

NHH



The Capitalist-Entrepreneur

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Abstract

This thesis presents and investigates a theory of entrepreneurship based on the Austrian School of Economics. By using a different theoretical framework than that of conventional economics we deduce a holistic theory of entrepreneurship and seek to explain other economic phenomena, such as the emergence of firms and business cycles, on the basis of this. We also suggest implications this new theory has for micro-economic models, management theory and public policy. We find that the Austrian School of Economics helps shed light on many phenomena that are poorly elaborated upon by conventional economics.

Preface

We wish to give many thanks to our supervisor, Ola Honningdal Grytten, for his genuine interest and concern. His help has been highly appreciated and beyond expectations. He has kept us on track throughout the writing process, ensuring we convey what we mean to. We also must express our gratitude to Peter G. Klein of the University of Missouri for his unconditional help with Austrian theory.

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Kristofer S. Faye-Hansen

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CONTENTS

1.	INTRODUCTION	8
1.1	RESEARCH QUESTIONS	8
1.2	BACKGROUND INFORMATION	8
1.3	METHODOLOGY.....	12
1.4	SCOPE AND LIMITATIONS.....	13
1.5	STRUCTURE.....	13
2.	THE AUSTRIAN SCHOOL OF ECONOMICS.....	14
2.1	HISTORY.....	14
2.2	METHODOLOGY OF THE AUSTRIAN SCHOOL	16
2.3	THE SUBJECTIVE THEORY OF VALUE.....	18
2.4	THE TIME-PREFERENCE THEORY OF INTEREST	20
2.5	AUSTRIAN CAPITAL THEORY	21
2.6	MONEY AND INFLATION	25
2.7	CANTILLON EFFECTS	30
2.8	THE AUSTRIAN BUSINESS CYCLE THEORY	31
2.8.1	<i>The loanable funds market</i>	<i>32</i>
2.8.2	<i>The production possibilities frontier</i>	<i>34</i>
2.8.3	<i>The intertemporal structure of production.....</i>	<i>36</i>
2.8.4	<i>The macroeconomics of capital structure</i>	<i>38</i>
2.8.5	<i>Secular growth</i>	<i>39</i>
2.8.6	<i>Changes in time preference.....</i>	<i>41</i>
2.8.7	<i>Boom and Bust</i>	<i>42</i>
2.9	CRITICS OF THE AUSTRIAN SCHOOL	45

2.10	CONCLUSIONS ON THE AUSTRIAN SCHOOL	47
3.	THE ENTREPRENEUR.....	48
3.1	WHAT IS ENTREPRENEURSHIP?	48
3.2	UNCERTAINTY, RISK AND PROFITS	51
3.3	JUDGMENT AS ENTREPRENEURSHIP	54
3.4	THE CAPITALIST-ENTREPRENEUR	55
3.5	THE ENTREPRENEUR AND THE BUSINESS CYCLE	56
3.6	CONCLUSIONS ON THE ENTREPRENEUR	60
4.	THE THEORY OF THE FIRM.....	62
4.1	WHY THE FIRM?	62
4.1.1	<i>Ronald Coase and the transaction costs view</i>	62
4.1.2	<i>The Austrian theory of the firm</i>	66
4.2	AN ENTREPRENEURIAL MODEL OF THE FIRM	68
4.3	ROI VS. PROFITS	69
5.	MANAGEMENT.....	75
5.1	MANAGING FOR PROFITS	75
5.2	DELEGATION OF DECISION RIGHTS	76
5.3	VERTICAL INTEGRATION	77
5.4	HORIZONTAL INTEGRATION	79
5.5	PRODUCTION PROCESSES.....	80
6.	CONCLUSIONS.....	82
6.1	CONCLUSIONS ON RESEARCH QUESTIONS.....	82
6.2	FURTHER RESEARCH	85
	REFERENCES	86
	APPENDIX.....	92

Figures

Figure 1.1 Global Innovation Index and Index of Economic Freedom.	9
Figure 1.2 GDP per Capita (PPP) and Economic freedom.	9
Figure 1.3 5-year compounded growth rate and Government expenditures.	10
Figure 1.4 5-year growth rate and Government Spending, Europe.	11
Figure 2.1 Black-Box Capital theory.	22
Figure 2.2 Intertemporal Capital Structure	22
Figure 2.3 Production process generating value through time.....	23
Figure 2.4 Determination of the equilibrium point for the exchange-value of money	27
Figure 2.5 Estimated Consumer Prices Index 1800-1912.....	28
Figure 2.6 The market for loanable funds.	32
Figure 2.7 The production possibilities frontier.....	35
Figure 2.8 Gross investment and growth (contraction, stationarity, and expansion)	35
Figure 2.9 The structure of production	37
Figure 2.10 The structure of production and consumption	37
Figure 2.11 The macroeconomics of capital structure	38
Figure 2.12 Secular growth.....	40
Figure 2.13 Technology-induced growth.....	41
Figure 2.14 Time-preference induced capital restructuring.	42
Figure 2.15 Government induced intertemporal disequilibrium.....	43
Figure 3.1 Interest rate projections and actual key policy rates.	59
Figure 4.1 Increase in intertemporal firm size.	64
Figure 4.2 Organizing and transaction costs.	65
Figure 4.3 Marginal cost and marginal revenue.....	70
Figure 4.4 Return on investment.....	71
Figure 4.5 ROI with low and high turnover	72
Figure 5.1 Production process.....	80
Figure 5.2 Hayekian triangle of complete production process.....	80
Figure 5.3 Hayekian triangle and pull-strategy.	81
Figure 5.4 Hayekian triangle with pull-strategy and just-in-time.	81

Tables

Table 2.1 Net present value of different cash flow structures	24
Table 2.2 Austrian vs. Conventional capital theory	25

Examples

EXAMPLE 2.1 THE PURCHASING POWER OF MONEY	29
EXAMPLE 3.1 ECONOMIC VS. TECHNICAL CALCULATION	57
EXAMPLE 3.2 EXPECTATIONS AND INFLATION	59
EXAMPLE 4.1 ROI VS. PROFITS	70
EXAMPLE 4.2 INVESTING WITH A CAPITAL BUDGET	72
EXAMPLE 4.3 PARTNERSHIP	73
EXAMPLE 5.1 ROI IN VERTICAL INTEGRATION	77

1. Introduction

1.1 Research questions

Our objective is to use the framework of Austrian economics to shed light on the field of entrepreneurship in the context of a market economy. Austrian economics puts entrepreneurship at the helm of the market economy. We hope to answer the following two questions:

1. Can Austrian economic theory help us understand entrepreneurship better than conventional economic theory?
2. Does Austrian theory have implications for how we understand business management and the role of public policy?

1.2 Background information

The limping economies of the west are a great concern and there is reason to be weary. In Europe, nationalism is on the rise. Both left and right wing politicians, even economists, doubt the free market system, blaming it for the current mess many economies find themselves in. At the same time, emerging economies are presenting impressive GDP growth, even those with totalitarian rule (e.g. China).

However, a quick look at some statistics reveals a different story. Figure 1.1 shows the top ten and bottom ten countries as measured by the Index of Economic Freedom and their respective scores on the Global Innovation Index. The global innovation index measures several elements which enables an economy to support innovative activities.

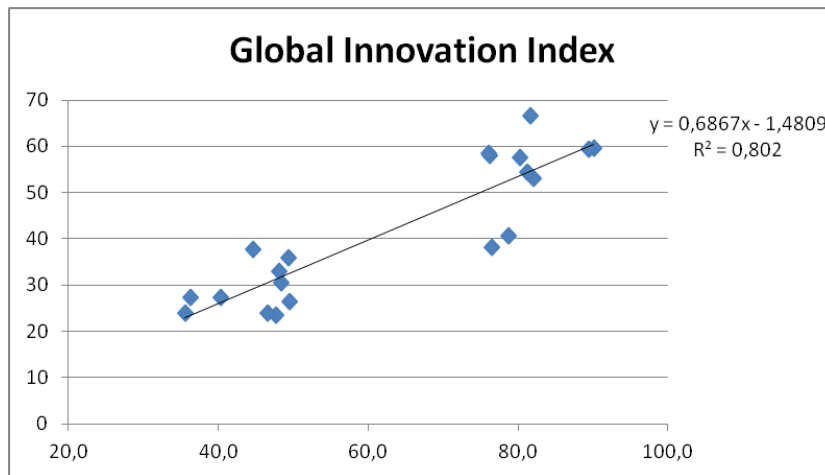
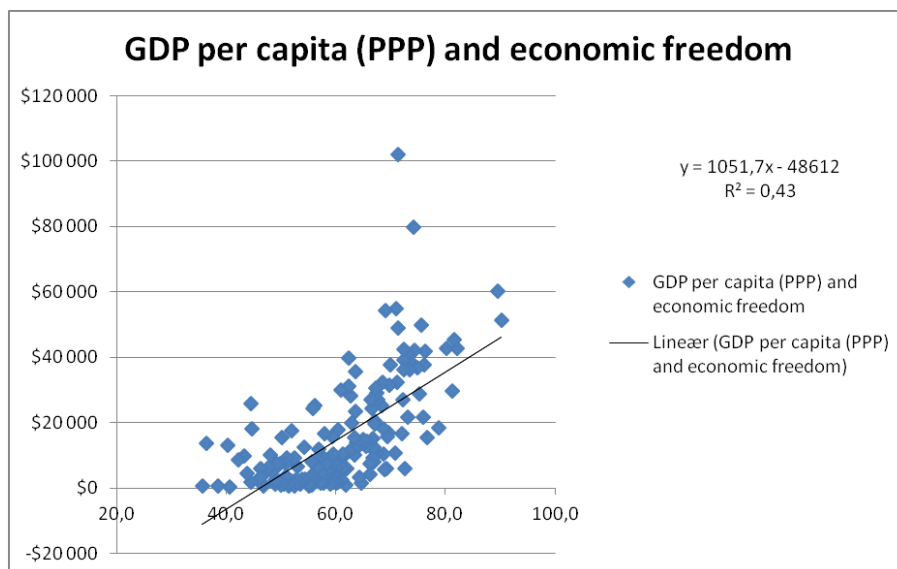


Figure 1.1 Global Innovation Index and Index of Economic Freedom.¹

Although a clear pattern seems to emerge there are those countries that have high scores in economic freedom, but remains low on innovation. In this particular case these are Chile and Mauritius. This suggests that there are more to innovation than economic freedom. That said, it still seems freer economies are more innovative economies.

Another sensible statistic to take a look at is economic freedom compared to GDP per capita. Figure 1.2 shows the Index of Economic Freedom along the horizontal axis and GDP per capita (adjusted for PPP) along the vertical axis.

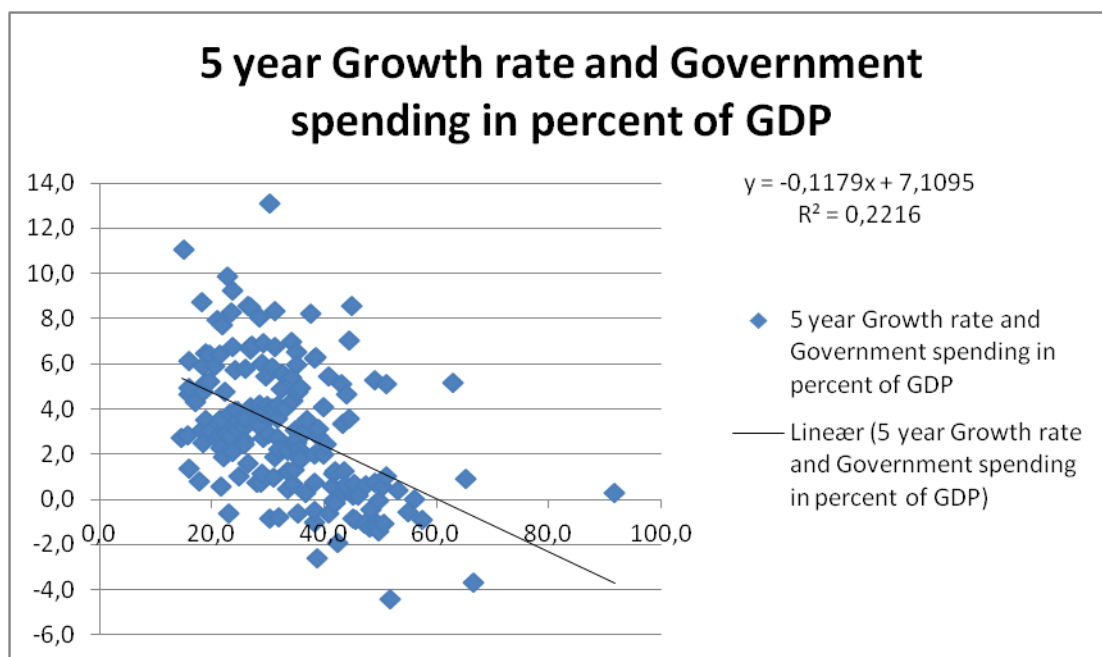


1.2 GDP per Capita (PPP) and Economic freedom. Source: www.heritage.org

¹ See Appendix

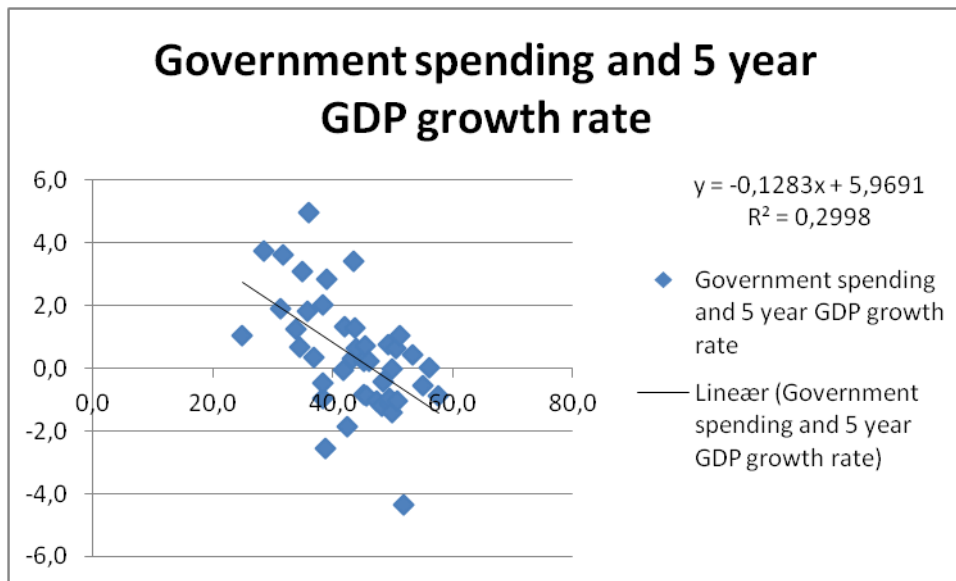
Figure 1.2 indicates a connection between GDP per capita and economic freedom. However, there remains the problem of countries' different histories. A country may have had a high economic freedom score for a short time and, thus, it will still have a low GDP per capita. We might look at GDP growth rates to better elucidate the impact of economic freedom, but there remains the problem of the post 2008 financial crisis impact and government debt problems of many economically free countries distorting these numbers. Furthermore, GDP is not necessarily a good measure for an economy's well being.

The often proposed solution to the economic problems of the west is increases in government spending to jump start the economy. A quick look at the statistics suggests that this might not be a good idea. Figure 1.3 shows 5 year GDP growth rate along the vertical axis and the government expenditures as percent of GDP along the horizontal axis. There seems to be some negative correlation between government expenditures and growth rate. Considering the vastly different economies constituting the whole selection it might be more interesting to have a look at a more narrow selection of more similar countries.



1.3 5-year compounded growth rate and Government expenditures. Source: www.heritage.org

Figure 1.4 shows government expenditures as percent of GDP and 5 year growth rate, but only for European countries. The tendency is clearer this time.



1.4 5-year growth rate and Government Spending, Europe. Source: www.heritage.org

It seems large government sectors acts as a burden on the economy, displacing the profit and loss system of the private sector with a bureaucratic one instead. However, it must be pointed out that the data which these analyses are based on are aggregates which may or may not lack vital information depending on country. One example is China with a modest government expenditure of 24 per cent of GDP and a 5-year compound annual growth rate of 9,3% (The Heritage Foundation). This looks convincing if one does not take into account that *gross capital formation* constitutes more than 45 % of China's GDP and one recognizes the debt fueled real estate bubble in China (The World Bank, n.d.). We will not delve into why it is so; suffice to say, utilizing such data to make economic policy would have dire consequences.

Although none of these statistics are conclusive in any way, they all tell a similar story. Freer economies perform better. The lack of a good measures for real economic progress makes these statistics superficial, yet they convey a clear message in our opinion. Although highly stylized, we contend that this is as good as it gets with economic statistics.

So why is it that the freer economies of the west seem stuck in second gear? We suspect a general ignorance of the workings of the market economy is to blame, in particular the understanding of entrepreneurship and free enterprise as the driving force of the economy. In other words; the theory is to blame.

The field of entrepreneurship is one that has gained increased attention in the last few decades. The increased understanding of entrepreneurship as a fundamental part of the market economy and of economic growth has led to this development. We now hear politicians talk warmly of entrepreneurs and the *gründer-spirit* as essentialities of the economy. However, we contend that the concept of entrepreneurship is one poorly defined in both conventional micro- and macroeconomics, and is subject to a multitude of interpretations. The phenomenon in question, when speaking of entrepreneurship, is not entirely clear either. Not having a holistic and coherent approach to the real and equilibrating forces of the market economy is problematic and can lead economists and policy makers astray in their endeavor to “fix” poorly performing economies.

One school of economic thought helps us shed light on this phenomenon, more so than others. The Austrian school of economics, with its “micro-based macro-view”, gives us a bottom up explanation of the market economy. Individual human action as a starting point for economic analysis makes room for a broad theory of entrepreneurship as the driving force of economic growth.

1.3 Methodology

Our analysis is a theoretical one, building on the theories of the Austrian school of economics, which we find best suited to explain entrepreneurship. We base much of our analysis on the interpretation of entrepreneurship proposed by Foss and Klein (2012). We also include insights from non-Austrians such as Frank Knight’s views on uncertainty and profits, and Ronald Coase’s work on explaining the formation of firms. At the center of our analysis will be the Austrian notion of an intertemporal structure of heterogeneous capital.

Otherwise our analysis will be inspired by the methodological approach of the Austrian school, as outlined by Mises (1949/1996), also referred to as the *causal-realist* tradition.

This approach is said to be *causal* in that it seeks to explain purposeful human action and economic phenomena in terms of Aristotelian notion of cause and effect, and *realist* in that it attempts to explain real world situations rather than hypothetical ones (The Ludwig von Mises Institute (c), n.d.).

By relying on the *causal-realist* approach and the works of other economists, we hope to make a logically coherent contribution to the field of theoretical micro-economics.

