the Austrians and the rest of economic profession. This paper argues that the gap could be narrowed if the Austrian economics becomes more mathematized.¹

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I was a summer research fellow at the Mises Institute in 2009. Throughout the fellowship, I greatly benefited from Professor Salerno’s kind help and constant encouragement.

¹By “mathematization of economics” I mean the “use of mathematical techniques ... in economic arguments” (Backhouse 1998, p. 1848). An alternative definition of the term can be found in Beed and Kane (1991, p. 581), who understand it as the “increasing emphasis given to mathematical economics.” For a discussion of the concepts of mathematization,

At a first glance, mathematization of Austrian economics may seem to be contradiction in terms. Yet, at a closer inspection, the idea turns out to be not paradoxical at all: note for instance, that the “literary” character of Austrian economics is typically not included among its defining characteristics (Machlup 1982; Leeson and Boettke 2006; O’Driscoll, Jr., and Rizzo 2002); in a similar vein, Vaughn (1998, p. 2) sees the Austrian aversion to mathematics as a “superficial identifying characteristic,” and Backhouse (2000, p. 40) points out that, to the best of his knowledge, no Austrian has “ever explained why mathematics cannot be used alongside natural-language explanations”; on top of that, Moorhouse (1993, p. 71) reviewing Mises’s views on mathematical economics concludes that there is “no major methodological gulf between praxeology and neoclassical mathematical economics.”

Admittedly, Rothbard, as well as some other Austrians, raised objections against mathematization; but his demonstrated preferences speak otherwise: he sometimes expresses his ideas formally or semi-formally (e.g., Rothbard 2004, pp. 120–121, 152–153, 234). In addition, there is a long line of authors whom we may count as Austrian or Austrian-inspired who occasionally use mathematics in their economic writings. These include Wicksteed (1910), Fetter (1915), Hayek (1941), Haberler (1950), Machlup (1939), Morgenstern (von Neumann and Morgenstern 1953), McCulloch (1977), Garrison (1978), Murphy (2005), Leeson (2010), etc.

Some of these authors even explicitly claim that mathematization of economics is, at least to a certain extent, methodologically acceptable or even desirable. For example, Hayek (1952, p. 214) sees mathematization as “absolutely indispensable to describe certain types of structural relationships”; Machlup (1991) roots for “polylinguistic scholarship” characterized by coexistence of mathematical and non-mathematical language; in Boettke’s (1996) view, formal models are “fine” when constrained by an understandability criterion; and according to Morgenstern (1963, p. 19), an outright supporter of mathematization of economics, the laws of society will be written in the language of mathematics, just like the laws of nature.

This paper acknowledges that mathematization has costs and benefits. At the same time, it admits that it is probably impossible to determine the range of levels of mathematization for which benefits outweigh costs. Given this limitation, the aim of this paper is thus rather modest: it merely

formalization, axiomatization, and abstraction, see e.g., Weintraub (1998) and Backhouse (1998).

attempts to show that the optimal level of mathematization is not zero. More specifically, this paper points out the benefits of mathematization that seem to have been overlooked by some Austrian authors and it shows that most of Austrian criticisms which supposedly challenge mathematization, in fact point to different issues.

BENEFITS OF MATHEMATIZATION

Mises (1996; 2003; 1977) and Rothbard (2004; 1997a; 1997b) claim that formalization adds nothing to our knowledge as it only involves translation of verbal statements into symbols.² According to Rothbard (1997a, p. 61; 2004, p. 325), benefits of formalization are none, and therefore formalization should be cut through the principle of Occam's razor.³ Mises (1996, p. 333) suggests that if there is any benefit to formalization at all, it is pedagogical: diagrammatic exposition can be helpful to students of economics. Mises thus indirectly admits that mathematics (in a diagrammatic form) contributes to clarity of exposition. But why restrict this benefit only to students? Should not economists always communicate with their colleagues in the clearest possible way, especially when presenting new ideas?

Clarity of exposition achieved through diagrammatic representation is but one (and perhaps even not the most important) benefit of the use of mathematics in economics. I propose that mathematics offers also the following three benefits: First, mathematics is nowadays a common language of most economists and other researchers across disciplines — it is thus necessary to communicate ideas; Second, mathematics is less ambiguous than verbal language as it forces one to define precisely the meanings of concepts; and Third, mathematics is generally more efficient than verbal language, both for “producers” and “consumers” of economic ideas. These three benefits of mathematization are now discussed in turn.

²This claim seems uncontroversial: it is put forward by both critics of mathematization (e.g., Novick 1954) and its advocates (e.g., Samuelson 1952). However, see Dennis (1982a; 1982b) for criticism of this view; see also Weintraub (1998, p. 1844) who posits the view of mathematics as an engine of discovery as an alternative to mathematics as a language.

³This Rothbard's claim is problematic: if true, how would we explain that mathematics itself (or any other discipline) became formalized? Indeed, until the Renaissance, there was basically only “literary mathematics”: for instance the symbols “+” and “—” first appeared in the late fifteenth century and “=” was introduced only in the early sixteenth century (Cooke 2005, p. 432).

Mathematics as a Common Language

If the great majority of economists use mathematics, it pays for each individual economist to use mathematics too; this is simply a coordination problem. The use of verbal language may lead to misunderstanding by the rest of the profession. When an Austrian and another economist speak of marginal utility or time preference, for example, do they in fact mean the same things?⁴

There are numerous examples in the history of economic thought when translation into the language of mathematics helped to clarify the differences between competing approaches.⁵ For instance, Marshall's (1982) translation of Ricardo's theory of price formation into mathematics allowed for distinguishing between the classical and marginalist theories and facilitated the latter's acceptance. Similarly, mathematics in the hands of Hicks (1937) and some others helped to detect the differences between "Keynes and the classics" on macroeconomic issues and contributed to the creation of the "neoclassical synthesis." According to one observer:

Keynes was impressed by the help given by mathematics when numerous economists (Harrod, Hicks, Samuelson, Bryce) cleared up confusions in his *General Theory* and also presented his system neatly with the help of mathematics. (Harris 1954, 384)

Several decades later, formalized language of mathematics revealed that the dispute between "monetarists" and "Keynesians" was not about a general theoretical framework but about different empirical assessment of the value of parameters of the same model (e.g., Modigliani 1977; Mayer 1995). To plunge into more heterodox waters, Roemer (1982; 1988) is one of several economists who formalized Marxian economics and thus helped readers to compare the similarities and differences between Marxism and other mathematized approaches.

⁴For a discussion of different definitions of marginal utility, see Hudík (2014a). On the ambiguity of time preference definition, see Potužák (2014).

⁵Admittedly, there are also instances when mathematization contributed to ambiguity of economic concepts (Stigler 1950). In this context, it should also be noted that there usually is more than one way of formalizing a theory and this further complicates the issue (Beed and Kane 1991).

With respect to Austrian economics it is interesting to note that according to Chipman (1954, p. 364), “it is hard to find in mathematical economics any discussions more abstruse and difficult to follow than the great verbal debates between the Austrian and American schools on capital theory.” Fortunately for Chipman and others, several attempts to formalize Böhm-Bawerk’s theory have emerged (e.g., Dorfman 1959; 1995; 2001; Potužák 2014) and helped to clarify the debate. Very helpful in this respect is also Garrison’s (1978; 2000) partly formalized treatment of Austrian macroeconomics.

Mathematization is of course not the only way of dealing with the “language-coordination problem.” For instance, one may ignore the majority of economists and choose to “play the game” only with those who use his (i.e., verbal) language. However, this would in effect amount to creating a closed school of thought whose members are able to communicate only with each other but would not be able to interact with the rest of the discipline.⁶ Closed schools of thought are analogous to closed economies: they protect their cherished ideas from competition. As in the case of trade, such a state of affairs benefits “producers” of ideas but hurts the “consumers” who receive products of inferior quality. Rothbard (1987) seems to have been aware of these adverse effects of isolated groups and perhaps that is also why he chose to communicate with the mainstream.⁷

Another possibility of approaching the “language-coordination problem” is to stick to verbal language with the proselytizing aim of persuading the rest of the profession to use it, too. In other words, one may be trying to change the language convention, and achieve a switch from a “mathematized equilibrium” to a “verbal equilibrium” of the “language coordination game.” Nevertheless, success of such an attempt seems unlikely, all the more for the fact that the “mathematized equilibrium” is — as I argue below — superior.

Mathematics as a More Precise Language

One of the benefits of mathematization is that it forces us to formulate our ideas precisely (e.g., Klein 1954; Tinbergen 1954; Chiang 1984;

⁶Interestingly, until the first half of the twentieth century, i.e., before mathematical methods spread through the discipline, mathematical economics was considered to constitute such closed group. See e.g., Clark (1947).

⁷Similar attitude was adopted by many Austrians before and after Rothbard, including Böhm-Bawerk, Mises, and Hayek.

Clower 1995). It is sometimes correctly argued that verbal language can be made as precise as the language of mathematics (e.g., Menger 1973; Beed and Kane 1991). In reality, however, this opportunity very often goes unexploited: unless one is forced to express ideas formally, one is perhaps not even aware that the language is ambiguous. Perhaps the best example of increased clarity due to formalization is the creation of the supply and demand model. As Schumpeter (1994, p. 602) points out:

the sponsors of supply and demand [of the 19th century], again with the unnoticed exception of Cournot (and very few others, such as C. Ellet and D. Lardner), even experienced difficulty in setting on its feet the very supply-and-demand apparatus, the claims of which to a place in economic theory they tried to assert. They talked of desires or desires backed by purchasing power, of “extent” of demand and “intensity” of demand, of quantities and prices, and did not quite know how to relate these things to one another. The concepts, so familiar to every beginner of our own days, of demand *schedules* or curves of willingness to buy (under certain general conditions) specified quantities of a commodity at specified prices, and of supply *schedules* or curves of willingness to sell (under certain general conditions) specified quantities of a commodity at specified prices, proved unbelievably hard to discover and to distinguish from the concepts—quantity demanded and quantity supplied.”

Precision of mathematics also helps to derive implications of one’s assumptions and to demonstrate possible inconsistencies (e.g., Dorfman 1954; Clower 1995). For instance, Samuelson (1957), by formulating Marxian model of wages and interest discovered an error in Marx’s theory that went unnoticed for 90 years (Brems 1975). Mathematics may also help to discover inconsistencies in the Austrian economics: Austrian economists work with preference scales; at the same time, they sometimes criticize the transitivity assumption used by other economists (Block and Barnett 2012). Yet, it is straightforward to show formally that an ability to rank alternatives on a single scale corresponds to the assumptions of completeness and transitivity of the preference relation. In other words, whenever a preference scale is introduced, completeness and transitivity of preferences are implicitly assumed (Hudík 2012). To use a different example, with the help of some simple mathematics it can be demonstrated that, contrary to Rothbard’s (2004, p. 240) claim, the principle of diminishing marginal utility does not necessarily imply a downward-sloping demand curve (Hudík 2011a).

Interestingly, Rothbard sees the ambiguity of the verbal language as an advantage. He quotes Bruno Leoni and Eugenio Frola:

the lack of mathematical precision in ordinary language reflects precisely the behavior of individual human beings in the real world. ... We might suspect that translation into mathematical language by itself implies a suggested transformation of human economic operators into virtual robots. (Rothbard 1997a, 62)

This argument is unpersuasive on several grounds: First, it is not at all clear why researchers should use imprecise language just because their researched subjects are imprecise; one can (and, indeed, should) talk precisely even about imprecision. Second, Leoni and Frola's argument seems to imply that economists should not describe human behavior by concepts which are not used by the acting individuals themselves. However, this requirement imposes unnecessary constraint on economic theories. For instance, economists would be barred from referring to the law of marginal utility merely because people are generally unaware of this law. Finally, Leoni and Frola neglect the fact that economics mostly deals with an order which emerges as an unintended consequence of human actions (Hudík 2011b) where their argument is inapplicable. Consider, for example, activities of speculators which inadvertently contribute to efficient allocation of resources. I assume that we want to be able to describe these consequences even though speculators themselves are unaware of them.

Mathematics as a More Efficient Language

Mathematics is often more efficient than verbal language for both “producers” and “consumers” of economic ideas. From the perspective of the “producers”, mathematics economizes on effort: laborious thought processes are “embodied” in simple rules for manipulation of mathematical symbols (Whitehead 1911, p. 41). In this context Duesenberry (1954) understands mathematics as a “capital good” increasing productivity of economist's “labor.” On the one hand, Duesenberry admits that it may be true that one cannot do anything with mathematics which cannot be done with verbal language; on the other hand, however, he claims that verbal language is much less efficient; according to his analogy, “[o]ne probably cannot do anything with power shovels that cannot be done with picks and

hand shovels" (Duesenberry 1954, p. 361). Analogously, Chiang (1984, p. 5) thinks of mathematics as a "mode of transportation".⁸

Chiang (1984, p. 4) mentions another aspect of the efficiency of mathematization of economics: there exists a large number of mathematical theorems at economists' disposal. Consequently, we do not have to rediscover these theorems whenever they arise in a new context (Dorfman 1954, p. 376). Thus, for instance, in order to prove his theorem of the existence of ("Nash") equilibrium in strategic games, Nash applied first Brouwer's and later Kakutani's fixed point theorems (Kuhn and Nasar 2002). Half a century before Nash, Euler's theorem was applied to address the "adding-up problem" in the theory of distribution (Stigler 1994).⁹

As for "consumers" of economic ideas, mathematics often allows them to economize on their time and attention: as Klein (1954, p. 360) puts it, "[t]here is a real merit in condensing wordy volumes or manuscripts into a few understandable pages." Nash may again be used as an example here: his famous dissertation thesis that earned him the Nobel Prize has only twenty seven pages; his paper on the existence of Nash equilibrium takes up only one page (Nash 1950a), while his ground-breaking paper on the bargaining problem is eight pages long (Nash 1950b). It is safe to assume that without formalization Nash's papers would have to be considerably longer.¹⁰

COSTS OF MATHEMATIZATION

Mathematization does, naturally, have its costs. As pointed out by Morgenstern (1963, p. 2), when evaluating costs of mathematization, one has to distinguish among (i) criticism of inappropriate use of mathematics, (ii) criticism of the underlying economic model which happens to be analyzed mathematically, and (iii) criticism of mathematization.

⁸This metaphor seems to have been used for the first time by Fisher (2007); for similar metaphors, see e.g., Pareto (1897), Champernowne (1954), Tinbergen (1954), Menger (1973) and McCloskey (1994).

⁹For more examples of mathematical theorems that were directly applied in economics, see Debreu (1984).

¹⁰As usual, there is a dissenting view, this time it is Marshall's:

The chief use of pure mathematics in economic questions seems to be in helping a person to write down quickly, shortly and exactly, some of his thoughts for his own use ... It seems doubtful whether anyone spends his time well in reading lengthy translations of economic doctrines into mathematics, that have not been made by himself. (Marshall 1982, p. ix)

In the first category we find criticisms of Bourbakism in economics (McCloskey 1994), of the use of calculus (Boulding 1948; Rothbard 1977), or of applying the mathematics of nineteenth-century mechanics to economics in general (Mirowski 1989). Likewise, criticisms of failed attempts to mathematize phenomena which seem to be impossible to address with known mathematics belong to this category (Beed and Kane 1991; Wutscher et al. 2010), as do also criticisms of misinterpreting quantitative economics (Mises 1996, pp. 55–56)¹¹ and measurement (Rothbard 1977). None of these or similar criticisms, justifiable or not, represent arguments against the use of mathematics in economics as such.

Type (ii) criticisms are also not arguments against mathematization. They include criticism of unrealistic assumptions (e.g., Keynes 1964; Leontief 1971; Beed and Kane 1991; Wutscher et al. 2010) or criticism of particular concepts that happen to be used by mathematical economics, such as equilibrium (Wutscher et al. 2010). It is important to repeat that most mathematization is simply a translation of verbal statements into symbols; hence, the problem must be with theories themselves, not mathematics (Backhouse 1998; 2000). One may interject that the use of certain branches of mathematics (e.g., calculus) requires some additional assumptions such as continuity and differentiability (Menger 1973); but again, this criticism concerns only the application of a particular branch of mathematics to particular economic problem and is consequently not a general argument against mathematization. Furthermore, technical assumptions used by mathematical economics are often harmless: for instance, it is well-known that all important conclusions of standard demand theory can be obtained without the assumption of continuous and differentiable utility functions. Yet, continuous and differentiable functions are often used for the sake of convenience.

Actual costs of mathematization are identified by type (iii) criticisms. What are these costs? I identify three: first, tendency to downplay factors which are difficult to formalize; second, tendency to lose touch with reality; third, decrease of intelligibility for lay people. Note, that the first two costs are not inherent to mathematization per se; they are rather incidental to it and can perhaps be avoided. More importantly, though, none of these

¹¹It should be added that Mises criticized the use of quantitative methods to test theories; there is no argument in Mises's writings against using quantitative methods in applied research. See also Leeson and Boettke (2006).

costs constitutes by its nature an argument for avoiding the use of mathematics altogether.

Downplaying Factors Not Amenable To Formalization

A tendency to neglect everything that cannot be easily formalized is a drawback of mathematization acknowledged by mathematical economists themselves (e.g., Debreu 1986). For instance, Krugman (1996; quoted in Backhouse 1998) argues that economists ignored important models for spatial economics just because these models could not be formalized.

Sometimes economists go so far as to demand that theories must refer only to quantifiable magnitudes. In his Nobel lecture Hayek (1975, p. 434) points out that

while in the physical sciences the investigator will be able to measure what, on the basis of a *prima facie* theory, he thinks important, in the social sciences often that is treated important which happens to be accessible to measurement.

He gives an example of quantifiable relationship between aggregate demand and total unemployment on one hand, and relationship between unemployment and the structure of relative prices and wages on the other. The former is accepted as “scientific,” while the latter is neglected as not testable because we never know what the equilibrium prices and wages are.

Other phenomena that are difficult to treat mathematically and are often mentioned by the Austrians are subjectivism and Knightian uncertainty. Again, these can be argued to receive insufficient attention by economists.¹² Still, one may wonder if perhaps the limits of mathematization, whether in this particular case or in general, do not often coincide with the limits of scientific investigation: are currently non-mathematizable phenomena amenable to science at all?

I suggest that the way to deal with the phenomena which are currently difficult to mathematize is not only a careful use of known mathematic tools but also development of new tools. For example, before von Neumann and Morgenstern (1953) mathematical economics (and, as a matter of fact, *any* branch of economics) was unable to deal with strategic decision problems. Hence, von Neumann and Morgenstern constructed

¹²For the debate on formalization of Knightian uncertainty, see Caplan (1999) and Wutscher et al. (2010); for an attempt to formalize subjectivism in games, see Hudík (2014b).

a completely new branch of mathematics to deal with strategic issues. As this example illustrates, the limits of mathematization are not given but constantly evolve.

Losing Touch with Reality

It is often argued that mathematization leads to a loss of contact with reality (e.g., Boulding 1948; Champernowne 1954; Novick 1954; Šímová and Šíma 2012).¹³ This can have several reasons: In Debreu's (1986, p. 1268) view, the power of mathematics is such that the "seductiveness of [mathematical] form becomes almost irresistible" and researchers thus tend to forget economic content. Still, Debreu argues that separation of models and reality can sometimes be an advantage. For instance, it is said to bring economics closer to the ideology-free ideal (see Düppe 2010).¹⁴

According to Duesenberry (1954, p. 362), loss of touch with the real world is simply given by the job description of an economic theorist: the aim of the theorist is not to explain a particular set of observations but to show general consequences of a set of premises. To this argument we may add that a theorist also aims at universalization: she also attempts to show that two or several seemingly separate theories are merely different manifestations of the same principle. Hence, theoretical research is necessarily often disconnected from reality as it focuses on logical consistency of theories. From this perspective, criticism of the separation of mathematical models from reality could be interpreted as a criticism of theoretical research as such and as a plea for focusing on applied research. I hasten to add that the debate on optimal allocation of resources between theoretical and applied research is extremely important (see e.g., Šťastný 2010); yet, it is a different debate than the one on costs and benefits of mathematization.

Intelligibility

It is probably true that the more formalized a model is, the less intelligible it is to lay people. Should economists worry about this trade-off? On the affirmative side stands the consideration that economic literacy is low

¹³On the other hand, Brems (1975) provides the following counter-example of verbal treatment leading to focus on imaginary problems: investment in the Keynesian theory was considered a function of the rate of interest instead of the *change* of the rate of interest, only because verbal economics was unable to handle difference or differential equations.

¹⁴Morgenstern praised mathematical economics for exactly the same reason. See Leonard (2010).

which in turn has substantial negative externalities as citizens and voters are called upon to form opinions on many economic issues (e.g., Becker 2000; Šťastný 2010). On the other side stands the argument that, as in any other science, researchers should write primarily for other researchers and educating lay people should be left to popularizers: as individual economists differ in their skills and talents, there are benefits from specialization.¹⁵ Trading off benefits of formalization for intelligibility of academic writing to the general public thus seems inefficient. A different question is whether economists have sufficient incentives to be popularizers; but that is again for another debate.

CONCLUSION

Examination of benefits and costs of mathematization suggests that the issue is not whether to use mathematics in economics or not; instead, the issue is what kind of mathematics is appropriate and how it should be used (cf. Backhouse 2000; Rosser 2003). It should be stressed that mathematization by no means is in conflict with the Austrian methodology, although some aspects of Austrian economics may be difficult to formalize at the present state of knowledge. This limitation, however, does not imply that we should give up on pushing the limits of mathematization further. Given that spreading ideas among the bulk of modern economists requires the use of mathematical language, one may only hope to see more and more mathematized Austrian economics in the future. For as they say: $b(m) - c(m) > 0$, for some $m > 0$.

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¹⁵Steven Levitt is an exception that may in fact prove the rule: his pop-economics books are co-authored with the journalist Stephen Dubner.

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A NOTE ON THE LIMITS TO MONOPOLY PRICING

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In 2009, I had for the first time the opportunity of participating in the Mises Institute summer fellowship program under the guidance of Professor Salerno. On this occasion, I worked on an article touching upon the theme of monopoly price theory, a shared research interest of ours (Salerno 2003, 2004). My goal was to focus on how the pricing of factors of production is affected when their products are sold at monopoly prices (Méra 2010).

Now, the very nature of the issue at hand required to take a “long run” perspective since it concerns the production decision point, a decision which must be made by some capitalist-entrepreneur in anticipation of its future returns. Because of this focus, I noticed in the course of my research that Ludwig von Mises and Murray Rothbard tend to emphasize the same requirement for

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a monopoly price to emerge, as far as the demand schedule for the monopolized good is concerned, in the long run and in the “immediate run” (when the good is already available).

This is problematic because, as I intend to explain below, their criterion of a seller or a cartel of sellers facing an “inelastic demand” above the “competitive price” (Mises) or the “free-market price” (Rothbard) is only required in the immediate run. This has consequences in regard to the question of the limits to monopoly pricing, a question that Rothbard (1962, pp. 680–81) briefly but explicitly deals with in his “A World of Monopoly Prices?” section when he asks “Can all selling prices be monopoly prices?” He also provides insights outside of this section which also have direct implications for that question. Most notably, he explains that the very concept of a monopoly price makes sense only as a byproduct of interventionism, arguably an improvement over Mises’ theory. Nonetheless, Rothbard’s take, as well as Mises’, suffers from this issue of the inelastic demand criterion and related weaknesses that I intend to highlight and repair below. Since these shortcomings happened not to be decisive for the article I worked on under Professor Salerno’s supervision, I had left them at that¹. It seems appropriate then to deal with them here.

