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**Monetary Expansion and Economic Crises:
An Austrian Perspective**

Master Thesis

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Declaration of Authorship

1. I hereby declare that I compiled this thesis independently, using only the listed resources and literature.
2. I declare that this work has not been used to obtain any other degree.
3. I agree that the work is made available for educational and research purposes.

Prague, 30th July 2014

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Abstract

The study of economic crises has been a major topic of interest in economics since at least the Great Depression and it has come to the fore once again after the latest crisis of late 2000s. It has also been one of the key themes for the Austrian school of economics in the form of the Austrian business cycle theory (ABCT), which puts emphasis on monetary factors influencing capital structure of the economy. In this thesis we provide a comprehensive exposition of the distinctive points of Austrian approach to the study of markets, the ABCT's propositions and conclusions and also the most important criticism of the theory and replies to it. The theoretical part is accompanied by an empirical illustration on the economy of the United States of America (USA) in the period starting at the end of the latest crisis.

JEL Classification: E32, E52, L26, N12, O11

Keywords: ABCT, Austrian business cycle theory, business cycles, intertemporal resource allocation, unsustainable growth, malinvestment, monetary expansion, economic crises

Abstrakt

Studium ekonomických krizí je jedním z ústředních témat ekonomického výzkumu přinejmenším od dob Velké hospodářské krize, které se znovu dostalo do popředí po poslední ekonomické krizi konce prvního desetiletí 21. století. Toto téma bylo také od počátku jednou z klíčových oblastí zájmu rakouské školy ekonomie ve formě rakouské teorie hospodářského cyklu, která zdůrazňuje roli měnových faktorů v ovlivňování kapitálové struktury ekonomiky. Tato diplomová práce představuje zevrubný výklad odlišností rakouského přístupu ke studiu trhů, rakouské teorie hospodářského cyklu a jejích závěrů a také nejdůležitějších kritik této teorie a odpovědí na ně. Teoretická část je doplněna empirickou ilustrací teorie na ekonomice Spojených států amerických v období po poslední krizi.

JEL klasifikace: E32, E52, L26, N12, O11

Klíčová slova: ABCT, rakouská teorie hospodářského cyklu, hospodářské cykly, mezičasová alokace zdrojů, neudržitelný růst, misalokace investic, monetární expanze, hospodářské krize

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Acronyms

ABCT	Austrian business cycle theory
CAGR	compound annual growth rate
CPI	consumer price index
FDIC	Federal Deposit Insurance Corporation
Fed	Federal Reserve System
FOMC	Federal Open Market Committee
GDP	gross domestic product
NBER	National Bureau of Economic Research
PCE	personal consumption expenditures
PP	percentage point
PPI	producer price index
QE	quantitative easing
US	United States
USA	United States of America
USD	United States dollar
VECM	vector error correction model

Introduction

The phenomenon of periodical economy-wide downswings in business activity of a capitalist economy is undoubtedly one of the greatest conundrums of economic science.¹ In more than 200-year-long modern history of the science, the issue of the so-called business cycle has stood at the forefront of interest, which was only strengthened after the first unprecedentedly prolonged and painful economic recession of the capitalist world – the Great Depression of 1930s.

What is more startling than mere existence of a scientific problem is the fact that even after those 200 years, the economic research has not come to a conclusion on the fundamental causes of the business cycle that would enable us to either prevent them from happening or at least anticipate and identify them in advance. As an indirect proof of this claim, we can take the number of scholars or practitioners who were identified to have sounded the alarm in advance of the recent great economic downturn of late 2000s. There were only a few dozen who saw the instabilities and the correction looming ahead. Bezemer (2009), for example, lists 12 authors whom he found to have predicted the economic trouble.² Nevertheless, the alerts mostly fell on deaf ears and were not able to trigger any widespread reflection in the economic community, with some of the authors predicting the problems being just labelled as ‘doomsayers’.

We do not claim that there should have been predictions of a particular time frame of the then-coming economic crisis as this would be in contradiction with the very thing that we are going to expose in the following sections. Nonetheless, a widespread proper understanding of the functioning of the capitalist economy as well as the phenomenon of sudden downturns of economic activity would have had to lead to much more than a few individuals drawing attention to massive problems and being unheard by the rest of the scholarly public.

¹ We are deliberately using only the term ‘downswing’ at this moment, since if it had only been for the upswings, there would hardly have been so much effort put into explaining them.

² It is of note here that 4 of these economists (which accounts for 33%) identified credit growth as the main cause of the problems and 2 of them were of the Austrian tradition.

In this thesis, we shall recount an addition and in some aspects alternative to the current mainstream synthesis of economic knowledge³ on the business cycle in the form of the Austrian business cycle theory (ABCT). The ABCT has recently been experiencing a renaissance within economics, which was only invigorated by the occurrence of the crisis of late 2000s. It is unique in its emphasis of time in the production processes, heterogeneity and structure of capital resources and the influence of manipulation of interest rates and money supply on that structure. In short, the theory asserts that a period of artificially induced low interest rates stimulates borrowing and (mal)investment, especially in the early stages of production, which is unsustainable and inconsistent with the consumption–saving preferences of the consumers and will have to be liquidated. A recession, which is a painful reallocation of resources back to its more efficient uses, comes when either the credit expansion slows down or when it projects into expectations of persistent excessive growth of all money prices. The underlying cause of the recession is lack of real resources to cover both the investment and the consumption patterns of the economic actors, which were made inconsistent by the manipulations of economic policies.

The aim of our endeavour is to prepare a comprehensive overview of the ABCT's propositions and conclusions along with the most important criticism and replies to it. On the basis of the theory, we shall further illustrate that after the latest worldwide economic downturn, we might be seeing yet another very soon due to the in essence unchanged and continuously exercised economic policies. The structure of this thesis is as follows: In section 1 we introduce the basic Austrian concepts necessary to put the ABCT into context. Section 2 focuses on the core of the theory and deals with its frequent criticisms. Finally, in section 3 we try to set out an empirical illustration of the theory on the latest conditions in the United States.

³ For a standard exposition of the synthesis of theories and formal models of modern macroeconomics, see Romer (2011).

1 Austrian approach and concepts

Although the Austrian school of economics may be seen as rejecting the notion of macroeconomics altogether (Horwitz, 2000, p. 1), a business cycle theory is in its nature definitely to be classified as a macroeconomic theory. Despite the fact, the ABCT's rooting in the Austrian tradition sets it apart from most of the modern macroeconomics. It is thus useful to define and explain the most important concepts used by the Austrian school of thought that differentiate it from the mainstream economics and which help to comprehend the later exposition of the theory and put it into historical and terminological context. We do that in the following parts.

1.1 Basic methodological tenets

In the very first place, it is important to keep in mind the methodological underpinnings that have accompanied the Austrian approach through its history.

We only recall here the two probably most important methodological principles of the Austrian school, which are in strong support of each other. These are the *methodological individualism* and the *methodological subjectivism*. Both of these tenets were pervasive through the pioneering work of the Austrian approach, Menger's *Principles of Economics* (Menger, 1871/2007, e.g. pp. 77–165). This is what distinguished Menger the most from the other two 'perpetrators' of the marginal revolution, Walras and Jevons.

The methodological individualism represents an approach in which the individual is always the focus of the study. It is the individual who gathers information, who makes the choices, i.e. who acts. It does not mean that there do not exist objective social phenomena, it is after all the task of economics to show the broad 'unintended consequences' of various single individual actions. The methodological individualism, however, demonstrates itself in the attitude to these unintended and possibly macroeconomic consequences. They are always viewed in the same realm of individual human actions, i.e. microeconomically.⁴

⁴ This feature of Austrian approach is probably most aptly expressed in the quote of a contemporary Austrian economist Roger Garrison: 'There are macroeconomic questions, but only microeconomic answers' (Horwitz, 2000, p. 1).

The methodological subjectivism, on the other hand, points at the thesis that the individual is the only source of value. Every individual has a unique scale of value known only to them, based on which they act and make their choices. These are the givens on which the social order grows. This tenet is also the reason for Austrians' reluctance to broad aggregation that is common in mainstream macroeconomics. If the values are subjective, and it should be remembered that this is the case on both the satisfaction/revenue side as well as the cost side, then aggregation makes little sense as the quantities are not simply additive. We should see this important notion permeating through our discussion of the Austrian concepts and the ABCT itself below.

1.2 Market process and entrepreneurship

We can contend that the body of current mainstream macroeconomics, be it the New Classical one or the New Keynesian one, is Walrasian in the sense that it stems from the Walras's concept of general equilibrium (Horwitz, 2000, p. 17). As macroeconomists strived to find their microeconomic roots, they naturally tended to equilibrium theory on which the thinking about causal relations among broad macroeconomic aggregates was as well based. On the other hand, the distinctly Austrian approach can be called Mengerian, by which we mean that it follows from the Menger's view of economy as a dynamic market process rather than a system of equilibrium. The defining feature of this approach lies in the above-mentioned methodological subjectivism, the perception of knowledge and information dissemination that the market process facilitates (p. 17) and the role of entrepreneurship in the process dynamics.

The mainstream within its equilibrium modelling understands the prices and quantities essentially to be the givens that are objectively known by the representative agents. These agents put these quantities into accord by the means of constrained maximisation of their utility or profit (Garrison, 2001, pp. 21–22). The agent here, in essence, is not an agent as there is no choice left for them. This is not fundamentally changed even under the case of implementation of some kind of imperfect information, which only adds a layer of probabilistic properties on how agents *react*. We understand that the equilibrium model draws on an approximation of the possible agents behaviour and its cummu-

lative effects based on standard microeconomic knowledge. Nevertheless, by its equilibrium nature it still leaves out an important part of the picture, which is emphasised by the Austrian approach as we describe below.

The Austrians bring to the fore the notion of the market as a place where the current prices are the result of what was subjectively believed to be true by *acting* entrepreneurs in the past and which are essentially at all times disequilibrium prices (Horwitz, 2000, pp. 20–21 and 30ff.). These prices convey condensed information about what the other participants in the market have already revealed they know or think. The information is not explicit but through the impact on the value of the price it facilitates guidance for others on how to act.

The important insight is that there is a process under way whereby the key actors are the so-called entrepreneurs. The entrepreneurs, based on their imperfect 'knowledge of the particular circumstances of time and place' (Hayek, 1945, p. 521), act on their divergent beliefs or, say, expectations about preferences of others. This process is exactly the way in which new previously unknown information and unavailable knowledge is created about not only where the prices of currently existing products should move but also about how the economic resources should be utilised and what to actually produce.

The entrepreneurship is an essential element for Austrians and we can identify two approaches to it in the history of its research by Austrian scholars. One, in the tradition of Wieser, Hayek and Kirzner puts emphasis on the discovery of already existing opportunities and the related knowledge and information creation. The essential role of the entrepreneur is thus the *discovery* of previously unnoticed opportunities for profit. The other tradition propounded mainly by Böhm-Bawerk, Mises and Rothbard focuses on the monetary calculation and forward-looking entrepreneurial appraisal under uncertainty. In this approach, the entrepreneurs exercise their *judgment* over the current conditions they see in the market and act on it by allocation of economic resources (Foss & Klein, 2012, pp. 43–77). If we talk about production, the entrepreneurs construct their subjective valuations of various current goods (as factors of production) utilising their expectations of future goods (as products) prices and use their resources to make profit. The results of the entrepreneurial action are

deemed inherently uncertain. In this second approach, even the opportunities are not thought to be objectively existing and to be discovered but the focus is on the entrepreneurial business planning (p. 76). The particular future goods and the ways in which to use and put together current resources may not yet exist at all and the entrepreneur literally creates new reality that did not exist in any objective sense guided by his judgment of the other agent's preferences. In both approaches, Austrians tend to emphasise that the nature of the entrepreneurial action makes it difficult to model probabilistically or by adding just another dimension or associated costs to the maximisation problem. The entrepreneurs do not only put effort into search for something particular. They really create knowledge they never knew they should have been looking for, but which they were simply *alert* to find (Kirzner, 1997, pp. 71–72).

The Austrian microfoundations are therefore slightly different from the microeconomic roots grafted onto modern macroeconomics. Where New Classicists and New Keynesians focus on the static problem of simultaneous maximisation based on known or probable information, the Austrians see gradual dynamic process of changes in production processes, incorporation of new knowledge into prices and creation of new products and prices based on unknown but subjectively estimated ever-changing preferences of individuals. Such a process also necessarily takes place in time. The action is not instantaneous, the process is under way in a continuous state of flux where the preferences or technology change and these changes and the results of the entrepreneurial action themselves slowly permeate through the economy in time and place. Taking interest in this process, which is not regarded as a simultaneous movement of all quantities toward known point of equilibrium, is a distinctive feature of Austrian approach.

1.3 The role of money

The second important object of study that we shall shortly discuss is money. As one would expect from the discussion above, the Austrian focus is not aimed on macroeconomic market for money, impact of monetary policy on broad aggregates, neither does it treat money as one of many goods to simply explain its accounting role.

Since the beginnings of the Austrian tradition, money's most important role has been deemed to be its role as a medium of exchange (Mises, 1912/1953, pp. 29–37). It is important to bear in mind that in such a position money enters virtually every transaction in the modern capitalist economy and is thus a key player in the market processes we described above. Individual prices and especially their relation to each other are the proxies through which the market coordination takes place. The changes, disturbances or policies on the money side, which never influence all prices in uniform manner, must therefore clearly have profound effect on this microeconomic coordination.

