Pharma, Finance and Freedom: Alternative Perspectives on Financing the Development and Production of Medicines

Master's Thesis

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Foreword & Acknowledgements

Despite often being overlooked, I urge the reader of this thesis to first read this foreword in order to understand its true purpose and essence without having any preconceived notion.

In 2012 I finished the Bachelor‘s program Bio–Pharmaceutical Sciences at Leiden University. It was in this period I became increasingly interested in the corporate side of the pharmaceutical industry combined with its impact on human health. I quickly realized that I preferred pursuing a career in this area instead of doing actual research and development. In order to realize this ambition I have applied for the Master program Management of Technology at TU Delft, for which I am currently writing this thesis.

By writing the thesis I hoped to have a chance to investigate the dynamic relationship of the pharmaceutical industry with different domains of society, especially science, laws and legislation and the economy. I intuitively distinguished these three domains, however I was uncertain about their actual relationship. What I did observe was that the economy was becoming increasingly more dominant and that this could be related to the problems of the pharmaceutical industry which I have learnt about during my Bachelor‘s, namely that of ‘drying pipelines’.

It was this personal guiding intuition – society comprising three domains – which formed the start of my research and thus also this thesis. I did not have a clear image whether this distinction was indeed present and if this truly had an effect on the problems of the industry and thus also on human health. The thesis can therefore be seen as the embodiement of my guiding intuition towards a solution for the problems of the pharmaceutical industry and society as a whole. In this journey I have strived to create a neutral

position for myself in which I have tried my level best to not let any personal belief influence the scientific integrity of my work. This can be seen among others as I have researched threefold society – described in anthroposophy – and Islamic finance in order to find solutions for the problems addressed in this thesis. Adherents tothese two world views would most likely not easily affiliate themselves with the other which may serve to illustrate my intended balanced approach. To ensure that my reasoning would not be biased my commission also has been multidisciplinary as each member has a different expertise and therefore also differing – and many times even opposing – views. It was this heterogeneity within the board which forced me to stay as nuanced as possible as it served as a great sample of society in which differing views are also present and should be considered. Also important to realise before reading this thesis is the fact that me being a Muslim in personal life did not play a part in the topic of this thesis. When discussing a potential solution with my first reader Islamic finance however did come up, and after having carefully weighed the merits agains the disadvantages it was selected. My personal belief however did not prevent me from being critical and I have aimed to apply the same level of scrutiny to all modes of finance researched in this thesis.

Finally, I would first like to thank God for making it possible for me to write this thesis. Second,: I sincerely thank prof. van Beers, dr. Ortt, dr. Pesch and dr. Houghton Budd for their valuable insights, help and critical encouragement in writing this thesis and especially dr. Naastepad for her continuous support and being a source of inspiration. Last but not least I am forever grateful to my mother and sister and friends for always being there for me.

Executive Summary

In this thesis I ask how the problems of the pharmaceutical industry of stagnating and declining R&D profitability due to 'drying pipelines' can be solved. I propose that the problems can be solved by remedying what I suggest is their ultimate cause: a problem of perception.

The pharmaceutical industry experiences its problem as one of declining R&D profitability due to market saturation. But why, if the customer is king (or, in terms of neoclassical economic theory, if the consumer is sovereign) is saturation of demand a problem? Is there a real problem, or is the problem experienced by the pharmaceutical industry consequent upon accepting such 'fruits' of neoclassical theory as the 'efficient market hypothesis' (EMH), maximisation of shareholder value (MSV), and new growth theory (NGT)? Ineluctably, therefore, I ask whether the problems of the pharmaceutical industry are not symptomatic of the need to reframe our understanding of economic life.

If the problem facing the pharmaceutical industry is a problem mainly of perception, unexpected solutions may come into view if things were conceived differently. The guiding intuition, in this regard, and the start of this project, was the idea that society has three dimensions and that much depends on how these dimensions are related one to another. Further, it led the writer of this thesis to consider the part that Islamic Finance might play in such a reframing, especially in the specific case of financing innovation in medicine.

Accordingly, the dissertation proposes such a reframing by, in essence, conceiving the development of medicine as a public good to be financed accordingly, leaving the commercial aspects – the production and delivery of drugs – to normal commercial life, but now relieved of the need to justify investment in R&D by ways of subsequent product sales and, therefore, profitability. If, via threefold society and Islamic finance, one can conceive medicine as a 'public good' then it is possible to think in the following terms:

- The discovery and development of drugs is a **cultural** event (up to the point of 'recipe').

- Ensuring such things as safety and equitable accessibility to everyoneis a **rights** matter (protecting IPRs as a public good, not a corporate asset).

- The production and delivery of medicine are matters for **economic** entities such as corporations.

This reframing leads to a concrete suggestion of how, with the help of insights derived from Islamic finance, such an idea could be given practical effect. Concretely,

- As a public good, the development of drugs could be financed out of donations both voluntary and involuntary (taxation), the funds from which were made available to medical professionals.

- A body to protect the health of the population (FDA etc.) would then license the recipe in the manner of copyright or a quality guarantee mark, but not as a corporate asset.

- Pharmaceutical entities would then simply be relieved of the need to capitalise R&D, and so of the problems associated with MSV, EMH and NGT.

Contents

Chapter 1

Introduction

1.1 The Problem

Since about two decades the pharmaceutical industry is witnessing a decline in its R&D profitability. This decrease is directly linked to decreasing R&D productivity, which refers to the output of new medicines relative to investments in R&D. The presence of increasingly fewer medicines in the pipeline is referred to by the industry as 'drying pipelines'. The output of new medicines remains roughly constant despite continual increases in investments in innovation. This is seen as a problem as it means that profits are declining. In its attempt to maintain R&D profitability the industry also increasingly influences law-giving and regulation[1] and research and education[2] From this observation an image emerges of the pharmaceutical industry in relation to two other spheres: the political-juridical sphere (encompassing legislation and regulation, including regulation that affects access to funding), and the cultural sphere (understood as encompassing morality, values, science, education and research). This creates a second societal problem. If medical R&D is seen as a means to achieve maximum profitability or returns on capital, this could lead to a situation where returns on capital rather than the needs of patients determine the medicines or more generally the kind of health care offered to the patient.

[1]For example, through lobbying for less stringent rules and legislation with regard to marketing, and for a stronger legal position compared to generic and 'alternative medicine.

[2]For example, by shifting medical research from the public sphere to the pharmaceutical industry; appropriating publicly funded medical research; and influencing curricula of university education, especially in medical and pharmaceutical studies.

In this thesis we ask how the pharmaceutical industry can be helped to solve the problem of declining R&D profitability in a way that would simultaneously solve the (related) societal problem.

1.2 Guiding Intuition and Research Questions

The guiding intuition, and the start of this project, was the idea that society has three dimensions and that the problem of the pharmaceutical industry as well as its solution depend on how these dimensions are related to one another. This idea arose from observation of the pharmaceutical industry in relation to legislation and science – or, more generally, of an economic sphere interacting with two other spheres, culture and rights life.

This is the guiding intuition of this thesis. An original thought of the writer of this thesis, not a derivative one has led to the formulation of the following research questions, comprising a main question and four subsidiary questions.

Main Research Question: Can recognition of three inherently autonomous yet interrelated spheres in society – culture, rights life and the economy – help the pharmaceutical industry to solve its problems of declining R&D profitability?

In order to be better prepared to answer this question, we start by examining the cause of the problem. More specifically, we investigate the relationship between the problem experienced by the pharmaceutical industry and precepts and prescriptions of today's dominant economic theory. This leads to the first subquestion:

Sub-Question 1: How do the 'efficient markets hypothesis' (EMH), prescriptions of maximisation of shareholder value (MSV) and new growth theory (NGT) influence the pharmaceutical industry's real-life problems of declining profitability and market saturation?

A growing focus on micro-economic behavioural rules (such as MSV) and a de-linking of such prescriptions with social gain or overall welfare has prompted the pharmaceutical industry to become increasingly active in in-

fluencing laws and regulation, and science and education. Profits in the industry are increasingly due not only to economic activity (the production and delivery of medicine) but also to activities in the political, legal, and cultural sphere. This routes a second question:

Sub-Question 2: Could freeing pharmaceutical and medical research from the pressure of MSV relieve the pharmaceutical industry of its problem of declining R&D profitability?

This reframing of the problem of the pharmaceutical industry leads to a concrete suggestion of how such an idea could be given practical effect: separating the development of medicines from the production and delivery of medicine. The starting point is an understanding of what health requires, which will lead to the development of certain medicines and therapies, which then need to be funded. In this proposal all medicines becomes generic medicines. The producers of medicines are no longer forced to submit the development of medicines to MSV.

However, the development of medical knowledge free of MSV constraints is possible only if it is funded accordingly. This leads to our third sub-question:

Sub-question 3: If funding by profit-maximising capital subjects the development of medicine to economic rather than medical criteria, and given that state–funding (taxation) is being increasingly marginalized by prevailing neo–liberal policy precepts, how else might medicine be funded?

Our aim is to come up with a proposal for funding the development of drugs by capital committed to the free development of drugs. However, examples appear to be almost non–existent, except in the Islamic world. Therefore, the idea in this part of the thesis is to consider the approach taken by Islamic finance. Focusing on social gain, Islamic Finance is committed to allocating capital directly (that is, not via profit maximisation) to purposes which are expected to deliver social gain, while capital is actively withheld from purposes which are expected to reduce social gain. Second, especially due to the prohibition of interest, there is a strong emphasis on risk/profit sharing within Islamic Finance. Making profit at the cost of the other is seen as immoral for both parties to a transaction. In addition, Islam also has a tradition of *sadaqah* (gifts). This leads to our fourth research question:

Sub-question 4: Can insights from Islamic finance – in particular (the insights behind) the prohibition of interest, risk sharing, and sadaqah – help in conceiving a model for an alternative solution to the problem of funding the development of medicine, one that frees it from profit making?

To give a more practical meaning to the threefold vision we ask whether a solution based on Islamic finance is feasible without corresponding changes in the economy. For capital to be allocated in terms of free[3] cultural life it is important that people are not led by the self–serving principle underlying MSV, rather the spirit–led motivation should be one of fraternity.

1.3 Method and Methodology

Within the MoT Master programme it is customary for a thesis to have both a theoretical and an empirical component. The theoretical component of this thesis includes an investigation into the theoretical foundations of the current economic behaviour of pharmaceutical companies (MSV, EMH, NGT) and an exploration of alternative economic behaviour and social order, based on rethinking the relationships between cultural life, rights life and the economy. The product of this rethinking – the thesis itself – could be reframed as a 'conceptual model' which needs to be tested. In this case it will not be possible to do these tests in real life as this is not within the scope of this thesis, however it is possible to test our reasoning on soundness, logic and quality.

