Ludwig von Mises Institute of Canada
www.pricesandmarkets.org Volume 7, Issue 1, SUMMER 2019

Journal of Prices & Markets

ESSAYS

BOOK REVIEW

ISSN 2291-6172

"Economics is mainly concerned with the analysis of the determination of money prices of goods and services exchanged on the market. In order to accomplish this task it must start from a comprehensive theory of human action…. It must not restrict its investigations to those modes of action which in mundane speech are called "economic" actions, but must deal also with actions which are in a loose manner of speech called "noneconomic." — Ludwig von Mises

Competition for Antitrust: The National Civic Federation and the Founding of the FTC

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Abstract

Regulation by the state can benefit or harm any business in society. While the market provides for consumers rather than special interests, rationally acting interests will be incentivized to use political means to capture rents, particularly if public clamor for regulation exists. The formation of the Federal Trade Commission, rather than providing a check on business interests, follows the pattern of regulatory capture. The National Civic Federation, a group with strong business interest ties, was crucial to ensuring this outcome at the commission's founding.

Keywords: Regulatory Capture, National Civic Federation, Federal Trade Commission, Regulation, Interventionism

JEL Codes: G38, N41, N42, P16

Introduction

The machinery and power of the state is potentially harmful or potentially beneficial to every industry, and it is in the best interest of an industry to ensure the latter result rather than the former (Stigler 1971: 3). The state in exercising its authority "can and does selectively help or hurt a vast number of industries" through its ability to "prohibit or compel, to take or give money" (Stigler 1971: 3). Even the possibility of being regulated creates an incentive for special interests to utilize the power of the state to their own advantage, acting as political entrepreneurs to further their own agendas. Under the institutional structure of the market economy, it is only by continually satisfying consumers that any individual firm or industrial group succeeds (Mises 1949[2007]: 270). The unhampered market provides no security for special interests. Rather, the demands of the consumers for the greatest satisfaction are the driving force of economic activity and create self-regulating tendencies in the market. It is the consumers' "buying and their abstention from buying [that] decides who should own and run the plants and the farms. They make poor people rich and rich people poor…They are merciless bosses, full of whims and fancies, changeable and unpredictable. For them nothing counts other than their own satisfaction" (Mises 1949[2007]: 270). Producers who continue to provide satisfaction to their consumer base survive in the competitive market; those who fail to provide satisfaction do not.

However, once the specter of government intervention is introduced, and the market is no longer unhampered, room becomes available for the formation of special interests to seek government interference in favor of their industries. It is under the interventionist scenario that regulatory capture occurs, where "bureaucrats, regulators and politicians cease to serve some notion of a wider collective public interest and begin to systematically favour specific vested interests, usually the very interests they were supposed to regulate and restrain for the wider public interest" (Baker 2010: 648). Regulatory capture by special interests can have dramatic effects upon the structure and dynamic capability of the economy. Note that the interventionist system does not change the self-interested behavior of the producers; it merely changes the field upon which they compete. While the unhampered market arrangement keeps the producers in a system of competition in production, the interventionist arrangement[1] leads those producers to become more heavily invested in the process of regulatory oversight. Stigler (1974: 5) argues that one such regulatory intervention "commonly sought by an industry is control over entry by new rivals. There is considerable…discussion in economic literature of the rise of peculiar price policies (limit prices), vertical integration, and similar devices to retard the rate of entry of new firms into oligopolistic industries." When a regulatory body is given the authority to construct barriers to entry into an industry and define the acceptable or legal methods for engagement within that industry, the regulators become the "producers", though they are in a position[2] which does not force them to compete for "consumers" in the same manner as that of the producers in industry. Rather, the regulator to industry relationship becomes more a system of the provision of rents based on competition in willingness to pay on the part of the industry.

Competing interests vie for beneficial regulations and attempt to mute the damage of those which are, or potentially are, harmful. The regulator's ability to provide for the interest will be subject to a weak constraint of public appeal, but this only binds insofar as the regulator's actions threaten his reelection. As long as the regulator is able to couch legislation in terms that the public favors, he will have far greater leeway to entice industries' engagement in willingness to pay competition (see Yandle 1983: 12). The industry wishing to capture the legislation must be able to provide the greatest amount of both votes and resources to the regulator (Stigler 1971: 12). The result is, in essence, a regulatory auction, though it is an auction done through a democratic process which allows those involved to hold a measure of respectability in view of the public. Perhaps ironically, the regulator may be found to be as unstable a taskmaster as a market consumer, favoring whichever side provides the highest benefit while remaining committed to that side only if it proves the stronger, i.e., a better source of gains to the regulator.

In this paper, we explore the role of special interests and regulatory capture in one of the United States' most foundational regulatory endeavors: the formation of the Federal Trade Commission (FTC). We will consider the historical role of the National Civic Federation (NCF) in the creation of the FTC as a response to the antitrust legislation movement at turn of the 20th century. The FTC was formed during what is now considered the Progressive era[3], often viewed as a period where the "progressive" idea was one of "political rationalization of business and industrial conditions, a movement that operated on the assumption that general welfare of the community could be served best by satisfying the concrete needs of business" (Kolko 1963: 2-3). Essentially, the prevailing view was that government needed to regulate business in order to best serve society. As Woodrow Wilson (1912: 188) said in a speech to the Economic Club of New York,

> Government cannot take its hands off of business. Government must regulate business, because that is the foundation of every other relationship, particularly of the political relationships. It is futile, therefore, to have the politicians take their hands off. They may blunder at the business, but they cannot give up. They may make fundamental mistakes – they will make a great many if you do not frankly assist and instruct them – but they must go forward whether instructed or not.

Businessmen, particularly those considered big business, went along and called for regulation. The problem, as Kolko (1963: 3) notes, is "the regulation itself was invariably controlled by the leaders of the regulated industry, and directed towards ends they deemed acceptable and desirable." As we will show, the founding of the FTC succumbs to exactly this outcome.

The economic tradition is no stranger to the theory of regulatory capture. Stigler (1971)

[1] This type of regulatory interventionism aims to retain a system of private property while imposing authoritarian commands to restrict and control property owners. The commonly stated justifications for such regulatory intervention into the market are to "combat suspected failures or abuses they [those claiming market failure] associate with the unhampered market" (Ikeda 2005, 21).

[2] As Stigler (1971: 4) notes, "The state has one basic resource which in pure principle is not shared with even the mightiest of its citizens: the power to coerce."

[3] The progressive era is usually considered to be from about 1900 to about 1916. Rothbard (1986: 109) claims, however, "Historians now realize that the period is really much broader, stretching from the latter decades of the nineteenth century into the early 1920s."

illustrates the incentives industries have for attempting to capture government regulation for their own benefits. Yandle (1983) shows that each regulation requires support from multiple angles, so that the regulations most likely to be politically successful come from the confluence of interest with those who give the public rhetoric and those who stand to gain. Becker (1983) argues that regulators favor the politically powerful through a process of competition for political favors. Friedman and Friedman (1984) stress that the interactions of powerful industry members, vested regulators, and connected politicians create an iron triangle of interests that can be very difficult to break once formed. Baumol's (1990) important contribution is to show that entrepreneurship can occur in multiple ways, including manifestations in the public sphere that may be unproductive or even destructive. Coate et al (1990) provide evidence that the modern FTC is influenced by both legal and political pressures (see also Reksulak 2010). Laffont and Tirole (1991) examine the nature of political influence that industries may hold over a regulating agency. Baker (2010) argues that regulatory capture led to the 2007-2008 financial crisis and provides an overview of the lifecycle of regulatory capture more generally.

The following pages will apply a theory of regulatory capture to the Progressive era regulation, particularly through a study of the passage of the Federal Trade Commission Act of 1914. During this era, the National Civic Federation acted as a political entrepreneur in order to capture regulation, namely the Sherman Antitrust Act of 1890 and its subsequent revisions.[4] The remainder of the paper is organized as follows: Section II explains the historical background of the NCF within the context of the Progressive era and Woodrow Wilson's New Freedom. Section III details the NCF's strategic use of the government in founding the FTC. Section IV concludes.

The National Civic Federation and Wilson's New Freedom

Before continuing into a discussion of the NCF's role in the passage of the FTC act, it is important to provide background on the Federation itself, explaining what it was and the setting within which it operated. This section will briefly lay out the context of the Progressive era, Woodrow Wilson's New Freedom, and the National Civic Federation.

The Progressive Era

The Federal Trade Commission Act of 1914 was passed near the end of the Progressive era. The act itself can be considered the culmination of the Progressives larger goal of providing a solution to the problem of trusts. These larger companies were merging together and dominating the market. As the economic strength of these companies became too great, it was believed, and is still believed by many today, that the state needed to intervene to assure competition by eliminating the trend towards monopolization (Glaeser and Shleifer 2003: 401-402; Djankov, Glaeser, La Porta, Lopez-de-Silanes, and Shleifer 2003: 606-607).

This historical scenario, however, is not entirely accurate. Though the size of the firms was indeed increasing, the dominant tendency of the time was actually one of growing competition (Folsom 1987: 131-133; Armentano 1999: 39-44; Boudreaux and Folsom 1999: 556-560; see also Young and Shughart 2010: 412). This "competition was unacceptable to many key business and financial interests, and the merger movement was to a large extent a reflection of voluntary, unsuccessful business efforts to bring irresistible competitive trends under control" (Kolko 1963: 4). Industrialization expanded the capacity of the economy, and this expansion brought new competitors into the market. The influx of these new competitors sent many businessmen into the halls of the state to plead for interventions that would secure their place in industry.

The Sherman Antitrust Act of 1890 was an early attempt at procuring security in industry, though this Act was an attempt by small and medium sized businesses to protect themselves from the greater efficiencies of the larger businesses within the same or competing industries (Kolko 1963: 61-63, 166; Weinstein 1968: 62-63; DiLorenzo 1985: 75-77; Armentano 1999: xi-xii). As DiLorenzo (1985: 81) notes, the Sherman Act was due to Congress's objections "to the fact that less efficient (smaller) businessmen ('honest men') were driven out of business. The fact that these and other businessmen voted and contributed in other ways to political campaigns surely helps to explain this stance taken by the Republican-controlled Congress." The small and medium sized businessmen sought regulatory protection for their interests, attempting to use antitrust laws as a way of threatening or tearing down their larger competitors when those competitors became too problematic. Despite the usual consensus of historians "it was not the existence of monopoly that caused the federal government to intervene in the economy, but the lack of it" (Kolko 1963: 5). Nevertheless, "trustbusting" was a major issue for many politicians of the era, particularly Presidents Theodore Roosevelt, Taft, and Wilson. Roosevelt's crusade[5] in particular forced business leaders, such as George W. Perkins, Elbert H. Gary, Seth Low, August Belmont, Andrew Carnegie and, John Hays Hammond (Kolko 1963: 131),[6] to realize that these efforts could either be used to their advantage or disadvantage.

An analysis of the history of the Progressive era, in light of the role that special interests play, makes it more difficult to portray Progressivism "as essentially a middle-class defense against the status pretentions of the new industrialists, a defense of human values against acquisitive habits, a reassertion of the older tradition of rural individualism" (Kolko 1963: 8) and more the case that "it is business control over politics (and by the 'business' I mean the major economic interests) rather than political regulation of the economy that is the significant

[4] The NCF is capturing the regulation because the amendments made to the Sherman Antitrust Act shift the benefits of Trust regulation from small business to big business.

[5] According to Dorsey (1995: 728), Roosevelt sought to pressure businessmen into reforming themselves. "He believed that the very threat of anti-trust legislation might convince corporate leaders to do business in the proper spirit of public service. He put the captains of industry on notice that if they failed to police themselves, to engage in what he considered moral behavior, then government would be forced to intervene" (Ibid.). In his attempt to do so, Roosevelt had a direct effect on who the Attorney General sought under antitrust law, personally directing him who to file suit against and who not to (Bittlingmayer 1996: 386).

[6] Many of whom were members of the National Civic Federation (Kolko 1963: 131). Carnegie and Hammond would both be very influential in the formation of Federal Trade Commission, the former for his hand in constructing an early draft of a bill outlining such a structure and the latter for his engagement with Washington during the period such bills were under consideration. As Weinstein (1968: 71) notes, "These men, although close to Roosevelt, greatly feared public clamor for regulation and his of 'Trustbusting' as a political issue. It was clear to them that when Roosevelt denounced 'bad' trusts his main target was Rockefeller and his Standard Oil Company, rather than the Morgan and other corporations in the Civic Federation."

phenomenon of the Progressive era" (Kolko 1963: 3). Businessmen desired to and succeeded in strategically using the power of the state in order to achieve for themselves more stability, predictability, and security. These businessmen desired what they called "rationalization," which was the "organization of the economy and the larger political sphere in a manner that will allow corporations to function in a predictable and secure environment permitting reasonable profits over the long run" (Kolko 1963: 3). Essentially, businessmen recognized the insecurity that comes with the unhampered market. State intervention into the economy in a manner that businessmen desired would have concentrated benefits for them and dispersed costs amongst the consumers and other competitors. Thus, the Progressive era can be viewed as the state organizing special interests against the common interests.

Woodrow Wilson's New Freedom

By 1912, there were two issues of utmost significance for Progressives: 1) what type of relationship should exist between the federal government and large corporations, and 2) how to address the socialist challenge to the corporate system while still maintaining the loyalty of the workers and farmers (Weinstein 1968: 117). These issues were not considered unrelated. The Progressive view held that correctly addressing the relations between government and business was necessary for rebuffing the tide of socialism. For President Wilson, the relationship had to be one of cooperation. It was never in question whether business should be regulated; the question was only one of what manner of regulations should take place and who should be involved in the regulating. As Wilson (1912: 187) proclaimed in a speech before the New York Economics Club, "Now, no study of the history of Government can be candidly made which will not lead to this conclusion – that the very things that government cannot let alone is business, for business underlies every part of our life; the foundation of our lives, of our spiritual lives included, is economic." Wilson's view at the time was that businessmen were not doing enough to combat socialism. In the same speech, he notes,

> The moral of the whole matter is this: The business of the United States is not as a whole in contact with the government of the United States. So as soon as it is, the matter which now give you, and justly give you, cause for uneasiness disappear. Just so soon as the business of this country has general, free, welcome access to the councils of congress, all the friction between business and politics will disappear (1912: 200).

Without business and government bonding together to control and regulate business, Wilson believed, the socialists could very well take over the nation. In his view, the only thing to hold back the "rising tide of socialism" was a program of cooperation between government and business where both agreed to act in concert rather than in contrast (Wilson 1912: 213). As we will show, businessmen were aware of the advantages of bonding with government, although with less noble intentions than what Wilson proposed.

In an effort to create this cooperative bond between business and government, Wilson enacted Progressive policies that have become collectively known as the New Freedom.[7] This program of policies is the result of a public outcry for reform. Wilson answered the call for such reform. "Big business" welcomed the opportunity, despite the vagueness and inconsistencies in Wilson's rhetoric concerning the New Freedom. Wilson's rhetoric would at one moment disparage and claim to be against big business, while in the next moment claim to be against only the trusts. In doing either, he was never able to clearly define the two: big business or trusts (see, for example, Wilson 1913; Kolko 1963: 206-211; Weinstein 1968: 162-163). Still, Wilson (1913) attempted to be clear that he was not against big business on its own, claiming "Big business is no doubt a large extent necessary and natural. The development of business upon a great scale of co-operation, is inevitable, and, let me add, is probably desirable."

Though his rhetoric may have been ambiguous, that Wilson was not against big business can be seen clearly in how pleased big business was with Wilson's overall program. Most of "the new laws attacking unfair competitors and price discrimination meant that government would now make it possible for many trade associations to stabilize, for the first time, prices within their industries, and to make effective oligopoly a new phase of the economy" (Kolko 1963: 268). While the stated goals of the New Freedom were to reduce tariffs, reform the inept national banking system[8], and most importantly strengthen the Sherman Act, it should be clear that the intentions were actually to have business reduce competition. Nevertheless, by the end of 1914, Wilson had proclaimed,

> Our program of legislation with regard to regulation of business is now virtually complete. It has been put forth, as we intended, as a whole, and leaves no conjecture as to what is to follow. The road at last lies clear and firm before business. It is a road which it can travel without fear or embarrassment (Quoted in Kolko 1963: 269).

Wilson's New Freedom played an important role in the actions taken by businessmen, particularly those who belonged to the National Civic Federation, to which we now turn.

The National Civic Federation

The National Civic Federation (NCF) was a federation of business and labor leaders in the United States during the early 20th century. Founded in 1900 by Ralph M. Easley[9], the NCF favored moderate Progressive reform that represented those leaders who made up its parts: business and labor. In essence, it was a conservative organization that sought to oppose the radicals of the working middle classes, socialists and "anarchists" among businessmen. "Anarchists" among businessmen, in this context, were those businessmen who favored no government involvement at all in business, i.e., those who favored *laissez faire* principles[10]. As Weinstein (1968: 7) notes, "The federation was organized in three nominal divisions,

[7] In reality, the New Freedom was intended more as a campaign document.

[8] It is during the same era that the Federal Reserve Act of 1913 is passed.

[9] Easley was a late 19th – early 20th century journalist and political activist.

[10] Of these supporters of laissez faire, the particular group in conflict with the NCF was the members of the National Association of Manufacturers (Weinstein: 1968: 5).

representing business, labor and an undefined public. Business leaders were of central importance, but the leading trade unionists of the day were members, as were professionals, political leaders, university presidents, newspaper publishers and editors, and leaders of the conservative farm organizations." The main goal of the NCF was the "rationalization, conciliation, and reform based on cooperation with representatives of organized workers, farmers, academics and reformers" (Weinstein 1968: 7). The NCF's use of the term "rationalization" mirrors that of the Progressives: a stable and secure (secure from competition) environment in which corporations can operate with the expectations of steady profits.

Despite the claim of representation from across the business spectrum, the NCF leadership was overwhelmingly dominated by big businessmen. These businessmen largely viewed the instability of the corporate system as a problem between capital and labor. They wanted to form a mutual trust between labor and business, or as businessmen and NCF member Marcus Hanna (1903: 7) phrased it, to "lay the foundation stone of a structure that will endure for all time." This coalition was the major focus of the Federation during its early years. It was considered conservative because the goal was essentially to maintain the same manner of doing business in light of the trade union movement. Many people at the time viewed the trade union movement as a permanent institution in American life, though even many businessmen of the NCF would only recognize unions when compelled to do so (Weinstein 1968: 11-15).[11] Aside from the issue of organized labor, the NCF also sought other reforms from the government, reforms that furthered their own interests. The area of antitrust was a particular one where members desired reform.

Many of the big businessmen disliked the Sherman Antitrust Act[12] due to its vague content. Businessmen saw this vagueness as a potential problem, particularly during Roosevelt's tenure in office and at the time Wilson was engaging in his ambiguous New Freedom rhetoric. Roosevelt would often make a distinction between "good" and "bad" trusts, making businessmen uneasy. Wilson's later inability to clearly define his terms added to this unease. Even labor leaders took issue with the wording of the Sherman act, understanding their need to be sure that "nothing contained in the antitrust laws shall be construed to forbid the existence and operation of labor organizations" (quoted in Kolko 1963: 263). Unionists wanted to be sure that trade organizations were exempted from the antitrust legislation. The ambiguity and problematic powers of the Sherman Antitrust Act were fundamental factors motivating the NCF's campaign for antitrust reform.

The NCF and the FTC

From its founding in 1900 until the 1914 enactment of the Federal Trade Commission Act, the National Civic Federation regarded antitrust regulation as being of utmost importance. Easley was inspired to found the NCF while attending a conference on trust regulation held in Chicago in 1899 (Weinstein 1968: 7-8). The vagueness of the Sherman Antitrust and a number of judicial actions stretching from 1890 to 1914 lead many corporate leaders to call for reform, though not abolition, of trust regulation. The Trans-Missouri Freight Association case of 1897 had laid down a particularly narrow view of the Sherman Act (Weinstein 1968: 62-63). During this case, the Supreme Court had declared there was no difference between reasonable and unreasonable restraints on trade. Both were considered illegal. However, even after this ruling, there was still a certain level of vagueness in regards to the application of the Sherman Act, as the Supreme Court remained "sharply and closely divided over such constructions of the Sherman Act" (Sklar 1988: 128). The sharpened definition meant that an even greater portion of the industrial world may fall into violation of the Sherman Act. In reality, the Act was being used to aid small business, shutting down any firm that grew too large (Kolko 1963: 166-167; Weinstein 1968: 62-64; DiLorenzo 1985: 74-77; Armentano 1999: 39-44). The leaders of the NCF desired some way of both quieting public demands against trusts and lowering the strictness of enforcement through the Sherman Act in general.

In 1906, the NCF began drafting plans to revise the Sherman Act along the lines of these objectives. The Federation received much support in their desire to reform trust regulation. As Fuller (1907), a lawyer from New York, told Easley during correspondence that "the so-called Sherman Anti-Trust Law, passed July, 1890, has not been improved by any of the ancillary laws passed since that time. All such laws, as well as most of the decisions on such subjects by the Supreme Court of the United States, have added to the government, and constantly diminished the rights of businessmen to do business." In 1907, the NCF held a national conference in Chicago to deal with the issues of trust regulation. The Federation invited to this conference "governors of the various states, commercial, trade, and other organizations" (Weinstein 1968: 73). According to the invitation letters, the topics of discourse were,

> (1) Government power over corporations engaged in interstate commerce; the division of power under the constitution between the nation and the state. (2) How should the corporation be constructed; should there be national corporations as well as state; the basis of capitalization of corporations; their internal control; provisions looking to the protection of investors and the stockholders, as well as fair dealing with the public; distinction between public and other corporations. (3) The just and practicable limits of the restriction and regulation, federal and state, of combinations in transportation, production, distribution and labor (National Civic Federation 1907).

The result of the conference was to have "produced a general set of principles, or approaches to the problem of consolidation and combination that helped lead the way back to a common law approach, adjusted to the conditions that existed as a result of the emergence of the large corporations as the dominant form of economic organization" (Weinstein 1968: 74). By taking action with the conference, the Federation won greater support from many reformers. The reform of the Sherman Act became seen as necessary.

After the 1907 conference in Chicago, Congress asked the NCF to design a bill that would provide their suggestions for trust reform. This draft became known as the Hepburn Bill, proposing "Reestablishment of the common law doctrine of distinction between reasonable

[11] This indifference stands in contrast to the National Association of Manufactures, which was consisted of small and middle-range manufactures who were openly and adamantly hostile to organized labor in all its forms.

[12] The Sherman Antitrust Act of 1890 required the Federal government to investigate companies suspected of forming cartels and monopolies.

and unreasonable restraint of trade" (Weinstein 1986: 78). The bill was intended to amend the Sherman Act; however, it found little support from small and medium sized businesses. Labor leaders also harbored concerns over this proposal. In a letter to Easley, lawyer and Federation member Edgar Bancroft (1908) notes,

> The reports in the morning papers of the conference at the White House concerning proposed amendments of the anti-trust law are rather disquieting to our friends here. They are suspecting that the labor elements are getting the "long end" of the bargain, and that there will be little or nothing for the business interests in the proposed changes.

The Hepburn Bill was politically infeasible due to the heavy objections from other interest groups, and as a result it did not pass.[13] The defeat of the bill, however, did not end the Federation's attempts at reform. As Weinstein (1963: 82) states, "As early as 1908 both Andrew Carnegie and Melville E. Ingalls had suggested to the Civic Federation an alternative that was to succeed – the idea of an interstate trade commission, modeled on the Interstate Commerce Commission and the British Board of Trade." To make such a commission a reality, the Federation set up a new committee in 1909 with the express purpose of proposing new legislations to enact the commission.

By 1911, it became apparent that some form of a trade commission was assured (Kolko 1963: 199; Weinstein 1968: 88-91). The Federation began new efforts at this time to propose a bill. The NCF wanted to build the commission in such a way as to give big business control over economic questions. As engineer, businessman, and Federation member John Hays Hammond (1911) noted during a lecture in Washington that the "Commission should consist chiefly of businessmen and with them should be associated experts on economic subjects and lawyers who have had extensive corporate practice" and that "this commission considerable latitude should be given in the exercise of its discretion as to economic questions; but should be, at the same time a legal tribunal to which appeal could be made, especially on legal issues, from the decision of the commission." The commission would, under the control of these businessmen, be able to curtail, not eliminate, competition to allow corporations to achieve the "rationalization" that they desired. One of the goals of the commission would be to limit the competition that was produced under the unhampered market system. As Hammond (1911) continued, "Ruinous Competition, involving the conduct of business without profit, is not to be encouraged, but, on the contrary, should be depreciated, as it deters the investment of Capital and other Kindred enterprises." In order to make their bill more feasible than the last one, the NCF sent questionnaires to about thirty thousand businessmen asking about the desirability of such a commission (Weinstein 1968: 87). On the legislative side, the Federation established a new committee, consisting of members of the Federation, including economist John B. Clark to prepare the bill. The completed bill was sent to Senator Newlands, Representative Clayton, President Wilson, and the President's new commissioner of corporations, Joseph Davies.[14] As Kolko (1963: 259) notes,

> The federation's plan provided for a seven-man Interstate Trade Commission chosen by the President and with powers of investigation and subpoena, and the ability to refer its complaints to the courts and fine companies $5000 for each violation. The commission could license corporations, and would require annual reports. Its jurisdiction would apply to companies with sales of $10 million and up. The proposal received an important circulation and a copy was sent to Wilson, while Davies also discussed the matter with Davies in detail.

By this point, the Federation had secured government support, with Wilson publicly declaring the need for such a commission on January 20, 1914. The next day, Newlands and Clayton introduced identical bills into Congress (Kolko 1963: 261-263; Weinstein 1968: 88). Other commission bills were introduced into Congress around the same time, but it was the Newlands bill that resembled the Federation's draft. The NCF's draft differed in that it included the federal licensing provision for interstate business conduct which did not make its way into the final Federal Trade Commission Act. However, the NCF draft "was almost a model for the final legislation in every other respect" (Weinstein 1968: 89). The Act passed through Congress and was officially signed into existence in September of 1914.

The Federal Trade Commission Act was the culmination of years' worth of campaigning from the National Civic Federation as well as the finale of Wilson's New Freedom. The FTC Act established a commission of five members, appointed by the President with the approval of the Senate. Of the five members on the commission, no more than three could be from any one party. The duty of the FTC was to prevent unlawful methods of competition, methods which they deemed to be unfair, from being used. The commission would investigate these unfair practices and issue "cease and desist" orders to businesses, with the orders being enforced by Circuit Courts.[15] Other powers granted to the commission included compelling businessmen to provide information and advising the Attorney General on correcting corporate actions.

The establishment of the FTC and all that it embodied was a success in the view of the National Civic Federation. As Weinstein (1968: 89) points out, "the ideas embodied in the Federal Trade Commission Act represents a triumph of the agitations and education done by the NCF of the previous seven years." The real reason for this triumph goes beyond what was stated in the act itself, however, As Kolko (1963: 267) states, "all and all, the Act was vague and unclear, failed to exclude businessmen from membership on the commission, and left a great area for free interpretation of the law." Not only did the legislation fail to exclude big businessmen, the Wilson's first appointees to the commission were Joseph Davies, Edward N.

[13] Bittlingmayer (1996: 385) attributes the failure of Hepburn bill to the increased power of the presidency that it contained, noting that "Roosevelt endorsed it at first. It would have increased the power of the presidency and allowed a graceful retreat on the trust issue. Reaction to the bill turned hostile, however, in part because it increased the executive's powers. It became clear a winning coalition could not be formed, and his administration put itself at ever greater distance from it."

[14] Davies, as chairman of the Democratic Party of Wisconsin and head of Wilson's campaign in the western states, had been instrumental in ensuring Wilson's 1912 electoral victory (MacLean 1992: 10-11).

[15] By 1915, Davies and the other initial members of the commission would expand the commission's power such that "[i]f a company or association filed information on a proposed act, the commission could file a complaint if it thought the suggestion illegal" (Kolko 1963: 272). This added function allowed the commission leeway to begin defining unfair practices through "conference rulings" to be viewed as precedents for future decisions (Kolko 1963: 272-273).

Hurley, William J. Harris, Will H. Parry, and George Rublee.[16] Nearly all of the first commission, intended to regulate businessmen, "was composed of individuals with business backgrounds or long pro-business records. The domination extended to even routine jobs in the bureaucracy, and applicants were asked to present 'letters of endorsement from some good, sound businessmen'" (Kolko 1963: 271). The pro-business influence of the newly formed FTC was clear in "its [favorable] position on trade associations in general and export trade associations in particular", associations directly formed for "the maintenance of prices and the elimination of internecine competition" (Kolko 1963: 275). The commission supposedly designed to protect the public from business (Wilson 1912: 188) became responsible for enforcing price fixing agreements.

With the commission enacted, businessmen would be able to aptly shape the legal prescriptions along with the President and diminish the fear of big business in the eyes of the public. Through the working of the commission, they would be able to do so on their own terms. In the words of Joseph Davies, "Nobody is henceforth going to be afraid of or suspicious of any business merely because it is big" (quoted in Kolko 1963: 270). Whether or not this statement is true is a question that is open to debate. However, what is clear is that the members of the NCF had successfully acted as political entrepreneurs and captured trust regulation for their own gain.

Conclusion

Taking into account the rational choices made by key business and political leaders during the time, it becomes more difficult to claim the Federal Trade Commission Act was passed with only the common good in mind. In reality, the National Civic Federation, a group consisting mostly of those leaders acting as political entrepreneurs, was able to capture trust regulation in order to restrict competition in their favor, while at the same time protecting themselves from the harmful effects of regulation held by other parties.

The first implication of the preceding analysis is that the Federal Trade Commission was captured by special interests even from its outset. This historical view may have further implications for its regulatory precedents and the agency's behavior over time. A second implication is that in-depth historical narratives are important for understanding the true nature of economic, political, and regulatory agencies. Considering the insecurity that the unhampered market provides to producers and Stigler's (1971) capture theory of regulation, it is possible to conceptualize the events above as one of just such a capture. Businessmen will desire to control regulation in their favor and escape the insecurity of the market. When faced with regulation, these businessmen will prefer to assure the benefits that can come with the regulation rather than face the harm. The progressive era illustrates this point, showing that businessmen fought to control politics rather than having politics control them.

[16] Hurley was a manufacturer and president of the Illinois Manufacturers Association. As Kolko (1963: 270) notes, "Hurley had aided Wilson's political career in 1910 as an intermediary with the Democratic Party of New Jersey." Hurley would also become the second chairman of the FTC, further solidifying the commission's relationship with trade associations. Harris was a businessman from Georgia. Parry was a former newspaperman and shipbuilder. Rublee was an attorney with the Progressive Party, sharing in that party's beliefs about the trust issue (Kolko 1963: 264).

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What Is Bitcoin?

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Abstract
The aim of this paper is to answer the question of what—from an economic point of view—Bitcoin is. For this purpose, I review the literature, discussing different views on the matter. Using the typology of money developed by Mises, I argue that Bitcoin is a private fiat medium of exchange, which, however, does not disprove the regression theorem. I also point out that Bitcoin is both a currency and a payment system based on the blockchain technology. The establishment of the nature of Bitcoin will allow for debunking some myths about this currency and for a reliable forecast of its further development. Although the future of Bitcoin as currency is uncertain, the implications of the distributed-ledger technology may be lasting and far-reaching.

Keywords: theory of money; private fiat money; Bitcoin; blockchain

JEL Classification: B53, E40, E42, G2

[1] The article is a substantially expanded and modified version of the paper entitled "Czym jest Bitcoin?" published in Polish in Ekonomia—Wroclaw Economic Review 9 (4), 2013.

Introduction

Bitcoin is a distributed digital currency chosen by the market and designed by an individual or a group of people known by the pseudonym Satoshi Nakamoto. It is open-source peer-to-peer currency relying on cryptographic principles. Bitcoin was established in 2009, but became well known in early 2013 when its price increased significantly—probably caused by the Cypriot financial crisis.[2]

Although the current use of Bitcoin remains limited, it is certainly one of the most interesting recent developments in modern monetary economics, and therefore merits scientific research. A few years ago, the academic literature on the subject was modest. Since that time, it has grown considerably. Actually, there are a number of different strands of research on Bitcoin.

Many authors focus on technical aspects of Bitcoin: the cryptographic, security, privacy or systemic matters (e.g., Nakamoto 2008; Grinberg 2011; Androulaki et al. 2013). Others examine taxes (e.g., Akins et al. 2013), accounting (e.g., Raiborn and Sivitanides 2015) or the legal status of Bitcoin (e.g., Mafte 2014), or call for regulation (e.g., Turpi 2014; Luther 2016a). Hendrickson et al. analyze the political economy of Bitcoin (Hendrickson 2016), while Brito and Castillo offer a primer for policymakers, giving recommendations on how to treat and regulate Bitcoin (Brito and Castillo 2013).

There is also a growing field of financial analyses. Financial researchers try to determine its price drivers (e.g., Ciaian et al. 2014; Bouoiyour et al. 2015), establish the fundamental value of Bitcoin (e.g., Hayes 2015b), investigate whether its price exhibits speculative bubbles (e.g., Cheah and Fry 2015), examine the operation of the Bitcoin exchanges (e.g., Morten et al. 2015) or see whether Bitcoin is consistent with the hypothesis of efficient markets (e.g., Bartos 2015). Many authors argue that Bitcoin has no intrinsic value and thus is subject to speculation (e.g., Gomez-Gonzales and Parra-Polonia 2014). Chowdhury argue against the diversification benefits of Bitcoin (Chowdhury 2014), while Bouri et al. argue that it is a poor hedge (Bour et al. 2017).