I begin with a brief summary of Rothbard’s view of monopoly prices as a hampered market phenomenon only. I interpret this modification of Mises’ monopoly price theory in the following way: the limits to monopoly pricing are shown to be narrower than what Mises thought. In other words, there is less room for monopoly prices to emerge in a market economy than Rothbard’s mentor considered.

Then I explain how, on the other hand, the ambiguous treatment of the inelasticity of demand criterion in Mises and Rothbard’s analysis leaves less room for monopoly prices than there really is. Although in contrast the modern neoclassical theory’s treatment of monopoly avoids the same ambiguity and its consequences, I show that the reason is accidental and that this should not be mistaken as a sign that it provides a superior alternative.

Finally, the main theory and policy implications of our findings are stressed: if there can be monopoly prices without inelastic demand schedules above free market prices, the price distortion potential of monopolistic

¹In Méra (2010), my remarks in relation to the issue of the inelastic demand criterion are confined to footnotes. The present article essentially elaborates on these remarks.

privileges is more important than what Rothbard envisages. It becomes then all the more urgent to refrain from granting them if one wants to spare the bulk of consumers from the effects of factor misallocation.

RE-THINKING THE LIMITS TO MONOPOLY PRICING: ROTHBARD'S CONTRIBUTION

In relation to Mises' exposition of monopoly price theory, Rothbard's central contribution is to show that the dichotomy between a competitive and a monopoly price is illusory in a free market framework. The movement from a competitive price to a monopoly price and the movement from a sub-competitive price to a competitive price are indistinguishable, for instance. The most fundamental reason is that the seller is in the same position *vis-à-vis* the demand schedule, whatever case one considers. All that we know based on Mises' praxeology is that, nonmonetary factors aside, the seller will try to obtain a price above which the demand schedule is elastic. This is true when he can obtain a monopoly price. But this is true as well as when he can only charge a competitive price. Otherwise, he would charge a higher price. In other words, both prices appear to be distinguishable only if one arbitrarily postulates that a certain price is competitive so that a higher price can be considered as a monopoly price if the seller can increase his monetary income or net revenue by selling the good at this higher price. Absent an independent criterion to conceive of this competitive price, the whole dichotomy fades away (Rothbard 1962, pp. 687–98). If one cannot distinguish between two things, they are essentially the same.²

On the contrary, there is an identifiable criterion providing the basis for such a distinction once one contrasts actions occurring in a free market framework with actions occurring while some potential sellers are excluded from the market under threats of or outright aggression. As Rothbard (1962, p. 904) puts it:

²O'Driscoll (1982, pp. 190–91) argues that “a distinctively Austrian theory of monopoly remains to be written” and more specifically that “Murray Rothbard and Dominic Armeniano, present a distinctive theory with roots deep in the history of economics and with strong affinity to the common-law treatment of monopoly. Their theory is not, however, the outcome or development of any particular Austrian insight.” However one might argue that Rothbard's take is distinctly Austrian in its realization that the usual dichotomy of a competitive and a monopoly price in a free market is an anomaly in the context of Mengerian price theory (as developed by Mises). After all, Rothbard's point is that the competitive price benchmark in a free market cannot be derived from the fundamentals of action. As a consequence, it appears as a foreign element forced into the theoretical edifice.

We have seen above that on the free market, *every* demand curve to a firm is *elastic* above the free-market price; otherwise the firm would have an incentive to raise its price and increase its revenue. But the grant of monopoly privilege renders the consumer demand curve less elastic, for the consumer is deprived of substitute products from other potential competitors. Whether this lowering of elasticity will be sufficient to make the demand curve to the firm *inelastic* (so that gross revenue will be greater at a price higher than the free market price) depends on the concrete historical data of the case and is not for economic analysis to determine.

In other words, one can conceive of a monopoly price, as compared to a free market price, because the demand schedules that remaining sellers face are altered. These sellers are then not in the same position *vis-à-vis* these demand schedules than they would be when anyone has the right to compete with them. They will then be able to charge a monopoly price if the demand schedules they now face, independently or together as a cartel, are inelastic above the free market price, which is only possible if the market demand schedule is inelastic above the free market price (Rothbard 1962, p. 674).³

Now, these simple yet profound insights mean the following, in relation to the question of the limits to monopoly pricing. If Mises and all the writers who have claimed that monopoly prices could arise in a free market framework have been mistaken here about their nature, they have underestimated the limits to monopoly pricing in society. Rothbard's contribution — recasting the theory of monopoly price as part of a theory of interventionism — implies the claim that the scope for monopoly prices is narrower than what Mises thought.⁴

THE OVERLOOKED CASE OF MONOPOLY PRICES WITH ELASTIC DEMAND SCHEDULES

Even if one endorses Rothbard's contribution, one might nevertheless argue that there is more room for monopoly prices than he thought. To

³If the grant of privilege is given to one seller only, then the demand schedule he now faces is the market demand schedule.

⁴It was quite narrow already as compared to the views of some of Mises' predecessors (Salerno 2003, pp. 60–62). Indeed there was no doubt for Mises that government is by far the main source of monopoly prices (Mises 1949, p. 363).

understand this, one must focus on some condition required for a monopoly price to emerge that both Rothbard and Mises have repeatedly stressed in their writings on the topic. The above quote displays this condition. The demand schedule that the holder of a monopolistic privilege faces must be such that above the free market price (or the competitive price, for Mises), one or several prices bring in more revenue. This is the “inelasticity of demand” criterion. The implication is that monopoly pricing in society is limited to the extent that demand schedules are elastic in the relevant ranges. For Rothbard then, the less goods there are for which people are eager to increase their expenses on above their free market prices, the less room there is for monopoly pricing, no matter how effective the grants of privilege are at hampering competition.

There can be no quarrel with this as long as one takes an immediate run perspective in which the goods to be sold or withheld from the market are readily available. Matters are different however once one focuses on the production decision points, when people try to maximize net income and not necessarily gross income. Increasing one’s net income by restricting one’s production of a good is possible even if one faces an elastic demand schedule above the free market price, provided that one’s average production expenses fall at a high enough pace (or rise slowly enough). All that is really required is that total expenses fall more than total income. The decisive consideration is not inelasticity of demand. If it remains of course a factor of emergence of monopoly prices, it is not a necessary criterion anymore. The limits to monopoly pricing are not as narrow as what Rothbard suggests.

MISES AND ROTHBARD’S CONFLATION OF THE IMMEDIATE RUN AND THE LONG RUN

Now the reader familiar with Mises and Rothbard’s writings might ponder. These authors did not forget to take production expenses into account in their discussions of monopoly prices, did they? To be sure, they did not. The point is however that Mises (1944), Mises (1949) and Rothbard (1962) never explicitly recognize that the inelasticity of demand criterion needs to be qualified once production is taken into account. In these expositions, they tend to jump from an immediate run to a long run perspective and *vice versa* without saying so. As a consequence, inelasticity of demand for the product appears to be a required criterion even when the analysis focuses on the production decision point.

For instance, in the paragraph following the above quote, Rothbard (1962, p. 904) mentions the restriction on production and the inelasticity criterion in the same breath, as if maximizing gross income still was the relevant consideration for the monopolist at the production decision point:

When the demand curve to the firm remains elastic (so that gross revenue will be lower at a higher-than-free-market price), the monopolist will not reap any *monopoly gain* from his grant. Consumers and competitors will still be injured because their trade is prevented, but the monopolist will not gain, because his price and income will be no higher than before. On the other hand, if his demand curve is inelastic, then he institutes a monopoly price so as to maximize his revenue. His production has to be restricted in order to command the higher price. The restriction of production and higher price for the product both injure the consumers.

Here the restriction of production comes as an afterthought, once one has considered which price would maximize gross income. Or, earlier, Rothbard (1962, p. 672) introduces the theory of monopoly price by quoting a passage of *Human Action* in which Mises focuses on the production decision point:

If conditions are such that the monopolist can secure higher net proceeds by selling a smaller quantity of his product at a higher price than by selling a greater quantity of his supply at a lower price, there emerges a *monopoly price* higher than the potential market price would have been in the absence of monopoly.

This is compatible with an elastic demand. And yet, Rothbard immediately adds, as if it was no different:

The monopoly price doctrine may be summed up as follows: A certain quantity of a good, when produced and sold, yields a *competitive price* on the market. A monopolist or a cartel of firms can, if *the demand curve is inelastic at the competitive-price point*, restrict sales and raise the price, to arrive at the point of maximum returns. If, on the other hand, the demand curve as it presents itself to the monopolist or cartel is *elastic* at the

competitive-price point, the monopolist will not restrict sales to attain a higher price. [Emphasis in the original]⁵

Similarly, in *Human Action*, the required condition of the inelastic demand for a monopoly price to emerge is defended, and then production considerations are added with no qualification of the criterion. The initial requirement reads as follows:

The reaction of the buying public to the rise in prices beyond the potential competitive price, the fall in demand, is not such as to render the proceeds resulting from total sales at any price exceeding the competitive price smaller than total proceeds resulting from total sales at the competitive price. (Mises 1949, p. 355)

Then he starts discussing the problem of resource allocation and production expenses. As a consequence, “net proceeds” (Mises 1949, pp. 357, 358, 359, 374) now become the relevant consideration, as they should. And yet, no mention is made of the fact that the previously stated requirement is not strictly valid anymore when he later refers to a “propitious configuration of demand” (Mises 1949, p. 370).

In Mises (1944), the same ambiguity is to be found in an even more pronounced way because Mises shifts back and forth from the immediate run to the long run perspective. First, Mises (1944, p. 2) posits the inelasticity of demand criterion with a numerical example. Given an existing stock of a good, the monopolist does not restrict his sales because demand is such that the total proceeds diminish at any higher price than the competitive one: “If a rise of the price above the competitive price results in a more-than-proportional restriction of the quantity bought by the public, the total proceeds of the seller would drop.” In the next paragraph, he switches to the long run perspective by considering the problem of the allocation of factors and then explains that,

⁵It is not without justification then, that Armentano’s summary of Rothbard’s position conflates the immediate run and the long run: “It has been common, of course, to speak of monopoly price as that price accomplished when output is restricted under conditions of inelastic demand, thus increasing the net income of the supplier.” (Armentano 1978, p. 103). See also Armentano (1999, p. 48) and Armentano (1988, p. 8). See also Costea (2003, pp. 47–48) and Costea (2006, p. 45) describing Mises’ position in the same way.

...if some special barriers prevent other people from competing with the monopolistic sellers, a restriction of the production of copper or shoes that does not comply with the demands of the consumers becomes possible. Although the consumers are ready to pay for additional quantities of copper or shoes at prices which would render an expansion of production profitable on a competitive market, the sellers, sheltered by monopoly, do not expand production if they are better off under a state of affairs which results in a higher income for them with curtailment of production. (Mises 1944, p. 2)

Notice how Mises speaks here of mere “income” and not “net proceeds,” despite the fact that he is considering the production decision point. And on the next page, he comes back to the immediate run inelasticity of demand requirement. Both the immediate and long run perspectives are in effect conflated.⁶ As one consequently fails to consider the case of a monopoly price with an elastic demand schedule, one narrows the limits to monopoly pricing too much (beyond Rothbard’s reduction to cases of interventions).

Surprisingly enough, given the evidence of conflation that we have shown, it turns out that in one instance Mises has implicitly considered the case of a monopoly price with an elastic demand. Mises (1944, p. 7) draws a table with hypothetical figures showing slightly decreasing average expenses as production expands. There are four prices considered, 5, 6, 7 and 8 monetary units per unit of product and a higher price always implies lower proceeds: the demand is elastic on whatever range we consider above 5, which Mises declares to be the competitive price. According to the inelasticity criterion, there is therefore no room for a monopoly price. But

⁶Klein (2008, p. 177) has noticed that in his general discussion of price determination, “Rothbard (1962) is somewhat imprecise in distinguishing among equilibrium constructs.” We might add that this is true of Mises too, at least in the context of monopoly price theory, as illustrated above. On the distinctions between a “plain state of rest” (PSR), a “final state of rest” (FSR), the intermediate “Wicksteedian state of rest” (WSR) coined by Salerno (1994), and an “evenly rotating economy,” as a complete set of precise equilibrium constructs, see Klein (2008, pp. 172–83). Rothbard’s “immediate run” (PSR) and “long run” equilibriums (FSR) that we have been using here are sufficient for our present purpose however. It does not fundamentally alter Rothbard’s discussion and our analysis here if one interprets them in terms of WSR and FSR instead, since the PSR and the WSR are both about decisions to be made regarding some already produced goods.

Mises writes that “the monopoly price most favorable to the monopolist is 7” (6, 7 and 8 are monopoly prices)! The reason of course is that, given the figures he chooses, the expenses required diminish more than the proceeds when one reduces the scale of production. Nevertheless, he does not mention explicitly that this is a case of a monopoly price with an elastic demand while, as shown above, he conflates the relevant required criteria for the immediate and the long run perspectives in the same article.

Rothbard too implicitly recognizes the case of a monopoly price with an elastic demand somewhere. In *Power & Market*, he reproduces an extract from *Man, Economy, and State* which claimed that an inelastic demand schedule is required for a monopoly price to arise. It is repeated word for word except for one added qualification: “The monopolist, as a receiver of a monopoly privilege, will be able to achieve a monopoly price for the product if his demand curve is inelastic, *or sufficiently less elastic*, above the free-market price” (Rothbard 1970, p. 44, emphasis added). Inelasticity is not a necessary requirement anymore. He does not explain the addition of the “sufficiently less elastic” criterion but one can certainly see that it makes perfect sense, in light of Mises’ example above and our comments.

To avoid conflation, one can explicitly refer to the two decisions points and thereby disentangle the two required criteria. Kirzner’s exposition comes closer to this than Mises’ and Rothbard’s (Kirzner 1963, pp. 265–96) and is arguably superior in this regard. Another is to call the immediate run and the long run monopoly prices differently. This is, as Salerno (2003, p. 31) notices, what Fetter (1915, pp. 80–81) does, writing of a “crude monopoly price” when the sale of an already produced stock of a good is considered, and of a mere “monopoly price” for a good when its production is considered. Then it can be easily grasped that a crude monopoly price requires an inelastic demand schedule above the free market price, whereas a mere monopoly price does not.

THE TROUBLE WITH ROTHBARD’S FALLING COSTS PROVISIO

The lack of a clear-cut explicit distinction in Mises and Rothbard’s analysis between the immediate run and the long run can lead to some further confusion. If one ignores the case of a monopoly price with an elastic demand, it is difficult to make sense of Rothbard’s *provisio*, according to which a monopoly price will arise when one is striving for maximum net proceeds, “whatever the actual configuration of money costs, unless, indeed, average money costs are falling rapidly enough in this region to make the “competitive point” the most remunerative after all” (Rothbard 1962, p. 674).

The reason is the following. For the “competitive point”⁷ to yield a higher net return than the restrictive alternative with an inelastic demand, it would be necessary that expenses fall in absolute terms when one increases production, not merely on average, since gross income falls when one expands until the free market point (by definition of the inelasticity of the relevant range of the demand schedule). But this is impossible. Average expenses might fall when production is increased, because of the indivisibility of some factors of production. Total expenses cannot. If the producer-seller will face an inelastic demand for his product in the future, restriction must pay whatever the configuration of expenses is. And believing that a *proviso* is required here amounts once again to an unjustifiably narrow view of the limits to monopoly pricing.

The *proviso* makes sense only once one recognizes the possibility of a monopoly price with an elastic demand. In general, the higher the average expenses become as production expands, the more likely it is that cutting production below the free market level pays. Hence the case of a monopoly price with an elastic demand, provided that average expenses become low enough when one reduces production below the free market level¹ (“low enough” meaning that total expenses fall at a faster pace than total receipts in order for net proceeds to rise). In other words, the more they rise instead, or fall at a slow pace, the less likely it is that net proceeds will be higher at a lower level of production, the more chances there are that the free market level of production is the most remunerative. But this possibility arises only when the demand is elastic above the free market price. When doing less brings in more gross revenue, restriction in the monopolized industry always pays. Any other conclusion unduly narrows down the limits to monopoly pricing.

⁷Rothbard speaks of a competitive point instead of a “free market point” because the context is his discussion of Mises’ theory. The reader must not get confused by this. This discussion is relevant in Rothbard’s framework once the theory is fixed and depicts how a monopoly price actually contrasts with a free market price instead of a “competitive” price. As Rothbard (1962, p. 903) puts it in his chapter on interventionism and socialism: “In chapter 10 we buried the theory of monopoly price; we must now resurrect it. The theory of monopoly price, as developed there, is illusory when applied to the free market, but it applies fully in the case of monopoly and quasi-monopoly grants.”

THE CURRENT TEXTBOOK TREATMENT AS A SUPERIOR ALTERNATIVE?

It could be argued that the orthodox take on monopoly as found in Arnold (pp. 223–58) or any microeconomics textbook is superior to Mises and Rothbard's in at least one respect: there is no risk of the sort of conflation we have pointed out here because there is no immediate run analysis to conflate with a long run perspective in its treatment of the issue. In that neoclassical approach, the sellers are producers too, even in the short run. There is no question of what to do with an available stock of a good. There is no reason then for inelasticity of demand to be a distinguishing criterion since monetary profit maximization — and therefore money costs — are relevant considerations in all cases.

Apart from the fact that getting rid of the immediate run is *per se* problematic since the useful and realistic concept of a crude monopoly price disappears from the picture, the most fundamental reason why inelasticity has no decisive role in that approach is that it is based on different categories with different criteria than the older monopoly price theory. As Caplan (1997) puts it, in modern neoclassical theory,

there is always some degree of monopolistic distortion unless firms face a horizontal demand curve. For unless firms face a horizontal demand curve, a profit-maximizing firm sets its price above its marginal cost. In the absence of perfect price discrimination, this means that there is a “deadweight loss” — or unrealized gains to trade.”

In other words, the fundamental distinction here is between “pure and perfect competition” with perfectly elastic demand schedules and “imperfect” or “monopolistic competition” with downward sloping demand curves (“monopoly” being the extreme case in which only one seller would face the market demand schedule).

Turning toward this approach as an apparently more rigorous alternative brings in its whole theoretical apparatus with its weaknesses that Mises and Rothbard have identified. For although Caplan (1997) claims that he affords “all too little attention to the modern neoclassical theory,” Rothbard (1962, pp. 720–22) actually demonstrates that perfect elasticity is impossible since it is not compatible with the always holding law of marginal utility. As a consequence downward sloping demand curves for individual sellers and the corresponding “failure” to equate price and marginal cost

are no signs of monopolistic distortion and the marginal cost pricing criterion cannot serve as a realistic criterion to conceive of a competitive price.

It should be kept in mind that the older monopoly price theory does not depend on the benchmark of “pure and perfect competition,” which explains why Mises and Rothbard found something of value in it whereas they entirely dismissed the newer view (Mises 1949, pp. 356–57; Rothbard 1962, pp. 720–38).

CONCLUSION: THEORY AND POLICY

Is there more to say about the maximum limits to monopoly pricing than the fact that in the immediate run, elastic demand schedules deprive monopolistic privilege holders of opportunities to charge “crude” monopoly prices? Or that demand schedules which are too elastic in relation to average production expenses deprive monopolistic privilege holders of opportunities to charge monopoly prices for their products? According to Rothbard (1962, p. 681), in the aforementioned “A World of Monopoly Prices?” section of *Man, Economy, and State*, “monopoly prices could not be established in more than approximately half of the economy’s industries,” among other reasons because it is impossible for every industry to face an inelastic demand schedule since buyers cannot spend more in every industry.

Now, as explained above, the inelasticity of demand criterion is only required in the immediate run perspective of deciding what to do with an available stock of a good. As a consequence, if at most half of the economy’s industries could face inelastic demands above their free market prices, there could still be other monopolized industries able to charge monopoly prices provided that their total expenses fall at a rapid enough pace when they reduce production. More than half of an economy’s industries might then charge monopoly prices. The limits to monopoly pricing are then larger when one focuses on the production decision points. In light of our explanations, Rothbard’s neglect of this insight is attributable to his and Mises’s tendency to conflate the immediate and long run perspectives in their expositions.

The implications are straightforward. As far as pure theory is concerned, Rothbard underestimated the impact of granting monopoly privileges on price formation. If monopoly prices can arise without inelastic demand schedules, factor allocation is correspondingly altered to the detriment of the bulk of consumers, beyond the already recognized alteration occurring under the condition of inelastic demand schedules. As far as policy is concerned, it becomes all the more urgent to abolish monopoly

privileges, or to refrain from enacting them in the first place, if one wants to minimize factor misallocation.

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III.

POLICY

HAYEK ON THE REGULATION OF THE BANKING SYSTEM AND CENTRAL BANK POLICY

MATEUSZ BENEDYK*

In recent decades we have witnessed several debates on the legacy of Friedrich von Hayek in the realm of monetary policy. His writings have been both endorsed and attacked by economists from opposing branches of Austrian economics.¹ Part of the problem is that Hayek partially changed his mind throughout his life and gave different policy prescriptions in the 1970s than he did in 1930s.² But even the interpretation

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I was a summer research fellow in 2012. This chapter was inspired by Professor Salerno's many contributions in the field of history of the Austrian school of economics and his investigations regarding the monetary theory.

¹For example Hayek was attacked for not seeing the merits of fractional reserve banking by Lawrence H. White, "Why Didn't Hayek Favor Laissez Faire in Banking?" *History of Political Economy* 31, no. 4 (1999): 753–69; and for not blaming fractional reserve bankers for business cycles by Walter Block, Kenneth M. Garschina, "Hayek, Business Cycles and Fractional Reserve Banking: Continuing the De-Homogenization Process," *Review of Austrian Economics* 9, no. 1 (1996): 77–94.

²For the discussion of Hayek's writings in 1970s and 1980s see G. R. Steele, "Hayek's Theory of Money and Cycles: Retrospective and Reappraisal," *Quarterly Journal of Austrian Economics* 8, no. 1 (2005): 3–14. Here we will deal primarily with the earlier works of Hayek.

of his major works on money, banking and business cycle from 1920s and 1930s poses some problems.

We would like to shed some light on the Hayekian analysis of different monetary institutions. Specifically, we want to clarify what the economic consequences of such institutions: fractional and one-hundred percent reserve banking; and various monetary policy norms of central banks.³ Special attention will be given to the differences between constructs of pure money and business cycle theories as opposed to policy prescriptions. The first section discusses the relation between fractional-reserve banking and the business cycle. It also deals with Hayek's opinions on one hundred percent reserve banking. In the second section we debate the claim of Hayek endorsing the monetary policy of stabilizing the level of nominal spending. Several concluding remarks are offered in the last section.