Such testing of the 'conceptual model' is done by using four different methods which all complement each other. First, using two world views which are dissimilar in many regards namely Islam and anthroposophy and more specifically, Islamic finance and a threefold society. This forces the reasoning to stay as neutral as possibble in order to avoid giving the impression of being biased. Second, the reasoning is applied on the case of the pharmaceutical industry and the development of medicines. As the industry has an evident

[3] 'Free' in this context refers to following its own precepts rather than those of financial gain

economic and societal component the case allows for a general impression regarding the (practical) viability of the thesis. Third, there are two interviews with Islamic specialists who provide essential information which is difficult – if not impossible – to obtain through (English) literature. Moreover, the interviewees are used to check whether the reasoning based on Islamic finance is sound or not. Fourth, the commision responsible for approving this thesis is multidisciplinary. Each member has a different expertise such as social constructivism, macroeconomics (both neoclassical and new Keynesian), business economics and associative economics. It is this diversity within the commission which ensured that the contents of this thesis were critically assessed as each member had his own perspective on the matter. Many times these perspectives were contradictory to each other making it imperative for the reasoning to be sound in order to be accepted.

Reflecting its guiding intuition the thesis concludes with a thought which results from the guiding intuition: a concrete proposal for the separation of the development of medicines from the production and sale of medicines, and for a corresponding funding. The result of this thesis thus is a hypothesis, namely the validation of which can occur in two ways . First, by implementing the idea which, however, is not possible within the short time span given for this thesis. Second, by testing the thought against the quality of the reasoning which led from the guiding intuition to the hypothesis. Is this reasoning biased, or is it a test of the 'real world' validity of the intuition?

1.4 Societal Relevance

The present study will be conducted using the pharmaceutical industry as a case and will therefore have special relevance to the pharmaceutical industry, but not to this industry only. A few words are needed concerning the representativeness of the pharmaceutical industry for industry as a whole. Like many companies today, the pharmaceutical industry is facing problems of stagnating or declining market share and, as in other industries, this problem is viewed as an innovation problem. It is clear that, in addition to production activities, all business depends on innovation and invention with respect to products as well as production processes, in other words, on cultural life (understood as comprising education, science, health care, reflection, art). Similarly, all business depends on respect for rights, laws and regulation.

Since this wider (cultural and legal) environment of business is a focal point of this thesis[4], it is relevant to all industry. However, in the pharmaceutical industry, the link with cultural life is perhaps even more pronounced and more direct than in some other industries. The research underlying the drug development process is a well-known example.

Another link with cultural life concerns the special role of the product of the pharmaceutical industry in the individual's physical, emotional, mental and spiritual wellbeing. Medicine supports individuals in their recovery from disease thus promoting a *'mens sana in corpore sano'*, arguably an important aspect if not the *sine qua non* of cultural life.

The link with the domain of rights, laws and regulation is also especially strong; in an attempt to break through the boundary of market saturation, lobbying for change in laws and regulation has become a common practice. In sum, although our main research question[5] — "Can recognition of three inherently autonomous yet interrelated spheres in society (culture, rights life and the economy) help the pharmaceutical industry to solve its inability to increase and maintain market share?" — has special relevance for the pharmaceutical industry, the features that it shares with other industries increase the societal relevance of the findings.

1.5 Scientific Relevance

The relevance of this thesis to economic science lies in the fact that it urges a reconsideration of the conventional economic way of thinking by not only examining neoclassical economics but by also proposing two alternatives, namely a threefold vision of society and Islamic finance.

Despite the co-existence of a variety of schools of economic thought in the West such as Classical economics, Austrian economics, Marxian economics, (Post-)Keynesian economics, and Institutional economics there is one which has influenced the world and society most dominantly since the 20th century: the school of Neoclassical economics (Dequech, 2007, Gruchy, 1972, Henry,

[4]See Exectutive Summary and section 1.4: Research Questions.
[5]See Exectutive Summary and section 1.4: Research Questions.

2012, Mair & Miller, 1996, Phelps, 1990, Screpanti & Zamagni, 2005). This influence can be found at the micro, meso and macroeconomic levels, which illustrates the extent to which neoclassical thinking has permeated individual, institutional and societal life.

The fact that neoclassical influence is now predominantly present should be considered when looking at current problems in the economy. Here we see that primarily the principle of maximisation of shareholder value (MSV) – a reduced[6] form of neoclassical thought – is adopted by companies as a corporate objective. Pursuit of MSV causes companies to spend their main efforts and capital in maximising profit and to subject all aspects that are part of or contribute to business, including innovation and invention, to this principle.

As MSV heavily influences the way we currently think it also has direct consequences for the way we perceive problems in the economy and the solutions we propose for those problems. Currently many companies are facing difficulties in maintaining and increasing their market share due to saturation of demand or so-called 'market saturation'. Different solutions can be proposed for this problem at the corporate, industrial, or even national level; however all can be traced back to one's perspective on the role and purpose of business in society. Since the problem still continues to exist, could it be that the dominant perception of the problem is itself part of the problem?

Is it time to reconsider the status quo, i.e. the mode of economic thinking on which Western society especially is currently predicated? It is possible that by considering business or economic life from a different perspective — rather than as agents of MSV — more effective solutions will be found. In this thesis we will investigate whether alternative perspectives exist, how these describe the phenomenon of declining market share, and what they suggest in terms of solution(s), paying particular attention to the practicability of the solutions.

While admittedly not (yet) mainstream – and perhaps even looked down

[6] 'Reduced form' is here meant not in the strict mathematical sense (as the reduced form of a general equilibrium model) but refers to the fact that currently in practice there is a one-sided focus on neoclassical 'micro-financing' without linking this back to the macroeconomy. Neoclassical economists namely primarily conduct micro-studies on a corporate or policy level without showing noteworthy concern for the consequences of such behavior on a macro level.

upon – the two alternatives of threefold society and Islamic finance do take into account culture and rights life, in addition to the economy, thereby allowing for new perspectives on and perhaps better ways of financing. Where current literature primarily follows conventional economic theory – in a direct or indirect manner – and therefore does not address the issues pertaining to economic imperialism[7] and MSV, neither alternative has this limitation and so has the potential to lead to innovative and better solutions for current problems in the economy and society as whole. The thesis includes a comparison between the three modes of economic thinking (i.e. the status quo compared with the threefold society and Islamic finance), with attention to the context in which they originated and their original purpose. Such a comparison allows for lessons to be learnt as weaknesses and potential points for improvement regarding current models can be identified more easily.

[7]'Economic imperialism' refers to the application of economic reasoning outside the economy, more specifically, in the cultural and rights sphere. The term will be elaboratly discussed in Chapter 4

Chapter 2

Overview of Thesis

Chapter 1: Introduction

1.1. The Problem

The problem researched in this thesis is twofold. First there is the problem from the perspective of the pharmaceutical industry which refers to its declining R&D profitability. This is a direct result of a declining R&D productivity which the industry calls 'drying pipelines'. The second problem is more fundamental as it encompasses the observation that in order to increase profitability the pharmaceutical industry uses the political-juridical and cultural sphere. The societal problem related to this is that medical R&D can be seen as a tool for profit maximisation instead of improving human health.

1.2. The Guiding Intuition and Research Questions

The guiding intuition of this thesis is that society has three dimensions – a cultural sphere, a political-juridical sphere and an econonomic sphere – and that the problem of the pharmaceutical industry as well as its solution depend on how these dimensions are related to one another. Following from this guiding intuition the research described in this thesis is initiated which is constructed by answering a main research question which again is divided in four sub–research questions.

1.3. Method and Methodology

This section describes the method and methodology used for this research. The theoretical component includes an investigation into the theoretical foundations of the current economic behaviour of pharmaceutical companies and an exploration of a potential new fundament for economic behaviour based on the guiding intuition. The empirical part involves the quality of our thinking about how pharmaceutical companies (should) behave. This reasoning is by using four different methods which are: *i)* the use of two differing world views (Islam and anthroposophy); *ii)* the use of the pharmaceutical industry as a case; *iii)* using two interviews with experts on Islam; and *iv)* the use of a multidisciplinary commission.

1.4. Societal Relevance

As the thesis revolves around the pharmaceutical industry an important societal factor is the relation with human health. It is especially relevant to investigate what is better for society: a pharmaceutical industry which has a primary goal of improving human health or for example one that is directed to maximising profit?

1.5. Scientific Relevance

The scientific relevance of this thesis is based on the fact that it urges a reconsideration of conventional economic thinking and proposes two alternatives: a threefold society and Islamic finance.

Chapter 2: Overview of Thesis

An overview of the whole thesis is given by briefly describing the contents of each chapter.

Chapter 3: Guiding Intuition

The guiding intuition is that society comprises three spheres: a cultural, economic and a legal sphere. In this chapter this intuition is further explored by discussing literature in which a similar notion is mentioned.

Chapter 4: Pharma's Problem in a Societal Context

4.1. The Pharmaceutical Industry and its Problems

A non-normative depiction of pharma's perception and response to its problem (perceived as a problem of declining R&D productivity and profitability). This perception leads to an increased influence on the legal and especially the cultural sphere which is a more general phenomenon[1] but one especially prominent in pharma.

4.2. "Colonisation" of Cultural Life

The cultural sphere, understood as including health care, is increasingly less free. While medical research is increasingly confined to research that is profitable in financial (rather than wider societal) terms, the freedom of choice of patients regarding their own treatment, and of doctors in their diagnosis and advice for treatment, is also reduced. The phenonomenon of a sphere being less free due to influences from another sphere is referred to in this thesis by the term 'colonisation'.

4.3. "Colonisation" of Rights Life

The rights sphere, including laws, rules and regulation, is influenced by the pharmaceutical industry in order to maintain or increase profitability.

4.4. The Pharmaceutical Industry and Freedom of Thought

The cause of both forms of colonisation is, we propose, ultimately a confusion of the intermediate and the ultimate goal of economics in theory and in practice. To what extent this is related to current economic thinking, is investigated in the next chapter.

Chapter 5: The Appropriateness of MSV, EMH, and NGT

The focus in this chapter is the relationship between private and social gain in modern economic theory and society.

[1] See, for example the neoclassical as well as the critical literature on 'economic imperialism' (Landes, 1961, Lazear, 1999)

5.1. Introduction

Consumer sovereignty (exogenous consumer preference) - an essential component of modern economic theory - involves freedom of cultural life.

5.2. Efficient Market Hypothesis

According to neoclassical theory as well as its 'fruit' EMH, prices and profits signal consumer preference. Share prices[2] are derived from these which means that with decreasing relative share prices capital must leave a company/industry. The pharmaceutical industry however does not accept this and tries to artificially inflate its stock price through, for example, share buy-backs, marketing, and lobbying for laws and regulation that directly or indirectly raise share prices. Uncertainty, speculation and reflexivity also influence share prices. Finally there are also consumers who are unable to make their preferences effective in the market due to lack of purchasing power. Considering these factors, capital allocation in response to share prices does not necessarily reflect the choice of patients regarding care for physical, psychological and mental health.

5.3. Maximisation of Shareholder Value

The main question addressed in this section is whether MSV respects consumer sovereignty, and so also freedom of the cultural sphere. There is a difference between original neoclassic theory and its modern 'fruit' of MSV. With Adam Smith and in original neoclassical theory there was still attention for the relationship between individual profit–maximizing behaviour (neoclassical theory's intermediate goal) on and overall wealth (the ultimate goal). Mathematical formulation of the neoclassical general equilibrium model in the 1950s permitted (mathematical) tests of the relationship between the pursuit of self-interest and social gain. Since then however less attention has been given to this question and more to (partial) micro-studies. What remains is a focus on private gain while the relationship with the ultimate goal (social gain) is often simply assumed. This leads to confusion between the end (social gain / consumer sovereignty) and the means (private gain) of

[2]That is, a decline in the share price relative to share prices of other industries or sectors.

the economy and 'colonisation' of the rights life and cultural life, an example of which is given in the next section.