Recently, some social science articles on Bitcoin have also emerged. For example, Angel and McCabe analyze the Bitcoin payment system from an ethical point of view (Angel and McCabe 2015), while Karlstrøm adopts an economic-sociology point of view, examining the material embeddedness of Bitcoin (Karlstrøm 2014). Teigland et al. analyze the institutional

[2] Luther and Salter examine the downloads of Bitcoin-related apps in the aftermath of the initial Cyprus bailout announcement (Luther and Salter 2017).

entrepreneurship in the Bitcoin community (Teigland et al. 2013), while Kondor et al. examine wealth distribution in the Bitcoin economy (Kondor et al. 2014). Bjerg provides a philosophical account of the ontological constitution of Bitcoin (Bjerg 2016), while Dodd analyzes Bitcoin as a social movement (Dodd 2017). There are also a few ethnographic surveys of Bitcoin users (e.g., Fletcher 2013; Wilson and Yelowitz 2014).

Last but not least, there is a growing economic literature on Bitcoin in particular and cryptocurrencies in general (e.g., Dowd 2014). Houy studies the economics of Bitcoin transaction fees (Houy 2014), or arbitrage opportunities in the cryptocurrency market (Hayes 2015a), while others examine the network effects of cryptocurrencies (Gandal and Hałaburda 2014; Cachanosky and Nair 2016; Luther 2016b). Some authors develop the Hayekian notion of competing currencies (e.g., Rogojanu and Badea 2014). Luther and Olson point out that Bitcoin functions as a public record-keeping device (Luther and Olson 2015). Harwick argues that the future of Bitcoin depends on the establishment of financial intermediaries that issue Bitcoin-denominated liabilities circulating as media of exchange (Harwick 2016).

However, the number of articles about the economic nature of Bitcoin remains limited, as few authors discuss the status of Bitcoin and whether it is money (e.g., Selgin 2013; Yermack 2013; Lo and Wang 2014; Ólafsson 2014; Šurda 2014; Wiśniewska 2016). So far, a consensus has not been achieved as to what Bitcoin is from the economic point of view. Some authors (e.g., Yermack 2013) argue that Bitcoin behaves more like a speculative investment than a currency. Others consider Bitcoin money but differ as to what kind of money Bitcoin. Perhaps the lack of a consensus opinion results from Bitcoin's short history, its technically complicated nature and virtual form, and the very fact that the contemporary theory of money was developed long before the emergence of cryptocurrencies.

The aim of this work is to discuss systematically these claims and answer the following question: what is Bitcoin from the economic point of view?[3] The establishment of the nature of Bitcoin will allow for debunking some myths about this digital currency and for a reliable forecast of its further development.

Is Bitcoin money?

A medium of exchange "is a good which people acquire neither for their own consumption nor for employment in their own production activities, but with the intention of exchanging it at a later date against those goods which they want to use either for consumption or for production" (Mises 1998, 398), while money is a medium of exchange that is commonly used (Mises 1998, 395).[4] Hence, to classify Bitcoin as money, it must be a medium of exchange and be commonly used.

It should be obvious that Bitcoin is a medium of exchange, since it is acquired neither for consumption, nor for use in production processes, but for the possibility of future exchanges for other goods (including currencies).[5] Moreover, Bitcoin has many properties thought to be desirable in a medium of exchange. Bitcoins are homogeneous, easily divisible (conceptually infinitely) and recognizable. They also are durable (since bitcoins are virtual, they cannot wear out) and portable (they can be very easily transferred via the internet). Bitcoins cannot be forged, have low storage costs, and are relatively scarce.[6]

The next issue to be solved is whether Bitcoin is commonly used as a medium of exchange. Of course, the term "commonly" is imprecise; nevertheless Bitcoin has not yet reached the status of a good to which all sellers of other goods first convert "their wares and which it paid every would-be buyer of any other commodity to acquire first" (Mises 1953, 32). In other words, practically all goods currently purchased for bitcoins may also be bought for other currencies. Moreover, the list of institutions that accept payments in bitcoins is still relatively short, just as Bitcoin's market capitalization remains relatively small.[7]

Therefore, Bitcoin is a medium of exchange, but not yet money. However, for economic analysis it does not really matter whether Bitcoin counts as money or it is merely a medium of exchange, because"vagueness in the denotation of money in no way affects the exactitude and

[3] I focus on economic aspects because the technical issues of Bitcoin and the overview of how this system works have been widely explained in other articles (e.g., Böhme et al. 2015).

[4] Howden re-addresses the idea of money as the general accepted medium of exchange (Howden, 2014; Howden 2015). He argues that being the generally accepted medium of exchange is notwhat defines money, as it is "rather a function that arises due to the widespread demand foran asset that eliminates risk and uncertainty in the payments system" (Howden 2014, 14). However, money eliminates risk and uncertainty thanks to being the generally accepted medium of exchange. A more detailed discussion of different theories of money is beyond the scope of this paper.

[5] Based on Howden's ideas, it may be argued that Bitcoin is a nonmonetary financial asset (Howden 2016). However, I do not consider financial assets as a separate category of goods, as they are contractual claims on producers' goods. Bitcoin is obviously not a claim on anything. A more detailed discussion of the typology of goods is beyond the scope of this paper.

[6] On the grounds of the algorithm created by Nakamoto, the supply of bitcoins rises asymptotically to reach its maximum quantity (21 million) in 2140.

[7] As of the end of 2015, Bitcoin's market capitalization was $6.76 billion, while the list of merchants accepting bitcoins reached more than 110,000 (Hileman and Ying 2016). Although its use is limited, Bitcoin's marketability has been steadily increasing since its creation. Moreover, its market capitalization is on par with some national fiat currencies (White 2015).

precision required by praxeological theory" and "all that is to be predicated of money is valid for every medium of exchange" (Mises 1998, 398). Thus, we can say that Bitcoin is a medium of exchange, which is a subset of money, or that Bitcoin is money *in spe*.

Not everyone agrees that Bitcoin is (potential) money. Some (e.g., Irdial 2011) argue that Bitcoin is a payment system or a protocol rather than a medium of exchange.Actually, Bitcoin's creator described it as an electronic cash system (Nakamoto 2008). However, if that were true, there would be neither goods prices expressed in bitcoins (just as there are not any goods prices expressed in credit cards or PayPal), nor Bitcoin exchanges, nor Bitcoin prices and exchange rates. Therefore, bitcoins are not merely digital tokens used in a payment system, because digital tokens (e.g., passwords to bank accounts) do not possess constantly changing prices. The belief that Bitcoin is not (potential) money, but only a payment system or a protocol may result from the fact that the name "Bitcoin" describes both a scheme designed to facilitate the transfer of value (payment system) and its own metric of value (digital currency) (Badev and Chen 2014). Unlike mere payment systems, which transfer funds denominated in national fiat currencies, when one uses the Bitcoin system, one has to acquire bitcoins. That means bitcoins are units of a separate currency. If Bitcoin was merely a payment system, we could directly transfer fiat currencies, just like when using PayPal or credit cards.

Others claim that Bitcoin is not (potential) money but merely a speculative asset (e.g., Yermack 2013).[8] They justify their opinion by arguing that Bitcoin does not fulfill the three basic properties of money: medium of exchange, unit of account and store of value.[9] It is debatable whether the last two functions are an essential part of the concept of money (Menger, 2007 280), but let's assume so for the sake of discussion. These authors point to the relatively narrow scope of Bitcoin's footprint in daily commerce as an argument for Bitcoin being a poor medium of exchange. However, while the limited use of Bitcoin in transactions explains why it is not yet money, it does not disconfirm its role as a medium of exchange. There are many media of exchange in the world, media whose scope of use varies widely.

Because of its huge price volatility and thus lack of stability, Bitcoin is believed to not be a store of value and a unit of account.[10] In consequence, holding bitcoins even for a short term is quite risky, and merchants, even if they accept bitcoins, post prices in national fiat currencies, such as U.S. dollars or euros. To be clear, Bitcoin's price volatility is an important obstacle to becoming widely accepted as a medium of exchange. However, since Bitcoin is a medium of exchange, it must be also a store of value. If an item were not suitable for holding, nobody would accept it in exchange (Mises 1953). Therefore, exchanging goods for bitcoins implies that somebody wants to store bitcoins, even if only for a very short time. Actually, most bitcoins are hoarded (Cofnas 2015), which clearly proves that people consider it as a store of value.[11]

Considering Bitcoin as a unit of account, it is worth noticing that usually a medium of exchange is also a unit of account, as "the valuation of commodities in terms of money … is … the most convenient and the simplest in practical operation" (Menger 2007, 277).[12] And indeed, there are shops that denominate prices in bitcoins. Moreover, other cryptocurrencies are usually exchanged only for bitcoins—therefore, their exchange rates are quoted in bitcoins, which implies that Bitcoin is a unit of account, at least for people using other cryptocurrencies.[13] In other words, although its role as a unit of account is narrow, Bitcoin is used as such.

Hence I argue that Bitcoin is a medium of exchange, which is the most important function of money. It is also a store of value, but its use as a unit of account remains limited. However, that results from the simple fact that Bitcoin is not yet widely used as a medium of exchange (it is not money yet). Therefore, Bitcoin is a medium of exchange, not a special investment or speculative asset. It is often argued that bitcoins are largely held for speculation (e.g., Lo and Wang 2014). However there is nothing unusual in holding (digital) currencies, even for speculative reasons. Actually, holding cash balances reflects the fact that money can be used in future exchanges. Thus, Bitcoin's holders may simply anticipate that the moneyness of Bitcoin will increase (e.g., due to new applications of the blockchain technology) and its price will rise.

[8] Some even consider Bitcoin a Ponzi scheme (e.g., North 2013). It is hardly true. A Ponzi scheme pays returns to investors from new capital brought by new investors. However, Bitcoin is not a security and does not grant any entitlements to profits, interest, dividends, and so on. Bitcoin is not a liability on any balance sheet, and no one promises high profits from purchasing, extracting or holding bitcoins. Owning them entitles a person to nothing more than making payments in the Bitcoin system (Badev and Chen 2014).

[9] Some authors are skeptical about Bitcoin's status as money because it is not backed by any government or central bank. Therefore, they argue that Bitcoin has no intrinsic value, unlike national fiat currencies, which are backed by a central bank's assets (Koning 2012). However, in reality they are not backed by a central bank's assets because they are not a claim to anything (that is why they are "fiat") and their holders cannot exchange them for any assets belonging to a central bank. Moreover, according to the orthodox theory of money's origin, money was not created by the state but spontaneously emerged as a medium of exchange from the attempts of enterprising individuals to minimize the transactions costs of barter (Menger 2007, 257–85).

[10] However, one should remember that the purchasing power of money is never stable. Hülsmann criticizes the postulate of stable purchasing power of money and argues that economists should focus on monetary stability in the sense of the physical integrity of money (Hülsmann 2008).

[11] Thus, it is a bit paradoxical that fact that "over 90 percent of bitcoin accounts are in a buy-and-hold mode" (Cofnas 2015) is often used as an argument against the monetary nature of Bitcoin.

[12] However, there may be goods that serve as units of account while not being media of exchange (Menger 2007).

[13] See, for example, Vircurex, https://vircurex.com/welcome/index?referral_id=392–1293, accessed February 2, 2018.

Last but not least, Bitcoin has to be clearly distinguished from electronic payment methods, electronic money (e-money) and virtual currencies. The electronic payment methods (such as debit and credit cards) allow users to access and transfer funds in their deposit or credit accounts in financial institutions (Fung et al. 2014). Therefore, they are not new media of exchange (like Bitcoin) but a relatively new and comfortable way to transfer existing fiat currencies.

There are many definitions of "electronic money." According to one of them, e-money is "monetary value stored electronically on devices such as a chip card or a hard drive in personal computers or a server, represented by a claim on the issuer, which is issued on receipt of funds for the purpose of making payment transactions, and which is accepted by persons other than the issuer" (Fung et al. 2014, 4). An example may be PayPal. Bitcoin is not e-money, because it has no central issuer. Therefore, bitcoins do not constitute a liability of any sort (Fung et al. 2014). Moreover, electronic money, such as PayPal, does not constitute a new currency. It only enables the transfer of existing currencies.

According to the European Central Bank, virtual currency is "a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community" (ECB, 2012, 13). Although the definition is so broad that Bitcoin may meet it, I do not agree with the European Central Bank to place Bitcoin in the category of "virtual currencies" along with currencies used in computer games (such as gold in World of Warcraft or Linden dollars in Second Life) or on social media (such as Facebook credits).[14] There are some similarities, such as their digital character. However, Bitcoin is not a mere virtual currency, coupon, voucher or token, thanks to which one can purchase specific virtual goods offered by some issuers (computer-games producers or social media). Instead, it is a medium of exchange, thanks to which we can purchase national fiat currencies or goods and services in the real world. In other words, one can buy real goods and services for bitcoins, not merely virtual objects in computer games or some premium services offered by social media websites. For example, gold in World of Warcraft is a medium of exchange in virtual reality, but not in the real world.

Thus, virtual currencies are merely consumption goods that enable gaining more satisfaction from the game (or social media website), not actual media of exchange. They are tokens issued by central entities to be used only in a specific context (to make computer games more enjoyable or—in the case of loyalty points, such as miles granted by airline companies—to exchange the tokens for the issuers' products). Moreover, there is no central issuer of bitcoins that may increase their supply arbitrarily, as is possible in the case of Lindens used in the computer game called Second Life. Virtual currencies, unlike Bitcoin, are controlled by counterparties, such as Facebook (which issues Facebook credits). Hence, I believe that the difference between Bitcoin and virtual currencies is a matter not merely of degree (the scale of use) but of substance. As Gertchev noted, "Bitcoins turn out to be the exact opposite of the 'Linden dollars' of the Second Life 'virtual world.' The latter are produced by a monopolist central authority, out of thin air, and without any other limitation but the very discretion of that same monopolist authority" (Gertchev, 2013).

[14] In a later publication, the European Central Bank redefines virtual currency as "a digital representation of value, not issued by a central bank, credit institution or e-money institution, which, in some circumstances, can be used as an alternative to money," but still includes Bitcoin in this category, alongside such goods as Lindens (ECB, 2015).

How should we classify Bitcoin?

Economists differ in their opinions as to what kind of medium of exchange Bitcoin is. Korda believes it is a token money (Korda 2013), while others consider it commodity money (Benedyk 2013; Graf 2014; Šurda 2014). A number of economists argue that Bitcoin is a private fiat money (Cowen 2011; Koning 2012; Velde 2013; Rogojanu and Badea 2014; White 2015).[15] Last but not least, some maintain that the traditional dichotomy of fiat and commodity money is inadequate and claim that Bitcoin should be classified somewhere between these two categories, as quasi-commodity money (Selgin 2013; Ólafsson 2014).

Before I discuss these concepts, I shall introduce the typology of money created by Mises, because the above-mentioned economists often refer to it (Mises 1953). The clear presentation of the definitions of various kinds of money will help us to better understand the very nature of money and Bitcoin.

As we can see in diagram 1, Mises distinguishes money in the broader and the narrower senses. Money in the broader sense covers money in the narrower sense and money substitutes, which are "absolutely secure and immediately payable claims to money" (Mises 1953, 50).[16] Money substitutes can be divided into money certificates—money substitutes completely covered by the reserves of money in the narrower sense—and fiduciary media, money substitutes

[15] Although Velde calls it "fiduciary currency" (Velde 2013).

[16] Mises offers a more elaborate definition of money substitutes: "Claims to a definite amount of money, payable and redeemable on demand, against a debtor about whose solvency and willingness to pay there does not prevail the slightest doubt, render to the individual all the services money can render, provided that all parties with whom he could possibly transact business are perfectly familiar with these essential qualities of the claims concerned: daily maturity and un-doubted solvency and willingness to pay on the part of the debtor" (Mises 1998, 429).

not covered in this way (Mises 1953).[17] Fiduciary media may be divided into uncovered bank deposits and notes, and token money (to the extent their face value exceeds their value as commodities).

Money in the narrower sense can be divided into commodity money—that is, money "which is at the same time a commercial commodity" (Mises 1953, 61)—and fiat money, which "is a money consisting of mere tokens which can neither be employed for any industrial purposes nor convey a claim against anybody" (Mises 1998, 426). In other words, fiat money is "a medium of exchange which neither is a commercial commodity, a consumer, or a producer good, nor title to any such commodity: i.e., irredeemable paper money" (Hoppe 1994, 49). Mises also includes credit money inthe category of money in the narrower sense: it is "money which constitutes a claim against any physical or legal person, but these claims must not be both payable on demand and absolutely secure" (Mises 1953, 61).[18]

It is worth mentioning that Mises also distinguishes primary media of exchange from secondary media of exchange, which are nonmonetary but highly marketable goods lowering the costs of holding cash (Mises 1998).

Now, let's move on to the classification of Bitcoin. Korda is of the opinion that Bitcoin is token money (Korda 2013). Interestingly, he does not provide any clear reasons for his opinion, but merely rejects any other possibilities identified by Mises. I do not agree with his statement, as Bitcoin is not a claim to money in the narrower sense—that is, there is no individual or institution obliged to redeem bitcoins on demand for a predetermined amount of national fiat currencies (instead, the exchange rates are floating). Therefore, because Bitcoin is not a money substitute, it can be neither a fiduciary medium nor a token money.

Benedyk (2013), Graf (2014) and Šurda (2014) consider Bitcoin commodity money. Many authors do not agree with such opinion, claiming that Bitcoin is neither backed by any commodity nor has any intrinsic value. Bitcoin is not backed by any commodity, but it does not need to be backed by commodity money[19]—what really matters is whether Bitcoin

[17] For instance, if the bank has deposited in its treasury one hundred ounces of gold and has issued notes amounting to one hundred ounces, then these notes are money certificates. If the bank issued more notes, these notes would then be fiduciary media. Of course such a distinction has a conceptual character. In practice, it is hard to distinguish these two types of money substitutes.

[18] In other words, credit money is "a claim falling due in the future that is used as a general medium of exchange" (Mises 1953, 62).

[19] Actually, if Bitcoin was backed by any commodity, it would be a money substitute, not money (in spe) in the narrower sense.

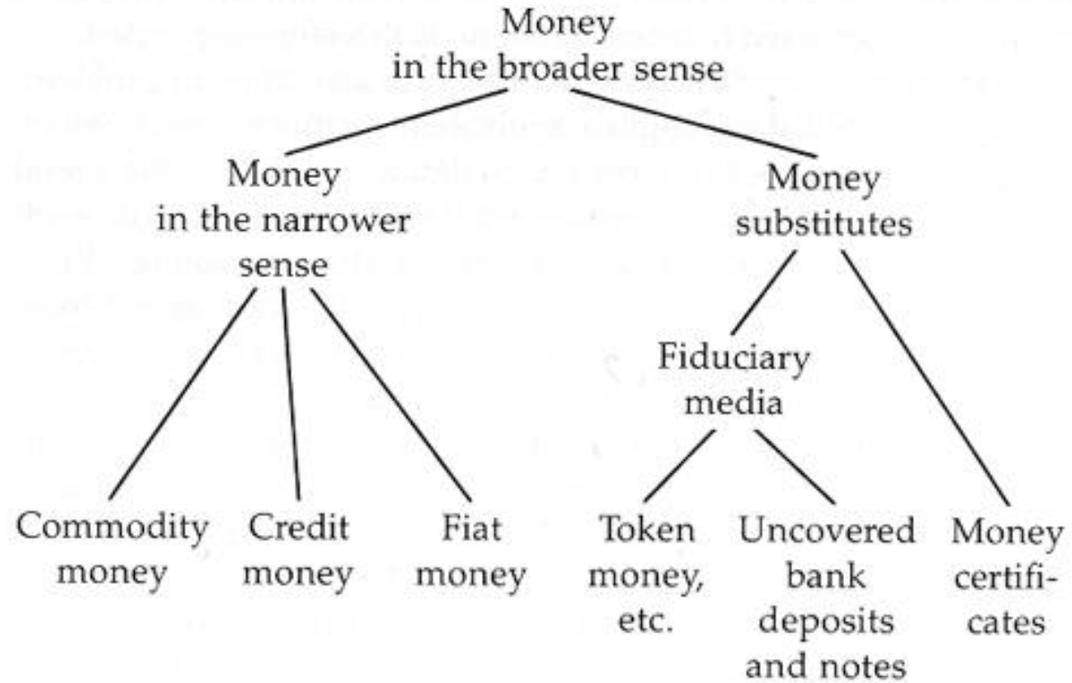

Diagram 1: Typology of money formulated by Ludwig von Mises Source: Mises (1953, 483)

has nonmonetary value. And it has indeed no intrinsic value—because there is no such thing as "intrinsic value," at least if we understand this term as value contained in the good itself. According to the subjective theory of value, the value of goods, including money, is determined not by some inherent properties of the good but by the importance that individuals attribute to goods for the satisfaction of their needs (Menger 2007, 114–21). However, the term "intrinsic value" is used not only in the philosophy of value, but also in finance, where it means the value determined through fundamental analysis—that is, entrepreneurs' appraisal process, based on assumptions about the future discounted income generated by the asset, or the nonmonetary value in the case of monies. In such a meaning, intrinsic value exists, and Bitcoin lacks it.

I argue that supporters of the theory that Bitcoin is commodity money fail to identify the nonmonetary uses of Bitcoin. For example, they argue that Bitcoin could be initially consumption good, with the nonmonetary value of Bitcoin resulting from the first users' satisfaction from the participation in a new monetary experiment, which is interesting from the cryptographic and/or libertarian (anti-establishment) point of view (Benedyk 2013; Gertchev

2013; Graf 2014). However, satisfaction from taking part in developing an alternate currency can hardly be described as a source of nonmonetary value. In other words, that explanation refers in reality to Bitcoin's (future) function as a medium of exchange. In a similar fashion, one could argue that paper U.S. dollars are commodity money because they satisfy the central bank's satisfaction from issuing them or because of numismatists' satisfaction. Graf adds that Bitcoin "could have functioned as a toy-like set of digital objects that could be collected" or that "possession of greater or fewer number of bitcoins could be taken as a badge of membership and commitment, or as among the signs and artifacts of participation" (Graf 2014, 26–27). Coinbrief rightly points out that Graf confuses motives and ends. The aesthetic, collectible, scientific or social satisfactions that come from the use of Bitcoin "were not ends, they were merely factors that motivated the early Bitcoin miners and developers to test its viability as a currency" (Coinbrief 2014). In other words, all allegedly nonmonetary uses of Bitcoin boil down to the monetary demand.[20] That should not be surprising, given that Bitcoin was designed for the sole purpose of functioning as a peer-to-peer electronic cash system (Nakamoto, 2008).

Others claim that nonmonetary value of bitcoins results from the processing power, energy costs or real computational work that takes energy (Hayase 2015). Such an opinion should be rejected because it is incompatible with the theory of economics and the subjective theory of value. Costs do not determine prices. That should become clear when we realize that costs are also prices—but prices of inputs used for production of certain goods. In fact, the relation between the price of Bitcoin and mining costs is quite the opposite: specialized equipment for mining bitcoins and energy spent for computational work are valuable only because of the value attributed to Bitcoin (or goods that could be purchased with bitcoins).

Tucker offers the strongest argument so far for recognizing Bitcoin as commodity money. He points out rightly that Bitcoin is both a payment system and money. Thus he argues that the use value of Bitcoin is embedded in the payment system on which Bitcoin lives, and that "if it were possible for the blockchain to be somehow separated from bitcoin (and, really, this is not possible), the value of the currency would instantly fall to zero" (Tucker 2014).[21] However, being an accounting unit in the payment system is also a monetary use. Moreover, Tucker's argument is circular. The only use value of bitcoins as units of digital currency is being transferred by the Bitcoin payment system. But the entire use value of Bitcoin as a payment system is to transfer bitcoins as units of digital currency (it can only transfer bitcoins). Thus, we face here a chicken-and-egg problem. Conversely, PayPal, from the very beginning, has been transferring already-established and separate fiat currencies. If all currencies collapsed (and a barter economy emerged), PayPal would become bankrupt, but we would survive without it. I do not deny the revolutionary advantages of blockchain technology. However, it does not change the fact that Bitcoin has no nonmonetary value.

Last but not least, I would like to refer to Guttenberg, who points out that the absence of evidence is not the evidence of absence (Gutenbertg 2014). Therefore, he argues that the fact that many authors cannot identify the use value of Bitcoin does not imply that there is none. But the lack of evidence does not allow me to classify Bitcoin as commodity money. The burden of proof rests on the supporters of the theory that Bitcoin is commodity money because they claim that something exists (i.e., the nonmonetary demand for Bitcoin), while Bitcoin "was designed from the ground up to be money, and therefore did *not* appear to have a clearly identifiable original direct use" (Davidson and Block 2015, 315).

Therefore, Bitcoin is not commodity money (or at least there is not convincing evidence that it is), because it has no nonmonetary demand linked with it as the medium of exchange. Bitcoin does not possess any use value, which implies that in case of loss of its function as a medium of exchange, its value could plunge practically to zero. In such a scenario, holders of that digital currency are left with merely a virtual record of a sequence of symbols, which can be used neither for consumption nor production purposes.[22]

Selgin agrees that Bitcoin does not possess any nonmonetary value, but does not consider it fiat money. Instead, he classifies Bitcoin as synthetic-commodity money, which he defines as "money that lacks nonmonetary value but is nevertheless reproducible only at a positive and rising marginal production cost" (Selgin 2013, 8). According to Selgin, commodity money has nonmonetary use value and is naturally or inevitably scarce, while fiat money has no nonmonetary use value and is scarce only by design, i.e., its scarcity is contingent (Selgin 2013). He believes that Bitcoin shares features with both commodity and fiat monies. It is both intrinsically worthless (like fiat money) and naturally or absolutely (by virtue of algorithm)

[20] It can be argued that Bitcoin is mostly demanded for speculative, not monetary, purposes. However, the speculative use is based on expectations that Bitcoin's use as medium of exchange will increase.

[21] Similarly, Šurda claims that Bitcoin has a dual character as virtual commodity and a service and that the utility of Bitcoin is derived from its reducing of transaction costs (Šurda 2014).

[22] Interestingly, such a situation occurred on June 19, 2011, when Bitcoin prices on its main exchange at that time, MtGox, collapsed from $17.50 to $0.01 in a matter of minutes (BBC 2011). It must be noted that the crash resulted from a hack attack. However, the panic sales on April 10, 2013, caused the price of Bitcoin to lose half its value in just six hours. The panic selling was a result of the delays in trading on MtGox, which suggests that people want to hold bitcoins only as long as they believe it can be exchanged in the future.

scarce (like commodity money).

I do not agree with Selgin. The scarcity of Bitcoin is hardly natural or absolute. It was synthetically created in a constructivist project, while the scarcity of commodity money (such as gold) is an inherent feature of reality and the supply of such money depends on the price structure. The supply of bitcoins is predetermined, but the algorithm can theoretically be changed, provided the majority of Bitcoin's users support such a change.

Moreover, synthetic-commodity money might be regarded as nothing more than a particular kind of a rule-bound fiat money. Actually, central banks could implement a Bitcoin-like protocol for national currencies. The so-called Fedcoin could replace discretionary policy with monetary-policy algorithms (Sams 2015). Such a digital currency would meet Selgin's definition of synthetic-commodity money. However, it would be a rule-bound fiat money, in fact. In other words, Selgin's dichotomy between absolute and contingent scarcity is imprecise and irrelevant. What really matters is whether the money has a nonmonetary value or not.

Also, Bitcoin is neither credit money, because it does not constitute a claim against any physical or legal person, nor a secondary medium of exchange, because it is not a nonmonetary good. Quite the contrary, Bitcoin enjoys pure monetary demand.

Therefore, I follow those economists who argue that Bitcoin is a private fiat money (e.g., Cowen 2011; Koning 2012; Velde 2013; Rogojanu and Badea 2014; White 2015). This statement could not be more apt, because Bitcoin is neither a useful (in nonmonetary sense) commercial commodity nor a claim to one. It has a private character, as it is not issued by any government institution and it is used and applied voluntarily (contrary to national fiat currencies, which were imposed on society as a result of legal tender laws and central banks'monopoly in issuing money).

Therefore, it seems that Bitcoin realizes the concept of "concurrent currencies" developed by Hayek, who advocated the abolition of legal tender laws and the government's monopoly over the issue of money, and argued that everyone should be allowed to issue its own currency competing for acceptance (Hayek 1976).

As I already mentioned, not all theorists agree with the classification of Bitcoin as private fiat money. There are two main arguments against such a view. Firstly, some economists argue that the concept of private fiat money is contradictory, as fiat money has value that results from itsuse as a legal tender. This argument is clearly invalid, as the essence of fiat money is not being a legal tender but being neither a commodity nor a claim to it.[23] Legal tender laws only explain why such types of money are preserved inthe market despite their obvious drawbacks (Hoppe 1994).

The second argument is much more sophisticated. It is sometimes believed that Bitcoin cannot be private fiat money, because it contradicts the regression theorem (Korda 2013). The theorem, developed by Mises, posits that today's value of money is based on yesterday's purchasing power, and this causal chain of reasoning goes back to the point just prior to when a given commodity first started being used as a medium of exchange (Mises 1953). In other words, the regression theorem stipulates that money must have originated as a previously valuable commodity because otherwise the objective use value of money could not emerge (because of the infinite regress in explaining the present value of money by its past purchasing power). Therefore, the theorem seems to be a challenge for my view of Bitcoin as fiat money, because it suggests that this digital currency had to have some nonmonetary value before it emerged as a medium of exchange.

However, Mises's regression theorem refers to the origin of new money from the pure barter economy. In such a world, a fiat money could not emerge as it would be impossible to determine its purchasing power. But the case of Bitcoin is completely different because it emerged in a monetary economy with the price structure in place. Therefore, it could piggyback onto the existing price framework without being valued directly as a commodity itself. Indeed, the first seller of bitcoins used the costs of production denominated in the U.S. dollar as a basis for the price asked (Šurda 2012, 41). It should be clear now that the purchasing power of Bitcoin could be evaluated thanks to the existence of a calculation framework in terms of the U.S. dollar.[24] In other words, the allegation that Bitcoin cannot be fiat money because it violates the regression theorem misses the point entirely, as it is based on a misinterpretation of the theorem, which refers only to the origin of money from the barter economy (Davidson and Block 2015).

The Future of Bitcoin

So far, I have been interested in determining the nature of Bitcoin. I stated that it is a fiat medium of exchange, but not yet money. Now I would like to consider whether Bitcoin will ever become money, or to be more general, what the future of Bitcoin is. There is no consensus in the literature. Some argue that it is a great invention that would revolutionize the global payment

[23] Actually, there are over four thousand private fiat currencies issued by local communities, companies and nongovernmental organizations, and do not have the status of legal means of payment (Private currencies. In Wikipedia n.d.).
[24] It is worth pointing out that Bitcoin's case is similar to the current national fiat currencies, which also did not emerge in a vacuum, but in a monetary economy, often as substitutes of money (e.g., claims to a certain amount of gold).

system (Andreessen 2014), while others believe Bitcoin is unsustainable and will collapse one day (Dowd and Hutchinson 2015). However, the most common criticism boils down to the fact that Bitcoin's use as a medium of exchange is still very limited, although it is systematically growing (Hilemanz 2016) and we cannot exclude the possibility that it will become money one day. The adoption of new monies or payment systems may be only gradual. As Menger pointed out, "it is only in the first instance a limited number of economic subjects who will recognize the advantage [of the new medium of exchange]" (Menger 2009, 36). In other words, Bitcoin has important network effects: the more people use it, the more valuable it becomes. The best way to consider whether it will reach a critical mass to become money is to identify some of its major advantages and drawbacks.[25]

First of all, Bitcoin has small transaction costs[26]—often significantly lower than traditional payment systems, which use national fiat currencies. This cost advantage is most clearly seen in international remittances (Folkinshteyn et al. 2015) and micropayments. Bitcoin has no cross-border limitations, is almost infinitely divisible and does not have a flat transaction fee (Lo and Wang 2014). Therefore, it might be an attractive option for sending small amounts of money to anyone in the world, with the potential to increase unbanked people'saccess to financial services and to improve the process of monetizing digital content (McCallum 2015).

On the other hand, there are some concerns that Bitcoin's transactions costs may rise as usage grows, which would reduce the incentive to use this digital currency (Ali et al. 2014b).[27] Others point out that the economies of scale in Bitcoin's mining industry are so large that the industry is a natural monopoly. The competition may thus break down, which could lead to the collapse of the whole system (Dowd and Hutchinson 2015).

However, these pros and cons may be irrelevant, as the key innovation of Bitcoin is the so-called "blockchain"—that is, the distributed ledger "which allows a payment system to operate in an entirely decentralised way" (Ali et al. 2014a, 1). The technology of a distributed ledger may thus significantly disrupt the financial industry, changing the way information is authenticated, because it potentially eliminates intermediaries such as banks. Therefore, the blockchain removes the credit and liquidity risks associated with intermediation. Moreover, implementing a distributed ledger could also reduce the systemic operational risk, since the payment system would not be dependent on a centralized third party like it is today (Ali et al. 2014a). Importantly, the distributed-ledger technology could also be applied to assets existing in electronic form (or digital property) other than currencies, such as stocks or bonds, facilitating faster securities settlements and providing more transparency in the financial markets. Actually, enabling smart contracts to develop may be the most important contribution of the distributed-ledger technology standing behind Bitcoin (Government Office for Science 2016).[28]

Conclusion

Bitcoin is a medium of exchange, but not yet money. The monetary use of Bitcoin is still limited, mainly because of its short history and high price volatility. However, it may become generally accepted, and hence money, if more people accept it for its monetary uses. If that day comes, Bitcoin will emerge as private fiat money because it is neither a commodity nor a claim to a commodity. It does not follow that Bitcoin somehow contradicts the regression theorem, because the theorem refers to the origin of money from the barter economy while Bitcoin was superimposed upon the existing price system.

The whole discussion about the nature and future of Bitcoin misses one point. The key to understanding Bitcoin is that it is both a digital currency and a payment system. Although its future as the former remains uncertain, "there is growing recognition that the lasting legacy of Bitcoin most likely lies in the technological advances made possible by its protocol for computation and communication that facilitates payments and transfers" (Lo and Wang 2014, 19). Indeed, the blockchain technology is a breakthrough in computer science because it solves the double-spending problem occurring in digital cash schemes. By removing the need for a trusted third party, Bitcoin is the next step in the evolution of payment systems (White 1996).[29] Actually, applying the distributed ledger technology could have much wider implications than disrupting the current payment system, such as facilitating the development of smart contracts.