In the realm of money, the mainstream synthesis usually studies the general price level in the economy and its movements, the general price inflation (Romer, 2011, pp. 513–576). The money is assumed to be neutral at least in the long run, its nonneutrality in the short run is modelled by various types of price rigidities.

On the other hand, the Austrians again focus on the particular processes through which money and the changes in its quantity affect the economy. The monetary nonneutrality, i.e. the changes in relative prices caused by monetary factors, is a key point of study. Money is assumed never to be neutral in this classical sense, especially not when the goal of monetary policy is keeping a price index stable or slowly growing in a growing economy, which is the case in most advanced economies. New money is created in this case to counter the deflationary effects of economic growth in stable money supply environment. However, it is always the case that 'new money enters the system at some specific point' (Rothbard, 1962/2009, pp. 813) and by the individual actions of economic agents real changes are taking place. Those who get hold of the money first change the quantities of products or investments they purchase which influences not only prices of those accordingly but consequently it similarly changes the choices of those who sell them, who are the second to get to the money. In this way the new money affects the economy far from evenly as it slowly flows through the economy based on the individual actions. The questions asked are in what manner and where new money enters the economy and how it influences the structure of relative prices and the structure of production.

Precisely the study of the effects of monetary changes on particular prices and their relations rather than average price level is a significant characteristic of Austrian theorising, which contrasts with theories of money neutrality present especially in the strands of macroeconomic thought in the Neoclassical tradition.

1.4 Theory of capital and structure of production

The last distinctive feature of the Austrian approach that we shall deal with here takes us to the core of the ABCT. It is the Austrian theory of capital and the related concept of the structure of production of capitalist economy.

In the basic macroeconomic models, the two fundamental variables, labour and capital, are usually perceived as homogeneous quantities. A concept of heterogeneity is mostly introduced for labour, such as in the *search and match* models (see e.g. Romer, 2011, pp. 486–506; Mortensen & Pissarides, 1999; Shapiro & Stiglitz, 1984). These are, however, stand-alone models of labour markets and unemployment. Early DSGE models usually dealt with representative agents and only recently the focus has been moving to models with heterogeneous agents or to promising agent-based modelling (Colander, Howitt, Kirman, Leijonhufvud, & Mehrling, 2008). In the tradition of Clark and Knight, the capital is mostly treated as an indistinguishable bundle. The inclusion of human capital (Romer, 2011, pp. 151–161) can be thought of as a sort of heterogeneity and research has also been performed in the area of non-smooth (or lumpy) investment (e.g. Bachmann, Caballero, & Engel, 2013; Thomas, 2002) or investment irreversibility (e.g. Veracierto, 2002). Nevertheless, the capital heterogeneity and capital structure has not been a central theme in the current mainstream macroeconomics.

In the Austrian economics, the issues of capital heterogeneity and capital structure are considered to be of foremost importance. The Austrian capital theory builds on different foundations and especially in the temporal element it once again originates in the works of Menger. Menger (1871/2007, pp. 51–66) laid down the basis for Austrian understanding of the structure of production by differentiating between goods of various *orders*. Based on the subjectivism he employed, he discovered that there is a ‘causal connection between goods’,

which stems from the subjective plans of entrepreneurs as we described them in section 1.2. By the goods of the *first order* we understand those that are directly usable by various actors to satisfy their needs and wants – i.e. consumer goods. The entrepreneurs almost invariably choose to use some intermediate goods that directly help them in the process of procurement of consumer goods. These are designated as goods of the *second order*. By iteration, we can imagine that in a developed economy, there are various steps of production in each of which some goods are used to procure some other goods and we can trace this process to arrive at the final consumer good. This constitutes the notion of *higher-order* goods (i.e. *capital goods*) that do not represent a homogeneous fund but rather form a structure – a structure of subjective entrepreneurial plans where second-order goods are valued by an entrepreneur thanks to their ability to help procure first-order goods; third-order goods are valued by an entrepreneur thanks to their ability to help in the production of second-order goods, etc.

Since at least Hayek (1935/2008b, p. 228), the notion of intertemporal structure of production has in its simplest form usually been depicted as one or other triangular diagram showing the various stages of the process ending in the final consumer output. The original Hayek's portrayal and another modern version by Garrison (2001, p. 47), whose diagrammatical expositions we use further in the thesis, are shown in Figure 1.

To dispel any doubts, the concept does not entail a linear production process or rule out the possibility that one and the same physical good can function as a good of various orders (even at the same time). It should at all times be kept in mind that the particular position of a good in the structure is not determined by its physical properties, but always by being a particular component in a subjective plan (Horwitz, 2000, p. 46).

We should also remark that there are at least two in a way distinguishable types of things that are to be understood as higher-order goods. On the one hand, higher-order goods are those things that ripe in the production process and flow through the structure of production finally maturing into consumer good. These are the so-called goods in process or to introduce a term from accounting – inventories. On the other hand, higher-order goods are also present in the capital structure as long-term production goods that are never to be-

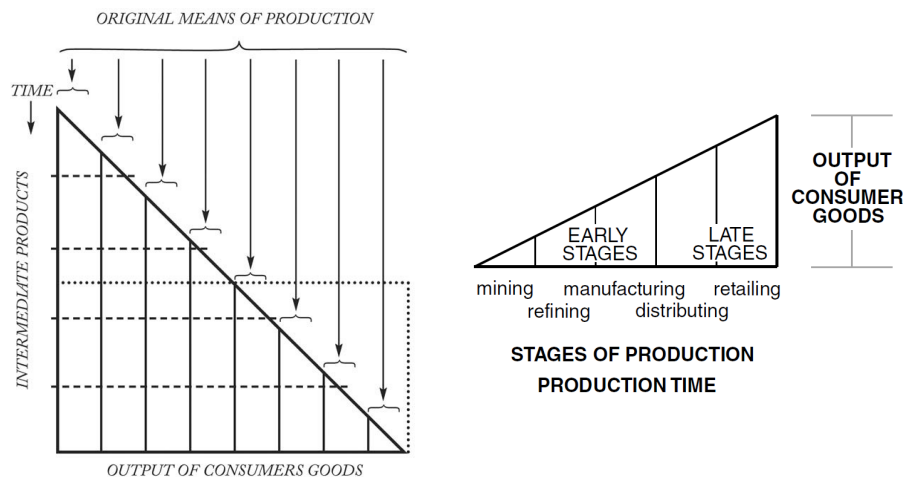


Figure 1: Hayek's (1935/2008b, p. 228) original depiction of intertemporal structure of production on the left, showing the time dimension on the vertical axis and output dimension on the horizontal axis. Garrison's (2001, p. 47) modern representation of the essential concept on the right with the axes switched.

come consumer goods but rather enter the production of consumer goods by the way of their use. In accounting terms these are mainly the property, plant and equipment and the use is generally manifested in the form of depreciation. This differentiation, nonetheless, has no impact on the fact that the key characteristic defining something as a capital good is the subjective 'intermediateness' of the object in the entrepreneurial plans leading to future satisfaction of needs and wants (Huerta de Soto, 1998/2009, p. 299).

The temporal aspect of the heterogeneity of capital, described above, is crucial in the exposition of the ABCT. It can, nevertheless, be considered only a subset of the notion of capital structure that was dealt with by the later Austrians. Lachmann (1978) speaks about the *heterogeneity in use* and *multiple specificity* of capital goods. A particular capital good is at any moment utilised in its 'best' identified use in a chain of other capital goods with which it is mutually *complementary*. The capital goods combinations are not formed arbitrarily but rather are result of the entrepreneurial planning we described in section 1.2. By multiple specificity, it is meant that a capital good intended for a particular purpose in an entrepreneurial plan may be of little use anywhere else or is at least to a varying degree specific to the plan. In changing circumstances the specificity

of the already created capital goods entails costly restructuring of the capital combinations as the capital goods must be used in alternative, possibly lower value uses. Thus “we must regard the ‘stock of capital’ not as a homogeneous aggregate but as a structural pattern” (p. 4).

The notion of capital as a structural pattern opens a whole world of issues that are hidden when it is handled as a single *K*. The centre of study is not focused on the level of investment or quantity of new capital created but it is more about what it is that is invested into and why and in the case of ABCT: what influences can lead to creation of a capital structure that may not be internally consistent.

1.4.1 Time preference and interest

The concept of capital structure is intertwined with the treatment of *time*. Time plays key role in the Austrian economic thought as it is an indispensable ‘ingredient’ of the market process and also an inherent element in any plan. Any entrepreneurial plans that we have hitherto discussed are necessarily *intertemporal*. We can draw some important observations based on this premise. Firstly, for the time during which capital goods (of various orders) are produced or used in production, some real resources have to be withdrawn from their ability to be used to satisfy current wants (i.e. consumed). This is the description of a simple reality that for any *investment* to take place, an act of *saving* has to occur. One can immediately ask a question for what purpose anyone could do that – abstain from satisfying wants now. It seems that a natural answer is to be able to satisfy wider range of wants or to attain more valuable goals in the future. This is the cornerstone of *time preference* theory. People generally prefer to have resources now than in the future. They thus forgo value (or consumption) now only to make the most of it in the future. The longer the resources are tied, the more value should be obtained in the future in return. The invisible measure of this time preference is in Wicksell’s terms the concept called ‘natural rate of interest’ (Horwitz, 2000, p. 54) or in Mises’s terms the ‘originary interest’ (Mises, 1949/1996, p. 526).

This way we get to an important feature of the Austrian theory of capital, which lies in its theory of interest. The Austrians assert that the underpinnings

of the phenomenon of interest do not rest in the demand for and supply of money or productivity of capital, but that the existence of interest is the manifestation of the underlying time preference of economic actors. In the broadest sense, the market where the time preference governs is, so to say, market for time, market where future is traded against present (Mises, 1949/1996, pp. 526–532). As these trades are usually performed in terms of money in a developed capitalist economy, the visible manifestation of interest (the Wickseilian *market rate of interest*) finds place in the *market for loanable funds*, i.e. the market where capitalists offer their savings and entrepreneurs seek capital funds to invest into capital goods needed in their ventures. But there is also the real side to the market for time. The market for time permeates through the whole capital structure where the proxy in the form of the market rate of interest indicates to the entrepreneurs in which and also how much time-consuming capital projects they should use the resources so that it is in line with the time preferences of the economic actors.

A simple example of the way in which a change in interest rate impacts the entrepreneurial decision-making with regard to time dimension of their plans is depicted in Figure 2. Three projects with various durations of their cash flows,⁵ show different changes in their profitability with the change in the interest rate (or economic cost of funding in other words). All projects are break-even at the interest rate of 5%, nonetheless, in the case of a decrease of the interest rate by one percentage point (pp) to 4%, the profitability does not change uniformly for the projects.⁶ It is a straightforward finding that lower interest rates are in general more favourable to longer-term investment projects.

Again, a note recalling the Austrian subjectivism is of importance here as the aspect of time in an entrepreneurial plan is to be comprehended as completely subjective as well. Thus ‘we are not referring here to the deterministic or Newtonian sense of the word (i.e., merely physical or analogical), but to the subjective sense; that is, the actor’s subjective perception of time within the context of his action’ (Huerta de Soto, 1998/2009, p. 268).

⁵ For simplicity the positive cash flows from the projects are set as one-off repayments in the final period.

⁶ It is no coincidence that the sensitivity of the value (of a bond) to changes in interest rate is one of the definitions of the term *duration* in standard finance.

	Cash flows at							NPV at	
	t_0	t_1	t_2	...	t_5	...	t_{15}	5%	4%
1-year project	-100	105	-	-	-	-	-	0	1
5-year project	-100	0	0	...	128	-	-	0	5
15-year project	-100	0	0	...	0	...	208	0	15

Figure 2: Impact of a change in the interest rate on three projects with different durations of their cash flows (one, five and fifteen years). Lower interest rates are in general more favourable to longer-term investment projects.

We should also draw attention to the fact that the market rate of interest is a visible expression of time preference, yet it contains various other factors than the time preference itself, such as various risk components (Huerta de Soto, 1998/2009, p. 289). The notion of some current general time preference is thus purely abstract and theoretical and can only hardly be grasped or estimated. We may say that in finance the concept usually coincides with what is called the real risk-free rate. To this is also connected the fact that as the entrepreneurs look for those ventures where the profit is highest, they use the resources in such a way that leads to a general tendency of levelling of the profit rate (leaving out the risk components) in various entrepreneurial ventures and also throughout the capital structure. This means that the slope of the hypotenuse in the capital structure diagrams introduced in Figure 1 reflects the time preference and will follow its changes as we shall see later.

Altogether, the real manifestation of time preference and the notion of capital structure are two sides of one coin. They bring us to a complex concept of *intertemporal structure of production* where time preference is one of the key measures determining value and productivity of various production processes via the rate of interest. The time preference, in this view, also determines the overall length and complexity of the capital structure, i.e. the Böhm-Bawerkian ‘roundaboutness’. The order of a capital good can therefore also be said to express its temporal proximity to the final consumer good.⁷ We shall see that this is a central feature of the ABCT.

⁷ This also brings us to the Hayek’s terms describing higher-order capital goods as *earlier stages* of production and lower-order ones as *later stages* (Hayek, 1935/2008b, p. 229ff.). We shall use these terms interchangeably throughout the text.