5.4. New Growth Theory

In original neoclassical theory and 'old' growth theory (Solow, 1956), knowledge was treated as a public good. New growth theory (P. Romer, 1989) describes todays reality where knowledge has become a commercial good. This raises the question how profit maximisation relates to consumer sovereignty. According to NGT, does commercialisation of research guarantee freedom in cultural life (including health care)? If so, through what mechanisms?

5.5. Conclusion

In neoclassical theory, the focus on private gain (profit) is justified with reference to the social gain this will bring about (more and/or superior goods for consumers). However, in today's institutional and theoretical context of which financial liberalisation, and the demolishing of boundaries between the economic sphere on the one hand and the legal and cultural sphere on the other are important ingredients a one-sided microeconomic focus on private gain appears to usurp the role of the cultural sphere (*i.c.* in the development of medicine). How can the autonomy of the cultural sphere be restored? Indeed, why is it important? These questions are explored in Chapter 4.

Chapter 6: Medicine - A Special Case

6.1. Freedom of Thought in Health Care

Explanation of the importance of freedom in the cultural sphere in general and especially in health care and medical research with the help of a brief review of the history of medicine which shows how varied ideas on health and health care are, both over time and at one point in time.

6.2. A Fraternity–Based Economy

The need to finance a free cultural life calls for an evolution from liberty to fraternity in the economic sphere / the market. Fraternity as the guiding principle for the economy being a minority point of view, there are hardly any

real-world examples, with the exception of the Islamic world. This section gives a nuanced portrayal of the selection for Islamic finance.

6.3. Conclusion

Free development of medicine can be beneficial for the pharmaceutical industry and society as a whole. In order to realise this the economy has to evolve from being liberty–based to fraternity–based.

Chapter 7: The Contribution of Islamic Finance

7.1. Islamic View on Trade and Freedom

Within Islam there is a direct focus on social gains. Trade and therefore also capital allocation have to meet moral standards and serve the betterment of society.

7.2. Islamic Finance in Practice

Three practical parts of Islamic finance which may prove crucial for the solution of the problem of the pharmaceutical industry will be highlighted, namely risk sharing, prohibition of interest, and *sadaqah* (gifts). These insights will (partially) be used in conceiving the model for a possible solution which will be discussed in the next chapter.

Chapter 8: Modelling a Possible Solution

8.1. A General Model for Pharma based on a Threefold Society

Separation of the development and the production & delivery of medicine (more generally, separation of the cultural, political–juridical and economic spheres). Concretely,

- As a public good, the development of drugs could be financed by 'committed capital', the funds from which were made available to medical professionals.
- Law–giving and regulating institutions (parliament / congress, FDA etc.) would then license the 'recipe' in the manner of copyright or a quality guarantee mark, but not as a corporate asset / patent.

– Pharmaceutical entities would then be relieved of the need to capitalise R&D.

8.2. Funding Threefold Society – Insights from Islamic Finance

Naturally, the production of economic goods, including generic medicine, will be financed out of income from sales. The rights life will be funded through taxation. Cultural life can funded out of the money or capital that is freed by productivity growth. This surplus (the money or capital that is no longer needed for goods production corresponding to meeting material needs) can be made available to the cultural sphere (including medical research and health care) in one of the following three ways in principle: (a) directly from the balance sheet of companies to cultural life; (b) indirectly, via institutions such as trusts, associations, foundations; (c) by paying out the surplus as (additional) income, which would enable individuals to directly pay for the health care of their preference. All three possibilities depend crucially on the willingness of surplus recipients to share any surplus with the rest of society for overall social gain.

Chapter 9: Conclusion, Limitations and Recommendations

9.1. Conclusions

In the final chapter the answer to the main research question "*Can recognition of three inherently autonomous yet interrelated spheres in society – culture, rights life and the economy – help the pharmaceutical industry to solve its problems experienced as declining R&D profitability?*" is given. The problems of the pharmaceutical industry appear to have their root cause not in the economy, but in the cultural sphere. This means that the solution can be to re–examine the relation between the three spheres of society.

9.2. Limitations and Recommendations

In this section the limitations of the thesis are discussed after which recommendations are given on how to potentially overcome them. These limitations are primarily regarding the methodology and about the practical viability of this thesis.

Chapter 3

The Guiding Intuition

As mentioned earlier (section 1.2) the guiding intuition of this research is the idea that society has three dimensions, comprising cultural life, rights life and economic life. The notion of social life as composed of three parts – i.e. *the threefold vision* – can be traced back to both historical and contemporary literature. Alfred Weber (sociologist Max Weber's younger brother) for example describes the presence of the following three spheres: *i)* culture which includes religion, science and the Freischwebende Intelligenz[1]; *ii)* the state which embodies politics and rights and also *iii)* the economy (Swedberg, 2000). Similarly, Charles-Louis de Montesquieu (1689 - 1755) advocated *Trias Politica*, i.e. the independence and equal power of legislative, executive and judiciary authorities as argued in his book *De L'Esprit des Lois* (On the Spirit of Law).

Probably the most elaborate explanations of the threefold nature of social life in recent times have been given by the philosopher Rudolf Steiner, whose views were discussed at the time in the *Journal of Political Economy* by Clark (1923) and in the *American Economic Review* by LeRossignol (1924). Steiner mentioned that the French motto of *Liberté, Egalité and Fraternité* is a fitting expression of the values belonging to these three spheres. *Liberté* in his view refers to culture as composed of science, art, religion, media and education, all of which should be allowed to develop on the basis of their own intrinsic value (freedom); cultural affairs should be free from interference by the state and the economy. In terms of the pharmaceutical industry

[1] *Freischwebende Intelligenz* is a term coined by Alfred Weber and refers to 'the social freedom of researchers from social classes (Elefante & D'agostino, 2008)

this would mean that research for new medicines would not be guided by MSV, nor by political preferences. *Egalité* or equality is the value out of which universal human rights develop. *Fraternité* which is the French word for brotherhood in Steiner's view is the value on whose basis the economy develops (Clark, 1923, Steiner, 2013).

By virtue of the division of labour (stressed by Adam Smith (1887) as the primary cause of increases in the wealth of nations) people in fact no longer produce for themselves, as was the case in the past; virtually everyone now produces for everyone else. Friction and chaos in contemporary economies arise, according to Steiner, owing to the discrepancy between this plain and obvious fact and the mentality of present-day humanity which is still orientated towards personal gain. The value created in the economy will be greater the less individuals work for themselves and the more they work to meet the needs of others. Competition is not the right principle for the economy, as it is according to prevailing economic theory, but for the cultural sphere, if interpreted as self-betterment.

Fraternité or brotherhood in the current economy is perhaps most difficult to realise in a world which thrives on egoism and is permeated with individualistic tendencies as represented by MSV and profit maximization. According to this principle the pharmaceutical industry would have to produce medicines for others in society to benefit from which currently is not the main objective. Many questions arise as to how brotherhood in the economy could be realised in practice. For example, *i)* how to survive as a pharmaceutical company if medicines are to be affordable for everyone? *ii)* How to determine what an individual's true needs are in health care and more specifically in terms of medicines? *iii)* And how to fund medical research if not through MSV and intellectual property rights?

i) Regarding affordability, Steiner would perhaps answer that economic conditions would be consciously brought about in such a way that that actual (market) prices converge to true prices, so that everybody can buy what he or she needs. In his '*National-Ökonomischer Kurs*' Steiner (1933) calls such an ideal price in which needs and purchasing power perfectly intersect a *'true price'*. A true price would permit the producer of the good to fulfil his own (material and non-material) needs and those of all his dependants. Fraternité - in the vision of Steiner - thus refers to the consumer and the

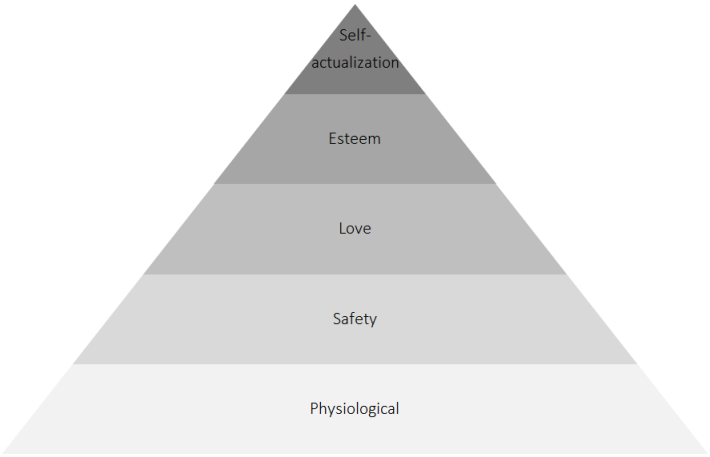

Figure 1: Pyramid depicting Maslow's (1943) hierarchy of prepotency

producer sharing a form of brotherhood. It namely is impossible to have a true price when a consumer is only searching to cut his own costs by selecting the lowest price, and a producer is only aiming at maximising profits. A producer who simply produces for his own gain may overprice a certain good, or unduly cut down on costs, or make a good which is not based on the (true) needs of individuals in society. When there is fraternité in a society consumers would not be willing to underpay a producer, while producers will not produce something which does not fulfil consumer needs nor will they overprice their product.

ii) The fulfilment of needs in general and health care needs in particular, also deserves special attention as one could ponder about the question what true needs are. There may exist a hierarchy of needs, with the first needs to be met being food and shelter or what Maslow (1943) would categorize as physiological and safety needs. In Maslow's paper *A theory of human motivation* he has distinguished five basic needs which human beings are motivated to achieve. These basic needs (Figure 1) are arranged in a hierarchy of prepotency which means that the most prepotent need (e.g. food) will dominate less prepotent needs (e.g. love) to the extent that the latter can even be temporarily ignored.

However, when basic needs are satisfied, less prepotent needs become the cen-

tre of an individual's life as for human beings gratified needs are no longer active motivators. Another question would be to which needs health care belongs. From a materialist perspective on the human being, the most relevant layer of Maslow's pyramid would be the lowest one. To the extent that psychological factors play a role in health, the higher layers also come into view, and if health has a spiritual component, it would be related to the highest non-material need according to Maslow (self-actualisation). This shows the pertinence of the question of freedom of medical research; as explained above, unless medical research is free [2], it is quite likely that material aspects of health will get more attention than others.

iii) Regarding the funding of free medical research, one may wonder whether and how the fraternité of Steiner would contribute to it. This is the subsidiary question of this thesis and will be discussed in the following two chapters. Linking Maslow's theory of needs to Steiner's fraternité one could imagine that a true price would enable the producer [3] to meet at least the bottom two basic needs. When this is the case an individual already has a degree of independence as he does not need money for his basic needs from a government of any other institution which may dictate what is 'good for him as he can decide this for himself. When interpreted in this way, Steiner's true price (a term with roots in Thomas Aquinas's concepts of just price and usury and in Aristotle's view on economics; e.g. Landreth (1976)) thus would guarantees a certain extent of freedom (Steiner et al., 2008). However, one could also be more ambitious and define a true price as the price that would permit the producer to also cover his higher needs and those of his dependents. If we take the example of a person having to pay for the education of his children, or for medical treatment of himself or his children, the presence of 'true prices' would mean that he is able to pay for the all of this, either directly or indirectly.