[25] Luther takes a similar approach (Luther 2016c).

[26] Or used to have. See the subsequent footnote.

[27] Actually, this is what happened at the end of 2017 – the average transaction fees skyrocketed. See: https://bitinfocharts.com/comparison/bitcoin-transactionfees.html, accessed Febreuary 2, 2018.

[28] BBVA (2015) and IIF (2016) provide more information about smart contracts.

[29] Initially, to transfer money it was necessary to meet the banker personally. Next—in the late Middle Ages—written payment orders (checks) were developed. Then the telegraph, credit cards and online transfers were created (White 1996). However, at the heart of all these payment systems lies a central ledger. Bitcoin introduces a fundamentally different decentralized structure that relies on cryptography rather than a central authority (Ali et al. 2014a).

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NGDP Targeting: Macroeconomic Panacea?

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Abstract

Following the financial panic and economic recession of 2008, many have recommended monetary authorities adopt nominal GDP targeting as a new monetary rule. Despite its recent popularity, nominal GDP targeting fails to achieve the end of aiding macroeconomic coordination. Its advocates fail to take into account the nature and importance of both the capital structure and price coordination.

JEL Classifications: B53, E42, E52

1 The author wishes to thank the comments and suggestions of an anonymous reviewer and the editor. They were immensely helpful.

Introduction

In the wake of the financial panic and economic recession of 2008, numerous macroeconomic theories and policies are being re-evaluated (Krugman 2009). Some economists argue that the crisis demonstrates a need to move away from discretionary monetary policy and instead adopt some monetary policy rule. One such proposed rule is nominal GDP (NGDP) targeting, made popular by a set of economists that have been given the moniker Market Monetarists[2].

Notwithstanding its seeming novelty, however, NGDP targeting as a proposed monetary rule has been debated since at least the mid-1980s. Following the bracing price inflation of the 1970s, a number of economists began searching for policy rules that would better achieve macroeconomic stability. It was argued by many that if the central bank successfully targeted NGDP, this would help achieve price stability and sustainable economic growth (Clark 1994; Deuker 1993; Feldstein and Stock 1994; Hall and Mankiw 1994; Kahn 1988; Taylor 1985). Some understood the goal of monetary policy to be keeping output "where the private sector would produce if it recognized and fully adjusted" to macroeconomic shocks (Bradley and Jensen 1989, 34; Bean 1983, 806).

Most of these earlier advocates used New Keynesian aggregate supply-aggregate demand analysis to arrive at their conclusions. Short-run economic disturbances, it was argued, remove the economy from its long-run growth path. Monetary policy targeting NGDP would work to offset such fluctuations. An increase in aggregate demand due to an increase in consumer or business confidence, government spending, or net exports, for example, would be met with a decrease in the money supply, while decreases in aggregate demand due to reductions in the above factors would be met with an increase in the money supply (Bradley and Jensen 1989, 35–35; Clark 1994, 12; Kahn 1988, 27–28; Taylor 1985, 65).

Targeting NGDP is trickier when responding to changes in aggregate supply, what Taylor (1985, 65) refers to as "price shocks." What monetary authorities should do in response to an aggregate supply shock depends upon whether NGDP increases or decreases (Kahn 1988, 27–28; Taylor 1985, 65). If NGDP increases, monetary policy should be tightened. If NGDP decreases, monetary policy should be loosened. Either way, NGDP targeting would not prevent prices and output from fluctuating, but it would divide the impact of the aggregate shock between overall prices and output. If overall prices increase by a larger percentage than that by which output falls, NGDP would increase, calling for a decrease in the money supply, thereby decreasing aggregate demand, causing a drop in prices, but also decreasing real output even more. Another approach that attempts to get to the same effect is merely to increase or decrease the rate of growth in the money supply depending on whether NGDP is above or below the target NGDP (Feldstein and Stock 1994, 13, Mankiw 1994).

NGDP targeting waned in popularity because it was understood that grave obstacles make it operationally ineffective. NGDP targeting models have been shown to be dependent on assumptions about potential rates of output growth, expectations, the nature and magnitude of the

[2]Largely a blogosphere phenomenon, the most well-known of the group, Scott Sumner, has authored two scholarly works that outline his vision for monetary policy (Sumner, 2012; Sumner, 2011). See also (Christensen, 2011).

chronological relationship between output and price inflation, the correlation between structural disturbances and macroeconomic outcomes, and time lags between policy action and economic effect (Bradley and Jansen 1989, 37–39; Kahn 1988 30; Taylor 1985, 69).

Empirical work also fails to verify the effectiveness of NGDP targeting. Clark (1994, 19) concludes that results from model simulation were inconclusive and not robust. Empirical data from 1954–83 indicate that policy aiming to stabilize the rate of growth in NGDP could actually contribute to the business cycle by causing output levels overshooting the final equilibrium (Taylor 1985, 75).

The question remains do market-monetarist NGDP targeting policies have anything better to offer? The short answer appears to be "No." The aim of this article is to examine the nature of market monetarism and evaluate whether its policy prescriptions will achieve the desired goal of macroeconomic stability. The next section explains the basic tenets and policy proposal of market monetarism. This positive exposition will be followed by a section presenting a critique of market-monetarist theory and policy. Despite its recent popularity, NGDP targeting fails to achieve the end of aiding macroeconomic coordination. Market monetarists manifest a faulty understanding of the way and extent to which expectations enter into economic decision making, and misunderstand the actual consequences of the monetary policy necessary to stabilize NGDP expectations. These weaknesses stem from the very theoretical framework and conception of economic activity possessed by market monetarists.

Market Monetarism and NGDP Targeting

Market monetarists, like conventional monetarists, assert that "money matters." For example, they see the root of the 2008 financial meltdown and subsequent recession as "monetary disorder" and generally use monetary disequilibrium theory as their analytical framework (Christensen 2011, 2-3). In doing so, they explicitly reject the notion of capital malinvestment leading to a recession (Sumner 2012, 132). They also claim to believe in markets, assuming them "to be efficient and forward looking" (Christensen 2011, 29).

They stress the forward looking of markets because for market monetarists expectations seem to trump all other considerations. In their eyes, the importance of expectations makes the money supply a suboptimal measure of monetary policy. Market monetarists argue that both the current price level and current NGDP are more affected by the expected future money supply than by the current money supply (Sumner 2012, 143–46). They particularly object to using interest rates as an indicator of monetary policy because, they claim, high or low interest rates give signals opposite than those conventionally understood due to inflationary or deflationary expectations, ala Friedman (Christensen 2011, 9-12). Changes in expected future monetary policy and expected future aggregate demand, they argue, are what drive current changes in aggregate demand. Likewise a change in the interest rate targeted by the monetary authority effects the expected future money supply, which, according to the quantity theory of money, will increase expected future NGDP. If the money supply increases while velocity remains unchanged, according Fisher's equation of exchange, the product of P times T must increase necessarily (Fisher 1918, 26–29). Christiansen (2011, 5), therefore, argues that the best indicators of monetary policy are asset prices.

The supremacy of expectations in their analysis can be seen in their explanation of economic cycles. On the one hand, increased inflationary expectations as a result of Franklin Roosevelt's devaluation of the dollar created higher expected growth rates of both nominal and real GDP. It is asserted that because investors expected increased NGDP, resulting in an increase in the expected rate of real GDP growth, industrial production and asset prices increased throughout 1933 (Sumner 2012, 144-45). Additionally, the source of the 2008 financial meltdown and economic crisis, it is claimed, was a breakdown of Fed credibility (Christensen 2011, 20-22). According to Sumner (2012, 139-43, 150; 2011, 9–16) the Great Recession of 2008 was due to Federal Reserve passivity inducing the stock market collapse of early October 2008 as investors realized that the central bank either could not or would not prevent a decline in NGDP. If the Federal Reserve would have acted to boost NGDP growth, it would not have been merely bailing out irresponsible borrowers, as some critics suggest. To the contrary, because decreasing NGDP makes it harder to pay debts, regardless of whether the drop is due to falling prices or falling output, the Federal Reserve's action (or inaction depending on one's framework) is the cause of the financial stress of the borrowers who could not have rationally foreseen that the fall in NGDP was coming.

Market monetarists focus on NGDP for several reasons. They argue that the problems associated with alleged liquidity traps are more associated with low NGDP growth than with low interest rates (Sumner 2012, 146–47). This is because the two components of the market interest rate—the real rate and the expected inflation rate—are closely linked to two components of expected NGDP growth: expected real growth and expected inflation. Expected inflation is obviously correlated with itself. It is also argued that the real interest rate is correlated with the expected real GDP growth rate. They offer no explanation, however, of why this must be the case or how real growth induces higher interest rates.

Nevertheless, market monetarists claim that successfully targeting NGDP growth would forestall depression due to a liquidity trap, because if people expect that NGDP will steadily grow, they will be less likely to hoard money and more likely to engage in spending adequate to prevent recession. Central banks are not limited, therefore, by interest rates that are near zero, because credible commitments to quantitative easing will result in inflationary expectations, raising nominal long-term bond yields (Christensen 2011, 14-15).

Like Taylor (1985) and Bradley and Jansen (1989), market monetarists think that NGDP targeting would temper recessions when the economy is faced with negative supply shocks. Such a policy allows for increased prices and therefore, it is argued it would reduce the magnitude of output reductions if aggregate supply unexpectedly decreases (Sumner 2012, 147). NGDP targeting, therefore, avoids the glut of goods and unemployment that would occur due to price and wage stickiness.

The problem, they say, is that monetary policy has been "excessively contractionary.

The real problem is nominal—insufficient nominal expenditure" (Sumner 2012, 160). Their advocating monetary stimulus to ward off recession is not due to a desire for Keynesian discretionary policies, they say, but rather due to their belief that monetary policy is too tight to foster the right expectations about NGDP growth. However, like Keynesians, they would not be worried if price inflation increased significantly in the short term if it was necessary to reach the targeted NGDP level (Christensen 2011, 28).

Market monetarists also like NGDP targeting because they think it the best indicator of two important economic realities (Sumner 2102, 150–51). Because loans are almost always numerated in nominal values, they argue that NGDP, as a measure of nominal income, is the best indicator for a borrower's ability to repay. They also claim that because NGDP is calculated with both prices and output, it more accurately measures nominal shocks than the price level does.

Given their fixation on expectations, it is no surprise that market monetarists see stabilizing expectations about NGDP growth as the goal of monetary policy. The way to accomplish this, it is argued, is to create a NGDP futures market in order to derive market forecasts of future NGDP growth. Sumner (2012, 155–59) suggests that the government could issue futures contracts with maturities of twelve and twenty-four months.

The interaction between the market and the central bank would result in both identifying the market expectations of further NGDP growth and putting in place a process by which the current money supply would automatically adjust so as to achieve the target rate. If, for example, the target NGDP growth rate was 5%, a twelve-month $1,000 NGDP futures contract would pay off $1050 at maturity. Investors who expect less than 5% NGDP growth would sell NGDP futures to the central bank. The central bank would see this as an indicator that investors expect NGDP growth to fall below its target and therefore make open market purchases of bonds. Trade would continue, it is argued, until the monetary base was at a level sufficient to stimulate enough spending to meet the 5% target growth rate.

Weaknesses of NGDP Targeting

What is to be made of the claims of Market Monetarism? Is it the solution to macroeconomic instability as is claimed? Sound economics, derived from realistic human action, reveals it is not.

One objection to using NGDP as a target for monetary policy is its focus on GDP as a measure of productive economy. It has been shown that equating GDP with the social economy is a fallacy (Osterfeld 1991, 9-14; Huerta de Soto 2006, 305-12; Ritenour 2010, 305-08). There are a host of reasons this is so. There are, of course, numerous statistical issues related to using less than accurate data out of necessity to calculate GDP. Besides accuracy considerations, however, GDP is not truly gross, because it leaves out the very important investment of intermediate capital goods. A better measure of aggregate spending that accounts for gross investment in the entire production structure may be Gross Output, a measure of total spending in all industries that the Bureau of Economic Analysis began publishing quarterly in 2014 (Skousen 2015).

Additionally the spending counted in GDP is not altogether productive, with a good portion funding government consumption instead of productive investment (Rothbard 2000, 339-48; Batemarco, 1987). We will find, therefore, that stabilizing NGDP does not necessarily contribute toward sustainable productive activity. It leads, instead, to stabilizing spending in a way that promotes economic instability through malinvestment and the misallocation of resources.

Beyond the problems with GDP serving as an indicator of economic prosperity, there are several problems with NGDP targeting that can be grouped into three main categories. The most fundamental set of fallacies associated with NGDP targeting is the theoretical framework and vision of economic activity possessed by its advocates. A second set is related to the form of expectations and the extent to which they enter into economic decision making. A third set of problems stem from the actual consequences of the monetary policy necessary to achieve stable NGDP expectations.

Faulty Analytical Framework and Views of Economic Activity

The primary reason that market monetarism misses the mark is due to the generally faulty analytical framework utilized to arrive at its conclusion. Such a framework entails an unsatisfactory understanding of economic activity, because it seems to misunderstand the nature of price coordination and leaves the inter-temporal capital structure out of the analysis.

While market monetarists staunchly reject claims that they are Keynesians, it is understandable why people would think so (Salin 2014). As documented earlier, they assert that recessions are due to insufficient aggregate demand. Income is thought to be created by money flows instead of by the provision of productive services accounted for in money prices. They ignore, reject, or dismiss the importance of the capital structure. Investment is driven solely by expectations (i.e. conventional wisdom) about nominal spending. A collapse in investment leads to recession and unemployment because "many prices are sticky" (Sumner, 2012, p. 161). Decreased aggregate demand and sticky wages and prices combine to result in idle factors of production including labor. Monetary policy can serve as the universal cure for persistent price disequilibria. All of this sounds rather Keynesian.[3]

Their entire analysis is predicated on the acceptance of the New Keynesian aggregate supply-aggregate demand framework, which is useless at best and actually grossly misleading. Even on its own terms, there are analytical problems with aggregate supply-aggregate demand analysis. Both curves, for example, are market equilibrium curves, not conventional supply or demand curves and separate assumptions underlie each curve (Colander 1995; Garrison 1996).

Most relevant and troublesome for evaluating NGDP targeting policy is that there is no such thing as aggregate demand that equates with aggregate supply at a single price level. The economy is made up of a vast network of distinct markets that are integrated into

[3] See Hazlitt (1977), Huerta de Soto (2006, 542–83) and Hutt (1979) on the fallacies of Keynesian economics. The same critique of Keynesian economics in this literature also applies to Market Monetarism.

one social division of labor through the inter-temporal production structure and the use of a general medium of exchange. What needs to be explained about recessions, therefore, is the cluster of entrepreneurial errors (Rothbard 2000, 8-9). Why do so many entrepreneurs get it wrong at the same time? Appealing to decreases in NGDP does not help explain the cluster of errors. Productive activity is the result of a vast number of decentralized decisions made by a multitude of different entrepreneurs at different places in the market division of labor. Capital is not a blob of homogenous matter, so investment is not a homogeneous 'I.' Sound analysis of macroeconomic dis-coordination must take these facts into account.

Similarly, when asserting that NGDP is the best indicator for a borrower's ability to repay debt, because NGDP is nominal income, market monetarists either fail to realize or ignore that a debt is owed by a specific person at a specific time and place, but NGDP is an aggregate magnitude. On could easily have an increasing NGDP concentrated in the hands of a few while still have a majority of debt holders insolvent because they individually do not have enough income to make good on their obligations. Once again the aggregate can mask the reality.

If people increase their demand to hold money, they will decrease their demand for consumer and producer goods. This would only lead to resources generally being held wastefully idle, however, if prices for these resources remained above the market-clearing level. This will not persist, of course, if price adjustments are allowed (Hutt 1979, 138-39).

If there is a drop in demand, the incentive to reap profits and avoid losses will lead both entrepreneurs and workers to reduce their selling prices. Consumers prefer to buy at lower prices. Unless frustrated by government intervention or the fear of strike threats, entrepreneurs will seek to adjust their selling price to a market clearing level. Such price reductions and cost cutting encourages continuous sales and employment. Real earnings of the firms concerned will stabilize, allowing them to continue production and, hence, to demand land, labor, and higher order capital goods from other firms in the production structure (Hutt 1979, 53–54).

Additionally, any supposed monetary disequilibrium due to decreased aggregate demand would consist in disequilibrium on part of individual persons in individual markets for specific goods. Instead of allowing markets to clear via price adjustments according to subjective preferences, market monetarists advocate that monetary authorities bring about market stability by increasing the money supply. In order for increasing demand for money to create monetary disequilibrium, something must hinder price adjustments. If prices and wages are sticky, there would need to be a significantly large increase in NGDP to maintain equilibrium.

Such inflation, however, will not necessarily equilibrate the specific demand for and supply of money on the part of the individuals who are experiencing the excess demand. Money will not necessarily enter hands of those actually experiencing excess demand for it (Howden and Bagus 2011, 396–97; Zahringer 2012, 319–21).

This, of course, begs the very question of sticky wages. Yeager (1986) suggests that an important source of price stickiness is due to the "who-goes-first problem." Entrepreneurs, it is argued, are faced with a sort of prisoner's dilemma because cutting prices has a public-goods quality. If, in the face of decreased demand for his product, a producer is the first to decrease his selling price, the price of his good will fall relative to that of other sellers. It is uncertain whether such a price drop will be enough to forestall losses, especially if factor prices do not fall. Yeager stresses that an entrepreneur's profitability is dependent not only on his pricing decision, but every producer participates as a buyer in many factor markets. His operation, therefore, is dependent on a lot of other suppliers in those markets.

Several theoretical problems with the notion of sticky wages have been identified (Bagus and Howden 2011; Bellante 1995; Hülsmann 2003; Rothbard 2004, 780-85, Simpson 2014, 50–66). It is not at all clear, for example, in what way the who-goes-first problem is a special case different from other pricing decisions producers must make. If the demand for a consumer or producer good decreases for any reason, sellers must cut their selling price if they want to minimize their revenue loss. How is responding to a decrease in demand for a product because of an increase demand for money more complicated than responding to a decrease in demand for a product relative to that for other products? Why is one case more fraught with paralysis? Regardless of any strategic decision-making that may or may not occur, sellers *must* be willing to accept lower prices if they want to sell more units, thereby minimizing their losses.

Additionally, the argument presumes that the excess demand for money is always "out there." A general increase in the demand for money will, however, incorporate factor owners' desire to build up real cash balances as well as households. Both firms and households would reduce spending to be sure, but they also would increase the supply of goods on hand to raise cash. Firms will draw down inventory and supply more products. Workers will supply more labor. All of this works to lower factor prices, making it less onerous for producers to lower their selling prices, thus making price adjustments easier, and prices themselves less rigid.

A popular explanation for sticky prices in the New Keynesian literature is the efficiency wage (Gordon 1990, 1157–59). Such a wage is allegedly above the market wage, but voluntarily paid by rational, profit-maximizing firms in order to maximize worker efficiency, minimize costs, and hence maximize profits. Bellante (1995) provides some helpful analysis of the weakness of New Keynesian efficiency wage theory. He notes that, at best, the concept of the efficiency wage merely adds another reason why wages do not instantaneously adjust to final equilibrium levels. It is not at all clear to Bellante that the concept is a net theoretical gain. Bellante asks, for example, if only a few firms pay above-market efficiency wages, resulting in market-specific unemployment, would not other entrepreneurs find use for those unemployed workers, snatching them up at lower wages? Additionally, he asks the very pregnant question, if all firms pay above market wages, how is the market wage defined?

This is an excellent question. We know that the demand for labor is determined by labor's discounted marginal revenue product (Block 1990; Ritenour 2010, 226–50; Rothbard 2004, 453–507). That is, the price of the product, the productivity of labor and time preference all affect the maximum price entrepreneurs are willing to pay for a given quantity of labor. To the extent that there is any credence in efficiency wage theory, it merely adds one more determinant of labor productivity. In addition to the technology used and the quantity of complementary land and capital goods, an "efficiency component" related to the wage rate could be included.

Entrepreneurs seeking to maximize their profits would take this into account and, still desiring to maximize profits, would adjust their appraised present value of labor accordingly. The efficiency wage, therefore, would merely be a maximum wage firms would be willing to offer their workers. The necessary implication is unmistakable. If all entrepreneurs pay efficiency wages to maximize their profit, by, in part, maximizing the productivity of the labor hired, the so-called efficiency wage is *not* a wage above the market wage. The efficiency wage *will be* the market wage.

More importantly, to focus on "sticky wages" is again to focus on the wrong issue (Bellante 1994, 30–31). At best sticky wages do not explain why a recession begins. They would only explain why a recession is prolonged. Additionally, if markets do not clear due to minimum wage and other price controls, this is clearly due to statist intervention. The solution, therefore, would be to free the market, not to intervene even more by arbitrarily increasing the money supply. If, on the other hand, markets do not equilibrate due to long-term labor (including union) contracts, this results in a voluntary excess supply of labor.

In fact, history reveals that prices and wages do adjust downward if allowed. Even in the case of long-term contracts, workers and employers can and do negotiate new market-clearing wages, as often happens during times of economic downturn (Simpson 2014, 67–73). For example, performing arts unions worked together with Broadway production companies, and musicians agreed to a 25 percent pay cut for a period following the 9/11 terrorist attacks in New York City which caused the tourist trade to temporarily fall off (Daniels and Vann 2003). A number of labor unions did the same thing in response to the Great Recession (Uchitelle 2010). The United Auto Workers recognized that sometimes one has to agree to a lower wage to keep one's job when the demand for labor falls. In 2011 Pittsburgh Symphony Orchestra musicians agreed to a not insubstantial 9.7% pay cut. In response to their actions, the Symphony's music director, Manfred Honneck, volunteered to take a 10% cut (Druckenbrod 2011). This is precisely how labor markets clear as demand decreases and one important way malinvestment is resolved in a recession.

Decreases in demand are always experienced in individual particular markets. When there is a decrease in demand or a decrease in supply in the face of elastic demand, total expenditures will drop. Note however, that spending is the effect of the changes in the preferences of buyers and sellers, *not* the cause of the decrease in demand or supply. Salerno (2006) shows how this applies to the broader economy. Market-clearing prices (and quantities) are determined on every market by the interaction of individuals' value scales on which a goods are valued in relation to one another and to money. It is only after market equilibrium prices and quantities and, therefore, the value of money, have already been determined that "spending" occurs.

Faulty Understanding of the Role of Expectations.

A particular manifestation of market monetarists' unsatisfactory economic framework is their perception of how and extent to which expectations enter into their analysis. Certainly no one should dispute that expectations play an important role in economic decision making. All action takes place in the present while the results of action will be reaped at some point in the future. Consequently, all action, including production, is forward looking. All action must therefore be based on speculations about the expected outcomes of various potential actions (Ritenour 2010, 33-36; Rothbard 2004, 4-7). However for understanding the nature of macroeconomic fluctuations, it is crucial that we have a proper understanding of the nature of the expectations that affect investment decisions.

As noted earlier, market monetarists seem to believe that investment is determined almost exclusively by expectations of future nominal spending (or NGDP). The problem with such a perspective is two-fold.

While sound economic theory recognizes that expectation of outcome in the future is a prerequisite of action in the present, economics cannot provide insight into the content of these expectations or how expectations change over time. Expectations are not autonomous entities, but are constrained by a person's goal, his past experience in attempting to achieve his goal and his entrepreneurial ability. Hence expectations are not monolithic, which is why entrepreneurs must incorporate thymology into their decision making (Salerno 2010, 215, 220). Treating expectations as universal and monolithic opens the door to grave errors of economic theory.

Economic recessions are not merely the result of decreases in aggregate spending due to universal pessimistic expectations. They are the result of entrepreneurial error (Rothbard 2000, 8-9; Hülsmann 1998). It is, in fact, possible for entrepreneurs to reap profits even in an environment of declining total spending. What matters is not aggregate spending, but the spread between the price of products and the sum of the prices of the factors of production. If the total quantity of all spending in the social economy falls and overall prices fall, firms can still reap profits as long as they identify those projects at which the factors are underpriced relative to the future price of the product they can be used to produce. Similar to the benefit consumers enjoy when prices of consumer goods fall, producers benefit when their factor prices fall. Such decreases make it easier to weather decreased demand for their product.

Additionally, the form of expectations assumed is the source of particular inconsistency in the market monetarist literature. This inconsistency, in turn, is also related to their failure to understand recessions as the result of a cluster of entrepreneurial error. Market monetarists assume that markets are efficient and forward looking. At the same time recessions are due to decreases in expected NGDP. If markets are efficient while forward looking, how can there be a cluster of entrepreneurial error? If market participants make efficient adjustments while looking forward, there should not be widespread mistakes made by entrepreneurs. If so, how can there be recession? Perhaps the response might be, as Christensen (2011, 5) implies, that although people have expectations that are indeed rational, they are not perfect. Even so, if market participant's properly forecast that the Federal Reserve would not or could not continue to increase NGDP through 2008, why should there be a recession? If their forecast was correct, they should have acted accordingly and markets would clear and at the very least there would not have been widespread persistent unemployment.

Consequences of Monetary Policy.

Sound economic policy is predicated on a sound understanding of economic activity. Those who advocate targeting some level of NGDP should explain why society needs more monetary units to grow in prosperity.

In fact we know that increases in the money supply--even those thought necessary to achieve some target level of aggregate expenditure--do not provide a general social benefit. At best monetary inflation merely results in higher prices for the same amount of goods. Increasing the money supply via credit expansion, however, does redistribute wealth to those who receive the newly created money first and away from those who receive the new money later or not at all (Mises 1990, 72–74).

Market monetarists' affection for NGDP targeting again demonstrates that an unsound theoretical framework will often lead to unsound economic policy. All of the problems of central planning in general apply to having a central monetary authority target NGDP (Salter 2013). Using monetary policy to stabilize NGDP would require great entrepreneurial acumen on the part of monetary bureaucrats—acumen we have no reason to believe they possess.

Various early proposals for NGDP targeting tend not to specify the actual policy instrument adjustments that will be necessary to make such rules operational (Taylor 1985, 81). This is troubling for NGDP targeting advocates, because their policy can only be achieved with a state-contingent monetary rule (Bradley and Jansen 1989, 37).

Taylor (1985, 79–80) sees the time lag between enactment of policy and its effect on NGDP (via changes in real GDP and overall prices) as the most difficult problem with NGDP targeting. According to the model he analyzed, changes in the money supply affected NGDP with a longer lag than they affected overall prices (Taylor 1985, 63), making stabilizing NGDP via monetary policy more difficult. One should note, in this context, that the time lag for the effects on NGDP and NGDP expectations will not only be long, but also variable. It is impossible to know with precision the effects of monetary inflation on prices and quantities. The Cantillon effects will play out differently with every injection of money.

Even among its early advocates, the advantage of NGDP targeting "depends on the ability of the policy maker to recognize and respond to changes in nominal GDP more quickly than the private sector can recognize and respond to shocks to the economy. While this may seem reasonable for the model we use, other theoretical models yield other conclusions" (Bradley and Jansen 1989, 39).

That is a huge admission. At best, for example, different model assumptions about how the labor market functions generate different results of alternative policy rules. Due to these ambiguities, advocates of NGDP targeting do not have convincing theoretical justification for their policy recommendation. GDP targeting may appear attractive under particular assumptions in certain theoretical frameworks, but given the reality of macroeconomic uncertainty, NGDP targeting is not that appealing after all.

Indeed, one of the biggest problems with trying to reduce economic fluctuations via NGDP targeting is the real effects of monetary inflation necessary to stabilize actual or expected NGDP. Even if the monetary authority announced its policy and the announcement was thoroughly credible, it is nevertheless necessarily true that the new money will enter the economy at particular points in the economy. Monetary inflation, therefore, will affect demands for specific goods first and then subsequent demand for different goods as the new money is spread through the economy. The step-by-step adjustment process during which the new money is absorbed necessarily results in real changes in relative prices and a real redistribution of wealth (Mises 2006, 85-88; Mises 1990; Salerno 2010, 202-03). Monetary inflation will affect real income by its influence on relative prices at different stages of production (Hutt, 1979, p. 114).

Monetary inflation occurs through the creation of fiduciary money via our banking system. Commercial banks increase the money supply through credit expansion not funded by voluntary savings. The market for loanable funds will clear at the market interest rate. How can banks expand their loans without lowering interest rates below what they would be otherwise? Of course they cannot.

Such credit expansion necessarily stimulates malinvestment by encouraging production processes that are too roundabout relative to social time preferences (Mises 1998, pp. 547–62; Hayek 2008, 189–329; Rothbard 2004, 994–1004; Huerta de Soto 2006, 347–84; Strigl 1934, 120–33; Garrison, 2001; Salerno 2012). It is common knowledge amongst economists that we get more of whatever we subsidize. Artificially lowering the interest rate subsidizes longer, more roundabout production processes. The trouble is that without an increase in voluntary savings, longer production processes are not all able to be completed. This is the heart of the malinvestment problem and results in recession. The necessary consequence of monetary inflation—even if the desire is to stabilize actual or expected NGDP growth—is the boom/bust cycle, in which resources are squandered, capital is consumed and society is relatively impoverished. Such an outcome is the exact opposite of the desires of those advocating NGDP targeting.

Some may argue that monetary authorities should only increase the money supply when the demand to hold money increases, thereby maintaining a productivity norm (Selgin 1990). However when banks increase the money supply, they do so by *lending*. People do not borrow to hold money, but to spend it. This point cannot be overstressed. The demand to hold money and the demand for loanable funds are two different things. People who borrow newly created money do not do so in order increase their cash balances, but to spend it on either consumer or producer goods. In the latter case we are back to artificially low interest rates which stimulate malinvestment and the boom/bust cycle.

Finally, it should be noted that some "excess capacity" apparent in the depths of recession exists in the form of sunk, non-convertible capital. Increasing nominal spending will not solve that problem. Unproductive, non-convertible capital cannot be made productive merely by increasing the money supply.

Issuing fiduciary money via credit expansion promotes unsustainable boom activity

because it provides both the incentive and the means for entrepreneurs to undertake projects for which there are insufficient real resources to carry them out. They cannot all be brought to completion, because the increased credit extended is not funded by an increase in voluntary savings. Therefore, some of these projects must be liquidated. This cluster of entrepreneurial error is what causes the recession. It is precisely the issuing of fiduciary money that sows the seeds of recession and cyclical unemployment. Inflation of fiduciary money, therefore, cannot be its cure.

Conclusion

Mainstream macroeconomic theory and policy obviously did not prevent the financial meltdown and recession of 2008-09. In fact, it is not hard to make the case that modern mainstream macroeconomics contributed to the meltdown (Reynolds 2010). In any event, the economics profession remains ripe for introspection, so that economists can provide better guidance in macroeconomic affairs. Thus comes market monetarism, the adherents of which advocate adopting monetary policy targeting future NGDP growth so as to maintain optimal expectations about future nominal income.

Market monetarists focus on NGDP for several reasons. They argue that the problems associated with alleged liquidity traps are more associated with low NGDP growth than with low interest rates, because if people expect that NGDP will steadily grow, they will be less likely to hoard money and more likely to spend enough to prevent recession. They think that NGDP targeting would temper recessions when the economy is faced with negative supply shocks, because the policy allows for increased prices and therefore would reduce the magnitude of output reductions if aggregate supply unexpectedly decreases. NGDP targeting, therefore, avoids the glut of goods and unemployment that allegedly would occur due to price and wage stickiness. Market monetarists, therefore, see stabilizing expectations about NGDP growth as the goal of monetary policy.

Praxeological, causal-realist economics reveals that market monetarism, however, is no macroeconomic panacea. Market monetarists are right that "money matters" for the economy and that investors are forward looking, making decisions based on their expectations of future outcomes. Alas, they misconstrue the way and extent to which both money and expectations matter.

The primary reason that NGDP targeting misses the mark is due to the generally faulty analytical framework utilized to arrive at its conclusion. Market monetarists seem to misunderstand the nature of price coordination and leave the inter-temporal capital structure out of their analysis.

While sound economic theory recognizes that expectations about the future are an aspect of action in the present, economics cannot provide insight into the content of these expectations or how expectations change over time. As noted, treating expectations as universal and monolithic opens the door to significant errors of economic theory. Market monetarists assume that markets are efficient and forward looking, but also claim that recessions are due to decreases in expected NGDP. They do not explain how, if markets are efficient and forward looking, can there be recessions due to a cluster of entrepreneurial error?

Market monetarists call for continual increases in the money supply, yet we know that such increases—even those thought necessary to achieve some target level of aggregate expenditure—do not generally benefit society. Rather, when commercial banks issue fiduciary money through credit expansion not funded by voluntary savings, they stimulate malinvestment. Entrepreneurs are provided both the incentive and means to undertake projects for which there are insufficient real resources to carry out. Therefore, some of these projects eventually must be liquidated. It is precisely credit expansion via the issuing of fiduciary money, therefore, that causes recession and cyclical unemployment. Inflation of fiduciary money, therefore, cannot be its cure.

Despite the seeming simplicity of a NGDP targeting rule, economic analysis reveals that NGDP targeting does not accomplish the end for which it is advocated: macroeconomic stability. Market Monetarism is a theory erected on a faulty macroeconomic framework and vision of economic activity. Its adherents, therefore, misunderstand the actual consequences of the monetary policy necessary to stabilize NGDP expectations. Market Monetarism should, therefore, be rejected as a guide for macroeconomic policy if we desire stability in the economy.

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A Misconception of Friedrich Hayek and the Market Algorithm

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Abstract

In this article, we comment on the *Journal of Economic Perspectives* article by Samuel Bowles, Alan Kirman, and Ravij Sethi (2017, 215–30). We find that the authors do not follow the implications of Hayekian economics to their full conclusion and misattribute to him the belief that free market policies follow logically from Hayekian economics. Moreover, we show that the authors´ views on destabilizing speculation are problematic from a Hayekian perspective. We argue that Hayek´s evolutionary theory of institutions cannot be used to justify existing government structures. Finally, we challenge the position that Hayek´s predictions have been disproved by history.