FRACTIONAL AND ONE-HUNDRED PERCENT RESERVE BANKING

In Hayek's view the contemporary organization of the banking sector was responsible for the cyclical fluctuations of the economy. He devoted the whole chapter of the *Monetary Theory and the Trade Cycle* to show that the expansion of credit by fractional-reserve banks must necessarily lead to unsustainable boom even if there is no central bank.⁴

According to Hayek the magnitude of the bank's credit expansion depends on its cash reserves. The crucial point is "that the ratio of reserves to deposits does not represent a constant magnitude, but, as experience shows, is itself variable."⁵ If, for whatever reason, economic conditions improve and banks consider their cash reserve to be excessive, they will grant additional credit to their customers. "[F]or reasons of competition ... the bank that first feels the effect of an increased demand for credit cannot afford to reply by putting up its interest charges; for it would risk losing

³This list does not pretend to exhaust all of the Hayek's insights in the field of money. It includes only the problems that created numerous controversies and rivalrous interpretations in the literature. More comprehensive study should include e.g., effects of various international monetary systems and the differences between central and free banking or between token and commodity money.

⁴Friedrich A. Hayek, "Monetary Theory and the Trade Cycle," In: idem, *Prices and Production and Other Works*, ed. Joseph Salerno, Auburn 2008, pp. 73–103.

⁵Ibid., p. 91.

its best customers to other banks that had not yet experienced a similarly increased demand for credit.”⁶

This expansion of credit occurs without corresponding growth of savings. Other banks cannot distinguish between deposits created out of new savings and the ones created without it. They will join the credit expansion, as money from other banks will be deposited in their company, and lower their growing reserve ratio. The effect of the process is that the money rate of interest is for the time being lower than the natural rate.

Only so long as the volume of circulating media is increasing can the money rate of interest be kept below the equilibrium rate; once it has ceased to increase, the money rate must ... rise again to its natural level and thus render unprofitable ... those investments which were created with the aid of additional credit.⁷

Since fractional reserve banking is in Hayek’s view responsible for the business cycle, it’s hardly a surprise that he mentioned on several occasions the idea of one-hundred percent reserve banking. As early as 1925 he discussed the idea shortly in a review of Federal Reserve monetary policy after the crisis of 1920. Hayek wrote the following:

The older English theorists of the Currency School, who, as we already pointed out, understood the nature of cyclic fluctuations better than most of the economists who came after them, also hoped that cyclic swings could be prevented by their proposals for the regulation of note issues. ... If the basic idea underlying the Peel’s Act were consistently implemented and a 100 per cent gold coverage were required for bank deposits as well as for bank notes, the problem of preventing depressions would be resolved in a drastic manner.⁸

A monetary system without business cycle seems like a desirable goal, but Hayek was not eager to advocate the idea of abolishment of fractional

⁶Ibid., p. 93.

⁷Ibid., p. 94.

⁸Friedrich A. Hayek, “Monetary Policy in the United States after the Recovery from the Crisis of 1920,” In: Idem, *Good Money. Part I*, ed. Stephen Kresge, *The Collected Works of F.A. Hayek*, vol. 5, Indianapolis 2008, p. 111, n. 37.

reserves. In *Monetary Theory and the Trade Cycle* Hayek stated clearly that in case of one hundred percent reserve banking:

[t]he stability of the economic system would be obtained at the price of curbing economic progress. The rate of interest would be constantly above the level maintained under the existing system. ... The utilization of new inventions and the “realization of new combinations” would be made more difficult, and thus there would disappear a psychological incentive toward progress.⁹

Hayek didn’t elaborate further on this point. It therefore seems unconvincing: why would capitalists earning a higher rate of interest on their capital be discouraged to innovate and invest? Shouldn’t a system where entrepreneurs make mistakes on a regular basis (malinvest during the business cycle) be more disruptive for innovators?¹⁰ Jesús Huerta de Soto thinks that “maybe it would be wiser to interpret the assertions Hayek made in 1929 (in *Monetary Theory and the Trade Cycle*) in the context of the lecture given before the *Verein für Sozialpolitik*. ... Hayek’s speech was subject to a rigorous examination by professors who were little inclined to accept conclusions they viewed as too original or revolutionary.”¹¹

Hayek returned to the idea of one hundred percent reserve banking in 1937 in the series of lectures published as *Monetary Nationalism and International Stability*. In the fifth lecture he reviewed briefly “The Chicago Plan of Banking Reform.”¹² This time Hayek’s objections to the abolishment of fractional reserve banking were completely different:

The most serious question which it raises, however, is whether by abolishing deposit banking as we know it we would effectively prevent the principle on which it rests from manifesting itself in other forms. ... [T]he question is whether, when we

⁹Friedrich A. Hayek, *Monetary Theory*..., p. 103.

¹⁰On this point see: Joseph Salerno, “A Reformulation of Austrian Business Cycle Theory in Light of the Financial Crisis,” *Quarterly Journal of Austrian Economics* 15, no. 1 (2012): 22–23, 37–38.

¹¹Jesús Huerta de Soto, *Money, Bank Credit and Economic Cycles*, translated by Melinda A. Stroup, Auburn 2006, pp. 470–71, n. 74.

¹²Friedrich A. Hayek, *Monetary Nationalism and International Stability*, In: Idem, *Prices and Production and Other Works*, pp. 410–13.

prevent it from appearing in its traditional form, we will not just drive it into other and less easily controllable forms. ... The [Peel's Banking] Act of 1844 was designed to control what then seemed to be the only important substitute for gold as a widely used medium of exchange and yet failed completely in its intention because of the rapid growth of bank deposits. Is it not possible that if similar restrictions to those placed on bank notes were now placed on the expansion of bank deposits, new forms of money substitutes would rapidly spring up or existing ones would assume increasing importance?¹³

This analysis does not mention any economic deficiencies connected with the system of one hundred percent reserve banking. The obstacle is of a practical nature — whether we will be able to stop the creation of new money substitutes that will take the place of bank notes and deposits.¹⁴ We may conclude here that Hayek saw the merits of advocating for an end of fractional-reserve banking — a seed of the business cycle in the contemporary economy — but never fully endorsed the program of one hundred percent reserve banking, pointing to problems of both a theoretical and practical nature.

CENTRAL BANK'S POLICY PRESCRIPTIONS

The greatest controversies regarding Hayek's stance on monetary theory arise from the central bank's policy norms that Hayek allegedly proposed. Since we live (as Hayek did as well) in a world of central banks managing the fractional-reserve banking system, we may ask if there is something the monetary authorities can do to mitigate the business cycle.¹⁵ Recently Lawrence White stated:

Hayek's business cycle theory led him to the conclusion that intertemporal price equilibrium is best maintained in a monetary economy by constancy of "the total money stream," or in

¹³Ibid., pp. 411–12.

¹⁴A description of these obstacles is a major part of Hayek's discussion of the Chicago Plan. It's therefore an overstatement to say that "in *Monetary Nationalism and International Stability*, [Hayek] changed his mind, proposed a constant money supply and advocated the demand for a 100-percent reserve requirement in banking" — Jesús Huerta de Soto, *Money...*, p. 470, n. 74.

¹⁵We have already discussed the possibility of central banks requiring banks to hold one hundred percent reserves on deposits, so we won't mention the subject in this section.

Fisherian terms, the money stock times its velocity of circulation, *MV*. Hayek was clear about his policy recommendations: the money stock *M* should vary to offset changes in the velocity of money *V*, but should be constant in the absence of changes in *V*.¹⁶

White's bold statements led Marius Gustavson to propose a 'Hayek Rule' — understood as keeping *MV* constant — as a norm for Federal Reserve's policy in the 21st century.¹⁷ Two questions arise:

(1) Did Hayek endorse such a policy?

(2) Does Hayek's business cycle theory provide a justification for "Hayek Rule"?

To properly answer these questions it's useful to consider the theoretical context of Hayek's business cycle investigations. For Hayek the main puzzle was how to integrate the theory of business cycle into the general equilibrium theory.¹⁸ In other words: how it is possible that forces leading markets to clear fail to coordinate consumers' preferences and producers' decisions during the business cycle? Hayek's view was that we should focus on the active role money plays in the economy. The introduction of money breaks the clear process of price formation in barter and makes it possible that "real" factors responsible for price formation will be for some time hindered by monetary factors.

Beginning in mid-1920s Hayek struggled to describe the active role money plays in price formation in a more detailed fashion.¹⁹ He came up

¹⁶Lawrence H. White, "Did Hayek and Robbins Deepen the Great Depression?" *Journal of Money, Credit and Banking* 40, no. 4 (2008): 754–55, emphasis added.

¹⁷Marius Gustavson, *The Hayek Rule: A New Monetary Policy Framework for the 21st Century*, Reason Foundation Policy Study 389 (2010). Gustavson's study includes references to White's 2008 paper.

¹⁸In Hayek's words: "By 'equilibrium theory' we here primarily understand the modern theory of the general interdependence of all economic quantities, which has been most perfectly expressed by the Lausanne School of theoretical economics." — Friedrich A. Hayek, *Monetary Theory...*, p. 19, n. 15.

¹⁹Between 1925–1929 Hayek was preparing a book on the subject titled *Geldtheoretische Untersuchungen*, which he never completed. Two articles Hayek published at the time were excerpts from the book: *Intertemporal Price Equilibrium and Movements in the Value of Money*, (originally appeared in German in 1928) published in *Good Money. Part I; The Paradox of Saving* (published in German in 1929) published *inter alia* in *Prices and Production and Other Works*. The English translation of the unfinished manuscript of the *Geldtheoretische Untersuchungen* has been recently published as *Investigations into Monetary Theory*,

with the idea of “neutral money” — a set of conditions needed for the money to be neutral toward prices. His first idea was that the supply of money must be constant in order to be neutral. In the 1930s he changed his mind and advocated the idea that money may be neutral when the effective money stream (MV) is constant.²⁰ Does it follow that Hayek advocated the monetary policy of stabilizing MV? Not necessarily.

In the second edition of Hayek's *Prices and Production*²¹ and in a paper from 1933 titled *On 'Neutral' Money*²² we find some clarifications as to the proper relation between the theoretical concept of neutral money and the prescribed monetary policy. In the latter Hayek wrote: “The concept of neutral money was designed to serve as an instrument for theoretical analysis, and should not in any way be set up as a norm for monetary policy, at least in the first instance.”²³ Hayek stressed the monetary policy can have different goals than getting close to the state of neutral money. He also mentioned the stable MV is not the sufficient condition for money to be neutral.

It is quite conceivable that a distortion of relative prices and a misdirection of production by monetary influences could only be avoided if, first, the total money stream remained constant, and second, all prices were completely flexible, and, third, all long term contracts were based on a correct anticipation of future price movements. This would mean that, if the second and third conditions are not given, the ideal could not be realized by any kind of monetary policy.²⁴

Lack of perfect foresight regarding the future value of money and any degree of price stickiness make neutral money an impossibility. One could

first chapter of: Friedrich A. Hayek, *Business Cycles. Part II*, ed. Hansjoerg Klausinger, *The Collected Works of F.A. Hayek*, vol. 8, Chicago 2012.

²⁰This evolution of Hayek's thought is well documented in another paper of Lawrence H. White, “Hayek's Monetary Theory and Policy: A Critical Reconstruction,” *Journal of Money, Credit and Banking* 31, no. 1 (1999): 109–20.

²¹Friedrich A. Hayek, *Prices and Production*, [In:] Idem, *Prices and Production and Other Works*, pp. 301–04.

²²Friedrich A. Hayek, *On 'Neutral' Money*, [In:] Idem, *Good Money. Part I*, pp. 228–31.

²³*Ibid.*, p. 228.

²⁴Friedrich A. Hayek, *Prices and Production*, p. 304. Almost identical statement in: Friedrich A. Hayek, *On 'Neutral' Money*, p. 230.

argue that even though we cannot reach perfection, it is still a good idea to pursue the ideal. But Hayek saw other problems with stabilizing the level of nominal expenditures. In *Prices and Production* he briefly discussed the problems with changing money velocity due to hoarding, dishoarding, changes in business organization etc.

For, in order to eliminate all monetary influences on the formation of prices and the structure of production, it would not be sufficient merely quantitatively to adapt the supply of money to these changes in demand, it would be necessary also to see that it came into the hands of those who actually require it, i.e., to that part of the system where that change in business organization or the habits of payment had taken place. It is conceivable that this could be managed in the case of an increase of demand. It is clear that it would be still more difficult in the case of a reduction. But quite apart from this particular difficulty which, from the point of view of pure theory, may not prove insuperable, it should be clear that only to satisfy the legitimate demand for money in this sense, and otherwise to leave the amount of the circulation unchanged, can never be a practical maxim of currency policy.²⁵

For Hayek it was clear that pumping money in any place in the economy as a reaction for increased demand for money in another place would not suffice to get closer to money neutrality. The money would have to be given to exactly those persons whose demand has increased. Hayek understood well that giving more money to a single person will result in a series of small adjustments of incomes and spending habits of many individuals cooperating with the agent, who got the money in the first place.²⁶ Increasing the quantity of money in places where the demand for money remained unchanged²⁷ would entail another round of necessary adjustments of incomes and spending patterns without accommodating the original change in money velocity.

Apart from abstract arguments about problems with implementation of stable MV policy Hayek specifically argued against monetary policy

²⁵Friedrich A. Hayek, *Prices and Production*, p. 297.

²⁶Example of such an analysis can be found in: Friedrich A. Hayek, *Monetary Nationalism...*, pp. 353–59.

²⁷For example when central bank buys large quantities of securities in a Quantitative Easing program.

measures to combat deflation during the Great Depression as late as 1932. In a preface to English translation of *Monetary Theory and the trade Cycle* Hayek wrote:

[The existence of deflationary process] does not, by any means, necessarily mean that the deflation is the original cause of our difficulties or that we could overcome these difficulties by compensating for the deflationary tendencies, at present operative in our economic system, by forcing more money into circulation. ... To combat the depression by a forced credit expansion is to attempt to cure the evil by the very means which brought it about; because we are suffering from a misdirection of production, we want to create further misdirection—a procedure that can only lead to a much more severe crisis as soon as the credit expansion comes to an end.²⁸

Not only did Hayek differentiate between theoretical concepts and policy norms, find practical problems in stabilizing MV and explicitly rejected fighting the recession with money creation, but he actually proposed another policy norm in the writings on money neutrality and constant flow of spending. In *Prices and Production* he mentions only that “Hence the only practical maxim for monetary policy to be derived from our considerations is probably the negative one that the simple fact of an increase of production and trade forms no justification for an expansion of credit, and that—save in an acute crisis—bankers need not be afraid to harm production by over-caution.”²⁹ In *On ‘Neutral’ Money* Hayek dared to propose a more specific solution:

[I]t seems to me that the stabilization of some average of the prices of the original factors of production would probably provide the most practicable norm for a conscious regulation of the quantity of money.³⁰

In light of these passages³¹ it seems that White’s statement about Hayek’s clear policy recommendation of stabilizing the level of nominal spending

²⁸Friedrich A. Hayek, *Monetary Theory...*, pp. 5, 6–7.

²⁹Friedrich A. Hayek, *Prices and Production*, p. 298.

³⁰Friedrich A. Hayek, *On ‘Neutral’ Money*, p. 231.

³¹Interestingly White quoted the same passage from “On ‘Neutral Money’” in Lawrence H.

is unfounded — Hayek explicitly endorsed another rule and found problems with implementing targeted nominal spending rule.

There are big differences between stabilizing MV and stabilizing the prices of factors of production. Proponents of stabilizing MV claim that a shrinking nominal GDP is an indication that the central bank should increase the money supply (we need to remember that NGDP is only an approximation of the level of spending, since GDP excludes transactions of goods that are not final. If we want to measure the level of spending properly we should include all money transactions). A proponent of stabilizing MV could argue that even if money expenditures rose during the boom phase, it would be unwise to let it shrink to the pre-boom level. Therefore Quantitative Easing I in the USA would be justified since NGDP was falling between Q3 2008 and Q2 2009.³²

A proponent of stabilizing the prices of the factors of production could argue that it's unwise to maintain prices at the inflated boom level. Lower input prices would actually stimulate the demand by entrepreneurs to start investing again. Hence, if we look at the level of factors of production prices we see a different story. Let's take for example Producer Price Index. At the end of the previous recession — in 2002 the index (1982=100) stood at around 100 points. At the bottom of recession in February 2009 it stood at around 160 points, so it would indicate that monetary policy was extremely accommodative.³³

There is also another “Hayekian” problem connected with advocating QE: can the central bank actually gather and process all the information needed to fight the shrinking money expenditures in the same manner as private banks would do.³⁴

White, *Hayek's Monetary Theory...*, p. 117.

³²According to “The Economist”: “Hayek believed the central bank should aim to stabilise nominal incomes. On that basis Mr [Lawrence] White thinks the Fed was right to pursue the first round of quantitative easing, since nominal GDP was falling, but wrong to pursue a second round with activity recovering.” Available online: <http://www.economist.com/node/17522368>.

³³All the data is taken from Federal Reserve Bank of St. Louis: <http://research.stlouisfed.org/fred2>

³⁴For the discussion see: William N. Butos, “Monetary Orders and Institutions: A Hayekian Perspective,” *Quarterly Journal of Austrian Economics* 15, no. 3 (2012): 259–76.

CONCLUSIONS

Friedrich von Hayek rarely stated clearly his monetary policy proposals. He was mostly interested in the field of pure monetary theory (at least in the 1930s). It seems to us that his theories of money and business cycle can give good arguments for people advocating one hundred percent reserve banking. When it comes to monetary policy of the central bank Hayek briefly proposed the idea of stabilizing the prices of factors of production, but did not elaborate on why this should be the best policy.

Perhaps it is unfortunate Hayek used the framework of general equilibrium theory to investigate the problem of the business cycle.³⁵ This might lead many to confuse the highly abstract and unrealistic conditions of general equilibrium with the desired state of monetary affairs, whereas occurrence of these conditions would actually mean that money is not needed in the economy at all.³⁶ Only late in his life Hayek managed to incorporate his more dynamic view on economy regarding competition and entrepreneurial discoveries into the money and the area of business cycles. In *Denationalization of Money*³⁷ he finally proposed the idea of opening the sphere of money and banking to the competition instead of leaving it to the plans of bureaucrats.

In a lecture from October 1977 Hayek stated:

The interesting fact is that what I have called the monopoly of government of issuing money has not only deprived us of good money but has also deprived us of the only process by which we can find out what would be good money. We do not even quite know what exact qualities we want because in the two thousand years in which we have used coins and other money, we have never been allowed to experiment with it, we have never been given a chance to find out what the best kind of money would be.³⁸

³⁵For other problems associated with Hayek's methodological choices see: Joseph Salerno, *Mises and Hayek Dehomogenized*, "Review of Austrian Economics," Vol. 6, No. 2 (1993), pp. 113–46.

³⁶Ludwig von Mises, *Human Action. A Treatise on Economics*, Auburn 1998, pp. 250–51.

³⁷Friedrich A. Hayek, *The Denationalization of Money: An Analysis of the Theory and Practice of Concurrent Currencies*, [In:] Idem, *Good Money. Part II*, ed. Stephen Kresge, *The Collected Works of F.A. Hayek*, vol. 6, Indianapolis 2008, pp. 128–229.

³⁸Friedrich A. Hayek, *Toward a Free Market Monetary System*, [In:] Idem, *Good Money. Part II*, p. 234.

This call for a competition in the field of money seems to me the best example of a truly Hayekian monetary policy.

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FIAT MONEY AND GOVERNMENT DEFICITS

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Scholars of the Austrian tradition are particularly known for their important work in the field of monetary economics. They analyze the dynamics of fiat money and its impact on the real economy. However, empirical attempts to support the theoretical claims are relatively rare. In this chapter, I sketch an empirical strategy to test whether a change in the monetary regime has significantly impacted the accumulation of public debt and government deficits in the United States. Government deficits appear to be significantly lower under the gold standard regime and significantly higher under a regime of fiat money after controlling for other explaining factors such as, for instance military expenses or interest charges.

This chapter is structured as follows. Section 2 gives an overview about the nature of money to understand the dynamics of fiat money. Section 3 outlines why the introduction of a fiat money regime potentially increases the accumulation of public debt. Section 4 outlines the econometric

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model to account for the effects of different monetary regimes on public debt. Furthermore, potential lines of research are provided to improve the explanatory power and robustness of the model. Section 5 concludes.

MONETARY MECHANISMS AND MONETARY POLICY

As Mises repeatedly stresses, money is the fruit of indirect exchange (Mises 1980, p. 45). Thus, the emergence of money is spontaneous and becomes necessary as the division of labor increases and wants become more refined (Mises 1980, p. 5). Individuals only choose to have recourse to indirect exchange when the goods they can acquire are more marketable than those which they surrender.

As a result, the most marketable commodities will become common media of exchange and their position is strengthened as their relative marketability increases in comparison to other commodities (Mises 1980, p. 6). The main function of money according to Mises is its universal employment as a general medium of exchange (Mises 1980, p. 7).

Hülsmann (2008) introduces a further distinction between natural and forced monies. Natural money corresponds to money that arose through voluntary actions of individuals which circulates until it is displaced by an external pressure. Alterations to the former type of natural money are defined as forced money. In this case, money no longer complies with individual preferences, but is the result of a welfare reducing imposition. As a consequence, forced monies are *per definitionem* less socially beneficial than natural monies, as they only exist due to the violations of individual rights. Based on this distinction, it is possible to introduce a further division between credit money and paper money. As Hülsmann (2008) points out, the value of credit money (a claim to money in the future) is based on the trust that the respective sum of money is eventually refunded in the future.

Paper money or fiat money owes its existence to legal privileges. Hülsmann (2008) emphasizes that paper money has never spontaneously emerged as a result of the voluntary actions of individuals. Legal tender laws impose the use of a lower quality paper money at the expense of the natural money. The bad money, i.e., the overvalued paper money, drives the good money, i.e., the undervalued natural money out of the market as their legal equivalence is only due to imposed laws and do not reflect the economic reality. This process is known as Gresham's law, named after Thomas Gresham (Hülsmann 2008, p. 127). Naturally, this leads to inflation of the overvalued money, "because this money is produced and held in greater quantities than would be the case in the absence of the price

control” (Hülsmann 2008, p. 127). The natural limit in money production is distorted as the full consequences are not borne by the money producer. Legally established values are not altered and constraining competitive processes are suspended under legal tender laws. Moreover, Cantillon effects, named after the French economist Richard Cantillon¹ enforce the enrichment of money producers under the regime of legal tender. As Hülsmann (2008, p. 44) points out, there can be no simultaneous increase of all prices as newly created money enters the market. The first users of the new money have the privilege to use it on goods priced according to the quantity of money that existed before the increase in the money supply. However, the newly acquired purchasing power does not remain unnoticed and spreads out through the economy. Prices eventually adjust upward due to the increased demand of the initial users. The last receivers have not benefited from the new money. To the contrary, they suffer a deteriorated quality of the money and higher price levels.

As Hülsmann (2008, p. 89) argues, debasement was traditionally the way to inflate the money supply. The nominal value of a coin was modified not reflecting the metal content any longer or the content of metal was reduced without an according change in the nominal value. However, debasement reached a whole new level with the emergence of fractional-reserve banking, i.e., the issuance of coins or bank notes which are not fully covered by the available reserves. This significantly reduced the cost of money production. According to Hülsmann (2008, p. 93), there are three main reasons that led to this phenomenon.