1.4 Scope and limitations

Our emphasis will be on explaining the role of entrepreneurship as an essential part of the market economy. We hope to help the reader see the economy through the entrepreneur's eyes. By combining Austrian capital theory with theories of entrepreneurship, our aim is to explain economic phenomena, such as firm creation and price formation, as a result of entrepreneurial activity.

Regarding Austrian economic theory, our aim is not to prove or disprove its validity. We merely use the Austrian school as a theoretical toolbox to better outline the role of the entrepreneur in the market economy. We therefore assume its basic theories to be valid.

Furthermore, we will limit our analysis to the theoretical realm, only using statistics were easily applicable. We try here to outline a new Austrian inspired take on entrepreneurship and micro-economic theory. Its validity should be subject for criticism and testing. Our mission is to provide the test subject.

1.5 Structure

Fearing that many economists are poorly acquainted with Austrian economic theory, we start by giving the reader an introduction to Austrian School economics. We find it necessary to devote a good number of pages for this purpose, if readers unfamiliar with Austrian economics are to comprehend our analysis.

After giving the reader an introduction to basic Austrian theory, we continue with an analysis of entrepreneurship in chapter 3 and in chapter 4 we investigate the phenomenon of firm creation and offer a revision of the microeconomic model of the firm.

In chapter 5 we investigate business management from the perspective of our discussions in chapter 3 and 4.

In chapter 6 we make our general conclusions.

2. The Austrian school of economics

2.1 History

It is worthwhile to review the history of the Austrian School before we elaborate on its theories. To distinguish the Austrian school from mainstream economics can in many cases be difficult due to the many overlapping areas. Here we wish to clarify the Austrian School as a distinct tradition in the field of economics, building on its own theories different from those of mainstream economics.

During the latter half of the nineteenth century, there emerged many conflicting schools of economic thought in Western Europe; The German Historical School and The Austrian School were two of them. The German Historical School sought to explain economic phenomena through the study of economic history while the Austrian school contended that economic knowledge arises from theoretical analysis (Taylor, 1980). Carl Menger (1840-1921), the first great Austrian, sparked off what has been known as the *Methodenstreit* in 1883 with his book “*Investigations into the Method of the Social Sciences with Special Reference to Economics*” (Hülsmann, 2005).

Earlier in his career, Carl Menger had produced a theory of value which resolved the question of price that for so long had perplexed the great classical economists. This theory was based on subjective value and the principle of marginal utility (Taylor, 1980). We will discuss this theory more in later sections. Austrian economists Friedrich von Wieser (1851-1926) and Eugen von Böhm-Bawerk (1851-1914), disciples of Carl Menger, took on the task of refining Menger’s theories, applying them to costs, interest and capital theory (ibid).

Ludwig Von Mises (1881-1973) and Friedrich Hayek (1899-1992), students of Böhm-Bawerk and Wieser respectively, continued their predecessors work. In 1912, Mises solved

the problem of applying marginal utility theory to money in *Theory of Money and Credit*. In *Socialism* (1921) Mises demonstrates the unworkable nature of socialism due to its lack of private ownership of capital goods and market prices. In 1949 he published his magnum opus *Human Action: A Treatise on Economics*, where he devotes much space to the epistemological and methodological foundation of economics as a science. Hayek became famous after being invited to the London School of Economics in 1931, where he quarreled with John Maynard Keynes over monetary policy, business cycles and public spending programs as a way to prosperity.

The Austrian school had, for reasons we won't elaborate on here, started to die out during the 1920s. This trend continued in the 1930's and the Austrian school more or less died out after Hayek's decision not to write a response to Keynes' 1936 publication *The General Theory of Employment, Interest and Money* (North, 2010).

Furthermore, the onset of world war two made massive government intervention in the economy necessary, allowing big government proponents to test out their ideas of a planned economy. After the war, the Keynesian interventionist paradigm had come to stay. However, both Mises and Hayek continued their work after the war, although with different focus. Hayek devoted his attention less to economic theory and focused on political theory. Mises on the other hand continued his work, refining the Austrian theories in books such as *Human Action* (1949) and *Bureaucracy* (1944). Mises had also decided to immigrate to the United States in 1940 where he worked as a visiting professor until his retirement in 1969. During this period Mises had the fortune to inspire a new generation of Austrian economists, most notably Murray N. Rothbard (1926 – 1995) and Israel Kirzner (Azad, 2005, p. 6).

Murray Rothbard made major contributions to Austrian economic theory, building upon the works of Ludwig von Mises. He wrote his own treatise on economics called *Man, Economy and State* in 1962 where he made many new contributions to Austrian theory. Israel Kirzner is well known for his research into entrepreneurship.

Of course, there have been many Austrian economists through the ages not mentioned by us, but we have to limit this section to include the most notable ones. Today, the majority of the Austrian school is focused around the Ludwig Von Mises Institute in Auburn, Alabama, and the George Mason University, Virginia, USA.

2.2 Methodology of the Austrian School

The Austrian School is most clearly separated from mainstream economics by its methodological foundations (Hoppe, 2006). Since the time of Carl Menger, the Austrian school economists have viewed economics not as an empirical science, but one based on logic deductive theorizing over economic phenomena. Carl Menger's conception of economic theory was "essentialist", seeking to discover the essence of economic relationships. Menger sought to discover "exact" laws governing economic phenomena. These were not laws of mathematical precision, "...but laws which follow necessarily from the essential nature of the factors involved, and thus are invariably true regardless of time and place" (White, 1977, p. 7).

For Menger and Böhm-Bawerk the scarcity of resources along with the human desire for ever greater satisfaction determined the essential structure of the economic world (ibid). This method of finding economic truth simply by thinking about economic phenomena set these early Austrians apart from their more mathematically oriented contemporaries (e.g. Léon Walras, Gustav von Schmoller). Indeed, the issue of apriorism and the scientific validity of Menger's "exact" laws is still much debated and attacked by economists today.

The methodological foundations of the Austrian school were further developed by Mises in his book *Human Action* (1949). Mises views economics as the most developed part of a more universal science of human action, *praxeology*. Praxeology is the deductive study of human action based on the axiom that humans engage in *purposeful* behavior rather than *reflexive* behavior. Purposeful behavior implies that humans engage in acts of choice which again implies that humans have preferences.

"No treatment of economic problems proper can avoid starting from acts of choice; economics becomes a part, although the hitherto best elaborated part, of a more universal science, praxeology" (Mises, 1949/1996, p. 3)

Furthermore, Mises prefers the term *Catallactics* to describe that part of praxeology dealing with human action in a market exchange context. That is, what most people think of as economics is just a branch of economics, *Catallactics*. Since everything that happens in the market place is a result of human action, any study of the market phenomena must begin with consideration about human action. Mises holds that any deliberate human action "...is

motivated by the urge to remove a felt uneasiness” (Mises, 1949/1996, p. 232). Man then chooses what means he himself regards as most fit to achieve his chosen ends. Economics as a science is not interested in why people choose certain ends, but merely that they do and how this brings about action resulting in exchange and price formation.

It does not matter for the science of action how people qualify this uneasiness from a physiological, psychological or ethical point of view. It is the task of economics to deal with all commodity prices as they are really asked and paid in market transactions. (Mises, 1949/1996, p. 232)

Mises’ *praxeology* is a purely aprioristic system of economic theory without any psychological considerations, providing only logical sanction for economic law (White, 1977, p. 13). It is clear that Mises attempted to establish economics, or praxeology, as a separate science from psychology and sociology. Mises holds that “...economics as a science is not concerned with the motives behind human actions but only the implications of action itself” (ibid. p.13).

The main controversy over the Austrian School is its reliance on axioms and deductive reasoning instead of empirical research and hypothesis testing. Mises’ *praxeology* rests upon aprioristic axioms not dependent on experience and not falsifiable through statistical method. From these axioms the field of economics is deduced through simple reasoning. This might at first sound unscientific, but Mises defends his views thoroughly.

The real thing which is the subject matter of praxeology, human action, stems from the same source as human reasoning. Action and reason are congeneric and homogenous; they may even be called two different aspects of the same thing. That reason has the power to make clear through pure ratiocination the essential features of action is a consequence of the fact that action is an offshoot of reason. The theorems attained by correct praxeological reasoning are not only perfectly certain and incontestable, like the correct mathematical theorems. They refer, moreover with the full rigidity of their apodictic certainty and incontestability to the reality of action as it appears in life and history. Praxeology conveys exact and precise knowledge of real things. (Mises, 1949/1996, p. 39)

It is worth pointing out that Mises dismisses all sorts of polylogism, claiming that all reasoning is guided by the same logic and this is the same for all humans. Different conclusion regarding the same problem must therefore stem from differences in premises, knowledge and preferences. Thus, it is possible to deduce exact laws through logic deductive

reasoning as long as one does not pass value judgments. To Mises, an African tribesman performing a rain dance is not irrational. The tribesman has simply chosen what means best serves his ends on the basis of his limited knowledge of natural phenomena. The tribesman has acted rationally. Only when an onlooker, educated in the workings of the natural phenomena, judges the tribesman's action according to his own standard, does it make sense to talk about irrationality.

The methodological approach of the Austrian School differs from that of mainstream economics. It is recognized by skepticism towards statistical analysis and mathematical models, noting that "...economic phenomena are necessarily discontinuous and discrete" (White, 1977, p. 10) Building on the human action axiom (people act intent on removing felt uneasiness) they seek to uncover cause-effect relationships in economic phenomena.

It is worth noting that the Austrian School does not disregard statistics as useful, but merely takes economic statistics for what it is. Economic statistics is historical data, not experimental data and to apply methods designed for natural experiments to historic data can never yield the kind of laws we get from the natural sciences. In fact "the interpretation of statistics and other historical data presupposes praxeological knowledge in isolating causal relationships and grouping related events" (White, 1977, p. 15). Economic aggregates are also frowned upon amongst Austrian School economists. The strict methodological individualism characterizing the Austrian School calls for disaggregation and the study of the economy's smallest parts, its human actors, and not mathematically constructed aggregates of past human actions.

2.3 The subjective theory of value

As mentioned earlier, Carl Menger developed a price theory which explained the price problem which had perplexed the classical school economists of 18th and 19th century. Such questions as why diamonds are more expensive than water, despite their limited use value for humans, were at the core of this debate. Menger rejected the notion that value was "an objective measure intrinsic in the good itself" or determined by cost of production (Taylor, 1980, p. 8). He claimed that value was based on individual human wants, placing "... human

beings at the center of economics” (Salerno, 2012b). Subjective valuation is the starting point of all economic activity, a necessity for exchange to make sense. Menger’s theory also explained how value or prices are imputed backwards from final goods (consumption goods) to capital goods (producer goods). That is, the value of a capital good or resource is determined by its *discounted marginal revenue product* (DMRP).

The theory of subjective value is today not limited to the Austrian School, but it’s more strictly interpreted by Austrian economists.

Carl Menger was also one of three economists developing the theory of marginal utility. Menger, Léon Walras and William Stanley Jevons all developed theories of marginal utility independently, but roughly at the same time (Hülsmann, 2005). Carl Menger’s theory of marginal utility differs from the modern interpretation; strictly abiding to ordinal rankings of units of goods, not measuring utility in “utils” or employing mathematical formula to explain the concept². This way of perceiving marginal utility is clearly connected to a strict interpretation of subjective value. There is no way of objectively measuring value, so two individuals’ perceived value cannot be compared. This leaves such concepts as public utility meaningless to the Austrian tradition. In Carl Menger’s words:

not only the *nature* but also the *measure* of value is subjective. Goods always have value to certain economizing individuals and this value is also *determined* only by these individuals. (Menger, 1871, 2007, p. 147)

The combination of subjective value theory and marginal utility stands at the core of Austrian economic theory.

² For a thorough explanation of the Austrian marginal utility theory see J. Huston McCulloch paper from 1977 available at <https://mises.org/etexts/McCulloch.pdf>.

2.4 The time-preference theory of interest

Another central aspect of the Austrian School is its emphasis on time in economic processes. Böhm-Bawerk's theory of capital and interest made the link between the extended and indirect production processes and the phenomenon of interest (Taylor, 1980). Böhm-Bawerk argued that people prefer present good to future goods of the same characteristics under strict *ceteris paribus* conditions. This assumption explains the margin between selling price and costs and "the margin which goes to the capitalist supplying the funds needed for intermediate products or capital goods" (Taylor, 1980, p. 9). Thus the return which the capitalist makes on his investment is a compensation for his deferred consumption.

In later times, Böhm-Bawerk's theory has been known as the *pure time-preference theory of interest*. The theory contends that the basis for the phenomena of interest is people's time preference. The result of people's time preference is what is known as the *pure rate* in Austrian theory. Of course, market rates always contain a risk premium, even those which are usually regarded as risk free. Risk and uncertainty can never be eliminated completely, which also means that this pure rate of interest can never be measured. Murray Rothbard (1962/2001) suggests decomposing the market rate in the following way.

Market rate = time preference component + entrepreneurial component + PPM component +
Terms-of-trade component

The *pure rate* is, as described above, the result of people's time preference and tends to be uniform throughout the economy. The *entrepreneurial component* differs from firm to firm and consists of the rate investors must anticipate in advance regarding a specific investment. Thus a particularly risky investment will tend to earn a higher net return, if successful, than what is generally perceived as a "safe" investment. The *PPM component* relates to changes in the *purchasing power of money* and expectations thereof. This element is ephemeral so the more that changes in the PPM are anticipated, the less important this element will be since the change itself will be more rapid (Rothbard, 1962/2001, p. 697).

The last component of the market rate exists to the extent that money changes are not neutral. Sometimes product prices rise and fall faster or slower than factor prices. Sometimes their behavior can be mixed with some of product and some of factor prices rising more

rapidly. Whenever there is a divergence in the rate of movements in the prices of products and the prices of original factors, a *terms-of-trade component* emerges in the natural rate (ibid). We elaborate on this in the section on *Cantillon-effects*.

In today's markets the risk free (e.g. government bond) investment is substituted for the time element. This effectively means that by altering interest rates, governments and their central banks are manipulating the time-preference or the market price of time itself. According to Austrian theory this has consequences, which we will elaborate on later.

The pure time preference theory remains theoretical in its foundations. However, it seems to us, at least, inconceivable that *time*, being the scarcest resource to any human being, should not have a price. In situations of deferred consumption, there must be some compensation, monetary or not, to make the extra time needed for the same satisfaction worthwhile to the person deferring this satisfaction. The actual compensation achieved by actors in the real world relies on other factors in addition to the time-preference of market participants and we will illuminate this further in later chapters when we look at time-preference theory along with Frank Knight's analysis of risk, uncertainty and profit.

2.5 Austrian capital theory

One of the key aspects of the Austrian school is its attention to capital theory. Austrian capital theory builds on the notion that capital is heterogeneous (Foss & Klein, 2012) and is organized in an intertemporal structure (Garrison, 2001). To illustrate the difference between Austrian capital theory and mainstream capital theory, we find it useful to first illustrate the mainstream model which Garrison (2012) refers to as the Clark-Knight model or rather "black-box" capital theory.

Garrison describes the functioning of the capital stock in mainstream macro economics, where capital is understood as a uniform lump of units of capital; a "black box" that transforms input of resources to output instantly. Furthermore, the maintenance of this capital stock is reduced to a technical detail.

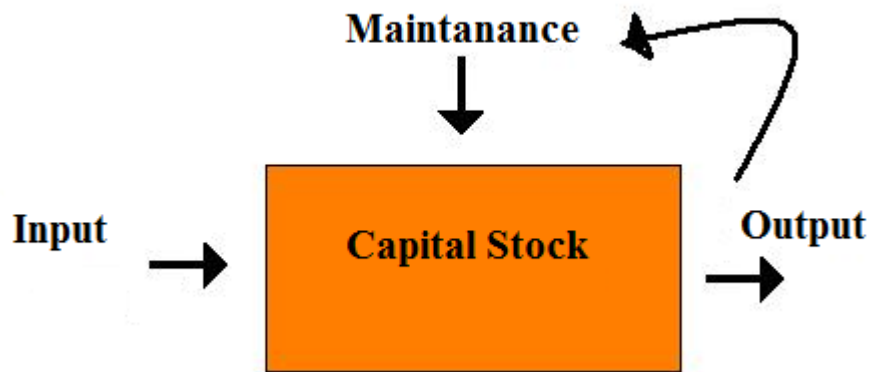


Figure 2.1 Black-Box Capital theory.

This model is of course a simplification of reality and was intended to be as well. However, the simplification is so severe that important aspects of the economy's functioning are lost. In this model capital is reduced to homogenous units which only have to be mixed with resources to create output. Production time is thought to be irrelevant on the basis that when a steady state of production is reached, production and consumption is simultaneous (Garrison, 2012).

Austrian capital theory contends that capital is heterogeneous. There are many forms of capital and capital is heterogeneous in the sense that the same capital can have many uses. Such uses are discovered by entrepreneurs trying to find better ways of meeting consumer demands. This heterogeneous capital is organized in a production process; “-a sequence of activities in which the outputs associated with some activities feed in as inputs to subsequent activities” (Garrison, 2005). The production process consists of stages of production through time and the process eventually yields the final consumable output. Figure 2.2 illustrates this process of production.

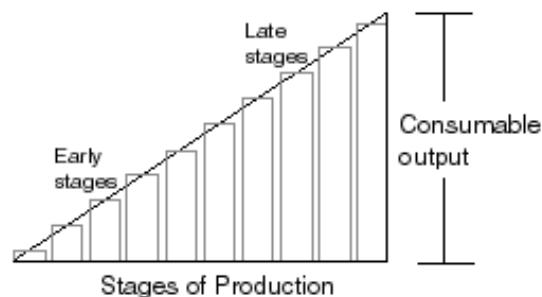


Figure 2.2 Intertemporal Capital Structure (Garrison, 2005)

Figure 2.2 shows ten stages of production and how value is added in each stage. The model also goes a long way in showing the imputation of value from the final consumer goods to the factors of production earlier in the production process. By this we mean that the price of a factor of production is its expected discounted marginal contribution to the final consumer good's value. Menger referred to goods of different orders, where goods of the first order are consumable goods and then there are the goods of higher orders, which have their values derived from goods of the first order.

The different stages in figure 2.2 must not be mistaken for specific businesses, but are merely there to help us visualize how production takes place. A specific business can be at several places in the triangle. Take for instance a coal mine. Coal can be sold directly to consumers for heating, sold to an electric plant which turns it into electricity or maybe the coal is sold to a steel mill to be used in steel production. Böhm-Bawerk also noted that “A growing economy is not just a consequence of increased capital investment, but also of longer and longer processes of production” (The Ludwig von Mises Institute (a), n.d.).

In Austrian theory the element of time in production is of utmost importance due to the fact that the financing of production has a price in the form of interest. Thus, the production process must generate value at a faster or equal pace than that of financial costs. Figure 2.3 illustrates this.