2 The Austrian business cycle theory (ABCT)

2.1 The origins of the theory

As we have explained the most important and distinctive concepts used in the Austrian economic theorising and though we have already touched upon some of the history of the thought, before the presentation of the most current theoretical exposition of the ABCT, we shall recall the roots of the theory itself.

Some of the first resemblings of the ABCT can be tracked back to 18th- and 19th-century England to Hume, Ricardo and British Currency School. These economists described the ability of banking sector to expand credit via issuance of fiduciary media and what impact this exerts on prices. On top of this extension of quantity theory of money on money substitutes, they also observed that this process is connected to booms in the economic activity, which are followed by subsequent declines. It might be surprising and definitely worth a more thorough research that Huerta de Soto (1998/2009, pp. 83–92) actually traces such ideas even back to 16th-century Spain's thinkers of the School of Salamanca.

Ricardo, moreover, offered his explanation of the phenomenon, which, nonetheless, was suited to an expansion in only one country that was to be put to an end by forces on international level (Rothbard, 1978/1996, pp. 74–78).

These deficiencies were overcome in the first integrated representation of the ABCT, which should certainly be attributed to Mises (1912/1953, pp. 357–366). Mises elaborated it on the foundations of the revolutionary theory of subjective value and the theory of capital developed by Menger and later by Böhm-Bawerk, both of whom we have already mentioned above as one of the first protagonists of the Austrian economic school. We have also already referred to the notions of *money rate* and *natural rate* of interest that should be assigned to Swedish economist Wicksell. In his economic *magnum opus* *Human Action*, Mises (1949/1996, pp. 538–586) devoted a chapter to his latest exposition of the topic of business cycles.

The author to which the theory owes its most notable depiction of the structure of production as the famous triangle is Hayek, after whom the image is usually called *Hayekian triangle*. Before turning to theorising in wider topics

of political economy later in his life, he worked out at least two major contributions to business cycle theory, *Monetary Theory of the Trade Cycle* (Hayek, 1933/2008a) and *Prices and Production* (Hayek, 1935/2008b), which now form core of the ABCT's history. It is of note here and it seems to be rather forgotten by the general economic public that in 1974 Hayek was awarded the Nobel Memorial Prize in Economic Sciences exactly for his 'pioneering work in the theory of money and economic fluctuations', i.e. his contribution to the ABCT.

After the Keynesian revolution took firm hold of macroeconomic thought – including business cycle theorising – in 1930s, there has been a resurgence and renewed interest in ABCT since at least 1980s. In the meantime, apart from Mises, probably the most important author reiterating ABCT themes was Rothbard in his *Man, Economy, and State* (Rothbard, 1962/2009) and *America's Great Depression* (Rothbard, 1963/2000). A number of authors then contributed as the part of the modern renaissance, most notably Skousen (1990), Huerta de Soto (1998/2009) and Garrison (2001).

2.2 Real saving versus credit expansion

As we shall expose in detail, the ABCT attributes the business cycle in the first place to monetary manipulations. It is thus convenient and common to describe the path through the cycle in comparison to natural market changes which may lead to similar effects as the monetary manipulations but which are sustainable in nature and do not cause any disruptions of the smooth functioning of the market system. We shall thus first describe two kinds of natural changes in the capitalist economy – the secular growth and the change in general time preference.

2.2.1 Secular growth

We have already touched upon the fact that saving, i.e. abstaining from consumption, is essential to any accumulation of capital goods.

In a simple case, we may imagine Robinson living on his island and catching fish by his bare hands. He usually catches three fish per whole day of trying and eats them. In this way he is well nourished. He could survive on two fish a day

and store one in his cold cave. Thus, one day he conceives an idea that if he had two spare days, he could go to the woods and find a suitable piece of wood from which he would manufacture a spear. He believes that with the spear he would be able to catch four fish in just a morning and use his afternoon for other ventures. Therefore, he lives on just two fish for four days and in that way he saves those fish. He is then able to undertake the journey to the woods with his accumulated fish and make the spear.

In this simple example, we can notice in a very intelligible manner many of the most important notions introduced in section 1. Robinson is an entrepreneur and a 'capitalist' in one person in his one-man 'economy'. He forms an entrepreneurial plan which involves production of a capital good. The plan needs time and resources to be executed and Robinson himself has to save these resources by refraining from part of his consumption. He does all that in order to achieve more valuable goals in the future, i.e. get more fish in shorter time and possibly utilise his spare time for leisure or further improvement of his life. Robinson's plan reflects his time preference, i.e. he values the future fish and spare time with its opportunities (taking into account the useful life of the spear) more than having his third fish each of four consecutive days.

In a modern capitalist economy with its complex structure of production as we have described it, a similar process takes place. Nevertheless, unlike in the Robinson's case, it involves various dispersed actors and a coordination of their individual plans through the price system. It follows from our exposition that (apart from genuine technological inventions) it is mainly the capital formation that changes the poor to the rich and thus allows economic growth of an economy. In the words of Huerta de Soto (1998/2009, p. 279, emphasis in original):

the essential difference between rich societies and poor societies does not stem from any greater effort the former devote to work, nor even from any greater technological knowledge the former hold. Instead it arises mainly from the fact that *rich nations possess a more extensive network of capital goods wisely invested from an entrepreneurial standpoint. These goods consist of machines, tools, computers, buildings, semi-manufactured goods, software, etc., and they exist due to prior savings of the nation's citizens.*

Thus, if in general the level of saving in a capitalist economy is able to support capital formation which exceeds the level of depreciation, than the economy is on a sustainable expansionary path. In this secular growth scenario, we do not assume any changes in time preference and thus we assume interest rate neutrality. A complete diagram of the growing economy by Garrison (2001, p. 54) is shown in Figure 3.

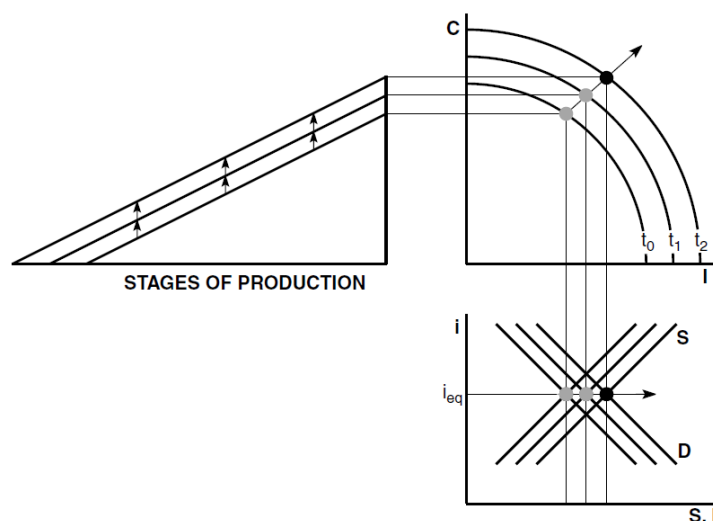


Figure 3: An economy in secular growth scenario (Garrison, 2001, p. 54).

The figure adds two more elements to the structure of production diagram we introduced in section 1.4. Firstly, the market for loanable funds diagram shows us the current level of time-preference-driven interest rate and the corresponding saving. This is in turn connected to the production possibility frontier showing choice between consumption and investment enabled by the saving. If we assume proper functioning of the market at the moment, the economy should be on the frontier, i.e. using all available resources up to their full potential.

2.2.2 Change in time preference

The second scenario that we shall set forth are the effects of a change in general time preference, i.e. the change in the ratio in which various actors in the

economy are willing to save resources instead of using them for the purchase of consumption goods. These changes would in reality be gradual, caused by, for example, changing demographics (Garrison, 2001, p. 61). For the purpose of straightforward exposition we shall assume an immediate substantial change.

In the case of decrease in time preference, the process of saving is intensified. If the resources are properly funnelled through the market for time, the increase in supply of loanable funds tends to decrease the interest rate, which in turn means that more, especially longer-term, entrepreneurial plans become economically viable. The resources that are no longer wanted for consumption enable the level of investment to increase. We again use the depiction of the process by Garrison (2001, p. 62) in Figure 4. We shall note that Figure 4 abstracts from the growth we introduced in Figure 3 and deals with the change in time preference *ceteris paribus* in a no-growth economy.

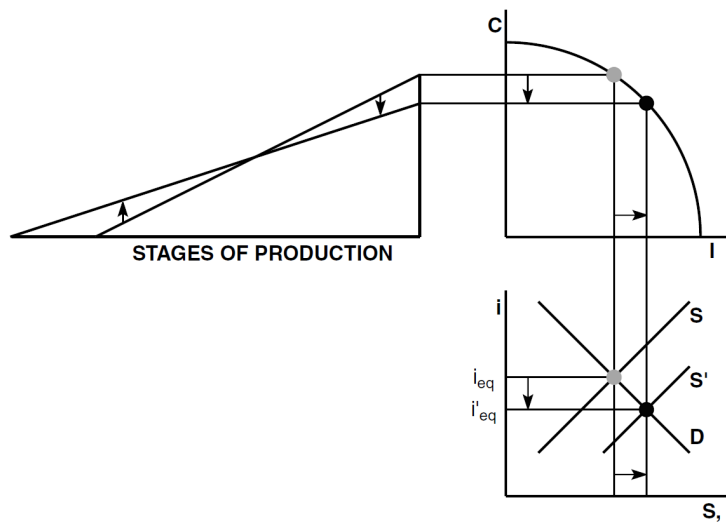


Figure 4: An economy under the change in time preference scenario (Garrison, 2001, p. 62).

Huerta de Soto (1998/2009, pp. 319–328) describes at least two important effects which lead to adjustment of the economic structure to the proposed time preference change.

The first especially important result emphasised by the ABCT can be seen in the production possibility frontier diagram and in the diagram portraying the

structure of production. The increase in saving goes hand in hand with the decreased demand for consumption goods as the economic actors abstain from consumption now to consume in the future. The entrepreneurship in these final stages of the structure of production thus becomes less profitable. Other things being equal, the entrepreneurs start to transfer resources to use them in the stages further from consumption, where profits are still higher, which is the general tendency of levelling the profits in all stages that we have already described. The new productive capacity being built that is expected to enable greater quantity of consumption goods in the future is in line with the change in time preference in favour of future consumption.

The second important effect is the effect of the decreased interest rate on the value of capital goods, i.e. long-term capital goods, and entrepreneurial projects further from consumption. We described the relationship between the discount rate and the value of long-term projects in section 1.4.1. Thus the currently existing capital goods raise in value, which in other words means that their expected profitability increases and thus their quantity can be expanded, i.e. similar long-term projects can be entered into. The decrease of interest rate, however, also reveals that some new, even longer-term projects are now viable and thus are started. This is again depicted in the diagram of the structure of production in Figure 4, where in the left-most part we can see the formation of new early stages.

Garrison (2001, p. 65–66) also notes that during the resource shift, the effects on particular types of resources are mainly divided along the line of their specificity. The specific factors that cannot easily move through the structure of production experience changes in their prices while the non-specific ones change their location in the structure to be allocated where their marginal product is the highest.

To conclude, the result of the change in time preference is a new structure of production that involves more roundabout entrepreneurial plans, is more complex and more capital intensive and thus enables greater quantity of consumer goods to be produced in the future. The changes are in line with the economic agents' desire to consume less now and more in the future.

2.2.3 Monetary expansion and the unsustainable results

As we have expounded the process behind sustainable changes in the structure of production in a secularly growing economy and in an economy where the preference for future consumption as compared to the current one has increased, i.e. the time preference has decreased, we are now ready to expose the problems that are triggered by monetary interventions into the economic matters.

There are various ways of monetary policy intervention that through the so-called transmission mechanism influence the economy. These are from the currently most used forms to the less utilised ones: Regulation of the base interest rates at which commercial banks can perform cash operations with the central bank (usually repo operations), regulation and growth of monetary aggregates, or regulation of commercial bank cash (or equivalents) reserves. The goal of monetary policy is mostly stipulated with regard to the level of prices, which should be held stable. However, in a growing economy with stable quantity of money, the overall level of prices as measured by the price indices would tend to fall. Therefore the goal of the monetary policy, whatever the tools and possibly with the help of the fractional reserve banking multiplicative money creation, must eventually lead to growth of the quantity of money. As the commercial banks are the first to touch the new money and their primary source of business is extension of loans, the principal stream through which the money enters the real market is in the form of credit. Thus, in Garrison's words, we may say that '[t]he three alternative policy tools are simply three ways of lending money into existence' (Garrison, 2001, p. 68).

Either through the fact that there are more funds available on the loanable funds market than are justified by the time preference (and the corresponding level of saving) in the economy or even directly as described above, the central banks' and commercial banks' actions in certain periods lower the prevailing market rate of interest below the level it would attain without their interference.

Now we can see that the initial effects of the monetary manipulation are the same as in the above-described case of the lowering of time preference and we may thus directly compare the following events. The main difference in the present case is that there has been no change in the consumption–saving pat-

terms of the economic actors. For the depiction of the adjustments of the economy we shall utilise Garrison's (2001, p. 69) diagram shown in Figure 5.