In the first place, the warehousing institutions, the original function of banks to the late 1700s, have been perverted. Second, credit banking has been perverted as banks use deposits for loans. Lastly, it was a natural response to the threat of government expropriation. As banks feared that their holdings would be eventually confiscated, they preferred to lend out the funds. However, as individuals eventually find out about the debased monies, it is necessary to guarantee a continual demand through legal tender laws. This privilege is the ultimate explanatory link for all other monetary advantages.

In addition to the outlined factors, the twentieth century witnessed the development of maturity mismatching in the banking sector (Bagus

¹See Richard Cantillon, *La nature du commerce en général* (Paris: Institute national d'études démographiques, 1997)

and Howden, 2009), i.e., borrow short and lend long. Nowadays, this is considered as one of the main functions of banks. For instance, Freixas and Rochet (2008) point out that “modern banks can be seen as transforming securities with short maturities, offered to depositors, into securities with long maturities, which borrowers desire.” Necessarily, this implies a certain “risk” for banks if the credits are not covered by corresponding savings of depositors. If depositors require their funds, banks can have recourse to derivatives (such as swaps or futures) or engage into interbank lending to limit this “liquidity risk.” However, this type of risk management is very costly. In a competitive environment where the success of a bank’s business is based on its ability to gain confidence of depositors, the constant mismatching of maturities must be relatively limited. Depositors are not likely to give their money to banks that accumulate negative working capital and struggle to refinance their debt.

To recapitulate, money evolved spontaneously in the market. Historically, gold and silver were chosen as the common medium of exchange for their practical purposes. For reasons of convenience, warehouses arose to store these metals and certificates were issued. As a consequence, certificates were traded in everyday business and rarely redeemed into gold. Unfortunately, this created a temptation to engage into fractional-reserve banking and to issue certificates in excess of the actual gold reserves. At some point, governments entered into the game and monopolized the minting of coins and established legal tenders laws. Under the classical gold standard from 1815–1914, a fractional gold standard was institutionalized and guaranteed by the respective states. As already outlined above, fractional-reserve banking diminishes the cost of money production and increases the profitability of banks. As a consequence, there is a tendency to threaten the financial stability of banks as the continual issuance of credits in excess of savings is eventually discovered by depositors and creditors. Bank runs and the liquidation of assets are naturally the cause as people lose confidence.

The drawbacks of this business model must be resolved by some external institution that guarantees the liquidity of banks. This is the role of central banks (Bagus 2012). Central banks are lenders of last resort for commercial banks. Banks can now refinance their debt through short-term credits and liquidity problems can be limited as the production of money is coordinated by the central bank. However, under the gold standard, even coordinated money expansion was limited by the fear of redemption in a

crisis. By the 1970s the burden of the gold standard was removed and the doors were further opened for the lucrative business of money creation.

MONETARY POLICY SINCE THE 1970S IN THE UNITED STATES

The abolition of the gold standard on August 15, 1971, led to the establishment of a regime of paper monies for most of the national currencies. Before this date all national currencies were linked to the gold standard via the US dollar. As the US decided to go off gold altogether, the fractional-reserve gold certificates basically became paper money (Hülsmann 2008, p. 223). The new fiat money standard magnified moral hazard at a large scale. Fiat money allows producers of money to “create *ex nihilo* virtually any amount of money” (Hülsmann 2006, p. 10). The growth of the money supply increased significantly after the decision to go off the gold window. The M3 monetary aggregate grew by 12.42 percent in 1972 in the US, although the average growth rate was about 6.76 percent in the decade before.

Under the regime of William McChesney Martin from 1951 to 1970, monetary policy was relatively conservative. Growth rates of the CPI were below three percent during the early 1960s (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 23). As Martin points out in testimony to the Joint Economic Committee: “the Fed has a responsibility to use the powers it possesses over economic events to dampen excesses in economic activity by keeping the use of credit in line with resources available for production of goods and services.”² In 1964, Martin expressed his concerns about increasing inflation as federal spending increased a lot during the second half of the 1960s. Bremner (2004, p. 191) cites a quote by Martin which summarizes his worries: “I think we’re heading toward an inflationary mess that we won’t be able to pull ourselves out of.” Martin expressed in his last press conference that he had “feelings of failure for not having controlled inflation” (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 26). By 1970, Martin was replaced by Arthur F. Burns. He commenced a period of high inflation and very low real interest rates, a byproduct of loose money now simplified by the full fiat money standard. However, even before the suspension of payment by the Fed in 1971, the federal funds rate was already lowered from 8.02 per-

²Martin’s testimony to the Joint Economic Committee, February 5, 1957. Cited by (Bremner 2004, p. 123).

cent during the first quarter in 1970 to 4.12 percent by the fourth quarter of the same year (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 26). What are the implications of low or even negative real interest rates? They reduce the incentives for people to save money and at the same time the cost of debt is significantly reduced. Even though federal funds rates were eventually raised during the following years, they never kept up with the running inflation rates and real interest would only be over 2 percent in the second quarter of 1976 (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 26). Thus, during his tenure until 1978, real interest rates were only above 2 percent for three quarters. The Per Jacobsson Lecture on “The Anguish of Central Banking” (Burns 1979) summarizes his views on monetary policy and central banking relatively well. Basically, the upward pressures on prices by interest groups are the real reason for the inflationary policy by the Fed. According to him, the Fed does not have enough power to effectively fight against inflation “as it is illusory to expect central banks to put an end to the inflation that now afflicts the industrial democracies” (Burns 1979, 21). After a short intermezzo by Miller whose tenure ended into an emergency sale of US gold and borrowings from the International Monetary Fund (IMF) (Dowd and Hutchinson 2010, p. 251), President Carter moved Miller to the Treasury department and appointed Paul Volcker as the chairman of the Fed.

As a consequence, the federal funds rates increased significantly from 2 percent to 12 percent (Dowd and Hutchinson 2010, p. 251) and real interest rates remained high during the 1980s. Just as Burns, he was also invited to give the Per Jacobsson Lecture, but concluded that inflation had been defeated under his regime. However, as the problem of inflation was apparently controlled, another chairman, Alan Greenspan was appointed. He supported the deregulation of the banking sector under Reagan (Dowd and Hutchinson 2010, p. 252). Greenspan emphasized that inflation must be kept low during his confirmation hearings (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 32), however it took only a few months until this plan was scrapped. Greenspan responded to the stock market crash of October 1987 by cutting interest rates and by declaring that the Fed is disposed to provide “liquidity” in such a case (Fernandez-Villaverde, Guerran-Quintana, and Rubio-Ramirez 2010, p. 32). Later, interest rates were kept low, even as inflation reached 6 percent during 1989–1990. The policy of low interest rates continued until 1994, where the Federal funds yield reached the

lowest levels since the 1960s. As a reaction to this inflation scare, interest rates doubled, although Greenspan was reluctant to take this action initially.³ However, this led to big losses for many entities that were betting on low interest rates. Most notoriously California's Orange County defaulted on its debt by speculating with derivatives on low interest rates (Dowd and Hutchinson 2010, p. 53).

By February 1995, Greenspan announced that his policy of increasing rates is over.⁴ Effectively, the money supply growth was 2.6 percent higher than nominal GDP during this tenure. The failure of Long-Term Capital Management in 1998 (Lowenstein 2001) illustrated perfectly the approach which was taken by the Fed by now. Not only was a bailout organized, but under Greenspan interest rates were subsequently cut three times to calm down financial markets. This low-interest policy basically allowed the financial sector to maintain more activity of unsustainable trading activities. Ultimately, this policy fueled the dotcom bubble during which stocks were even more overevaluated than during 1929 (Garrison and Callahan 2003). As a consequence, interest rate raises followed in the year 1999 and 2000 which eventually triggered the bust of the stock market. However, already by 2001, the federal funds rate was lowered again to fight the ongoing recession. Together with the occurrence of the 9/11 terrorist attacks and fiscal policy under the newly elected President Bush, interest rates attained the lowest level since 1961 by the year 2002. From 2002 to his retirement in January 2006, Greenspan kept interest low below 3 percent. This period also witnessed the housing bubble and the closely tied structured finance crisis. The burst of this bubble finally led to the current financial crisis. The following "non-moderate" recession is accompanied by nominal interest rates which are currently approaching zero, while real interest rates are simply negative. The development of the federal funds rate can be depicted as follows in figure 1.

To summarize, ever since the fight on inflation of the early 1980s under Volcker, interest rates have been declining. The most substantial reductions happened in the post-era of the dotcom bubble and as a response to the terrorist attacks of 2001. Likewise, federal funds rate have been lowered to an all-time low to fight the current recession. Monetary policy of the last

³Board of Governors FOMC Transcripts, February 3–4, 1994, p. 55.

⁴Testimony to the House Banking Committee, February 22, 1995).

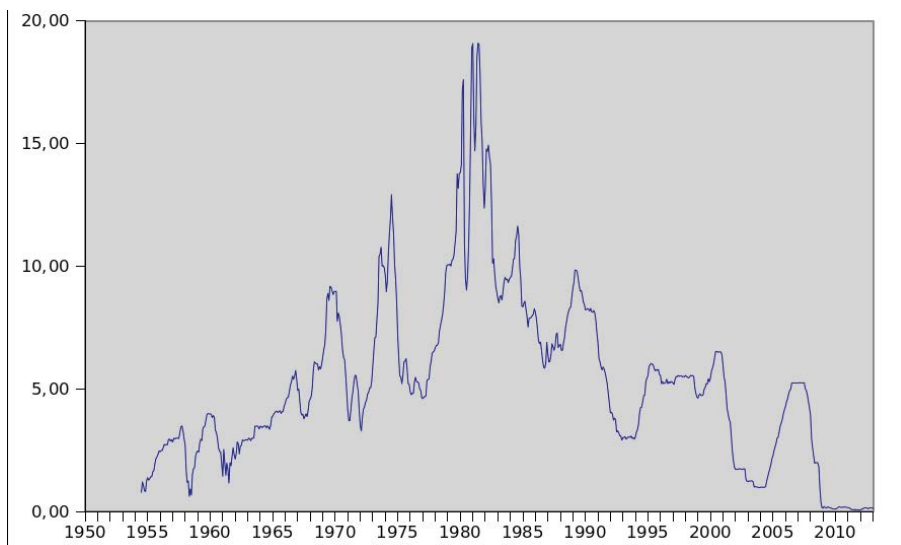


Figure 1: Federal Funds Rate (1954–2013)

Source: Board of Governors of the Federal System

thirty years substantially reduced the cost of debt and consequently eased the issuance of debt securities in the financial market.

FIAT MONEY AND PUBLIC DEBT

Fiat money and legal privileges reduce the natural barriers to the creation of credits. Debts are an easy way to increase the expenses of governments. Furthermore, debts are by far more popular than the alternative, i.e., taxes. However, governments are special debtors as they can have recourse to means of financial repression: “Financial repression occurs when governments implement policies to channel to themselves funds that in a deregulated market environment would go elsewhere” Reinhart, Kirkegaard, and Sbrancia (2011).

There are several measures that increase artificially the demand of sovereign bonds, however the main measure of financial repression is to keep nominal interest rates low through loose monetary policy. It reduces the interest expenses for governments and high inflation reduces the cost of debt at the expense of the creditors. Similarly, traditional investors are more likely to put their money into government bonds as savings accounts are not profitable enough. In the case of negative real interest rates, as witnessed

1945–1980 and since 2007 (Reinhart, Kirkegaard, and Sbrancia 2011), it even becomes a supplementary tax in addition to the redistributive consequences of inflation. Figure 2 shows the evolution of government debt

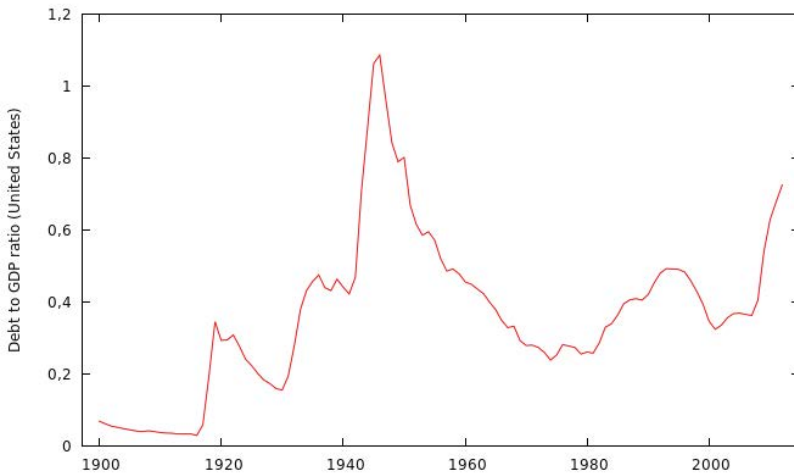


Figure 2: Evolution of public debt between 1900 and 2013

Source: Bohn (2008)

during the phase of positive real interest rates and a sharp increase since 2007 when real interest rates were negative again.

EMPIRICAL IMPLICATIONS

Building upon the theoretical arguments of this paper, it is manifest to test whether public debt and government deficits have, *ceteris paribus*, significantly increased under a full fiat money standard.

Yoon (2012) shows, using a new recursive method for unit root testing, that the U.S. public debt–GDP ratio was explosive in nature during the sample period. This is an interesting result as a standard unit root test such as an augmented Dickey–Fuller test shows that this series contains an unit root and is therefore stationary (Bohn 2008). As a result, there is no concluding evidence about the properties of public debt in the United States during this period.

Figure 4 suggest that wars played a major role for the accumulation of debt. As Figure 3, Yoon (2012) points out “The War of Independence, Spanish–American War, the Civil War, World War I, and World War II —

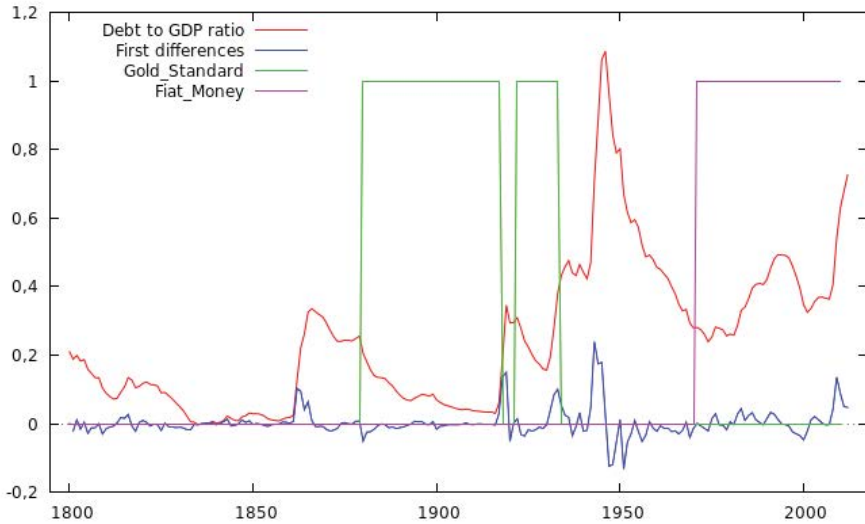


Figure 3: Debt to GDP ratio (1800–2012) including time frames of gold standard and fiat money

explain the high debt–GDP ratio in 1791 and the sharp increases in 1812–16, 1861–66, 1916–19, and 1941–46.” By way of contrast, the debt–GDP ratio has generally declined during peacetime periods, with the exception of the Great Depression/New Deal era (1929–39), the 1980s, and the post-1921 period.” Furthermore, the author interprets the exceptional period from the 1980s onwards as a result of the Cold War and the “post-2001 war on terror.”

There might be a potential endogeneity bias for the decision to adopt (or leave) the gold standard or a fiat money standard, which could likely lead to spurious results for our analysis. Basically, this would mean that some underlying factor accounted for both the choice of the monetary regime and the differences in the level of public debt. For example, war times and a suspended gold standard have been highly correlated in history for obvious reasons. However, as Bernanke (2004, p. 16) outlines, those decisions are highly influenced by internal and external political factors so that it is very unlikely to be an issue for our analysis.

EMPIRICAL STRATEGY

One potential empirical strategy has been outlined in Gabriel (2014). As outlined above, there is conflicting evidence about the stationarity

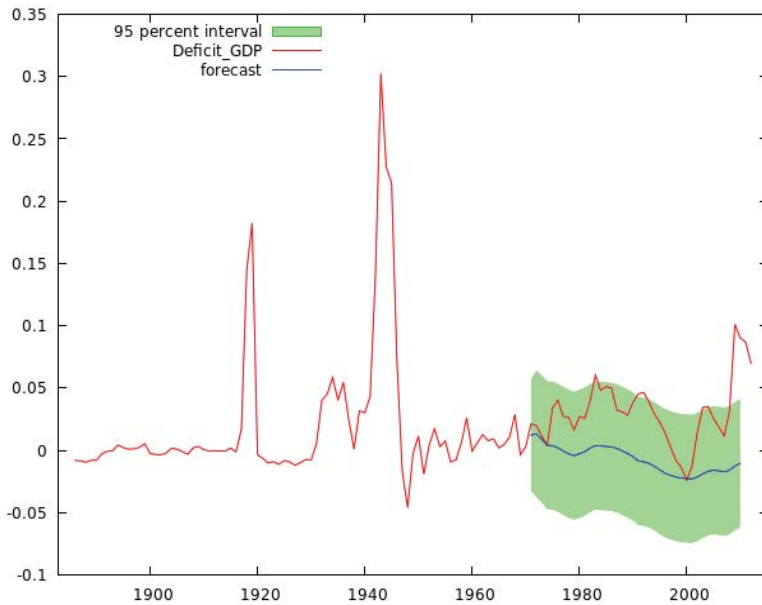


Figure 4: GDP deficits from 1800 to 2012 —Forecast: 1971–2012

of public debt. To overcome this problem, I analyze GDP deficits as the dependent variable for the sample period from 1800 to 2012 (Bohn 2008). In this paper, I use a VAR(2) model which controls for several factors such as military spending to capture the war periods or interest charges to capture the cost of debt.⁵ The model allows us to make interesting forecasts of how the dependent variable should have evolved during the period of the full fiat money standard (1971 to the present) after controlling for the outlined variables. Figure 4 summarizes the findings of Gabriel (2014).

The red line describes actual data on GDP deficits for the specified period. As described before, the VAR(2) model is applied to the dataset from 1800–1970 to generate a forecast of the how the values should have evolved based on the specified framework. This is the blue line. Finally, the green area corresponds to the confidence interval for the forecast of the VAR(2) model. This graph shows that actual deficits are in general higher

⁵Refer to Gabriel (2014) for the details of the model, where several tests, such as e.g., autocorrelation in error terms, to account for a potential downward bias are provided.

(except for the year 2000) than they should be. Thus, the interpretation of this period by Yoon (2012) as a result of the Cold war is not supported by this analysis. The noteworthy GDP deficit figures must be explained otherwise. The theoretical arguments in this chapter make a case that the dynamics of fiat money are a plausible explanation for this observation.

CONCLUSION

Austrian scholars in monetary economics are not tired of pointing out the dynamics of fiat money and their impact on the economy. This chapter attempted to complement their theoretical arguments by providing a short historical overview of monetary policy in the United States. A preliminary empirical assessment provides evidence that the switch to the current monetary regime possibly explains higher GDP deficits after controlling for other factors such as military expenses or interest charges. A more detailed analysis on this issue is left for future research.

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KNOWING AND ENTREPRENEURSHIP

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We understand knowledge as an acquaintance with various facts and natures of objects in the real world. By studying and investigating aspects of our lives we get to “know” certain things and we classify these inquiries into disciplines. We can widen knowledge in total by different methods. In order to achieve progress in gained knowledge we use dissimilar frameworks to learn mathematics, physics, economics, social relations, characters of our friends, or languages. It is also important that we can learn some of these things through different methods, especially different methods for different people, or different methods for the same people over time. One term “knowledge” is being used to deliberate in general about all those disciplines, yet this should not cloud first and foremost feature of knowledge: its heterogeneity.

The Austrian school has been mostly successful in economic theorizing because it realistically emphasizes heterogeneous nature of the world.

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I would like to thank to Professor Joseph Salerno for many years of his invaluable help. This article is an outcome achieved due to indispensable long-term academic guidance of Professor Salerno. My intellectual development would have not been possible without his personal support, and without the study of his masterful works on monetary theory and general economic theory.

Whereas various neoclassical schools, or their siblings, tend to homogenize economic phenomena, the Austrians tend to do the opposite. The prime example of the case is theory of capital, which in the Austrian version is built on the notion that capital goods do not have a common physical denominator (which could theoretically express its aggregated “amount”). Starting from such basic observation the Austrians were able to build their own theory of socialism and theory of the business cycle. As Roger Garrison notes (1992, p. 171, emphasis added),

If capital goods were wholly non-specific, if the collection of them were fully *homogeneous* such that any one capital good is a perfect substitute for any other, then production processes could proceed as if time ran both ways. A half-finished performance hall could be completed — with no effects on cost or construction time—as a bowling alley; the production process that yields musical instruments could — with an eleventh-hour change of mind — yield bowling pins and bowling balls instead.

Under homogeneous circumstances the issue of proper allocations would never have to arise, since every process would already be fully integrated and properly coordinated. The problem of the trade cycle would be nonexistent, since any inconsistency in the various diverse stages of production would be absent. Similarly any socialist economy would not fail at the basic problem of equilibrating the capital goods market, because optimal allocations of them would have already been chosen.¹

Other important Austrian contributions are also more or less related to the issue of heterogeneity. For this reason it could even be seen as a typical feature of the modern Austrian economist’s toolbox. Austrians are different, because Austrians heterogenize.

The same approach to heterogeneity applies for different types of “knowledge.” A typical model breakthrough comes from Hayek’s example of a breakaway from the neoclassical approach. Hayek’s famous contribution comes from the analysis on how knowledge is “used in society” (Hayek

¹Mises notes (1966, pp. 206–07) that under perfect substitutability of capital goods would imply that “all means of production ... would be as if only one kind of means — one kind of economic goods of a higher order existed.” Therefore in a socialist economy one could calculate according to the usage of the one universal higher order good (e.g., kilograms of such good), and avoid the problem of valuation of heterogeneous factors of production (non-perfect substitutability of capital goods).

1945). Yet even though this analysis of complexity of economic phenomena is fruitful and worth of deeper studying, it (along with others) created a lot of side debates about the “knowledge” problem under hypothetical socialist order. We will attempt to refrain from settling those debates here. Our goal is to follow Hayek’s footsteps and to try to distinguish several types of knowledge. The goal can allow us to settle the definitional importance of knowledge for Mises’s argument about the impossibility of the rational allocation of resources under socialism.

Here we offer our (arbitrary) classification of knowledge, which, though not very rigorous, helps to navigate through the usages of the term in the calculation debate. It is important to keep in mind that we don’t want to completely classify various types of knowledge, but to envision how it relates to the socialist puzzle.