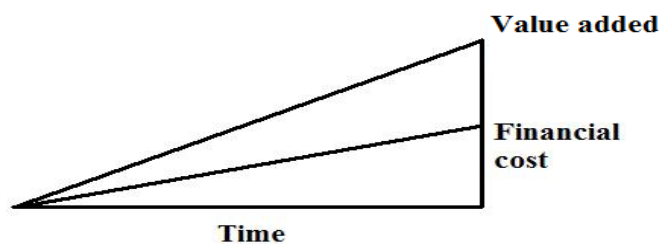


Figure 2.3 Production process generating value through time

The illustration shows an example of a profitable production process, financed through debt. Interest paid on the financing of the production process will in this case determine how profitable it is as long as we keep other things unchanged. If the interest payment was to rise to a point above the final market value of the goods produced, the production of this particular good would be unprofitable. In other words, the higher the interest rate, the faster the production process must add value to stay profitable. This has consequences for what projects might be undertaken by entrepreneurs. Projects and production processes which take

a lot of time before yielding a return are dependent on lower interest rates than competing short term projects. As shown in table 2.1, at 8 % interest rate the short term project is preferred to the long term, but if we reduce the interest rate to 4 % the situation changes and the long term project is now preferred, due to the different discounting of future cash flows.

Period		0	1	2	3	4	5	6
Long term project	CF	-200	-75	-50	100	200	250	250
NPV at 4%	kr 344,58	-200	-72	-46	89	171	205	198
NPV at 8%	kr 241,77	-200	-69	-43	79	147	170	158
Short term project								
	CF	-200	100	100	100	100	100	100
NPV at 4%	kr 324,21	-200	96	92	89	85	82	79
NPV at 8%	kr 262,29	-200	93	86	79	74	68	63

Table 2.1 Net present value of different cash flow structures

If we think of this intertemporal structure of production as an aggregate of the whole economy, it is clear that interest rate will affect its structure. The capital structure adapt to changes in demand and prices through the actions of entrepreneurs. However, heterogeneous capital cannot be shifted around costlessly. The more severe the changes in prices and demand are, the more problematic this process will be. In essence, the capital structure is chasing an ever changing consumer demand, never catching completely up. The more often and quickly demand, and consequently prices, changes, the more problematic for entrepreneurs and the economy as a whole.

Garrison (Garrison, 2013) sums up the differences between Austrian and conventional capital theory as the following:

Conventional capital theory (Knight)	Austrian capital theory (Hayek)
Maintenance is a technical detail	Maintenance is optional
Capital is permanent	Capital is ever changing
Capital is the only factor	Capital is unique and heterogeneous

Production time is irrelevant	Production time is key variable
It's all about sources and services	It's all about temporal structure

Table 2.2 Austrian vs. Conventional capital theory

2.6 Money and inflation

The Austrian school theory of money adheres to a market based approach in which the market decides what to use as money. As Carl Menger noted, money evolved in the market place as some commodities were more saleable and could be obtained for the sole purpose of exchanging it for another commodity.

As each economizing individual becomes increasingly more aware of his economic interest, he is led by this *interest, without any agreement, without legislative compulsion, and even without regard to the public interest*, to give his commodities in exchange for other, more saleable, commodities, even if he does not need them for any immediate consumption purpose. With economic progress, therefore, we can everywhere observe the phenomenon of a certain number of goods, especially those that are most easily saleable at a given time and place, becoming, under the powerful influence of *custom*, acceptable to everyone in trade, and thus capable of being given in exchange for any other commodity (Menger, 1871, 2007, p. 260).

Menger describes here the origin of money and how some commodities came to be preferred as a medium of exchange. Thus money exists independent of any government interference when people are free to use whatever they want as money. As people learn that they can achieve greater satisfaction through “surrendering less saleable commodities for others of greater saleability” (Menger, 1871, 2007, p. 262) money comes into existence. However, Menger also notes that government, by making laws regarding a certain commodity, can improve the money-character of that particular good (ibid).

Money is also a necessity to perform economic calculation. To perform economic calculation there has to be established market prices in a common denominator. In an advanced economy the possible uses of resources are not obvious and consequently actors must have some way of calculating how to best allocate these resources. Money-prices as established in the market place provide this information by revealing the “exchange value”

of particular good in relation to money. Money-prices thus provide market actors with a reliable and calculable measure of relative values. However, money must not be confused as a measure of value. A measure of value must not necessarily be money, and vice versa. Still, the particulars of a certain form of money might make it suitable as a measure of value due to established prices and the inherent properties of that particular form of money (Menger, 1871, 2007).

Menger concludes that neither a *measure of value* nor a *store of value* are functions which can be attributed to money as such, but the fact that some forms of money serves these purposes better than others makes them preferred. This goes a long way in explaining the popularity of metal coins as money throughout history.

Mises took on the challenge of elaborating Menger's analysis of money in his book *Theory of Money and Credit* (1912). Most notable were the problem of explaining the value of money and applying marginal utility theory to it (The Ludwig von Mises Institute (a), n.d.). The problem at the time was that in order to explain the marginal value of money, one has to assume an object that has already got purchasing power. To know the value of money we must know its purchasing power, but how can one explain the purchasing power in terms of value?

Mises solved this question through his regression theorem. The value of money is determined by the purchasing power it had the day before. And the purchasing power of the day before is determined by the value it had the day before again. This moves the question back in time instead of circles, but the question remains if this regression can continue infinitely back in time. Mises' answer was that this regression stops at the time where the object was first used as money and was valued as a commodity or consumer good (Hülsmann, 2005). This implies that money must always originate in the market and that fiat currencies derived their value from the commodities they were once linked to (The Ludwig von Mises Institute (a), n.d.).

By establishing this theory Mises was able to apply the same theoretic framework as applied to any good in the market, thus ending the separation of monetary theory from the general economic theory of individual action and utility, supply and demand. (Rothbard, 1976/1997). Thus, supply is the total stock of money and demand is the total market demand to gain and hold cash balances based upon its marginal utility of individuals subjective value scales.

Rothbard continued Mises' work on monetary theory building on the same notions of subjective value scales and marginal utility. Rothbard rejected the Keynesian theories of liquidity preferences and speculative demand. Using the framework of a free market economy and a commodity money (100% reserve gold standard), Rothbard explains that money-demand constitutes an exchange-demand and a cash-balance demand for money. Exchange demand, or *pre-income demand*, is that demand for money which originates from sellers of all other goods, wishing to buy money.

Cash-balance demand, or *post-income demand*, is the more volatile component and is determined by the moneys' marginal value in everyone's subjective value scales. The total demand for money is the sum of these two components. The money supply constitutes the total stock of money commodity at any given time (Rothbard, 1962/2001).

Figure 2.4 shows the total demand for money as a sum of the two aforementioned demands for money and the supply as given by the monetary stock. We clearly see that this model of the market for money is a self-correcting one. Were the PPM to be slightly higher than the equilibrium point A, people would want to reduce their cash balances. This would again drive down the PPM as people sell money for goods.

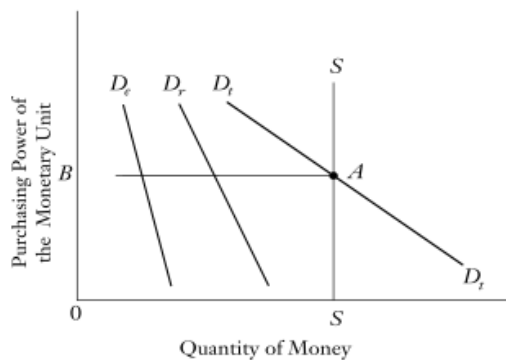


Figure 2.4 Determination of the equilibrium point for the exchange-value of money (Rothbard, 1962/2001)

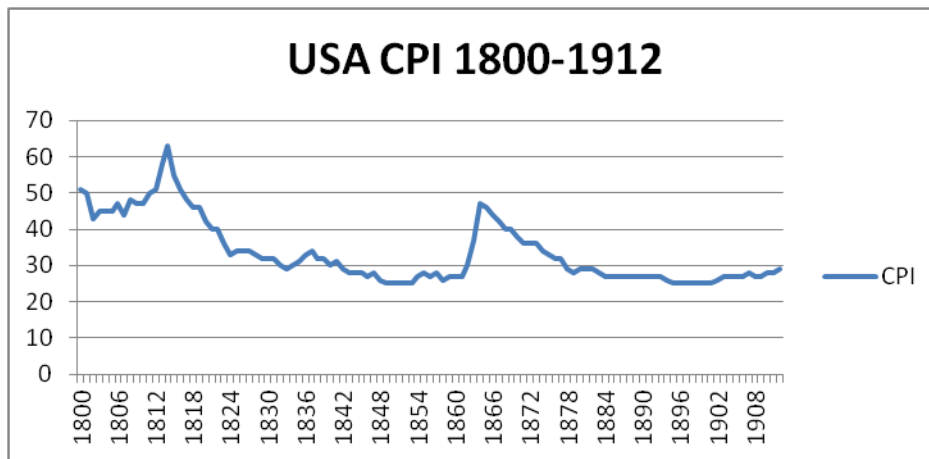


Figure 2.5 Estimated Consumer Prices Index 1800-1912. Source: www.minneapolisfed.org

Were the PPM to be lowered, the effect would be reversed as demand for money is higher than the stock. Rothbard thus concludes that “there is no such thing as “too little” or “too much” money, that, *whatever the social money stock, the benefits of money are always utilized to the maximum extent*” (Rothbard, 1962/2001, p. 670). An increase or decrease in the money supply, Rothbard concludes, confers no social benefit, but can only benefit some at the expense of others.

The self-adjusting nature of the money market means that in an expanding economy the natural trend is for prices to fall and PPM to rise, *ceteris paribus*. Figure 2.5 show the estimated CPI of USA from 1800-1912. There is a general rise in PPM during the period, starting at 51 in 1800 and ending at 29 in 1912. The spikes are due to the war of 1812 and the American Civil War, both necessitating the printing of fiat currency and the suspension of metal standards. The rise in PPM would have been even more had it not been for the huge gold findings of the late 1840s in America and further discoveries in Alaska and South Africa in the late 19th century.

In the Austrian tradition, inflation is viewed as an increase in the money supply or rather the stock of money, not an increase in consumer prices. This is important to take note of as we will be using this definition of inflation throughout this thesis. Austrian theory describes inflation of the money supply as a sequence which we will elaborate on in section 2.6.

Regarding the purchasing power of money, Rothbard also denies that there exists a measure of such a thing. He uses the following example to elucidate his position:

Example 2.1 The purchasing power of money

Let us now assume that the following is the array of prices in the PPM on day 1:

10 cents per pound of sugar.

10 dollars per hat.

500 dollars per TV set.

5 dollars per hour legal service of Mr. Jones, Lawyer.

Now suppose the following array of prices of the same goods on day 2:

15 cents per pound of sugar.

20 dollars per hat.

300 dollars per TV set.

8 dollars per hour of Mr. Jones' legal service.

Now what can economics say has happened to the PPM over these two periods? All that we can legitimately say is that now 1 dollar can buy 1/20 of a hat, instead of 1/10 of a hat, 1/300 of a TV set, instead of 1/500 of a set etc, etc. Thus, we can describe (if we know the figures) what happened to each individual price in the market array. But how much of the price rise of the hat was due to a rise in the demand for hats and how much to a fall in the demand for money? There is no way of answering such a question. *We do not even know for certain whether the PPM has risen or declined.* All we do know is that the purchasing power of money has fallen in terms of sugar, hats, and legal services, and risen in terms of TV sets. Even if all the prices in the array had risen we would not know by *how much* the PPM had fallen, and we would not know how much of the change was due to an increase in the demand for money and how much to changes in stocks. If the supply of money changed during this interval, we would not know how much of the change was due to the increased supply and how much to the other determinants. (Rothbard, 1962/2001, p. 738)

However, Rothbard do concur that there is a use for indices based on fixed quantity weights for a base period (Rothbard, 1962/2001, p. 740). Such indices of “market baskets” provide a proxy, but are not without difficulties. There is no such thing as an *average buyer*, only individual buyers with individual preferences. They all have their own unique basket. Thus, the assumed change in PPM will be different for every individual. Consider the sharp rise in housing prices in Norway the last 15 years.

During the same time the mortgage rate has fallen considerably. For the person who bought a house and took up a mortgage 15 years ago, housing expenses has fallen, assuming he has an adjustable rate mortgage. For the individual who has not yet bought a house, but who wants to do so, houses have become more expensive. Each year, his salary can buy less of a house. The change in the CPI is perceived differently for each individual. While the first individual experiences increased purchasing power, the second individual experiences a decreased purchasing power, *ceteris paribus*.

2.7 Cantillon effects

Cantillon effects are named after the 18th century French economist Richard Cantillon. Cantillon is widely credited as the first to point out the relative changes in prices resulting from changes in the money supply. Cantillon effects are the real changes in resource allocation resulting from the change in relative prices between the time the new money enters the economy and the time where the economy has fully adjusted to the new money supply (The Ludwig von Mises Institute (b), n.d.). New money enters the economy while still retaining the original PPM. The preferences of the “first spenders” will therefore have a higher impact on the capital structure. Resources are, to a larger extent, allocated to the wants of these first spenders.

The increased demand in those sectors preferred by first spenders will increase profits and lead to resources being allocated to this particular use. Thus inflation does not affect all prices equally or at the same time, but through a sequence dependent on the spending behavior of money holders all along the channels of monetary flows (The Ludwig von Mises Institute (b), n.d.). The producers of goods demanded by the first spenders will increase their spending as a result. Resources will again be allocated, to a larger extent, according to the demands of these secondary spenders and so forth. If new money enters the economy through investors, one will expect the CPI to be one of the last places this inflation will show up. On the other hand, if the new money enters the economy through the salaries of government workers, one would expect this inflation to show up in the CPI more quickly, assuming they are more likely to use it for consumption goods.

Cantillon effects can also be used to explain economic bubbles. Were the new money to be pent up in a particular market, meaning that the second receiver of the new money used it to buy the same thing as the first receiver, prices would keep rising in this particular market as long as new money keeps flowing in. The inflation would not, to the same extent, spill into other parts of the economy. An example would be such as the credit fueled American housing bubble of the mid 2000s. The same can be said of stock markets or other asset markets. Bubbles can, of course, also occur without any new money entering the economy. If the market participants were struck by a mania and allocated much of their income to a particular asset market, one might be able to produce a bubble. However, in this case no inflation has taken place. The increased money demand for this particular asset must then be offset by decreased money demand for other goods and assets. To make the distinction between a bubble induced by monetary expansion and a bubble induced by real changes in peoples subjective value scales, we suggest the term *pent up inflation* for the former and *mania* for the latter.

The essence of Cantillon effects is that money is never neutral, due to the transition period where the economy adjusts to the new money supply. There is no way of “putting” new money into the economy without distorting the capital structure, both with regards to the composition of demand and through interest distortions. New money entering the economy creates winners, those who receive it first, and losers, those who receive it last.

2.8 The Austrian Business Cycle theory

The Austrian school is probably most renowned for its alternative business cycle theory (ABCT), receiving increased attention after the 2008 financial crisis. However, in our experience most economists are not familiar with ABCT and we hope to give the reader a concise yet thorough interpretation of it in the following. We will base our interpretation mostly on Roger Garrison’s book *Time and Money* (2001), which provides a good heuristic toolset for understanding ABCT.

Garrison’s model consists of a three graphical building blocks. These are the *production possibilities frontier* (PPF), a *loanable-funds market* (LFM) and the *intertemporal structure*

of production (ISP) also known as a Hayekian triangle. Using these we are able to give an intuitive picture of what the ABCT states.

2.8.1 The loanable funds market

The LFM as shown in figure 2.6 represents the supply and demand for loanable funds at different interest rates broadly conceived. Consumer lending is netted out so only the macroeconomic relevant saving is included in this setup. Net lending is the savings of all income earners made available for investors to maintain and expand the capital structure. Retained earnings and saving in the form of purchasing equity shares are also included. The supply of loanable funds represents that income which is not consumed, but rather put to work and earning interest.

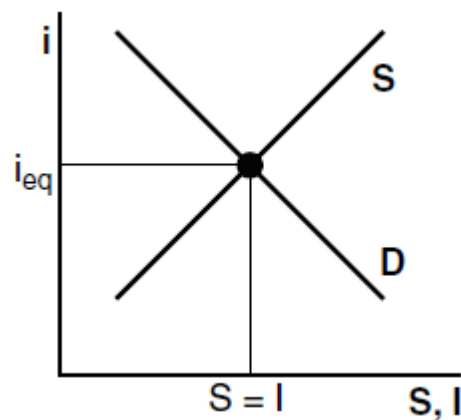


Figure 2.6 The market for loanable funds. (Garrison, 2001, p. 37)

Some basic assumptions in this model need to be clarified. There is of course a small portion of income which is neither spent nor lent, but is part of the *cash-balance demand* or the *liquidity preference* of consumers and businesses. In an indirect way these liquid funds serve as a form of saving since they are not spent on current consumption. This introduces some slippage into the model, but as Garrison notes this has little effect on the model because “to the extent that an increase in saving is accompanied by an increase in liquidity preferences, it does not substantially increase the supply of loanable funds and hence has little effect on the

rate of interest” (Garrison, 2001, p. 37). Changes in *liquidity preferences*, or *cash-balance demand* in Rothbard’s terms, would affect the PPM which could present their own problems.

The demand for loanable funds represents the willingness of borrowers to invest in the economy’s production process. Investment in this context refers to means of production including plants, tools, machinery and goods in process as well as human capital. Thus, the demand for loanable funds reflects the businesses’ eagerness to pay known input prices today in order to receive some unknown payment in the future.

The loanable funds market facilitates the coordination of production plans with consumer preferences. The rate of interest serves as a signal as to how much demand there will be in the future. An increased savings rate will allow for more consumption in the future and *vice versa*. Discrepancies between the interest rate and input and output prices will be exploited by entrepreneurs. Exploiting these intertemporal discrepancies earns the entrepreneur profits which again attracts other entrepreneurs, reducing the discrepancies of a particular market over time. If we were to make the unrealistic assumption of no changes in the underlying economic reality, all investors would earn the market rate of interest.

The market process, consisting of the actions of fallible men, is of course not perfect. This introduces some discoordination due to errors made by entrepreneurs, such as making an unprofitable investment. The LFM registers the expected rate of return net of the losses incurred by this discoordination. Thus, the loan rate of interest is not a *pure* rate of interest and reflects more than underlying time preferences, as described in section 2.3.

Regarding the loan rate of interest there are some differences between capital-based and conventional macroeconomics. Expected losses on the demand side is usually identified as *business confidence*, and changes in the level of expected losses are explained by psychology or “the waxing and waning of “animal spirits,” to use Keynes’ colorful phrase” (Garrison, 2001, p. 38). Capital-based theory calls for an economic explanation for changes in expected losses. The normal assumption will therefore be: no changes in the general level of expected losses except when our market analysis suggests so.

On the supply side there exists a similar contrast between capital-based and conventional theory. Expectations of loss, manifesting itself as a loss of business confidence on the demand side, manifests itself as an increase in *liquidity preference* on the supply side in conventional theory. But *liquidity preference*, like *business confidence*, seems to call for a

psychological explanation. In capital-based theory, lender's risk is a more suitable term calling for an economic explanation. In capital-based theory, changes in both expected losses and lender's risk are not assumed unless analysis of market conditions suggests so.