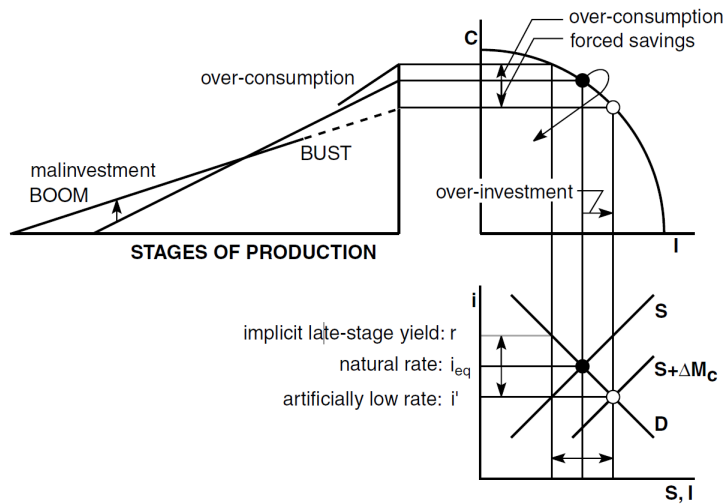


Figure 5: The processes in the economy ensuing after monetary expansion (Garrison, 2001, p. 69).

We may notice the first difference right at the first effect we described above for the case of change in time preference of the economic actors. As the new loanable funds are funneled to the market in the form of new credit, there has been no increase in real saving and thus no decrease in consumption. As the loanable funds diagram shows, the new credit increases the supply of loanable funds, which at the prevailing consumption–saving preference of the economic actors will lead rather to a further decrease in saving and a move to stronger consumption.

At the same time, the ensuing fall in the interest rate has its effects unchanged. Under the new, lower interest rate at which the credit is supplied, the entrepreneurs are enticed into new, more roundabout processes and that leads to a more capital-intensive structure of production as we described in section 2.2.2.

In Garrison's rendition, the production possibility frontier is defined as sustainable combinations of consumption and investment and thus he describes the ongoing stretch brought about by monetary expansion as a move beyond

the line. In monetary terms, there is more consumed and more invested at the same time. In the structure of production diagram in Figure 5, the process is portrayed as a break in the Hayekian triangle. A general discoordination that is not backed by the preferences of the economic actors has been brought to the economy and cluster of entrepreneurial errors is going ahead. The state is unsustainable and we shall see how and why it has to be reversed in the section below.

2.3 The reversal and the bust

The mechanics of the reversal are a very important point in the exposition of the ABCT. Nevertheless, it should be noted that the exact point in time and place in the structure of production that triggers the process in which the entrepreneurs throughout the structure start to realise that the abundance of real resources was a delusion cannot be exactly determined theoretically as it is specific for the particular cycle. We shall thus recount those processes that are common for the business cycles we are describing.

Huerta de Soto (1998/2009, pp. 363–384) describes several effects that eventually lead to the reversal of the boom processes and through which the bust ensues.

Firstly, unlike in the case of voluntary saving and the following sustainable expansion of the structure of production, in our case of changes caused through credit expansion, the factors of production are not freed from their use in the late stages of production. As there is a higher total monetary demand for the factors, their prices are gradually bidded up as the entrepreneurs compete for them in various stages of the production process. The rise in the prices is gradual and protracted as the credit expansion continues. As it is not exactly foreseen at the beginning, it raises the costs of the newly started projects above those originally expected.

In the second place, due to growth in nominal income of the economic actors, whose time preference has not changed in any manner, due to partial withdrawal of the factors of production from the late stages producing consumer goods and also due to imaginary profits experienced by the entrepreneurs throughout the structure of production, the relative prices of consumer

goods must sooner or later rise in relation to capital goods further from consumption. As there has been no fall in consumption, the relative rise in prices of consumption goods is more than proportional to the rise of prices of factors of production. This is important as it feeds optimism to the entrepreneurs whose costs are already rising (Mises, 1949/1996).

As the relative increase in price of consumer goods occurs, it manifests itself in relatively greater profits in the later stages of production. Since the funds from the credit expansion mainly enter the structure in the earliest stages of the production process, the bidding for resources causes the prices of factors to rise there the most and thus the profits gradually diminish there in relation to profits in the later stages. This effect starts to prompt entrepreneurs in the early stages to rethink their long-term projects they entered into.

Sooner or later the rate of credit expansion slows down. This naturally leads to rise of the interest rate back towards its natural level. The interest rate additionally increases even above its natural level due to the autonomous demand for subsequent capital goods, which was first described by Hayek (1937). This phenomenon in short means that after some resources had been committed to specific long-term capital goods, which may have no other use than in a particular production process, the entrepreneurs may be willing to disregard some expense, e.g. from depreciation, to complete their plans and invest in the complementary capital goods closer to consumption that are needed. Thus, they may be willing to take new credit at higher rates to see the long-term projects to their completion.

Later in the process the entrepreneurs in the earliest stages even start to encounter operational losses, which is a clear signal that the investment projects they try to maintain were unwisely invested resources and that these must be liquidated. This will involve transfer of productive resources along the structure of production towards the consumption end.

The result after the bust has ensued is that some of the capital that was invested into the lengthening of the capital structure is found to have been irreversibly squandered as far as the capital goods are not completely convertible and also the plans to which they belong now have their value diminished under their original expected value. The reversal involves some of the investments be-

ing abandoned and left unused as the complementary capital goods and working capital is not present. It may be that due to the overconsumption stemming from the imaginary profits enjoyed by the economic actors in the times of boom, even some of the previously existing capital may have been ‘consumed’, i.e. not enough was invested in it as the resources were malinvested elsewhere in the structure to be of no value later and thus in reality consumed.

Another important aspect of the bust phase of the cycle is that the revelation of the mass error on the side of the entrepreneurs leads to a general decline in entrepreneurial confidence. The entrepreneurs seeing their past mistakes are more cautious and less risk-taking as they are unsure of their ability to foresee future market events and they may distrust the monetary calculation that was misguided in the times of boom and led them to squandering of their resources.

These are the usual aspects of the general economic crisis that is the result of the bust of the previous monetary expansion round.

2.4 Criticisms

The ABCT has been critically assessed on several grounds. We shall deal with this criticism and present the responses to it in the current section.

2.4.1 Forced saving

The first and probably the oldest criticism of the ABCT that we should shortly mention is the problem of the so-called forced saving. The roots of this controversy extend back to the 19th-century England’s theoretical dispute between Currency School and Banking School and the topic was dealt with by Bentham, Thornton and John Stuart Mill. Later it was exposed by Walras (Hayek, 1932).

The phenomenon of forced saving can shortly be described as the fact that when the prices of consumer goods rise, the consumers are forced to decrease their consumption and thus they allow greater capital accumulation than otherwise. With regard to the criticism of ABCT, the mechanism of forced saving was claimed to decrease the natural rate of interest (or time preference) so that it reaches the market rate, which was diminished by the credit expansion, and thus the reversal of the boom can be avoided (Hayek, 1933/2008a, p. 119). An-

other reason for this to happen during the expansion should be that the new money probably first reaches the wealthier consumers who may have higher propensity to save, whereas it reaches those poorer later and therefore those are more affected by the rise in consumer prices and are forced to save (Mises, 1949/1996, p. 548).

The notion that the so-called forced saving may substitute increase in voluntary saving is fallacious for the simple fact that it would mean that all of the additional credit created in the credit expansion which reaches the hands of the economic agents would have to be saved in order to be it that the time preference catches up on the decline of the market interest rate. This is hard to imagine, especially as the effects of illusory wealth that accompany the boom come into play and entice the economic actors into more consumption (Mises, 1949/1996, pp. 549–550). Therefore, the ‘forced saving’ may only partially compensate for the lack of real saving that is needed to support the lengthening of the structure of production started by the credit expansion.

2.4.2 Unused capacities

It might be argued that in the case where some of the resources available in the economy are idle before the start of the credit expansion, the expansion is beneficial for the economy as it allows these resources to be employed.

The problem of idle resources was discussed number of times by the Austrian scholars. Mises (1949/1996, pp. 578–580) argued that it is absolutely possible that there are some unused resources even in an unhampered economy (as he called an economy without monetary or other intervention) and that it in no way changes the conclusions of the ABCT. It is the result of the errors that were naturally committed in the past, according to Mises. The reason why the resources are unused is that their owners have not yet adjusted their price to that which would allow the resources to be used in the current market conditions. We might say that the idleness of the resources is frictional. The process of market coordination would sooner or later lead to their reallocation and most advantageous use. There may of course exist capital resources that cannot be economically viable under current conditions at all but that only means that

there are other more urgent needs for the complementary capital goods and working capital than in those projects.

The ABCT deals precisely with misallocation of resources that ensues following the influx of new credit and the lengthening of the structure of production under the illusion that there are more real resources saved for the new entrepreneurial plans to be exercised. It is not of any special importance if these resources are enticed from other uses due to the expansion or if these are resources previously idle in the economy, which were on their way to be reallocated to their market-compatible uses. The difference may be that the prices of these factors of production are not bid up so high in relation to the case we described in section 2.2.3 (Huerta de Soto, 1998/2009, p. 442), but this is simply due to the fact that the prices for which they were offered when idle were possibly too high and would have to diminish if they should be utilised in the natural market conditions. Thus this is a case of the importance of relativity rather than absolute level of the prices, as the prices may not be bid up but are anyway kept unnaturally high instead.

Therefore we can see that the argument of unused resources does not cause a significant problem for the ABCT as we exposed it.

2.4.3 Consumer credit

The ABCT is usually expounded as a theory where the monetary expansion affects the economy due to the new money entering it in the form of credit offered to the entrepreneurs in their role as producers. Thus it has come under criticism as in the modern economies a considerable part of the credit is actually supplied to consumers in the form of various types of consumer credit and thus the effects we described would not necessarily appear.

Firstly, we should note that the largest part of the consumer credit is represented by real estate loans and mortgages.⁸ Buying a home is definitely to be considered either as an investment or as a purchase of very durable consumer good, which will similarly as durable capital goods serve and bring its fruits

⁸ For example, according to the Federal Reserve, in December 2013 all types of outstanding residential real estate loans made up 64% of outstanding loans extended to consumers. The outstanding consumer lending itself stood for roughly 50% of all commercial and consumer lending. (Federal Reserve Board, 2014)

for several years. This may be accounted for similarly in the manner of depreciation. Unlike durable capital goods, the home does not bring future profits, but similarly to durable capital goods, it (mostly) serves consumption in the future. We may assume that even other loans extended to consumers would predominantly satisfy a demand for more or less durable consumer goods. In this manner, not much changes in our account of the business cycle as this will lead to a similar shift in the structure of production and malinvestment towards long-term capital and consumer goods, which is not supported by the economic actors time preference but instead only by artificially low interest rates and the artificial credit. As we have expounded in section 1.4.1, real savings are always needed to finance sustainable investment into new capital goods and we can add that the same holds for the durable consumer goods.

Assuming that some of the credit is used for direct and immediate consumption, we would see this credit to only strengthen the forces that were described in section 2.2.3 and that lead to the break of the Hayekian triangle. Only in the case that all the credit created in the course of monetary expansion was utilised for the current consumption, the ABCT would not be applicable in the exposed form. Instead, we would expect the reverse of the described expansion or a process similar to that described as the reversal and economic bust explained in section 2.3 should take place (Huerta de Soto, 1998/2009, p. 407).

2.4.4 Expectations

However the above-mentioned criticisms may have crossed the modest volume of debate about the ABCT, the most often articulated criticism of it comes in the field of expectations. The issue of expectations slowly came to the fore of mainstream macroeconomic debate in the 1960s and has changed the science ever after. In simplicity the assumption of rational expectations means that the economic agents are not systematically wrong in their predictions. The ABCT seems to come out untouched by this decade-long development and allegedly ignore the advances brought forward by the 'rational expectations revolution'. We shall show below that this is not exactly the case.

The basic question posed by the criticism focused on the presumed ignorance of rational expectations by the ABCT comes as to why would the economic

actors, if they possibly knew the theory of the business cycle we exposed above, act in the case of monetary manipulations of the credit market as if the manipulations were real changes in the time preferences of others.

Caplan succinctly articulated this reservation in his unpublished article as follows (Caplan, n.d., emphasis in original):

‘Supposedly, since the central bank’s inflation cannot continue indefinitely, it is eventually necessary to let interest rates rise back to the natural rate, which then reveals the underlying unprofitability of the artificially stimulated investments. The objection is simple: Given that interest rates are artificially and unsustainably low, why would any businessman make his profitability calculations based on the assumption that the low interest rates will prevail indefinitely? No, what would happen is that entrepreneurs would realize that interest rates are only temporarily low, and *take this into account*.’

Other authors have expressed a similar point. Tullock (1988) stated that one would understand if entrepreneurs were misled once or twice but not repeatedly. He especially put this into the perspective of the Austrians allegedly arguing that entrepreneurs ‘are well informed and make correct judgments’. Essentially the very same objection is presented by Wagner (1999, pp. 70–72). Cowen (1997, pp. 76–102) provides an extensive critique of the ABCT on the ground of expectations as well.

The replies from the Austrian theorists in the expectations debate usually follow two paths of argumentation. One of them proceeds in the way that even if the entrepreneurs know about the true nature of the changes in the economy, i.e. their artificiality, and have more or less correct expectations, they will behave as the theory predicts anyway as they still expect it to be profitable for them. The second argument is essentially a reiteration of the discussion of knowledge and information problems that the proponents of the Austrian school led in the context of the debate on the impossibility of socialism. It emphasises that there are necessary limits to what can be known and expected. We look further into these arguments in the following subsections.