JEL: B31, B53, D84

Introduction

The article "Friedrich Hayek and the Market Algorithm" (2017, 215–30), by Samuel Bowles, Alan Kirman, and Rajiv Sethi (henceforth BKS), discusses Friedrich A. Hayek´s contributions in regard to the market process and knowledge. The article is published in the *Journal of Economic Perspectives*' "Retrospectives" section, which discusses the history of economic ideas in order to deepen the dialogue among economists and to cast new light on economic questions. While a retrospective on Hayek´s contributions on knowledge and the market process is necessary and highly appreciated, we believe that BKS do not shed new light on the development of economic thought. Moreover, they misattribute to Hayek the view that free market policies follow logically from his economics. Because of supposedly destabilizing factors inherent in the market process, BKS defend certain government interventions. In this article, we try to correct possible misunderstandings and errors concerning Hayek´s work.

The Implications of Hayek´s "The Use of Knowledge in Society"

BKS arrive at two main conclusions. First, Hayek´s critique of equilibrium is still relevant. Second, Hayek´s support for free market policies does not follow from his knowledge paradigm. We fully endorse the first conclusion. It is both true that Hayek´s seminal article "The Use of Knowledge in Society" is implicitly critical of neoclassical equilibrium analysis and that "Hayek´s arguments have not been ignored by economists" (BKS 2017, 219). Yet we find that BKS, like many other economists, may not have fully appreciated the implications of the Hayekian knowledge paradigm. Hayek´s insights into the nature of knowledge imply a fundamental methodological critique. Indeed one of Hayek´s most famous dictums states that "it is probably no exaggeration to say that every important advance in economic theory during the last hundred years was a further step in the consistent application of subjectivism" (Hayek 1955, 31). If knowledge is personal, tacit, private, dispersed, subjective, and creative, it cannot be mathematized. Entrepreneurial creativity and subjective time are by definition absent from mathematical models, including agent-based computational economics.[1] Accordingly, Hayek argued for a very restrictive use of mathematics as a theoretical tool. He explained:

> The first is that it is an erroneous belief, characteristic of bad mathematicians, that mathematics is essentially quantitative and that, therefore, to build on the great achievements of the founders of mathematical economics, men like Jevons, Walras and Pareto, one has to introduce quantitative data obtained by measurements. That was certainly not the intention of the founders of mathematical economics. They understood much better than their successors that algebraic mathematical formulae are the pre-eminent method for describing abstract patterns without assuming or possessing particular information about the specific magnitudes involved. One great mathematician has indeed described a mathematician as a maker of patterns. In this sense mathematics can be very helpful to us. (Hayek 1978a, 4)

Hayek is against quantitative research methods in economics, but sees mathematics as

[1] For an elaboration on entrepreneurial creativity, see Huerta de Soto (2010) and on subjective time see O´Driscoll and Rizzo (1996).

a potentially useful tool to describe the market process. He reasons that contrary to the natural sciences, where causal relationships can be expressed in equations with very few variables, economics attempts to explain phenomena of a higher degree of complexity "where we cannot expect to find permanent constant relationships between aggregates or averages" (Hayek 1978a, 5). Also, mass phenomena do not consist of a sufficiently high number of similar events to assign probabilities to their occurrence (ibid.). For Hayek, a fundamental difference exists therefore between the natural and social sciences that should manifest itself, among other ways, in the use of distinct methods. Thus we feel that even agent-based computational economics as advocated by BKS is not reconcilable with a truly Hayekian approach. Mathematical models are inferior to verbal language in portraying human creativity and subjective knowledge.

We dispute the second result as well, according to which Hayek believed that "his advocacy of free market policies follows as a matter of logic from his economic vision" (p. 217). BKS seem to fall prey to a misunderstanding. A policy position can never be derived logically from value-free economics. Specialization and the division of labor, for example, may increase overall production. But the Ricardian theory of comparative advantage does not logically imply that one has to favor specialization. As David Hume´s (1739) "is-ought problem" states, there is a significant difference between positive statements (the *is*) and normative statements (the *ought*). The ought does not follow from the is. But did Hayek really commit the basic fallacy that BKS seem to ascribe to him?

Hayek explicitly recognized that an ought cannot be derived from an is, writing that "from our understanding of causal connections between facts alone, we can derive no conclusions about the validity of values" (Hayek 1978b, 21). Accordingly, from Hayek´s insight that the market process makes modern living standards possible by using dispersed individual knowledge unavailable to a central planner, it does not follow that we ought to have a market process. An egalitarian might prefer central planning and lower living standards. Hayek does not commit the logical error that the authors ascribe to him and for which they provide no evidence except for one citation: "That our whole modern wealth and production could arise only thanks to this mechanism [utilization of information on the market] is, I believe, the basis not only of my economics but also much of my political views" (Hayek 1994, 69). Yet a common basis for two views does not imply that one view follows logically from the other.

Stabilizing and Destabilizing Speculation

BKS (p. 221) argue that free markets do not always increase coordination: "Individually profitable activities can be destabilizing in the aggregate." According to them, herding behavior and speculation can have destabilizing effects. They illustrate this point with Hayek's tin example, where price changes incentivize users to economize tin, thereby disseminating knowledge through the whole economy. The authors state: "An individual may seek to profit by buying and hoarding tin in anticipation of further increases in price. But this activity itself has price effects, which in turn may result in hoarding by others, and so on. The changes in the price of tin will be driven by some combination of fundamental factors (of the kind that concern Hayek) and speculative forces that seek to extract information from prices. If speculative interest is strong enough, the result can be considerable nonfundamental volatility in the price of tin" (p. 222). The authors conclude that "the economics of information does not lead us to a case for unregulated markets" (p. 223). As the authors think Hayek logically derived a case for unregulated markets from his economics, they believe they have refuted him.

But is speculation on unhampered markets really destabilizing? BKS are right that speculation has price effects. We can distinguish two cases. First, speculation correctly anticipates future prices—for example, an increase in the price of tin. In this case, speculation and the additional demand speeds up the price evolution toward the higher level. Speculators earn a profit. Second, speculators fail in their anticipation. Indeed, there can be errors in speculation, yet they tend to self-correct through the actions of entrepreneurs trained in forecasting future demand. When, for instance, speculators overestimate the increase in the price of tin and bid accordingly, it will soon become evident that the price does not clear the market, and a reverse price movement will set in. Erroneous speculation leads to losses and is quickly corrected by other speculators that want to earn a profit.

Also, if a speculator thinks that the price will rise in the future, he buys today based on the profit spread between the spot and future price. BKS focus on the herding effect of many other investors foolishly doing the same thing. Yet as the price increases today, marginal sellers will enter the market and put downward pressure on the spot price. Rather than becoming decoupled from economic fundamentals, speculation and the profit motive anchor the spot price and protect against the out of control price spiral that BKS think will happen.

Thus, it is unlikely that entrepreneurs collectively misjudge demand and create "considerable nonfundamental volatility in the price of tin" or any other good. It is also unlikely that entrepreneurs deliberately want to earn a loss and forgo such a profit opportunity. No one can afford to make losses for a long time on an unhampered market, which rules out destabilizing speculation not generated by government interference. Accordingly, the social function of speculation on the free market is to smoothen business fluctuations, increase liquidity, and increase the speed of price evolutions.

Even assuming that speculation may be destabilizing in an unhampered market, for two reasons this would not imply a case for government intervention. First, it may well be that the wealth created through the market's superior information processing outweighs the negative effects of speculation. Yet the authors do not make such a comparison. Thus the economics of information might well lead to a case for unregulated markets if the assumed undesirable effects of speculation are minuscule in relation to the general prosperity generated by markets. Second, government intervention and its prospect can induce market participants to speculate on the duration, details, and consequences of government intervention. Such intervention-induced speculation may well have more undesirable effects than speculation on free markets. Take for instance the speculation in real estate markets anticipating new zoning regulation, the role of the Community Reinvestment Act in the recent financial crisis, or foreign exchange speculation attempting to exploit inconsistent government policies.

In this context, it is astonishing that BKS do not address the contribution that brought Hayek a Nobel Prize: his work on macroeconomics and Austrian business cycle theory (ABCT). This is surprising because this contribution deals with a case of destabilizing entrepreneurial activity. According to ABCT, entrepreneurs are led to engage in unsustainable investment projects by artificially low interest rates. These malinvestments and the accompanying "irrational exuberance" on the part of speculators are, however, not a result of laissez-faire but of the harmful central bank policy of causing and prolonging price distortions through producing new money. In a world with such a policy, speculation may become destabilizing even if entrepreneurs know prices do not clear the market and are far away from their fundamentals. Because entrepreneurs do not bet against central banks, reverse price movement may not set in. Rather, entrepreneurs will try to make use of the new money to profit from the bubble as long as it lasts. Instability in such a world is fostered by high leverage, which may result in fire sales (Brunnermeier 2009). Yet such leverage would not occur on a free market but is stimulated by central bank policies and the fiat money system, which lead debt to become more attractive by allowing for artificially low interest rates and an upward trend in prices.[2]

In sum, entrepreneurs drive the economy more rapidly towards equilibrium if they correctly anticipate prices and if the market is unregulated. Insofar as entrepreneurs err on fundamentals, new opportunities for arbitrage emerge and other entrepreneurs may move the economy towards equilibrium. From a Hayekian perspective, speculation tends to be stabilizing on the unhampered market, but may become destabilizing in case of an artificial credit expansion or other government interventions.

The Value of Existing Institutions

The authors interpret Hayek's social philosophy as stating that "freely grown institutions that constrain the scope of the market in favor of public administration in resource allocation may be presumed to have purpose and value, even if these benefits cannot be deduced by rational reflection" (p. 226). But in *The Constitution of Liberty*, Hayek wrote: "*To the empiricist evolutionary tradition, on the other hand,* the value of freedom consists mainly in the opportunity it provides for the growth of the undesigned, and the beneficial functioning of a free society rests largely on the existence of such freely grown institutions" (Hayek 2011, 122; emphasis added). In italics, we see the part that BKS omit when they cite the above passage (p. 226). Hayek commented a few sentences later: "Paradoxical as it may appear, it is *probably* true that a successful free society will always *in a large measure* be a tradition-bound society" (ibid.; emphasis added). Thus, Hayek did not defend freely grown institutions with such an rigorous and certain claim to absoluteness in this passage as BKS suggest. On the contrary, for Hayek, institutions do not have value just because they evolved spontaneously; they also must be submitted to economic analysis: "It would be however wrong to conclude, strictly from such evolutionary premises, that whatever rules evolved are always or necessarily conducive to the survival and an increase of the populations following them. We need to show, with the help of economic analysis […] how the rules that emerge spontaneously tend to promote human survival" (Hayek 1988, 20). Hayek continued in clarifying that these rules are not protected "from critical scrutiny," above all because "there has so often been coercive interference in the process of cultural evolution" (ibid.). Indeed, one may ask in what sense institutions that constrain free markets in favor of "public administration" have "freely grown." The size of today´s states is not the result of independent cultural evolution, but of intervention into the free market. The political process cannot be considered a part of the evolutionary process of the free market, because the market order is characterized by voluntary cooperation while the state is characterized by hegemonic cooperation (Mises 1998, 196). If a result brought about by coercion is considered to be the result of spontaneous evolution, "spontaneous evolution" would become an all-encompassing, empty and basically useless concept. Any evolution or history would be "freely grown" and beneficial only by virtue of the fact that it exists, including "freely grown" gulags in the Soviet Union. A Hayekian state would be limited to codifying the norms that evolved spontaneously and were pre-existent in society. It would not design its "own" norms and pass them as legislation. Only when traditional norms prove to be incomplete and ineffective should the legislator intervene and modify freely grown rules (Hayek 1998, 88–89).

Thus, the major part of today's public administration rules did not evolve freely, but was designed and passed as legislation by politicians. Minimum-wage laws, for instance, did not evolve spontaneously. Gerald Starr explains in his book *Minimum Wage Fixing* that "the practice of minimum wage regulation is generally considered to have first developed in New Zealand and Australia around the turn of the century" (Starr 1993, 1). States wanted to prevent and settle industrial disputes with minimum wages, starting with the New Zealand Industrial Conciliation and Arbitration Act of 1894 (ibid.). BKS's justification of many existing government structures as a product of cultural evolution therefore must fail.

Moreover, cultural evolution is not the only part of a Hayekian argument for free markets. As Hayek pointed out, freely grown institutions must stand up to the "critical scrutiny" of economic analysis. In this respect, and assuming for the sake of the argument that monetary institutions have evolved freely, Hayek advanced theoretical arguments against monetary interventionism by central banks. Similarly, Hayek attacked central planning, the latter in particular in his contributions to the socialist calculation debate, which BKS hardly mention, as we will discuss later.

The Predictions Implicit in *The Road to Serfdom*

BKS reason that seven decades of Western liberal democracies disprove Hayek's predictions which he made in *The Road to Serfdom*. Interventionist economies such as the Nordic countries perform well in measures for democracy, civil liberties, and innovativeness by the World Bank, Freedom House, and Bloomberg (p. 226–27). They write: "[Hayek] saw hierarchical and collectivist political systems as a threat to individual liberty .[…]. But, seven decades later, we have a record of sustained liberal democratic values in economies with substantial government involvement, and the evidence does not support Hayek's most dire predictions"

[2] On artificially high leverage caused by government interventionism, see Hülsmann (2013) and Marquart and Bagus (2014).

(p. 226–27). First, there are other possible readings of *The Road to Serfdom*. Hayek-biographer Bruce Caldwell notes that the inevitability thesis, according to which any degree of economic interventionism will lead to totalitarianism, is one of the most frequent misreadings of *The Road to Serfdom*. He goes on: "Hayek denied this reading both in the book itself and in subsequent responses to his critics. That the book was originally intended as a part of the Abuse of Reason project provides further evidence in Hayek's favor. One of the major themes of the 'Scientism' essay is that the historicist search for general laws that would allow one to predict the future course of history is chimerical. Would it make sense for the author of such an essay to then turn around later in his work and attempt to predict the future course of history?" (Caldwell 2004, 241) According to Caldwell, Hayek did not claim that economic interventionism must always lead to totalitarian societies.

Second, and assuming that Hayek really made this point, one might reply to BKS that the interventionist spiral moves slower than they reckon. We might be on the road to serfdom but we might not have reached totalitarianism yet. Indeed, the government´s portion of GDP has been on the rise for a long time. Furthermore, some observers report an increasing decay of civil liberties in the Western world, especially after the 9/11 attacks. Susan Herman, president of the American Civil Liberties Union, speaks of an "erosion of American democracy" (Herman 2011). The inevitability thesis might get a late confirmation if Herman is correct, since terrorism can be seen as a blowback against foreign interventionism financed by interventionist Western governments.

Hayek´s Central Claim

BKS's central conclusion reads as: "[Hayek] advocated minimal government involvement in economic activity because he saw hierarchical and collectivist political systems as a threat to individual liberty, not because his economics *per se* had demonstrated the superiority of unregulated markets" (p. 226–27; emphasis in original). But they reach this conclusion without criticizing Hayek's contributions to the socialist calculation debate or mentioning his works on macroeconomics and ABCT. In both areas, Hayek's knowledge paradigm plays a crucial role. Since knowledge is only available always dispersed, tacit, and incomplete in millions of individual minds, interventionist and socialist economies cannot make full use of the existing knowledge but only of the knowledge available to the ruling class, whereas unregulated markets can fully use knowledge. In the ABCT, entrepreneurs are misled to engage in malinvestments because they do not know whether interest rates decrease due to falling time preferences or due to an artificial credit expansion. They are initially not aware of what prices are distorted and to what degree. They are clueless on about when the artificial boom ends because they do not know how long central banks provide liquidity (Bagus 2007). As we said earlier, even if they are aware of the unsustainable nature of the boom, they want to profit from the bubble before it collapses and they will not refrain from investing the newly created money. BKS do not criticize these applications of the knowledge paradigm to business cycles and central planning. Their argument that Hayek's economics does not show the superiority of unregulated markets therefore remains incomplete. If one accepts Hayek's economics of knowledge in these theoretical fields, one must indeed conclude that "his economics *per se* had demonstrated the superiority of unregulated markets."

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Austrian Business Cycle Theory Redux: Integrating *Sticky Consumption* and *Sequestered Capital*

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Abstract

F.A. Hayek's trade cycle theory was triumphant in the early 1930s, but withered within a decade as critics went unanswered. Hayek challenged others to "prove" theoretically, what he "knew" intuitively about business cycles. In the late 1990s, Roger Garrison responded with a logically sound and pedagogically persuasive model that answered most of Hayek's critics. In recent years, the Garrison model has been confronted over its (1) conflict with empirical evidence that consumption is sticky, (2) lack of insight into the timing of either booms or busts, and (3) inconsistency with rational expectations. To address these, we first modify Garrison's model to identify not just the capital usages in the stages of production, but also sequestered pre-production (R&D) capital. With sequestered capital in play, sticky consumption can be logically accommodated, providing answers all three criticisms of Garrison—addressing Hayek's challenge.

Keywords: Sticky consumption, sequestered capital, Austrian Business Cycle Theory (ABCT), Hayek's challenge

JEL Codes: El4, E21, E32

Introduction

Roger Garrison's (2001) model of the Austrian Business Cycle Theory (ABCT) has become its standard exposition—it is logically consistent and has proven pedagogically persuasive. Unfortunately, it suffers from three shortcomings: 1) it requires the assumption of immediate overconsumption to maintain logical consistency against the preponderance of evidence which now indicates that consumption is sticky; 2) it provides no clear prediction of boom and bust timings; and 3) it is subject to the rational expectations critique.

Toward overcoming its deficiencies, we introduce sticky consumption and sequestered capital into Garrison's (2001) model, organizing the remainder of the paper as follows: In Section II, we review Garrison's model. In Section III, we review the evidence that consumption is sticky rather than immediately reactive as assumed in Garrison's model. In Section IV, we modify the Hayekian triangle to distinguish *pre-production* capital usages (e.g., capital used in new product R&D) from capital used in *on-going* production processes. In Section V, we place our modified Hayekian triangle into Garrison's model and also introduce the modifications necessary so that, consistent with empirical evidence, consumption largely unresponsive (i.e., sticky) during the initial phase of the boom. Pivoting off this explanation of the boom, Section VI offers insights into how, and when, the inevitable bust plays out. In Section VII, we explain two additional benefits of including sequestered capital into the model—providing insights into boom and bust timings, and an additional response to the rational expectations critique of ABCT. Conclusions follow in Section VII.

Garrisonian ABCT

"Thinking strictly in terms of the Hayekian triangle," Garrison (2004, p. 335) concludes that *immediate overconsumption, overinvestment,* and *malinvestment* are all necessary to the logical consistency of ABCT. Figure 1 reproduces, with a few modifications, Garrison's diagrammatics. Our modifications of Garrison's (2001) figure are the following. First, we have shaded the initial, sustainable Hayekian triangle that prevails before the credit expansion. This makes it easier to see that the credit expansion has caused an overinvestment in both the early stages of production (due to the decrease in nominal interest rates), and in the latest stages of production (due to an increase in late stage yield). The obtuse triangles representing economic distortion at either end of the Hayekian triangle (Garrison's "dueling" triangles) stand out by being unshaded in the figure, in contrast to the sustainable (shaded) triangle. Further, the dotted line within the shaded Hayekian triangle indicating the bust (the impossibility of sustaining all the early-stage investments undertaken) is visually striking. Second, we have added the large hollow dot to his 2001 presentation, consistent with his 2004 presentation. In Garrison's rendering, immediate booming consumption and investment propel the economy from the solid dot on the PPF orthogonally beyond the PPF in the direction of the large hollow dot.

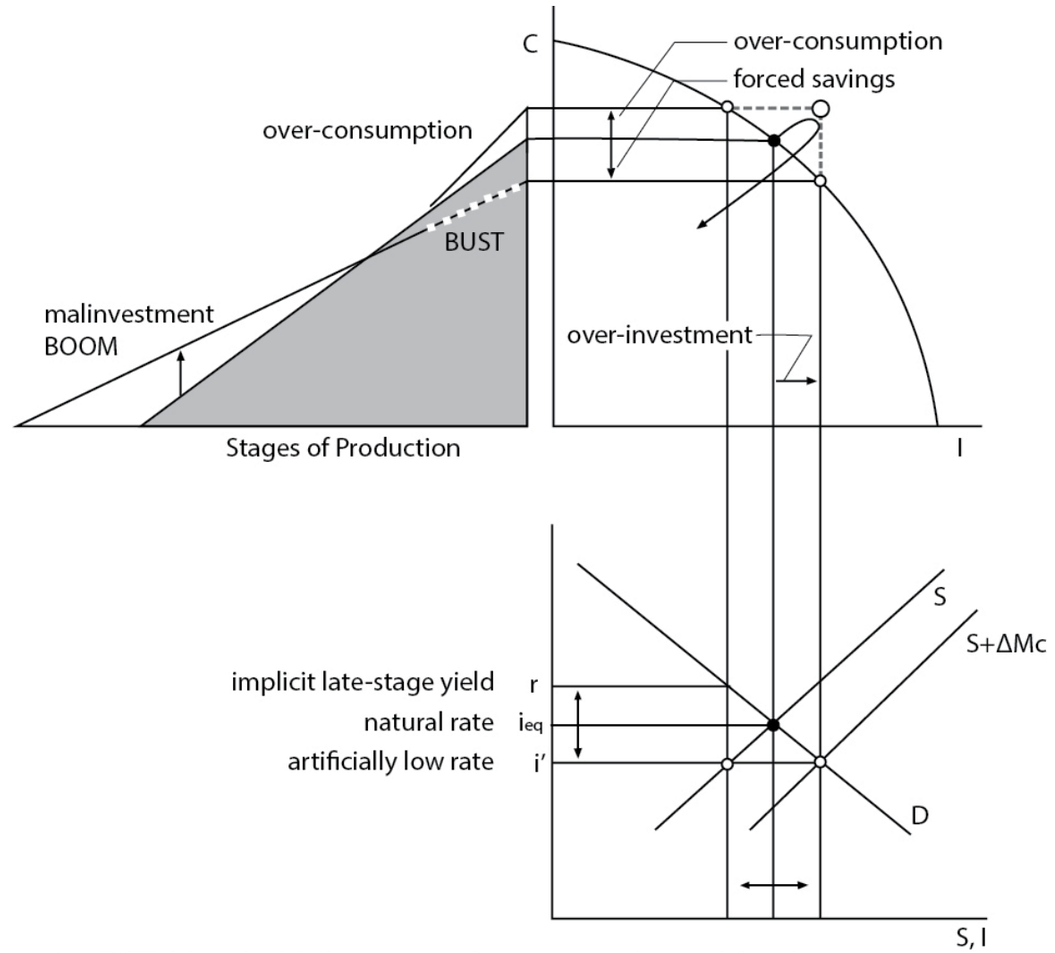


Figure 1. ABCT driven by Malinvestment, Overconsumption, and Overinvestment
Source: Garrison (2001, p. 69)

The explanation of Figure 1 is well known to Austrian economists. Injection of new credit by the monetary authority sends the interest rate below the natural rate. The immediate results of a decline in the interest rate are that: 1) the quantity of loanable funds that households supply falls; 2) consumption rises; and 3) the quantity of loanable funds demanded by business rises. Responding to the immediate increase in household demand for consumption goods, late stage investment expands. At the same time, because the interest rate has declined, businesses increase investment in early stage production. The reallocation of capital simultaneously toward both ends of the Hayekian triangle is unsustainable because it creates a hole in the middle of the capital structure. mAs the boom turns to bust, consumption and investment both decline precipitously.[1] We see no

[1] Garrison's (2004, p. 335-36) explanation reinforces ours: "While there is no lag between earning money (in early stages) and spending it (on consumables), there is scope for both malinvestment

logical inconsistency in Garrison's model.

Importantly, the logical consistency of Garrison's model requires *both* immediate overconsumption *and* booming malinvestment.[2] The problem is that empirically consumption is sticky—it does not play out the way Garrison's model predicts. It does not immediately rise during the boom nor does it rapidly decline as the bust ensues.

Contra Garrisonian ABCT: Consumption is Sticky

In the late twentieth century, and early twenty-first, robust empirical evidence emerged that, just as many early business cycle theorists like Hayek had thought,[3] the time path of consumption was not volatile, but rather smooth.[4] John Campbell and Angus Deaton (1989) in "Why is Consumption So Smooth?" concluded that ". . . in postwar U.S. quarterly data, consumption is smooth because it responds with a lag to changes in income." Deaton (1992) provides further evidence of consumption stickiness in *Understanding Consumption*.

In an empirical study of consumption not just in the United States, but across countries throughout the industrialized world, stickiness is consistently found to be both statistically significant and of a substantial size:

> [W]e find that when econometric techniques that account for measurement error are used, consumption growth exhibits a high degree of persistence, or momentum. . . . Fitting the model to data from thirteen countries, we estimated that consumption growth persistence is always significantly above the random walk benchmark of 0 and is never robustly different from about 0.7. (Carroll, Slacalek, and Sommer; 2011, p. 1144)

Removing the influence of other factors, Carroll, Slacalek, and Sommer find a statistically robust "persistence" (across thirteen countries) in changes in consumption growth of 0.7.[5] To provide a comparison benchmark by which to assess the size of this consumption stickiness measure, they note that: "the serial correlation for spending growth in the raw data is much lower than 0.7 . . . in U.S. data the estimated coefficient for nondurables and services consumption growth is about 0.35." (p. 1136)

This empirical evidence of sticky consumption contradicts a condition required for the logical consistency of Garrison's model—the condition of immediate overconsumption during the credit expansion inspired boom. As Garrison (2004) explains, if one assumes as Hayek did, that consumption is sticky initially and only later rises as boom-countering consumption, one must explain the lags "between the increased allocation of resources toward the early stages and the subsequent allocation in the direction of late stages." In the absence of an explanation of these lags, Garrison correctly concludes that logical consistency requires immediate overconsumption. But, again, this puts the model in conflict with the evidence that consumption is sticky. What is needed, then, is an explanation of the lags. Toward this end, in the next section, we introduce sequestered capital into the structure of capital triangle in Garrison's model.

Modifying the Hayekian Triangle

In *Prices and Production,* Hayek ([1935] 1967) argues that the "output of consumer goods" is produced by a process in which "intermediate products" are coordinated (allocated and reallocated) via the voluntary interactions of competing and cooperating entrepreneurs who are guided by emergent price and production signals. Garrison's (2004) explanation emphasizes Hayek's *stages-of-production* framing.[6] In *Time and Money,* Garrison (2001,

and overconsumption to take place at once. Thinking strictly in terms of the Hayekian triangle, we can envision a pattern of reallocation in which both early and late stages get increased at the expense of middle stages. This understanding of the market process, set into motion by credit expansion, helps dramatize the notion that malinvestment and overconsumption are compounding problems. And even beyond this two-way distortion of the intertemporal pattern of resource allocation, there is scope for temporary, that is, unsustainable, increases in production all around. Both capital and labor can be employed more intensely than is possible on a sustainable basis. Routine maintenance of machinery can be postponed, and the machinery can be kept running more hours per day or more days per week than usual. A greater proportion of the population can be drawn into the labor force, some workers can work overtime, and others can postpone retirement."

[2] As Garrison (2004) explains, Hayek's version of the theory, which hypothesized booming malinvestment, but not immediate overconsumption, hinges upon the existence of time lags—"between the increased allocation of resources toward the early stages and the subsequent allocation in the direction of late stages"—that Hayek never explained.

[3] Hayek (1932b, p. 126) criticized R.G. Hawtrey for theorizing "against all evidence" that marked declines in consumer spending characterized the beginnings of depressions. "In fact, of course," Hayek (ibid) explained, "depression has always begun with a decline in the demand, not for consumers' goods but for capital goods, and the one marked phenomenon of the past depression was that the demand for consumers' goods was very well maintained for a long while after the crisis occurred."

[4] It should be noted that with regard to how consumption played out during the boom, Hayek disagreed with Mises. Hayek's version of the business cycle did not require immediate overconsumption as *did* Mises's (and as *does* Garrison's): "It has been pointed out already in what respect we are free to call an improvement in the quality and an increase in the quantity of products economic progress. If we apply this yardstick to the various phases of the cyclical fluctuations of business, we must call the boom retrogression and the depression progress. The boom squanders through malinvestment scarce factors of production and reduces the stock available through overconsumption; its alleged blessings are paid for by impoverishment. The depression, on the other hand, is the way back to a state of affairs in which all factors of production are employed for the best possible satisfaction of the most urgent needs of the consumers" (Mises, 2008 [1998], p. 573).

[5] According to the Permanent Income Hypothesis, past changes in consumption should not explain current changes in consumption. Yet, controlling for other factors, Carroll, Slacalek, and Sommer still found a "statistically robust persistence" in changes in consumption growth of 0.7. Were changes in consumption growth characterized by a random walk, per the PIH, the estimated persistence coefficient would have been 0.0, instead of 0.7.

[6] Cachanosky and Lewin (2017, p. 3) argue that "The structure of production is not only *the* distinctive characteristic of the ABCT, it is also the most objectionable component of such theory." Like us, they are unsatisfied with current capital structure theory, but for reasons that are orthogonal to ours: "the structure of production [i.e., *stages-of-production]* implies multiple dimensions or variables that are confounded in one single term." For more details on their work investigating the micro-foundations of Austrian business cycle theory see: Lewin and Cachanosky (2016) and Cachanosky and Lewin (2014). Our criticism is, rather, about the incom-

Figure 5.5, p. 47) goes into more detail, but there is no doubt that he conceived of the time-leg of the Hayekian triangle as solely the stages of production—the stages being "mining, refining, manufacturing, distributing and retailing."

In order to represent *all* capital used in an economy, logically, one cannot exclude any of the activities in which capital is employed. By definition, *pre-production* business activities *precede* the stages of production. Increasingly important to industrialized economies are the employments of capital in *new-product* research and development. Independent consideration of capital usages in pre-production, new-product R&D is crucial because unlike the capital used in the stages of production, the capital used in new-product R&D: 1) is uncoordinated and unconstrained by the output volume and output price signals of horizontal new-product R&D competitors; and 2) emits signals of neither output price nor output volume to coordinate and constrain time-forward stages of production.

Restating, from the opposite direction, for clarity: The output prices and output volume signals that are available and which crucially inform the decisions of competing and cooperating firms involved in on-going production processes across the stages of production, are signals that, by definition, are absent as firms use capital in pre-production activities—potential new products that are only just being researched and developed have neither observable prices nor sales volumes. New-product R&D is much, much more, and consequently takes much longer (months or years) than just thinking up a new product—that is only the research piece, and it is just the tip of the R&D iceberg in many cases. After "thinking of the idea" comes the more capital intensive efforts to: 1) create a working prototype, 2) turn the prototype into a manufacturable product, and 3) create the pre-product-launch inventories. Again, it is in this sense that we use the term sequestered capital—because the usages of capital by firms engaged in pre-production cannot be informed by one another's output prices and supplies of output, because, by definition, their products have not yet been launched onto the open market.

Not only does pre-production fail to emit signals of prices and production, there is also abundant evidence that the entrepreneurs who are engaged in new-product R&D often go to great lengths to stifle signals about their enterprises. For example, they often require their employees to sign *non-disclosure agreements* (requiring employees to keep secret the details of new-product R&D) and *invention agreements* (that pre-specify the sharing agreement for anything that employees invent during their employment).[7] Enforcement of these agreements requires due diligence by entrepreneurs under the definition and statutes regarding trade secrets.[8]

pleteness of the coverage of the *stages-of-production* triangle rather than confounding aggregation.

[7] Another .example: in an empirical study of "whether R&D-intensive firms use time-vested stock-based pay to keep their R&D investments secret," Erkens (2011) discovered that "executives' unvested equity holdings are larger when executives are employed by R&D-intensive firms in industries that rely more on secrecy to profit from R&D." This is consistent with the actions of R&D entrepreneurs mentioned in the text (the non-disclosure and invention agreements). Erkens' explains that because unvested equity holdings would be lost by employees leaving R&D employers, such holdings acts as a deterrent to the bidding away of employees with knowledge of trade secrets.

8 ". . . [T]he term 'trade secret' means all forms and types of financial, business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, prototypes, methods, techniques, processes, procedures, programs, or codes, whether tangible or intangible, and whether or how stored, compiled, or memorialized physically, electronically, graphically, photographically, or

Because of these efforts to assure the discretion of R&D employees, and because pre-production generates neither product price nor output volume signals, we refer to capital used in pre-production as sequestered capital. Because pre-production, by definition, precedes the actual production (the stages of production), modifying the Hayekian triangle to distinguish pre-production (sequestered) capital is straightforward. Figure 2 shows the full structure of capital which includes not only the stages of production but also the pre-production efforts (i.e., new-product R&D) that precede them.

Within the stages-of-production trapezoid portion of this modified Hayekian triangle, notice the grid of arrows. To our knowledge we are the first to employ arrows such as these. We use them to highlight the information flows that are taking place across the stages of production. The horizontal arrows illustrate that prices are informing production decisions throughout the process from which final goods and services emerge. The vertical arrows illustrate how relative prices guide the decisions of firms that are involved in the production

Stages-of-Production as a Subset of the Full Capital Structure of different outputs but equally distant in time from the production of the final output, such that resources are allocated efficiently between these competing alternative uses. The slope of the hypotenuse of the triangle, per convention, is indicative of the interest rate signal that coordinates roundaboutness (as the interest rate rises the slope steepens and production is hypothesized to become less roundabout).

In sharp contrast to the situation within the stages-of-production trapezoid, pre production investments lack relative price signals that are essential for the efficient coordination of capital. Within pre-production (sequestered capital) stages, price and production signals between and among laterally competing firms are largely silenced because firms that are researching and/or developing products have much less information about one another's activities than firms that are producing and selling products.

Guido Hülsmann (1997) explains that Austrian economists take different positions on the importance of the role of prices in market coordination—with Mises emphasizing them less than either Hayek or Kirzner. As Mises (2008; 1998, p. 333) explains

In drafting their plans the entrepreneurs look first at the prices of the immediate past which are mistakenly called present prices. Of course, the entrepreneurs never make these prices enter into their calculations without paying regard to anticipated changes. The prices of the immediate past are for them only the starting point of deliberations leading to forecasts of future prices.