Figure 2.6 identifies a market clearing, or equilibrium, rate of interest where saving and investment are brought into equality. This is the conventional understanding of the LFM. However, in application there is an unconventional understanding of the LFM critical to its incorporation into capital-based macroeconomics. Capital-based theory does not rely on two conflicting construction, one for the long run and one for the short run. An increase in saving now means an increase in consumption in the future and increased profitability for resources committed to meet that future consumption demand. There is no "paradox of thrift" causing the economy to "automatically" fail and explanations for sluggish economic performance must be found elsewhere. To help identify instances in which the market process works, or fails to work, we must introduce the *production possibilities frontier* (PPF), the second element of capital-based macroeconomics.

2.8.2 The production possibilities frontier

Although present, the PPF is never an integrated part of conventional macroeconomic analysis. In Austrian theory it becomes a cornerstone for understanding the basic options for an economy.

The PPF shows the tradeoff between two alternative outputs that are negatively related. Figure 2.7 demonstrates the case of guns and butter. Some resources are suited for the production of either output; some other resources are better suited to producing guns and some to producing butter. To change the mix of output it becomes necessary to use resources better suited for one output for producing the other. This results in an increasing cost in butter to produce one additional unit of guns.

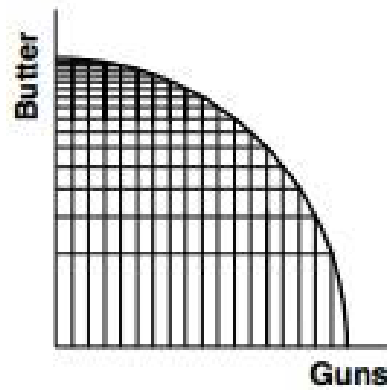


Figure 2.7 The production possibilities frontier (Garrison, 2001, p. 41)

In its application in capital-based macroeconomics, the PPF draws attention to the fact that an economy grows to the extent that it uses resources to make capital goods instead of consumer goods, thereby increasing its productive capabilities and *roundaboutness*.

In capital-based theory, the PPF shows the tradeoff between consumption (C) and investment (I). Together with saving (S) this construction allows for a convenient link to conventional macroeconomics which uses these same aggregates. Investment is measured in gross terms, allowing for capital maintenance, consumption and expansion. There is a point at the PPF curve where gross investment is just enough to offset capital depreciation. Figure 2.8 shows different states of an economy.

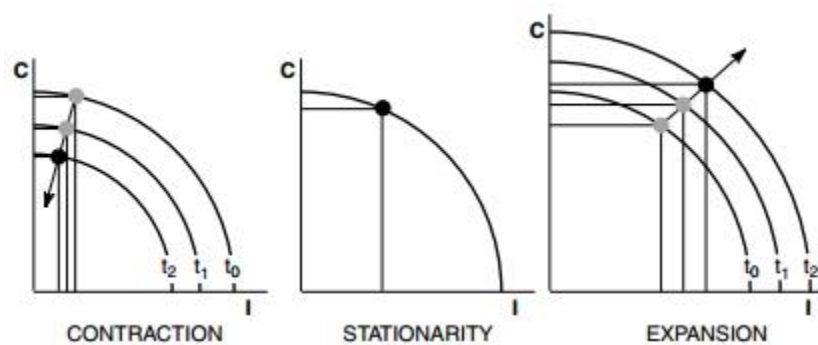


Figure 2.8 Gross investment and growth (contraction, stationarity, and expansion) (Garrison, 2001, p. 43)

In a mixed economy there must be made room for government spending (G) and taxes (T). In the simplest form, government imposes a “head tax” and spends the money in a way wholly unrelated to the private sector, and maintains a balanced budget. In such a case, the PPF simply applies to the private sector of a mixed economy. How the size, shape and location on the PPF are affected by government will depend on how the tax system is

designed and how revenues are used by government. Just how this affects the PPF is beyond the scope of this analysis.

However, in the simplified case above we can expand the model to include debt-financed government spending simply by relabeling the x-axis in the loanable funds market $I+G_d$, where G_d is the debt-financed government spending. In this case we ignore the possibility of inflationary finance. Government borrowing being additive to private investment affects interest rates and the intertemporal allocation of resources.

The PPF demonstrates to us sustainable combinations of C and I in a fully employed private economy or the fully employed private sector of a mixed economy. However, the PPF is not absolute. Consumption and investment can temporarily move together outside the frontier and, in the event of an economy-wide downturn, move inside the frontier.

2.8.3 The intertemporal structure of production

In conventional macroeconomics, attention to the stages of production is limited to avoid double counting when constructing aggregates (e.g. national income accounts). By only summing the value added in each stage one is able to calculate the total value of final output. Thus, emphasis is put in the value dimension of the stages and not the time dimension.

In capital-based macroeconomics attention is paid to both the value dimension and the time dimension. The relationship between final, consumable output value and production time is represented graphically as the legs of a right triangle (as shown in section 2.4). The hypotenuse expresses value added on a continuous basis. Thus, the value of a good in process is the vertical distance between its location on the hypotenuse and the horizontal axis, systemically discounted relative to the finished consumer good. For the sake of simplicity, a linear construction is chosen over an exponential one.

Figure 2.9 shows this construct also known as a Hayekian triangle. It identifies five different stages of production as mining, refining, manufacturing, distribution and retailing. This identification is purely for illustrative purposes. Some time a particular business might be at several places in the structure. Consider a coal mine producing coal for steel and electricity

as well as coal for people's barbecues. With regards to the modern day service oriented economy, education and training can be regarded as early stages of production, producing human capital which again yields consumable services or input services.

To make the triangle adaptable to the PPF it stops at output. However, it is easy to imagine a mirrored consumption triangle, taking into account consumer durables as part of the output. This is shown in figure 2.10. This gives a broader picture of the economy, but offers little to our analysis. It is production that is hard and complicated. Consumption is the easy part.

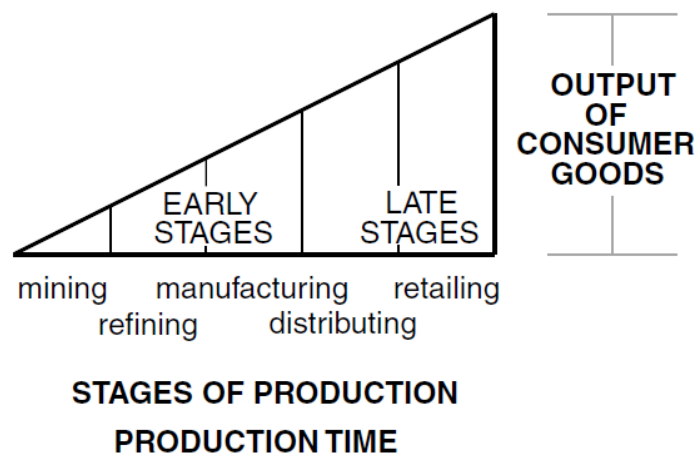


Figure 2.9 The structure of production (continuous-input/point-output) (Garrison, 2001, p. 47)

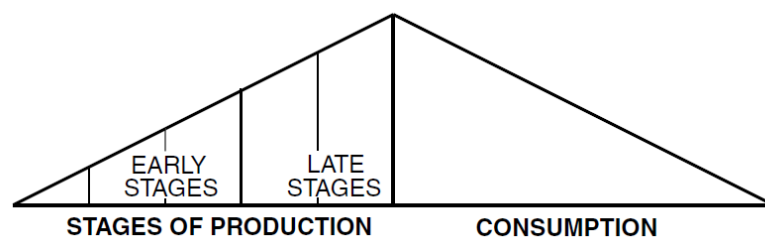


Figure 2.10 The structure of production and consumption (Garrison, 2001, p. 48)

The Hayekian triangle we use might seem overly simplistic. However, the triangle is designed to set complexities aside and highlight the macroeconomic aspects of intertemporal equilibrium and intertemporal disequilibrium.

2.8.4 The macroeconomics of capital structure

Figure 2.11 shows the three previous figures in an interconnected construct depicting a wholly private economy or the private sector of a mixed economy, as discussed above. The LFM and the PPF are connected by their common horizontal axis measuring investment. The structure of production and the PPF are connected by their common vertical axis measuring consumption. The connection between the structure of production and the LFM is not as explicit, but critical to our understanding of the model. The slope of the hypotenuse reflects the market clearing interest rate. Garrison argues that “reflects” is as strong a connection which can be made with a continuous-input construction. The slope of the hypotenuse reflects more than the interest rate, partly due to inputs being added and partly due to the temporal proximity to consumable output. However, under given institutional arrangements the interest rate and the slope of the hypotenuse will move in the same direction. A higher (lower) interest rate will result in a steeper (shallower) slope. If the consumers have a low time preference, this makes possible a more roundabout and faster growing economy.

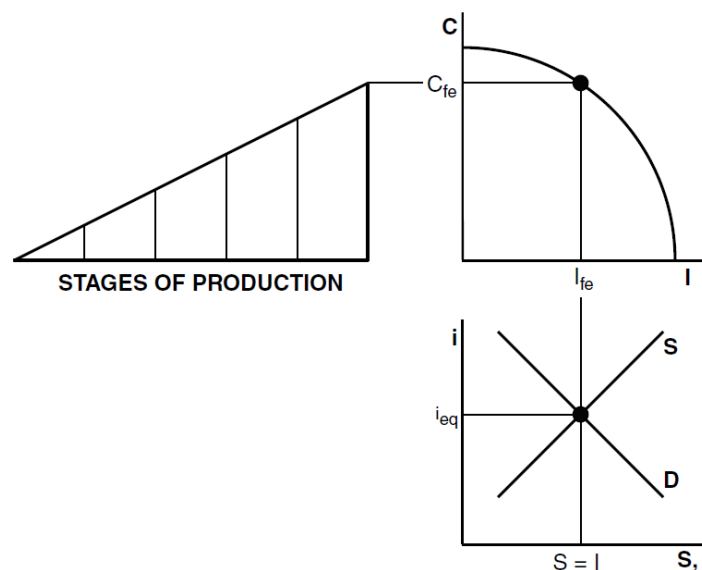


Figure 2.11 *The macroeconomics of capital structure* (Garrison, 2001, p. 50)

The location of the economy on the PPF implies full employment, or rather the natural rate of unemployment. The compatibility of the three elements implies that the market clearing interest rate is also the “natural” rate of interest.

In its simplest form, this construct depicts a fully employed, no-growth economy, where investments are just enough to offset depreciation. The interest rate reflects the participants' time-preference. This steady-state structure resembles Mises' Evenly Rotating Economy where production and consumption takes place, but there is no uncertainty and change. This gives us an initial benchmark for further analysis of what Garrison calls secular growth and cyclical fluctuations.

Figure 2.11 looks very different from traditional ISLM analysis. Unlike the ISLM analysis, the graphics does not include a market for money. However, money is present in every diagram and is assumed to allow participants to avoid the inefficiencies of barter. Furthermore, the monetary phenomena in the context capital-based macroeconomics, is a source of looseness in the market process governing the intertemporal allocation of resources.

2.8.5 Secular growth

Figure 2.12 depicts a case where an economy is expanding from $t=0$ to $t=2$. The Austrian notion of secular growth occurs without being provoked by policy or technological advancements. The only prerequisite for secular growth is that gross investment is larger than capital depreciation. The interest rate is assumed to remain constant, that is no change in time preference. This is represented by the shifts of the supply curve in the LFM, yielding the same interest rate in every period. Note that the interest rate expresses time preference, not the supply curve. However, as Garrison points out, historically, increased wealth is accompanied by decreased time preference, causing the interest rate to fall. In the case of secular growth the model abstracts from this relationship.

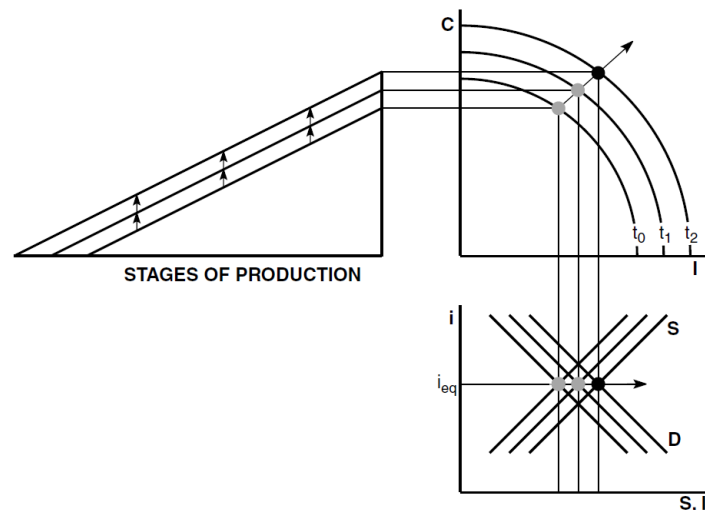


Figure 2.12 Secular growth (Garrison, 2001, p. 54)

The economy expands due to the increasing amount of capital which again leads to an increase in consumable output. The unchanged interest rate results in an unchanged slope of the hypotenuse. Where the consumers to lower their time preferences, this would reduce the slope and make more time consuming production processes possible. Consider such time consuming and uncertain processes as research and development. With a lower interest rate, these processes are more economically viable. Thus, a lower time preference can speed up technological advancements.

In the case of technology induced growth, this translates into *as if* the subsistence fund increased. This leads to more profitable opportunities for investment and the increased demand for financing might cause the interest rate to rise. However, unlike other macroeconomic constructions, it is not necessarily so that a positive technology shock causes the equilibrium interest rate to rise. As the economy grows faster as a result of technological advancements, so does income and savings. The increased savings might suffice to drive down the interest rate again. This is shown in Figure 2.13 where interest rates first rise along S as demand changes from D to D' . The increased income, resulting from technological advancements, causes a shift in time-preference and a shift of the supply curve from S to S' . This reduces the interest rate to its former level.

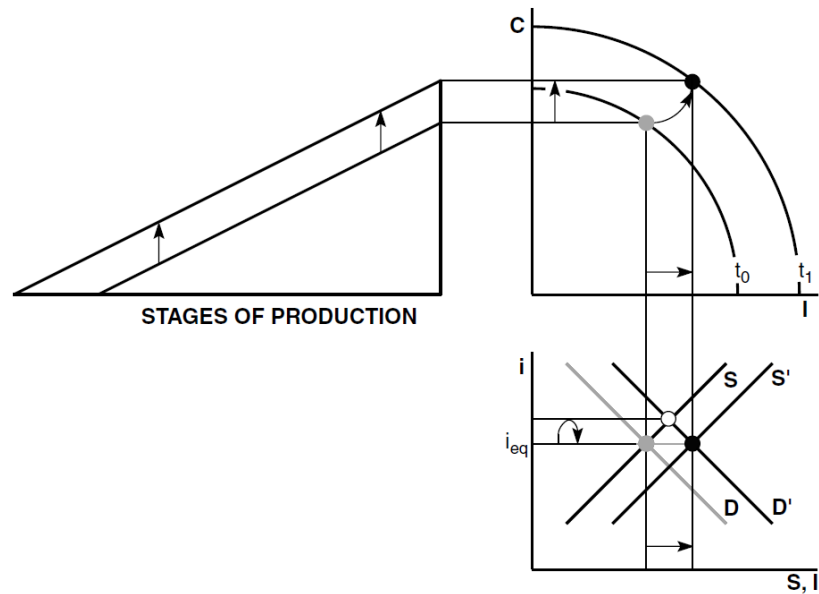


Figure 2.13 Technology-induced growth (Garrison, 2001, p. 59)

2.8.6 Changes in time preference

Changes in consumers' time preference can also result in increased growth, and this particular aspect is of outmost importance in the Austrian school. In figure 2.14 an increase in thriftiness is depicted as a rightward shift in the supply of loanable funds. With the demand for loanable funds unchanged, this results in a lowering of the interest rate, a reduction in current consumption and an increase in investment. The reduced interest rate results in a shallower slope of the hypotenuse. Unlike Keynes' theory, the reduced current consumption implies increased consumption in the future. Entrepreneurs are guided by the interest rate in their decisions to invest.

To presuppose that the business community perceives a reduction in current consumption as permanent begs the question as to how the intertemporal allocation of resource ever got to be what it is. Such a vision of the market economy means it could never cope with changes in consumers' time preference. Furthermore, if the business community perceives a reduction in consumption as permanent, would it not also perceive an increase in consumption the same way?

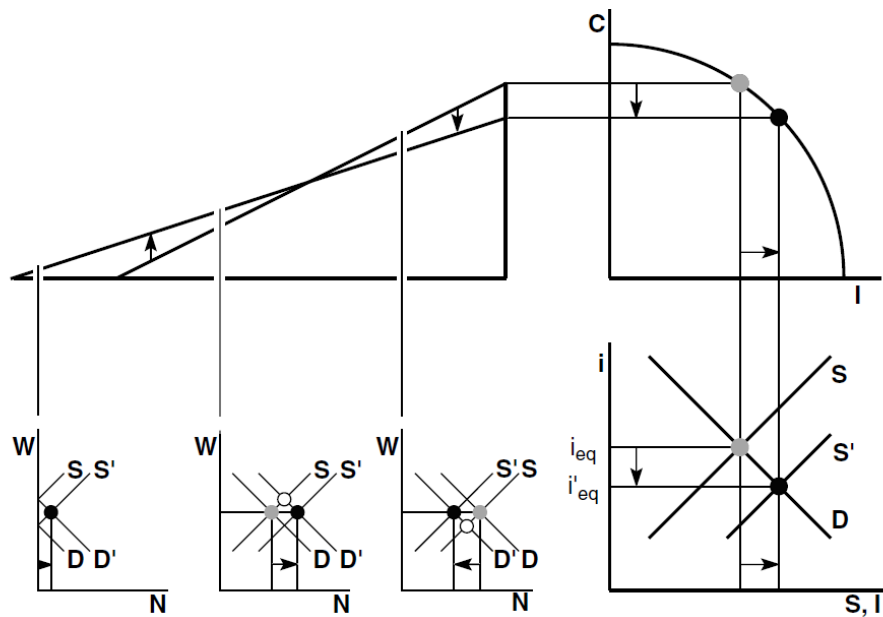


Figure 2.14 Time-preference induced capital restructuring (Garrison, 2001, p. 65).

Figure 2.14 also shows stage specific labor-markets to visualize the change of resource allocation which takes place as resources are bid from late stages to earlier stages of production.

2.8.7 Boom and Bust

In the previous we have shown how an economy moves from one intertemporal equilibrium to another without any interference from any monetary authorities. This enables us to distinguish between genuine growth and an artificial boom.

We will now describe what happens, according to Austrian theory, in an economy where a central bank, or fractional reserve banks for that matter, increases the money supply. Figure 2.15 depicts an economy's reaction to a credit expansion, while time preferences are assumed to be unchanging. The money supply is assumed to be under the control of a monetary authority i.e. a central bank. The supply of loanable funds consist of both saving by income earners and funds made available by the central bank. The new money enters the economy through the credit markets since this is most consistent with modern economies in general. The central bank often has multiple ways for manipulating the money supply, or

rather the supply of credit. Common to these are that an increase in the money supply puts downward pressure on interest rates.