Figure 2 is a first attempt to depict the nonhierarchal relationships between the economy and cultural life. Clearly, education and science (cultural life) are affected by external factors; the way in which they are funded (economic

[2]Free in the sense of freedom of thought, as explained in the next chapter; not *gratis*, because researchers need to meet their material and non-material needs to be able to do research.

[3]Meaning, in this case, all those who, through their labour and mental qualities, contribute to the production of a good.

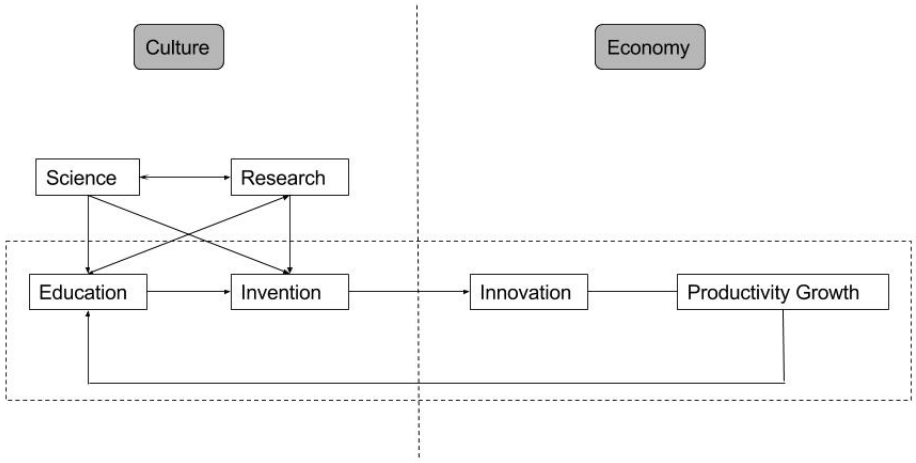

Figure 2: Representation of the relationship between education and productivity growth in the context of cultural life and economic life

and rights life)and the right for education (rights life) are examples of influences coming from both the rights and economic sphere (Figure 7). The example of education in relationship with productivity growth shows how cultural life and economic life mutually support each other. There can be a notable effect from culture life on economic life (productivity growth). Vice versa, productivity growth generates the resources which fund cultural life. Trying to concretize the relation on a relatively high level between education and productivity growth also already shows the intricacies involved when exploring the relation between different spheres. Important here to note is the difference between invention which is a part of cultural life and is knowledge free from economic considerations and innovation which is knowledge applied in the economy.

Where on the one hand freedom of thought, capital and ideas embodies the notion that human beings and the three spheres can mutually influence each other; on the other hand there is the paradigm in especially the Anglo-Saxon world that the spheres function in a hierarchical and more deterministic manner as is discussed in Chapter 3. The latter is depicted in Figure 3 which shows that a deterministic view of life leaves no room for freedom of thought or for interaction among the spheres and with individuals. Steiner perhaps was the first to concretize the presence of three spheres to such an elaborate degree and by doing so he has influenced and inspired others.

An example of a contemporary economist building on Steiner's work is Houghton Budd who uses Steiner's description of social life – as the interworking of culture, politics and economic life – as a fundament for improving the stock corporation (Houghton Budd, 2004). He states that the solution to current problems in the stock corporation can be solved by managing the three spheres autonomously while still ensuring their coherence.

Another example is Sison (2010), who describes a company as being embedded in and defined by economic, legal and cultural systems. He does so referring to the work of Aristotle, thus substantiating the intertemporal character of the observation of threefoldness. In his work he criticizes MSV as a corporate objective and describes the consequences of application of neoclassical theory on a firm–level as follows:

> 'Under the guise of asceptic, value–neutral, amoral and 'sci-

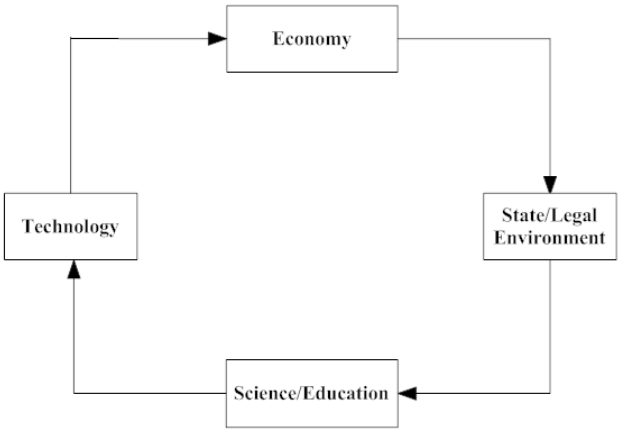

Figure 3: Deterministic representation of the relationship between economy, state, science and technology

> entific' theory, immoral business and management practices have in fact been promoted'. (Sison, 2010, p.20)

Sison argues that a firm should be grounded on ethical views of the human spirit which include working towards social gain and self–actualisation. Here we thus see that Sison attributes a far more important role to cultural life than is currently the case.

The final example of threefolding we will discuss is of Jürgen Habermas as it is described by Kunneman (1998) in his book *Postmoderne Realiteit*. Habermas distinguishes the 'system' which embodies the economy and state and the 'lifeworld' which is a universe of what is self-evident or given. According to Habermas it is possible to reduce the influence of consumerism on the lifeworld and to reduce bureaucratization of daily life by "communicatieve rationaliseringsprocessen" in the lifeworld. To describe the relation between 'the system' and 'the lifeworld' Habermas uses the term 'interferentie'. This relation is dependent on how two 'logics' interact which one side is characterized by the logic of communicative actions and one the other side the logic of money and power. These two logics are mutally dependent but also try to displace each other. In the 'interferentie' the logical of communicative actions will prevail according to Habermas as this is the most fundamental.

When Habermas describes "colonisation of the lifeworld" he means the dom-

inance of economic priorities (similar if not synonymous with economic imperialism) and the displacement of communicative actions by bureaucracy. This imperialism can be taken away by forcing the 'system' back to its own domain the market and state and thus subjecting it to normative control from the lifeworld. We here clearly see that Habermas does not envision society to be imperialized by the economic sphere, rather he urges for a free cultural sphere and an economy which has clear boundaries. This normative control from the lifeworld is one of the most important factors of Habermas' idea of progress.

In the literature there thus apparently is discussion regarding the presence of three spheres that are autonomous but still part of one coherent entity, i.e. social life. In the Anglo-Saxon literature however the threefold vision is not present as explicitly as in the Continental European literature. On the other hand, the literature on economic imperialism could also be taken as an example of a threefold vision in the Anglo-Saxon world, in the sense that it implicitly acknowledges the existence of other spheres besides economics; otherwise, what is there to imperialise?

In this section we thus have seen that the threefold vision of society is not unique in literature. The autonomy of the three spheres however is something which does not yet exist in reality and this could benefit society and more specifically the pharmaceutical industry. Where there currently is a hierarchal order of the three spheres with a dominating position of the economic sphere compared to the cultural and legal sphere, in principle, autonomy of all spheres could be realized by liberating cultural and legal sphere from the compulsion of MSV. The question however is: How? Later, in chapter 7, we will consider how a mode of financing exist that set limits on profit maximisation and where the economy is guided by fraternity opposed to liberty: Islamic finance. In that chapter we will explore this mode of financing and investigate whether it permits a free cultural sphere.

Chapter 4

Pharma's Problem in a Societal Context

4.1 The Pharmaceutical Industry and its Problems

4.1.1 Research Intensity

The pharmaceutical industry is characterized by having the largest research and development (R&D) expenditure and R&D intensity (R&D expenditure relative to sales) compared to all other industries (Evans, n.d.). Another distinguishing factor is the length of the drug development process as it is estimated to take 8-12 years for one novel medicine to be introduced into the market (DiMasi & Grabowski, 2007, Tonkens, 2005). This length is primarily due to regulations and requirements regarding drug safety and efficacy imposed by governmental regulatory agencies such as the Food and Drug Administration (FDA) in the United States. - The lengthy development and diffusion is corroborated and expanded by the research of Ortt (2009) on an industry level. The length of the pre-diffusion phase of the pharma and health care equipment industry is here described to be around 26 years. The pre-diffusion phase here accounts for the sum of the innovation phase - the time between invention and initial market introduction (the first time a medicine is for sale) - and the adaption phase which refers to the following period up to industrial production and large scale diffusion. The apparent discrepancy with the aforementioned twelve years can be explained by the

fact that this number only includes the drug development process excluding the period post market introduction. The composition of the pre-diffusion period will be further discussed when describing the drug development process in its generic form. Finally, an important remark regarding these relatively lengthy periods is that they pertain to the innovation of novel medicines of which no similar forms are available on the market.

4.1.2 Market Saturation

The large expenditures and lengthy development process however do not translate into large innovative output which is illustrated by the fact that in the past 60 years (1950-2010) there has been increasingly more R&D expenditures without notable increases in new drug approvals (Gerybadze, 2010, Kaitin, 2010, Munos, 2009, Pammolli et al., 2011, Scannell et al., 2012). The annual R&D output over these sixty years has been relatively flat with some increases in 1990 to 1995 (see Figure 4).

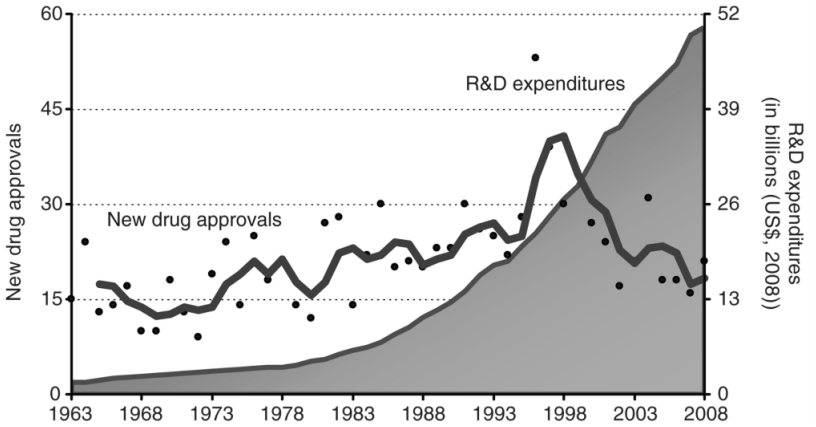

Figure 4: New drug approvals (dots), represented on the left vertical axis, and pharmaceutical R&D expenditures (shaded area), represented on the right vertical axis, in the United States from 1963 to 2008. R&D expenditures are presented in terms of constant 2008 dollar value. The trend line is a 3-year moving average. The source of drug approval data is the Tufts Center for the Study of Drug Development (CSDD). The source of R&D expenditure data is the Pharmaceutical Research and Manufacturers of America; Industry Profile 2009; conversion of actual expenses to constant dollars was performed by Tufts CSDD. The graph is derived from a report by Kaitin (2010).

While on the one hand the innovative output thus seems to be running constant the measures of the pharmaceutical industry to increase this number have been extensive and increasing over the same period. However since 1985 the industry has been spending more on R&D at an average compounded growth rate of 12,3%.