2.4.4.1 Unimportance of expectations of future bust

As we have said, the first channel of argument comes in the way that the entrepreneurs enter the train of the credit expansion albeit they know it is unsustainable. The explanation is in short presented by Huerta de Soto (1998/2009, p. 422, emphasis in original):

‘[T]hey have no reason to refrain from requesting the loan and using it to expand their investment projects, *if they believe they will be able to withdraw from them before the onset of the inevitable crisis*. In other words the possibility of earning considerable entrepreneurial profit exists for those entrepreneurs who, though aware the entire process is based on an artificial boom, are shrewd enough to withdraw from it in time and to liquidate their projects and companies before the crisis hits.’

This argument was brought to a more rigorous footing by Carilli and Dempster (2001) who developed it with the use of game theory as a problem of prisoner’s dilemma. The authors first explain the issue on the side of the banks in a fractional-reserve banking system with common currency, which has been the usual institutional setting for past hundred or more years. Secondly, the decision problem is present also on the borrower’s side of the market.

In general, any individual bank has incentives to lend its excess reserves if it expects greater marginal benefit than marginal cost from the action, where the most important in the terms of costs is the additional liquidity risk which the bank undergoes by the extension of the additional lending. There would essentially not be much of a problem in the case where each bank issued its own currency and thus borne full responsibility of increasing its money supply, i.e. assumed the whole liquidity risk. The problem of the prisoner’s dilemma comes in the world of monopolised currency where the banks share a common monetary supply pool. The banks in this case always bear a part of the liquidity risk that the other banks create. Thus if the banks have an opportunity to lend excess reserves, the profit-maximising behaviour of each individual bank is not to be conservative as in that way it can increase its profits and at the same time pass some of the risks on others. If it did not expand its lending, it might face

increased risks as the others do expand, but its returns unchanged, which is worse expected outcome. Thus we can see how profit-maximising banks will try to utilise any additional liquidity (extended by the central bank) to expand their lending (possibly at decreased interest rate to entice the borrowers).

On the entrepreneurial side of the market, during the credit expansion, the entrepreneurs face choices to use or not to use the additional credit for newly profitable projects, only some of which might later show unprofitable due to the unsustainability of the expansion. Even if every entrepreneur knows that the credit expansion is under way, it is in his best interest to take additional borrowing and make his investments as it may not be his particular investments that will go under when the bust comes and thus he bears only part of the risk that is inflicted by his action. Choosing to abstain from taking advantage of the new credit would mean to see the profits being diminished in relation to others taking part in it.

In this way, we can see that for the boom to start, it is not necessary that the entrepreneurs are somehow fooled or even repeatedly fooled. Even reasonably rational actors that are profit-maximising in the relevant institutional context will behave in a way that sets off the cycle as described in the sections above.

Nevertheless, besides this explanation of the issue, there are still other problems regarding knowledge and information that the entrepreneurs face in the real world, which we shall deal with in the next section.

2.4.4.2 The knowledge problem

In the section 1.2, we described the Austrian concept of the market process, the underlying role of prices as benchmark information signals in this process and the way in which new particular knowledge is continuously incorporated into them. It was one of the core features on the side of the Austrians in the economic calculation debate of the first half of the 20th century, which dealt with the issue that without the market process itself, it is impossible to calculate the market prices that would be present if the market process was in place.

The question for those who are sure that the entrepreneurs cannot be fooled by credit expansion is the following: How does a general theory explaining that when the market rate of interest is artificially decreased below the underlying

rate corresponding to the time preferences of economic actors, a misallocation of resources takes place which has to be sooner or later reverted, help the entrepreneurs to determine what should the interest rate be if there was no interference with it? The Austrian exposition of the market process and its workings indicates that there is no way in which the entrepreneurs would be able to derive an unskewed market price if the process, i.e. the tool through which the 'true price' is generated, is itself being distorted. As Garrison put it: '[K]nowing that a signal is being jammed is not the same thing as knowing what the unjammed signal is' (Garrison, 1986, p. 446).

In this debate about the possibility of extracting somehow what are the actual impacts of monetary policy and banks' behaviour on the interest rate, it should also be noted that although we modelled it as such for the purpose of easier theoretical exposition, the monetary intervention is not a one-off act but rather an institutionalised long-term act of central planning and setting the interest rate. Thus it is questionable how could, for example, entrepreneurs of the mid 2000s possibly find any true market rate of interest at all from which to start with their inductions of to what extent the rate had been changed by the credit policies.

The last point here is about the structure of relative prices in general. As the interest rate is manipulated, even if at least some of the entrepreneurs react to it as if it was reflecting underlying time preference, by their behaviour they change the structure of relative prices in the real economy. The market process facilitates the movement of this information in a condensed form through the structure. This condensed form, however, again does not enable one to distinguish the various factors impacting a particular value of a particular price. Thus, even entrepreneurs who are not directly exposed to the credit market now use distorted information and act guided by it.

3 Empirical illustration

After expounding the theory itself, we shall now turn to an empirical illustration of it. There have already been several attempts to treat the ABCT empirically and we shall thus first take a look at this literature in a short overview.

3.1 Empirical literature overview

One body of literature is such that it first interprets the ABCT in terms of impacts on broad economic aggregates and then applies statistical testing on the stated hypotheses. Wainhouse (1984) is one of the first attempts to handle the ABCT statistically. He summarises the ABCT into six key propositions about macroeconomic aggregates, which he tests statistically on United States (US) monthly data spanning from 1959 to 1981. As the pioneering work in the current wave of statistical analyses of the ABCT we can label Keeler (2001). The author studies quarterly macroeconomic data for eight business cycles from 1950 to 1991 in the United States of America (USA) as defined by National Bureau of Economic Research (NBER). Carilli and Dempster (2008) build on and extend the Keeler's study on longer and newer series from 1959 to 2007. Similarly, Bismans and Mougeot (2009) build a fixed effects model to test hypotheses on quarterly macroeconomic aggregates for Germany, the USA, England and France from 1980 to 2006. Their approach is reused in Anker (2011) for Scandinavian countries Denmark, Norway and Sweden for the period 1980–2010. Mulligan (2002) aims to find long-term relationships among sectoral employment and various interest rates in US monthly time series spanning from 1959 to 2000 using cointegration analysis. In his later work (Mulligan, 2005), the author employs a vector error correction model (VECM) on four macroeconomic indices constructed from US monthly data, this time from 1959 to 2003 and he uses the VECM methodology to test the ABCT again in Mulligan (2006). Sechrest (2004) studies how correlations between various macrovariables in the US monthly data for 1959–2002 support the ABCT. Cachanosky (2014) studies how expansionary monetary policy in a large and influential economy like the US can affect capital structure in small open economies on the data for years 2002–2007 in Colombia and Panama.

The second type of literature is more narrative in its nature and does not emphasise statistical testing in the manner the above-mentioned literature does. Butos (1993) studies the expansion of 1980s with the consequent recession of 1990–1991 in the USA. He points out the pattern in bank reserves growth, which shows that from 1983 to 1987 Federal Reserve System (Fed) maintained expansionary monetary policy. Apart from graphical analysis of chosen variables, the

author points to several other historical factors of the cycle which are necessary to explain its particular characteristics. In this case, it is e.g. enacted acceleration of depreciation schedules which helped diverting the expansion into real estate markets. Hughes (1997) is another look at the crisis of 1990–1991 and the preceding recession. The author also identifies higher average money supply growth for years 1981–1987 than for 1987–1991. Then he identifies different patterns of volume of long-term bank loans for higher-order and lower-order industries (higher in the first period and lower in the second period for the former and vice versa for the latter). Powell (2002) makes a narrative account of the recession and successive ‘lost decade’ in Japan in 1990s. He describes how the moves to alleviate the crisis implemented by Japanese government and Bank of Japan were in line with either Keynesian or monetarist recommendations, yet the economy did not recover as expected. He points out how e.g. the fiscal stimuli and government lending programmes kept alive the structure of production (with emphasis mainly on construction industry) that did not satisfy the wants of consumers. The author’s analysis from the Austrian point of view, on the other hand, focuses on the boom of late 1980s caused by expansionary monetary policy. Callahan and Garrison (2003) as well prefer historical explanation rather than formal modelling to employ the ABCT. Their work is a very comprehensive study of economic history of the so-called dot-com boom–bust cycle. They analyse monetary policy and various political decisions and their impacts leading to the bubble and its burst in 2001. The authors also touch the theories of asset price bubbles based on psychological grounds and accept their complementarity to a sound economic theory. Bocutoğlu and Ekinçi (2010) show some basic correlations illustrating the ABCT on the case of USA and Fed within their mainly narrative study. Lastly, Montgomery (2006) does not deal with the ABCT directly but instead focuses on one of its key building blocks – heterogeneity of capital goods and complementarity relationships between them.

3.2 General considerations

Most of the above-mentioned studies, especially from the first group, use more or less aggregated macroeconomic data to illustrate or even test the ABCT. From the point of economic methodology that is emphasised by the Austrians, this

may be problematic as the microeconomic aspect of the explanation of the market processes is lost in this manner. The ABCT among other aims to point out the complexity and heterogeneity in the real economy. We also explained in the part 1 that the subjectivity of the individual valuations does not allow their simple aggregation.

Another problem in empirical illustration is the relativity of the effects and magnitudes described by the ABCT. The changes that take place during the various phases are relative to what would happen without the monetary expansion that sets the cycle off. At all times there are innumerable other effects asserting their influence on the aggregate quantities studied, which may act in the same or opposite direction as the ones presumed in the ABCT. If these other effects are not captured, they may completely fog the effects of the theory being illustrated. Capturing them, on the other hand, can prove to be impossible and even if possible would make the explanatory model overly complex. An economist thus finds oneself in a similar position as the entrepreneur in the course of the boom. While the entrepreneur cannot recognise the signal even if he knows it is scrambled, for the economist it is hard to find the way it is scrambled due to the noise of other market events.

Nevertheless, the problem of finding good proxies is a general one in the field of economics. We shall try to illustrate the effects predicted by the theory in the following section.

3.3 The United States business cycle of 2009–?

In this part we shall examine the period starting at the beginning of the latest United States (US) recession, i.e. December 2007, and lasting until the present from the point of view of the ABCT. We build our analysis on the findings in some of the empirical literature mentioned above.

We first describe the general economic development of this recent period in the United States of America. After that we expose the unprecedented monetary policy and expansion in these latest years. Finally, we step through various propositions about the effect of this policy on the US economy that would be predicted by the ABCT. We study if these effects are present on the partially disaggregated data available for the US economy.

The period start is chosen as the beginning of the latest US recession as it is registered by NBER since this is also the start of a monetary expansion anew as we shall see below.

3.3.1 General economic development in the period

The onset of the 2007–2009 crisis in the real economy was preceded by turmoil in the financial markets starting with Bear Stearns liquidity crisis and its acquisition by JP Morgan Chase. The turbulences in the financial markets got intense in the second half of 2008 with Lehman Brothers filing for bankruptcy on 15th September and the US government-sponsored enterprises Fannie Mae and Freddie Mac being placed into conservatorship. Similarly, the insurance company AIG suffered from severe liquidity problems and was bailed out by the Federal Reserve and the Treasury. The economy went into serious recession with the year-on-year change in GDP going as low as -6.12% in the first quarter of 2009.

The economic stimulating policies that followed the economic contraction from both the monetary and the fiscal sides, together with the consequent improvement of financial conditions and recovery in foreign economies were indicated as important factors in the reverse of the economy back to GDP growth in the final months of 2009 by the Board of Governors of the Fed.

The GDP further rebounded in 2010 when additional monetary policy stimulus was put into place. The economy continued to record only moderate GDP growth through the period 2011–2014. There were at least two slowdowns of the rate of growth throughout the period, one in the first half of 2011 and later again in the end of 2012. Another one seems to be on the way in the first half of 2014.

The overall shape of the US economy in terms of GDP is shown in Figure 6. The period of the recession of the economy as defined by NBER is depicted in this and subsequent figures by the area shaded in red.

The unemployment in the period largely tracked the decline in GDP. In the second half of 2008, it sharply rose to its highest level since the beginning of 1990s. The labour market continued to contract even more quickly in 2009, although in the second half of the year it was slowly reaching its bottom. The unemployment rate touched 10% at its highest.



Figure 6: Real gross domestic product growth in the USA (Federal Reserve of St. Louis, 2014).

Only very slow improvement in overall employment was seen throughout the 2010. The Board of Governors of the Fed commented that ‘[o]ver most of the period, the pace of hiring was insufficient to substantially reduce the unemployment rate.’ Signs of bettering came at the end of the year.

The unemployment humbly decreased in 2011 reaching 8.2% at the end of the year. Throughout the remaining years of 2012–2014 the unemployment rate was decreasing in steady pace, while it still remains above the pre-crisis levels.

The unemployment rate over the period of 2007–2014 as reported by Bureau of Labor Statistics is depicted in Figure 7.

The inflation has been measured by the Federal Reserve in terms of chain-type price index for personal consumption expenditures (PCE) since 2000. This index is somewhat different from the usual consumer price index (CPI) mainly in that it has changing weights and thus takes into account substitution on the part of consumers.