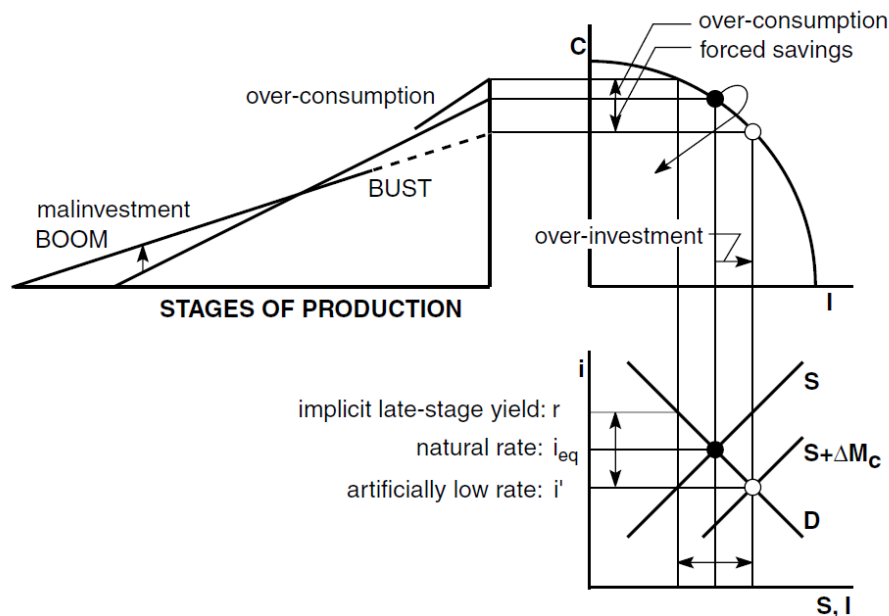


Figure 2.15 Government induced intertemporal disequilibrium (Garrison, 2001, p. 69).

We assume the central bank to set a target interest rate i' and take actions to meet this target. By increasing the money supply, the central bank is able to push the interest rate down to the targeted value. The new money in the form of additional credit is labeled ΔM_C in recognition that the monetary expansion might not fully translate into credit expansion. It is possible that some people would choose to increase their cash holdings as a reaction to policy induced changes in the interest rate. Such changes in the demand for cash balances, although not without effects of its own, are of secondary importance.

Unlike the example of secular growth, the policy induced interest causes divergence between consumers' allocation of income and investors' expectations about the future. At the new lower interest rate, consumers want to save less and consume more. However, investors are given the signal to invest more, the same signal they would have perceived if a change in time preference where causing the change in interest rate. The credit market is sending two opposing signals. The increased investment pulls the PPF location east, while the increased consumption pulls north. The result is an economy trying to locate outside the PPF. The economy is trying to have it "both ways" so to speak.

Due to the looseness of money, the opposing forces do not cancel each other out immediately. Instead, resource prices are bid up due to the increase in the money supply.

Some prices rise more than others as was discussed in the section on Cantillon-effects. The lower interest rate makes long term projects seem relatively more attractive to investors. At the same time increased consumption results in increased cash flows.

The changes in interest rates and the increase in consumption cause the Hayekian triangle to take two different forms, indicating intertemporal disequilibrium. The forces pulling for investment calls for a shallow slope of the hypotenuse while consumer spending calls for a steeper one. Resources are, according to capital-based theory, bid away from the middle of the triangle into early stages and late stages. Consider such early stages to be the investment in a skyscraper and late stages to be increases in inventories and a general increase in capacities. The broken hypotenuse indicates that the restructuring cannot actually take place.

Austrian theory contends that monetary authorities manipulate the signals given by the credit market, causing consumption to increase and entrepreneurs to embark upon unprofitable projects. The signals of low interest rates favor long term projects and increased consumption creates expectations of larger cash flows. At some point it is revealed that projects are not profitable. As entrepreneurs bid for increasingly scarce resources, prices rise until projects are no longer profitable. These unprofitable projects, or malinvestments, must then be liquidated and boom turns into bust.

According to Paul Cwik (2004) a boom usually comes to an end when interest rates start to rise. Interest rates will eventually start to rise either through a *real resource crunch* whereby the rising prices of input factors causes an ever increasing demand for credit, or through a *credit crunch* whereby the monetary authorities jack up rates when the annual growth in the CPI becomes unacceptable.

We will leave our inquiry into the Austrian Business Cycle theory for now, but revisit it during our discussion on entrepreneurship. There is still much to be said about the distortive effects of monetary expansion.

2.9 Critics of the Austrian School

Among the common criticisms of the Austrian school is its lack of empirical foundation (Horwitz, 2012). That is its reluctance to test its theories empirically. The claim that one can reach correct conclusion through the use of *a priori* principles without engaging in empirical analysis, is a bold one. This way of thinking has been ridiculed as *armchair economics*, referring to the idea that one can deduce all of economics from one's armchair.

However, this image of the Austrian school is more of a caricature than a reality. The Austrian skepticism towards empirical analysis has its origins in its subjectivist foundation. Empirical analysis may provide correlation, but it is up to theory and the human mind to provide causation. Furthermore, statistical analysis is not without its own *a priori* assumptions, such as normal distribution, and a general overconfidence in the validity and robustness of the data. That is to say, not recognizing the fragility of statistical analysis based on limited economic data (Leamer, 1983).

To Austrians, empirical analysis is not off the table, but comes second to the theoretical analysis. Correlation is second to causation. Consider an example. The Austrian theory claims that an increase in the money supply by a central bank will reduce interest rates. If so happens and interest rates do not fall, the statistical data would refute this claim. However, the Austrian economist would then claim that interest rates are lower than they otherwise would have been. The logically deduced economic laws of the Austrian School are claimed to be uncontestable by empirical analysis. Thus a statistical analysis which yields a result in opposition to these laws must be discarded as erroneous.

While statistical analysis cannot, according to the Austrian school, be used to establish economic laws, it can be useful in determining which economic laws, and their effects, are at play at different times. George Selgin (2012) makes the argument that although the theoretical arguments of the Austrian School might be logically valid, it is necessary to determine how useful it is in explaining any particular historical episode. It might be the case that the effect, as stipulated by Austrian theory, is trivial. We revisit our example above. If the central bank conducted a monetary expansion, how can we know if the difference it made was not trivial?

To answer this question might prove impossible even if statistical analysis is employed, yet it shows us how statistical analysis can be useful in determining specific magnitudes of economic laws. That is not to say that there can be statistical laws, but one might uncover significant tendencies. As Selgin writes:

What's in between is trying to arrive at an informed estimate of just *how much* of any observed phenomenon an applicable theory explains and, when there are several equally applicable theories, their relative worth (Selgin, 2012).

The lack of empirical analysis demonstrating the explanatory power of Austrian theories might be the reason why the Austrian school remains on the fringes of the economic science. We concur that the Austrian school might enjoy a more central position if more statistical works of the kind mentioned were undertaken. As Antony Davies writes: "... in their skepticism, Austrians miss an opportunity to use statistical analysis to refute non-Austrian claims" (Davies, 2012).

Another critique of the Austrian School is the claim that Austrian theory is not very Austrian at all (e.g. Caplan, 1997; Selgin, 2012). The claim is that Austrian theory is already part of conventional theory and there is almost no significant distinction to be made. We find this to be true in the sense that much of it is overlapping, but the differences lie in the subtleties. That is, the debate must become quite specific for these differences to emerge. Moreover, it seems to us that this critique often comes from more open-minded mainstream economists who have learned to appreciate some of the insights from the Austrian School.

The Austrian Business Cycle theory (ABCT) has been a topic of controversy and critique ever since the 1930s and continues to be so in the wake of the 2008 financial crisis (e.g. Krugman, 1998; Krugman, 2008; Caplan, 1997; Tullock, 1988). Particularly the notion of *overinvestment* due to lowered interest rates, has received much criticism for being logically incoherent. Austrian economist Joseph T. Salerno (2012a) argues that much of mainstream interpretation of the theory misrepresents essential features of it and conflicts with its presentation by its leading proponents, thus leading to erroneous conclusions. Overinvestment is not part of modern ABCT, and Salerno argues that these critics paint a caricature of the theory.

Another critique occurring quite often is that ABCT takes entrepreneurs to be stupid. The claim that temporarily lowered interest rate causes entrepreneurs to foolishly embark upon

projects which will reveal themselves to be unprofitable when interest rates rise, is somewhat ridiculed. After all, if the entrepreneurs know interest rates will rise, why would they embark upon such projects?

The answer is that entrepreneurs are not stupid, nor are they infallible. Furthermore, it is not only lowered interest rates which affect willingness to invest, but also increased consumption demand induced by the same lowering of interest rates. In the events when such critics come from economists claiming the entrepreneurs to be governed by animal spirits, we find it humorous more than anything.

We will revisit the case of the entrepreneur facing the ABC in the next chapter.

2.10 Conclusions on the Austrian School

Although much of the Austrian theory is mostly similar to conventional economics, we find there are some major aspects which set it apart. The Austrian emphasis on *time*, *uncertainty* and on capital as a *structure* might be what significantly separates it from mainstream economics. The implication of intertemporal disequilibrium and uncertainty (agents act on incomplete information) clearly sets Austrian economics apart from conventional economics.

Furthermore, Austrian economics does not attempt to construct mathematical decision rules, which is an implication of the uncertainty and incompleteness of information in economic phenomena. This also implies that the ability to make accurate forecasting is not viewed as the goal of economics as a science.

In our further analysis, these key aspects will be the basis for distinguishing the Austrian school from conventional economics.

3. The Entrepreneur

3.1 What is Entrepreneurship?

When talking of entrepreneurship, it is not entirely clear what exactly is meant. In general, most people refer to entrepreneurship as the process of starting new businesses and the entrepreneur being the visionary owner of this new business. However, there are many interpretations of what exactly entrepreneurship is. We will here review some of the explanations of entrepreneurship and then build on these to construct a theory of entrepreneurship in accordance with Austrian theory.

One of the earliest notions of entrepreneurship was made by 18th century economist Richard Cantillon. Cantillon defines the entrepreneur as “the person who buys at a known price to sell at an uncertain price” and being at the core the economic process in a market economy (Murphy, 1986). This definition clearly involves the entrepreneur as being a risk-taker, assuming his own judgments about future prices are the correct ones.

Joseph Schumpeter is widely acknowledged for his work on entrepreneurship. His definition links entrepreneurship to innovation, and entrepreneurs being those who implement innovation within markets. This entrepreneurial change has 5 manifestations. 1) the introduction of a new (or improved) good; 2) the introduction of a new method of production; 3) the opening of a new market; 4) the exploitation of a new source of supply; and 5) the re-engineering/organization of business management processes (Ahmad & Seymoure, 2008). Schumpeter’s definition does not imply that the entrepreneur must be an inventor himself, only that he implements it and thus bring about change in the economy (Hagedoorn, 1996, p. 889).

Furthermore, the Schumpeterian entrepreneur need not be a business owner or risk-taker. Schumpeter also views entrepreneurial activity as disturbing the economy’s equilibrium state and being a source of business cycles. The entrepreneur is understood as a *disequilibrating* factor (Kirzner, 1973). Following this logic, the economy would be in equilibrium when absent of entrepreneurial activity. Rothbard criticizes his theory for having no relation to the

real world and being “a mere exercise in equilibrium logic leading nowhere” (Rothbard, 1987).³

Frank Knight (1921, 1935) emphasizes the bearing of uncertainty as the key aspect of entrepreneurship, uncertainty being the source of profits and losses. The Entrepreneur receives a profit when his judgments about uncertain future conditions prove to be correct. We clearly see the resemblance with Cantillon’s definition. Knight’s theory of profit and uncertainty will be given more attention in section 3.2.

Ludwig von Mises (1949/1996) describes the entrepreneur in a similar way as Knight. The entrepreneur, according to Mises, is someone who deals with the uncertain conditions of the future. Since human action is always aiming at the future, there is an element of entrepreneurship in all human action. However, for the sake of illuminating economic phenomena one must narrow the concept of entrepreneurship down to what it means in a *Catallactic* context. In this sense, Mises argues:

The specific entrepreneurial function consists in determining the employment of the factors of production. The entrepreneur is the man who dedicates them to special purposes. In doing so he is driven solely by the selfish interest in making profits and in acquiring wealth. But he cannot evade the law of the market. He can succeed only by best serving the consumers. His profit depends on the approval of his conduct by the consumers. (Mises, 1949/1996, p. 290)

It is not hard to envision entrepreneurs who are not solely motivated by profits, but one must realize that profits are a *mean*, not an *end*. Where the entrepreneur to disregard profits completely he would lose his capital and not be able to fulfill whatever desires he might have.

Determining the employment of resources implies control of the resources to be employed. Whether control of resources implies ownership will be discussed later.

Mises’ description of entrepreneurship has many commonalities with that of Frank Knight’s. Uncertainty, as opposed to risk, is the key to unlocking the origins of profits and loss. Uncertainty is a result of change not predictable in a scientific way. The economy as a

³ For a thorough critique of Schumpeter’s theory see Rothbard (1987) available at https://mises.org/journals/rae/pdf/R1_6.PDF

dynamic and ever changing phenomenon stands in contrast to modern teachings of economics where equilibrium is at the core. The neglect of entrepreneurship in modern analysis is a direct consequence of the general preoccupation with final equilibrium positions (Kirzner, 1979).

Austrian school economist Israel Kirzner defines the entrepreneur as a recognizer of profit opportunities. Kirzner employs a rather peculiar construct to illuminate the entrepreneurial process. First of all, he uses the notion of *spontaneous learning*, meaning the sudden recognition of a profit opportunity or in a more general sense; a chance for improved satisfaction. The agent's ability to recognize such opportunities is dependent on his own *alertness*. Once such an opportunity is recognized as beneficial, it becomes a resource (Gunning, 2000).

The entrepreneurial process, in this sense, is the alertness to and recognition of profit opportunities. Once recognized, profits are realized through pure arbitrage and the entrepreneur becomes in essence an *arbitrageur*. In Kirzner's construct of a pure entrepreneur economy, agents are divided into pure entrepreneurs and Robbinsian economizers. This construct is a market where consumers and resource owners are strictly Robbinsian economizer, exclusively price-takers whose role it is to "use *known* available resources in the most efficient manner to achieve given purposes" (Kirzner, 1979, p. 6). The pure entrepreneurs are solely responsible for the changes in prices, production methods and quantities. By uncovering profit opportunities, the pure entrepreneurs provide new knowledge for the Robbinsian economizers to act upon.

Kirzner's construct does not go a long way in describing the real world. It is more of an analytical tool to understand the formation of prices and the equilibrating nature of entrepreneurship. That is, the present Robbinsian allocation is wrong from the point of view of an omniscient entrepreneur. The entrepreneurial function ensures this allocation comes closer to equilibrium.

Kirzner also makes a clear distinction between entrepreneurship and resource ownership.

We must stress that all, but Schumpeter's theory, views entrepreneurship as an equilibrating force. In Austrian theory, the actions taken by individuals are inherently equilibrating, and thus entrepreneurship must be so too. This might come as a surprise to those who regard

Schumpeter as an Austrian School economist. Schumpeter is not regarded as an Austrian economist by contemporary Austrians.

From these different approaches to entrepreneurship it is not easy to make any conclusions. What is clear is that entrepreneurship as future oriented and as a source of change is present throughout these descriptions. For now we can conclude that human action itself is entrepreneurial as it aims at improving expected utility in the uncertain future.

However, it still remains to define entrepreneurship in a market economy context. In order to do so, we must have a clear definition of the goals of the agents organizing the productive process of an economy.

If relying on Mises' human action axiom, that humans act to remove felt uneasiness, we must define what goal entrepreneurs are aiming at to distinguish them. We will assume that in general the goal is to obtain financial profits. However, it still remains to explain what exactly profits are.

3.2 Uncertainty, Risk and Profits

To define financial profits Foss & Klein (2012) turn to the works of Frank Knight. Knight views profits as a payment for the successful bearing of uncertainty as opposed to risk-bearing. Risk, according to Knight is what can be measured in a scientific way, while uncertainty being that which cannot. Risk can be calculated by acquiring data on a sufficient number of similar cases to make an informed estimate of expected losses. Such *statistical* probability, as opposed to *a priori* probability, is the kind of problem most often encountered by businesses (Knight, 1921, 1935, p. 215).

The risk associated with a particular field of business can then be viewed as a fixed cost. The statistical method cannot tell us with certainty what this cost will be in any particular case, but given sufficient number of similar cases in a sufficient time space it can give us a good estimate. This is of course the basis for insurance.

The risk-premium paid to an investor, is compensation for expected losses. If we assume no change, and thus, no uncertainty about the future, the investor who stays in a particular

investment for a sufficient period of time would receive no more than the pure time-preference interest rate. Given that the risk is calculated correctly, the risk-premium should just offset losses over the same period of time, so that the particular investment yields no more than other investments.

In a world that doesn't change, where the economy has reached equilibrium, there are no profits or losses. It is the real world we are interested in and the fact that the real world does change, and so do consumer preferences, introduces what Knight terms uncertainty. This is an uncertainty about the future. In an economic context, this is uncertainty as to what to produce and how to produce it.

The origin of profits is getting ones predictions right. Likewise, the origin of losses is getting them wrong. Since production takes time and the rearrangement of resources as well, the businessman must make a prediction today about what consumers will prefer in the future. According to Knight, this process of making judgments about the future and bearing uncertainty is the essence of entrepreneurship. However, being right or wrong about future consumer preferences does not suffice to explain how profits are generated. This judgment about the future must necessarily have some physical manifestation.

Mises (1949/1996) explains the origin of profits as the action taken when an entrepreneur believes the market's expected *discounted marginal revenue product* (DMRP) of a factor of production is less than his own expectation. The entrepreneur anticipating demand for a particular good going up in the future, also, by definition, assumes the DMRP of factors of production to go into this particular good to be higher. If the market does not share his vision of the future, the entrepreneur will be able to buy these factors of production at a discount (in the eyes of the entrepreneur). If the entrepreneur's expectations about the future turn out to be right, he will receive a profit. The profit consists of the discrepancies between the factors' price at the time of buying, and what they ought to have been, taking into account what future conditions turned out to be. Mises puts it neatly:

If all entrepreneurs were to anticipate correctly the future state of the market, there would be neither profits nor losses. The prices of all the factors of production would already today be fully adjusted to tomorrow's prices of the products. In buying the factors of production the entrepreneur would have to expend (with due allowance for the difference between the prices of present goods and future goods) no less an amount than the buyers will pay him later for the product. An entrepreneur can make a profit only if he anticipates future conditions more correctly than other entrepreneurs. Then he buys

the complementary factors of production at prices the sum of which is smaller than the price at which he sells the product. (Mises, 1949/1996, p. 293)

Profits are then the result of getting resources to their highest valued uses. As consumer demands are constantly changing, entrepreneurial activity must go on perpetually in all businesses, if they are to receive profits. Entrepreneurs can then be said to play catch-up with an ever changing equilibrium state. Those who get closest to this state receive the biggest reward.