OBJECTIVE “TECHNOLOGICAL” KNOWLEDGE²

The word “objective” seems suitable, because the main feature lies in the interpersonal aspect of this knowledge, which can be simply transmitted from one person to another. It is knowledge which is coded in textbooks and countless publications.³ Due to its specific “objectivity” it can be communicated between the people with the use of alphabet, algebra and other symbols. Without those symbols there would be no abstract thinking, and consequently man would still live in caves (Cassirer 1944, pp. 46–47). Objectivity is here to be understood as the possibility to be (potentially) universally recognized by any intelligent being, no matter what place and time one lives in. Due to language and objectivity of those statements knowledge can be transmitted (sometimes through the painful process of learning) between all intelligent (and sufficiently capable) individuals.

Such knowledge can include statements from all developed sciences be they empirical or non-empirical; mathematics and logic, physics and chemistry, climatology and biology, economics and sociology, politics and history, etc. Even though all those disciplines differ and use radically dissimilar methods, they can be grouped into one big family of objective Science. There are multiple examples of that knowledge such as (geology) “earth is not flat,” (biology) “spiders eat flies,” (physics) “the speed of light

²Although other types below could also be seen as objectively existing.

³During the socialist calculation debate the term “technological” knowledge was used (see Mises 1966, p. 699).

is constant,” (mathematics) “In Euclidean geometry parallel lines do not intersect,” (climatology) “Earth is warmer than it was 40 years ago,” (economics) “minimum wage leads to higher unemployment,” (history) “Julius Cesar did not invent the caesar salad,” and so forth.

The important fact is that none of those statements has to do with distinct characteristics of the particular being who is proposing them. They are as general as possible and can be presented by a male teenager in Africa, a female doctor in Germany, or retired astronaut in the Moon. Also they are conditioned by the concept of *Wertfreiheit*. They are value-free. Their most important feature is correctness or incorrectness, no matter the values, opinions and views of the person proposing them. During the socialist calculation debate such knowledge was seen as easily obtainable and possessed by socialist bureaucrats.

HAYEKIAN KNOWLEDGE

Human knowledge does not end with such universal and communicative observations. Not all the data can be effortlessly gathered in objectified and interpersonal form. Some information is hard or costly to transfer, so perhaps it seems sensible to use the name “transfer problem.” There exist two main reasons causing the transfer problem to arise. The first one is a subjective nature of individually “witnessed” data, which become a part of “tacit knowing.” Hayekian knowledge is perceived by an individual. At the same time it is being used by the individual even though she or he cannot formulate it explicitly and communicate it to another person. Tacit information is beyond textbooks and often beyond personal recognition of it (Polanyi 1966, p. xviii). Since personal boundaries are difficult to overcome such knowledge remains hidden behind individual barriers of the mind (Huerta de Soto 2010, pp. 27–28).

The second reason for the transfer problem is decentralized nature of Hayekian knowledge. At first it may seem that the reason is no different from the first one. Nevertheless the difference is important, because in the first case barriers have more to do with individual’s limits. In the second case scantiness of the data is an objective fact important for practical reasons. Because countless individuals are working with complex data, it is practically impossible for any isolated individual to gather their knowledge and unify it into one objective formula (even without admitting the “tacit” element of it). Hayek wrote extensively about its economic importance (see his illustrations in Hayek 1945, p. 522). He also made it an important part of the argument against market socialism model (Hayek 1940, pp. 192–93).

The examples of that knowledge could be “John knows unspoken local customs,” “Jack is the only one who knows how to talk to Mary,” “Martin knows how to start that machine,” etc.

MISESIAN KNOWLEDGE

An important question that arises with the title of the section is: why make a difference between “Hayekian” and “Misesian” knowledge? We are inclined to do so, because Mises emphasized the *role of prices* in the economy, whereas Hayek attempted to go further and focus on something underneath prices: *production functions*. For the former, prices per se were of interest. For the latter something more substantial had to be hidden behind those prices. Hence local conditions and knowledge about them was named by us as “Hayekian.” In the case of Mises, all aspects associated with calculation and prices will be seen by us as “Misesian” knowledge.

Therefore Misesian knowledge is strictly associated with monetary prices, and has three interrelated features in different time dimensions:

1. past prices and praxeological recapitalizations undertaken in the past,
2. current price offers,
3. “current allocation activities” (Salernian “social appraisalment process”⁴).

Strictly speaking prices are ratios of exchange between sovereign owners in a realized transaction. In that sense they are phenomena of the past. Currently existing, though not yet realized, price offers are also often seen as “prices” of the present circumstances. Competing and cooperating owners of the factors of production establish a nexus of contracts that allows them to create the price structure. The phenomena of price activities arise in all instances of economic calculation — realized past prices, past actions undertaken to correct them, current price offers, and current actions based on calculation outcomes and expectations about future prices. Clearly, at every point in time part of the existing Misesian knowledge is objective and known, but part of it is always beyond human recognition, because it

⁴On the appraisalment process see Salerno (1990, p. 42; 1994a, p. 120). It is of course debatable to call activities as “knowledge.” But, as we explain below, we will stretch a little bit and name them “knowledge,” because from a certain perspective this is what the central planners would need to “know” — the actions of private owners — in order to act efficiently.

will be determined in the future: allocation activities undertaken after the acquaintance with price offers. That is why entrepreneurship consists of a combination of knowledge and ignorance.

Past prices can be observed and expressed in the form of statistics, therefore they belong also to our first category of knowledge (as we emphasized in the beginning we are not searching for fully non-overlapping definitions). Nevertheless past prices are only the beginnings of calculation, since they only reflect past choices conditioned by outdated anticipations (see Mises 1966, p. 330). The next constituents are price offers, which in the Misesian sense are not yet “prices.” They are offers formed today under current market conditions, which are different from the conditions under which past prices had been formed. Therefore in contrast to realized prices they convey some form of current information and views about the future. If someone theorizes about prices as information signals, currently available price offers perform this function (they are not strictly speaking prices as exchange ratios).⁵

Price offers and past prices close the category only of existing Misesian knowledge. Economic calculation involves economic activity under uncertainty, what results in changes of economic conditions and unexpected outcomes (with price changes). It is one thing to know past prices and current price offers, but it is another to act upon those prices. Past prices inform entrepreneurs about past events. Current price offers inform entrepreneurs about today’s conditions and expectations about the future. Potential, not realized, prices “transmit” correct and incorrect entrepreneurial anticipations about possible marginal valuations of resources they own. That is why they do not transmit strictly Hayekian “knowledge,” but can include entrepreneurial perspectives on Hayekian knowledge.

All knowledge associated with various past and present instances of monetary calculation is not sufficient for the market process to happen. The driving forces for it are allocation activities (part of yet non-realized Misesian knowledge of what would private entrepreneurs do). These are actions undertaken by entrepreneurs after recognition of current price offers (with considerations on past prices and recapitalizations). The central owner under socialism has precisely the following problem: he cannot

⁵They also include current understandings of past trends in prices. The information on past prices visioned as valuable is being reflected in the current appraisal.

know allocation activities based on current price offers.⁶ He is not in a position to recognize what private owners would do, and how they would exclude each other from the market process. He is able to gather data on past prices, or even price offers right before the complete nationalization of resources, but he cannot know which allocation activities would have been performed under private property. Even if he or she knew all the relevant Hayekian knowledge, it would not suffice to solve allocation problems under socialism, since all of the Misesian knowledge would have to be known. The activity of entrepreneurs is something which cannot be implicit in the informational parameters of any system of equations, or any prices based on past or current data (see Salerno 1994, p. 120).

Three distinctive examples of Misesian knowledge could be: (1) "Lemons sold for 3 dollars per kilogram yesterday," (2) "This flat is for sale for a million dollars," (3) "Martin decided to produce 30 uniquely designed cars and price them at \$3 million per car."

"FULL" ECONOMIC KNOWLEDGE

Complete economic knowledge is not anything "real," but it is one of the assumptions in the possible "mathematical" solution to the calculation problem (which was never consequently defended by anyone). It boils down to knowledge of all possible "production functions" available to human beings. Hayek had this type of knowledge in mind when he theorized about allocation problems after postulating many *ifs*; if we possess all relevant information, all preferences, all knowledge of available means, then the problem of allocation is "purely one of logic" (Hayek 1945, p. 519).

In the neoclassical analysis, production functions are very simple (they have to be) and easily subjected to mathematical formulation. They use only a few variables as factors of production. Their coefficients are given and their influence on production is established and well known. At the same time, since the equations are simple and use few variables, "marginal rates of substitutions" can be inferred from those equations. They can become sorts of shadow prices, which could in theory substitute real world monetary prices and entrepreneurial assessments.⁷ Those substitution levels

⁶At some point Hayek suggested this is not the main problem, because "price expectations and even the knowledge of current prices are only a very small section of the problem of knowledge" (Hayek 1937, p. 51). In the other paper he suggested otherwise. See Hayek (1984, pp. 57–58).

⁷Stigler and Becker (1977, p. 77) use the term "shadow price" to label a valuation for a good,

can demonstrate, for example, “how much more is being produced when x amount of factor A is substituted for y amount of factor B?” Such contingent tradeoffs could be used for rational allocation.⁸

In reality such full economic “knowledge” cannot be achieved for two main reasons. Firstly, as Austrian economists have emphasized, production functions⁹ are complex and each one of them is extremely specific. Production functions consist of many factors of production, which cannot be constricted and grouped into such macroeconomic (or microeconomic) variables as “K” (capital goods) and “L” (labor), or additionally “H” (human capital) and “A” (technology, or “total factor productivity”). Real world production functions have many more variables and their coefficients are not stable numbers. Due to complexity of those functions, simultaneous equations of production functions cannot in fact be “solved” even in “theory.” Walrasian equations can surely be solved, because they are simple and have *as many equations as unknowns* with known coefficients (Walras 1954, p. 238).¹⁰ They appear to be mathematical tasks. By assuming such a trivial world of flat production functions, one is assuming away essential problems of complex economic reality.

The second reason for the lack of such “full” knowledge of the real world is uncertainty and human creativity. However precise the production functions are, they are never accurate, because people are never in a position to fully determine the future. They cannot “close” production functions and make them “complete,” because they would have to include all possibilities about the future.¹¹ Assumptions about the knowledge of

which is not sold or purchased in the market. They use it for a different type of a discussion, but the idea to use the concept of “shadow price” is similar as in here. A “shadow price” is something which is to be inferred from subjective valuations and can substitute market pricing. Yeager uses “shadow price” in the analogous sense (Yeager 1994, p. 101).

⁸From the equations we can know how much of an additional amount of one factor of production is needed to replace decreased amount of the other factor if one wishes to maintain the level of output. These types of rate can be known only if production function is simple and known.

⁹Actually the word “function” is a doubtful name, but it is a topic for another discussion. There is not much typically “functional” about production processes.

¹⁰Walras later on (when he deals with progress) allows for adjustable coefficients, but still the system contains “as many equations as there are unknowns to be determined” (p. 384).

¹¹This is why a neglected Barone stated that “it is frankly inconceivable that the *economic* determination of the *technical* coefficients can be made *a priori*” (Barone 1908, p. 287). Ironically he later became to be quoted for having “solved” the problem of economic

those functions implicitly embrace the notion that future is largely foreseen, and that man can anticipate what he or she will learn in the future. Human beings are not omniscient and the future is purely uncertain (in the Knightian sense). It cannot even be subjected to calculus of class probabilities, because in the course of economic events case probability prevails. By assuming away the uncertainty of the future, the fundamental problems of entrepreneurship are also assumed away. Change implies necessity for economic decision making (Mises 1966, p. 212).¹² With full knowledge of the future, human beings do not face the problem of proper judgments, since all of them are optimal and efficient. Henceforth “full” economic knowledge (which would allow “shadow prices” instead of monetary prices) is impossible to be achieved, because production functions are too complex and because people can never have a complete list of “correct” functions (which would include information about future events).

The last few sentences seem too trivial and obvious to be mentioned, but there is an interesting consequence of them for the Hayekian concept of knowledge. The complete full economic knowledge is not split up and partitioned between the individuals, therefore it does not become “Hayekian knowledge” when decentralized. If we somehow summed up all the Hayekian knowledge we would still not achieve “full knowledge.” In referring to the hypothetical concept of full economic knowledge Mises writes “no single man can ever master all the possibilities of production, innumerable as they are,” and so the entrepreneurs are divided between their tasks in the environment of monetary calculation (Mises 1990, p. 17). Hayek has a footnote to that Mises’s passage when he refers to the “division of knowledge” (Hayek 1937, p. 50). Yet this is not what Mises had in mind, since clearly full economic knowledge, “all the possibilities of production, innumerable as they are,” cannot be either known or divided between individuals just as infinity cannot be divided into finite numbers. Mises’s point was that “full knowledge” can never be achieved, not that it is in some way divided between the people (compare with Horwitz 1998, p. 430).

As we see, full economic knowledge is unachievable because of the “complexity” and “indeterminacy” of what we sometimes call “production functions.” Indeterminacy problems were to be avoided only if man

calculation under socialism, even though he did not believe so and actually argued the opposite.

¹²As Hayek (1945, p. 94) notes “economic problems arise always and only in consequence of change.”

could turn into a sort of “Laplace’s demon” — entity capable of gaining knowledge about “everything,” *meta*-knowledge, which would allow the possessor of it to project reality in any way he or she wanted. Fortunately we deal in this article with humans, not gods; henceforth we can set such issues aside for philosophers and theologians. The theoretical economic system can never be “complete” in such sense.

KNOWING, GUESSING AND THE MARKET PROCESS

Perfect Laplacian knowledge leads to perfect forecast. All-knowing man possessing features of the Laplacian “demon” could notice and understand the position of any molecule (even a social “molecule”) in the (social) universe. Such recognition would allow for the planning of every future step ahead and effectively adjust actions to any desirable and possible state of affairs. No mistakes would be committed and the equilibrated Utopian dream could be realized. Any step away from such perfect knowledge results in uncertainty. In order to cope with uncertainty people try to forecast future events.

Beyond the point of perfect knowledge the strict connection between knowledge and forecast breaks. At the extreme, perfect knowledge allows for perfect forecast.¹³ Once we move away from perfect knowledge we also move away from perfect foresight. Moreover, under the circumstances of uncertainty more knowledge does not always mean better forecasts. It may be truer for cases of natural sciences. The more we know about physics, or chemistry, the better we can forecast “behavior” of the matter. It is slightly different with knowledge of social sciences, where knowledge to some extent improves our understanding of the social world (not necessarily forecasting abilities). More Hayekian, or more current Misesian knowledge, does not necessarily lead to a better economic forecast.

Portions of social knowledge do not guarantee that foreseeing will be in a better shape. Entrepreneurs might be equipped with Hayekian knowledge, but this does not guarantee their success. They can gain a lot of Hayekian knowledge in the market, but still these gains will not automatically transform themselves into entrepreneurial successes. Even the elements of Misesian knowledge do not assure that. Entrepreneurs can

¹³“It may be added that knowledge, in the sense in which the term is here used, is identical with foresight only in the sense in which all knowledge is capacity to predict” (Hayek 1937, p. 51). It might be stated that we need calculation, because we can never possess enough knowledge.

acquaintant themselves with past prices (realized exchanges) and price offers (currently existing ratios). Knowledge of those is not a formula for commercial accomplishments. When the entrepreneur starts to gather all the price data and gets to know current and previous price offers, it is still not enough to bring him good foresight. Moreover, it is almost nothing. The entrepreneur can gather all that knowledge, and still lose money.

Additionally, gains in knowledge *per se* do not reap entrepreneurial gains. The effective entrepreneur is not someone who knows “more” than others. There are many entrepreneurs who accomplish a lot even though they were less knowledgeable than their rivals. Especially in the light of the fact that many huge entrepreneurial successes work like in the romantic Schumpeterian story of the entrepreneurs, who break the existing social structures. Sources of triumphs for any entrepreneur do not lie in the typical knowledge build-up, but often in envisioning what is unseen and most likely cannot be seen. All those actions are subjected to revisions and to praxeological recapitalizations in the form of losses and profits, as well as changing asset ownership. Good choices are indicated by correct monetary imputation, and do not have to be correlated with gains in information, or any type of “knowledge” acquisition (Salerno 1990a, pp. 59–60; 1990, pp. 42–43).

Naturally, it does not follow that “knowledge” has nothing to do with forecasts and entrepreneurship. Nevertheless, the entrepreneurs are not spreading Hayekian “knowledge” in their calculations. First of all, in the case of the unfortunate word “transmission,” they are transmitting some things, but these are not Hayekian knowledge and not in the form of prices. Entrepreneurs are transmitting their judgments, and they do it mostly in the form of price offers conveying this information. Whether correct or incorrect, price offers given by sellers of goods and services inform us about how market conditions are currently perceived. The yet to be successful entrepreneur is the one who is capable of “spotting” false prices, a discrepancy between current price offers for factors of production and prices for consumer goods which will be created in the future. “Spotting” is a metaphor, since technically we can only “spot” what already exists. “False prices” do not exist yet. They shall only materialize once the future becomes present. Hence the reason why Kirznerian “profit opportunities” are blurred by clouds of uncertainty and they do not exist yet. Current price offers inform us how entrepreneurs envision today future market conditions. Precisely that kind of “information” is hidden behind prices, not information about proper ways of adjusting “production functions.”

In the neoclassical framework entrepreneurial choice is given by the intersection of the marginal revenue curve and marginal cost curve. The main oversimplification in such an apparatus comes from the coincidence of the two and presupposed incidental existence. In reality one can get to know marginal cost curves by searching for price offers (more or less). Nevertheless the marginal revenue curve does not exist; it cannot be spotted and properly acted upon. We cannot be alert to the marginal revenue curve because it is not there yet. Instead of one marginal revenue curve there is virtually unlimited number of potential non-realized marginal revenue curves. Each of them has case probability assigned to it, thus strictly speaking it has no numerical probability at all. Whoever is more successful in picking the “proper” curve, wins. The “proper” solution is offered with the future being realized. In order to foresee the demand, one does not need to “know more” than others. One needs to make a proper judgment (Hülsmann 1997, p. 35). The “selection” mechanism cannot be reduced to gains in any mentioned type of knowledge.

In other words, the market process is not driven by entrepreneurs who know more, but by entrepreneurs who deliberately select arbitrary types of information and act upon them. A real world forecast is based on those selections of information. Information is interpreted, understood and used.¹⁴ What types of information are available to various entrepreneurs? As we saw in the process of economic calculation there is lots of it: realized transactions, which inform us about habits; and recapitalizations, which inform us about the extent of past mistakes. On top of that there are current price offers, which inform us about competitive potential in the market e.g., in which field we can be outcompeted by others and in which fields can we rely on the division of labor. Finally, there are undertaken actions and reallocations by other owners. All this Misesian type of knowledge is generated by the market, based on praxis, and can be referred to as the social appraisal process.

Not only is the world and its information heterogeneous, but so too are individuals. Each entrepreneur is different and has his unique entrepreneurial vision, which can be expressed through the use of property. Entrepreneurs differ in their judgments and disagree on what is economical, and

¹⁴As Kirzner points “*possessing* all this information is not the same as having *assimilated* it” (Kirzner 1996, p. 150). In this sense “assimilation” process is always subjective (both for the entrepreneur and hypothetical central owner under socialism).

what is not (Lavoie 1985, p. 123). Whoever performs well enough in this task outcompetes his rivals in the market process.

Let us take the case of an entrepreneur producing machines with the use of steel. He can notice past prices for finished products (machines) and past prices of steel. They can inform him about past exchanges and demonstrate past market conditions. He can evaluate them and engage in *Verstehen*. Any information he gets by contemplation can be useful for current price considerations. Equally useful are “present prices,” price offers for steel. (The entrepreneur also tries to anticipate future prices of the machines). Steel prices inform the entrepreneur how steel is being valued by sellers and by his competitors, other entrepreneurs who alternatively employ steel (to produce something else or similar). Henceforth current prices (offers and transactions from the immediate past) at least inform the entrepreneur of how valuable alternative employments for various factors are, or how other market participants envision the markets of goods produced with steel (compare with Yeager 1994, pp. 95–96). This notification of how much factors are expected to be worth, is a relevant part of the market process and entrepreneurial division of labor.

Accurate anticipation of future prices based on individual understanding of selected information leads to profits. In everyday life we notice how new information changes the prices and actions of market participants. The person acquiring new knowledge cannot be sure that its spread should change prices in a particular way. In some cases we can be almost close to certainty what the effect should be. But it can never be “fully” known in advance. If new fields of oil are discovered, the anticipation is that the price of oil should go down. Nevertheless it need not to, and we can envision scenarios in which the opposite happens. Successful entrepreneur is the one who can “interpret the information” correctly, but only in the *ex post* sense. He acts very often against the tide and the rest of the market.

The crucial side of the competitive process is its legal aspect. The mechanism of entrepreneurial selection is based on property shifts, which result from monetary calculation. This works despite psychological motivations of the participants, or their “knowledge,” or their “ignorance.” It does not matter what entrepreneurs’ incentives are, or what kind of information they possess. They can know a lot, or little, they can be motivated in their actions by their personal skills, or act upon an ideological bias. Whatever they know, and whatever their incentives are, as economists we do know that those who satisfy consumers most survive in the market. We do not even have to assume that entrepreneurs are interested in “maximizing” profits

(Alchian 1950, pp. 212–13).¹⁵ Their personal interests and motivations are not important. Profits are the link between consumer satisfaction and entrepreneurial decisions acknowledging them. That is why the market process “works” — because calculation has consequences for allocations.

In the economic analysis of socialism we can assume many things. If we assume that planners have “full knowledge,” then we “solve” the problem with an unrealistic assumption. In the real world planners can only gain other types of knowledge. They can possess all the necessary technological knowledge, and even the more specific Hayekian knowledge of time and place. We can even add that planners could possess scatters of Misesian knowledge: they could accurately know past prices and price offers right before the imposition of the socialist order. Yet even this knowledge does not solve the main socialist deficiency: the central owner does not know what are, or would be, the allocations of private owners. He cannot substitute them, or even hire them as bureaucrats, because tangible entrepreneurial skills are manifested in the realms of praxeological boundaries conditioned by asset ownership. When the central owner nationalizes the resources, all entrepreneurial skills are outlawed and simply lost.¹⁶ They cannot be recovered by any bureaucratic structure, because there is no real world competition set in the property regime.

CONCLUSIONS

As we have seen, in economics “knowledge” can have many different meanings. In assessing economic systems one has to be careful in making particular assumptions about “knowledge,” because any discussion may turn out to be blurred by definitional barriers. Depending on what we exactly mean by the term “knowledge” various conclusions about its possession or non-possession can be reached. It all comes down to what exactly we understand by this term.

¹⁵Actually “maximization” is also an improper word, since it would imply we have a particular “function” to be maximized. In reality, entrepreneurs choose between various rates of profits and case probabilities associated with them.

¹⁶Mises (1990, p. 38) brilliantly emphasized this in his initial article: “Unfortunately ‘commercial-mindedness’ is not something external, which can be arbitrarily transferred. ... The entrepreneur’s commercial attitude and activity arises from his position in the economic process and is lost with its disappearance.”

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ECONOMIC POLICY AND ENTREPRENEURSHIP: ALERTNESS OR JUDGMENT?