Thus this raises a question: are there still that many diseases etc. for which new medicines are needed? Or has pharmaceutical research over the past 60 years been so successful that it has more or less achieved its purpose: finding medicines for (almost) all diseases that can be treated with medicines? If a continual flow of new medicines is required to increase market share, would this not require a continual flow of new diseases requiring medicines? We will return to this question when describing the standard modus operandi of the pharmaceutical industry.

4.1.3 Profitability: "Drying Pipelines"

Despite the increasing R&D investments, more or less constant output and long duration of the medicine development process, the pharmaceutical industry has managed to create considerably large profits (Roberts, 1999). This profitability is predominantly possible because companies have market exclusivity through intellectual property right (IPR) protection (i.e. patents) for a variable amount of years after a patent is granted. In this period of IPR protection companies must use their temporary monopoly position to recover all their investments and make profits before the patent has expired. After patent expiration revenues decline rapidly due to a phenomenon which is called *generic erosion* (Saha et al., 2006). Generic erosion[1] refers to companies selling generic versions of the medicine for a lower cost thus eroding the

[1]Although companies which produce generic medicines are an inherent part of the pharmaceutical industry they are still fundamently different as they do not have to invest in research leading to the conception and validation of a new medicne. The companies who do concern themselves with these type of investments are primarily facing problems with recovering costs of their investment in research while the generic companies only reproduce already validated medicines. The generic companies therefore can be seen as types of production companies with minimal R&D. In this thesis we focus on companies which do invest in the introduction of novel medicines as they are responsible for the introduction of new medicines for diseases and face the problem of market saturation. The term "pharmaceutical industry" will thus always refer to these type of companies unless it is stated otherwise.

revenues of the innovative firms with their relatively cheap alternatives. Erosion of revenues is possible because generic firms can simply reproduce the original drug without all prior investments. In figure 5 an example of generic erosion of revenues is depicted for the medicine Losec which was originally created by AstreZeneca to treat gastric acid. The figure clearly shows that revenues of AstraZeneca regarding Losec decline rapidly after patent expiration in 2001. Generic erosion and numerous other factors such as declining R&D productivity, pricing regulation and cost-constraints are putting pressure on pharmaceutical companies as these factors are inhibiting the ability to introduce new drugs after patent expiration (Drews, 1998, Paul et al., 2010, Vernon, 2005). Not being able to launch (patent-protected) medicines renders incumbent pharmaceutical firms incapable of making profits or even recover R&D investments (Booth & Zemmel, 2004). In the pharmaceutical industry jargon this is called the problem of "drying pipelines", i.e. companies having insufficient lead molecules to develop into a medicine (Cressey et al., 2011). Due to generic competition after patent expiration market saturation occurs. The pharmaceutical industry thus is geared towards introducing medicines before patent expiration in order to maintain profitability and stay competitive. We thus have identified three main problems which affect the pharmaceutical industry, namely i) generic erosion; ii) "drying pipelines" and iii) market saturation. All these three core problems underly a greater problem, namely that of an incapability of the pharmaceutical industry increase or at least manintain market share.

A question raised in this thesis is whether not being able to maintain or increase market share of the pharmaceutical industry as a whole is a problem *per se*. There can possibly be alternative ways for a company to be profitable but in this section we have described the problem from the pharmaceutical industry's perspective. If for example we would examine generic erosion we could imagine that this is a problem for the incumbent pharmaceutical company who created the medicine; however advantageous for a patient and perhaps also society. When people are healthy they can namely fullfil tasks which benefit themselves and other illustrating a clear societal benefit. We here already actually see an interesting difference in values which will be discussed when describing the difference between conventional market/economic theory with alternative perspectives.

4.1.4 Profitability: The Role of Law and Regulation

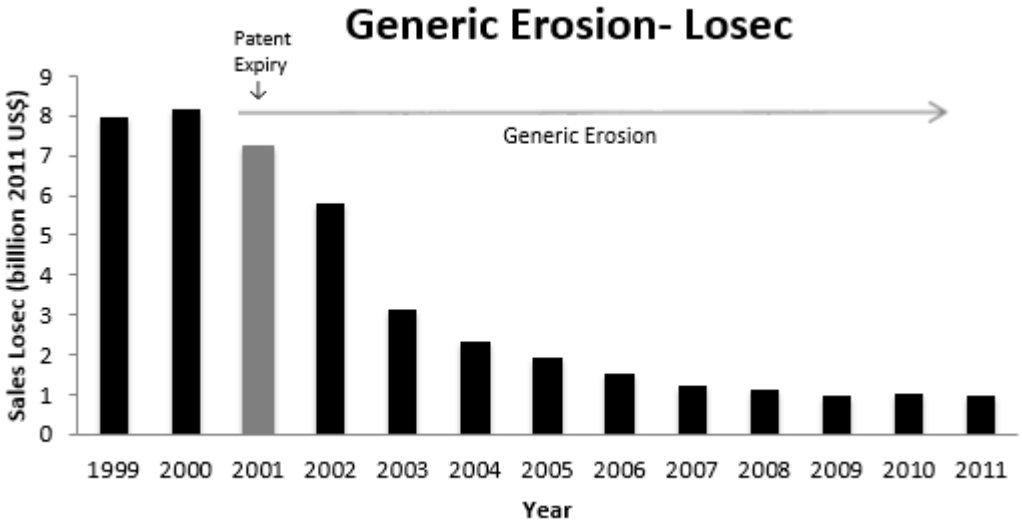

Figure 5: Generic erosion of revenues of AstraZeneca regarding gastric treatment drug Losec. The year 2001 is the year in which AstraZeneca lost its intellectual property rights over Losec. Graph is produced by using data from annual reports from AstraZeneca ranging from 1999 to 2011 which can be retrieved from http://www.astrazeneca.com/Investors/Annual-reports.

Although the pharmaceutical industry currently often portrays itself as being victimized by stringent rules and regulation there also is a different side. Spitz and Wickham (2012) have done insightful research on whether or not the profits of the pharmaceutical industry are used for high R&D costs –as is claimed by the firms - or actually are oligopolistic rents. Quite surprisingly the latter appeared to be the case as between 1988 and 2009 the pharmaceutical industry gained profits which were 3 to 27 times higher than the all-industry average while they invested less in R&D than other high R&D firms. In the 'Entrepreneurial State' Marianna Mazzucato shows that - among others things - in the pharmaceutical industry a pivotal role is played by the government regarding breakthrough innovation, economic growth and thus also profitability (Mazzucato, 2011). In her article she describes that it is actually the state which funds high risk research while the pharmaceutical sector appropriates the majority of the returns. Block and Keller (2015)

substantiate the findings of Mazzucato by describing the essential role of the government in the pharmaceutical industry via three fundamental routes, namely: *i)* through a wave of legislation a legal and institutional industry mechanism is created which enables private appropriation of publicly funded research; *ii)* most blockbuster drugs - i.e. the driving factor behind pharmaceutical industry sustainability - are conceived with governmental support and *iii)* an evident evolution in governance of science which entailed that especially IPR became more in service of the industry. The pharmaceutical companies on the other hand do invest, however such investments are often directed to less risky projects such as 'me too drugs'[2] and also large amounts of resources are spent on marketing. In contrast to many other countries such as the Netherlands, direct–to–consumer– advertising is allowed in the United States due to lobbying of the pharmaceutical industry and proves to play an important role in increasing the sales of prescriprion drugs (Donohue et al., 2007, Wilkes et al., 2000). In short one can observe a trend of socialization of risk and privatization of returns.

4.1.5 From Molecule to Blockbuster

If the aforementioned problems of the pharmaceutical industry are evident, the question arises whether measures are required to remedy them. This then raises the obvious question what kind of measures could solve the problems and probably even more importantly why do current measures (at least partially) fail to achieve their goal? In order to answer this question we will try to map out in which way pharmaceutical companies operate while trying to launch a new innovative medicine. By describing this hypothetical explanatory case different important constituents of the industry can be explored and it can illustrate in which way each of them relate to the problem-solving capability of the industry. The aim of our description of this imaginary case is twofold. First we will describe the general way in which pharmaceutical companies often portray their pathway to developing a new blockbuster medicine. In the second part we will try to see in which way certain elements of this pathway are related to the earlier observed problem of maintaining

[2]'Me too drugs' is a popular term for drugs which are not innovative but are already existing drugs which contain minor changes. As they are not more effective for the targeted indication the term has a negative connotation in the sense that it is only marketed for commercial purposes rather than being more effective than existing drugs.

and increasing market share and primarily in which way the pharmaceutical industry currently tries to solve this problem.

As already explained a pharmaceutical company constantly strives to launch a blockbuster medicine[3] which enables the firm to recover prior investments and be profitable. Drug development – i.e. all efforts of a company which are aimed at developing a new medicine encompassing primarily R&D but also legislation, funding, mergers & acquisitions (M&A) and collaborations with both academia and other firms – is a pivotal and often well established process within each firm. Despite individual differences between companies regarding their drug development process the main constituents greatly overlap (Tonkens, 2005).

[3]A "blockbuster medicine" is a drug which allows pharmaceutical companies to not only recover their prior investments but also to make considerable amounts of profits. The latter is especially important for the industry as it attracts investors who are searching for a higher return on their capital

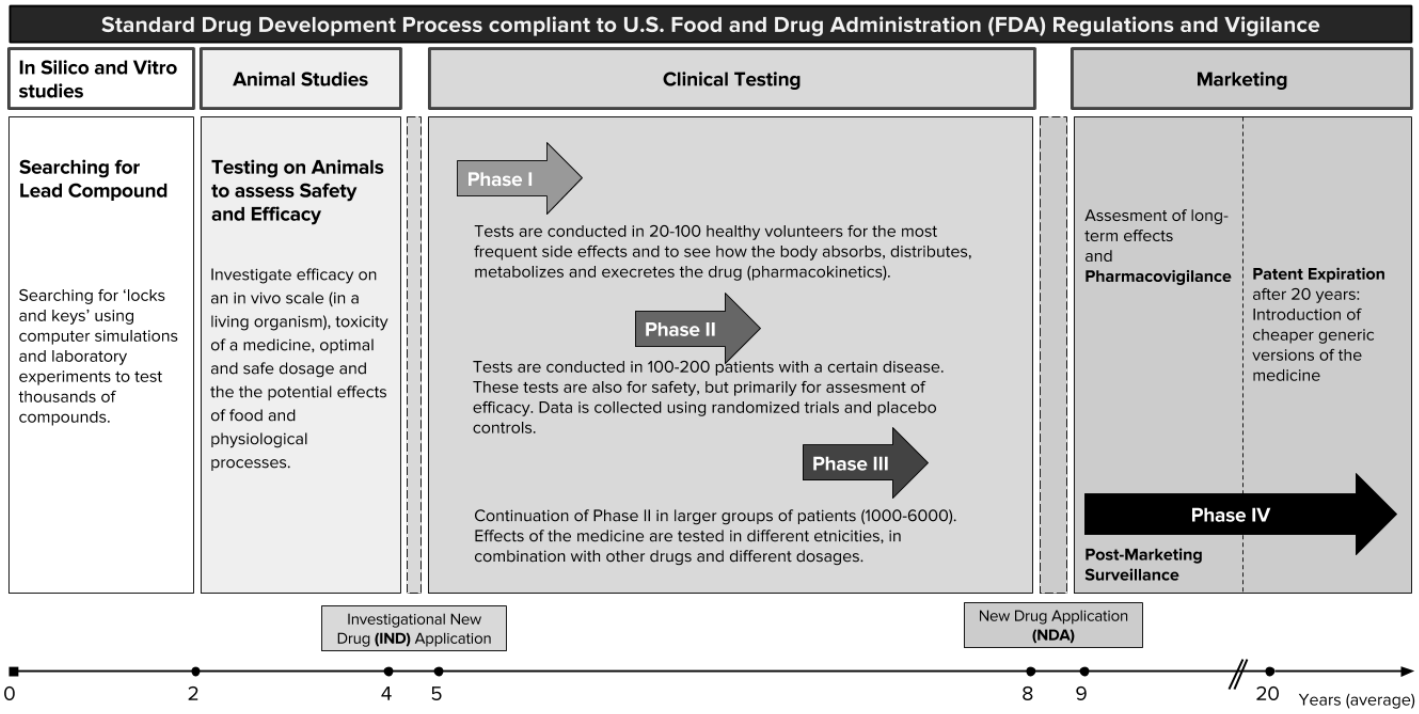

Figure 6: Standard Drug Development Process

In Figure 6 a generic form of the drug development process within the pharmaceutical industry is depicted. In order to gain a proper understanding of this figure it is inevitable to mention certain fundamental principles within pharmacology and pharmaceutical sciences. We will however try to keep this as brief and comprehensive as possible considering the fact that it is not the goal of the thesis to give an elaborate overview of the intricacies involved in the scientific part of the pharmaceutical industry. As already could be seen in figure 3 the drug development process can be roughly divided in the following six phases:

1. *In silico and in vitro studies:* In this first part of the drug development process all research efforts are directed to finding a drug target – in a process called 'target validation' – and subsequently to find lead compounds which fit this earlier validated target. Probably one of the most simplistic ways of explaining these pharmacological and pharmaceutical principles is via the "lock and key analogy". The analogy states that in the human body there are several drug targets or drug receptors which can be seen as locks. The moment when a substance such as a medicine – the key – fits this receptor a biological response is elicited. Important to note is that this model assumes that diseases can (only) be cured through biochemical intervention from outside.

   The plethora of diseases – if not all– can be ascribed to the occurence or absence of such a biological response. In order to investigate treatments for diseases it thus is important to firstly establish which 'lock' is involved in a disease; or the other way around: which 'locks' are susceptible for an amount of 'keys' and which disease is related to this 'lock'. When the lock is identified and validated the drug development truly starts as now research will be done to find keys which fit the lock as well as possible. The most traditonal way of finding such keys is to isolate the receptor/lock on a laboratory scale and to add a new chemical compounds which possibly could fit the lock and keep repeating this process untill a desired outcome is met. This iterative process of *in vitro* testing is very time consuming and therefore also expensive. With the advancements of information technology however the efficiency of finding lead compound has increased. It now namely is possible to model a receptor by using sophisticated software and to simulate how well a potential molecule would fit on this receptor. These simulations are

part of what is called *in silico* testing and significantly increase the efficiency of in vitro tests. It now namely is possible to already dismiss a very large quantity of drug candidates based on data retreived from simulations. Despite large advancements which are made to make this part of the drug development process more efficient it still accounts for an average of two years. *In silico* and *in vitro* studies are – similarly to almost all types of basic types of research – intrinsically subject to great uncertainty which again makes it one of the most risk-bearing parts of the development process.

2. *Animal testing:* The occurrences of this phase are somewhat self-explanatory. From the previous studies only a small selection of molecules have been selected from a database of thousands of compounds. However the human body is still too complex to predict whether or not a medicine will be efficacious and – perhaps even more important– safe. At the inception of this part of the drug developing process researchers namely only know that a certain compound has the potential of eliciting a response in the human body. Important questions however regarding for example efficacy on an *in vivo*scale (in a living organism), toxicity of a medicine, optimal and safe dosage and the potential effects of food and physiological processes are still unanswered. To find an answer to these pivotal questions in vivo testing becomes the only viable option. To make the extrapolation from laboratory to human beings smaller medicines are first tested in animals. Opposed to the previous phase ethical considerations now thus also are introduced as there rise questions like when is it allowed to test in animals and what are the criteria which are to be met to be allowed to finally test in humans. In order to safeguard such ethical principles the FDA has formulated extensive protocols[4] to which investigating institutions such as academia and pharmaceutical companies should comply. The aforementioned illustrates the heavy involvement of the FDA in the North-American drug development process and apart from animal studies all other phases are also heavily regulated. The drug development process could therefore be described as several parties directing their efforts to meet FDA standards and protocols as without approval from the FDA medicines will never reach the market.

[4]Good Laboratory Practice for Nonclinical Laboratory Studies (21 CFR Part 58)

3. *Phase 1:* After a succesful completion of the *in silico/vitro* and animal studies an Investigational New Drug (IND) is submitted. This is done in order to get approval for transition to Phase 1 of the drug development process. The regulations and corresponding vigilance from this point in time will be increased due to the fact that the medicine will be tested in human beings. In this phase the experimental drug will namely be researched in the context of pharmacokinetics. Pharmacokinetics can be simply explained as 'what does the body do with a drug' and is described by the ADME-principle, an acronym which respectively refers to Absoption, Distribution, Metabolism and Execretion. The Phase 1 tests are conducted in 20 to 100 healthy volunteers who are carefully monitored for pharmacokinetics but also adverse drug effects. After a series of requirements stipulated by the FDA are met Phase 1 is completed.

4. *Phase 2:* While in Phase 1 drugs are tested on healthy volunteers Phase 2 is the first time in the drug development process the experimental medicine will be tested on patients who can actually benefit from it. In this phase two major categories are tested: safety and efficacy. Although a lot of research has already been done in the previous phase regarding safety this will be continued for the whole drug development process. As the medicine is now tested in actual patients its potential effect can be actually observed, i.e. the efficacy of the medicine. For these tests approximately 100 to 200 patients are tested in order to investigate the pharmacodynamics. Pharmacodynamics – opposed to pharmacokinetics – refers to what kind of effects the drug has on the human body. These tests are conducted in the form of randomized trials and with placebo controls all conform to FDA regulations and standards. The research for efficacy and safety of a particular medicine are thus the primary objective of this phase and all the upcoming phases. For every medicine however there is a different relation between the two, as for example a medicine for cancer will have to meet lower criteria for safety –provided there is a efficacy – while this would not be the case if the disease for which the medicine is developed was not as life-threathening. We here see that the FDA – and not the patients suffering from a certain disease – decides what kind of adverse effects will be tolerated.

5. *Phase 3, the New Drug Application and Market Introduction:* The third phase of the drug development process is characterized by large clinical trials in which primarily the safety and efficacy of the experimental drug are more thoroughly researched. Due to the magnitude of these clinical trials – approximately 1000 to 6000 patients are tested – they are more expensive and regulated in comparison with the previous phases. In order to reduce the risk of making large investments on costly phase 3 trials drugs have to meet strict criteria in Phase 2 of the process. As a result of this additional stringency in phase 2 we can observe that the success rate to transition from Phase 2 to Phase 3 is only 25% in the years 2005 to 2009 while that of Phase 3 to the New Drug Application (NDA) is 67% (Arrowsmith & Miller, 2013, Bunnage, 2011). When a drug succesfully passes the guidelines dictated by the FDA a pharmaceutical company will file for a New Drug Application. An NDA[5] is the proof that a pharmaceutical company has fulfilled all legal requirements regarding safety, efficacy, labeling, content, manufacturing and quality for a specific drug and therefore it is allowed to be commercially distributed. When the NDA is obtained the pharmaceutical company is allowed to sell the medicine on the market, i.e. market introduction.

6. *Phase 4:* In contrary to the previous phases the fourth and final phase is not designated for clinical trials *per se*. In this phase the medicine namely is already approved and introduced to the market and now there is industrial production and large scale diffusion. The fourth phase therefore is most essential from a commercial perspective as the plethora of all the revenues are generated from the inception of this phase until the date of patent expiration. In the drug development process two pivotal regulatory concepts are market exclusivity and patent protection. Both concepts may appear to be synonymous, however there are distinct differences. Patent protection is namely provided by a patent and trademark office and the application for a patent and subsequent the issuing thereof occurs in the most early stages of the drug–development–process, namely from the moment that i*in silico* or *in vitro* studies show that a molecule may have a certain desired pharmacological effect(see Figure 7). This entails that the standard patent protection of twenty years already encompasses a large period of drug

[5]http://www.fda.gov/Drugs/DevelopmentApprovalProcess/HowDrugsareDeveloped andApproved/ApprovalApplications/NewDrugApplicationNDA/

development – pre-market introduction – thus shortening the effective duration of a monopoly position of the pharmaceutical company for a specfic drug. The effective period in which a company can reap the benefits of a monopoly position and other possible rights acquired by the conditions stipulated by the patent office are from the moment of market introduction (after NDA) untill the date of patent expiration, i.e. the effective patent life (EPL) (H. G. Grabowski & Vernon, 2000). Market exclusivity refers to the FDA not allowing any generic application for the same or similar indication. Market exclusivity is thus a right which is granted by the FDA and its length is dependent on the type of medicine and whether or not it is a new chemical entity (NCE)(Bunnage, 2011, H. Grabowski, 2002).

Although the fourth phase thus clearly is more commercial compared to the previous phases this does not entail that it is exempt of clinical trials. There namely are numerous of trials which are conducted and patient data which is collected with regard to potential long term (adverse) effects, these activities are all part of a science within pharmacology called pharmacovigilance.

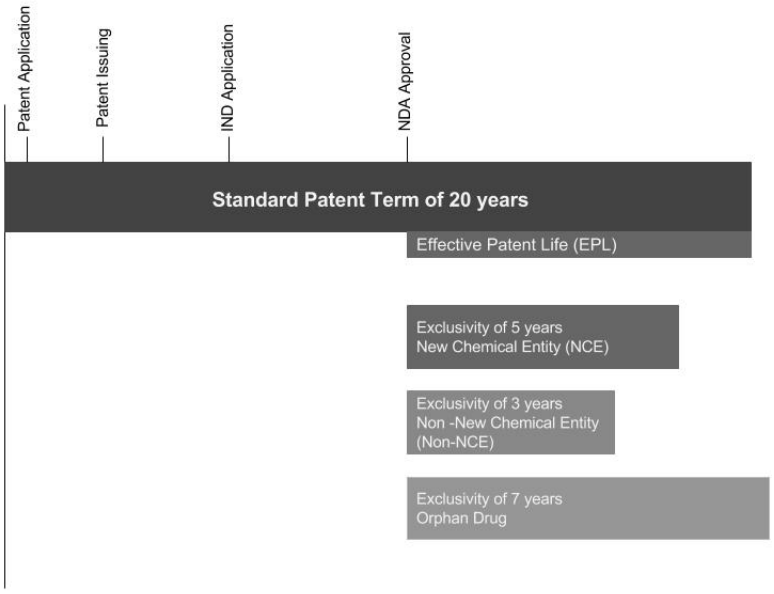

Figure 7: Standard Patent Life and Market Exclusivity

All these phases show that in an intricate manner economics, legislation and science are interwoven in the process of developing a drug. The development of a medicine by the pharmaceutical industry in its essence could be described as a scientific act in which a chemical substance is created or improved in order to influence the physical condition in a human body. The figure however already shows that – apart from R&D – legislation also plays a pivotal role in the drug development process. Rules stipulated by the FDA namely shape the way in which research is conducted. In order to actually introduce a novel medicine into the market it is namely required to comply to these rules. Consequently a company's own considerations regarding for example ethics are rendered irrevant if this is not conforming to previous established rules and legislation. Finally if we observe the large amounts of capital used for and earned with medicines the role of economics becomes evident. Interesting is also the role which capital plays in the motivation behind actually initiating the drug development process. Are medicines namely

created for the betterment of the health of human beings or for commercial gains? Do these two goals always fully coincide? These questions already show that the motivation of the pharmaceutical industry complicates the drug–development–process.