The entrepreneurial activity can be said to be the driving force of the market economy. Through profits and loss, ownership of resources is shifted from the less efficient to the more efficient entrepreneurs. The entrepreneur's efficiency is determined by his ability to comply with consumer's wants. The entrepreneur is subject to the sovereignty of consumers (Mises, 1949/1996).

While on the topic of profits and loss, it is worthwhile to mention its relevance to economic calculation and the *socialist calculation debate*. Without the feedback mechanism of profits and loss, entrepreneurs will not know what the most urgent consumer wants are. If they were to guess it correctly, "they would lack the means to adjust production accordingly" (Mises, 1949/1996, p. 299). This insight is of outmost importance in understanding the workings of a market economy and the structural problem of any socialist state or organization not relying on private ownership and free exchange.

The absence of profits and losses makes for economic chaos. This is what happens in a socialist economy where there are no market-prices for factors of production. It is the same with public sector where service providers are not subject to market forces. Efficient allocation of resources is dependent upon the guiding hand of profits and losses.

This dynamic view of the economy and emphasis on it not ever being in equilibrium implies also that there is no such thing as a "normal rate of profit". Furthermore, "capital does not beget profit. Profit and loss are entirely determined by the success or failure of the entrepreneur to adjust production to the demand of the consumers," (Mises, 1949/1996, p. 297).

3.3 Judgment as entrepreneurship

Following the insights of Frank Knight and Ludwig von Mises, Foss and Klein (2012) make their case for judgment as the crucial element of entrepreneurship. Following the logic of Knight's theory of profit, the key to obtaining profits is having good judgment about the future. The entrepreneur with better judgment will also be the more efficient one.

This particular form of judgment is based upon what Foss and Klein refers to as tacit knowledge. This knowledge can neither be taught nor learned. This is not to say that experience and skills do not play their part. The formulation of decision problems, imaginative skills, analytical skills and skills at collecting data are useful when trying to realize an entrepreneurial venture (Foss & Klein, 2012). However, they are only complimentary to judgment. Two persons having the same skills might arrive at two different conclusions as a result of this last ingredient, judgment.

Judgment must not be mistaken for forecasting. Forecasting is a tool, but judgment is necessary to interpret the results given by forecasting. Judgment implies making a decision in the absence of any clear decision making tool.

When faced with the problem of dealing with what Mises refers to as *case* probability or cases where one must rely on *estimated* probability, to use Knight's term, the entrepreneur must form tacit probability estimates (Foss & Klein, 2012). Thus the entrepreneur relies upon his judgment where no clear decision rule exists. This is the problem faced when allocating current or new resources for satisfying future preferences. The uncertainty facing the entrepreneur can only be dealt with through his good judgment. Since profits are a result of the successful bearing of uncertainty and successful bearing of uncertainty relies on good judgment, profits are a result of good judgment. Losses, on the other hand, are the result of unsuccessful bearing of uncertainty i.e. poor judgment.

3.4 The Capitalist-Entrepreneur

We now have defined the essential feature of entrepreneurship as being judgment about the future and the successful bearing of uncertainty as the source of profits. It still remains, though, to define exactly who the entrepreneur is. As we have mentioned earlier, this view of the entrepreneur can be said to apply to all human action. We must clearly define the entrepreneur for the purpose of studying entrepreneurship in a *Catallactic* context.

When we talk of profits and losses it is financial profits and losses that are of interest. The same goes for uncertainty.

Since decisions cannot be sold or purchased, a market for judgment does not exist. The entrepreneur cannot sell judgment (as opposed to advice) and this implies ownership of the resources to be allocated towards uncertain ends. In the event an employee allocates resources on behalf of the owner, the owner may at his own discretion overrule the employee's decision. If the employee's salary is dependent on the successful allocation of these resources, it is still just compensation reflecting his marginal revenue product. If he is performing his task poorly, his labor has a low marginal revenue product in its current use. The entrepreneurial judgment was exercised when the owner decided to leave the particular resource allocation decision to this employed person's judgment. In doing so the owner might be successful or fail. The outcome is a result of the owner's organizing of heterogeneous resources.

For the sake of studying the market economy it is the capital-owning entrepreneur we are interested in. Rothbard (1962/2001, p. 463) terms this the *capitalist-entrepreneur* as opposed to a pure entrepreneur only making judgments, but who is not in a position to receive profits, and the pure capitalist who steers clear of uncertainty and only receives interest on his capital.

It is this notion of the capitalist-entrepreneur, which best describes the controlling agents of the production process of the modern economy. To make sense of what goes on in the economy, we will view the economy through the capitalist-entrepreneur lens.

The capitalist-entrepreneur must buy factors of production in the present and the product which these are used to produce, must be sold in the future. In order to obtain profits, he

must be on the lookout for situations where factors' DMRP does not reflect their true future value i.e. the factors are under-priced.

If the capitalist-entrepreneur correctly judges the true DMRP of factors he will gain a profit, since the market *under-prices* these factors at the time he buys them. However, once acting upon his recognition of this profit opportunity, the result will be a tendency to eliminate these profits. As he extends production in this particular process, he will increase demand and price of these factors of production. In addition to this, the fact that he receives a profit will attract other capitalist-entrepreneurs to the same area. Then the increased demand will further raise input-prices and the increased supply will reduce output-prices (Rothbard, 1962/2001, p. 465).

This process ensures that resources are allocated to their highest valued uses according to consumer preferences. Upon recognizing a profit opportunity, the capitalist-entrepreneur is willing to bid resources away from those who employ them for less valued purposes. Losses in one process makes sure resources are made available for other processes. Thus, the structure of production is synchronized to the highest extent possible with consumer preferences through the actions of profit-seeking capitalist-entrepreneurs. The extent to which they are able to approach equilibrium is dependent on their judgment, quality and availability of information, institutional factors as well as how volatile consumer preferences are. Reorganizing the production process takes time and money, so the quicker and cheaper it can be reorganized, the better for the economy.

3.5 The entrepreneur and the business cycle

Having a clear definition of the capitalist-entrepreneur (henceforth just entrepreneur) it is time to revisit the Austrian business cycle theory. Entrepreneurial mistakes are at the core of ABCT and it is useful to elaborate on this now that the entrepreneurial process has been discussed.

Let us, however, first consider Crusoe on his island. In a Crusoe economy, the allocation of resources towards the satisfaction of future wants is a trivial problem. Crusoe, having very

limited options and naturally a superb knowledge of the islands only consumer's preferences, can easily direct his efforts and resources to their best possible uses.

In an advanced market economy, the allocation of resources is of course a much more complex matter. The entrepreneur can direct his resources to a multitude of uses. To know what use is the most valuable, the entrepreneur relies on market prices in the form of units of the medium of exchange i.e. money, which enables him to calculate profit and loss as well. Thus, money-prices are the basis for economic calculation and the conveyor of information regarding the relative value of different resources and the relative value of different uses of these resources. The importance of money calculation can hardly be exaggerated.

Monetary calculation is the guiding star of action under the social system of division of labor. It is the compass of the man embarking upon production. He calculates in order to distinguish the remunerative lines of production from the unprofitable ones, those of which the sovereign consumers are likely to approve from those of which they are likely to disapprove. Every single step of entrepreneurial activities is subject to scrutiny by monetary calculation. The premeditation of planned action becomes commercial precalculation of expected costs and expected proceeds. The retrospective establishment of the outcome of past action becomes accounting of profit and loss. (Mises, 1949/1996, p. 229).

Economic calculation can only be achieved in presence of market prices based on private ownership of resources. Private ownership and actual market exchanges are necessary to establish prices based on individuals' subjective value scales. By this we mean that prices must be established through voluntary human action. What people *think* prices should be does not suffice, because their answer would be influenced by their own subjective value scales. The buyer and seller would surely prefer different prices. The prices of interest are the realized prices, which we can obtain by observing actual transactions in the market place.

Example 3.1 Economic vs. technical calculation

The classic example used to distinguish economic calculation from technical calculation is the case of the engineer and the bridge. An engineer can easily calculate if a bridge can be built to cross a particular river. He can calculate how much resources must be spent in its production and how much time it will take to finish it. What is achievable with today's resources and technology is a matter of technical calculation through the established sciences and units of measures. So in this case the engineer can easily determine whether the bridge

can be built or not. However, in order to determine if the bridge *should* be built, we rely on economic calculation and the consideration of alternative cost.⁴

So to allocate resources economically the entrepreneur must rely on market prices in the form of money. In a free market place these prices are determined by three factors: the supply of a resource, the demand for a resource and the purchasing power of money. Changes in prices can come about through changes in any of these three factors.

Relevant to the efficient allocation of resources are the real changes in the supply and demand of particular resources. Price changes induced by a lower or higher purchasing power of money can come about by a change in demand or supply of money itself, and are not reflecting any real changes in resource availability. Such changes introduce noise in economic calculation.

It is clear then, that such changes in prices will result in the misallocation of resources if they are not accounted for by the entrepreneur. ABCT states that market prices are distorted by the actions taken by monetary authorities. A monetary expansion will result in a lower interest rate, but also Cantillon-effects depending on how the money enters the economy. Such actions will therefore lead entrepreneurs astray.

A common criticism of the ABCT is that it takes entrepreneurs to be stupid. Entrepreneurs familiar with economics and the operations of the central bank will not be led astray by temporarily reduced interest rates. While this might be true in the case of interest rates it is not so in the case of Cantillon-effects which can exist in multiple places in the economy and with different intensities. In any case, it is not a simple job to accurately predict when interests will rise again nor is it easy to determine the relevant price deflator for any particular good. Figure 3.1 shows the Norwegian central bank's interest rate projections compared to the actual rate. Predicting future rates does not look like an easy task, even for those who control it. In the absence of policy induced bubbles and busts, one might expect it to be less of a concern.

⁴ We find it amazing how often this lesson is neglected in modern societies, particularly in the spheres of government.

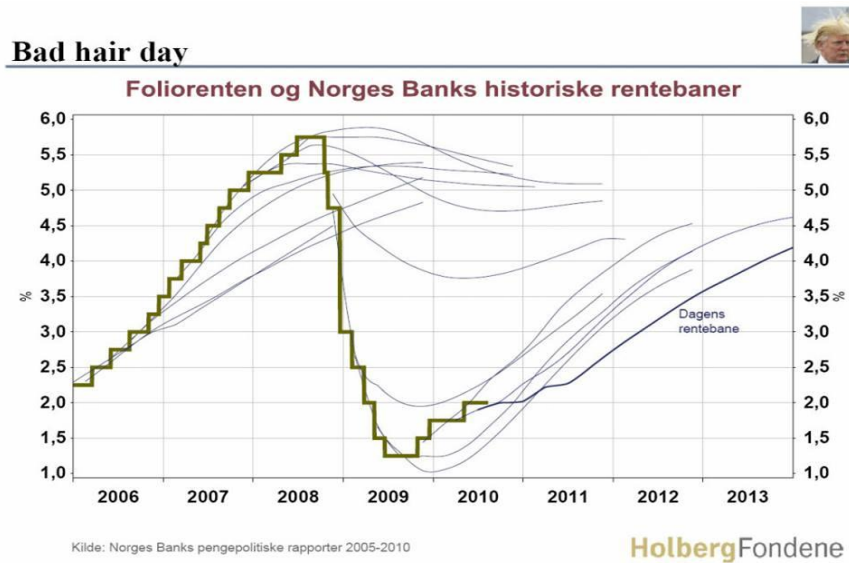


Figure 3.1 Interest rate projections and actual key policy rates. (Nettavisen, 2010)

According to the Austrian school, the general inflation of the money supply and rise in the CPI are not made insignificant by the mere expectations of these changes by entrepreneurs and consumers. As long as the interest rate is hampered with, entrepreneurs can never know what the interest rate should really be. It is not simply a question about if and when interest rates will rise. Furthermore, adjusting for inflation is not as simple as employing the CPI-deflator to any good's price. Following the logic of Cantillon-effects, each and every good has its very own deflator.

Example 3.2 Expectations and inflation

Consider an engineer in his workshop. What if we were to manipulate his measuring tools so that the centimeters on his rulers became smaller every year? Furthermore, we made kilograms a bit lighter, his scales showing a smaller number as time went by. Conventional economic theory will have us believe that as long as the engineer knows the rate at which his measuring tools are changing, he will still be able to perform the necessary calculations. However, this example needs some modifications. Let us rather say that his measuring tools shrink at an average rate 2.5 % every year. This leaves the possibility that some of the tools are not shrinking and some might even be getting bigger. In such chaos only the crudest of constructions could be realized.

Our analogy might leave much to be desired, but it illustrates the crucial point of ABCT. Monetary expansion leads to the general decay of entrepreneurs' most important decision-making tool; monetary calculation based on market prices.

We must emphasize that any medium of exchange is capable of introducing noise to economic calculation. Perfect money would be something that never changed value in the eyes of humans, so that any change in the market prices was due to real changes in supply and demand of the goods and services themselves. Such money is unrealizable. Still the critique of monetary authorities stands, since any price which is not the result of voluntary market exchange must simply be regarded as the wrong price and not fit for economic calculation.

The entrepreneur faced with the distorted market-prices induced by a monetary authority has a hard time deciding where to allocate his resources. Even if he knows prices to be inflated in a particular field of the economy, he might convince himself to invest there. If he can get out in time, which is before the inflation stops, there might be huge profits to be secured. In modern times, authorities have introduced further moral hazards by bailing out these entrepreneurs; ensuring resources stay in the hands of unsuccessful gamblers.

According to ABCT, the reluctance of both monetary authorities and governments to allow the economy to rearrange its capital structure when monetary expansions are halted; ensures a prolonged state of economic recession. The actions taken, such as further monetary expansion and the bailing out of failed businesses are futile attempts to preserve a capital structure not in synch with consumer preferences. On top of this, it ensures that resource ownership stays in the hands of those who have proven their incompetence, prohibiting successful entrepreneurs in attaining ownership of these resources.

3.6 Conclusions on the entrepreneur

We now have a clear definition of the entrepreneur as an uncertainty-bearing decision-maker relying on his own judgment and monetary calculation based on market prices, to best allocate resources between different uses and intertemporally. The entrepreneur's goal is to make profits in the catallactic sense, and this is achieved when resources are bought at a price lower than their true DMRP. The entrepreneurial process can then be summed up as the following:

1. *Market disequilibrium*

The market is in disequilibrium due to ever changing consumer preferences. This implies the presence of profit opportunities.

2. *Judgment*

Relying on his judgment and limited information, an individual decides what action best suited to bring the market closer to equilibrium and thereby realizing a profit.

3. *Allocation of resources*

If the individual decides to act, he must allocate resources in order to realize potential profits. This involves changing the structure of production. The individual now becomes an entrepreneur, putting his own resources at stake.

4. *Market test*

After the allocation of resources is made, the market test will decide if the entrepreneur's investment is profitable or not.

5. *Equilibrating forces*

If the entrepreneur is successful, his investment will not be liquidated and the profits he receives will promote more of the same investment. If unsuccessful, the investment must be liquidated, so that resources are freed up for other uses. This brings the market closer to equilibrium.

This must be understood as a continuous process, going on indefinitely. The economy is then never truly in equilibrium, just more or less in disequilibrium. An economic crisis might then also be described as when the market suddenly realizes that the equilibrium position is far away from where it was believed to be.

To clarify the possible exception when an entrepreneur is willing to forego financial profits for the sake of some other preferred reward (e.g. charity or the ability to produce something of personal interest) it must be pointed out that profits in the form of money is just a mean for realizing ends. To the extent an entrepreneur is willingly foregoing a better investment opportunity he is subsidizing his current investment. He actually becomes a consumer and uses his money to uphold a structure of production, not sustainable where it not for his own specific preference for consuming the products or services rendered by this specific process.

When an entrepreneur stops targeting financial profits, and let his own personal preferences determine where to invest, he is really increasing his consumption. The specific investment made on these grounds can only be sustained as long as the entrepreneur can direct profits

from other investments to sustaining this unprofitable investment. The question is if such an investment should be called entrepreneurial. If the entrepreneur knows that the investment only can survive with him subsidizing it, and he is intent on doing so, there is no uncertainty involved, and hence it is not entrepreneurial. In this sense only profit seeking individuals can be said to be entrepreneurs. It can be argued that there exists uncertainty as to if the non-financial goals, whatever they might be, of the investor will be realized. But this uncertainty is outside the boundaries of catallactics.

To sum up, we regard only the profit-seeking investor as an entrepreneur and that entrepreneurial judgment is judgment about the allocation of future use of resources. In contrast to the mainstream understanding of entrepreneurship, we view entrepreneurship not as the starting of new businesses, but as an ongoing process that must be present in any firm if it is to survive. Furthermore, we view entrepreneurship as an equilibrating force, bringing the economy forward in its chase for profits.

4. The theory of the firm

4.1 Why the firm?

The question remains as to why the economy is organized in the manner it is, consisting of firms, owners and employees. We can imagine the production processes of an economy still going on in an economy consisting of a multitude of independent, self-employed individuals contracting with each other. We will offer two complementary explanations as to why the economy's production processes is organized in this way.

4.1.1 Ronald Coase and the transaction costs view

Ronald Coase (1937) seeks to explain the emergence and boundaries of the firm through agents economizing on transaction costs. The distinguishing mark of the firm is assumed to be "... the supersession of the price mechanism," (ibid. p. 389). Coase points to the fact that

organizing production merely through the price mechanism involves costs of discovering what the relevant prices are and negotiating separate contracts for every exchange transaction.

These costs, according to Coase, cannot be eliminated completely, but can be greatly reduced by organizing production within a firm. The multitude of contracts necessary for the owner of a factor of production to cooperate with other factor owners, are substituted for one single contract. Coase points out that the character of the contracts substituted is of a nature where a factor of production enters a firm for a fixed or fluctuating remuneration and agrees to obey the entrepreneur within certain limits. In contrast, were the entrepreneur to obtain ownership of this factor, there is no remuneration or limits to the factor's use.

Furthermore, Coase argues that there may be a desire to make long term contracts to avoid certain costs incurred with the making of each new contract. It may also be preferable to make long rather than short-term contracts due to the risk attitude of the parties concerned. However, the making of such contracts is made difficult due to the problems of forecasting.

When the direction of resources is dependent on an entrepreneur's judgment instead of the price mechanism, a firm can be said to exist. Within the scope of this firm, costs that would otherwise emerge due to the use of market exchange contracts, otherwise known as *transaction cost*, will be eliminated.

Based on the economizing on transaction costs, Coase is able to explain why the firm emerges. But the question remains as to why there does not emerge one giant firm; eliminating all transaction costs. To answer why firms do not keep growing, despite the promise of monopoly gains and reduction in marketing costs and transaction costs, Coase suggests that the two following arguments are the most probable.