MATTHEW MCCAFFREY*

A serious interest in the entrepreneur is often considered a defining characteristic of the Austrian school. This attention is evident in its prehistory, in the writings of Richard Cantillon, Jean-Baptiste Say, and others (Hébert 1985; Hébert and Link 1988), and also in Carl Menger's foundational *Principles of Economics* (1871). Entrepreneurship plays a central role in the work of Ludwig von Mises as well, who often referred to it as the “driving force of the market.” However, despite the universal importance assigned to the entrepreneur among Austrian economists, there is still much discussion about what exactly entrepreneurs do, and their precise function in the market economy. The questions involved are often complex and cover a wide range of problems, such as the determination of profit and loss, the role of uncertainty and speculation in the market, and the equilibrating properties of arbitrage, to name only a few. As a result, the various theories of entrepreneurship that have appeared in the

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I was a summer research fellow from 2008–2013. Professor Salerno served on my master's thesis committee in 2010, and we have since collaborated on several research projects. This essay was inspired by our work on the history and theory of entrepreneurship, for which Professor Salerno was an invaluable mentor.

Austrian tradition, each of which has its own fundamental assumptions and goals, have been the source of disagreements about economic theory and policy.

One controversial problem that remains to be thoroughly examined is the relationship between entrepreneurial theory and public policy. The relevant questions are: does economic policy have a direct effect on entrepreneurial behavior, and if so, can the study of entrepreneurship inform economists regarding the welfare outcomes of intervention into the market process? Thus far, the conventional wisdom on this subject (and on entrepreneurship in general) has been largely informed by the writings of Israel Kirzner, which have proved quite influential among recent generations of Austrian economists. Kirzner argues that policy interventions remove the incentive provided by pure profits, thereby hampering entrepreneurs' ability to discover beneficial opportunities in the market. This in turn implies that opportunities for mutually beneficial market exchange are passed over, and interference with entrepreneurial alertness therefore undermines the welfare-increasing properties of the market process, which normally encourages entrepreneurial alertness and discovery.

Given that Austrian economists are often critical of the various economic arguments in support of regulation, it should not come as a surprise that an entrepreneurial theory linking intervention to welfare losses would be readily accepted. However, I argue that the view of entrepreneurship advanced by Professor Kirzner faces serious difficulties when it tries to explain the effects of public policy on entrepreneurship. I suggest that more satisfactory answers to questions of policy can be found by considering intervention through the framework of entrepreneurial calculation and judgment. This approach was pioneered mainly by Ludwig von Mises, especially in his famous dispute over the feasibility of socialism. Mises's work has in turn been expanded and elaborated by later economists, especially Joseph Salerno, whose contributions to our knowledge of the entrepreneur's distinct role cannot be overstated (1990a, 1990b, 1993, 2008). The work of economists like Mises and Salerno clearly demonstrates that the calculation-judgment theory is applicable to a wide range of policy problems, and firmly establishes the dangers of economic intervention for the market process.

ENTREPRENEURIAL INCENTIVES AND ECONOMIC POLICY

This section explores the relation between alertness theory and economic policy. The framework for Kirzner's policy analysis is found in his theory

of “entrepreneurial incentives,” developed primarily in his book *Discovery and the Capitalist Process* (1985).¹ Entrepreneurial incentives are a way to explain the roots of alertness and their role in promoting opportunity discovery. This is necessary because for Kirzner discovery falls outside the conventional economic presentation of incentives, as I will now explain. A consistent theme in Kirzner’s writings is the contrast between what he calls “Robbinsian maximizing” and entrepreneurial alertness. Robbinsian maximizing is a textbook description of how individuals engage in the weighing of alternatives, perform cost-benefit analysis, and maximize utility.² In other words, Robbinsian maximizing involves individuals perceiving and reacting to incentives in the usual economic sense. However, “ordinary” incentives cannot be used to explain entrepreneurs’ discovery of opportunities, Kirzner argues, because incentives must be *known* to an actor in order to be incorporated into standard utility calculus. But pure profit opportunities are *unknown*; they are waiting to be discovered, and therefore cannot consciously play into the cost-benefit analysis of individuals. Alertness to opportunities must therefore be explained by factors other than conventional economic incentives.

Kirzner calls these factors “entrepreneurial incentives.” Entrepreneurial incentives are contained in previously-unforeseen profit opportunities. Unlike ordinary incentives, pure profit opportunities attract the attention of entrepreneurs because it is in the entrepreneur’s interest to notice them (1985, pp. 28–29). Previously-unseen profit opportunities represent potential gains for entrepreneurs, who will be alert to them provided the opportunity is valuable enough. Entrepreneurial incentives are therefore another way of saying that *opportunities cause their own discovery*. Kirzner calls this conclusion a “paradox,” because it is unclear how such causation could occur:

How, one must surely ask, can an enhancement of the desirability of a particular course of action which by the very definition of this kind of incentive *has not yet been noticed* inspire its discovery? How can an *unnoticed* potential outcome, no matter

¹A thorough review of the theory of entrepreneurial incentives is beyond the scope of this paper, which deals only with its application to economic policy. For a more complete exposition, cf. McCaffrey (2014).

²It has been argued that Kirzner interprets Lionel Robbins too narrowly, mistakenly concluding that he is simply an early proponent of the conventional economic approach to utility maximization (Salerno 2009).

how attractive, affect behavior? How can the attractiveness of an unknown opportunity that awaits one around the corner possibly inspire one to peer around that corner? (1985, pp. 108–09; emphasis in original)

Unfortunately, Kirzner does not resolve the paradox. Instead, he suggests that, although the foundations of alertness require serious investigation, the tendency of opportunities to cause their own discovery is a part of our basic factual knowledge of the economy (1985, p. 109).

Kirzner's views on the foundations of alertness have already received critical attention (Hülsmann 1997; Foss and Klein 2010; Friedman and Evans 2011), and it has been argued that the opportunity paradox places the alertness theory on insufficient foundations (McCaffrey 2014). Because potential entrepreneurs are prevented by definition from knowing of the existence of an opportunity, and even of searching for it, the causal explanation of alertness must come from some other source, specifically the opportunity itself, and the "open-ended" environment it resides in. The problem pointed out by the critics is that it is logically unsatisfactory to think of unknown opportunities as causing alertness, or helping to "[switch] on the entrepreneurial antennae" (1985, p. 109). Opportunities are not acting agents, and without this key connection between opportunities and discovery, alertness theory runs into difficulty, almost anthropomorphizing opportunities in order to explain how they inspire discovery.

Consequently, this problem carries over to Kirzner's analysis of economic policy as well, in that the alertness approach does not provide a framework for real-world analysis of the welfare effects of government intervention. Kirzner's research in entrepreneurship is generally intended to demonstrate the equilibrating and welfare-enhancing properties of the market process, with policy considerations playing a secondary role. Nevertheless, thinking in terms of entrepreneurial incentives is supposed to shed new light on economic policy prescriptions too, explaining how hampering the market process produces inferior welfare outcomes, thus adding vital support to more conventional analysis.

Although economists have developed numerous ways to analyze public policy, many of these are framed in terms of the effects of regulation on ordinary incentives. Kirzner, however, argues that there is danger in thinking only in these terms, to the neglect of the welfare implications of entrepreneurial incentives (Kirzner 1984; 1985, pp. 132–33). This is because changes to entrepreneurial incentives affect the market process in a special

way. Specifically, economic regulations hamper entrepreneurial alertness, and prevent the discovery of new opportunities, resulting in welfare losses. This assessment depends on the paradox of alertness discussed above.

Kirzner's view of economic policy is a straightforward application of his incentive theory, and he describes the connection between regulation and entrepreneurial incentives as "intuitively obvious" (Kirzner 2009). Specifically, economic policy poses a threat to human welfare when it reduces or eliminates entrepreneurial incentives. When economic policy eliminates a profit opportunity or renders it less remunerative, it becomes less attractive to entrepreneurs. Because it is no longer in an entrepreneur's interest to notice the opportunity, it tends not to be noticed. By reducing the rewards (in terms of pure profit) attached to alertness, regulation therefore decreases the likelihood that entrepreneurs will be successful discoverers:

[D]irect controls by government on prices, quantities, or qualities of output production or input employment may unintentionally block activities which have, as yet, not been specifically envisaged by anyone. Where these blocked activities turn out to be entrepreneurially profitable activities (perhaps as a result of unforeseen changes in data), the likelihood of their being discovered is then sharply diminished. Without necessarily intending it, the spontaneous discovery process of the free market has thus been, to some extent, stifled or distorted. (Kirzner 1982)

Intervention eliminates new and unknown opportunities, preventing entrepreneurs from being drawn to them, and ultimately preventing welfare-enhancing market coordination. How precisely does regulation affect alertness? The answer seems to be that,

*To announce in advance to potential entrepreneurs that [for example] "lucky" profits will be taxed away is to convert open-ended situations into situations more and more approximating those of a given, closed character. The complete taxing away of pure entrepreneurial profit can, it is clear, succeed only in removing from potential entrepreneurs all incentive for paying attention to anything but the already known. (Kirzner 1985, p. 111, emphasis in original)*³

³The last sentence seems to imply that entrepreneurs can pay attention to the unknown. Unfortunately, Kirzner does not explain exactly what this might entail.

Kirzner seems to be arguing that entrepreneurs possess a general knowledge of “where to look,” such that if this general field becomes less profitable, they will be less likely to notice specific opportunities in it. Yet if opportunities are discovered without ordinary incentives (such as those involved in search efforts), it is not clear how giving entrepreneurs general information would aid or hamper discovery. Would not information about where to look simply affect ordinary, known incentives? If expressed in these terms, the thrust of Kirzner’s argument would be unobjectionable. It would imply that when government announces a certain kind of production is no longer profitable, entrepreneurs acknowledge this change, alter their calculations accordingly, and shift their resources to more remunerative forms of production. Yet this view of entrepreneurship and regulation relies on the conventional approach to incentives: the open-ended-vs.-closed distinction is most plausible if entrepreneurs can act and search for opportunities, or, even better, exercise judgment about how to use resources. But if we try to apply the specific notion of entrepreneurial incentives to policy analysis, the causal problem of alertness appears again.

Consider an example. Suppose there are two industries, auto manufacturing and software engineering. In each of these industries entrepreneurs are earning the same returns, and as far as all potential entrepreneurs are concerned, both industries are equally attractive. Let us then suppose the government announces that a new tax will be levied on the profits of the auto industry, while the software industry will be left unhampered. According to Kirzner, opportunities in auto production have been eliminated, and potential entrepreneurs will now perceive the industry as closed, which in turn means relatively few profit opportunities will be discovered there. There are two ways to explain this result. First, entrepreneurs might acknowledge the new policy, ignore the auto industry, and focus their attention elsewhere. This would involve action and search, however, and is not consistent with Kirzner’s theory of alertness. The second possibility is that entrepreneurs do not act differently in response to the new tax policy, but instead the lack of profitability in auto manufacturing unconsciously steers them away from that industry and toward others. This seems more in keeping with Kirzner’s theory, but it returns us once again to the question of causation.

A potential entrepreneur’s knowledge of the tax could certainly influence his deliberate search efforts and decisions about production. But how could it influence the passive state Kirzner uses as a starting point? If a profitable opportunity cannot, by itself, cause its own discovery, how can

we be sure that an unprofitable opportunity will have the opposite effect, and tend to remain unnoticed? If an entrepreneur does not know that an opportunity exists, how can a policy that decreases the profitability of that opportunity change the likelihood of his noticing it? In order to answer these questions, it seems we must incorporate other kinds of behavior, such as search or judgment.

I will not add to this criticism other than to point out that if entrepreneurial incentives cannot be integrated into a theory of unhampered markets, then the implications for restricted markets are ambiguous. If one believes there is no necessary tendency for entrepreneurs to notice opportunities (or even that opportunity discovery is not the best basis for a theory of entrepreneurship), then the above policy analysis loses its force; regulation might just as well hamper erroneous incentives or errors as prevent entrepreneurial success.⁴ Based on the above discussion, it should be clear that policy analysis poses a problem for alertness theory.

In addition to typical policy questions, the opportunity-causation problem also has implications for the debate over the feasibility of central planning, a system of organization Kirzner argues is subject to a lack of proper entrepreneurial incentives (1982). Using the entrepreneurial-incentives approach, however, the case against central planning might actually be weakened:

It is true in a trivial sense that entrepreneurs can be defined as those who are “alert to profit opportunities,” but we wonder why agents of the central planning board could not be equally alert. The real issue is not alertness, but the magical property that Kirzner attributes to those who are alert: the property of thereby finding what they are looking for (a profit opportunity) and knowing what to do about it. If mere alertness — activated by “the profit motive” ... — were all it took to produce the requisite knowledge, one could incentivize central planners with the same motive or an even stronger one, such as the death penalty ... (Evans and Friedman 2011)

There is then a difficulty in explaining how entrepreneurial alertness differs in market versus non-market (e.g., socialist) settings. If alertness is

⁴Also, regulation need not simply inhibit the discovery of profitable opportunities: it might also produce new opportunities for rent-seeking or other forms of destructive entrepreneurship (Foss and Klein 2010).

a universal phenomenon, as Kirzner believes, then it is unclear how or why government agencies do not also possess some degree of alertness — or why they could not be motivated to alertness. Once again, the necessary links between opportunity and alertness — and between decreased opportunity and non-alertness — are missing. Without them it does not seem possible to apply Kirzner's alertness theory to economic policy, at least in the manner he suggests. The solution, I argue that we can solve this problem by relying on the concept of entrepreneurial calculation using money prices.

As mentioned above, Kirzner recognizes the problem involved in not explaining opportunity causation, yet still draws theoretical and policy conclusions as if the paradox had been resolved. It is difficult to escape the feeling that Kirzner accepts it as a matter of course that the market process produces beneficial welfare outcomes, and further, that this is the direct result of entrepreneurs tending to discover profitable opportunities. As he himself puts it, "there can be no doubt that such inspiration [i.e., entrepreneurial alertness] has been of enormous importance throughout recorded human history" (1985, p. 109). But this is a conclusion to be reached by careful reasoning, not a fundamental assumption. And until we clarify these assumptions and more clearly explain the foundations of entrepreneurial theory, economic policy is bound to remain a controversial subject. While this is far from an exhaustive discussion, I hope it is sufficient to demonstrate the need for careful scrutiny of the alertness hypothesis in economic policy, and moreover, to spark economists' interest in alternative theories of entrepreneurship that more easily explain the effects of regulation on entrepreneurial behavior.

ENTREPRENEURIAL CALCULATION AND JUDGMENT

The problems of the alertness approach do not mean that entrepreneurial theory must give up any hope of policy relevance. However, they do require us to more carefully consider the basic elements of theory, and how they relate to real-world human behavior. To this end, I suggest that instead of a theory of entrepreneurial *alertness*, what is needed is a theory of entrepreneurial *judgment*. The judgment approach to entrepreneurship has a long history within the Austrian school, and can be traced back at least as far as Menger's writings. Menger did not write extensively on the entrepreneur, but he did describe a number of different ways entrepreneurship can occur (1994, pp. 159–61). Two forms of entrepreneurship that are relevant for judgment are "the *act of will* by which goods of higher order

... are assigned to a particular production process” and the “*supervision* of the particular production process” (Menger 1994, p. 160; emphases in original). Both of these aspects of entrepreneurship point to the idea of a capital-owning, decision-making entrepreneur (Salerno 2008).

The judgment approach flourished in the works of Menger’s disciples, especially in the writings of Böhm-Bawerk (McCaffrey and Salerno 2014), Frank Fetter (McCaffrey unpublished), and Ludwig von Mises. Of these economists, Mises’s writings have received the most attention, and are the subject of controversy. Yet a careful study of his writings shows that his work falls within the judgment tradition. This thread of Mises’s thought begins with early writings such as *The Theory of Money and Credit* (McCaffrey 2013), and continues on through his more systematic exposition of entrepreneurship in *Human Action* (Salerno 2008; Foss and Klein 2010). The judgment view was further elaborated by Murray Rothbard, who placed his own discussion in the midst of an extended treatment of production theory (2004, pp. 509–55).⁵ Among more recent generations of economists, the judgment theory has been developed by Joseph Salerno (2008) and has crystallized in such works as Foss and Klein (2012). This approach to entrepreneurship is therefore well-established within the Austrian school, and in fact represents a dominant trend in historical Austrian thinking on the subject.

The judgment approach views entrepreneurship as the function of residual decision making about the use of heterogeneous capital goods in production. In other words, the entrepreneur is the individual or group ultimately responsible for the direction of an enterprise, and this entails the ownership of capital and the direction of the factors of production. Because production takes time, arranging the structure of production implies that entrepreneurs make speculative judgments about the future state of the market. Eventually, consumer demand will reveal whether particular uses of capital were justified. If his initial judgments were correct, the entrepreneur earns profits, and if not, he incurs losses. The entrepreneur therefore bears the uncertainty of the future in exchange for the chance to reap profits. The key point, however, is that in order to do this entrepreneurs must exercise judgment about the allocation of resources.

However, when making decisions entrepreneurs first require some method of comparing the costs and benefits of each alternative use of

⁵Rothbard also drew attention to the Austrian heritage in entrepreneurship and pointed out several confusions about this legacy (1985; 1987).

scarce resources in order to determine which combinations of the factors will serve the most urgent needs of consumers. Entrepreneurs find this means of evaluation in *monetary calculation*. Calculation consists in entrepreneurs appraising the future prices of the factors of production through their “experience’ of past prices and ... their ‘understanding’ of what transformations will take place in the present configuration of the qualitative economic data” (Salerno 1990a, p. 60). Once these mental estimates have been formed, entrepreneurs are in a position to gauge the relative merits of alternative arrangements of the factors. But their experience and understanding must be expressed in terms of a common denominator, namely money prices:

[A]s Mises points out, economic calculation involves arithmetic computation and ... it is for this reason that economic calculation can only be calculation in terms of money prices. ... As the only possible tool of calculable action, money prices do not merely permit people to utilize their individual “knowledge of particular circumstances of time and place” to enhance the efficiency with which goods are produced in society, prices render possible the very existence of social production processes. (Salerno 1990b)

Calculation therefore provides the “indispensable mental tool for choosing the optimum among the vast array of intricately-related production plans that are available for employing the factors of production within the framework of the social division of labor” (Salerno 1990a, p. 52). In other words, calculation provides, among other things, a basis for entrepreneurs’ judgment regarding the direction of the factors. More profoundly, calculation is actually the fundamental characteristic of a rational economic system, which is simply impossible in its absence, as in the case of socialist societies (Mises 1998 [1949]; Salerno 1990a; 1990b; 1993).

The distinct traits of calculation and judgment are all absent in the alertness view. This is a necessary result of Kirzner’s distinction between Robbinsian maximizing and entrepreneurial discovery, which excludes capital ownership, uncertainty bearing, and monetary losses from the start. Yet this exclusion is precisely why alertness theory stumbles when it confronts policy analysis. Because Kirzner cannot incorporate ordinary economic decision making into entrepreneurship, he instead explains it by appealing to variables outside the sphere of action, i.e., the existence of pure profit opportunities, which in turn leads to the problems discussed

above. However, a capital-owning, uncertainty-bearing entrepreneur who earns monetary profits or losses can play an integral role in policy analysis.

THE POLICY IMPLICATIONS OF ENTREPRENEURSHIP

With the ideas of entrepreneurial calculation and judgment in mind, we can now make sense of the link between public policy and entrepreneurial theory. One distinct advantage of the calculation-judgment theory is that it is easily integrated into policy analysis; the causal connections between policy and entrepreneurship are not metaphorical or paradoxical, but can be analyzed using fairly straightforward economic tools. What is more, by showing how policy interventions interfere with the process of economic calculation and judgment, we can more clearly determine the welfare implications of such interference.

Ownership and Political Entrepreneurship

The application of judgment theory begins with the idea of ultimate or residual control over an enterprise. By determining where the locus of control and decision making lies, we can determine the scope and extent of entrepreneurial calculation, and also see how it might be hampered. More importantly, by discovering which individuals ultimately own and allocate resources, we can see how entrepreneurial behavior is different across institutional and policy contexts. The most obvious examples to contrast are entrepreneurial behavior in the market and in the political realm.

We have already said something about entrepreneurial calculation in the market. In sharp contrast is the element of “entrepreneurship” that occurs within government. Although decision making within government is often complex, it is clear that within any given state there is some form of ultimate authority over resource allocation. The exercise of this control may be termed “political entrepreneurship” (McCaffrey and Salerno 2011). Political entrepreneurship is distinct from market entrepreneurship in at least two important ways: first, it occurs outside the sphere of economic calculation, and second, it is financed through coercive redistribution as opposed to voluntary exchange.⁶ The non-voluntary nature of public finance means that no matter how decisions are made, they will conflict

⁶Note that Kirzner’s entrepreneur does not possess resources in either a political or a market setting. Therefore, market entrepreneurship cannot easily be distinguished from political entrepreneurship based on this difference or on considerations of the entrepreneur’s methods of finance.

with the current preferences of the public at large, while the absence of calculation means decisions lack rational direction. Political entrepreneurship — i.e., government decisions about the allocation of resources—therefore diverts the stream of spending away from the path it would have taken in an unregulated market, and also distorts the structure of production (Rothbard 2004, pp. 1151–55, 1167–68; McCaffrey 2011). Political entrepreneurship cannot therefore produce the same welfare-enhancing effects as market entrepreneurship, and the absence of entrepreneurial calculation within government means that it never could.

Entrepreneurship and the Institutional Framework

The judgment approach also allows us to see how policy shifts the entrepreneurial function from one individual or group to another, and how this shift affects welfare outcomes. Changes in the entrepreneurial function are most relevant in a system of economic intervention. Under interventionism, ownership is systematically shared between government and private individuals, or in other words, there is a forcible separation of the ownership and control of the means of production. One way to describe this situation is “*institutionalised* uninvited co-ownership” (Hülsmann 2006; emphasis in original). For instance, when a government nationalizes an auto manufacturer or even the auto industry, entrepreneurs in these firms surrender their decision making ability, and the entrepreneurial function is shifted from the market to the political sphere. Even if entrepreneurs nominally retain ownership of the firm, they are little more than the managers of the enterprise — they can ultimately be replaced by the political entrepreneurs, who retain residual control. A system of government intervention, because it alters the pattern of ownership of the factors, also involves a systematic transfer of decision-making authority over them. Intervention therefore changes the pattern of entrepreneurship in society, by shifting the entrepreneurial function from some individuals to other more favored groups, be they rent-seeking firms or political entrepreneurs themselves.

“Institutionalized uninvited co-ownership,” is also closely tied to the incentive problem known as “moral hazard,” defined as, “the incentive of a person A to use more resources than he otherwise would have used, because he knows, or believes he knows, that someone else B will provide some or all of these resources” (Hülsmann 2006). When ownership and control are forcibly separated, a wide range of “perverse” incentives — such as moral hazard, adverse selection, and the tragedy of the commons — are

brought into play. Under a system of free contracting, entrepreneurs (principals) must use judgment to arrange incentives within the firm, thereby mitigating moral hazard. However, when ownership is forcibly shared, the scope for calculation and judgment are reduced, prolonging or even institutionalizing incentive problems.