The above analysis of the explanatory case will make clear that solutions to the pharmaceutical industry's problems are predominantly sought in the innovation and research domain while this probably only is a part of the problem. By only focusing on this part of the industry important questions remain unanswered such as for example what initially drives the initiation of the drug developing process. While the aforementioned different phases are well–documented and established such other facets of the industrys operations are more implicit. It namely is not clear whether the search for a novel medicine is motivated by demand from society or by demand from for example shareholders — or, by considerations of health or profit maximisation. If both, to what extent are the two (theoretically and empirically) reconcilable?

What also is interesting is the fact that despite apparent problems in the industry several large pharmaceutical companies are still managing to generate considerable amounts of profits. Lazonick (2014) attributes such profits of pharmaceutical companies to financial operations such as large buy-backs of own corporate stocks. Here he explores the reason behind an observed discrepancy between on one hand the flourishing stockmarket and high corporate profits and on the other hand great income inequality. He namely explains that the largest part of the income is earned by only 0.1 percent of all U.S. income recipients, while the majority is facing problems such as declining job opportunities and underpayment. In his analaysis he also refers to large pharmaceutical companies such as Pfizer which has spent 71 percent of its profits into buybacks and 75 percent of these profits on dividend payments in the period from 2003 to 2012. This contradicts phamaceutical companies who claim that their high prices of drugs are needed for R&D while in reality capital reserves are allocated for the goal of increasing stock prices and executive payments. The amount of money which is invested in R&D – which has been continuously increasing since the 1960s (see Figure 1) – is often funded by the government through loans and subsidies (DiMasi & Grabowski, 2012, Mazzucato, 2013). By doing this the problems of the industry seem to be masked rather than truly addressed.

Observing the pharmaceutical industry in this wider context, a picture emerges of industry in relation to legislation and science - or, more generally of an economic sphere interacting with two other spheres, culture (understood as encompassing morality, values, science, education and research) and rights life (encompassing legislation and regulation, including regulation that affects access to funding.

Moreover, in the description of the drug development process it also becomes apparent that basic research is crucial for pharmaceutical companies. This most risk-bearing part of the industry however is often funded and executed by the government which also plays an important role in creating legislative benefits for the industry (Block & Keller, 2015, Mazzucato, 2011). Despite the fact that there are apparent problems the solutions suggested by the industry seem to be somewhat superficial. Companies namely do not address the problems directly and seem to be somewhat biased to the research, innovation and legislation component of these problems. The current approach can somewhat ironically be compared to that of the treatment with a medicine. With the exception of most antibiotics and vaccines all medicines namely only deliver symptomatic treatment instead of actually treating the root cause of the disease(Lu, 2005, McKee, 1988). In order to truly find structural solutions for the problems within the industry it therefore can be crucial to look at the problems from a new perspective which includes all three spheres relevant to the industry (research, legislation, and economic activity which here refers to the production and sales of medicines). Before introducing any new approach it is important to ascertain whether the current approach is related to conventional theories which underlie the provided solutions given by the pharmaceutical industry. Two well-known strands in the literature which place industry within the context of its wider environment are Philip Kotler's (2010) marketing model, and the academic field of Sectoral Systems of Innovation (SSI) studies (Malerba, 2002). The main purpose of our review is to explore how these two main strands of research relate the firm to the three spheres in which it is embedded. Interestingly, as we shall see, both strands of research acknowledge the existence, and importance to the firm, of the three spheres above.

4.1.6 The Marketing Environment Model

Kotler defines the market environment as

> "the actors and forces outside marketing that affect marketing management's ability to build and maitain succesful relationships with target customers."(Kotler & Armstrong, 2010, p.90)

The environment can be divided into three categories which are *i)* the micro environment; *ii)* the meso environment and the *iii)* macro environment. The distinction between micro and meso environment is only made in European marketing literature, while American marketing literature pools micro and meso environment together under the header of the former. The marketing environment of Kotler can be summarized as follows:

- *Micro Environment:* These are forces within the company that affect the ability to serve its customers. It refers to the challenges that come from inside the business itself and therefore it is also referred to as the internal environment. The micro environment is thus basically the inside of the firm which includes its organisation model, its business economics and other factors which are in its own control.

- *Meso environment*: This category describes the firm in relation to the industry in which it operates. Important constituents of the meso environment are on one hand the relations of a specific firm with suppliers, market intermediaries, the public and suppliers, and on the other, its relations with customers. The meso environment thus describes factors which are not under direct control of a firm but still can be considerately affected by its marketing strategies and policies of the micro environment.

- *Macro Environment*: This environment refers to the outer societal forces which affect the micro and meso environment. It includes concepts such as demography, natural forces, "economy" (which here refers to the the macro-economic environment), "technology", "politics" and "culture". The macro environment can thus not be readily altered by a firm itself however adequate consideriation and analysis of the environment is described to be pivotal for the execution of effective marketing.

The marketing environment model thus provides a robust framework which includes several internal and external forces which all affect a firm and its relationships with customers. Using the model, people within the firm can identify and analyse the marketing environment and all its different constituents in order to formulate effective marketing stratgies and policies.

In terms of the three spheres identified above, Kotler's micro environment contains the economic activities –the production and sale of a service or good – undertaken by the firm as part of the process of serving its customers. Under the heading of 'meso environment', Kotler includes relationships (between firms, between the firm and its customers) which 'are not directly under the control of the firm' and which are often regulated by law and formal and informal rules. Kotler's macro-environment includes elements which we have identified as part of culture in a wider sense (including the generation of new knowledge). With a view to the problems experienced by the pharmaceutical industry taken in this thesis, especially the meso and macro-environment are important. We can see that factors such as "technology" –intrinsic to the earlier discussed cultural sphere –, "politics" and "culture" all are included within the model of Kotler. However when framed from a commercial point of view, the result is a model in which the various elements are hierarchically ordered rather than treated as independent, autonomous fields. An example of such a hierarchy can be found in Kotler's description of culture:

> "Culture is the most basic cause of a person's wants and behaviour. Human behaviour is largely learned. Growing up in a society, a child learns basic values, perceptions, wants and behaviours from the family and other important institutions. A child normally learns or is exposed to at least some of the following values: achievement and success, activity and involvement, efficiency and practicality, progress, hard work, material comfort, individualism, freedom, humanitarism, youthfulness, and fitness and health. Every group or society has a culture and cultural influences on buying behaviour may vary greatly from country to country. Failure to adjust to these differences can result in ineffective marketing or embarrassing mistakes." (Kotler & Armstrong, 2010, p. 161)

In this description Kotler's emphasis on culture becomes evident. However in his approach, "culture" is relevant only as a factor (e.g. values, perceptions)

influencing customers' wants and behaviour. Values are not considered independently but more as a reality to be reckoned with (or to influence) in order to create more effective marketing strategies which again should lead to more profit. Important to notice is the fact that economic activities such as profit maximization as a corporate objective are part of the micro environment according to Kotler's model. However, in reality we can see that this extends to the meso and macro environment and especially "culture". This is can also be seen in the model of Kotler which teaches that "culture" exists as a factor to serve the economy. Applying the marketing environment model for the pharmaceutical industry leads to an effective way of identifying and analyzing different internal and external forces, however the apparent hierarchal structure of the model possibly does not allow each constituent of the marketing environment to be independently considered.

4.1.7 Sectoral Systems of Innovation

SSI studies focus on innovation at the level of a sector[6] integrating the industrial economics literature - basically standard microeconomics - with innovation studies (Malerba, 2002). An 'innovation system' is defined by Edquist (2001) as "all important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations". An innovation system has two especially important constituents namely organizations and institutions. Organizations refer to the actors/players within a system, which include universities, companies, venture capitalists and the government. Institutions on the other hand are described as the 'rules of the game' which constitute patents, policies and norms that influence the relationships between organizations within the system. The innovation system of one specific sector such as the pharmaceutical industry is called a 'sectoral system of innovation'(Malerba, 2002, 2004).

The sectoral innovation system of the pharmaceutical industry has been researched, however this research has been primarily descriptive(Bartholomew, 1997, Gilsing & Nooteboom, 2006, McKelvey & Orsenigo, 2001, Senker et al., 2001). Descriptive in this regard means that the interactions between the in-

[6]The orgin of SSI lies according Freeman (**?**) in the work of Friedrich List who mentioned a "Nation System" which would eventually be called a "National System of Innovation". It is this originally national level theory which would eventually lay the basis for the current SSI studies.

stitutions and organizations are researched and described as they are, but an underlying theoretical model of the relationships between the various elements of an innovation system - whether actual or ideal - appears to be lacking. The SSI approach can be used for describing the pharmaceutical industry as a system of sectoral innovation by systematically organizing all its constituents with regard to innovation. The aforementioned marketing problem - the incapability of the pharmaceutical industry to increase or at least maintain market share – could then be classified as a system failure(Poel et al., 2010, Woolthuis et al., 2005). A 'system failure' has been defined in the past in many ways which show overlapping and differing elements(Carlsson & Jacobsson, 1997, Edquist, 1997, Johnson & Gregersen, 1995). A simple but comprehensive description has been given by Woolthuis *et al.* (2005) who describes a 'system failure' as a systemic imperfection which can occur if a combination of constituents within the system are not functioning efficiently causing learning and innovation to be impeded. There are many types of system failures (see Table 1), however it is outside the scope of the thesis to elaborate on all of them. A few noteworthy within the context of the market problem at hand are infrastructural, hard institutional and soft intuitional failures. With these three types of system failure in particular we notice that the SSI approach - similarly to Kotler's marketing environment model takes into account factors such as science, legislation, and values. However, also here these are all not considered as autonomous domains but in this case as constituents which can either promote or impede innovation. Moreover, describing for example certain social values as a "soft institutional failure" creates the impression that values are treated as secondary or even subservient to the greater cause, i.e. innovation. It is a hypothesis of this thesis that such a hierarchal design could prevent the different domains within a sectoral innovation system from developing autonomously and preclude solutions to the aforementioned problems that are, perhaps, more effective and lasting because they provide answers to more fundamental questions

Table 4.1: Types of system failures

Type of system failure	**Description**
Infrastructural failures	Failures in physical infrastructure needed for innovation such as IT,,machine, technology and science
Transition failures	Inability to adapt to changes in technology
Lock in/path dependency failures	A system which cant adapt to new technologic paradigms due to the,fact it is locked-in a paradigm which has become less efficient or even obsolete
Hard institutional failures	Regulations and legislation which impede innovation and learning
Soft institutional failures	(Political) culture and social values which form the boundaries in,which innovation occurs and failures within such boundaries can obstruct,innovation
Strong network failures	Too strong ties between constituents of the system due to which opportunities,are ignored which present themselves outside of the network
Weak network failures	There is no real relationship between constituents due to which there,they cant learn from each other
Capabilities failures	A constituents lack of capabilities to learn and adapt

4.2 "Colonisation" of Cultural Life

In the previous section we discussed the dynamics characterizing the pharmaceutical industry followed by the industry's perception regarding its problems. We observed the presence of three spheres, of which the cultural sphere includes health care. In this section we will discuss the observation that while medical research is increasingly confined to research that is profitable in financial (rather than wider societal) terms, the freedom of choice of patients regarding their own treatment, and of doctors in their diagnosis and advice for treatment, is also reduced.