First, there might be that the cost of organizing additional transactions within the firm might be rising. If so, there must be a point where the organizing of one additional transaction within the firm equals the cost involved by carrying it out in the market place. Secondly, there is the possibility that when transactions are organized, the entrepreneur fails to allocate factors of production to their most valued uses. Again there would be a point where the benefits of organizing transactions within the firm would be outweighed by the loss incurred through wasteful use of resources. This second argument resembles the argument Mises makes in his critique of socialism.

With regards to the explanation of firm size as dependent on its cost curve, Coase argues that as long as more than one product can be produced, there is no reason why an upward sloping cost curve should limit the size of the firm.

It is worthwhile to elaborate on what exactly is meant by firm size when talking of transaction costs. When organizing transaction costs within a firm, it is the transactions otherwise made upstream or downstream from the firm which are in question, also known as backward and forward integration. So the size in question is how much of a particular production process is organized in one firm. To help visualize this, it is useful to revisit the Austrian capital structure.

Figure 4.1 illustrates the total intertemporal production structure of tires sold to a specific market. Consider a business selling tires to consumers in the last stage of triangle. If the entrepreneur controlling this business believes it to be economical to organize the transactions with the distributor and producer of the tires, he can merge with or buy these businesses. By doing so he is increasing the intertemporal size of the firm.

If, on the other hand, he were to increase the size of his firm by selling more tires, the increased size of the firm does not automatically imply organizing more transactions. It is then a question of scale. Transaction costs can of course be dependent on scale if increased scale necessitates an increased number of contracts. This again might make it more economical to integrate if such an assumption is made. Figure 4.2 shows cost of organizing and cost of transactions depending on number of contracts necessary to realize a certain production level in a specific business.

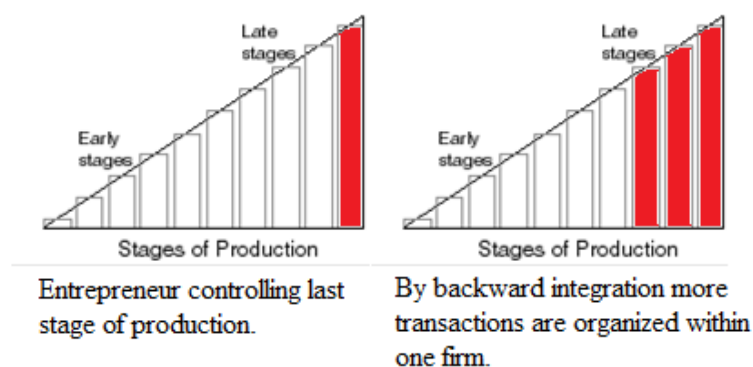


Figure 4.1 Increase in intertemporal firm size.

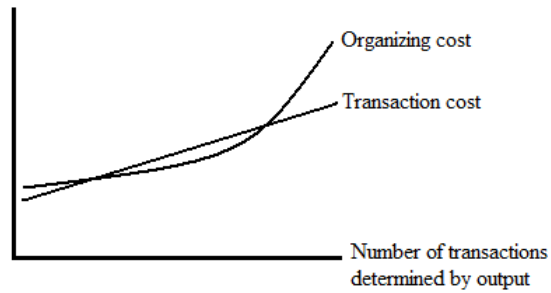


Figure 4.2 Organizing and transaction costs.

For this particular business small scale production does not qualify for further integration of transactions, but as production rise so does transaction cost. Since organizing costs rise at a slower rate at first, there is a point where further integration becomes economical. However, at one point the marginal cost of integrating one more transaction becomes higher than the cost of making this transaction in the market place. At this point further integration is not economical. In the discrete and discontinuous real world it is of course a much harder task to find this optimum.

The determination of a firm's vertical boundary based on transaction and organizing costs is a theory which has received much attention since Coase's seminal analysis from 1937. However, we contend that even though Coase's analysis goes a long way in describing one aspect of the firm, economizing on transaction costs, it does not sufficiently answer why the firm emerges.

Coase's argument rests on the notion that production processes could be carried out in the absence of firms. Although this may be true, it leaves the question of how these production processes could ever come about. Who organized these production processes and how were they paid?

In a world of uncertainty, the organizing of production processes involves putting resources at stake. Even if this organizing service could be purchased in the market place, it is not clear who the buyer is or what the organizer should be paid.

We find that the notion of transaction costs describes one of a firm's functions, but does not answer the essential question of why firms emerge. If transaction costs are the decisive factor leading to the formation of firms, there should be no need for firm creation in a world of no transaction costs. However, in a world with no transaction costs there still is the

problem of organizing and experimenting with new production processes, and how this process will come about. We find Coase's theory to be insufficient in this regard.

4.1.2 The Austrian theory of the firm

From an Austrian perspective the emergence of firms must be explained by the actions taken by market participants and their motives for doing so. Foss and Klein (2012) argues that in general, agent may realize returns from their human capital through three means: 1) Selling labor services on market conditions; 2) entering into employment contract; or 3) starting a firm. For a person whose services are difficult to measure, option 1) and 2) are inefficient means for realizing these returns. The person whose services are of this kind, becomes "... an entrepreneur, employing and supervising other agents, and committing capital of his own to the venture, thus contributing a bond" (ibid. p. 164).

Foss et al. (2006) argues that when entrepreneurial judgment is complementary to resources, it makes sense for the entrepreneur to own these resources, since entrepreneurial judgment is costly to trade. The notion that entrepreneurial judgment is costly to trade follows the logic of Knightian profits and uncertainty. After all, the entrepreneur believes himself to be right and everyone else to be wrong about current and future prices. If the entrepreneur is confident in his judgment about the future, it makes sense for him to acquire ownership of these complimentary resources in order to capture the profits he believes he can realize.

Knight (1921, 1935) makes the argument that in the case where the reward is uncertain, as with profits, a person would not willingly accept to be directed in his efforts without some guaranteed reward. This can be said to be the case with entrepreneurial judgment. In order to exercise his judgment to the full extent, the entrepreneur must have complete control of the resources required.

In order to exercise his judgment, the entrepreneur must have control, and in order to have control he must have ownership. The firm can then be viewed as "the entrepreneur and the assets he owns, and ultimately controls" (Foss & Klein, 2004). The theory of the firm is then:

essentially a theory of how the entrepreneur exercises his judgmental decision-making – what combinations of assets will he seek to acquire, what (proximate) decisions will he delegate to subordinates, how will he provide incentives and employ monitoring to see that his assets are used consistently with his judgment, and so on. (ibid. p. 8-9).

The firm is an extension of the entrepreneur himself; the physical manifestation of his judgment.

The emergence of firms can then be explained by the lack of complete markets for judgment, necessitating that the individual invests and bears uncertainty on his own. Since optimal uses of assets cannot be known *ex ante*, Foss et al. (2006) makes the argument that entrepreneurial activity has a need for controlled experiments in order to uncover how capital and resources are best applied. If so, the system must be isolated from outside disturbances and controlled in some way, necessitating the formation of a firm.

These arguments go a long way in explaining the emergence of firms, but it remains to explain the boundaries of the firm.

We have previously touched upon the argument put forth by Mises, and elaborated upon by Rothbard, regarding economic calculation in a socialist system. The argument is that in order to perform economic calculations it is necessary to have a functioning market for capital goods as well as consumer goods. This is the basis for calculating profits and loss. In the absence of a market for capital goods, such as in a socialist state, it is impossible to perform economic calculation since profits and losses cannot be determined.

As a firm grows bigger the use of internally traded intermediate goods, for which no external market reference exists, “...introduces distortions that reduce organizational efficiency” (Klein, 1999, p. 28). This imposes an upper limit for firm size as economic calculation and efficient allocation of resources becomes impossible. As Klein points out:

“Central planning” within the firm, then, is possible only when the firm exists within a larger market setting (ibid).

An historic example of this might be the Soviet Union. The Soviet Union can be understood as giant firm existing in a global economy. The fact that there existed many open markets for goods outside the Soviet Union gave the Soviets proxies for how they should price resources

within their own system. Without these external markets we can assume that the Soviet Union would have collapsed much sooner.

We clearly see that there is an opposing force to the benefits of organizing transactions within a firm and the attainment of property rights to resources. However, to further explore firm size it is necessary to revise to textbook model of the firm from the capitalist-entrepreneur point of view, which will be done in section 4.2.

From an Austrian perspective we can conclude that the firms emerge as a mean for entrepreneurs to realize returns to their judgment. When judgment is complimentary to a resource it makes sense for the entrepreneur to own this resource. This can be understood as a sort of horizontal integration of his judgment and the resource. In the event judgment is sold on the market as advice, or a person is hired by an entrepreneur in an advisory role, the entrepreneurial judgment is still performed by the resource owner in accepting or rejecting these advices.

In world of Knightian uncertainty, entrepreneurial activity also involves putting resources at stake and whoever owns these resources is exposed to potential losses. The immeasurable, and hence uninsurable, nature of uncertainty suggests that the resource owner must have the same expectations as whoever controls his resources, or at least partially. If the resource owner has expectations he will allocate his resources accordingly, or he might hire someone whose judgment he deems better suited for allocating his resources. In both instances the resource owner ends up as the entrepreneur.

4.2 An entrepreneurial model of the firm

The Austrian theory of the firm establishes the firm as an extension of the entrepreneur, or rather the capitalist-entrepreneur, but it still remains to investigate if this alternative theory has any implications whatsoever. To do this we rely on the standard production model of the firm in micro-economics, as this serves as a useful heuristic tool although not perfect.

The standard production function model of the firm is one with severe limitations with regards to the real world. Coase (1937) makes the point that with regards to firm size this

model assumes an upward sloping cost curve to be the limiting factor. However, this assumes that only one product can be produced. A firm can of course engage in many such production functions, maximizing ROI, and the model as such cannot have practical significance in determining firm size, according to Coase.

Gabor and Pearce (1952) make a similar argument as Coase with regards to there being more than one investment opportunity and this having an effect on output. Furthermore, they make the case for adjusting the model to reflect real accounting principles where returns to capital or dividends are not treated as a cost. They also argue for a maximization of ROI rather than profit-maximization and point out how ownership structures can affect level of output.

Klein (1999) adopts Gabor and Pearce's ownership perspective where the firm is recognized as an investment. In this case, the firm's objective is to maximize return on invested capital. Money capital in this view is not simply regarded as a factor of production and a cost to the producer. Money capital in this view is regarded as a unique factor of production, or rather a *controlling* factor of production as opposed to land, labor and physical capital as *contracting* factors. These contracting factors receive a fixed or agreed upon payment, while the controlling factor receives the net proceeds of the operation. The efficient scale of productions is then determined by factors outside the firm, such as other investment opportunities and availability of money capital. It is the entrepreneur who, through his allocation of money capital, determines the level of output of the firm and hence the corresponding product price.

A model of the firm building on Austrian principles must then have capital as a scarce and limiting factor, a *controlling* factor of production. The *contracting* factors of production going into a production process are the physical manifestation of the fact that financial capital was allocated for this purpose.

4.3 ROI vs. Profits

The basic premise for the standard production-function view of the firm is that the manager, or whoever controls this decision, wants to maximize absolute profits. This is given by the adaptation of *marginal revenue equals marginal cost* solution. One critique of this model is

function. We assume all inputs are bought at $t=0$ and outputs sold at $t=1$. The capital requirement function includes the outlays for total cost and a fixed investment of 500.

$$\text{Capital requirement} = 40Q + 0,5Q^2 + 1000$$

If instead of maximizing profits, the owner wants to maximize ROI, we get a solution where $Q = 24,75$ and $\text{ROI} = 16,22\%$ and a price of 87,625 as opposed to the profit maximizing solution where $Q = 30$ and $\text{ROI} = 15,09\%$. Figure 4.4 shows these two different solutions.

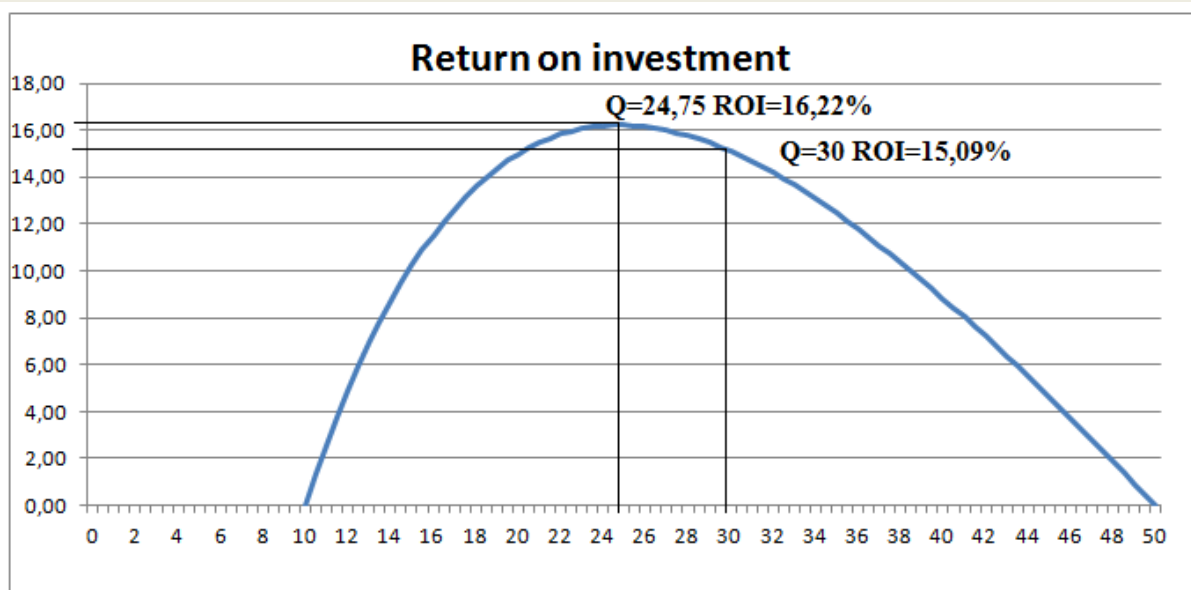


Figure 4.4 Return on investment

As example 4.1 shows us, our assumptions about the entrepreneur's goal has impact on output and price. The difference between the solutions depends on the specific nature of the firm, or rather production process, at hand. Note that the less capital needed for sustaining a given production level, that is; inputs and outputs are purchased and sold more than once between $t=0$ and $t=1$, the smaller the difference becomes. This is shown in figure 4.5.

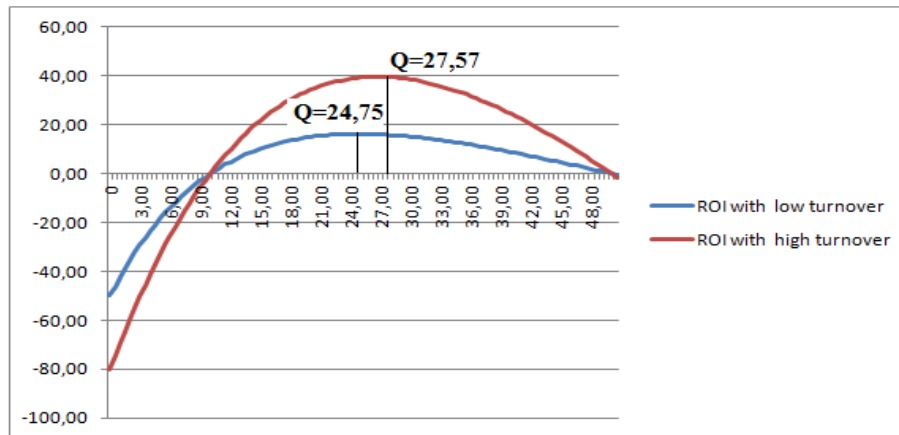


Figure 4.5 ROI with low and high turnover

The ultimate controlling factor for a given project is the opportunity cost of the capital needed for any output level. This can be modeled simply by including this opportunity cost of capital in the cost formula for the particular production process as in the standard model. However, opportunity cost is not known *ex ante*, so this is not a realistic procedure. If we assume the entrepreneur has a multitude of different projects to invest in and a limited amount of capital, it makes sense for him to maximize expected ROI on his portfolio of investments.

Example 4.2 Investing with a capital budget

We will now consider an entrepreneur with a capital budget of $W=1600$ and two investment projects P_1 and P_2 . To maximize profits the entrepreneur must maximize ROI on a portfolio consisting of both projects.

P_1 is given by: Price= $100-0,5Q$ Total cost= $80Q$

Capital Requirement= $80Q$

The profit maximizing solution for P_1 is $Q_1=20$ $P_1=90$ and Profits= 200

P_2 is given by: Price= $50-0,5Q$ Total cost= $45Q$

Capital Requirement= $45Q$

The profit maximizing solution for P_2 is $Q_2=5$ $P_2=47,5$ and Profits= $12,5$

However, in order to maximize profits with a limited budget, the entrepreneur must maximize ROI. In this case, with a budget of 1600, the solution is approximately:

$Q_1=18$ and $P_1=91$ $Q_2=3,4$ and $P_2=48,3$ Combined Profits=209

ROI=13,0625%

Neither of the projects adapts a profit maximizing solution individually, even though the capital budget is sufficient for such a solution in either P_1 or P_2 .

Considering example 4.2 there is by no means certain that production processes will adapt a profit maximizing solution. The choice of output must always be seen in context of capital limitations and optional investments.

Gabor and Pearce (1952) also point out that the particular ownership structure of firm may impose limitations on what output level is chosen. We will borrow their example:

Example 4.3 Partnership

Consider a partnership of two individuals. Each receives a share of profits in proportion to capital subscribed. Suppose the capital of the firm is £5,000; £2,000 of A's and £3,000 of B's. Suppose also profit amounts to 6 per cent. of the capital per annum and the competitive rate is 2 per cent. only. Imagine that the introduction of another £2,000 capital is expected to reduce the rate on the whole to 5 per cent. If A subscribes £800 and B £1,200, there is no conflict of interest. The £800 will earn 5 per cent. less £20 (i.e. 1 per cent. on A's original £2,000), which gives a marginal rate of $2\frac{1}{2}$ per cent. Similarly the £1,200 will earn 5 per cent. less £30 (1 per cent. on £3,000), i.e. $2\frac{1}{2}$ per cent. It is clearly in the interests of both A and B to expand the business. But if the whole of the £2,000 is to be subscribed by B, then A will be the loser. There will be an obvious conflict of interest. If A were to subscribe £667, this sum would earn 5 per cent. less £20, i.e. 2 per cent., which is the alternative rate. He would neither gain nor lose. If he subscribes less he is the loser, if more, he gains. If the £2,000 were raised by the introduction of a new partner, both A and B lose. We are led to conclude that in such circumstances shares are likely to be sold at a premium. (Gabor & Pearce, 1952, p. 263)

In such circumstances as in the example made by Gabor and Pearce, the obvious solution is to borrow money at the competitive rate. However, this assumes that the firm in question is able to borrow money at a rate lower than the expected return from expanded production.

We must also consider the individual entrepreneur's time preference. It might be that the ROI when maximizing profits is not sufficient for the entrepreneur to prefer future over present consumption.