Mises's take is that the *prices of the immediate past* are the starting points of deliberations about entrepreneurs' forecasts of *future prices*. And, as Mises states, "It is . .

in writing if (A) the owner thereof has taken reasonable measures to keep such information secret; and (B) the information derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, another person who can obtain economic value from the disclosure or use of the information . . ." 18 U.S. Code§ 1839-Definitions accessed online at: https://www.law.comell.edu/uscode/text/18/1839

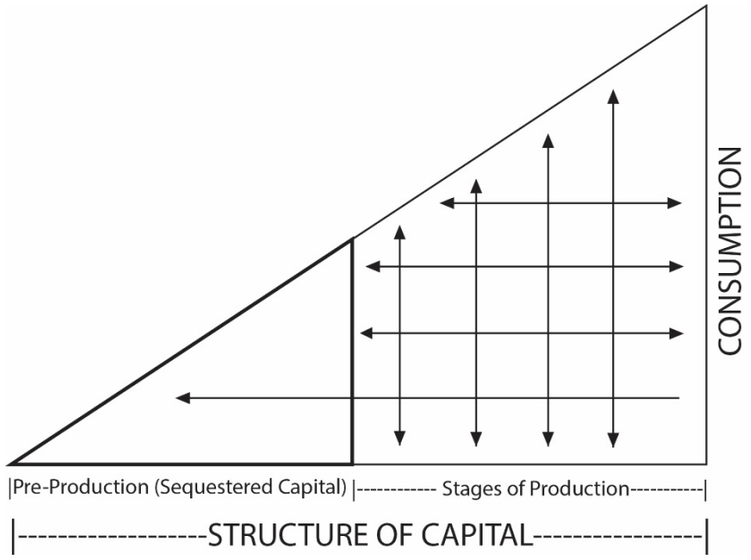


Figure 2: Revised Hayekian Triangle:

. the anticipations of future prices of the products that determines the state of prices of the complementary factors of production" (*ibid*.).

Following Mises's argument, *prices of the immediate past* are factored into entrepreneurial forecasts of *future prices* that give rise to action, which then "*determines the state of prices* of complementary factors of production." For our purposes, all that is important is that one agrees with Mises, that these interactions must be considered. Whereas all of these interconnections apply to entrepreneurs across the traditional stages of production, only some of them apply to entrepreneurs researching and developing new products in what we have labeled the "pre-production" portion of the structure of capital (the sequestered portion). New-product entrepreneurs, unlike stages of production entrepreneurs, are blind to not only the preparations of lateral competitors, but also, at times, the knowledge of who and how many lateral competitors there might be. With less information, the ability of new-product entrepreneurs to anticipate future prices is reduced. This greater uncertainty, together with the constraint imposed by higher borrowing rates (reflecting this greater uncertainty), works against overinvestment in new-product R&D. But when the interest rate is artificially driven below the natural rate, then, according to our theory, overinvestment in new-product R&D will ensue.

For concreteness, think about the informational constraints confronting an existing sawmill versus those facing a sawmill under development that is neither producing nor selling any sawmill services. The existing mill *and* potential new mill both can be informed by: 1) the prices of inputs used by sawmills (including credit priced, for now, at the natural rate of interest); 2) the prices being charged by existing sawmills for their services; and 3) the range of services being offered by existing mills. On the other hand, *potential* new mills, by definition, offer

no services and consequently emit no price signals that would alert them to one another's pre-production preparations. The lack of these market signals is illustrated in Figure 3 by the absence of vertical and horizontal arrows within the sequestered capital triangle.

Certainly, any mills that *are* under development will be demanding inputs from firms operating across the stages of production in Figure 2. These demands drive up input prices and, as a consequence, might constrain the number (and extent) of new mills under development. That is, information about input prices flowing from firms operating across the stages of production *does* inform business activities in the *pre-production* space. This is shown by the horizontal, unidirectional arrow in Figure 2 that extends from the stages of production *into* the pre-production triangle. The reason that this price-information arrow is unidirectional is definitional. Preproduction goods and services under research and/or development *do not have priced goods on the market*. Information flows in, but does not flow within, or out of, the sequestered capital triangle.[9]

So long as there has been no excessive credit expansion, and so long as input markets are undistorted, there is no reason to think that new-mill development will be excessive. This will be the case, in our conception, if, as shown in Figure 2, the slope of the trapezoidal (stages of production) area, matches the slope of the pre-production (sequestered capital) triangle. Alternatively stated, when the natural rate of interest guides both pre-production and the stages of production, new products are assumed to emerge at rates that cause no system-wide disruption.[10]

A Sticky Consumption, Sequestered-Malinvestment Boom

With pre-production (sequestered) capital properly distinguished from the stages of production, immediate overconsumption is no longer a required component of Garrisonian ABCT to insure its logical consistency.[11] In this section, we modify Garrison's Figure 1

[9] Restating and summarizing for emphasis and clarity: Firms operating in the pre-production space are distinctly unlike firms that are actually producing and selling products across the stages of production. Pre-production firms, by definition, are not yet producing priced output. Consequently, pre-production firms emit neither output price nor output volume signals to coordinate and/or constrain either other pre-production firms' activities or the activities of firms across the stages of production.

[10] Garrison (2014, p. 3) explains that Hayek, ". . . was always careful to square his theorizing with the general equilibrium of the Lausanne school of economics rooted in the works of Leon Walras. But the emphasis was always on 'general' rather than on 'equilibrium.' It would be more accurate to say that Hayek always paid explicit attention to general interdependencies among all markets -- whether or not the market forces with those interdependencies are conceived as having actually achieved a state of equilibrium." Similarly, both Garrison's "sustainable process," and the modification of it we are proposing, put the emphasis on "general" rather than upon "equilibrium." Along these lines, O'Driscoll (1977, p. 23) explains that Hayek used "economic theory so as to focus on the market *process,* by which disparate plans of individuals are equilibrated, rather than on equilibrium *states*." Our thinking follows Garrison, Hayek and O'Driscoll.

[11] When Hayek posited a business cycle model without immediate overconsumption, postulating just an unaccompanied malinvestment boom, Hicks challenged the model by asking why it would be that prices would not immediately adjust and put an end to malinvestment as soon as it began. Hayek asserted the existence of a lagged response to mal-

diagrammatics so that consumption is completely sticky (remaining unchanged) during the initial phase of the boom inspired by an excessive expansion of credit. Figure 3 (below) illustrates our modifications.

The second law of supply is a fairly standard economic principle—the idea that the quantity supplied of anything is more responsive to a change in price in the long run, as suppliers have more time to adapt, than in the short run. Our assumption, that the short-run loanable funds supply curves in Figure 3 are completely inelastic (vertical), makes consumption *perfectly* sticky. This simplifies the diagrammatics, but changes none of the substantive results.[12]

To highlight sticky consumption, the boom depicted requires no immediate increase in consumption whatsoever. The monetary authority's credit expansion shifts the supply rightward and drives the interest rate down. The immediate (short-run) impact of the decrease in the interest rate upon household consumption and saving is captured by the completely inelastic (vertical) short-run supply curves shown in Figure 3.[13]

Prior to the credit expansion, the following conditions hold. First, the loanable funds market is assumed to have equilibrated at the natural rate of interest (i_{eq}) at the intersection of the short-run loanable funds supply (S_{SR}) and the loanable funds demand curve (D) at point L. Second, the economy is at a sustainable full-employment point by virtue of being *on* the production possibility frontier at point L. Finally, pre-production and the stages of production are coordinated by the prevailing natural rate of interest in sustainable proportions. As in Figure 1 (Garrisonian ABCT), the initial, sustainable structure of capital is shaded in Figure 3 with the addition of a shaded pre-production triangle and a shaded stages-of-production trapezoid that are, again, of sustainable proportions.

The directional arrows displayed in the interlocking panels of Figure 3 illustrate the short-run impact of the monetary authority's credit expansion. In the market for loanable funds, the injection of new money *pads* the short-run supply curve. (Garrison often uses the term "pads" in his oral presentations in this context to emphasize that the supply curve proper, the one

investments, but never provided a defensible answer to Hicks' challenge. Noting this, Garrison ultimately sided with Mises (who insisted on immediate overconsumption), rather than Hayek, and modeled ABCT with both malinvestment and immediate overconsumption. With sequestered capital in play, because malinvestments in pre-production do not send signals of prices and production volumes, the lagged response to the malinvestment boom is explicable. The price and production signals that constrain lateral competitors' usages of capital across the stages of production are absent throughout the pre-production period of time it takes for idea discovery, prototype creation, and initial pre-product-launch inventories to be created.

[12] With consumption less sticky, the short-run loanable funds supply curves will be upward sloping rather than vertical. This would mean that relative to the boom-induced results shown in Figure 4 that: 1) consumption would rise slightly; 2) the interest rate would fall by a smaller amount; 3) investment would rise by a smaller amount; and 4) the amount of sequestered malinvestment would be smaller.

[13] The assumption that the short-run loanable funds supply curves are completely inelastic (vertical) makes consumption completely sticky. This simplifies the diagrammatics, but changes none of the substantive results. With consumption less sticky, the short-run loanable funds supply curves will be upward sloping rather than vertical. This would mean that relative to the boom-induced results shown in Figure 3 that: 1) consumption would rise slightly; 2) the interest rate would fall by a smaller amount; 3) investment would rise by a smaller amount; and 4) the amount of sequestered malinvestment would be smaller.

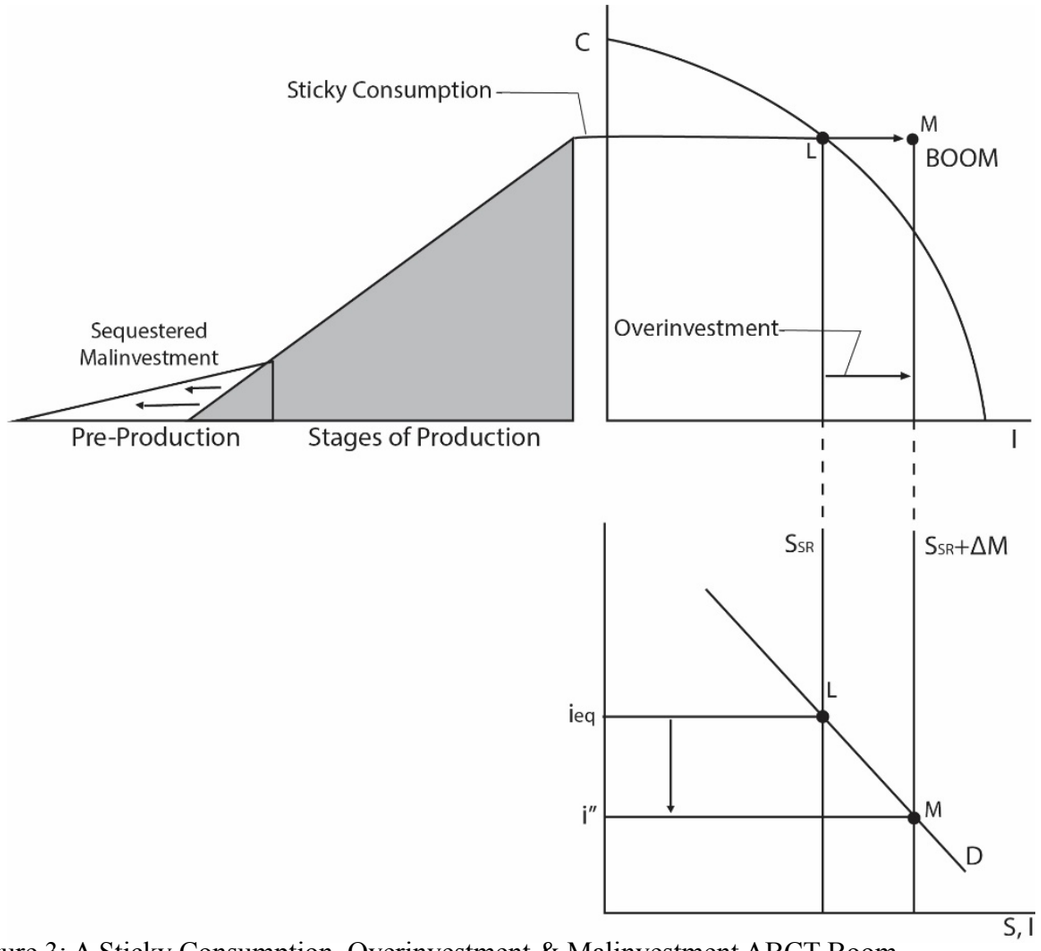


Figure 3: A Sticky Consumption, Overinvestment & Malinvestment ABCT Boom

that continues to describe amounts of saving at any interest rate, remains unchanged—putting green ink on paper does not alter the intertemporal preferences of savers one iota).[14] The credit expansion drives the interest rate (as indicated by the down-arrow in the loanable funds panel) below the natural rate to i", at the intersection of the monetarily *padded* short-run supply curve $S_{SR}+\Delta M$ and demand curve D.

As the interest rate falls below the natural rate, overinvestment occurs; the directional arrows on the production possibilities panel show an overinvestment boom that allows the economy to move, temporarily, beyond the sustainable frontier to point M. Importantly, the decline in the interest rate stimulates investment into sequestered capital, the earliest

[14] In following Garrison's terminology, *padding* means that the Fed's open market purchases increase the quantity of bank reserves, or base money, which increases the supply of loanable funds beyond household supply of loanable funds. As base money increase, the deposit expansion process in the fractional reserve banking system increase the amount of checkable deposits (i.e., fiduciary media), thus accounting for the overall increase in the money supply.

component of the capital structure**.** The directional arrows in the structure-of-capital panel of Figure 3 emphasize that sequestered malinvestment characterizes the boom. Unsustainable amounts of investment are flowing into pre-production enterprises (e.g., research and development) in amounts that exceed those anticipated across the stages of production.

Because pre-production (sequestered) investment is by definition the earliest component of the capital structure, whenever malinvestment is caused by an overexpansion of credit it will *necessarily* involve increased investment in pre-production activities. Again, "sequestered malinvestment" is the term we use to define malinvestment into preproduction business activities. Again, pre-production R&D is, by design, secretive. This means that inefficient duplications within the pre-production stages will not be revealed during the earliest phase of the boom depicted in Figure 3.

Only as initial inventories enter the stages of production, where prices and production signals *are* emitted, will errors of duplication be revealed. The revelation of such errors can, when they emerge in a swarm or cluster, cause system-wide disruption that can result in an economic bust. McClure and Thomas (2018) provide a price theoretic explanation for duplicative investments in new-product R&D that emerge in clusters disruptive to the anticipations of entrepreneurs across the stages of production.[15]

Boom-countering Consumption and the Inevitable Bust

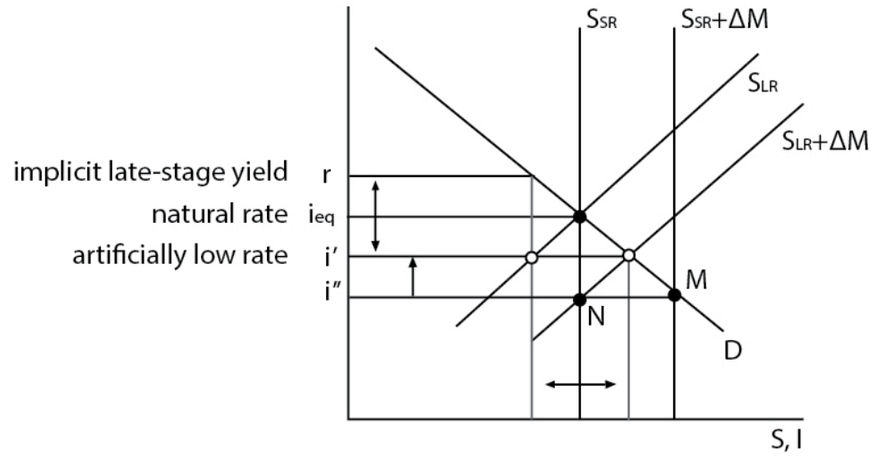
In this section, we reconsider Hayek's conception that, during later stages of the malinvestment boom, intensified consumption will occur.[16] By reframing ABCT in the context of the full structure of capital we are able to straightforwardly explain how Hayek's conception lines up with a natural extension of the short-run analysis presented in our discussion of Figure 3.

The second law of supply is a standard principle in economics—the idea that supply is more elastic in the long-run than the short-run. Recall that perfectly inelastic supply curves were used in Figure 3 to analyze the initial impact of the credit expansion. To provide insight into the process that plays out beyond the short-run, Figure 4 introduces a long-run loanable funds supply curve (S_{LR}) that is more elastic along with its corresponding, parallel-padded long-run supply curve ($S_{LR}+\Delta M$). The implication is that the interest rate will rise to i', at the intersection of $S_{LR}+\Delta M$ and D, from its short-run low of i".[17] This rise in the interest rate causes saving and investment amounts to decline from their short-run levels, at points N and M, to long-term levels determined by the hollow dots shown in Figure 4. Savings declines from the level consistent with point N to that determined on S_{LR} at i'. Investment declines from M to the level determined by the intersection of $S_{LR}+\Delta M$ and D.

Notice that our introduction of the second law of supply has not reduced the importance of the discoordination of saving and investment implied by the hollow dots; it delays the time at which this discoordination occurs. Whereas the discoordination of saving and investment occurs immediately in Garrisonian ABCT (the hollow dots in the loanable funds panel of Figure 1), in Figure 5 this discoordination is not immediate. The hollow dots in Figure 4 come into play in the long-run, preceded by a short-run discoordination of investment at M and saving at N.[18] With the second law of supply at work in the loanable funds market, the short-run interest rate of i" gives way to i' in the long run. As we will see, this *eventual* rise in interest rates implies an *eventual* boom-countering rise in consumption.[19]

Figure 4: Loanable Funds Adjustments Beyond the Immediate-term

Boom-countering intensified consumption



To see how the short-run to long-run movements in the loanable funds market result in boom-countering overconsumption, Figure 5 presents the interlocking production possibility frontier that corresponds to the loanable-fund diagrammatics from Figure 4. The hollow dots in the loanable-funds panel of Figure 5 track upward to the two hollow dots on the PPF in the upper panel of Figure 5. These represent the market forces that come into play *after* the credit-expansion boom that pushed the economy beyond the PPF in the upper panel to point M. Point M is the relevant starting point from which to understand the intuitive prescience of

[15] In addition, we want to point out that new-product R&D involves three distinguishable stages: idea prospecting (the creation of a prototype), productization (turning the prototype into a product expected to be profitable if produced), and the manufacture of the initial, pre-product-launch inventory. It is a mistake to think of R&D as just thinking up a new idea; the amount of capital investment in new-product R&D in the United States, properly understood as composed of all three stages, is enormously large. For a fuller discussion of these stages see McClure's and Thomas's (2017a) online, SSRN working paper.

[16] See Garrison (2004, p. 334) for a detailed explanation of Hayek's conception of boom countering consumption.

[17] Recall from the discussion of Figure 3 that the short-run rate reached a low of i" at the intersection of $S_{SR}+\Delta M$ and D.

[18] Note that short-run saving remained unchanged by the interest rate drop to i" because the short-run supply curve is assumed to be perfectly inelastic.

[19] Garrison (2004, p. 334) emphasizes that Hayek conceived of the "boom-bust cycle as forced saving, which is *eventually countered* by intensified consumption demand."

Hayek's boom-countering intensified consumption.

The large hollow dot beyond the PPF in Figure 5 represents the combined forces that pull the economy away from the short-run boom-inspired position at point M. The curved arrow toward this large hollow dot, which emanates from M, illustrates the predicted path following the boom. Again, saving and investment both decline as the short-run gives way to the long-run. The decline in saving brings about the increase in consumption (projecting from the lower panel of Figure 5 to the PPF panel). The market forces that come into play following the initial boom are pushing the economy in a counterclockwise direction away from point M toward the large hollow dot. The counterclockwise boom-countering movement in Figure 5 (increasing consumption and decreasing investment) is remarkable because the boom-countering direction of change in Garrisonian ABCT (Figure 1), is a clockwise movement implying that *both* consumption and investment decrease precipitously.

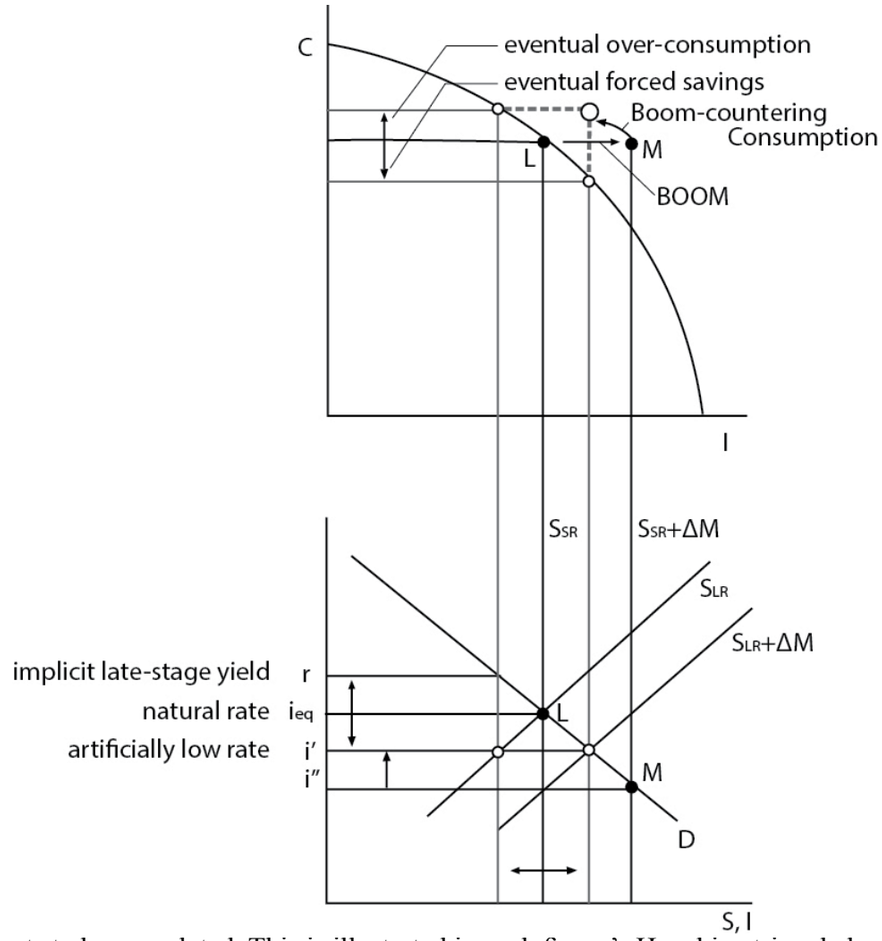
The position of the large hollow dot on Figures 1 and 5 is identical. The stark difference in the direction of change (the clockwise time-path in Figure 1 *versus* the counterclockwise path in Figure 5) is due to the difference in starting points. Because neither sticky consumption nor non-signal-emitting pre-production activities are present in Garrisonian ABCT, the movement toward the large hollow dot in Figure 1 constitutes the boom.[20] On the other hand, in Figure 5, with both sticky consumption and pre-production (sequestered capital) in play, interest rates fall from i_{eq} to i", and the boom moves the economy beyond the PPF in the short run to point M. Only in the long run do the forces represented by the large hollow dot in Figure 5 impact the economy. These forces come into play as short run gives way to long run with the interest rate rising *from* i" *to* i'.

Beyond Boom-Countering Consumption: The Inevitable Bust

Beyond the boom countering consumption shown in Figure 5, in the even longer run, an inevitable bust looms. Comparing Figure 5 with Figure 1, it becomes clear that the same forces of over consumption and forced saving that precipitated the bust in Figure 1 are also present in Figure 5; the only difference is that in Figure 5 they are labeled *eventual over-consumption* and *eventual forced saving* because they only come into play *after* the boom.

To make the bust explicit in the reframed ABCT, the structure-of-capital panel that is missing from Figure 5 is presented in Figure 6. At a glance, it is clear that the Hayekian triangles in Figure 1 and Figure 6 offer similar explanations of the bust. In both cases the bust is due to malinvestment and overconsumption that make it impossible for the overinvestment in early

Figure 5: Boom-countering Intensified Consumption



stage projects to be completed. This is illustrated in each figure's Hayekian triangle by the dotted line within the shaded area that is labeled "BUST."

The crucial difference in the Hayekian triangles is that in Figure 1 the capital structure consists of only the stages of production, whereas in Figure 6 the full structure of capital is in play (both the stages of production *and* pre-production). It is because of this difference that the composition of the malinvestment in Figure 6 differs from that in Figure 1, where all of the malinvestment is stages-of-production malinvestment. In Figure 6, on the other hand, the malinvestment also includes pre-production (sequestered) malinvestments. The directional arrows in Figure 6 illustrate the change in capital investment into pre-production that occurs as the interest rate rises from i" (where $S_{SR}+\Delta M$ and D intersect) to the longer-run rate of i' (where $S_{LR}+\Delta M$ and D intersect). As the interest rate rises, for example, resources devoted to new prototype research shift into the development of existing prototypes because they are less distant in time and less risky than yet-to-be-created prototypes.

[20] As interest rates fall in Figure 1 from i_{eq} to i', the economy makes it move from the solid dot *on* the PPF toward the large hollow dot *beyond* the PPF.

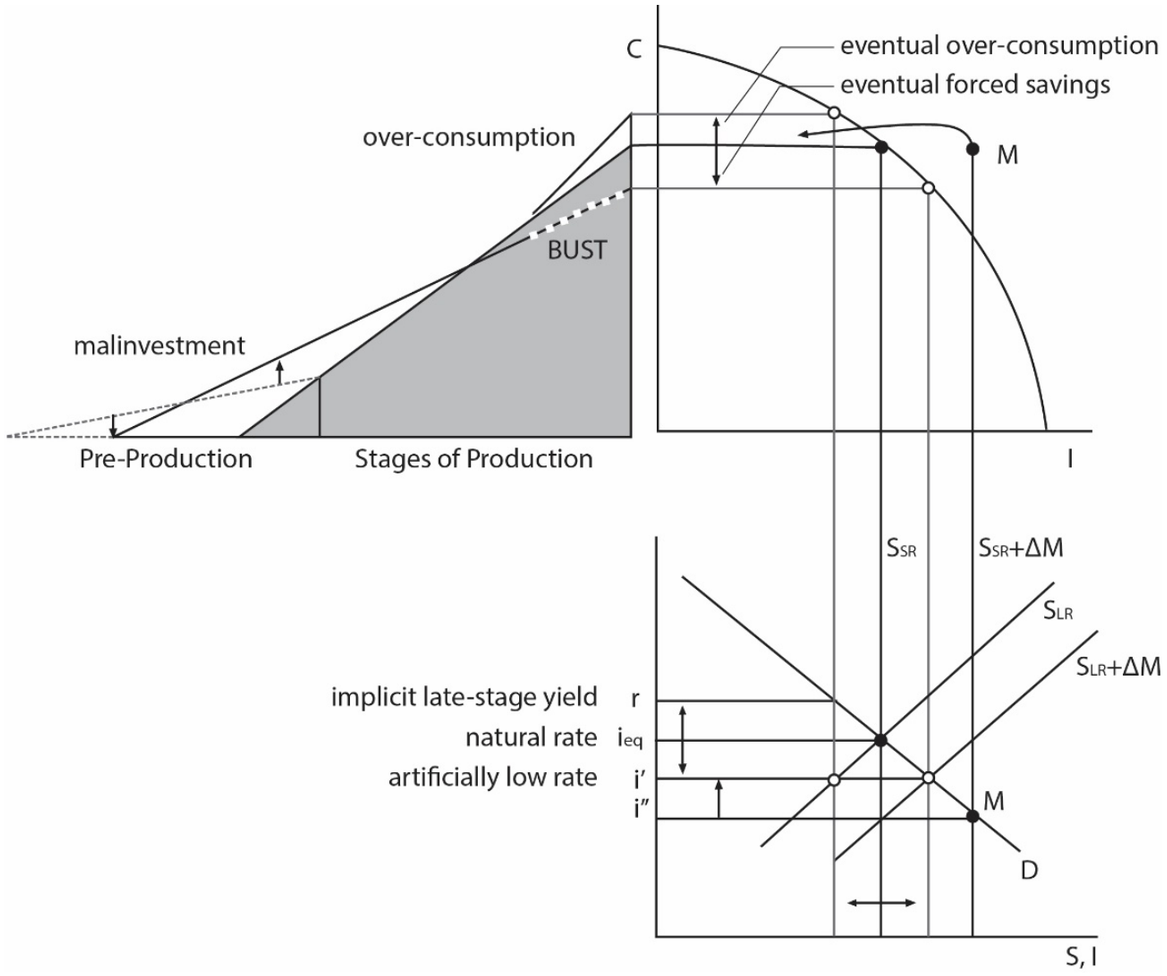


Figure 6: The Structure of Capital Bust

A final difference between Figures 1 and 6 is the clockwise movement from boom to bust in the former versus the counterclockwise movement in the latter. As seen in Figure 1, the logic of the stages-of production framing of ABCT implies roughly proportionate immediate increases in consumption and investment during the boom. This boom is followed by a rapid decrease in consumption, and subsequently by roughly proportionate decreases in investment and consumption that drive the economy inside the PPF. In Figure 6, with the full capital structure (pre-production and stages of production) and sticky consumption in play, the boom is driven by increased investment.

Eventually countering this boom are concurrent and roughly proportionate *increases* in consumption and reduced investment, as interest rates rebound off their short-run lows.

Subsequent to this consumption countering, investment and consumption both decline, but the declines in investment outpace the small declines in consumption shown.

The small consumption declines attending the rendering of the bust in Figure 6 are consistent with robust empirics indicating that consumption does not abruptly collapse at the beginning of downturns. As shown by the directional arrow in Figure 6, the bust lands the economy within the PPF. Although the bust in Figure 1 also lands the economy within the PPF, there is a clear difference from Figure 6 regarding where consumption ends up at the conclusion of the bust relative to where it started prior to the credit expansion. In Figure 1, consumption ends up far below its pre-credit-expansion level. In Figure 6, one sees that consumption is sticky rather than highly volatile over the cycle as seen in Garrison's model (in Figure 1).

Why It's Worth Complicating ABCT with Sequestered Capital

Comparing Figure 6 with Figure 1, we see the complications that come with introducing the concept of sequestered capital into ABCT. Beyond the benefit already discussed (that of maintaining logical consistency while accommodating sticky consumption), in this section, we discuss two additional benefits that offset the costs of including sequestered capital in the model.

Sequestered Capital Offers Insights into the Timing of Booms and Busts

Eugene Fama, famous among those who are critical of current explanations of financial bubbles, argues that the primary difficulty is that none of them offer a perspective about how one might anticipate boom and bust timings:

> For bubbles, I want a systematic way of identifying them. It's a simple proposition. You have to be able to predict that there is some end to it. All the tests people have done trying to do that don't work. Statistically, people have not come up with ways of identifying bubbles. Eugene Fama (2016)

Perhaps the biggest benefit that sequestered capital offers, is that it can provide clear insight into the timings of booms and busts.

For example, recall Douglas French's (2006) insightful linkage of underlying monetary conditions to the famous first financial bubble, the Dutch Tulipmania of 1636-1637. Because sequestered capital was not part of the ABCT model that French applied, he understandably could offer no explanation of the timing of the Tulipmania boom and bust. Thinking in terms of sequestered capital, McClure and Thomas (2017b) were able to build upon French's insights and explain the timing of the Tulipmania boom and bust. Tulip bulbs were capital that became sequestered at planting time, when an unknown and unknowable

quantity of bulbs were planted in the fall of 1636. This is when speculation began in earnest. The meteoric rise in prices of bulb promissory notes started *just after* the capital was sequestered (just after the bulbs were planted). The bubble burst when signals about the quantity of developing capital emerged in the form of tulip sprouts that became visible as they arose from beneath the soil in the first week of February 1637.

The successful use of sequestered capital in explaining the timing of the Tulipmania boom and bust, suggests its potential fruitfulness as an explanation of the timing of other price bubbles. Two that appear promising to us at this point are: 1) the dotcom bubble; and 2) the recent rise and fall in the price of Bitcoin. We think it is likely that a sequestered-capital-aware investigation of the historical and institutional context of these two modern day bubbles will reveal the same timing pattern that played out in the seventeenth century's Tulipmania bubble: with rapid price increases attracting large numbers of new entrants, whose new-product development activities are largely unknown to one another and whose new products, consequently, hit the market concurrently in such large quantities that prices collapse. Although these inquiries are clearly beyond the scope of this paper, they suggest the potential fruitfulness of bringing sequestered capital into analyses of financial crises.

Sequestered Capital offers an Answer to the Rational Expectations Critique of ABCT

A prominent criticism of traditional ABCT is that it is inconsistent with the assumption of rational expectations (see Tullock 1987, Cowen 1997, Wagner 1999). Standard ABCT assumes that entrepreneurs are fooled by credit expansion into engaging in unprofitable long-term investments. The critics of ABCT argue such systematic mistakes are inconsistent with the assumption that entrepreneurs are rational, profit maximizing agents. While any individual entrepreneur might mistakenly invest in projects that are too roundabout or too short because they do not correctly forecast the future path of interest rates, in the aggregate, these errors should cancel out and the medium-term-length of investment chosen by entrepreneurs should prove correct. The systematic overinvestment hypothesized by ABCT is not possible if entrepreneurs have rational expectations. Moreover, the proponents of ABCT are caught in a contradiction: the entrepreneurs, who are ordinarily assumed to possess tremendous foresight, act in a systematically irrational manner over the course of the business cycle.