Moral hazard is not the only aspect of government intervention that can be viewed in an entrepreneurial light though. A closely related subject is the problem of “regime uncertainty.” This term was coined by Higgs (1997) as a way to explain the conditions which led to the long-term decline in private investment during the Great Depression. Higgs argues that entrepreneurs were reluctant to invest in a political environment hostile to their profit-seeking interests. In particular, widespread fear existed among businessmen that under the New Deal regime, industries would be nationalized, while taxes and other regulations would severely curtail profitability. What is more, the ideological stance of the Roosevelt administration was decidedly anti-business, creating an environment in which the viability of the fundamental institutions of the market economy was thrown into question. The uncertainty produced by the regime thus resulted in depressed investment and significantly delayed recovery.

Yet if the task of the entrepreneur is to allocate resources in the face of uncertainty, why would regime uncertainty pose a special problem? Regime uncertainty is relevant for judgment because it represents uncertainty about the institutional environment in which entrepreneurs make decisions; in a way, it tears the canvas on which entrepreneurs are trying to paint. One way to express this idea is to say that regime uncertainty occurs at a different institutional “level” than entrepreneurs are used to dealing with (Bylund and McCaffrey unpublished). That is, when regimes create fear about the security of the very system of private enterprise — in practice, the security of property rights and profits — they throw the “rules of the game” into question. Entrepreneurial judgment, on the other hand, usually takes place at the level of the “play of the game,” with certain institutional constraints taken for granted.

One result is that regime uncertainty undermines judgment by threatening its *raison d'être*. In a regime that is considered friendly to private enterprise, entrepreneurs constantly strive to earn profits and avoid losses. When regime uncertainty appears, however, entrepreneurs cannot be sure of the link between successful judgment and monetary rewards, and they therefore restrict their profit-seeking behavior (Bylund and McCaffrey unpublished). Reduced activity by entrepreneurs implies reduced effort to

calculate in the economy, and ultimately, decreases in consumer satisfaction. There is then a reasonable chain of causation running from policy (actual or threatened), to entrepreneurs' perceptions of monetary incentives, to a decline in entrepreneurial activity, and finally, to resulting welfare losses.⁷ Judgment therefore provides a substantive connection between regime uncertainty and welfare.

This is one way the conventional effects of regime uncertainty can be expressed in entrepreneurial terms. We can also imagine the reverse of regime uncertainty, when entrepreneurs believe returns will be *guaranteed* no matter the quality of their judgment. Of course, guarantees of profitability and security are not found in the market; they are, however, often made by government in its negotiations with rent-seeking firms. When guarantees are made, profit-seeking activities increase because entrepreneurs believe they will be protected (e.g., through grants of monopoly privilege or bailouts), whether their investments are wise or not. Entrepreneurs are more likely to engage in risky and unprofitable production when convinced they will not ultimately bear the uncertainty of their decisions. This again hints at moral hazard.

CONCLUSION

The theory of the entrepreneur is one of the most important components of economic science. But although it is vital for economists to understand the driving force of the market, it is equally important know how public policy hampers this force. The most obvious obstacle to economic progress is government intervention in the market economy, which inevitably involves interference with the decisions of the entrepreneur. Yet how we think of the entrepreneurial function matters greatly for our conclusions about exactly how economic policy changes the entrepreneurial process and the welfare outcomes of the market economy. If, following Kirzner, we view the entrepreneur as a resource-less and inactive agent awaiting the serendipitous discovery of profit opportunities, policy analysis becomes effectively impossible. Because the existence of profit opportunities does not explain a tendency toward entrepreneurial success, it likewise does not show how changes to the policy environment tend negatively to impact discovery and the welfare of market participants. The alertness theory does

⁷Note that these links would be absent if entrepreneurs were unaware of the existence of monetary incentives.

not then provide a substantial foundation on which to build a distinctly entrepreneurial approach to policy analysis.

However, once we take into account the vital roles of calculation and judgment, it is easy to see that economic policy distorts and changes entrepreneurs' behavior. Judgment theory relies on the concrete notions of capital ownership, calculation in terms of money prices, and decision making about the use of the factors, all of which can be seen at work in the real world. Intervention shifts the pattern of ownership and therefore also falsifies the money prices entrepreneurs use to appraise the factors of production. Intervention also directly abrogates the judgment of entrepreneurs by diverting the structure of production from the course it would have taken in an unregulated market. The direction and scope of entrepreneurial decision making are thus altered, and consumer welfare is reduced. Moreover, public policy can drastically affect the business environment in which entrepreneurs act, threatening the fundamental institutions of the market economy on which entrepreneurs rely. This depresses entrepreneurial activity, resulting in a general loss of welfare.

Judgment, through its connections to economic calculation, provides a concrete reference point from which to analyze the effects of policy. Calculation is mass to judgment's velocity, and together they form the driving force of the market. This view of the entrepreneur not only has a long history within the Austrian school, but has already been applied to numerous problems in theory and policy, and will no doubt serve as a useful tool for analyzing many more. It therefore represents a positive way forward for scholars in economics and public policy.

As a final thought, let me add that while the future is bright, so too is the past; in other words, it is vital to recognize that many of the most important advances in Austrian economics have emerged from careful reflection on the foundations laid by the giants of the tradition, whose insights must never be taken for granted. As our thinking on entrepreneurship moves forward, it too should be mindful of its roots in the Austrian school, and always take care to appreciate the contributions of previous generations. With that in mind, it is safe to say that as this tradition grows and thrives in the coming years, it will owe no small debt to Joseph Salerno.

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PROSPECTS FOR INTERDISCIPLINARY ENGAGEMENT WITH INTERNATIONAL RELATIONS

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Throughout his career, Dr. Salerno has sought to expand the influence of Misesian scholarship, not only through his own research, but also classroom engagement, graduate student mentorship, and the education of the general public. His impressive body of work represents a true educator whose interest is fundamentally the advancement of human knowledge. It is in this spirit that this chapter seeks to provide an initial blueprint for the interdisciplinary expansion of Austrian principles to the political science realm, specifically the subfield of international relations theory. While international relations theory has strong shared origins in classical liberal approaches (Van de Haar 2009), recent theoretical evolution across the dominant paradigms has increased the potential for an expansion of Austrian ideas. Many theories within the

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I was a summer fellow in 2007 and 2008. During these experiences, under the advice and support of Dr. Salerno, I developed a passion for the field of international conflict. Furthermore, Dr. Salerno instilled in me the importance of thinking strategically regarding interdisciplinary theorizing and the importance of interdisciplinary work to the future of the social sciences.

subfield of international relations have begun to experience something of an “individualist shift” both methodologically and theoretically.¹ For these reasons, if approached correctly, international relations research is a field ripe for future interdisciplinary engagement.

Notably, there does not exist an absence of political science research by Austrians, though these contributions remain beyond mainstream political science discourse. Perhaps the best examples are Murray Rothbard’s *Power and Market* and the concluding chapter of *Man, Economy, and State* which explicitly engage the effects of coercion, or politics, on human behavior.² The foundation of the argument focuses primarily on the voluntary interactions of individuals in the absence of violence (economics), and yet concludes by engaging the reality that coercion (politics) is nearly always and everywhere present and “economic analysis must be extended to the nature and consequences of violent actions and interrelations in society” (Rothbard [1962] 2004, p. 875). In essence, the fields of economics and political science are highly complementary if not inherently intertwined. Unfortunately this early clear intersection of the two fields of inquiry did not occur more broadly, as political science, the younger of the two, developed from a combination of European legal and historical approaches (Carr 1939; Morgenthau 1948) and early American behaviorist research (Merriam 1924; Key 1934; Key 1966).³ However, unlike economics where certain biases may exist, Austrian ideas surrounding political organization, coercion, and the state are somewhat accepted. For example, James C. Scott’s *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* and Charles Tilly’s “War Making and State Making as Organized Crime” share many commonalities with Rothbardian analysis of the state and are standard reading in undergraduate comparative politics courses.

This chapter proceeds by outlining the evolution of international relations theory over the past two decades with specific attention to the

¹This trend originates in the renewed emphasis on domestic politics as a source of foreign policy behavior and extends to recent research examining the underlying causes of individual decision-making (Putnam 1988) and the relationship between the preferences of individual decision-makers and foreign policy selection (Bueno de Mesquita 1999).

²Indeed, the clarity of analysis from one volume to the other highlights the artificial and unnecessary division of the two works by the initial publisher.

³While some influence from economics is present in contemporary political science research, it is primarily of the positivist variant, to which there has been a significant backlash in the form of “post-positivist” theoreticians (e.g Peterson 2004; Tickner 2005).

progression of theoretical development toward a greater focus on human action. While most research is heavily positivist in its construction, theoretical development over the course of the past two decades has led, steadily, away from the abstractions of traditional neorealist (Waltz 1979) and liberal institutionalist (Keohane and Martin 1995) paradigms that have dominated international relations research. New theoretical approaches that offer greater recognition to human agency, as well as new methodological challenges in qualitative research, provide an opportunity for Austrian engagement. Following a discussion of these theoretical approaches, I conclude with suggested strategies for continued expansion of Austrian ideas to the social sciences outside economics.

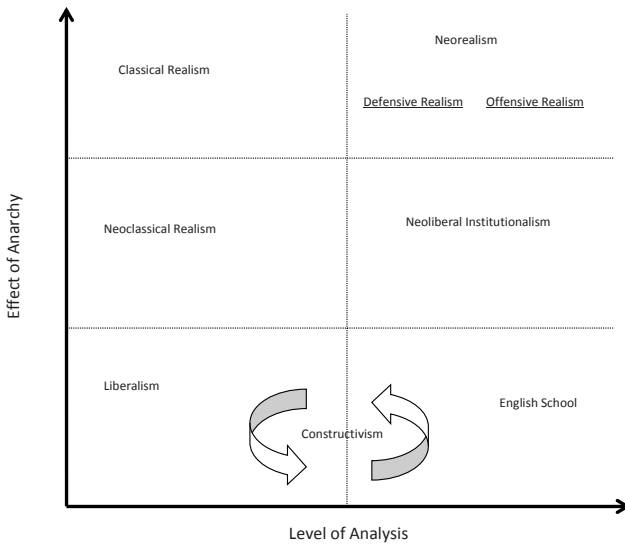
THE CURRENT STATE OF THE INTERNATIONAL RELATIONS LITERATURE

I first introduce through a simple illustration the relative position of the dominant international relations theoretical perspectives in the context of two fundamental criteria in Figure 1. The theories are organized according to their assumptions concerning the effect of anarchy on preferences, and thereby behaviors (y-axis), and the assumed level of analysis determining the type of actor under study (x-axis). Organizing each perspective by their nuanced conceptualizations on these two particular subjects provides an effective means of discussing their unique attributes within the context of their overarching similarities. (See Figure 1 on the following page.⁴)

Notably, either abstraction presents potential problems for future Austrian interdisciplinary analysis. In particular, the level and corresponding relevant unit of analysis being anything beyond the individual is an inherently hostile assumption, as praxeological analysis recognizes accurately that only individuals are capable of action. For example, neorealists may assume for theoretical purposes that all states are rational unitary actors, but such an assumption is ineffective in generating common sense explanations of real world phenomena, given “there are no such things as ends of or actions by “groups,” “collectives,” or “states,” which do not take place as

⁴Immediately the reader will notice the placement of constructivism. While I do not discuss constructivism at length in this chapter, constructivism is unique given its assumption of an endogenous relationship between levels of analysis. As examples, the key systemic features which frame state's conceptions of world politics such as state sovereignty (Treaty of Westphalia) and anarchy are not universal truths, but social constructions by the states themselves (Wendt 1992, 1995). It is this endogenous relationship between society, state, and system the graphical portrayal is intended to illustrate.

Figure 1: The Dominant Paradigm in International Relations Theory



actions by various specific individuals (Rothbard [1962] 2004, p. 2). However, in the theoretical space that minimizes such abstractions, specifically the liberal and neoclassical realist conceptual spaces, the possibility for the development of an interdisciplinary Austrian discourse is quite plausible. Driving this evolution toward the individual over the past two decades of international relations research is in part the desire of applied research to understand real world outcomes, leading to what J. David Singer (1961) termed “vertical drift” wherein theories built on such abstractions as “state behavior” become applied to explaining foreign policy choices by individuals.

For much of international relations, anarchy defines contextual constraints, where expected behavior follows from the strength of the anarchy assumption (Powell 1994). Implied for many authors, particularly in the realist tradition, is that given anarchy and human depravity, conflict will ensue. Even neoliberal institutionalists acknowledge the anarchy assumption of neorealism, resigning themselves to searching for those conditions in which “cooperation under anarchy” is a possibility (Axelrod and Keohane 1985). If anarchy is as salient a political problem as neorealists suggest, then actors seek nothing more than power, as apart from coercive

government their security is impossible to guarantee (hence Waltz's characterization of the system as "self-help"). However, if anarchy is merely an environmental condition suggesting the absence of a single coercive entity, rather than being a constraint that determines behavior, then gains are not inherently zero-sum and cooperation is not only possible, but likely the dominant strategy within the anarchic context.⁵

On the right side of the horizontal axis are the predominantly system-focused explanations of international politics, depicting states as unitary actors. In this context, simplistically, the relationship of anarchy is perceived as either an aspect of the environment (English school) or the prime determinant of state preferences (Neorealism). On the left hand side of the graph reside those theories of international politics which focus on a sub-state unit of analysis, each providing an explanation of state behavior as a determinant of either group or individual action. The "Effect of Anarchy" in this context is parallel to the underlying discussion of the "state of nature" in much of political philosophy.⁶ Toward the top of the y-axis,

⁵This distinction between anarchy as a defining characteristic that *causes* states to behave a certain way, as is the assumption by neorealists, versus anarchy as merely a systemic condition that describes the absence of a single coercive entity, as is the assumption by liberal researchers in international relations, has dramatic consequences for expectations of state behavior. Flowing from the neorealist assumption that anarchy causes behaviors are the assumptions that all states pursue self-help strategies, all gains are relative and mutually exclusive, and thereby this systemic condition leads inevitably to conflict. However, if anarchy is merely a descriptive characterization of the international system as the absence of government, which through liberal logic may be a systemic condition that expands possible behaviors rather than constrains as realists would claim, it cannot be assumed anarchy inherently leads to competition over relative gains and conflict. The "strength" of the anarchy assumption in international relations theory is thereby the degree to which the condition of anarchy forces states to behave in a specific manner.

⁶It is worth noting that the conceptions of "anarchy" in international relations theory are not entirely identical in classical realism and neorealism (or lower horizontal pairings) as the graph may suggest, as Morgenthau did not share Waltz's view that the international system is inherently conflictual due to the effect of anarchy (see Morgenthau 1948, pp. 39–40). However, Morgenthau does share the Hobbesian view of human nature which is an abstraction based upon the Hobbesian view of the state of nature, or anarchy. Morgenthau's conception of human nature, the basis for his description of statesmen and justification for the primacy of the state, exists as an extension of the idea of man's nature under conditions of anarchy, even if he does not agree anarchy exists in the reality of international politics. Perhaps a more appropriate title for the y-axis would be "conception of human nature" ranging from good to bad. However, I expect in that case a footnote would be necessary explaining the nuances of the systemic level. The point here, however, is simple: philosophically the effects of anarchy on behaviors and human nature are directly related.

anarchy has a powerful effect on human behavior, wherein man cares only for his self-preservation resulting in a Hobbesian existence that can only be described as “nasty, brutish, and short.” Alternatively, toward the bottom of the vertical axis, the state of nature, or anarchy, does not imply chaos. Intrinsic to anarchy in this Lockean conception is the principle of natural law endowed to the individual, wherein everyone is entitled to “life, liberty, and property.” In this context, human nature is not so negatively viewed, as individuals are capable of organizing themselves. Government, thereby, is either only necessary to protect person and property against those occasional individuals who seek to violate the principles of natural law, or alternatively is entirely unnecessary if individuals are capable of interaction absent a monopolizing coercive force (Rothbard 2002a). The vertical axis across both levels of analysis can also be described as the degree to which cooperation is possible in the absence of a centralized government in international politics.

Given the existing landscape of international relations theory, Moravcsik's (1997) conception of liberalism, designated simply as “liberalism” in the illustration, provides the clearest potential avenue for the application of Austrian ideas. Recognizing the failures of systemic, state focused neorealism to account for domestic sources of state behavior (notably the collapse of the Soviet Union), Moravcsik (1997) presents a reframed variant of liberalism in international relations to fully account for the dynamics of policy formation. As both economists and political scientists are well aware, the term liberalism has been construed to mean a myriad of things, both within and beyond international relations research. Moravcsik's articulation of a liberal theory of international relations is an attempt at salvaging liberalism's “self-inflicted” condition. However, as the author makes clear, he is providing a “restatement” of liberal theory built squarely on classical liberal foundations.⁷ Liberalism as defined by Moravcsik thereby is explicitly

⁷Notably this restatement is not neoliberal institutionalism, which unfortunately dominated the term liberalism until very recently. In terms of assumptions, neoliberal institutionalism shares the entirety of the neorealist core (including the states as rational actors abstraction) while moderately relaxing the implications of anarchy on state preferences. Given this relation, Keohane's (1993) statement that neoliberal institutionalism “borrows as much from realism as from liberalism” is disingenuous. Institutionalism borrows entirely from realism, while only moderately co-opting liberalism's focus on the human progressivity (Zacher and Matthews 1995). To use the example of cooperation, it occurs despite systemic conditions of anarchy because actors determine that by doing so they can improve their condition (e.g., Axelrod and Keohane 1985). The core assumptions regarding states as rational unitary

a theory of preference formation, and it is in this particular conceptualization of liberalism that the most fruitful possibilities of interdisciplinary theorizing with Austrian researchers lies.

Moravcsik makes a series of core assumptions emphasizing preference formation and the evolution of interests within domestic society. First, the fundamental actor in international relations is the individual. Decisions are made by individuals acting in response to an environment to satisfy subjective goals determined by subjective sets of values. Already, we have dramatically complicated the study of international relations away from systemic theories. Second, and by extension, the state is a subset of individuals in society reacting to the preferences of individuals in the society at large. Actors in government, like actors in domestic society, have their own sets of values and preferences and exist in a particular institutional context, be it democratic or authoritarian. This environmental constraint shapes the availability and perceived values of the policy options available to state actors, but individuals remain the only entity capable of action. Finally, preferences across potential behaviors, and the resulting causal processes in policy choice, are constrained further by the international environment of interacting individual preferences and material capabilities (or opportunity to achieve some end).

Moravcsik (1997) essentially constructs a “bottom-up” view of international politics, tracing the source of state behaviors to the initial development of preferences by individuals within societies. What individuals within states want “is the primary determinant of what they do,” not the nature of the system as anarchic (Moravcsik 1997, p. 521), opening the door to understanding political phenomenon as they actually happen rather than under a predefined set of unrealistic abstractions. However, to employ liberalism to better understand outcomes we must have some means of logically deducing the source of preferences, of which Moravcsik lists three: ideational, commercial, and republican. The ideational components capture particular political, national, and socioeconomic cleavages and are manifest in normative explanations of the democratic peace (Dixon

actors and the system organization as anarchic are identical. Neoliberal institutionalism appears to remain ambivalent to the historical emphasis of classical liberalism on the individual and the promotion of human freedom, leaving preferences as exogenously determined. I'll refrain from delving further into the nuances of neoliberal institutionalism and neorealism, as the neo-neo debate has been thoroughly explored elsewhere (Jervis 2003; Baldwin 1993; Powell 1994).

1994), ethnicity based explanations of foreign policy behaviors (Davis and Moore 1997), and liberal economic preferences (Mousseau 2003). Commercial incentives are driven by motivations for some subjectively defined economic gain. These may take the form of trade and investment behaviors, but also may manifest themselves through preferences for resource access and even coercive seizure (e.g., Snyder 1991). Finally, republican sources of preferences are rooted in the political institution's method of filtering the preferences articulated by the domestic populace. Likely the best examples are provided by the institutional democratic peace literature, but more specifically selectorate theory (Bueno de Mesquita et al. 1999). Indeed, selectorate theory, may provide the best illustration of the bottom-up preference formation process presented by liberalism while retaining a focus on individual action.

The implication of this articulation of liberal theory is a complete reformulation of how we conduct international relations research to refocus not on states, but upon the individual within society. Neorealism, restricted to the system level and states as actors, fails to independently account for state preferences, and so a focus on human action is the logical transition. However, a focus on individuals does not eliminate the systemic realm, in so far as the system is defined through the behaviors of other individuals engaging in their own series of actions within and between political systems.⁸ Furthermore, given the necessity of such a transition toward the individual and human action, there has been something of a convergence in international relations theory. For example, Jack Snyder's (1991) work on empires, if one was ignorant of his self-identification as a "realist," is indistinguishable from the theoretical processes outlined by Moravcsik. Specifically, Snyder discusses the logrolling interests of domestic actors, ideational preferences, and political institutional configurations all contributing to the propensity and rate at which empires historically over-expand - an outcome that is impossible to explain under any framework where states are rational unitary actors.

This international relations shift toward liberalism seems intuitively obvious, occurring quite broadly in mid-range topical analysis (see Oneal 2012): individuals have values for ends and employ means to achieve those ends. However, understanding, operationalizing, and incorporating the preferences of actors, determining their relative importance, and

⁸See the conceptual discussion of interactions in Bueno de Mesquita et al. (1999).

then interacting those aggregate preferences with state structures and the preferences of others individuals outside the state is a daunting task, and attempts to do so do not debunk clearly deduced theory as the burden of properly specifying such empirical analysis is exponentially greater than traditional state-level studies. However, with advancements in technology, the ability to conduct econometric tests of liberal ideas are more accessible and plausible, providing a means to mathematically sort out myriad coinciding human behaviors. In particular, the recent availability of multilevel modeling to political scientists is intuitively appropriate for testing liberal hypotheses, which employ indicators from across arenas of political interaction (e.g., actors both within and between states). Indeed, progress for the field entails “an increasing ability to explain and connect complex phenomenon” both theoretically and methodologically (Dryzek 1986, p. 301).

Liberalism in international relations theory is not the only path that has evolved to grant greater attentiveness toward the inherent basis of social science research in human action. Neoclassical realism possesses many of liberalism’s strengths while attempting to maintain many of classical realism’s fundamental Machiavellian assumptions. Like liberalism, neoclassical realism “explicitly incorporates both external and internal variables.” However, “the scope and ambition of a country’s foreign policy are driven first and foremost by its place in the system and specifically by its relative material power capabilities ... the impact of such power capabilities on foreign policy is indirect and complex ... translated through intervening variables at the unit level” (Rose 1998, p. 146). Though political preferences are influenced by the actor’s position in the power hierarchy relative to all other actors in the system, human action still is the fundamental phenomenon of interest. Indeed, there are close parallels evident in not only the analysis, but also the conclusions, of neoclassical realists and Austrians on the topic of war and empire. For example, both Snyder (1991) and Salerno (1995) engage in similar discussions of the relationship between inflation and imperial expansion, as well as highlighting it as a catalyst of further international conflict and long run unsustainability.⁹

⁹Snyder’s *Myths of Empire* is both an excellent example of neoclassical realism and source of many parallels with existing Austrian perspectives, including coalition behavior in democracies leading to warlike behaviors, the pervasiveness of certain “myths” of external threat exploited by politicians to justify conflicts, and the inevitable destructive consequences of imperial overexpansion.