Although the PCE inflation spiked reaching 4% at the onset of the economic crisis, at the end of 2008 it went down to almost zero. The Board of Governors of the Fed noted in its annual report for the year 2008:

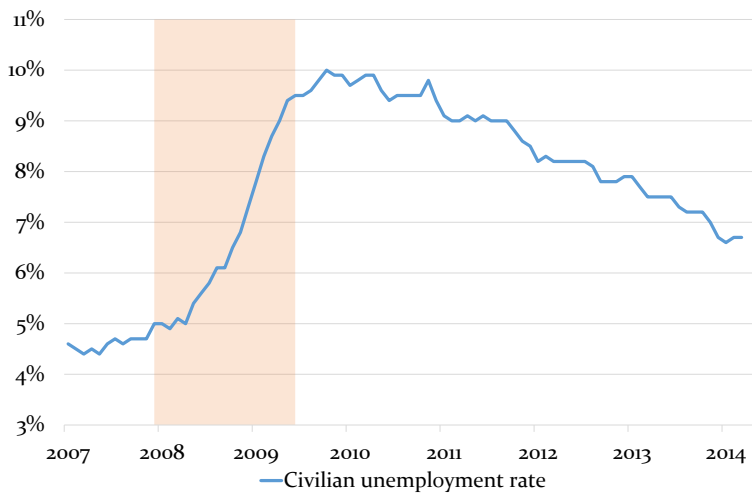


Figure 7: Civilian unemployment rate in the USA (Federal Reserve of St. Louis, 2014).

‘The downturn in sales and production, along with steep declines in the prices of energy and other commodities and a strengthening in the exchange value of the dollar, has contributed to a substantial lessening of inflation pressures in the past several months.’

There was a period of mild deflation as defined by PCE price index throughout 2009, which rebounded at the end of the year to 2.04%. This was explained by the rise in energy prices by the Board of Governors. Meanwhile the core PCE inflation, which excludes food and energy items, remained subdued, i.e. below 2%.

The PCE inflation stayed mostly below 2% over the years 2010 to 2014. It exceeded this value in 2011 and early 2012. However, the Fed’s monetary policy is mainly based on the core inflation as measured by core PCE price index, which only touched 2% from below in the period.

The overall situation of the changes in the PCE price index in the years 2007–2014 is put forward in Figure 8. We also show the changes in core PCE price index and for comparison add the changes in standard CPI.

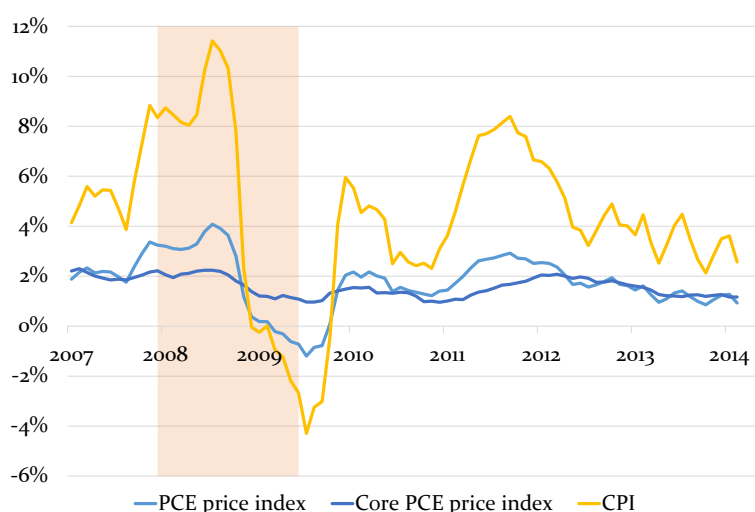


Figure 8: Changes in PCE price index, core PCE price index and CPI over the previous year in the USA (Federal Reserve of St. Louis, 2014).

3.3.2 Monetary policy measures

The Federal Reserve responded with severe cuts of the federal funds rate in response to the emerging economic woes. From the value of 5.25% in the middle of 2007, the Federal Open Market Committee (FOMC) lowered the rate by 3.25 pp to 2%. As the turmoil in financial markets intensified and the economic issues showed to engulf the real economy, the FOMC further decreased the rate to effectively zero. The unprecedentedly low federal funds rate remained fluctuating in a narrow band around 0.15% to this day.

The schedule of effective federal funds rate over the observed period is portrayed in Figure 9.

As soon as in August 2007, the Federal Reserve started to implement extraordinary monetary policy measures in order to deal with the problems in short-term markets. These included lowering collateral quality requirements and large open market operations. In the final months of the year the Fed introduced a Term Auction Facility in order to supply short-term credit and brought up currency swap arrangements with other central banks to increase USD liquidity in foreign markets.

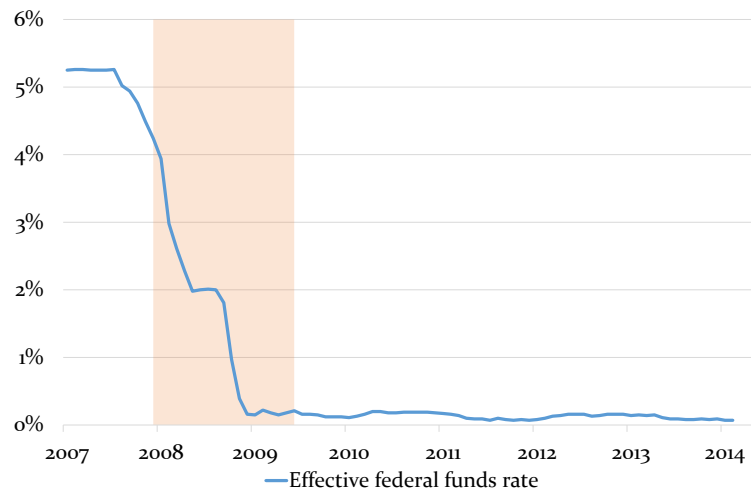


Figure 9: Effective federal funds rate in the USA (Federal Reserve of St. Louis, 2014).

In March 2008 further facilities were introduced, such as Term Securities Lending Facility, which provided primary dealers with Treasury securities for a term of 28 days up to \$200 billion, or Primary Dealer Credit Facility. The range of collaterals accepted in open market operations were gradually broadened. The problems with money market mutual funds' liquidity were warded off by a special facility in September 2008. In October, the Fed started outright purchases of asset-backed short-term commercial papers.

The Fed also intervened in the Bear Stearns acquisition by JP Morgan Chase with a loan up to \$30 billion, provided provisional lending to Fannie Mae and Freddie Mac, extended a loan up to \$85 billion to AIG. The Federal Deposit Insurance Corporation (FDIC) also extended its guarantees on various losses of FDIC-insured institutions.

The extraordinary liquidity programmes and direct purchases of mortgage-backed securities were essentially extended in 2009. The facilities were being phased off in the first half of 2010 but judging that the pace of economic recovery is weak the Fed announced that it would reinvest the principal of the debt it was already holding in longer-term Treasury securities. In November a new plan to buy additional \$600 billion of long-term Treasuries was announced and became known as the second round of the so-called quantitative easing (QE).

In September 2012 another round of QE was declared and comprised of purchasing \$40 billion of agency mortgage-backed securities per month. It meant that the Fed was planning to increase its holding of long-term securities at a total pace of \$85 billion per month.

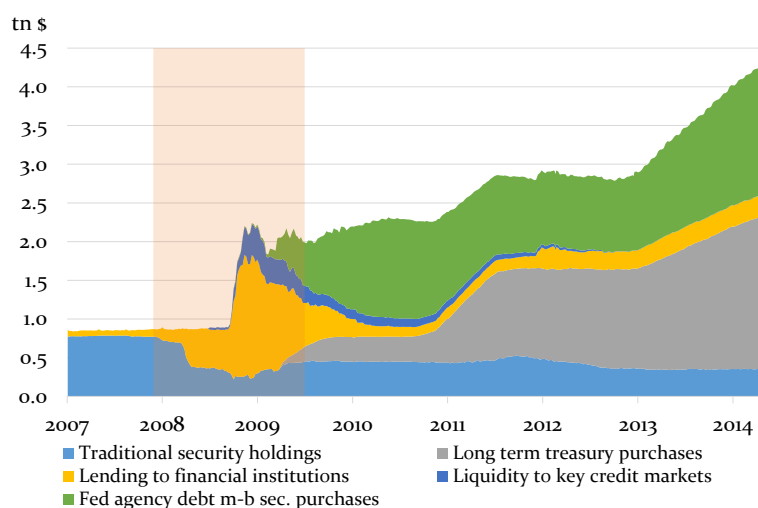


Figure 10: Federal Reserve balance sheet assets (Federal Reserve Bank of Cleveland, 2014).

The Fed continued the extraordinarily expansionary policy throughout the year 2013. In December 2013 the FOMC announced attenuation of the buying programmes by decreasing the outright purchases of mortgage-backed securities to \$35 billion and long-term Treasuries to \$40 billion. This was further decreased to \$30 billion and \$35 billion respectively as of February 2014, \$25 billion and \$30 billion respectively as of April 2014 and the current plan as of May 2014 is to continue expanding the balance sheet at a pace of \$20 billion and \$25 billion for the respective type of securities.

The bigger picture of the expansion of the Fed's balance sheet with assets assigned to groups defined by the Federal Reserve Bank of Cleveland is depicted in Figure 10.

While the monetary base more than quadrupled over the course of seven years, the growth in M2 money stock was \$49 billion a month from December 2007 to April 2014 compared to only \$30 billion a month over the period of the

preceding business cycle (from the beginning of the recession to another). The M2 money stock thus grew 51% over the seven years.

The development of the M2 money stock throughout the observed period is presented in Figure 11.

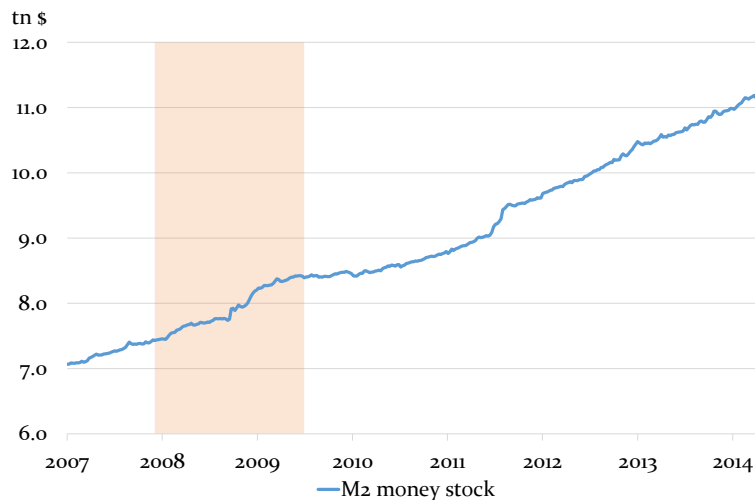


Figure 11: M2 money stock of the USA (Federal Reserve of St. Louis, 2014).

We can conclude this section with stating that in the past seven years, an unprecedented monetary expansion has been taking place. The federal fund rate hit the so-called zero lower bound and extraordinary measures pumping new money onto the markets were implemented. This is a crucial prerequisite for setting in of the boom phase of the business cycle as described by the ABCT.

3.3.3 Market and natural interest rate discrepancy

As we have described in the theoretical part of this thesis, monetary expansion is recognisable by money coming into existence on the one hand and on the other by the interest rate on the market being pushed below the natural rate, i.e. the rate that would prevail in a market without the expansion.

Nevertheless, as we have also noted, the differences in absolute magnitudes of the interest rates can be explained by various factors and an entrepreneur or an economist is not able to extract the true natural rate from the market if it was skewed in one or other direction.

We therefore take the approach of Keeler (2001), who notes that due to the usual characteristics of monetary policy and the mechanisms it uses, the short-term interest rates are usually depressed further down than long-term interest rates. He finds a pattern of this effect throughout eight economic cycles in the years 1950 and 1991 in the USA, which shows that in the beginning of the cycle, the slope of the yield curve (i.e. the ratio of long-term and short-term rates) is usually elevated and later in the expansion the yield curve flattens.

In our analysis we study the slope of the yield curve in the observed period of 2007–2014. For the long-term interest rate we use the 10-year Treasury constant maturity rate and for the short-term interest rate we use the 3-month Treasury constant maturity rate. We calculate the slope of the yield curve based on the Keeler’s formula, which is the following:

$$s = \ln \frac{1 + i_{LT}}{1 + i_{ST}},$$

where s represents the slope and i_{LT} and i_{ST} represent the long-term and short-term rates respectively. The form of the resulting yield curve slope is depicted in Figure 12.

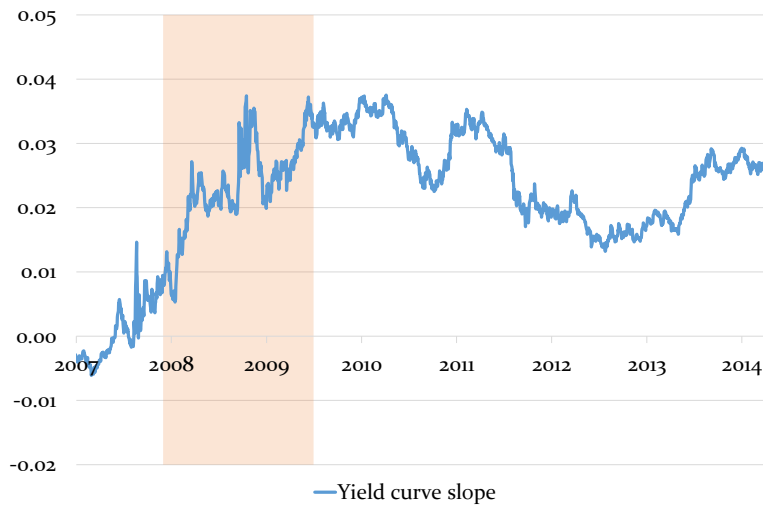


Figure 12: Slope of the government yield curve in the USA. Based on Federal Reserve of St. Louis (2014).