In the face of these criticisms, many Austrian economists have written articles that argue ABCT is still applicable to an economy where decision makers have rational expectations (e.g., Salerno 1989, Hülsmann 1988, Block 2001, Carilli and Dempster 2001, Block and Barnett 2005, Evans and Baxendale 2008, and Englehardt 2012). The defenders of ABCT have mainly relied on three types of arguments. The first type of argument uses game theory to argue that the individual entrepreneur faces a prisoner's dilemma when credit expansion artificially lowers interest rates. Increased investment is a dominant strategy for the individual entrepreneur even though the socially optimal strategy is not to increase investment. The second type of argument stresses that artificially low interest rates create an adverse selection problem because they encourage individuals with less ability to become entrepreneurs. Credit expansion therefore lowers the quality of the marginal entrepreneur and causes fools to become entrepreneurs (and not the other way around). The third type of argument holds that the changes in the pattern of interest rates caused by credit expansion create a signal extraction problem that biases entrepreneurs into increasing investment.

While all three of these types of arguments in defense of ABCT have merit, without sequestered capital foundations they have proven less than fully satisfying to critics. Therefore, a major advantage of the modified model of ABCT developed in this paper is that it provides a new explanation for malinvestment that is consistent with rational expectations. If the earliest stages of the capital structure are sequestered, as we have argued, this provides a straightforward response to the rational expectations critique of ABCT. Entrepreneurs do not make biased use of information that is available, but rather their decisions are biased by the lack of available information.

Final Thoughts

In the late 1970s, there were serious debates about whether ABCT should remain a central point of emphasis in the Austrian-school:

> Rumor has it that at a recent strategy meeting, the top-flight Austrian economists decided that the Austrian business cycle theory should be deemphasized in favor of other aspects of Austrian theory. As is obvious from this paper, I think the exact opposite should be done. We need more, not less, work on Austrian business cycle theory. (Hummel 1979, p. 51)

Fortunately, Roger Garrison (2001, 2004) agreed with Hummel and created a logically consistent rendition of ABCT. Within the traditional stages of production framing, logical consistency required that Garrison build immediate overconsumption into the model's credit expansion boom.

Now, as in the late 1970s, there are rumors that top-level Austrian thinkers want to deemphasize ABCT because, although Garrison's model is internally consistent, it suffers from a variety of flaws, including: 1) its assumption of immediate overconsumption is at odds with empirical reality—a preponderance of robust empirical evidence now indicates that consumption is sticky, expanding only sluggishly during the boom and contracting slowly during busts; 2) Garrisonian ABCT offers no clear insight into the timing of credit cycle booms and busts; and 3) Garrison's model remains somewhat vulnerable to the rational expectations critique (that rational agents, now knowing the theory, should undermine it by anticipating it).

The ABCT model presented in this paper addresses all three of these deficiencies and, at the same time, is, like Garrison's, logically consistent. The key to being able to defensibly introduce sticky consumption into ABCT is recognizing that the traditional stages-of-production framing for ABCT is grossly incomplete. The full structure of capital

includes not only the stages of production, but also the sequestered usages of capital in pre-production stages of new-product research and development. It is no surprise that traditional ABCT, being so incompletely framed, has periodically raised doubts among top-level economists both within and outside the Austrian school. Heretofore, Austrian analysis of excessive credit expansion has ignored the fact that the earliest usages of capital are in pre-production stages in which laterally competing firms, lacking knowledge of one another's preparations, are most likely to engage in malinvestment. With the full structure of capital in play—stages of production *plus* sequestered pre-production—we predict that ABCT will remain an important component of the Austrian-school canon.

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Two perspectives on accounting and reporting standards: Welfare vs. Austrian Economics

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Abstract

The most common and predominant economic perspective on accounting and reporting standards is Welfare Economics using mainstream agency theory. The aim of this paper is to show that the focus on mainstream agency theory in discussing the economic function of accounting leads to an underestimation of the role of market prices. Using arguments from Austrian Economic Theory it will be shown that standards based on Fair Value Accounting lose the connection to market prices under the influence of Welfare Economics. Accounting and reporting standards based on Historical Cost Accounting better incorporate the function of market prices in a market economy because cost accounting is based on market prices. This way historical cost accounting has advantages in the complex and dynamic market process.

Keywords: International Financial Reporting Standards**,** German Code of Commerce**,** Historical Cost Accounting**,** Welfare Economics**,** Austrian Economics

JEL classification: **B530, G000, M410**

[1] The author thanks Dr. Janet Duke (University of Freiburg) and Ralf Möllers (Ministry of Education Hesse) as well as anonymous reviewers and the editor for helpful advice on this paper.

Introduction

Accounting is not only important for a single firm, it also plays an important role in a market economy. Economists who deal with accounting matters have different approaches when considering the function and consequences of accounting systems for an economy. Researchers influenced by Behavioral Economics e.g. investigate the role of accounting on judgement and decision making for a broad set of users including regulators and market participants. Leaving aside the assumption of consistently rational agents, behavioral accounting uses insights from psychology and sociology (Gillenkirch and Arnold 2008; Braun 2016). From the perspective of Critical Accounting researchers, accounting is seen as a phenomenon which has a wide range of social, economic and political consequences. They take a critical look at how accounting and accountants influence society and organisations (e.g. Laughlin 1999).

The orthodox and most common approach to the economic analysis of accounting systems comes from Welfare Economists. They see the role of financial accounting and reporting standards as a means to reduce market failures such as information asymmetries (e. g. Lev 1988, Healey and Palepu 2001). In this sense, financial accounting and reporting reduces the asymmetric information, and thus leads to better market results. This view is widely accepted in the literature about accounting and reporting standards and it yields some important insights, as will be discussed in chapter 2.

This paper focuses on two perspectives, as it compares the orthodox view of Welfare Economics on financial accounting and reporting to an additional perspective, i.e. the perspective of Austrian Economics. Austrian Economists first considered the role of accounting within their debate on socialism (Mises 1920; Hayek 1940). These arguments were picked up in more recent contributions of Austrian Economists (Boettke 1998; Boettke 2012; Huerta de Soto 2013), but these rarely analyze special accounting standards in detail (a very short analysis is provided by Huerta de Soto, 2009). In the financial and accounting literature the Austrian view on accounting is scarcely recognized (e.g. Brösel e.a. 2012) with recent exceptions in case of business valuation (e.g. Olbrich e.a. 2015; Rapp e.a. 2017) and Historical Cost Accounting (Braun 2016). The analysis of accounting and auditing principles from the standpoint of Austrian Economics is recommended, though (Fox 2016).

It is claimed that the discussion should be supplemented by a perspective that is based on Austrian Economics, which does not see accounting as a correction of market failures but rather as a prerequisite for the functioning of markets (as is shown in chapter 3). Austrian Economics stresses the dynamics of complex market processes, which make it important for market participants to find information and orientation in an ever-changing world. In contrast to the point made by Welfare Economics, accounting is not only important in order to inform others, but also to get information as a leader of a firm. The necessary information is provided by market prices, and the function of market prices should be transformed into accounting. The aim of this paper is to show that discussing the economic functions of accounting solely under mainstream agency theory leads to underrating the role market prices play in a market economy and in accounting, something which is crucial from the standpoint of Austrian Economics. Several other issues emerge from comparing the perspectives of Welfare and Austrian Economics on

accounting, e. g. the role of accounting in a market economy in general or the ongoing discussion about Fair Value vs. Historical Cost Accounting.

The approach used in this paper to answer the question of how prices and their fundamental role should be treated in accounting standards is deductive. Chapter 4 picks up the discussion about Fair Value vs. Historical Cost Accounting and evaluates the standards set under standard economic theory and Austrian economic theory. It will be shown that the Anglo-Saxon influenced accounting systems have been developed under the influence of the standard economic model. This way, prices, their function in accounts, and thus their function in the economy are downplayed. Accounting systems based on historical costs transport prices and their function into accounts, which is consistent with the role accounting should play from an Austrian perspective. Recognizing the fundamental role of prices in cost-based accounting has advantages over Fair Value Accounting.

Welfare Economics and Accounting

The orthodox and predominant approach of Welfare Economics assumes that market failure leads to welfare losses (e. g. Lev 1988, Healey and Palepu 2001). In the case of market failure, either the state or private actors must find solutions to minimize the resulting welfare losses. External effects, market power, or information asymmetries are the main categories of market failure. Most obvious and relevant for the case of accounting are significant information asymmetries, either between management and investors or across investors (e.g. Lev 1988). Information asymmetries are defined as information differences between different market sides, e.g. entrepreneurs and savers (Healy and Palepu 2001). The existence of asymmetric information can harm the market process to such an extent that it can prevent some transactions from occurring (Akerlof 1970). It can make market transactions more difficult and lead to an increase of transaction costs (Lev 1988). The transactions costs would enlarge the welfare losses connected to asymmetric information and thus decrease the social gains from trade.

Asymmetric information is broadly discussed in the economic, accounting, and financial literature (e.g. Gassen 2009, Healy and Palepu 2001, LaFond and Watts 2008, Lev 1998). Küting and Lam (2013) consider the purposeful reduction of asymmetric information as the basic objective of each accounting system. From this perspective, financial accounting and disclosure, as well as the reporting based on it, reduce asymmetric information, as they provide information held by managers (better-informed market side) to stakeholders of the firm (lesser-informed market side), while most of the research focusses on outside investors as the lesser-informed market side on the capital market (Healy and Palepu 2001). Thus, financial accounting, and disclosure, as well as the reporting based on it, lead to welfare gains.

As information and incentive problems can impede the efficient allocation of resources in capital markets, financial accounting and financial disclosure can help to improve the allocation of resources in two ways. Ex ante, the disclosure of financial information reduces investors' lack of information before they invest in a company. Through regulation managers can be required to fully disclose their private information. Financial intermediaries such as financial agencies or financial analysts produce private information in order to uncover managers' superior information. Another way to disclose private information is the use of optimal contracts (Healy and Palepu 2001).

Ex post, i.e. after signing a contract, managers and investors are part of a principal-agent-relationship, where the investors are the principals. However, the better-informed party are the managers (as agents of the investors). They have been appointed responsible for the firm. However, if they are not only the better-informed party, but also have diverging interests from the principals, then an agency problem arises in the principal-agent-relationship. This means that asymmetric information can lead to opportunistic behaviour and to problems such as poor investments for the firm, or otherwise inefficient use of resources. Again, without a solution, welfare losses would be the result.

In both cases, financial information based on the firm's accounting and its disclosure can reduce information asymmetry. Before investing, investors can use and screen the disclosed financial information in order to decide whether they invest into a company. Furthermore, firms can use voluntary disclosure of financial information as a form of signalling (Zimmermann 2002). Managers can signal the credibility of their firm by releasing financial information. After investing, investors can monitor the performance of the management by financial statements. This can only be effective to the extent that the financial information is reliable. Financial accounting is therefore regulated, e.g. firms have to use certain accounting methods, standards, and accepted principles. In the Anglo-Saxon region, the US-GAAP or the International Financial Reporting Standards (IFRS) are the dominant accounting standards. In continental Europe national accounting methods are still predominant. In Germany, e.g. financial statements prepared according to the German Code of Commerce (*Handelsgesetzbuch*) are mandatory for single entities. Only firms active on capital markets in the European Union must use the IFRS for group accounts. In Germany the principle rules set out in the German Code of Commerce are accompanied by informal, generally-accepted accounting principles which come from relevant literature, jurisdiction, and common practice. Compared to principle-based accounting according to the German Code of Commerce, US-GAAP and IFRS are often seen as casuistic. In addition to mandated accounting standards, the reliability of financial statements is secured through an opinion of external auditors. This can be seen as the use of a specialist in order to monitor the better-informed market side.

Comparing the accounting standards dominant in the Anglo-Saxon world to those dominant in continental Europe, one can see that US-GAAP and IFRS are constructed mainly in order to reduce the higher transaction costs caused by asymmetric information. According to the Framework of IFRS, financial statements are prepared and presented for external users such as present and potential investors, employees, lenders, suppliers, customers, government, and the public. The objective of financial statements is to provide information about the financial position, performance, and changes in financial position of an enterprise that is useful to a wide range of users in making economic decisions (IFRS Framework 12). This objective addresses the asymmetric information between management and external users. Management must

provide its private information to external stakeholders who base their economic decisions on this information. Management is seen as the better-informed market side, the lesser informed stakeholders require information. Decision usefulness is the criterion for the information management has to provide to external users.

In accounting systems used in continental Europe, e.g. the German Code of Commerce, providing information is just one objective of financial statements. In addition to providing information and thus reducing asymmetric information, financial statements are used to calculate the part of earnings which can be distributed to the owners of an enterprise while maintaining the capital on an appropriate level. In this way, the interests of outside creditors such as banks, suppliers, and employees are included. Profit and loss statements are used to examine whether the earnings distributed to owners come from profits or if they are taken from capital reserves. Furthermore, accounting is used for documenting business transactions in an enterprise. The objectives of distribution of earnings and documentation of business transactions stand pari passu to the objective provision of information to external stakeholders. This shows that different accounting objectives not only exist, but also play an important economic role.

An Austrian Perspective on Accounting

As shown so far, the usual economic perspective on accounting is a view from the standpoint of orthodox Welfare Economics. The optimal allocation of resources is the higher objective of regulation, which is transformed into the subordinated objective to provide the lesser-informed market side with information through disclosure of financial statements. There are two assumptions in this perspective: The first assumption is that there is an optimal allocation of resources, i.e. there has to be an optimum. The second assumption is that management has better information than stakeholders. The assumption that there is an optimum which can be achieved through regulation is indeed a very strong one, though it is a common assumption in (mainstream) economic analysis.

Furthermore, assuming that management has better information neglects the process of becoming informed. Taking away the first and modifying the second assumption, a different approach to why and how accounting is performed provides different insights. The Austrian School of Economics, represented by economists such as von Mises and von Hayek, takes a different view on economics than orthodox Welfare Economics. Here it will be argued that an Austrian perspective on the economic role of accounting, financial statements, and disclosure will lead to a complementary assessment of accounting and reporting standards.

The role of different levels of knowledge was recognized by Austrian Economists as well (Hayek 1940). The difference is that Austrian Economics analyses the economic process rather than an optimum or equilibrium. From an Austrian perspective the market is first and foremost a "dynamic entrepreneurial-competitive discovery process" (Kirzner 1998, 5f.). The central assumption for Austrian Economists is the „unavoidable imperfection of man's knowledge and the consequent need for a process by which knowledge is constantly communicated and acquired" (Hayek 1945, 530). By taking the constitutional imperfection of knowledge as a given, the role of accounting goes beyond the simple reduction of asymmetric information. Accounting is important not only as a means of improving the otherwise imperfect market process, but it is also a necessary pre-condition for the functioning of the market process in general. The market as a spontaneous order is different from yesterday's spontaneous order and will be different from tomorrow's spontaneous order. If at all possible, an optimum or equilibrium in this dynamic process will exist only briefly. The central task of the dynamic market process is to create, process, and distribute knowledge that is widely strewn across economic actors in a society. In the market process, the dispersed knowledge, which is in sum much more than any single person could possibly possess, is collected and coordinated. It results in market prices showing the relative scarcity of goods and resources.

If economic actors can only possess limited knowledge and are limited in their cognitive abilities, they need information which gives them orientation in a complex, ever changing, and subjectively perceived world. Otherwise sensible decisions are impossible in the dynamic market process. The instrument which reveals information and is thus a point of orientation for economic actors is the price mechanism, which results from the market process and shows relative scarcities (Huerta de Soto 2013). In this sense the price mechanism works as a data collector for the widely-dispersed knowledge and provides information about the relative scarcity of capital, goods, and services. The prerequisite for the functioning of the market process is private property of production goods. Without private property there will be no market, and without market there will be no monetary market prices. Without market prices economic actors lack the necessary information about relative scarcity of goods. And without these, economic actors cannot decide sensibly about the many different ways to use goods and capital (Boettke 1998). But sensible economic decisions are crucial in a market economy. Otherwise entrepreneurs will be sanctioned by losses and may finally have to leave the market if losses persist. Only if decision-makers read the information given in the price mechanism *properly* will they earn profits and be able to stay in the market. Decision errors are continually detected and corrected with the help of profit and loss accounting (Boettke 1998). If accounts show profits as a result of economic activity, this means that decisions were based on a correct interpretation of market signals and management is approved in its doing. Losses, on the other hand, indicate a misreading of price signals, forcing management to change or to leave the market.

In this sense profit and loss accounting plays the role of evaluating how the market prices were read by managers and entrepreneurs. This is what the Austrian Economists called *economic calculation* in the debate about socialism. With profit and loss accounting, entrepreneurs can determine retrospectively whether their interpretation of market prices was correct. And here a crucial difference to the standpoint of Welfare Economics about accounting becomes clear: While Welfare Economics considers accounting as something managers and entrepreneurs do primarily for external stakeholders, in Austrian Economics the most important task for managers and entrepreneurs is to inform themselves about market conditions through the signals market prices send. Financial accounting as economic calculation is the way to discover if managers decided rationally and efficiently (Mises 1920). It determines the success of economic activity (Mises 1920; Mises 1940) – and is not a way to approach a hypothetical market equilibrium.

A firm will find out if it was sanctioned positively or negatively in the market process through its accounts; there will either be a profit or a loss. From this standpoint, the main objective of accounting is the self-information of management and entrepreneurs, rather than the information of others. Acquiring and keeping information is historically the reason why entrepreneurs started to keep accounts (Schön 1997; Penndorf 1914). If profit and loss accounting shows profits, this profit can be distributed among owners without lowering the firm's amount of liable equity.

From the Austrian perspective, management accounting, which should be based on market prices as well, plays a rather forward-looking role in economic calculation but it is also relevant in providing orientation for future economic actions. In this sense, calculation of expected costs and expected proceeds is the basis for future plans executed in an economically rational manner by firms (Boettke 1998), which are also trying to forecast economic developments. Orientation and forecast are based not only on own profit-and-loss-evaluations, but also on the evaluations and forecasts of other entrepreneurs. This means that accounting and its disclosures allow entrepreneurs to observe the evaluations of other economic actors (Huerta de Soto 2013).

In conclusion there are four functions that profit-and-loss-accounting has in the market process: Acquiring information about the firm's economic activity and the ability of managers and/or entrepreneurs to read market prices properly. If successful, profits result. If not, there will be a loss; calculation of earnings distributable to owners while maintaining capital, observation and evaluation of other market participants and their activities; planning of future economic activity with adjustments based on past profits or losses.

These functions are met by accounting based on historical costs because historical cost accounting is accounting using realized market prices. If accounting is based on fair values, the functions are not fully met, as will be shown later.

From the Austrian point of view, accounting is a basic necessity for the functioning of markets rather than a reaction on market failure. In a market economy, an economic calculation such as accounting is the only way to find out where failures in the reaction to market prices and thus market processes occurred (Huerta de Soto 2013). Participants in a market economy recognize their gains from mutual exchange through the tool of profit-and-loss-accounting (Boettke 2012). This can only be achieved if assets and liabilities have a monetary value and are thus comparable, even if the valuation process always remains subjective. The role of accounting standards here is to set an objectified framework for subjective valuation.

Discussion and evaluation of accounting standards

The use of Fair Values in Financial Statements

Financial statements prepared according to the IFRS (including profit-and-loss-accounting through the profit-and-loss statement) have a single objective: to provide financial statement information so that actual or potential investors and creditors can decide whether they want to give the respective firm money or not. This objective is strongly influenced by mainstream agency theory and the information problems stressed within. In this context Fair Value Accounting has gained influence on accounting and financial reporting in recent years (Whittington 2008). As a result of the increasing use of fair values in accounting, IFRS 13 Fair Value Measurement was issued in 2011. IFRS 13.9 defines the fair value as the price that would either be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement day. The definition used in US-GAAP is comparable. It should be noted that accounting systems use the terms *value* and *measurement* with a less careful consideration than Austrian value theory does. According to Mises (1949, 215) "the main thing in balance sheets and in profit-and-loss statements is the evaluation of assets and liabilities not embodied in cash." In the Austrian sense valuation equals the ranking of alternatives on an ordinal scale and does not equal a particular amount of money. Prices do not permit "one to liken them to the measurement of physical and chemical phenomena" (Mises 1949, 218). In this paper the term *measurement* is used only if it is directly related to an accounting standard.

Accounting systems are generally a mixture of fair value and historical cost accounting. In the IFRS, fair values potentially higher than historical costs are used, e.g. for the evaluation of tangible and intangible assets when the revaluations model is chosen (IAS 16 and IAS 38). It is also used for investment property (IAS 40), but most frequently for financial assets and liabilities (IFRS 9). For an impairment test (IAS 36) the carrying amount must be compared to the recoverable amount. The recoverable amount is defined as the higher of an asset's fair value less costs to sell, and its value in use. The value in use must be estimated reflecting the respective future cash flows the entity expects to derive from the asset, expectations about possible variations, the rate of interest, and the uncertainty inherent in the asset.

Valuation according to German GAAP is based, with very few exemptions, *solely* on historical costs, which is a special characteristic of accounting conservatism. According to § 253 of the German Code of Commerce, historical costs are not only the basis, but also the upper limit for valuation. Only if market prices indicate that the carrying amount of an asset is higher than actual prices, § 253 of the German Code of Commerce requires an impairment of assets due to the principle of prudence. For long-term assets the reduction in value must be expected to be for the long run. Current assets must be impaired even if there is a short-term fall in value. Thus, fair values are only used when they are lower than historical costs.

The debate on Fair Value vs. Historical Cost Accounting

The discussion about the shift from Historical Cost Accounting towards Fair Value Accounting in accounting standards is considered to be of high importance (e.g. Plantin e.a., 2008). "Proponents argue that fair values for assets or liabilities reflect current market conditions and hence provide timely information, thereby increasing transparency and encouraging prompt corrective actions" (Laux and Leuz 2009). This argument implicitly shows that the reason for using fair value accounting is to deal with agency problems. The whole concept of fair value is based on (neoclassical) welfare economics (e. g. Braun 2016). Thus, it can be argued that mainstream

agency theory as a part of Welfare Economics is the fundamental assumption that led to fair value accounting.

Other advocates of Fair Value Accounting see it as "the only comprehensive and internally consistent approach" (Barth 2006, 274) standard-setters could identify. They see the primary objective of financial reporting in aiding users of financial statements in making economic decisions. Under this assumption fair values are considered to be relevant as they reflect present economic decisions. Additionally, fair values do not reflect the characteristics of the entity that holds the assets or liabilities, but only the characteristics of the assets or liabilities themselves. They are therefore comparable. Furthermore, fair values are seen as consistent as they reflect the same type of information in every period. And fair values are viewed as timely because they reflect changes in economic conditions at the time these conditions change (Barth 2006). Watts (2003) notes that in practice, these theoretical advantages could be offset through managerial manipulation. Plantin e.a. (2008) use a formal equilibrium model to show that the use of fair values has advantages under certain conditions, while historical cost accounting is preferred when assets have a long duration, trade in an illiquid market, or feature an important downside risk.

Critics of enhanced use of fair values in accounting argue that the underlying assumptions made by advocates of Fair Value Accounting should be tested. For example, the concentration on decision usefulness as the main objective of accounting is questioned, regarding legal and stewardship purposes. The "stewardship dimension is concerned with monitoring the past as well as predicting the future" (Whittington 2008, 144).

As Historical Cost Accounting refers to fair values only in case they are lower than acquisition prices, it is a specification of conservatism in accounting. Accounting conservatism is defined as the asymmetric recognition of gains and losses, i.e. earnings reflect bad news more quickly or completely than good news (Basu 1997). Conservatism was present in early accounting practice (Penndorf 1914) and is used in all accounting standards, but to different degrees. In the IFRS, conservatism appears as the principle of prudence, which is set out in its framework. The principle of prudence has the character of directing accounting policies without being binding. It becomes more concrete in the measurement of inventories, where lower of cost or market is the general rule. In continental Europe, accounting conservatism is more important and is sometimes seen as the predominant accounting principle, even though the influence of international accounting standards has reduced the importance of prudence in recent years. In the German Code of Commerce it is manifested in § 252 (and is thus a binding principle), where it explicitly demands prudent accounting with an earlier recognition of potential losses than profits.

Watts (2003) explains conservative accounting as a means of addressing moral hazard in various contractual relationships of a firm characterized by asymmetric information. Net assets and cumulative earnings are less likely to be overstated, reducing the likelihood of distributions that violate contracts such as debt covenants, compensation, or employment contracts. Furthermore, conservative accounting numbers provide verifiable (conservative) information for investors, helping them to evaluate subsequent earnings. In this view market participants can use these numbers for their own valuation and to discipline other sources of information (Watts 2006).

According to Watts (2003), other reasons for conservatism in accounting could be shareholder litigation, taxation, and standard setting. Litigation is more likely when net assets and earnings are overstated and thus the expected litigation costs of overstatement are higher than those of understatement. Taxation could be a reason for conservative accounting when firms can lower the present value of taxes by an early recognition of losses, due to a linkage between reported earnings and taxable income. Standard-setters as well as regulators may prefer conservative accounting measures as overvalued assets and overstated income are better observable and thus better usable in the political process.

All analyses either pro or contra Fair Value Accounting have certain underlying assumptions that direct the discussion. First, the discussion is based mainly on arguments coming from Welfare Economics, using agency theory or in some cases equilibrium analysis. By doing so it is implicitly assumed that there is an optimum in the market. Theoretical frameworks other than Welfare Economics are rarely used to show the advantages or disadvantages of accounting systems. Second, most analyses focus on the role information plays for stakeholders outside the firm. This is indeed of high importance. But in addition to dispersing information, it should not be overlooked that information has to be acquired before being dispersed, as all economic actors do not have perfect knowledge *a priori*. Third, many studies do not distinguish clearly enough between prices and values. These shortcomings should be compensated for by using an additional and – in the context of accounting – new perspective from Austrian Economics.

Evaluation of standards from the perspective of Austrian Economics

In chapter 3 it was laid out that according to Austrian Economics prices play a crucial role in the acquisition and dispersion of widespread knowledge in a market economy. Through profit- and-loss accounting, market participants – including firm management – can determine how price signals were used to make economic decisions and lead a firm. The function of prices and the function of accounting are, in this sense, closely connected.

The IASB stresses that the fair value is a market-based price. But a market-based price is not a price paid on the market and thus no market price. It is not a price, but rather a hypothetical value based on a hypothetical market transaction, not a real price based on a real market transaction. It has to be stressed at this point that value and price are not the same. IFRS 13 allows different ways to determine a fair value using a "fair value hierarchy". On Level 1, which has the highest priority, the inputs to determine the fair value are quoted prices in active markets for identical assets or liabilities that the entity can access at the measurement date (IFRS 13.76). An active market is defined in IFRS 13 „as a market in which transactions for the asset or liability take place with sufficient frequency and volume to provide pricing information on a ongoing basis". Level 2 of the "fair value hierarchy" uses inputs other than quoted market prices included within Level 1, such as quoted prices in active markets for similar assets or liabilities or quoted prices for identical assets or liabilities in markets that are not active (IFRS 13.81f.).

It should be noted that even with these market-based methods ("mark-to-market") for the determination of a fair value, the fair value is not based on realized market transactions.

According to IFRS 13 market based methods are not the only ones allowed; methods based on discounted (future) cash flows or on option price models ("mark-to-model") are also permissible, if relevant observable inputs are not available. Using the discounted cash flow method or option price models means using financial market theory, which, in turn, is closely connected to mainstream economic theory. All this means that, in practice, the fair value as well as the value in use can be determined by estimates about the future. That is why IFRS-financial statements are based on significant and highly subjective assumptions. With methods using subjective estimates, the distance between fair values and prices grows even more. The assumptions made can hardly be objectivized. Goh e.a. (2015) show that investors have to "price the fair value of assets". By making extensive use of fair values, IFRS-accounting loses its connection to market prices and fails to incorporate their crucial functions in a market economy.

One result could be that a financial statement according to IFRS shows gains that are not yet realized (and maybe never be), due to the use of estimations and hypothetical market values rather than realized market prices. The valuation of assets and liabilities is always subjective, but fair value can reflect a bulk of subjective assumptions. This is a problem from the standpoints of both Welfare and Austrian Economics. From the perspective of Welfare Economics, in practice, it can enlarge the asymmetric information between management and stakeholders.

For Austrian Economists the problem is even bigger: The information role of prices gets lost when hypothetical market values – rather than real prices – are the basis for the valuation of assets and liabilities. This could lead to a loss of orientation in the complex and dynamic market process, which accounting is supposed to give to managers and entrepreneurs.

Further problems can result from the distribution of unrealized gains. The IFRS do not have the function of distributing earnings. In practice, a profit calculated according to IFRS is a basis for bonuses and other profit-related expenses. So the profit-and-loss-accounting's function to maintain capital could be annulled. Another problem is the pro-cyclical effect of IFRS accounting. If market participants focus on unrealized gains and losses, an overreaction on capital markets is possible. This, in turn, would intensify business cycles as well as unrealized gains and losses (Brösel e.a. 2012, Gassen 2009).

In accounting systems such as the German Code of Commerce, historical costs and thus real market prices based on realized market transactions set the frame for management's notoriously subjective appraisals. This also means that some information gets lost, e.g. when assets gain value far above their historical costs. This rise in value cannot be represented willingly in financial statements according to the German Code of Commerce. The "real" value cannot be seen in the firm's disclosure, which means that asymmetric information between management and stakeholders is not reduced as much as would be possible if the increase in value were shown correctly. In this way, German GAAP acknowledges that a "correct" value is hard to determine as long as it is not approved by real market transactions. From the perspective of Welfare Economics, this deficit remains. But from the Austrian perspective accounting based on historical costs is accounting based on market prices. Thus, accounting systems based mainly on historical costs (such as German GAAP) transport the function of market prices better than systems based on fair value accounting.

Conclusions

This paper has attempted to broaden the economic perspective on accounting systems. It was shown that the International Financial Reporting Standards were set under the strong influence of orthodox Welfare Economics, mainly agency theory. Under this aspect, accounting and financial reporting play an important role in diminishing information asymmetries between different economic actors. In this sense, accounting and reporting systems are a reaction to market failure in order to increase social Welfare by improving the allocation of resources in markets.

But as this paper has shown, the orthodox view that puts accounting at the end of what happens in markets is just one aspect of how the role of accounting in a market economy can be seen. Considering such real and therefore relevant things as imperfect knowledge, uncertainty, and the complexity and dynamics of markets, accounting is important as a basis for a market economy. Without profit-and-loss-accounting, markets in a market economy could not work, as it is a significant way for market participants in order to find orientation in a complex world. Profit-and-loss-accounting provides the orientation market participants need by rating the information market prices give. Therefore, the connection between market prices and accounting should not get lost as could be the case with Fair Value Accounting.

From the perspective of Austrian Economics Historical Cost Accounting has advantages as it is price accounting and thus transfers the function prices play in a market economy into accounts. This way they can be used for orientation in a complex and dynamic world. In the juxtaposition historical cost vs. fair value accounting it is argued that Fair Value Accounting fails to incorporate prices and their function which are both stressed by Austrian Economists. Under this aspect of Austrian Economics, accounting systems which are based on historical costs are superior to those based on Fair Value Accounting because the subjective appraisals used in fair values hinder the orientation based on market prices. With respect to the future development and evolution of accounting standards, this means that real market prices based on real market transactions should play a more explicit role for the appraisal of assets and liabilities.

A remaining problem that has not been treated in this paper would be if there were no market prices, only distorted prices or if costs and benefits are not fully incurred by market participants, e. g. in the case of externalities or if central banks inflate prices purposely. Neither Cost nor Fair Value Accounting is equipped to handle this potential malfunctioning of the price system. But if market prices show relative scarcities, they should also show it in a firm's accounts.

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Was the Stagflation episode Keynesian or Hayekian?

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Abstract:
J.M. Keynes and F.A. Hayek debated the causes of economic cycles. Keynes (1936) thought shifts in the "marginal efficiency of capital" drive self-reversing cycles. Hayek (1931, 1933) asserted that artificially low interest rates cause entrepreneurs to invest more in longer-term projects than is supported by consumer preferences. This paper tests the Keynes and Hayek theories by examining the relation between interest rates and Stagflation output gaps. Data from the Stagflation episode (1965-1989) support Hayek's theory. Modern economists correctly interpreted Stagflation as evidence against Keynes' "general theory", but should have considered Hayek's theory and policy recommendations more carefully.

Keywords: The Keynes-Hayek debate, Stagflation

JEL Codes: E12, E14, E32, E43, E58, E65

Introduction

J.M. Keynes persuaded most economists of the mid Twentieth Century that fluctuations in total private investment spending cause boom-bust cycles[1]. Hayek (1931) claimed that inflationary central bank policies cause economic fluctuations[2].

The Keynes-Hayek debate regarding economic cycles was largely theoretical. As time passed Keynes' trade cycle theory faced strong challenges, especially during the Stagflation period. This paper examines a key issue in the Keynes-Hayek debate: the relation between interest rates and economic cycles.

Interest rates were at the center of both Keynes' and Hayek's theories. Keynes thought that bullish and bearish animal spirits drive both investment demand and boom-bust cycles. Keynes' theory predicts that interest rates are leading procyclical. Hayek asserted that manipulation of interest rates by central bankers causes malinvestment and economic cycles. Hayek's theory predicts that interest rates are leading countercyclical.

The next part of this paper examines Keynes' and Hayek's theories. Part three specifies tests of Keynes' and Hayek's cycle hypotheses. There are three test variables: interest rates, wage rates, and GDP gaps. Part four uses data from the Stagflation period (1965 to 1990) to test the Keynes' and Hayek's hypotheses. Part five discusses the statistical findings of the preceding section. Mainstream economists correctly discounted Keynes "animal spirits" hypothesis, but underrated Hayek's hypothesis.

The Keynes and Hayek Hypotheses

Testing the Keynes and Hayek theories requires specification of alternative hypotheses. Most contemporary economists assume rational expectations, but this is not required. Behavioral Economists reject rationality even regarding relatively simple economic decisions. Rational Expectations indicates that monetary policy has no *systematic* effects entrepreneurial plans for investment or hiring because interest and wages rates adjust for future inflation. Hayek thought increasing the money supply reduces interest rates, and this biases investment towards longer term projects. Hayek rejected strict notions of rationality due to complexity and uncertainty in modern economies. Entrepreneurs form plans that are approximately coordinated by market prices, but they can also be misled into making errors when prices are distorted (Hayek 1937)[3].