Furthermore, in the previous we have treated demand and production costs as given. In the real world both demand and production costs are uncertain and based on the entrepreneur's expectations. The entrepreneur knows there is an element of uncertainty to his own expectations. The expected return to his investment must therefore be of such magnitude as to offset his anxiety of being wrong. If so, it would surely be preferable to go for a ROI maximizing solution rather than a profit maximizing solution. In a world of uncertainty it is expected returns which are governing the entrepreneur's actions.

With regards to uncertainty, the particular firm's organization might also affect the level of output. We can imagine a traditional firm relying on a push-strategy to be more exposed to uncertainty and a modern firm relying on a pull-strategy to be less exposed. The entrepreneur's compensation for uncertainty must be seen in context of potential losses. Adapting an ROI solution gives the entrepreneur more assurance and less exposure to uncertainty.

The entrepreneurial model of the firm, based on Austrian economics, is not a simple mathematical exposition with a definite solution. Although mathematical constructs are good heuristic tools, one must not forget the multitude of factors playing a role in firm operation in the real world. The assumption that firms want to maximize profits by adopting a *marginal revenue equals marginal cost* solution is, frankly, too much of an assumption. We contend that an entrepreneur may have many motivations for doing what he does, but that in general his goal is to maximize the return on his investment.

5. Management

5.1 Managing for profits

The overall goal of business management is maximizing the return the owners, or capitalist-entrepreneurs, get on their investment. This must be seen as maximizing profits for a *given* investment. To do so the firm must maximize its inputs' *discounted marginal revenue product*, from the firm's perspective. The purpose of different managerial approaches can all be seen in relation to the notion of DMRP.

The discounting element of DMRP implies that time and risk plays a role in maximizing it. If an entrepreneur is able to reduce the time necessary to convert an input to a consumable output, the time dimension of the discounting is reduced as well. In the case where there is a risk that inputs will not make it to the consumer (e.g. bursting champagne bottles, inefficient production lines) there is opportunity to improve profits by eliminating the sources of the risk.

The revenue product realized from the outputs can be increased through entrepreneurial activity. By finding new and more valuable uses for inputs, the firm can increase the relative value of outputs to inputs. This can also be done through marketing.

By employing new technology the DMRP of inputs can be increased when less of any input is needed for the same output, or when the technology enables a firm to produce a more valuable product from the same resources.

However, it is not enough to simply increase inputs DMRP. The firm must also be able to capture this increase for its owners. This involves attaining ownership rights and a good bargaining position towards input owners. Thus, it becomes clear that the firm must increase its share, as well. This can either be done by attaining ownership through vertical integration, taking steps to better their bargaining positing, or increasing their share by increasing the DMRP itself, while the market price for the input stays the same.

From our discussion it is clear that a particular firm should chose a strategy reflecting its specific situation and possibilities to increase its share of inputs' DMRP.

5.2 Delegation of decision rights

A common theme in modern management approaches is trying to emulate the market place within the firm. By delegating decision rights to managers and providing incentives like bonuses or profit sharing, firms are trying to generate the high powered incentives of the market place.

In doing so, the firm or its owners, are encouraging “intrapreneurship”, a form of internal entrepreneurial activity, engaged in by the firms’ employees. To foster such entrepreneurial attitudes and behavior, managers must give employees significant discretion (Foss & Klein, 2012). However, this involves challenges when it comes to measuring and rewarding employees efforts. There is a chance that providing incentives for those tasks that can be measured at low cost, twist efforts away from tasks that are costly to measure (ibid).

From an Austrian perspective the delegation of decision rights and construction of incentives must be seen as entrepreneurial activity conducted by the owner of the firm. Although employees may have decision rights, these are not ultimate. The owner of the firm may at his own discretion overrule decisions made by an employee. The entrepreneurial action was made when the owner of the firm decided to combine his resources with the mind and labor of an employee, in order to maximize inputs’ DMRP. The challenge of getting the right employee for the right job is a matter of combining complimentary resources.

To provide incentives for employees with regards to experimental activity and increasing the firm’s net returns, should not just be seen as aligning the interests of the owner and the employee. As jobs become more complex, there are increasing difficulties in making a contract stipulating the tasks the employee is expected to do. Furthermore, it might be more difficult to measure the results of an employee’s efforts. Consider the worker standing at a factory production line in contrast to a manager responsible for the whole factory.

In dealing with employees it is harder to assert the DMRP of their efforts and their potential. Employees cannot be owned, and the firm owner does not have the same power to control and measure their contribution as he may with his own capital. The owner cannot know the full potential of his employees. Experimenting through ever increasing contractual

arrangements would be prohibitively costly. In order to realize an employee's full DMRP the employee must be incentivized to realize it on his own.

In the case where an employee has a fixed income and clearly defined tasks, as stipulated by a contract, he has limited incentives to make efforts beyond what is expected by the owner and according to contract. There exist, of course, the incentive of getting a promotion, but this might not suffice to make him realize his full potential. He need only be better than the rest.

To make employees realize their full potential, it is necessary to share with them the extra return generated, either in the form of money or some other way. The employee finds himself in the same situation as the owner. The owner would not invest in increasing the DMRP of inputs, if he expects he cannot capture a sufficient share of this increase for himself. The employee will not make the effort to increase his own DMRP if it only benefits the owner.

5.3 Vertical integration

One of the basic arguments for vertical integration is to avoid the problem of double marginalization. This is based on the standard micro-economic model of the firm, where deviation from the competitive level creates deadweight losses. Once again we want to stress that the firm must be seen through the eyes of the capitalist-entrepreneur. Assuming the entrepreneur wants to maximize ROI it is not clear if vertical integration is preferred.

Example 5.1 ROI in vertical integration

Consider this typical textbook example of two independent firms, upstream and downstream, who each have market power.

Price is given by: $P=12-Q$

Firm 1: Total cost= $4Q$ Marginal cost= 4

Wholesale price when Firm 1 wants to maximize profits then becomes $W=8$

Firm 2: Total cost= $8Q$ Marginal cost= 8

Retail price when firm 2 wants to maximize profits the becomes $P=10$ and $Q=2$

Industry profits then becomes 12 instead of 16 as it would have been if there was only one firm.

Consider now that each firm has a capital requirement function consisting of outlays and fixed investments.

$$CR_1=4Q+50 \qquad CR_2=WQ+70$$

Both firms adopt a ROI maximizing solution.

Firm 1 wants to sell $Q=3,5$ at price $W=8,5$

Firm 2 then reacts by adapting the solution $Q=1,6$ and $P=10,4$

Firm 1 realizes a ROI of 12,76 % and firm 2 realizes a ROI of 3,64 %

If these two firms where now to integrate and become one firm, the ROI maximizing solution would be:

$Q=3,76$ and the owners would realize a ROI of 11,8 %.

Example 5.1 shows a situation where the upstream firm does not gain, in terms of ROI, by integrating. This is caused by the specifics of each company with regards to their margins and capital structure. If we adjusted the example, it might very well be that a merger would be beneficial in terms of ROI. The point to be made is that this is by no means a certainty.

Though the argument for double marginalization does not necessarily hold true, there might be other benefits with vertical integration. Historically, firms have integrated to gain control of scarce resources and can thereby reduce uncertainty regarding critical inputs. Furthermore, vertical integration eases the synchronization of supply and demand along the chain of products.

From an Austrian perspective, capturing DMRP is the main argument for integration as well. Foss and Klein (2012) argues that the most critical goal of vertical integration is that of capturing returns from relationship specific investments. In the event a downstream firm makes an investment increasing the DMRP of its inputs, the supplier of these inputs might want a higher price. To the extent the upstream firm has market power; it is able to reap the benefits of the downstream investment. For the downstream firm, vertical integration becomes a tool for protecting its profits in such an event.

Lu and Tao (2008) finds that vertical integration among Chinese manufacturing firms has a negative impact on firm sales, market share and productivity, but a positive impact on product prices. Their findings suggest there are more benefits to vertical specialization due to economies of scale. A study by Silke and Lederman (2008) on the American airline industry found that large network carriers which are integrated with their regional partners perform systematically better than non-integrated carriers.

The different findings of these two research papers suggest the decision of vertical integration is a complex one, where every aspect of the firm must be taken into account. Different forces are at play in different situations. Austrian economic theory can only help us keep our eye on the target.

5.4 Horizontal integration

With regards to horizontal integration, the same Austrian principle of maximizing DMRP applies. Through horizontal integration a firm may achieve synergies through economies of scale. The stronger bargaining position it may achieve, increases the share of value added the firm may capture, both with regards to customers and suppliers. However, all aspects of a firm must be evaluated to make sure two firms are compatible. The *ex post* bargaining position may not outweigh other forces generating inefficiencies. Austrian economics cannot provide a definite decision rule in such cases.

5.5 Production processes

Finally, we would like to suggest the use of the Hayekian triangle for heuristic purposes in understanding production processes. The Hayekian triangle depicts a production process with regards to time and value added.

Figure 5.1 shows a production process consisting of two work stations (W1 and W2) taking equal amount of time to perform their tasks. All inputs are bought at t_0 and sold at t_4 . There is a time gap between the work stations in which intermediate goods are stored for later use in workstation 2. We assume these intermediate goods to have a market value so we are able to establish the value added of this process. During time in storage and in inventory there is an opportunity cost to be accounted for, hence the downward sloping line reflecting the loss of value from the owner's perspective. The opportunity cost is at play in all time periods, but are clearly shown in period t_1 to t_2 and t_3 to t_4 . The relevant Hayekian triangle for the whole production process is shown in Figure 5.2.

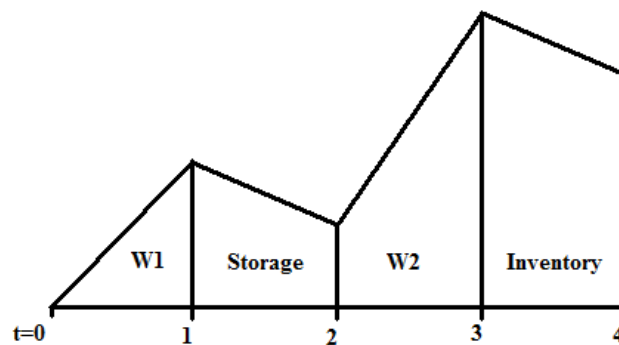


Figure 5.1 Production process

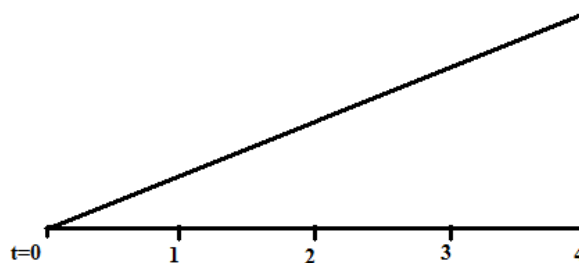


Figure 5.2 Hayekian triangle of complete production process

The complete production process depicted as a Hayekian triangle shows us the relevant added value accruing to the owner of the firm. Due to the time spent in inventory the firm does not realize the full potential of the market.

Now, assume the firm is able to adapt a pull-strategy for its production line, so that all goods are sold at t_3 . Figure 5.3 show the relevant Hayekian triangle for this process. Note the steeper slope of the hypotenuse, symbolizing that value is added at a quicker pace.

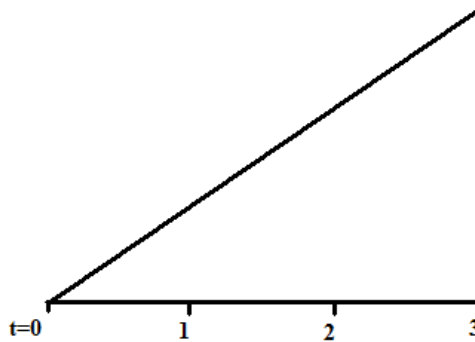


Figure 5.3 Hayekian triangle and pull-strategy.

However, there still remains the wasteful element of storage between t_1 and t_2 . We now assume the firm adopts a *just-in-time* production process, eliminating the time in storage. Figure 5.4 shows the new Hayekian triangle with an even steeper hypotenuse.

The slope of the hypotenuse represent the ROI and the steeper the better. We have here shown two different methods for improving ROI for the same inputs and outputs. The origin of this improvement is the decreased opportunity cost resulting from the reduced time it takes from production initiation and consumption/sale, which results in a lower discounting and less capital outlays.

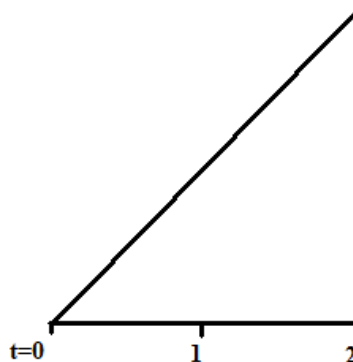


Figure 5.4 Hayekian triangle with pull-strategy and just-in-time.

6. Conclusions

6.1 Conclusions on research questions

Our aim has been to present Austrian economic theory and its explanation of entrepreneurship as an inherent phenomenon in the market economy. We have built our analysis on the contribution of many Austrian school economists as well as contributions from others. We asked two questions and it now remains to answer these.

Can Austrian economic theory help us understand entrepreneurship better than conventional economic theory?

We find that the Austrian theoretical framework gives us a holistic and logically coherent theory of entrepreneurship. By putting the individual human actor at the center of economic research, one is able to deduce a theory explaining entrepreneurship, as well as the emergence of firms. In line with the Austrian methodology we see how economic phenomena spring out from individual human action; entrepreneurship and the emergence of firms being results of this.

The Austrian theory of the intertemporal capital structure and real uncertainty about the future helps us understand why human action and its outcomes take the particular form they do. This also helps us explain such phenomena as business cycles from an entrepreneurial point of view, as well as the origins of profit and economic growth. We also find the Hayekian triangle as a useful heuristic tool for understanding production processes.

Whereas mainstream economics treat entrepreneurship as a limited phenomenon regarding start-up businesses, Austrian economics treat entrepreneurship as a basic trait of the market economy; at the core of a larger system and a factor which can help us explain a whole array of other phenomena. The constant disequilibrium economy results in opportunities for entrepreneurs in search for profits and the economy is brought closer to equilibrium. The quicker entrepreneurs can reallocate resources, the closer to equilibrium the economy can get. To help himself exercise his judgment and claim possible profits the entrepreneur

organizes resources in firms. When the data entrepreneurs are acting upon is manipulated, we get misallocation of resources eventually resulting in an economic downturn. We conclude that the Austrian theory of entrepreneurship is a valuable contribution to both fields of economics, *micro-* and *macroeconomics*.

*Does Austrian theory have implications for how we understand business
management and the role of public policy?*

We have tried to illuminate how Austrian theory can help managers understanding the purpose of management and the specific role of the capitalist-entrepreneur as opposed to managers and advisors. We find that Austrian theory can provide an essential understanding of management and its purpose.

Management is an extension of the entrepreneur's judgment and its purpose is to maximize profits by maximizing the share captured of inputs' DMRP. The different methods for doing so is a functional question and Austrian economics cannot give a clear cut answers in such cases. However, as we have shown, Austrian economics can provide insights which challenge mainstream simplifications of complex phenomena such as vertical integration. Also, the Austrian emphasis on economic calculation with established market prices is a fundamental insight for business managers.

Regarding public policy, Austrian economic theory is vehemently opposed to any form of intervention. However, we want to take the opportunity to make suggestions for how intervention can cause the least damage.

Market prices as defined by the Austrian school are the basis for economic calculation and the rational allocation of resources. Any deviation from the practice of letting profit and loss, based on market prices, control the allocation of resources constitutes a loss. Though many people might find it preferable to deviate from the market system in particular cases due to moral convictions, they should not be allowed to fool themselves and others into believing that the economy as a whole is better off.

There are, of course, situations in which intervention of some form is unavoidable due to the lack of complete property rights. In such cases externalities may occur. The important thing for government intervention is to deviate as little as possible from what the market price

would have been had the property rights been complete. This price, unfortunately, becomes mere speculation in any case, but one should at least have a neutral approach when setting it.

Furthermore, as explained by the Austrian business cycle theory, any steps taken by government to prevent the reallocation of both capital and labor will be detrimental to economic progress. Entrepreneurs must be free to reallocate their capital, hire and fire employees as they see fit, in order for resource allocation to be efficient. Arbitrary meddling in private individuals' affairs also introduces regime uncertainty. Lensink et al. (1999) finds a clear negative effect of regime uncertainty on economic performance. Predictability of government policy is paramount in reducing uncertainty, especially when the public sector might constitute 40-50 % of an economy.

There is also the risk that government policy can make it more profitable for entrepreneurs to devote their efforts and resources into evading taxes instead of meeting consumer wants. We contend that a low rate, large base tax system is preferable in this regard.

The way governments see competition and monopoly should also be revised. The present day policy of "you must compete, but are not allowed to win" is a peculiar one, and its basis is in normative considerations not economic ones. Instead of fearing monopolies, governments should fear their self-imposed barriers to entry (e.g. compliance cost, certificates, permits etc.). In any case, the fact that a firm produces less than its absolute sustainable level frees up resources to be put to work elsewhere. The notion that somehow consumer surplus is preferable to producer surplus reeks of politics rather than economics. Furthermore, the whole concept of high price, low output monopolies in the free market is one challenged both by history and theory.

In any case the government should go to great lengths in not giving entrepreneurs false signals. This applies to both monetary and fiscal policy. Distortion of market prices must be avoided to the highest extent possible.

6.2 Further research

Our findings and conclusions beg to be backed up by more hard evidence. This paper has been conceived of as a presentation and explanation of the Austrian theory of entrepreneurship. In depth analysis of the few phenomena we have touched upon must be the subject of further research. However, we find that many of the theories we have elaborated on make good subjects for more in depth analysis, both theoretical and empirical. We hope our work might inspire others to do so.

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Appendix

The following table shows data for figure 1.1 constituting Global Innovation Index (GII) scores and Economic Freedom index (EFI) scores. The data is found at www.globalinnovationindex.org and www.heritage.org respectively.

Country	GII	EFI
Hong Kong	59,43	90,1
Singapore	59,41	89,4
Australia	53,07	82,0
Switzerland	66,59	81,6
New Zealand	54,46	81,2
Canada	57,6	80,2
Chile	40,58	78,7
Mauritius	38	76,5
Ireland	57,91	76,2
Denmark	58,34	76,1
Lesotho	26,29	49,5
Ukraine	35,78	49,3
Bolivia	30,48	48,4
Ecuador	32,83	48,0
Angola	23,46	47,7
Uzbekistan	23,87	46,5
Argentina	37,66	44,6
Iran	27,3	40,3
Venezuela	27,25	36,3
Zimbabwe	23,98	35,5

The following countries have been left out due to incompleteness of information: Taiwan, Macau, St. Lucia, North Korea, Burma, Kiribati, Solomon Islands, Chad, Equatorial Guinea, Republic of Congo, Timor-Leste, Turkmenistan, Haiti, Central African Republic, Democratic Republic of Congo, Eritrea and Cuba.