In the graph, we can compare the slope of the yield curve in the height of the previous boom cycle in 2007 and how the slope soared in the wake of the bust when new expansionary monetary measures were established. It has since then been markedly high and the levels are comparable with the levels in the first three years of the previous cycle of 2001–2007.

We suggest from the pattern observed that the effect of the monetary expansion of the past years is noticeable in the structure of interest rates and indicates that the market interest rates are manipulated under their natural levels.

3.3.4 Industrial activity across the structure of production

The second pattern that we attempt to illustrate is the pattern in industrial activity according to the position in the structure of production, or according to the time-intensity of the production or the so-called Böhm-Bawerkian roundaboutness.

As there is no data available that would somehow treat the activity in the economy according to a reliable measure of distance from the final product or the production time intensity, we have to select some proxies for the effects we want to study. From the obtainable data for the US economy we choose three sectors with the differentiation along durability available. The selected sectors are materials, manufacturing and consumer goods. The groups are then further divided to durable and non-durable materials, durable and non-durable manufacturing and durable and non-durable consumer goods.

The durable materials sector includes mainly consumer parts materials and equipment parts materials and the non-durable is consisting of textile, paper and chemical materials groups. The main groups according to weight in durable manufacturing are computer and electronic products manufacturing, machinery manufacturing, fabricated metal products manufacturing, aerospace and miscellaneous transportation equipment manufacturing and motor vehicles and parts manufacturing. The non-durable manufacturing on the other hand are mainly food, beverage and tobacco products and chemicals manufacturing. The durable consumer goods include automotive products or home electronics. The non-durable consumer goods are foods and tobacco, chemical products and energy.

The sectors are selected in such a way that they should mimic the distance from the final consumption. On the axis going from materials through manufacturing to consumer goods we would expect the activity to be affected, i.e. boosted, by monetary expansion most in the materials sector, less in the manufacturing and the least in the consumer goods. We would expect that along the durability axis, the durable groups would be growing faster than the non-durable groups due to the expansion and the corresponding effect of interest rates below their natural levels.

The resulting pattern in the industrial activity of the groups defined above is presented in Figure 13. The data are monthly and they are depicted as an index with base in July 2009, i.e. the first month after the end of the recession as defined by the NBER.

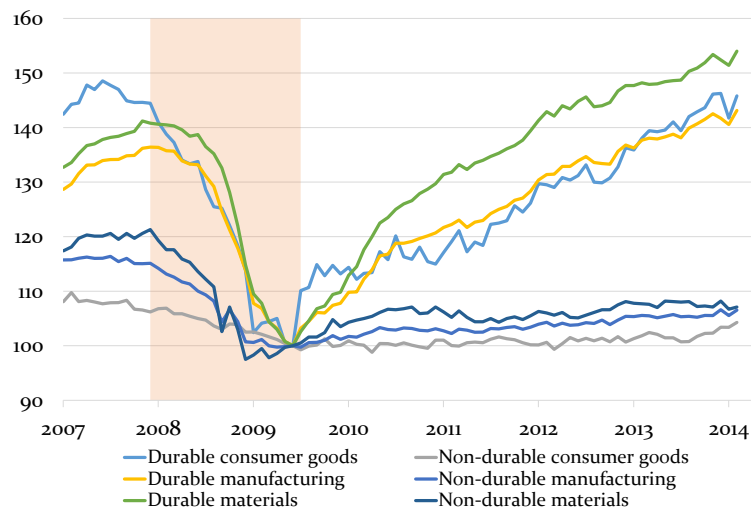


Figure 13: Industrial production indices for the USA with base in June 2009 according to the selected groups. Based on Federal Reserve of St. Louis (2014).

It can be seen in the analysis that the pattern of noticeably higher growth of activity in the durable sectors is clearly present. On the other hand the differences between the three groups are not very significant. The reasons for that may be that the sector divisions available are in reality not exactly plausible as proxies for the roundaboutness of production or time distance from the final consumption.

In this way, the effects that the theory would predict are only partially visible in the data in the form of the visible discrepancy between industrial activities related to durable and non-durable goods.

3.3.5 Prices across the structure of production

There is a third effect of monetary expansion that we should be able to show and that is the relative movement of prices along the structure of production. The theory would predict that the prices in the earlier stages should be bid up faster during the continuing expansion than the prices in the later stages, i.e. those closer to consumption. Also the effect of discounting explained in section 1.4.1 should exercise disproportionate upward pressure on the prices in the structure of production, affecting more the earlier stages.

In this particular analysis, the data available are more favourable to us as we can use the producer price indices (PPIs) which are provided separately for parts of economy closely resembling the stages of production as they are treated in the ABCT. We chose three PPIS, the PPI of crude materials for further processing, the PPI of intermediate materials and the PPI of finished goods. As the names suggest, we would expect these indices to represent the prices in the stages from the earlier (crude materials) to the later (finished goods).

We analyse the pattern in the prices across the production stages in Figure 14. We have also added the PCE price index to compare the growth of producer prices with the growth in consumer prices themselves.

We can observe in the figure that the relative movement of the prices in the structure of production follows the schedule predicted by the ABCT for the period of boom. The compound annual growth rate (CAGR) of the prices of crude materials for further processing, which represents the stages furthest from consumption, was 8.8% and in total the prices increased by 49.1% in those less than five years. The prices of intermediate materials representing the middle stages registered CAGR of 3.6% with total increase of 18.1% over the period. The prices growing the least were those of finished goods (i.e. latest stages) with CAGR of 3.0% and total increase of 14.9%. In comparison, the prices which are observed for the purposes of maintaining the stable prices within the dual mandate of the Fed grew only 1.7% annually (in terms of CAGR) and 8.1% in total.

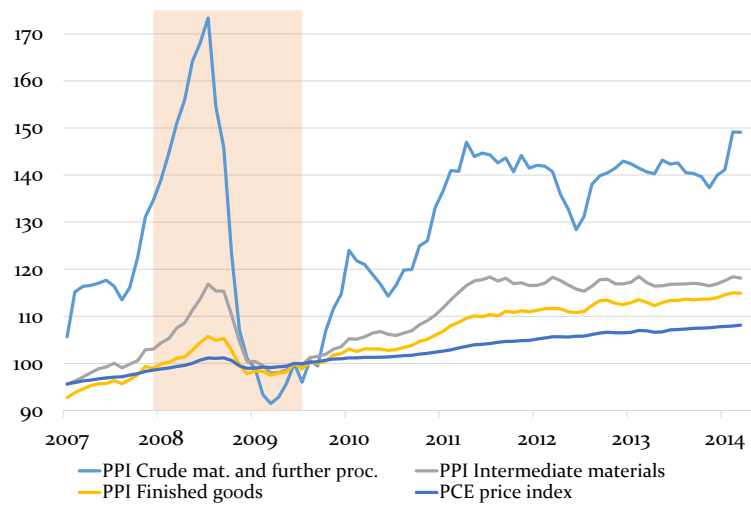


Figure 14: Producer price indices according to the stages of production and PCE price index in the USA. All with base in June 2009. Based on Federal Reserve of St. Louis (2014).

We can conclude that in the analysis of the price structure in the period of monetary expansion of 2009–2014 we find support for the predictions of the ABCT.

3.3.6 Equity markets across the structure of production

The fourth indication of how monetary expansion affects the structure of economy that we would expect is in the prices in equity markets. There should once again be pattern of the prices being elevated for the companies operating in the early stages and relatively less elevated for the companies operating in late stages.

To show if this is the case in the observed period, we chose three US equity market subindices that should serve as proxies for the activity in the various stages in the production structure. The index representing the latest stages of production is the Dow Jones US Consumer Goods, for the earlier stages the selected index is Dow Jones US Industrials and for the earliest stages it is Dow Jones US Basic Materials. For the comparison of the growth in the indices we

chose to put them on the same base that corresponds to their actual trough during the crisis of 2007–2009, which is the beginning of March 2009.

The development of the three stock indices is put forward in Figure 15.

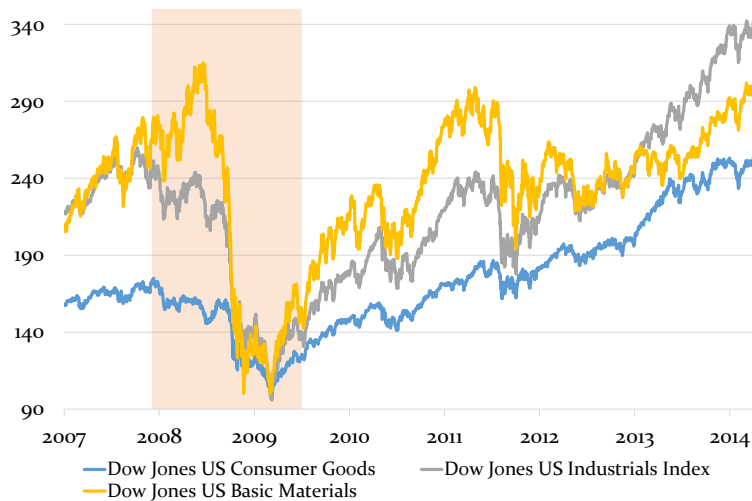


Figure 15: Equity market indices according to the stages of production in the USA with base in March 2009. Based on Bloomberg (2014).

The first fact interesting from the point of business cycle theory is that despite only humble recovery in the real economy of the USA, all the selected subindices are as of the beginning of May 2014 already above their pre-crisis levels.

Secondly, we can see a familiar pattern in the indices until the stock markets fall of August 2011, which happened mainly due to a downgrade of US sovereign debt rating from AAA to AA+ on 6th August. There were significant discrepancies between the indices representing the stages and these differences followed what would be predicted by the ABCT. The markets reached their maximum on 21st July 2011 and at that time the Basic Materials subindex had grown 56% more and the Industrials subindex had grown 27% more than the Consumer Goods subindex since the trough in the beginning of March 2009.

After 2011, the scheme predicted by the ABCT has been partially broken. It can be observed that the Basic Materials subindex is currently placed in the middle in its growth since the March 2009 market bottom. Nonetheless, there is still a marked difference between the Consumer Goods subindex representing

the latest stages and the two indices representing the earlier stages. Again, in terms of total growth since March 2009, as at the beginning of May 2014 the Basic Materials subindex had grown 17% more and the Industrials subindex even 33% more than the Consumer Goods one.

We can conclude that there is a partial support in the stock market indices data in the period 2009–2014 for the predictions of the ABCT.

Conclusions

After the expansionary monetary policies of 2000–2006, the economic crisis of 2007–2009 came as a surprise to most market actors as well as to the economic community. It had not been foreseen and the mainstream macroeconomics had some hard time finding its cause. The immediate reaction in the USA was a new round of expansionary monetary policy, which over the years 2008–2014 attained unprecedented levels. In this thesis, we presented a theory that explicitly links these monetary policies to the causes of economic recessions in the capitalist economy.

In the first part, we focused on explaining the concepts used throughout the Austrian business cycle theory (ABCT). We pointed out some Austrian methodological tenets and explained the understanding of market as a process with its important time dimension and the role of entrepreneurship. We showed the unique Austrian approach to heterogeneity of capital in the explanation of the structure of production of the market economy and what roles the time and interest play there.

The second part focused on the full exposition of the ABCT. We explained how the monetary policy expansion leads to the lengthening of the structure of production and changes in relative prices in the economy and how this is not in line with the underlying preferences and economic realities. We described the ways in which it leads to malinvestment and consumption of capital, which is eventually revealed and results in exposure of the errors that were made in the course of the boom and subsequent reorganisation of the structure of production accompanied by a recession. Still in the realm of the economic theory we dealt with the most frequent criticisms of the theory.

In the third part we illustrated the patterns predicted by the ABCT on the latest round of the monetary expansion in the USA. We showed how the Federal Reserve entered into extraordinarily loose monetary policy measures more than quadrupling its balance sheet after it hit zero with its main policy interest rate. Such a monetary expansion should be breeding ground for the effects described by the ABCT for the phase of the boom. We studied the effects that would be predicted by the theory on the interest rates, industrial activity, relative prices and equity markets in the period of 2008–2014 and found support for the predictions especially in the interest rates and relative prices analysis, while only partial support in the industrial activity and equity markets analysis.

We would say that it should come as no surprise if the humble economic growth that ensued after the latest economic bust in the US economy came to another decline in this decade as the economy seems to be in yet another round of distortion of the structure of production caused by an extraordinarily expansionary monetary policy.