[1] Keynes' 1936 book, The General Theory of Employment Interest and Money, played an important role the debate over economic cycles during the 1930's, but other economists advanced similar theories earlier. Kalecki (1933, 1935), Lautenbach (1929), Commons (1926), and Clark (1923) formulated "Keynesian" theories before Keynes. Keynes deserves credit for examining the effects of false price signals and irrationality on economic conditions, but he owed many unpaid intellectual debts. Keynes seemed to think that his own contributions to developing "demand side economics" were especially important. Keynes (1935) made the following immodest claim in a letter to George Bernard Shaw: "I believe myself to be writing a book on economic theory, which will largely revolutionise- not, I suppose, at once but in the course of the next few years- the way the world thinks about economic problems."

[2] Hayek owed intellectual debts to Wicksell, Cantillon, Böhm-Bawerk, and most especially to von Mises. Hayek refined the cycle theory the main elements of which were specified in Mises' Theory of Money and Credit.

[3] Carilli and Dempster (2001) argue that central bank manipulation of interest rates creates incentives that cause even highly rational entrepreneurs to make faulty capital investment decisions.

Keynes held views that were similar to modern Behavioral Economists. Keynes believed that irrational bullish and bearish feelings among entrepreneurs drive boom-bust cycles. Keynes thought entrepreneurial errors were so pervasive that even rational entrepreneurs follow herds of irrational investors[4].

While it is acceptable to depart from the strictest notions of rationality, methodological individualism is essential. Since Hayek's emphasized distortion of prices he adhered to methodological individualism. Keynes focused on statistical aggregates. Hayek (1931 p227) asserted that Keynes' focus on aggregates "conceal the most fundamental mechanisms of change". Hayek's argument applies to the postwar "hydraulic" Keynesian theory because this model lacked micro-foundations. Behavioral economists have, of course, developed models based on *individual* irrationality. The issue as to whether Keynes' notion of animal spirits can be related to microeconomic foundations is interesting, but also not relevant to this paper. This paper focuses on empirical evidence, not logical tests. While theory must be rooted in microeconomic principles, examination of macro-historical data is useful exercise in economic history. Furthermore, most mainstream economists insist upon empirical analysis (see Friedman 1953). Neither Keynes nor Hayek could perform modern statistical tests during the 1930's. Bordo (1986) asserts that Austrians still don't use modern statistical tests. However some modern Austrians *have* reported empirical support for the Austrian theory[5].

The Keynes and Hayek hypotheses are subject to an additional test because these two theories make opposite predictions regarding interest rate movements during economic cycles. The next two subsections restate the Keynes and Hayek theories of cycles.

Keynes' Effective Demand Hypothesis

Keynes (1936) blamed boom-bust cycles on changing Animal Spirits. Animal Spirits bias entrepreneurial assessments of the marginal efficiency of capital[6]. Bullish optimism of entrepreneurs causes unsustainable booms. Investment rises with entrepreneurial optimism, and this increases incomes. If overly optimistic expectations determine capital investment disappointments are inevitable. Disappointing commercial results create entrepreneurial pessimism. Bearish pessimism converts a boom into a bust. Busts reinforce pessimism, which keeps total investment and aggregate demand low. Bearishness slows commercial production and lessens employment. *Liquidity Traps* (an alleged tendency of investors to hold money if interest rates are relatively low) intensify the effects of depressed marginal efficiency of capital. Idle money keeps aggregate demand low and unemployment high.

Keynes' assumed that expected profits drive production and employment. Short run costs depend on labor productivity and wages. Keynes defines an aggregate supply function: $Z=\Phi(N)$. Z is the "aggregate supply price of output of employing N men" (Keynes, 1936 p25). Φ

[4] See Keynes (1936) pp156-158.

[5] Hughes (1997) examines various types of evidence for the 1981-1991 period. Callahan and Garrison (2003) and Keeler (2001) find statistical and historical support for the Hayek theory. Mulligan (2006) runs more sophisticated tests the Hayek theory.

[6] See Fuller (2014) for a critique of Keynes' Marginal Efficiency of Capital concept.

represents labor productivity. The total revenue product of labor depends on hiring. Revenue (D) is a function of employment: $D=f(N)$. Equilibrium occurs if entrepreneurs maximize expected profits. When D exceeds Z, entrepreneurs perceive unexploited profits, and hiring increases. When Z exceeds D, entrepreneurs expect losses and will reduce employment. Intersection of aggregate supply with aggregate demand determines the total level of spending in any economic system that uses money instead of barter.

Keynes (1936 p29) described the intersection of Z and D as "the substance of the general theory". Sub-categories of D cause macro fluctuations. Keynes (1936 p28) subdivides aggregate demand into D_1 and D_2. D_1 is consumer spending. D_2 is entrepreneurial business investment. D_2 depends on overall household income and the marginal propensity to consume (χ), a fixed percentage of spending out of marginal income. D_1 is therefore a function of $\chi(N)$. Since the sum of D_1 and D_2 equals $\Phi(N)$, D_1 minus $\Phi(N)$ will equal D_2. Keynes concludes that the volume of employment depends on three variables: Φ, χ, and D_2. Φ is set by given skills of the labor force, a given level of technology, and by a given marginal cost of extracting natural resources. χ is determined by existing habits, social norms, or psychological factors, and will change only very gradually[7].

If Φ and χ are fixed in the short-run, D_2 is essential. D_2 depends on entrepreneurial profit expectations. Shifts in D_2 may drive cycles, but why does D_2 change? Keynes specified the factors which he thinks govern D_2 in chapter eleven (The Marginal Efficiency of Capital) and chapter twelve (The State of Long-Run Expectation). The Marginal Efficiency of Capital depends on bullish or bearish attitudes, which we will denote as "B". That is, $D_2=f(B)$.

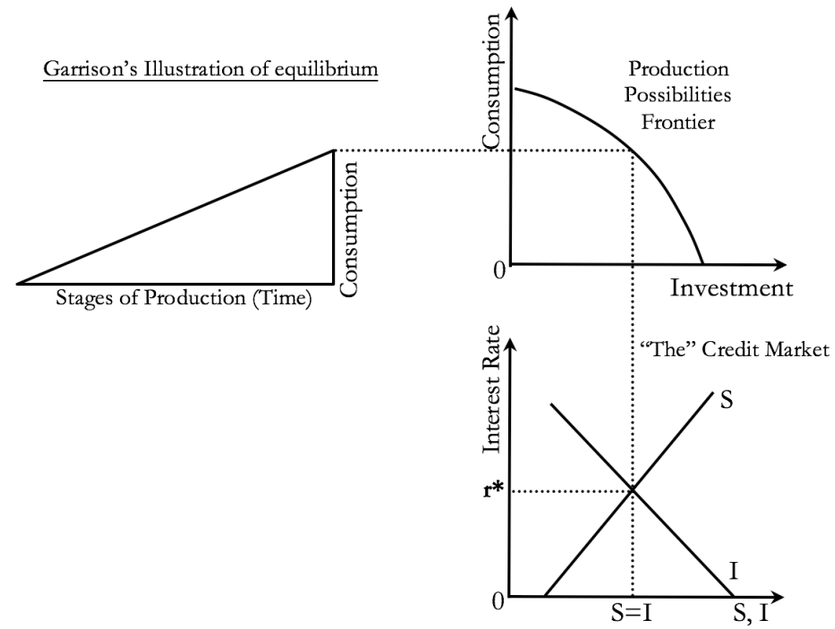
Keynes' argument for deficiencies in aggregate demand is completed in chapter fifteen (entitled *The Psychological and Business Incentives to Liquidity*). Speculative money demand prevents interest rates from falling enough to compensate for bearish animal spirits. The money that entrepreneurs don't want to borrow sits motionless in the hands of investors- and this intensifies unemployment. Fluctuations in B cause shifts in the Marginal Efficiency of Capital. Keynes referred to MEC shifts throughout his book, though the centrality of these shifts is made clear in chapter 22[8].

Hayek's Monetary Theory of Trade Cycles

Hayek's theory has six key elements. First, industrial processes are lengthy-roundabout; second, monetary disturbances that change real interest rates; third entrepreneurs lack direct knowledge of general economic conditions; fourth, entrepreneurs use money prices for knowledge of general economic conditions; fifth, entrepreneurs err due to biased price signals; sixth, capital is inconvertible after being added to production processes.

Garrison (1999) provides a useful means of visualizing Hayek's theory. Visualization of Hayek's theory begins with the "production triangle". The horizontal length of the triangle represents time taken to finish production. The value of unfinished goods increases in stages that occur over time- as represented by the slope of the hypotenuse. The time required to complete projects poses a problem: entrepreneurs must anticipate all consumer demands. The complexity of modern industry makes expectation formation even more difficult.

Interest rates coordinate entrepreneurial commercial plans with consumer spending plans. Interest rates reflect consumer time preferences, or willingness to defer consumption. Interest rates are set by the interaction of entrepreneurs seeking credit and consumers saving income according to time preference. Garrison (1999) depicts Hayek's theory in the following graphs. Supply and demand in "the" credit market determines the discount rate for capital projects. A higher interest rate reduces expected profits of all entrepreneurial projects, but this affects longer term projects more so. A production possibilities frontier (PPF) depicts tradeoffs between new capital and new final goods.



Coordination of the time horizon of entrepreneurs with household decisions to save-spend occurs at market equilibrium. Equilibrium between consumer saving and private investment result in the zero inflation "natural rate of interest" (Wicksell 1898). The natural rate of interest is simply the rate where marginal consumer time preferences align with entrepreneurial plans for additional capital investment. Central bankers are, of course, notorious for causing inflation. Suppose anti-inflation central bank policy pushes industrial production below potential. How does this work? High interest rates *lengthen* the time horizons of consumer, so savings increase and consumption expenditures diminish. High interest rates also discourage longer-term projects. Divergence of consumer and entrepreneurial time horizons compresses the corners of the triangle as production moves inside the PPF.

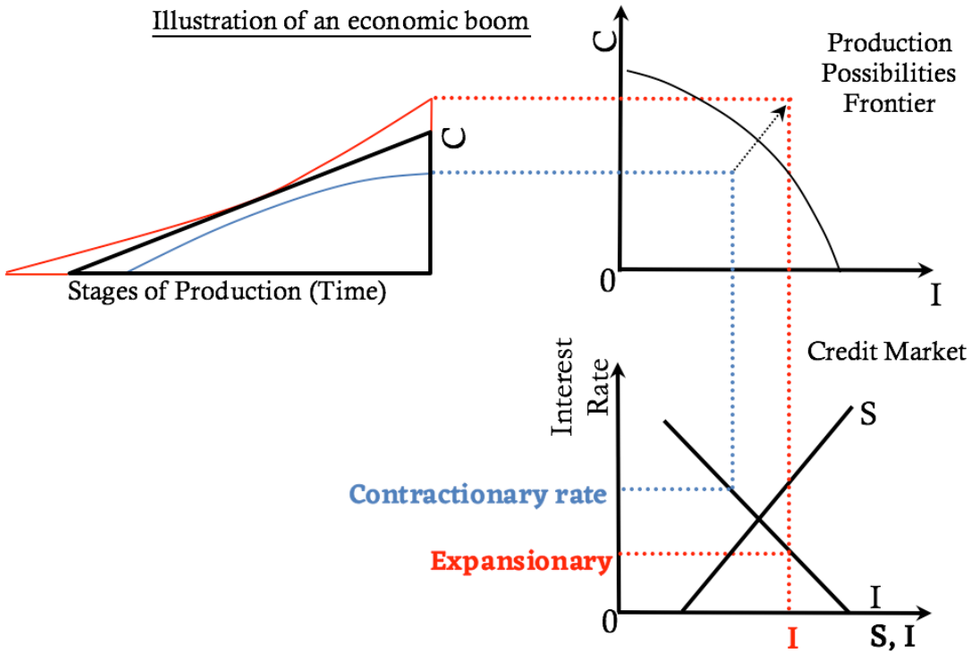
[7] Keynes (1936 pp107-8) specified six saving motives: unforeseen contingencies, foreseen expenses (retirement, child education…), tradeoffs between future and immediate consumption, interest income, planned increases in lifetime consumption, financial speculation, and miserliness.

[8] Garrison (2001 p126) describes Keynes' theory as "labor based macroeconomics". According to Garrison, Keynes thought capital markets were dysfunctional to a point of being beyond analysis. However, the dysfunctionality of capital markets is why these markets played an important role in his theory

An economic boom begins with "stimulative" interest rate reductions by central bankers. Injections of new reserves reduce interest rates and encourage investment by entrepreneurs, with bias towards longer term projects. If central bankers drive interest rates below the natural rate, then entrepreneurial time horizons for investment exceed the time horizons of consumers to save money for future purchases: entrepreneurs want to invest long-term, consumers want to spend short-term. Bias towards longer-term capital plans will lead to a constellation of commercial failures.

The combination of consumers demanding more consumer goods in the short-term and entrepreneurs investment in more long term capital projects tugs at the corners of the triangle. Consumer and business plans point to a combination of consumption and investment beyond the PPF. The hypotenuse of the production triangle is twisted opposite to what had previously been the case.

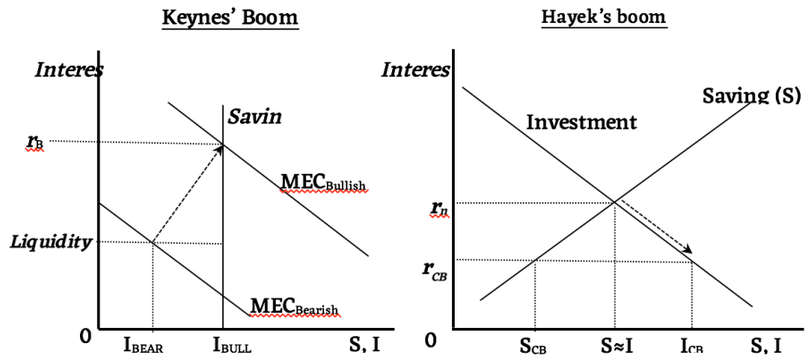
Central bank policy sets an unsustainable boom into motion. The blue lines below plot an initial production level, with interest rates set at a "contractionary" anti-inflation level. The red lines depict the new target point for all economic plans, with the interest rate reduced to an "expansionary" level, below Wicksell's natural rate of interest. Entrepreneurs cancel some longer term plans after their unprofitability becomes apparent.



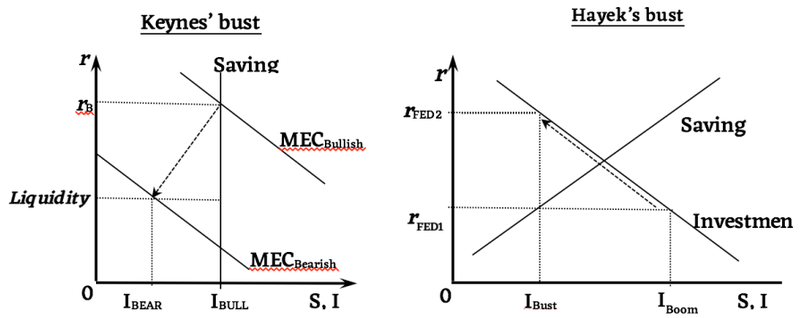
Keynes and Hayek made opposite predictions regarding cyclical interest rates movements[9].

[9] Hayek's theory predicts comovement of consumption and investment spending. Keynes' theory also predicts comovement of consumption and investment. Krugman (1998) claims that the Austrian cycle theory predicts consumption-investment countermovement through time. Krugman's interpretation of Austrian theory is wrong and

Hayek thought that the "injection effect" of *supplying* new bank reserves forces rates down, causing an unsustainable boom. Artificially low interest rates cause *malinvestment*: systematic bias towards longer-term projects. Malinvestment should register in macroeconomic data. Keynes thought shifts in the *demand* for credit cause cycles. Hayek (1975, 1989) warns against using aggregate data to examine economic cycles, and for tests of Keynes' theory specifically. Howden (2015) argues that macroeconomic data is useful if it achieves a balance between complexity lost due to aggregation versus the analytical advantage of reduced complexity. Howden questions the usefulness of GDP data, and suggests the use of Gross Private Product instead. Howden raises legitimate issues, but I will use GDP data favored by Keynesians, to provide a test of Keynes' hypothesis *on their own terms*. Keynes' theory indicates that the interest rate is *leading pro-cyclical*: bullish shifts of the marginal efficiency of capital cause higher interest rates, bearish shifts of marginal efficiency of capital cause lower interest rates.



Hayek's theory indicates that interest rates are *leading countercyclical*, as seen above and below. A lower interest rate precedes booms, it being forced down by inflationary monetary policy. Booms tend to end after central bank officials increase the interest rate, often to fight inflation.



The *leading pro-cyclical/leading countercyclical*, distinction allows us to test of the Keynes-Hayek theories of economic cycles. How should we measure boom-bust cycles?

unoriginal (see Salerno 2014). Garrison (1999) illustrates consumptions-investment comovement in this Austrian theory with clarity. Since Keynes and Hayek both predict consumption-investment comovement, this issue provides no empirical test.

Test Specification

Mainstream economists define the trade cycle in terms of rising and falling GDP. The standard definition of economic cycles is straightforward and perhaps common-sense, but there are possible weaknesses in this notion of trade cycles. MacKenzie (2018) argues that trade cycles should be measured in rising and falling GDP Gaps. Macroeconomics is divided into growth theory and cycle theory. Economic data should also be divided by growth and cyclical factors. Keynes and Hayek sought to explain *unsustainable* booms. Changes in GDP reflect growth and cyclical factors[10]. De-trended GDP data should isolate cyclical factors in the economy, as there is nothing inherently unsustainable about rising GDP. Failure to de-trend data for tests of trade cycle theories biases scientific tests. Growth based on labor and capital development is sustainable, and therefore irrelevant to cycle theories.

Differences between actual and potential GDP reflects the overall degree of inefficiency and error in the economy. If actual GDP is less than potential GDP, there is a loss of real useful output for consumers, and a loss of income to workers and owners of capital. If Actual GDP is *temporarily* above potential GDP, then workers are giving up too many leisure hours, capital is being overused and is depreciating too fast, and the rate of inflation will rise. Situation where actual GDP rises faster than potential GDP are unsustainable, by definition. The growth rate of actual GDP can exceed the growth rate of potential GDP only if there is either unemployed labor and underutilized capital available or if there are unrecognized errors in oversupplying labor and overusing available capital goods. MacKenzie (2018) provides evidence for the empirical relevance of the GDP Gap measure of cycles.

Is de-trending GDP data necessary? Cycle theory aims at explaining a recurrent problem: episodes of severe underutilization of capital and labor unemployment. Cycle theory is not supposed to explain real long-term GDP growth. Economic growth stems from development of the capital stock and the labor force, not the employment of capital and labor. It is, of course, the case that the Hayek and Keynes cycle theories involve investment in capital goods. However, these two theories focus on cyclical implications of investment errors, not economically efficient addition to the capital stock. Investment errors will have implications for long-run economic growth, but these implications do not pertain to the cycle issue. Hayek hypothesized that investment errors would lead to abandoned projects and temporary excess labor supply. Keynes hypothesized that investor pessimism would reduce aggregate expenditures, causing higher unemployment shortly afterwards. Since the Hayek and Keynes theories predict unemployment of available resources, data used to tests these theories should focus on resource utilization, not resource development.

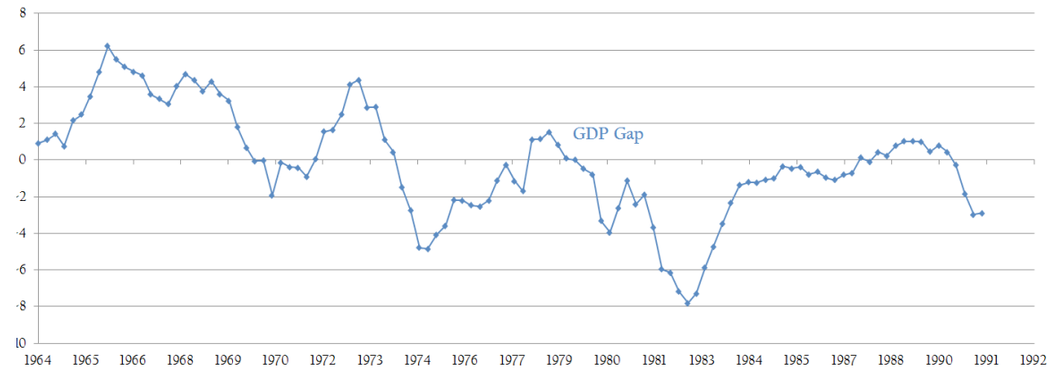
Is potential GDP the right statistic to use in de-trending actual GDP? The accuracy of potential GDP data is debatable. Data for potential GDP output is estimated using data on resource productivity. While all estimates of potential GDP are imperfect, what matters is whether there is substantial systematic bias in this data over time. Data on potential GDP is compiled by professional using the best available techniques. There is no obvious reason to doubt that this statistic has large systematic biases.We de-trend data on economic cycles by dividing the difference of potential GDP and actual GDP by potential GDP as seen just below.

$$Y_{GAP\%} = \left(\frac{Y_1 - Y_{P1}}{Y_{P1}}, \frac{Y_2 - Y_{P2}}{Y_{P2}}, \ldots, \frac{Y_N - Y_{PN}}{Y_{PN}} \right)$$

The Y_{GAP} term is the percent change in GDP gaps across time periods. The time period under scrutiny here is 1965-1990. Why is the 1965-1990 time period of special interest? Bernanke (1986) argues that scientists learn more from large events than from small events: seismologists can learn more from earthquakes than from minor tremors, and labor economists can learn more from unemployment during the Great Depression than from unemployment during other times. The 1965-1990 period is interesting because it spans the buildup and unwinding of a major wave of inflation, along with several serious recessions. Economists often characterize the initial postwar period as a period of relative economic stability: stable growth, a stable price level, and a stable inflation-unemployment Phillips Curve relation. Inflation began to rise during the late sixties, and the Phillips Curve relation broke down in the 1970's. Stability resumed only after the recessions in 1970, 1973, 1979, and 1981 (according to the conventional notion of a recession). The occurrence of four serious economic downturns within a dozen years is highly unusual, and therefore an object of scientific interest. Exclusive focus on the 1970-1981 period would omit relevant data. Consequently, it is useful to start the analysis in this paper with the initial rise of inflation during the late 1960's and end with the winding down of inflation and unemployment during the 1980's. Of course, other periods should (and have) receive attention. For example, Callahan and Garrison (2003) examine the Dot.com episode.

The graph below shows the GDP Gap as percentage of potential GDP from 1964 to 1991. Positive numbers are Inflationary Gaps. Negative numbers are Recessionary Gaps. Downturns in the GDP Gap-cycle start earlier and last longer than is the case with the usual rising-falling GDP concept of trade cycles.

Percentage deviation of actual GDP from Potential GDP



Federal Reserve Economic Data, downloaded October 9th 2016

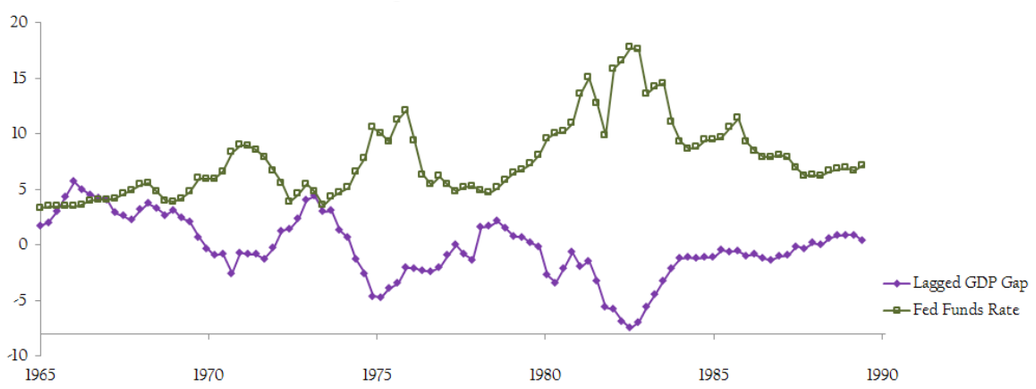
[10] Tullock (1988) points out that GDP data does have mathematical properties of a cycle. The standard rising-falling GDP concept of a cycle does follow an irregular pattern, with expansion longer than recessions and the amplitude of peaks and troughs varying. The $Y_{GAP\%}$ measure of cycles doesn't fit the pattern of a perfect cycle, but it does reveal a process of expansion and recession, and does so more clearly than the standard GDP cycle.

What really matters is the underlying causes of changing GDP Gaps. The last section established that interest rate movements are a key point of contention in the Keynes and Hayek theories. The Federal Funds Rate is a key policy variable. Past efforts of Fed officials to fine tune (or coarse tune, nowadays) the economy focused on the Federal Funds Rate. The process of transmitting changes in bank reserves to changes in the real economy starts with targeting the Federal Funds Rate. The Federal Funds Rate is also an overnight rate, so it does not need to be adjusted for inflation.

It is possible to use mid or long term interest rates to test Keynes' and Hayek's theories. One could also use several interest rates as independent variables. Hayek (1941) did mention the relevance of multiple interest rates. However, the issues relating to relative movements of short term and long term interest rates are somewhat beyond the scope of this paper. Also, use of several interest rates as independent variables would cause multicollinearity, since interest rates are correlated, except during yield curve inversions.

$Y_{GAP\%}$ is the dependent variable, and the Federal Funds Rate is $ß_1$. Any effects of the Federal Funds Rate on cyclical movements in GDP Gaps will take place with a lag. Conventional estimates of the effects of policy on "the economy" mostly fall within one or two years. We will consider a lag of eighteen months between the time that the Federal Funds Rate changes and the time when changes in $Y_{GAP\%}$, as in the next graph.

GDP Gaps and the Federal Funds Rate



Federal Reserve Economic Data, downloaded October 9th 2016

GDP Gaps and the Federal Funds Rate are correlated. Fed officials claim that market forces influence the Federal Funds Rate. If this is true and Keynes is right, then Animal Spirits should register in the form of leading pro-cyclical Federal Funds Rate.

Luther and Cohen (2014) argue that movements in the Federal Funds Rate may not indicate deviations from the natural rate of interest. The Federal Funds Rate correlates with other rates, especially other short-term rates, so it should move with economic cycles like other rate.

Consequently, we will use the difference between the natural rate and the Federal Funds Rate as the first independent variable in this study[11].

The second independent variable is a measure of wage rates. An index on real compensation for the non-farm business sector is available at *Federal Reserve Economic Data*. Data on real compensation needs to be de-trended for changes in productivity. The need for de-trending wage data is simple: entrepreneurs hire workers according to their discounted marginal revenue product. Rising productivity increases labor demand, but this is a non-cyclical growth factor, which must be factored out. Simple division of quarterly data for real compensation by an index of labor productivity in each corresponding time period provides data for the second regressor: $ß_2$. The effect of $ß_2$ on $Y_{GAP\%}$ is not lagged- entrepreneurs hire labor at "the going rate".

Testing the Keynes and Hayek theories

Keynes' and Hayek's hypotheses can be tested with an OLS regression. OLS regression can resolve the key point of contention between Keynes and Hayek by focusing on the two aforementioned variables. $ß_1$ must lead $Y_{GAP\%}$ by eighteen months to establish lagged effects. Keynes and Hayek surely agreed that the full effects of a shift in credit markets take time to materialize, though the exact length of this lag is not determined by theory. Data on actual and potential GDP is kept on a quarterly basis, so the Federal Funds Rate is leads by six quarters. Six quarters is a plausible length of time for the Federal Funds Rate to register in actual data. Wages affect entrepreneurial decisions with no lag.

The regression equation therefore is: $Y_{GAP\%} = \beta_1 F_{t-6} + \beta_2 W_t + \varepsilon$

The use of just two dependent variables is justified partly by the fact that Keynes and Hayek both referred to *the* rate of interest. The two theories being tested both dealt with a simplified scenario where *one* interest rate exists in *the* market. A simplified one-rate approach is further justified by the facts that public officials do target the Federal Funds Rate, and the Federal Funds Rate affects other interest rates through term-structure and risk-structure. 1965-1998 are years when Federal Reserve officials executed aggressive monetary policies. In other words, I will follow the advice of Friedman (1953) to seek maximum explanatory power from a minimum of variables.

Keynes clearly placed more emphasis on wages than did Hayek. Mises (1949: pp575-577) and MacKenzie (2011) assert that wages must fall during economic downturns to minimize unemployment. That is, mass unemployment is caused by wages being above market clearing levels, due to either high wage policies or worker stubbornness. Furthermore, relatively high wages will tend to slow overall economic activity over time, relatively low wages will tend to accelerate overall economic activity over time.

The period spans twenty-five years, yielding 100 observations. Given the aggressive nature of Federal Reserve policies during the 1965-1989 period (already seen above), the Federal Funds Rate should be strongly correlated with $Y_{GAP\%}$. The results of the first regression are meaningful, as shown in the following tables.

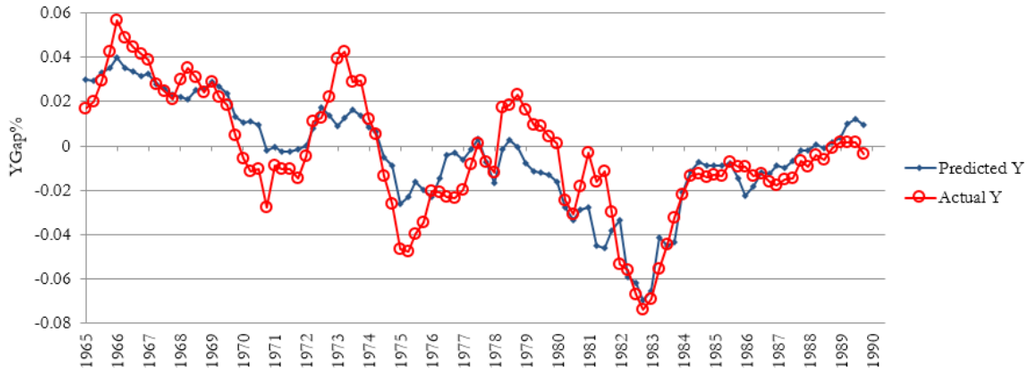
[11] An anonymous referee suggested using the difference between the Federal Funds Rate and the Natural Rate.

Regression Statistics	
Multiple R	0.8755057
R Square	0.7665102
Adjusted R Square	0.761696
Standard Error	0.0132644
Observations	100

There is an seventy-six percent correlation between $Y_{GAP\%}$ and the independent variables. Could this relatively high correlation be merely coincidental? Perhaps so, it could be a fluke. What do the other statistics show?

	Standard Error	*t Stat*	*P-value*
Intercept		6.5168179	3.217E-09
$\hat{b}_1$: Fed Funds Rate		-13.287967	1.448E-23
$\hat{b}_2$: Real Wage		-6.2354318	1.172E-08

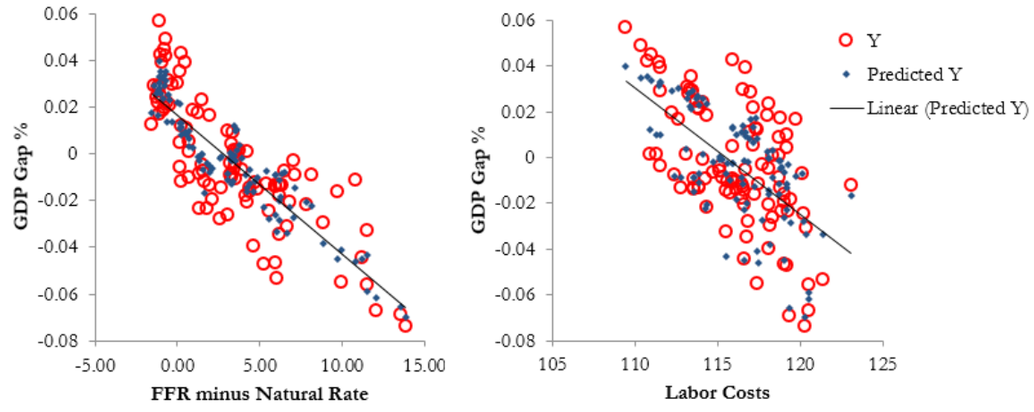
The T-statistics suggest that the results of this regression are not merely coincidental. Most importantly, $\hat{b}_1$ is negative. The evidence thus indicates that the Federal Funds Rate is leading countercyclical, as predicted by Hayek's theory. The next chart shows actual and predicted values of GDP gaps by the regression.



Actual and predicted $Y_{GAP\%}$ don't line up perfectly, hence a correlation of "only" seventy-six percent. How does each independent variable relate to the dependent variable?

Both $\hat{b}_1$ and $\hat{b}_2$ are inversely related to $Y_{GAP\%}$.

Yet visual inspection of these two relations suggests a more consistent association between $\hat{b}_1$ and $Y_{GAP\%}$. Wages are clearly leading countercyclical (as indicated by Mises). Productivity adjusted real wages rose prior to Stagflation recessions, which contributed to relatively slow hiring and elevated unemployment rates subsequently.



The Federal Funds Rate has a discernable lagged effect on $Y_{GAP\%}$ of eighteen months. There is no theoretical reason to assume an eighteen month lag. Lagging the Federal Funds Rate five or seven quarters changes the R^2 to .748 and .755, respectively. Both independent variables remain statistically significant with a five or seven quarter lags on the Federal Funds Rate. The "true" monetary policy lag on GDP could be sixteen or twenty months, but this can't be tested because monthly GDP data doesn't exist. It is quite possible that Federal Reserve policies affects elements of GDP Gaps incrementally over a range of twelve to twenty-two months, but simple OLS analysis would not verify this assertion even if monthly data is available.