Another possible example is that of Robert Higgs (1987) “ratchet effect” and the “phoenix factor” discussed by Organski and Kugler (1977). Distinctly, while liberalism is a theory of preferences from the bottom up, neo-classical realism is a theory of preferences from the bottom down. Though liberalism as discussed is perhaps more amenable to Austrian engagement, both approaches, however, attempt to integrate individual behaviors into a general theory of international relations, albeit with different emphases on the relative importance societal influences.

Perhaps neoclassical realism and liberalism constitute different roads leading to the same destination. Both take seriously the need to incorporate greater complexity into our theories to better account for political phenomenon. Encouraging for practitioners of international relations, and the potential for interdisciplinary engagement with the Austrian school, is the drifting of paradigms not further apart, but closer together. These two latest iterations of realism and liberalism are perhaps more theoretically compatible than ever before in the past, constituting, in Lakatosian terms, progress in the field. In conjunction with rising methodological interest in deductive theory development and qualitative analysis (see Goertz 2005), a fruitful cross discipline dialogue incorporating the Austrian school as a next necessary step to this theoretical evolution in international relations is now possible.

STRATEGIES FOR FUTURE INTERDISCIPLINARY ENGAGEMENT

In order for such a debate to both occur and be fruitful, not only must the theoretical components be compatible and international relations researchers amenable to an Austrian turn, as I argue they now are, but the presentation of the ideas must be done in a thoughtful and effective manner. Just as in the presentation of any argument or position, the negative aspects of the method by which it is presented, or the individual doing the presenting, affect audience receptivity. For this reason, it is necessary for those engaging mainstream IR theory in advocacy of an Austrian perspective to be somewhat strategic, or at least minimally thoughtful, in the method and context of that interaction. While international relations as a field may be ready for interdisciplinary engagement, there are, in my opinion, three broad strategic impediments currently limiting the persuasiveness of the Austrian school to the social sciences (and the general public) that must first be addressed.

Strategy 1: Comprehension Before Engagement

One great pitfall to any interdisciplinary engagement is a failing to fully understand the core theories, methods, and even discipline specific jargon of the field you seek to engage.¹⁰ Comprehension is a necessary condition to effective engagement, and in its absence, attempts at an intellectual exchange may be dismissed or misunderstood, harming future discourse. As one example, there is a frequent and unfortunately persistent mischaracterization in Austrian circles of democratic peace theory, often inappropriately conflated with neoconservative foreign policy prescriptions. As but one example, a recent discussion by Hans Hoppe (2013) on the democratic peace grossly mischaracterizes the theory as including the claims “In order to create lasting peace, the entire world must be made democratic” and “war must be waged on those states to convert them to democracy and thus create lasting peace.” Such a claim about democratic peace is a complete invention, as there is not a single piece of democratic peace research in international relations that states either. Indeed, the original conceptualization of the democratic peace in modern political science empirical research was labelled the “libertarian peace” and focused on libertarian normative values (Rummel 1983). Such claims are completely absent in both the normative (Dixon 1994) and institutionalist (Bueno de Mesquita et al. 1999) explanations of the empirical finding, which has been described as “the closest thing we have to an empirical law in the study of international relations” (Levy 1989, p. 88). Indeed, the empirical record even suggests that newly created, unstable democracies are the most violent states in the system (see Mansfield and Snyder 2002). Dr. Hoppe appears to confuse the democratic peace, which originates as a deductive theory about domestic influence on the polity by Immanuel Kant ([1795] 1991, p. 113) and/or the rise of capitalist preferences by Joseph Schumpeter (1950; 1955), with neoconservative foreign policy recommendations (e.g., Kagan 2012) and the idealist policy prescriptions of Woodrow Wilson.¹¹

¹⁰Perhaps the best example is the term “institution” which possesses numerous definitions dependent upon the field and context within which it is used.

¹¹Notably, Kagan and many neocons operate out of the field of history. There are no significant neoconservative international relations scholars, due both to the absence of any clear logic behind such an approach as well as a dearth of empirical evidence for such policies’ effectiveness. Wilsonian idealism, likewise, is generally absent in contemporary research, and the term exists in the present typically as a pejorative used by neorealists in describing liberal theorists (e.g., Mearsheimer 1995).

While the criticism of such neoconservative policies that follows in Hoppe's analysis is well crafted and would be predominantly shared by most democratic peace theorists, the failure to properly engage the enormous extant literature and demonstrate a basic knowledge of the theory as it currently exists in international relations fosters and supports divisions between the two social science fields rather than providing interesting political science insights from an Austrian perspective. Research in coercive hierarchical power relationships and the dissemination of democracy (Organski 1968; Rasler and Thompson 1994), the causal development of clear individual preferences within democratic (and non-democratic) institutional frameworks (Mousseau 2003; Peceny and Butler 2004; Gartzke 2007), and the relationship of foreign policy behaviors to institutional coercive strength (Rhamey 2012) all go ignored through this failing to engage international relations scholarship. Such a dialogue between these systemic and liberal approaches with Austrian scholarship has enormous potential for better understanding human action in the political context.¹²

Strategy 2: Engage and Incorporate Mathematics

If a priori science is a valuable approach, and we cannot knowingly observe the underlying motivations of actors, then generalizable and observable patterns of behavior should no doubt be present throughout a cadre of relevant historical events. While exploration of a single event may require a potentially dangerous divination of motivation in order to sensibly explain an historical episode, as well as any relevance to praxeological theories, econometric large-N analysis possesses the virtue of mathematically organizing possible relationships between events to uncover generally present correlations. A relationship between observable phenomena that are generalizably present in coincidence with an outcome of interest should correspond with any reasonably developed praxeologically deduced theorem, and certain types of statistical analysis may heavily complement Austrian research.¹³ While the idiosyncrasies of a single case may make for

¹²For an introduction to the democratic peace in international relations, see Russett et al. (1995).

¹³Importantly, there is an intuitively plausible potential relationship between the praxeological approach and Bayesian empirical analysis that requires additional future attention by social scientists. Bayesian analysis recognizes the inherent uncertainty underlying observable events, obvious when observing real world phenomenon, as we cannot understand the complexity of motivations inherent in individual decision-making. However, rather than the explicitly inductive process of Bayesian updating, conceivably our priors may be

difficult historical illustration, laws of human behavior capable of explaining real world occurrences, in a Mengerian sense, should be observably evident in a statistically significant fashion across a relevant population in a properly specified model.¹⁴ While the failure to demonstrate expected empirical relationships that can be deduced from a praxeological approach does not, by definition, disprove the theory, it can serve the quite important purpose of highlighting deficiencies or logical fallacies within a deduced theorem. Theories are not apodictically true simply by labeling themselves a priorist, and a failing to observe generally present historical relationships that should coincide with the theory in a properly constructed econometric model is *potentially* an indication of a failing in the theory's initial deductive logic. Furthermore, formal modeling, such as that often employed in applications of selectorate theory (see Bueno de Mesquita et al. 2008), can be a helpful means of organizing information regarding causal processes arrived at through clearly deduced theories.

Austrians often criticize econometric analysis as promulgating poorly developed or even illogical theories through the manipulation of algorithms to provide corroborating mathematical relationships. However, such a cautionary note surrounding statistical analysis is made by any serious approach to the social sciences, even in the most positivist corners, and an emphasis on theory prior to econometric testing is taught in every mainstream graduate research design course.¹⁵ This attack on econometrics, then, is something of a straw man caricature of econometric research as such inductive, hyper-positivist work is not the standard in mainstream social science. Instead, the hostility toward mathematics is more likely an indication of mathematical ignorance of underlying statistical algorithms, a confusion regarding statistical claims surrounding causality, or simply an attempt to promulgate a bad, illogical theory when confronted with a lack

updated instead by the deductive expression of a praxeologically based theory, permitting a more effective and appropriate large-N test. In other words, the logical posterior for an Austrian Bayesian model is the deductively generated theoretical information where probabilistic analysis is conditional on common sense claims.

¹⁴“Properly specified model” is simply one that accurately manages the nature of the data (e.g. clustering, time series, hierarchical data structure) while also organizing the data to logically fit deduced theoretical priors. Generally, the problem in social sciences is not the models, but poor application and interpretation.

¹⁵Such criticisms are present in the most frequently used texts for such courses in political science and sociology doctoral programs, such as those by Shively (1974), King et al. (1994), Goertz (2005), and Ragin (2008).

of, or even contradictory, empirical evidence. While properly developed social science theory is not dependent on empirical “proof,” an absence of such is typically a sound indication that something in the theory’s logic has gone awry. This is not to suggest that historical method of careful logical argumentation on a case by case basis is without merit (e.g., Rothbard 2002b). However, such qualitative approaches, while interesting, may not provide the most effective social science illustrations regarding generalizable theories. Econometric knowledge is neither the foundation nor the end goal of social science research, but if done well, it is an important tool in the arsenal of the social scientist and should be embraced.

Strategy 3: Focus on Academic Engagement

The ideas of the Austrian school have the potential to contribute greatly to the social sciences, but perceptions of those ideas, and thereby their dissemination, may be marred, however unfairly, by an unclear union between the intellectual development of theory building and libertarian political activism. As such, scholars should promote a clear distinction between Austrian research and political activism, not allowing scholarly work to be shrouded by irrelevant, and sometimes counterproductive or contradictory, agendas. This strategic concern is particularly applicable to interdisciplinary expansion to political science and international relations, fields already highly sensitive to the politicizing of social science research. In these fields, new research programs viewed as pandering to particular ideological perspectives or political groups, regardless of whether they are left, right, or libertarian, are likely to be quickly dismissed. For this reason, the community of Austrian scholars should promote a clear distinction between Austrian research and political activism.

In part due to the efforts of scholars such as Dr. Salerno, the Austrian school has grown in prominence and exposure by leaps and bounds in the academic community, both within economics and beyond. However, the growth of the Austrian school as a heterodox approach may also tend to attract elements that seek to exploit rising interest for personal profit, or those attracted to the community not necessarily by its ideas, but its distinctiveness from the existing status quo. Such groups may include racists, fear-mongers, or simply those advocating apophenic views contradictory to empirical reality. Clearly, as an intellectual enterprise that not only values the development of thoughtful theoretical and empirical research, but also one with a deep dedication to principles of human liberty, the scholarly community must act to quickly condemn any such groups that may

attempt to associate themselves with the Austrian school for no other reason than its rising popularity. Organizations or individuals whose mission is contrary to that of advancing sound social scientific thought and human liberty central to the Austrian school should be immediately and quickly dismissed. Obviously most Austrian scholars are quick to condemn these types of groups or individuals, but a more active, vocal, and immediate stance is necessary within the scholarly community in opposition to such detrimental associations to prevent negative perceptions by broader academe and to preserve the school's intellectual integrity. In addition to being clearly opposed to principles of human liberty and Austrian thought, such negative associations would also be highly detrimental to the advancement of interdisciplinary opportunities across the social sciences.

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AFTERWORD

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Austrian economists are justifiably proud of the rich heritage handed down by Carl Menger, Eugen von Böhm-Bawerk, Ludwig von Mises, Murray Rothbard, and their contemporaries, and Austrians are keenly interested in the origin and development of their ideas. An appreciation for history has led some modern economists, mistakenly, to see the Austrian tradition as static, rigid, and backward-looking, focused on the achievements of the past rather than discoveries and new developments.

As the contributions to this volume attest, nothing could be further from the truth. Austrian economics is a vibrant, healthy, growing tradition, confident in its core propositions while filled with lively debates and exciting new advances. These authors of the essays collected here build upon, refine, extend, and challenge the contributions of their teachers, just as previous generations have done, all the way back to Menger.

Joseph Salerno's own work is a vibrant illustration of this pattern. Salerno has made seminal contributions to the development and application of Austrian economics, while remaining within the broad, causal-realist tradition pioneered by Menger and refined by Böhm-Bawerk, Mises, and Rothbard. Salerno's early work was in monetary economics and the history

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of economic thought. His doctoral dissertation (Salerno 1980) offered a novel interpretation of the “bullionist controversy” and subsequent developments in British monetary theory and policy. He also published a number of important papers on the largely-neglected French liberal school of Say, Destutt de Tracy, Dunoyer, Bastiat, and Molinari, among others, and their important predecessor (and proto-Austrian) Cantillon (Salerno 1978; 1983; 1988). Along with Rothbard he developed a distinctly Austrian approach to measuring the money supply (Rothbard 1978; Salerno 1987), one consistent with Austrian concepts of the nature and role of money.

It was his work on money that led Salerno to a significant breakthrough in the interpretation of Mises’s economics. It had long been recognized, inside and outside the Austrian school, that Mises’s great accomplishment in his *Theory of Money and Credit* (1912) was an integration of monetary theory into the general, subjectivist, marginalist understanding of value, prices, and markets shared by the Austrian, Walrasian, and Marshallian schools. Prior to Mises, prices were typically analyzed as exchange ratios between goods, not ratios between goods and a monetary unit. Money was a “veil,” overlaying (or obscuring) underlying economic relationships. Mises showed that economic actors evaluate units of money the same way they evaluate discrete units of other goods and services, namely in terms of marginal utility, and that the general theory of economic value also explains the value of money.

In a perceptive Postscript to a reprint of Mises’s 1920 essay on socialist calculation, Salerno (1990a) highlighted the degree to which Mises’s analysis of socialism flowed from his analysis of money. As Salerno (1990a, p. 35) put it:

Mises’s pathbreaking and central insight is that monetary calculation is the indispensable mental tool for choosing the optimum among the vast array of intricately-related production plans that are available for employing the factors of production within the framework of the social division of labor. Without recourse to calculating and comparing the benefits and costs of production using the structure of monetary prices determined at each moment on the market, the human mind is only capable of surveying, evaluating, and directing production processes whose scope is drastically restricted to the compass of the primitive household economy.

In other words, what Mises means by “economic calculation” is monetary calculation. The core problem facing the government planner is not that he lacks the “knowledge of particular circumstances of time and place,” as Hayek (1945) famously put it, but that he lacks the real-world monetary prices needed to weigh alternative benefits and costs, to estimate rates of return on investment, and hence to allocate resources rationally in a complex world.

This insight led to a profound revaluation of Mises’s contributions and the role of Mises’s work in the history of economic thought. By the 1980s Hayek’s profound and influential social theory, which emphasized the challenges of economic organization under dispersed knowledge and limited understanding, and was deeply wary of attempts to reconstruct society according to some “rational” plan, was embraced by most Austrian economists. Even today, Hayek’s pithy line from *The Fatal Conceit* (1988, p. 76) — “The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design” — adorns many an email signature line and blog masthead. But, as Salerno carefully demonstrated, this anti-rationalist, incrementalist, evolutionary, “English” approach to economics, law, and social theory was particular to Hayek, and not at all shared by Mises.

In “Ludwig von Mises as Social Rationalist” (1990b) and “Mises and Hayek De-Homogenized,” (1993), Salerno offered a different interpretation of Mises and Mises’s place within the Austrian tradition. Salerno argued that Menger’s younger colleagues Böhm-Bawerk and Weiser extended Menger’s approach along distinct, sometimes contradictory, paths. What we might call a Wieser-Hayek-Kirzner strand of Austrian economics emphasizes disequilibrium, the informational role of prices, and profit-seeking behavior as an equilibrating force. In contrast, the Böhm-Bawerk-Mises-Rothbard strand emphasizes monetary calculation and the entrepreneur as a purposeful, forward-looking agent. In my own work on the entrepreneur (Klein 2008a; Foss and Klein 2012; Klein and Bylund 2014) I have highlighted two distinct Austrian interpretations of the entrepreneurial role. In Kirzner’s (1973) influential formulation, the entrepreneur is a largely passive “discoverer” of profit opportunities created by disequilibrium “gaps” in the current structure of market prices. As I read Mises — largely influenced by Salerno’s interpretation — the entrepreneur plays a different role in Mises’s system, namely deliberate, active, purposeful action in the face of uncertainty in pursuit of economic gain. In the former approach, the market does the work, and the entrepreneur need

not be “rational,” only alert to preexisting opportunities. In the latter, the entrepreneur makes use of monetary calculation to plan and act to bring about an improvement in market conditions. I view my own work here as largely an extension of Salerno’s interpretation of Mises.

While some of Salerno’s contemporaries such as Israel Kirzner and Leland Yeager challenged Salerno’s “two Austrian traditions” thesis (Yeager 1994; Kirzner 1999), Salerno’s intellectual mentor, Murray Rothbard, embraced it. Indeed, Rothbard hailed Salerno’s work on calculation and knowledge as a major advance in the Austrian tradition, and an improvement on his own understanding. Rothbard (1989) described Salerno’s “Social Rationalist” paper as “a wonderful, superb advance and breakthrough, not only in the history of economic thought, but also in economic theory itself. ... In a sense, this sort of breakthrough experience is something like the joy of an intellectual conversion.” Rothbard went on to note that while he had harbored reservations about Hayek’s emphasis on the division of knowledge and coordination of plans, he had never quite been able to articulate why he felt uncomfortable about Hayek’s approach to the calculation problem. “Even though steeped in Mises, I had never really paid enough attention to his society-as-division-of-labor theme, and the crucial rationalism there.” Rothbard also described Salerno’s “Mises and Hayek De-Homogenized” as “a magnificent achievement.”

Most important, Rothbard (1989) saw Salerno’s contributions as exemplifying the general pattern of advance and development within the Austrian school:

Your article also points up an important point for the history of thought generally and for Austrian economics in particular. People have bitterly accused me of resisting all change in Austrian economics and of denouncing any differing opinions. Not true: I welcome change and advances in Austrian theory provided that they are true, i.e., that they work from within the basic Misesian paradigm. So just as I think I have advanced beyond Mises in developing the Misesian paradigm, people like Hans Hoppe and yourself have advanced the paradigm still further, and great!

Like the contributors to the present volume, I hope to make my own incremental advances to the Austrian tradition by building on Salerno’s work, just as Salerno built on Rothbard, Rothbard built on Mises, and so on.

Another of Salerno's important contributions is his reinterpretation of the rise, decline, and rebirth of the Austrian tradition itself. Most accounts of the Austrian school trace its demise to the 1930s and 1940s, as Austrian capital theory was attacked by Knight and Sraffa and Austrian monetary and business-cycle theory was attacked by Keynes and his followers. The rise of positivism and mathematical formalism rendered the Austrians' causal, verbal style obsolete anyway. Then — according to the typical account (e.g., Vaughn 1994) — the Austrian school experienced a dramatic revival following the South Royalton conference and Hayek's Nobel Prize, both of which occurred in 1974.

Salerno offers two important corrections to this story. First, he argues that the core of the Austrian system as it developed in the late nineteenth and early twentieth centuries was not its distinct approach to money and the business cycle, but Menger's causal, realistic account of price formation (Salerno, 1999). Austrian economics was not — as even some contemporary Austrian economists seem to believe — verbal Walrasian or Marshallian microeconomics plus capital-based macroeconomics (and spontaneous order and plan coordination and the knowledge problem as additional glosses). Instead, Austrian economics was a different kind of microeconomics. As Salerno demonstrated, Mengerian price theory peaked before 1920 following the contributions of Böhm-Bawerk and a few European Mengerians, and the particularly important work of the English economist Philip Wicksteed and the Americans John Bates Clark, Frank Fetter, and Herbert Davenport. Unfortunately, during this time most younger European, British, and American economists were adopting Marshall's eclectic, mechanistic approach, and interest in Menger faded. More important, the "fourth" generation of the Austrian school, led by Hayek and including Morgenstern, Haberler, and Machlup, were heavily influenced by Schumpeter, who had introduced Walrasian price theory to the German-speaking world. In other words, by 1920 most economists, including the younger Austrian economists, had abandoned the causal, realistic approach to value, prices, and markets offered by Menger and Böhm-Bawerk.

The importance of Mises's *Human Action* (1949) is not, in this interpretation, simply that it provided an overview of Mises's mature thinking on a variety of economic topics — a sort of advanced Austrian textbook. As Salerno (1994; 1999) argues, Mises's treatise offered no less than a rehabilitation and restatement of Mengerian price theory, one further developed by Rothbard in his *Man, Economy, and State* (also widely mistaken for a textbook). Salerno is himself a major contributor to this revival of Austrian price

theory, in particular by highlighting and developing the various equilibrium constructs used by Mises and Rothbard (e.g., the “plain state of rest,” the “final state of rest,” and the “evenly rotating economy,” and what Salerno (1994, p. 99) calls the “Wicksteedian state of rest,” a concept implicitly, but not explicitly, analyzed by Mises and Rothbard).

Second, Salerno (2002) argues that the Austrian revival should be dated not from 1974, starting with the South Royalton Conference, but from 1962–63, when Rothbard published *Man, Economy, and State* (1962), *America’s Great Depression* (1963), and *What Has Government Done to Our Money?* (1963), the works that sparked the younger South Royalton participants’ interest in Austrian economics. Interestingly, these works all deal with what I have called “mundane Austrian economics” (Klein 2008b) — the analysis of value, prices, markets, money, capital, and government intervention — and not the more esoteric philosophical, methodological, and political topics that interest so many Austrians today. Salerno’s introduction to the 2009 edition of *Man, Economy, and State* is a major contribution to doctrinal history in its own right, pointing out Rothbard’s many advances beyond Mises, particularly in the areas of capital theory and monopoly theory.

In all these revisionist essays, Salerno demonstrates a keen grasp of the underlying theoretical and doctrinal issues, bringing out nuances and subtleties overlooked by other writers. Indeed, many Austrian writings on the Austrian school paint a somewhat tedious and even maudlin picture in which the major thinkers and writers agree on fundamental issues and are united in a desperate battle against socialists, Keynesians, and interventionists. As Salerno points out, the truth is far more interesting. While the early and later Austrians shared many core constructs, theories, and doctrines, there was a tremendous variety of ideas and approaches within the Austrian school, as there continues to be today. The Austrian tradition from its inception was a living, breathing, and lively intellectual movement, filled with internal as well as external controversy. This variety continues to the present, and it is important to review, analyze, sometimes synthesize, and other times disentangle the different theories and methods. Far from indicating weaknesses within Austrian economics, these controversies demonstrate its strength. *Vive les différences!*

To summarize, Salerno’s contributions range across a variety of subjects (money, price theory, comparative economic systems, doctrinal history, and more) and employ a variety of methods, while remaining squarely in the causal-realist tradition established by Menger, Böhm-Bawerk, the

Anglo-American Austrians, Mises, and Rothbard. He is an exceptionally clear thinker and an excellent writer, witty and erudite as well as thoughtful and informative.

I met Joe Salerno in 1989 at an early edition of the Mises Institute summer instructional conference (later expanded into today's "Mises University"). He was already a rising star in the Austrian movement, but came across then — as he does now — as a regular guy, a wisecracking, sharp-tongued, unpretentious, rough-hewn fellow from New Jersey. He remains one of the funniest people I've ever met, and I can't recall how many hours I've spent laughing with him (and his charming wife Helen). I've lectured, along with Joe, at the Mises University for the last twenty years, and he is enormously popular with students, for his humor as well as his knowledge.

Joe took over for Guido Hülsmann as director of the Mises Summer Fellows Program in 2004, and it has been a joy to watch him embrace the role of mentor for dozens of younger scholars, many of whom have contributed to the present volume. Besides having a huge influence on his contemporaries, Joe has become the leader of the Austrian movement to its younger practitioners. Speaking for my fellow Austrians, I can say, with pleasure, that we are all Salernians now.

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