Bibliography

- Anker, R. (2011). *Austrian business cycle theory: Evidence from Scandinavia*. (Unpublished thesis). Aarhus University, DK. Retrieved from <http://pure.au.dk/portal-asb-student/files/39957752/Thesis.pdf>
- Bachmann, R., Caballero, R. J., & Engel, E. M. R. A. (2013). Aggregate implications of lumpy investment: New evidence and a DSGE model. *American Economic Journal: Macroeconomics*, 5(4), 29–67. doi:10.1257/mac.5.4.29
- Bezemer, D. J. (2009, June). “No one saw this coming”: *Understanding financial crisis through accounting models*. MPRA Paper No. 15892. Retrieved from <http://mpa.ub.uni-muenchen.de/15892/>
- Bismans, F. & Mougeot, C. (2009). Austrian business cycle theory: Empirical evidence. *Review of Austrian Economics*, 22, 241–257. doi:10.1007/s11138-009-0084-6
- Bloomberg. (2014). *Bloomberg professional database*. [Database].
- Bocutoğlu, E. & Ekinci, A. (2010, September). *Austrian business cycle theory and global financial crisis: Some lessons for macroeconomic risk and financial stability*. Paper presented at the ICE-TEA 2010: The Global Economy after the Crisis: Challenges and Opportunities. Retrieved from <http://mises.org/journals/scholar/ekinci.pdf>
- Butos, W. N. (1993). The recession and Austrian business cycle theory: An empirical perspective. *Critical Review*, 7(2–3), 277–306. doi:10.1080/08913819308443300
- Cachanosky, N. (2014). The effects of U.S. monetary policy on Colombia and Panama (2002–2007). *Quarterly Review of Economics and Finance*. Advance online publication. doi:10.1016/j.qref.2014.03.003
- Callahan, G. & Garrison, R. W. (2003). Does Austrian business cycle theory help explain the dot-com boom and bust? *Quarterly Journal of Austrian Economics*, 6(2), 67–98. doi:10.1007/s12113-003-1019-x
- Caplan, B. (n.d.). *Why I am not an Austrian economist*. Retrieved from <http://econfaculty.gmu.edu/bcaplan/whyaust.htm>

- Carilli, A. M. & Dempster, G. M. (2001). Expectations in Austrian business cycle theory: An application of the prisoner's dilemma. *Review of Austrian Economics*, 14, 319–330. doi:10.1023/A:1011985113936
- Carilli, A. M. & Dempster, G. M. (2008). Is the Austrian business cycle theory still relevant? *Review of Austrian Economics*, 21, 271–281. doi:10.1007/s11138-008-0044-6
- Colander, D., Howitt, P., Kirman, A., Leijonhufvud, A., & Mehrling, P. (2008). Beyond DSGE models: Toward an empirically based macroeconomics. *American Economic Review*, 98, 236–240.
- Cowen, T. (1997). *Risk and business cycles: New and old Austrian perspectives*. New York, NY: Routledge.
- Federal Reserve Bank of Cleveland. (2014). *Credit easing policy tools*. [Database]. Retrieved from http://www.clevelandfed.org/research/data/credit_easing/index.cfm
- Federal Reserve Board. (2014, April). *Assets and liabilities of commercial banks in the United States (weekly) – H.8*. Retrieved from <http://www.federalreserve.gov/releases/h8/20140404/>
- Federal Reserve of St. Louis. (2014). *Federal reserve economic data*. [Database]. Retrieved from <http://research.stlouisfed.org>
- Foss, N. J. & Klein, P. G. (2012). *Organizing entrepreneurial judgment*. Cambridge, UK: Cambridge University Press.
- Garrison, R. W. (1986). Hayekian trade cycle theory: A reappraisal. *Cato Journal*, 6, 437–459.
- Garrison, R. W. (2001). *Time and money: The macroeconomics of capital structure*. London, GB: Routledge.
- Hayek, F. A. (1932). A note on the development of the doctrine of “forced saving”. *Quarterly Journal of Economics*, 47, 123–133. doi:10.2307/1885188
- Hayek, F. A. (1937). Investment that raises the demand for capital. *Review of Economics and Statistics*, 19, 174–177. doi:10.2307/1926358
- Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review*, 35, 519–530.
- Hayek, F. A. (2008a). Monetary theory and the trade cycle. In J. T. Salerno (Ed.), *Prices and production and other works: F. A. Hayek on money, the business*

- cycle, and the gold standard* (pp. 1–130). Auburn, AL: Ludwig von Mises Institute. (Original work published 1933)
- Hayek, F. A. (2008b). Prices and production. In J. T. Salerno (Ed.), *Prices and production and other works: F. A. Hayek on money, the business cycle, and the gold standard* (pp. 189–330). Auburn, AL: Ludwig von Mises Institute. (Original work published 1935)
- Horwitz, S. (2000). *Microfoundations and macroeconomics: An austrian perspective*. London, GB: Routledge.
- Huerta de Soto, J. (2009). *Money, bank credit, and economic cycles* (2nd ed.) (M. A. Stroup, Trans.). Auburn, AL: Ludwig von Mises Institute. (Original work published 1998)
- Hughes, A. M. (1997). The recession of 1990: An Austrian explanation. *Review of Austrian Economics*, 10, 107–123. doi:10.1007/BF02538145
- Keeler, J. P. (2001). Empirical evidence on the Austrian business cycle theory. *Review of Austrian Economics*, 14, 331–351. doi:10.1023/A:1011937230775
- Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35, 60–85.
- Lachmann, L. M. (1978). *Capital and its structure*. Kansas City, KS: Sheed Andrews and McMeel.
- Menger, C. (2007). *Principles of economics*. Auburn, AL: Ludwig von Mises Institute. (Original work published 1871)
- Mises, L. von. (1953). *The theory of money and credit* (H. E. Batson, Trans.). New Haven, CT: Yale University Press. (Original work published 1912)
- Mises, L. von. (1996). *Human action: The treatise on economics* (4th ed.). San Francisco, CA: Fox & Wilkes. (Original work published 1949)
- Montgomery, M. R. (2006). Austrian persistence? Capital-based business cycle theory and the dynamics of investment spending. *Review of Austrian Economics*, 19, 17–45. doi:10.1007/s11138-006-6092-x
- Mortensen, D. T. & Pissarides, C. A. (1999). New developments in models of search in the labor market. In D. Card & O. Ashenfelter (Eds.), *Handbook of labor economics* (Vol. 3, pp. 2567–2627). Elsevier. doi:10.1016/S1573-4463(99)30025-0

- Mulligan, R. F. (2002). A Hayekian analysis of the term structure of production. *Quarterly Journal of Austrian Economics*, 5(2), 17–33. doi:10.1007/s12113-002-1010-y
- Mulligan, R. F. (2005). The Austrian business cycle: A vector error-correction model with commercial and industrial loans. *Journal of Private Enterprise*, 21(1), 59–91.
- Mulligan, R. F. (2006). An empirical examination of Austrian business cycle theory. *Quarterly Journal of Austrian Economics*, 9(2), 69–93. doi:10.1007/s12113-006-1009-x
- Powell, B. (2002). Explaining Japan's recession. *Quarterly Journal of Austrian Economics*, 5(2), 35–50. doi:10.1007/s12113-002-1011-x
- Romer, D. (2011). *Advanced macroeconomics* (4th ed.). New York, NY: McGraw-Hill.
- Rothbard, M. N. (1996). Economic depressions: Their cause and cure. In R. M. Ebeling (Ed.), *The Austrian theory of the trade cycle and other essays*. Auburn, AL: Ludwig von Mises Institute. (Original work published 1978)
- Rothbard, M. N. (2000). *America's Great Depression* (5th ed.). Auburn, AL: Ludwig von Mises Institute. (Original work published 1963)
- Rothbard, M. N. (2009). *Man, economy, and state*. In *Man, economy, and state and Power and market* (2nd ed.). Auburn, AL: Ludwig von Mises Institute. (Original work published 1962)
- Sechrest, L. J. (2004, March). *Evidence regarding the structure of production*. Sul Ross State University. Retrieved from <https://www.mises.org/journals/scholar/Sechrest8.pdf>
- Shapiro, C. & Stiglitz, J. E. (1984). Equilibrium unemployment as a worker discipline device. *American Economic Review*, 74, 433–444.
- Skousen, M. (1990). *The structure of production*. New York, NY: New York University Press.
- Thomas, J. K. (2002). Is lumpy investment relevant for the business cycle? *Journal of Political Economy*, 110, 508–534. doi:10.1086/339746
- Tullock, G. (1988). Why the Austrians are wrong about depressions. *Review of Austrian Economics*, 2, 73–78. doi:10.1007/BF01539299

- Veracierto, M. L. (2002). Plant-level irreversible investment and equilibrium business cycles. *American Economic Review*, 92, 181–197.
- Wagner, R. E. (1999). Austrian cycle theory: Saving the wheat while discarding the chaff. *Review of Austrian Economics*, 12, 65–80. doi:10.1023/A:1007765427200
- Wainhouse, C. E. (1984). Empirical evidence for Hayek's theory of economic fluctuations. In B. N. Siegel (Ed.), *Money in crisis: The Federal Reserve, the economy, and monetary reform* (Chap. 2, pp. 37–72). San Francisco, CA: Pacific Institute for Public Policy Research.

A Master Thesis Proposal

Master Thesis Proposal

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Notes: The proposal should be 2–3 pages long. Save it as “yoursurname_proposal.doc” and send it to mejstrik@fsv.cuni.cz, tomas.havranek@ies-prague.org, and zuzana.irsova@ies-prague.org. Subject of the e-mail must be: “JEMoo1 Proposal (Yoursurname)”.

Proposed Topic:

Monetary Expansion and Economic Crises: An Austrian Perspective

Topical Characteristics:

The Austrian business cycle theory (ABCT) has recently been experiencing a renaissance within economics, which was strengthened by the occurrence of the recent crisis. It is unique in its emphasis of time in the production processes, heterogeneity and structure of capital resources and the influence of manipulation of interest rates and money supply on that structure. The theory asserts that a period of artificially induced low interest rates stimulates borrowing and (mal)investment, especially in the early stages of production, which is unsustainable with the consumption/saving preferences of the consumers and will have to be liquidated. A recession, which is a painful reallocation of resources back to its more efficient uses, comes when either the credit expansion slows down or when it projects into expectations of persistent excessive inflation. The underlying cause of the recession is lack of real resources to cover both the investment and the consumption patterns of the economic actors.

In this thesis I am going to prepare a comprehensive overview of ABCT's propositions and conclusions, contribute to the series of literature on the empirical testing of whether these are in line with reality and summarise methodological views of the Austrian school and discussion about whether and how econometrics can help in putting the theory to the test.

The empirical testing is going to be performed on appropriately disaggregated macroeconomic data from selected European countries.

Hypotheses:

1. Supply of savings and supply of credit are not dependent as a result of monetary policy. The loanable funds market is out of equilibrium.
2. Interest rates and their structure are affected by monetary policy.
3. Capital structure and the time structure of production are affected by interest rates and their structure.
4. Relative prices (earlier vs later stages of production) are affected by interest rates and their structure.

5. Slowdown in monetary expansion causes liquidation of malinvestments and reallocation of resources within an economic recession.

Methodology:

There are a lot of eligible methods to be used for testing the hypotheses spanning from correlation analyses, OLS regressions, vector autoregression models, Granger causality tests, tests for cointegration of non-stationary series to vector error correction models.

The most appropriate methodology for testing each hypothesis will be chosen based on the particular data and its properties.

Outline:

1. Introduction
2. Austrian business cycle theory
3. Existing empirical research review
4. Empirical part
 - (a) Methodology
 - (b) Analysis
 - (c) Discussion
5. Methodological discussion overview
6. Conclusion

Core Bibliography:

- Anker, R. (2011). *Austrian business cycle theory: evidence from Scandinavia*. (Unpublished thesis). Aarhus University, DK. Retrieved from <http://pure.au.dk/portal-asb-student/files/39957752/Thesis.pdf>
- Bismans, F., & Mougeot, C. (2009). Austrian business cycle theory: empirical evidence. *Review of Austrian Economics*, 22, 241–257. doi:10.1007/s1138-009-0084-6
- Carilli, A. M., & Dempster, G. M. (2008). Is the Austrian business cycle theory still relevant? *Review of Austrian Economics*, 21, 271–281. doi:10.1007/s1138-008-0044-6
- Garrison, R. W. (2001). *Time and money: the macroeconomics of capital structure*. London, GB: Routledge.
- Hayek, F. A. (1935). *Prices and production* (2nd ed.). London, GB: Routledge and Sons.
- Huerta de Soto, J. (2009). *Money, bank credit, and economic cycles* (2nd ed.). Auburn, AL: Ludwig von Mises Institute.
- Keeler, J. P. (2001). Empirical evidence on the Austrian business cycle theory. *Review of Austrian Economics*, 14, 331–351. doi:10.1023/A:1011937230775
- Mises, L. von. (2006). *The causes of the economic crisis, and other essays before and after the Great Depression* (P. L. Greaves Jr., Ed.). Auburn, AL: Ludwig von Mises Institute.
- Mulligan, R. F. (2002). A Hayekian analysis of the term structure of production. *Quarterly Journal of Austrian Economics*, 5(2), 17–33.
- Mulligan, R. F. (2006). An empirical examination of Austrian business cycle theory. *Quarterly Journal of Austrian Economics*, 9(2), 69–93.
- Murphy, R. P., Barnett, W., II, & Block, W. (2009). Testing Austrian business cycle theory? A rejoinder to Andrew Young. *Journal of Business and Economic Perspectives*, 35(2), 73–86.
- Wainhouse, C. E. (1984). Empirical evidence for Hayek's theory of economic fluctuations. In B. N. Siegel (Ed.), *Money in crisis: the Federal Reserve, the economy, and monetary reform* (Chap. 2, 37–72). San Francisco, CA: Pacific Institute for Public Policy Research.

Young, A. T. (2005). Reallocating labor to initiate changes in capital structures: Hayek revisited.
Economics Letters, 89, 275–282. doi:10.1016/j.econlet.2005.05.033

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