There is other evidence of policy lags. Hughes (1997) discusses how monetary policy of the early 1980's caused the 1991 Recession. In the conventional view, policy lags range from twelve to fifty months (Havranek and Rusnak 2013). Most economists believe that the effects of monetary policy are long and variable, but the effects of policy may not vary much. The evidence reported in this paper indicates that the lagged effects of Federal Reserve policy during the Stagflation period are over a year, but not particularly variable.

Implications

The test reported in this paper covers the Stagflation period. Stagflation matters because it is *the* modern example of a buildup and reversal of inflation by the Federal Reserve, and the period during which professional opinion shifted away from Keynes. Data from the Stagflation period tests a key point of contention between Keynes and Hayek. Keynes' theory predicts leading *procyclical* interest rates. However, the Federal Funds Rate was leading *countercyclical* during the Stagflation period. How might a Keynesian respond to this evidence? This paper uses standard data (i.e. GDP, real compensation) generally accepted by Keynesians. Any reasonable Keynesian should admit that the aforementioned data contradicts Keynes' theory of Bull-Bear Boom-Bust cycles.

Hayekian cycle theory is founded upon sound theory and supported by empirical data. Hayek (1937, 1939) admitted that entrepreneurs may be misled by distorted market signals- in this case interest rates regulated by a central bank. The evidence reported in this paper supports Hayek's claim that boom-bust cycles are caused by disequilibrium interest rates. The predictions of Hayek's theory don't line up with the data *perfectly*. However, evidence indicates Hayek's theory correlates with macro data *closely*.

The evidence in this paper adds to an already strong case against central bank credit regulation. Free banking is the alternative to central banking[12]. The evidence also contradicts Keynes' negative view of entrepreneurs. Entrepreneurs always make some errors, but Fed policies cause errors that are systematic and systemic. Evidence suggests that entrepreneurial plans are best guided by freely adjusting market interest rates, not by central bank policies.

[12] Selgin and White (1994) and Rothbard (2005) each argue for their own types of hard-money bank systems, with fractional or full reserves, respectively.

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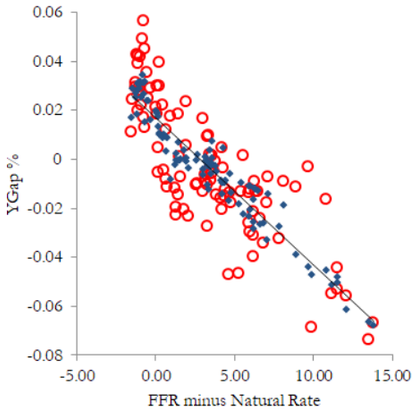
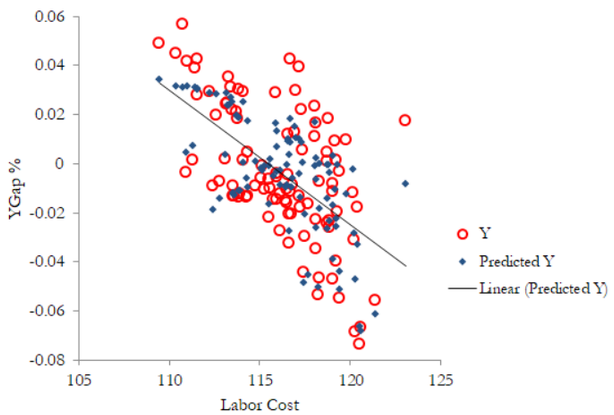
Appendix: Alternative Federal Funds Rate Lags

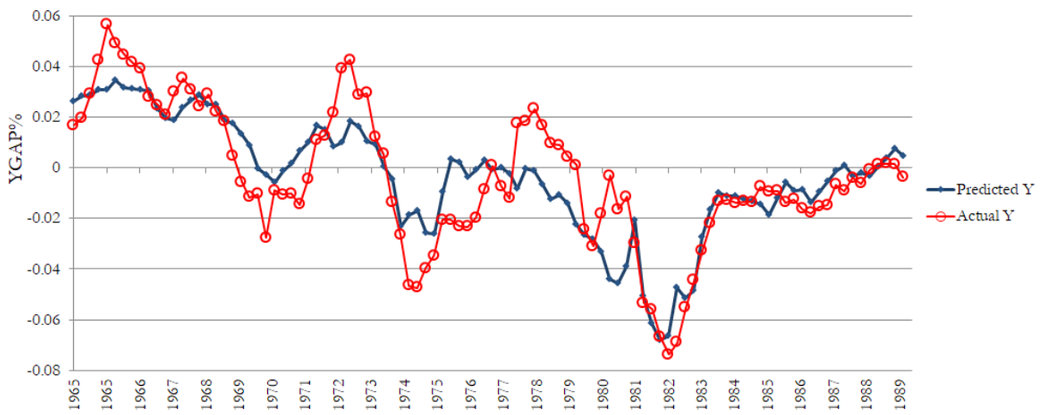
Results of a Four Quarter Lag

Regression Statistics	
Multiple R	0.85301
R Square	0.72762
Adjusted R Square	0.722
Standard Error	0.01433
Observations	100

			t Stat	*P-value*
Intercept	0.30124	0.0652	4.61989	1.2E-05
FFR	-0.0051	0.00043	-11.8	1.9E-20
Wages	-0.0025	0.00057	-4.3636	3.2E-05



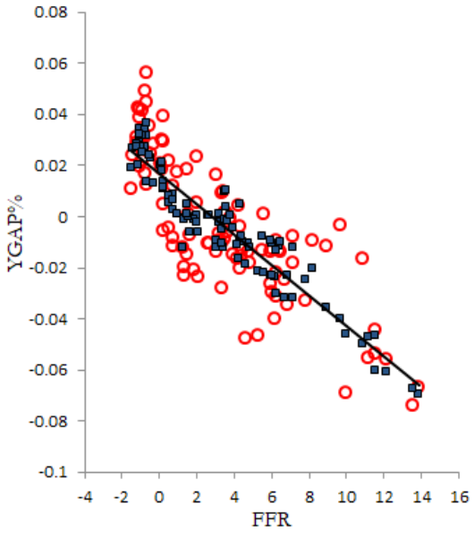


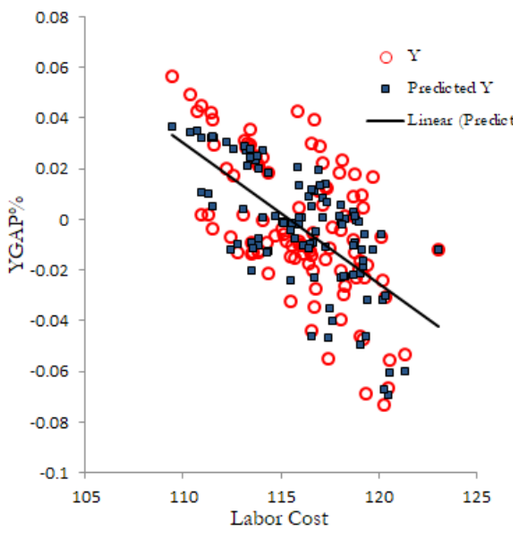


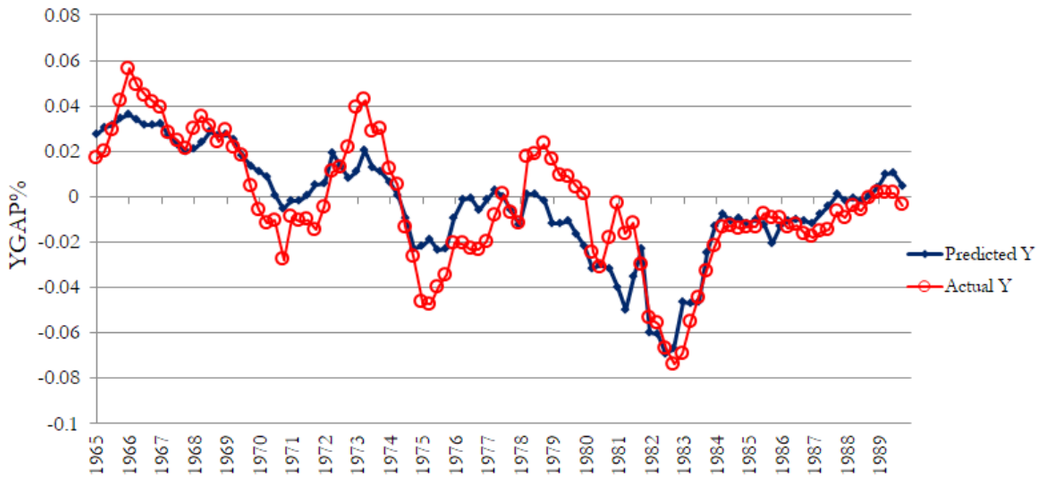
Results of a Five Quarter Lag

Regression Statistics	
Multiple R	0.86512
R Square	0.74843
Adjusted R Square	0.74324
Standard Error	0.01377
Observations	100

		Standard Error	*t Stat*	*P-value*
Intercept	0.34226	0.0608	5.62604	1.78E-07
FFR	-0.0051		-12.526	5.5E-22
Wages	-0.00283		-5.3517	5.82E-07



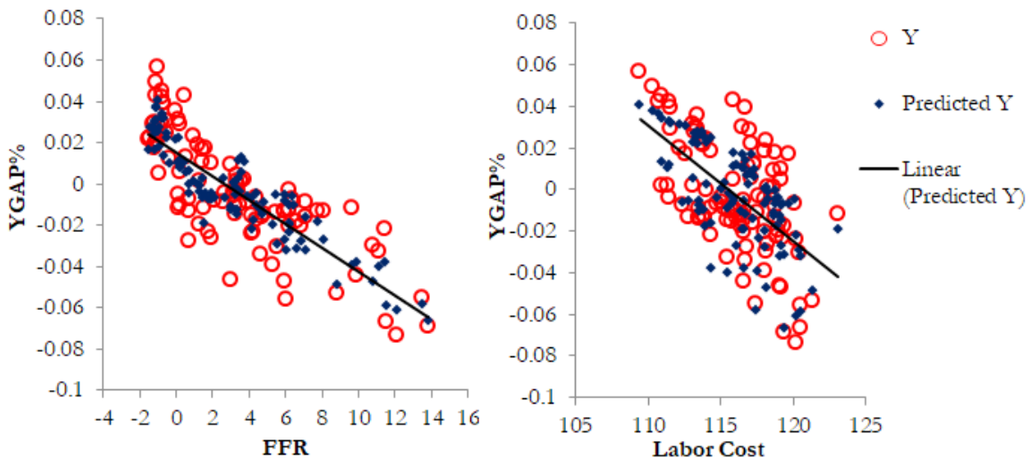


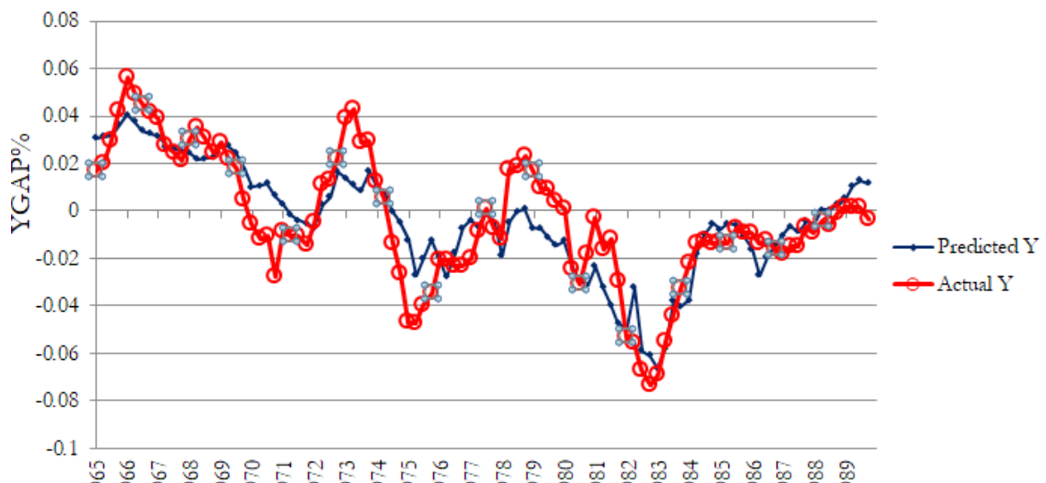


Results of a Seven Quarter Lag

Regression Statistics	
Multiple R	0.86873
R Square	0.75468
Adjusted R Square	0.74963
Standard Error	0.0136
Observations	100

			t Stat	*P-value*
Intercept	0.41158	0.05812	7.0814	2.3E-10
FFR	-0.0049	0.00038	-12.782	1.6E-22
Wages	-0.0034	0.0005	-6.8196	7.8E-10





Pierre Desrochers and Joanna Szurmak (2018) *Population Bombed: Exploding the Link Between Overpopulation and Climate Change*, Global Warming Policy Foundation, London.

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I started my studies in agricultural science at the University of Guelph in September, 1973. Our curriculum included a course called "Agricultural Science and Man.[1]" One of our professors had a poster in his office. This poster contained a drawing of an island, dominated by dark shades and colours. Faceless, identical human shapes covered the land. The crowded humans on the land had pushed some less fortunate humans into the water. This poster was a visual representation of the content of the course. Human population has crowded the earth to the point that survival was at risk. *The Population Bomb* (Ehrlich, 1968), and *The Limits to Growth* (Meadows *et al*, 1972) served as unofficial textbooks. My professors treated these books with reverence. If there was a debate about these ideas, none of it found its way into our classroom. The Ehrlichs and the Meadows were describing the world as it would be. Some years later, I came across the work of Julian Simon and learned that there was another perspective.

The rival factions in this debate have been given many labels, including the Optimists and the Pessimists, the Biological perspective and the Economic perspective, the reflexivists and the anti-reflexivists, the conservationists and the technologists and the Survivalists and the Cornucopians or Prometheans. Desrochers and Szurmak settle on calling the two sides the pessimists and the optimists. They contribute on the optimist side of the debate, joining a tradition which includes Simon (1981, 1990), (Lomborg (2001), Anderson (2004), Goklany (2007), Ridley (2010) and Pinker (2011, 2018). *Population Bombed* is an important and innovative contribution to this debate. The authors pose challenges to both sides, and, in the end, sketch a path to resolution of this long intellectual feud.

Historical and pre-historical examples of social collapse have fascinated social theorists. "Why did the X empire fail?" The population debate asks if what happened at these local or regional scales can happen at a global scale. The first phase of the population debate was about the adequacy of food production relative to the size of the global human population. Then the debate shifted to prospects of increasing natural resource scarcity as population growth and economic progress proceeded. The next phase focussed on the pressure that economic growth put on ecological systems. The current concern is the effect of economic and population growth on climate. Desrochers and Szurmak trace the debate to Aristotle and Plato, but their emphasis is on literature since Petty in 1682, Malthus in 1998 and Godwin in 1820.

Chapter 1 is important for readers who are familiar with the three earlier phases of this debate but who may not be aware of the recent connections to climate. It also provides an overview of the six chapters to follow.

Chapter 2 is a masterful summary of what the authors call the optimist and the pessimist discourses. I thought that I was familiar with most of the contributions to this topic. But Pierre and Joanna introduced me to many writers whose work was new to me. I was surprised to see the number of contributions to this literature made by economists, mostly on the pessimist side.

Chapter 3 is empirical. The pessimists have developed models to make predictions about pending social and environmental outcomes. The optimists have focussed on analysis of historical trends. The pessimists' predictions have anticipated social collapse as human population surpassed their estimates of planetary carrying capacity. The optimists' data show favourable trends in measures of human well-being and in levels of environmental quality. They conclude that past predictions of the pessimists have not come true.

Chapter 4 draws on Professor Desrochers' previous work in industrial ecology, particularly his research on the transformation of waste streams into commercial products in the history of manufacturing. The chapter begins with a discussion of the Environmental Kuznets Curve which describes the relationship between environmental quality and income per person. According to this model, increases in income per person initially reduce environmental quality. As income increases, however, this relationship peaks and then declines as income per person increases. Increased efficiency in the use of raw materials, including the transformation of waste streams into product streams help explain the Kuznets curve. One of the critical elements of the optimist perspective is that innovation, resource discovery, increases in capital stock and other improvements in production practices push back the material limits that would otherwise constrain growth in human population. This is a pivotal point of contention with the pessimist

[1] Remember, it was the 70s. People used names like that for courses at that time.

view. The pessimist counterargument might be "So far so good doesn't mean that disaster isn't waiting around the corner." I will return to this point later in this review, but, at this point, let me suggest that a more complete theoretical basis for the optimists' claim would strengthen the mostly empirical case that is made by the optimists. Here is where the Austrian economics perspective can be helpful.

The thesis of chapter 5 is that the pessimists, having been unsuccessful with their predictions of emerging natural resource scarcity or deteriorating indicators of environmental quality, have moved the yardsticks to climate. Climate, according to this view, is a planetary limit[2] that is reaching a critical threshold. It is the capacity of the environment to serve as a sink for by-products of human production and consumption that is the ultimate binding limit to population growth.

Chapter 5 also includes an excellent critique of the IPAT identity, as well as calculations of environmental footprint and recent attempts to measure planetary boundaries. The chapter provides a synopsis of the soil erosion scare of the mid to late 20th century. I conducted research on this topic at the beginning of my career at Guelph. The Canadian Senate Standing Committee on Agriculture and Natural Resources released *Soil at Risk* in 1984. I joined the faculty at Guelph in 1985 and my first research grant financed supported a project on the economics of soil erosion. The Senate Committee report claimed that Canadian agriculture faced an imminent crisis. Soil erosion was an immediate threat to the viability of agricultural production in Canada. The research that my students and I and other agricultural economists in Canada and the United States conducted found no evidence of a systemic threat to productivity from soil erosion[3] in North America. The remainder of chapter 5 discusses claims and counter-claims about the relationship between population growth and climate change.

Chapter 6 draws on concepts from public choice theory and the sociology of science literature to resolve a paradox: Why are authors in the pessimist camp so reluctant to change their position based on the poor track record of their predictions? The chapter examines the economic incentive structure of scientific research. The authors explain that, from a professorial point of view, there is no such thing as a bad crisis. The bigger the crisis the bigger the research grants. They invoke Ron Bailey's theory of the iron triangle. Researchers need crises to justify research funding. Media need crises to sell advertising space, in print media, and time in broadcast media. And interest groups need crises for fundraising. Most people seem to be aware of the incentives for propagating alarm for media and interest groups. But repeated public opinion surveys measuring trust of occupational groups suggest that it is not common knowledge that professors also respond to incentives. Chapter 6 peaks behind the curtain on the peer review process, which many non-academics treat as synonymous with validation. The authors discuss the work of Ivan Oransky and his colleagues which has documented widespread deviations between the ideal of scientific objectivity and the actual practice of science.

Desrochers and Szurmak draw on recent findings in the social psychology literature that have identified cognitive limits and biases that influence the way that people perceive and interpret information. They use the concepts of illusion of understanding bias, confirmation bias, motivated skepticism, naïve realism, the false consensus effect, groupthink and the role of prestige to explain the reluctance of the pessimists to adjust their views when confronted by the empirical trend analysis of the optimists. The chapter concludes with a discussion of what the authors call "the epistemic culture of biology." The authors contend that the disciplinary habits which serve biologists well in their own field fail them when they venture in to social science territory.

Chapter 7 concludes the book. It also offers hope for reconciliation between the two silos of belief described in earlier chapters. The authors ground their optimisms in the examples of two potential role models: Ted Nordhaus and Adam Frank. Nordhaus has journeyed from the pessimistic side to an understanding if not an embrace of the optimistic view. Frank, a biologist, is described as a transformative optimist. This final chapter suggests that some middle ground exists[4] in this debate.

Population Bombed is a book about rival belief systems. It is a book about ideology. Most of the authors in this literature have viewed their contributions as empirical. "Here are the facts." "And here is what those facts mean." "And these facts show that we should do X." But both sides appeal to the same world history, to the same facts. But people perceive facts through lenses of belief, through ideology. I am using the word ideology in a non-pejorative way. And I am offering it as a universal claim, as a characterization of human nature. Every person has a belief system. Every person is ideological. People have beliefs about how society is constituted and about how it came to be constituted. They also have beliefs about how society should be constituted and about the means or the processes to be used to realize their normative visions. This is what I mean by ideology. Jonathan Haigt (2012, p. 270) uses the term "moral systems." Christian Smith (2003) uses the term "moral matrixes." Ideology, in the universal and non-pejorative sense the I am using the word, is at the core of the debate that Desrochers and Szurmak examine. Pessimists believe that the biological concept of carrying capacity applies to the population of human beings and their habitat, earth. They are thinking metaphorically. A breeding population of fruit flies in an enclosure with a fixed food supply will grow rapidly and then collapse when that food supply is exhausted. And so it will be with people and the earth. The optimists believe either that there is a carrying capacity of earth, but that it is not proximate, or, that the concept of carrying capacity does not apply to humans in the way that it applies to fruit flies. The optimists claim one of two categorial differences between the biologists' fruit fly experiment and the people/earth relationship. Either the carrying capacity of earth relative to human needs is much larger than the capacity of the enclosure with the fixed food supply is relative to the growth of a population of fruit flies. Or, people are not like fruit flies.

[2] Rockstrom *et al* (2009), writing in the pessimist tradition, develop a model that adds 6 other planetary boundaries to climate.

[3] On the other hand, we found that soil erosion in Ontario did give rise to significant off-farm effects in the form of reduced water quality as displaced soil and nutrients from farms were transported downstream from erosion sites. his of this debate.

[4] Desrochers and Szurmak mention two other examples of migration between the two camps earlier in the book. One is the transformation of Marxist views over time. Marx and Engels (*Population Bombed*, p. 36, p. 48) wrote from an optimist perspective, but more recent Marxist literature has tended to adopt the pessimist view. And Bjorn Lomborg started out with the intention of proving Julian Simon wrong, but ended up being persuaded by the data.

There are logical similarities in the positions of both sides of the population debate. Both sides appeal to "if present trends continue" arguments. Both sides acknowledge scarcity as a constraint to human action. Both sides invoke a trust proposition. The pessimists endorse a trust of science and government proposition. The optimists endorse a trust of human adaptation proposition. And there are important differences in the ways that each side uses trend arguments and characterizes the scarcity constraint. As I mentioned earlier, some authors have labeled the pessimist side in this debate the biologist or ecological perspective and the optimist side the economist perspective. One way of thinking about ecology is as the study of how living organisms adapt to scarcity. And economics is often seen as the study of how humans adapt to scarcity. But there are important differences in the nature of the implied adaptations. Both ecologists and economists accept that individual humans face scarcity in choosing among alternative courses of action. We all have 168 hours per week of time to allocate among our various activities. I can't eat the sandwich that I made for lunch more than once. If I drink the last cup from the teapot, I can't have another cup unless I make more tea. Both sides in this debate would treat those statements as trivially self-evident. But scarcity also manifests at a community or aggregate level. Under the pessimist view in this debate, the actions of all humans taken as a group face a collective scarcity that is not perceived by individuals. According to the pessimist view, because individuals do not perceive this category of scarcity accurately, or maybe even at all, they act as though it does not exist, as though it is not real.

This special category of scarcity is usually characterized in terms of carrying capacity. There is are finite limits to the number of people that the material environment that constitutes earth, can sustain. At one level, both sides believe this. The difference in beliefs has to do with the proximity of these limits relative to current activities of humans. One side believes that these limits are close, that individual humans are not able to perceive this and that the consequences of transgression of the limits are non-linear, irreversible and severe. The other side believes either that the limits are not close or, alternatively, that there will be warning signs will tell us when we are approaching a limit and that these warning signs will encourage adaptation.

Both sides appeal to "if present trends continue" arguments. The optimists present data on a range of human quality of life and ecological condition variables that show improving trends, as least for nation states at or above the turning point on the Kuznets' curve. The pessimists develop estimates of habitat carrying capacity and present trend data that, if projected, will exceed the estimated capacity level. The trust proposition of the pessimists is that the scientists who have estimated the carrying capacities got it right, both in identifying the correct dimensions of carrying capacity and calculating the critical levels of those capacities. They also invoke a thrust proposition that governments and international agencies will faithfully and effectively apply the recommendations of the scientists. The trust proposition of the optimists is that people have found ways to adapt to changing conditions of scarcity in the past and that they will continue to do so in the future.

The optimists' trust proposition modifies the biologists' fruit fly metaphor. It claims that humans are qualitatively different from other animals. Matt Ridley ((2010, pp. 56-57) put it this way:

> There is strikingly little use of barter by any other animal species. There is sharing within families, and there of food-for-sex exchange in many animals including insects and apes, but there are not cases in which one animal gives an unrelated animal one thing in exchange for a different thing.

The optimists also have a different conceptualization of natural resources than the pessimists do. The pessimists argue, with full justification, that the matter that makes up the habitat of humans, is finite. The organic and inorganic material of the earth is fixed, as is the flow of solar radiation that reaches the planet's surface. Humans cannot consume more than the quantity of matter or the flow of solar radiation. But this is not what the optimists have in mind when they speak of natural resources. Only a small fraction of the organic and inorganic matter of the earth constitutes natural resources. That fraction consists of the combinations of matter and solar radiation that humans have figured out how to use to their advantage. Paul Romer (2015) discusses this perspective in terms of combinations of elements. Using the number of elements[5] in the periodic table, Romer explains that there are 100x99 ways to combine any two elements. There are, however, 100x99x98x97 ways to combine any 4 elements.[6] His point is that the existing human population has only explored a small fraction of the combinations of elements available in our habitat. It is only the sub-set of those combinations that have been discovered to be useful by humans that constitutes the class of natural resources. Romer's conclusion is that "there have been too few people on earth and too little time since we showed up to have tried more than a miniscule fraction of all the possibilities."

The optimists also differentiate humans from other animals on a dimension that they do not articulate well. This is the dimension of the variation across individuals. Humans are more varied than other animals. And instances of rare individuals with extreme attributes are important to the optimists' narrative. Through the process of voluntary exchange of unlike objects that Ridley claims is uniquely human, these individuals with extreme attributes can have an impact on large numbers of their fellow humans. Entrepreneurial alertness, creative destruction, discovery, competition as a discovery procedure, the price system accelerate evolution and adaptation. Simon and others in the optimist tradition emphasize the importance of exceptional, creative individuals. And the larger the human population, the higher is the probability of an exceptional individual being born. Exceptional individuals have exceptional ideas. And the application of those exceptional ideas pushes back the carrying capacity constraint.

This journal publishes scholarship in the Austrian subjectivist tradition. What does *Population Bombed* have to do with Austrian economics? Partisans in this debate, for the most part, have not been adherents of the Austrian tradition. I think that there are at least 5 contributions that the Austrian perspective can make to this debate. The optimists maintain that human innovation acts to relax the constraints imposed by a finite biophysical environment. But, to the pessimists, this claim looks like a leap of faith. Historically, Austrian have made significant contributions to our understanding of entrepreneurial alertness and the division of labour that

[5] Which he treats as 100 for illustrative purposes.
[6] For a total of 94 million combinations.

could lower the faith threshold of the optimists' trust proposition. This literature provides a theoretical foundation for the optimist claim. It also provides an explanation of the paradoxical Simon result of decreasing scarcity of natural resources as economic growth proceeds. Hayek's (1978) characterization of competition as a discovery procedure explains the role of the price system as a testing ground for hypothesized innovations.

One of the central claims of the pessimists is that human society is getting perilously close to thresholds of biophysical limits of the natural world and only the enlightened scientific experts can see this. This is an important claim. And, if true, it requires serious examination of alternatives to the existing situation. One of the alternatives that has been systematically ignored or rejected by the pessimists is that the price system, which normally provides a social global early warning system of impending scarcity. One of the most incisive criticisms of the Limits to Growth analysis was that the systems dynamics model did not include a feedback mechanism in the form of prices. A model of economic growth without prices is like a car without a gas gauge. The driver has no indication that the ride is almost over. Economists are expected to talk about the price system, but the Austrian perspective on the price system is of particular importance in this context. Hayek (1945) differentiated between two types of human knowledge. He called one type scientific knowledge and the second type "knowledge of the particular circumstances of time and place." Scientific knowledge is objective, mostly coherent and centralized. His second category of knowledge is subjective, incoherent and distributed among the individual members of society. He explains that what he calls "the marvel of the price system," is that it can transform knowledge of the particular circumstances of time and place into objective, socially coordinating knowledge, in the form of prices. He used the example of tin to illustrate that, because of the information that is embodied in prices, users of tin start looking for alternatives, or cut back on consumption or start looking for new sources of tin. The "marvel," according to Hayek, is that people don't have to understand the technical details of why or how tin became more scarce. They learn from observing an increasing price that some type of limit is being approached. Hayek did not maintain that this early warning system is perfectly prescient, even though he has been falsely accused of holding this view. He did argue that the price system is a necessary institution, in the sense that it alone can transform fragmented, sometimes subjective, conflicted knowledge which is not directly observable in any other way, into objective, if imperfect, information in the form of prices.[7] James Buchanan (1962) once argued that the primary focus of economic research should be on discovering ways to extend voluntary exchange relationships into realms where they do not currently exist. If there is a gap in our social early warning system, as the pessimists maintain, it is at least worth considering how the price system could be extended in the relevant dimensions to help us mobilize the knowledge that we need in a way that prompts people to touch the brakes. But, as long as the pessimists embrace a blanket condemnation of the price system as the reason for our headlong plunge into the abyss, I am not optimistic.

Recent contributions to the Austrian economics literature on crony or political capitalism also have the potential to help with the resolution of this debate. The pessimist side rejects

[7] Hayek (1945) does not explain the institutional mechanism through which this knowledge transformation takes place. Barnett (1992) provided the required explanation. Private property and freedom of contract serve as the legal and institutional foundation of the process that Hayek described.

private ownership of resources and the coordination of resource use through the price system and idealizes collective ownership of the means of production. The optimist side idealizes individual or voluntary group ownership. But actual human societies, now and historically, do not conform to pure or ideal types. Actual human societies exhibit mixtures of ownership arrangements. If ideology has framing effects, as current research in social psychology suggests, then protagonists can interpret historical data in a way that is consistent with their world view, but which may be subject to partiality. Pessimists look at western market economies and see them as ideal type private property regimes They observe that environmental pathologies exist. Optimists look at centrally planned or collectivist states and see them as collective ownership of the means of production societies. They observe that environmental pathologies also exist (eg. Hill, 1992). A more balanced perspective is that crony or political capitalism is endemic to many modern and past societies, and that the causal interpretation of environmental and social pathologies is more complex than either side in this debate tends to admit. Wolf's (1979, 1980) set of diagnostic categories, which includes market as well as non-market or policy failures, offers a more balanced approach. If both sides in this debate interpreted actual historical economic and social systems on a continuum and not as binary ideal type categories, this would be a step in the right direction.

The Austrian contributions to the Economic Calculation Debate also can reinforce the recent literature on crony capitalism. Broad calls on the pessimist side for fundamental reorganization of the modern techno-capitalist economic system for treating the natural world as a commons ignore the information and incentive problems that are associated with this ownership structure. The proposed abolition of property rights would come at a cost. Property rights can be the ally of sustainable resource management (Brubaker (1995), Anderson and Leal (1992, 2001, 2015), Dales (1968), Bate (2001)). The abolition of private property makes it impossible for the price system to transform the fragmented, subjective, conflicted "knowledge of the particular circumstances of time and place" into social coordinating objective knowledge (Hayek, 1945, Barnett, 1992).

Intellectual courage will be required if the gap between the two contending solitudes is to be closed. An emerging perspective in the Austrian environmental economics provides a template for this type of courage. Dolan (2006), Adler (2009) and Dawson (2013) have proposed an Austrian property rights approach to anthropogenic climate change. Their approach is theoretical, encompassing economic and legal theory. And this approach is embryonic. But it is courageous in that it takes as given that there is a scientific claim that human activities influence climate and it maintains that a decentralized property rights-based system could be used to resolve conflicts over competing claims to use of the atmosphere. This literature is likely to offend both sides in this debate. It is therefore difficult for me not to like it. It is a template for progress in that it takes the core ideas of both sides of the debate seriously and attempts to craft a logically and ethically consistent approach to conflict resolution. More generally, the emerging Austrian environmental economics literature, with leading contributions by Rothbard (1982) and Roy Cordato (1992), offers a distinct and useful conceptualization of environmental problems. Rothbard (1979) and Cordato (2004) reject diagnoses of environmental problems based on efficiency criteria and suggest that we should see them as disagreements among people about how elements of the

natural world should be used. This implies that the path to solving environmental problems is one of conflict mediation, which is worth considering as an alternative to the polarization of contending views in this debate.

Desrochers and Szurmak locate themselves in the optimist camp. But I think that they challenge both sides in the hope that resolution can be achieved. For the optimists, their claim that human innovation, discovery and ingenuity can forestall the natural limits and constraints feared by the pessimists needs further elaboration to overcome the pessimists' perception that this is a leap of faith. The Austrian literature on entrepreneurial alertness and on the nature of competition as a discovery procedure and the emerging Austrian environmental economics literature have much to contribute to this project. The challenge to the pessimists is to take more seriously the optimists' perception of the trust in science and government proposition. They need to consider a more realistic model of the relationship between science and politics. Their claim that the institution of private property and voluntary cooperation within the price system needs to be fundamentally reformed needs to be evaluated with a deeper appreciation of the information and incentive problems that might arise under their proposed alternative. And, for both sides, I would add the challenge of Buchanan's proposal to seek to expand the scope of voluntary exchange relationships among property owners,[8] with a focus on the specific fears of under-appreciated thresholds named by the pessimists.[9]

There is one point that Julian Simon made that seems to be underappreciated by both sides in this debate. He conditioned his optimism on one specific feature of social organization. He insisted that for the processes of innovation, discovery and adaptation to fulfill their potential, people had to be free. If people are not free, then Simon's optimism evaporates.

[8] Outside the world of Austrian economics, the Free Market Environmentalism literature pioneered by John Dale (1968) and Terry Anderson and Donald Leal (1992, 2001, 2015) also occupies some fertile middle ground for the reconciliation project.

[9] Recent work by Aliakbari and McKitrick (2018) is an example of what I have in mind.

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