As a patient you are legally free to make your own health care decisions. In practice however, this freedom can be questioned as for example in France there a law has been passed[7] which forces doctors to vaccinate childeren. Moreover, for most patients making a health care decision by yourself probably is difficult because you are not educated in all intricacies involved in both the disease as its treatments. Therefore it is logical that patients often rely on their physician for getting advice regarding an optimal treatment. Does this however mean that a patient has to blindly follow a health care professional? Badcott (2005) has researched that patients can significantly contribute to the effectiveness of treatment if they are (till a certain extent) aware of how a disease and treatment work. Moreover, as a 'hermeneutic expert' – meaning that only the patient actually experiences the illness – combined with expertise of the physician both parties can more effectively decide on an optimal treatment.

A problem however arises when the treatments available are already influenced and governed by an institution outside of the realm of both patients and physicians. If we for example consider health insurance daily practice shows that physicians will prescribe medicines which are included in a patient's insurance policy as he could not afford other, potentially superior, alternatives. We here already see a constraint on the freedom of both patient and physician as health insurance seems to heavily influence the choice in treatment. More abstractly put, if disease X has treatments A up to Z but only treatment A is covered by health insurance it would *de facto* mean that

[7] http://www.loc.gov/law/foreign-news/article/france-constitutional-court-confirms-legal-obligation-to-vaccinate-children/

many patients and physicians would be forced to forsake all other treatments due to considerations of patient purchasing power rather than the actual well-being of the patient.

One could probably (correctly) argue that insuring patients for all treatments available is not viable from an economic perspective. This however is true in the current economic system, however an alternative way of financing could change this. Such an alternative, "freed capital", will be discussed in Chapter **XX**. The goal of this section however is not to address this matter, rather one that is more fundamental in nature. Given the fact that health insurance and relating policies play such an important role in the choice of treatment one should ask what determines which treatment is liable to be taken up in an insurance policy and others are not. Continuing with the aforementioned abstraction, what makes treatment A superior to the other treatments? The multiple millions of dollars spent by pharmaceutical companies on lobbying suggests that companies aim to get their medicines taken up by insurers as this almost guarantees its prescription and sale (Ismail & Washington, 2008). We here see that the freedom of physicians and patients to choose treatments is heavily influenced by factors from economic life. In the next section we will discuss other examples of how economic life seems to in uence both cultural and rights life which is described as *'economic imperialism'* in literature.

Another example of colonisation of cultural life by the pharmaceutical industry has to do with education. In order to maintain or increase R&D profitability the pharmaceutical industry influences universities to not teach alternative medicines as it does not conform to the current rules and regulations governing pharmaceutical research. Baugniet et al. (2000) explains that there is a currently is a shortage on lessons about alternative medicine and that students who have not been educated about alternative medicines are more likely to reject it.

The final and most important form of colonisation of cultural life by the pharmaceutical industry is that of medical research. In *Creating the Market University* Elizabeth Pop Berman (2011) describes that in the last century a paramount change has taken place in the way science – also pharmaceutical science – is conducted and its role in society. The focal point of her research is the observation that "market logic" (profit–maximizing behaviour) has entered academic life from the 1970s and subsequently she tries to ex-

plain how and why this has happened and what the consequences of such a logic are. "Market logic" only was able to successfully root itself in academic life from the 1970s. This makes it interesting to investigate what kind of changes have led to the adoption of this logic as this would provide insight as to why economic thinking currently enjoys its powerful status. As recounted by Berman, in the beginning of the 20th century universities were still seen as an 'ivory tower' in which science and knowledge were somewhat isolated from external influences possibly due to ethical considerations and a lack of understanding of the potential of scientific knowledge in fields outside academia. A crucial point in global history however for the position of science and universities was World War II and especially the Manhattan Project[8] (Kelly, 2005). As mentioned by Mazzucato (2011) it was the government who opened the door for the use of 'academic science' – i.e. science conducted at academia – by corporations such as pharmaceutical companies. Especially primary research which is expensive and has a high probability of faillure was conducted through government funding allowing corporations to subsequently reap the benefits from the results of this research for their own gain. As this continued the relation between government and academia, but also corporations became more intertwined, gradually changing the academic objective behind scientific research. In the 1950s and 1960s universities were namely still relatively secluded and scientific research was still perceived as something which was conducted in order to gain knowledge per se (*'art pour l'art'*) and all other benefits which could be reaped from this process were deemed secondary while in the 1970s this became more tailored to the demands from economic life.

4.3 "Colonisation" of Rights Life

In the previous section we have described various instances of the economic sphere manipulating the cultural sphere. This however does not always oc-

[8]8The Manhattan Project was a large scale military research and development project aimed to create the first nuclear weapons. The project was a collaboration between the US, the UK and Canada initiated during World War II and resulted in the two atomic bombs which were used in the bombing of Hiroshima and Nagasaki. For realizing its goals approximately 130,000 people were employed and an amount of $2 billion dollars was spent. The Manhattan Project therefore was one the largest scientific undertakings which did not only change the organization of science, but even the perception regarding science and its alleged purposes.

cur directly, it is also possible for the legal sphere to be influenced which eventually can lead to subjugation of the cultural sphere. An example specific to the pharmaceutical industry is pharmaceutical lobbying; this clearly illustrates how pharmaceutical companies try to change rules and regulation in order to maximize their profits due to demands from the economy.

Ismail (2008) mentions that pharmaceutical, medical and health product manufacturers have spent more than one billion US dollars from the year 1998 to 2006 on federal lobbying. He further mentions that Lobbying disclosure reports filed with the American Congres reveal that this money is spent on a great variety of issues which the pharmaceutical industry considers essential. The most important results of pharmaceutical lobbying thusfar have been *i)* blocking the importation of relatively inexpensive drugs from other countries; *ii)* protecting pharmaceutical patents both within the United States and abroad; *iii)* ensuring greater market access for pharmaceutical companies in international free trade agreements; and iv) preventing the American Congress from limiting personal advertisements for prescription drugs.

The last of these 'achievements' – the permission to do direct–to–consumer advertising of prescription drugs – has had effects on society which were almost directly detectable. Due to increased industry spending on these type of advertisements – an increase of more than twentyfold from the year 1998 to 2006 – the IMS Health, a health consulting firm, reported that there has been a widespread over–prescription of drugs. This illustrates how pharmaceutical companies have used the legal sphere to influence the demands of their consumers.

4.4 The Pharmaceutical Industry and Freedom of Thought

In the two previous sections we have seen how the pharmaceutical industry has 'colonized' cultural and rights life in order to maintain and increase its profitability. Observation of the pharmaceutical industry colonizing the other two spheres especially with relation to legislation and science - or, more generally of an economic sphere colonizing culture (understood as encompassing morality, values, science, education and research) and rights life

(encompassing legislation and regulation, including regulation that affects access to funding) leads to an image depicted in Figure 8.

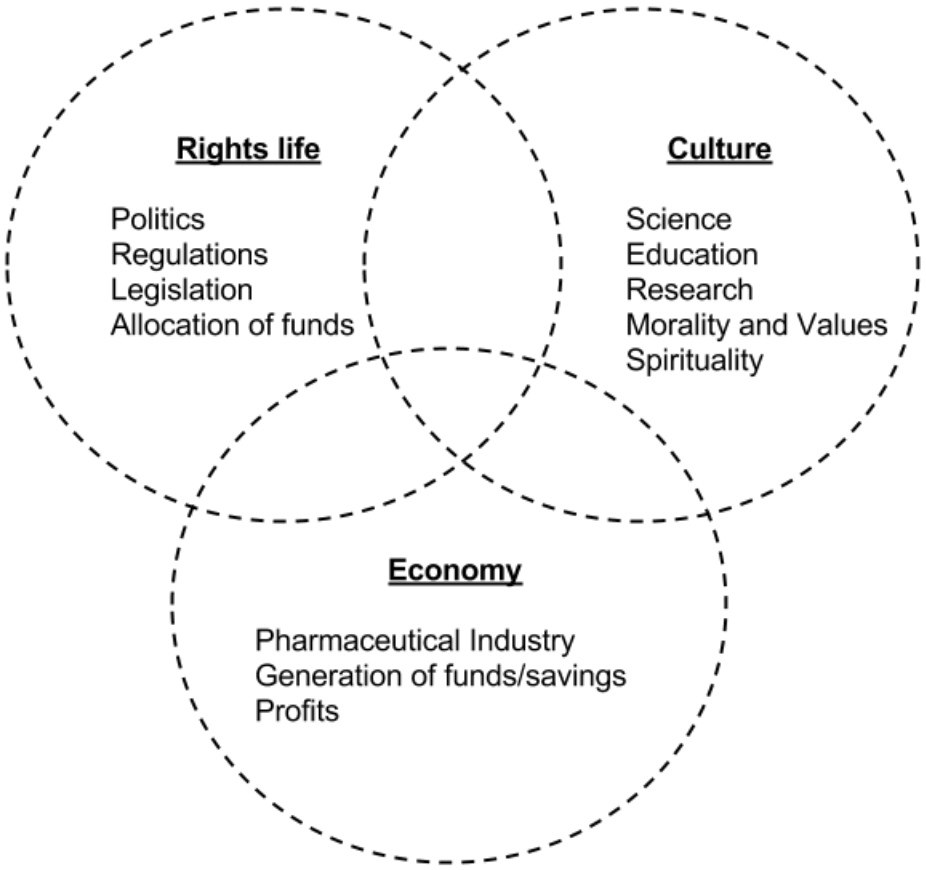

Figure 8: Three spheres in which the economy embodies the pharmaceutical industry. Economic imperialism refers to the economic sphere entering both cultural life and rights life

The dominance of the economy above the other two spheres raises two important questions. First, why does the pharmaceutical industry act in this manner? Second, what are the consequences of this 'imperialistic' behaviour. To answer the first question we have to look at the prevalent way of economic thinking which is used by pharmaceutical companies, i.e. neoclassical economic thinking. Following this line of reasoning the pharmaceutical industry should shrink when profits decline. On a corporate level this however does not occur as individual companies try to maximize their profits. In this process of profit maximisation it therefore is possible that pharmaceutical companies eventually are forced to cross the boundaries of the economy and have to colonize the other two spheres. This colonisation is seen by the industry trying to actively influence education, medical science, advertising and rules and regulations. In chapter 5 we will elaboretly discuss the current dominance of the economic sphere.

The second question was related to the consequences of economic imperialism of the pharmaceutical industry. As we have already discussed the industry is subjecting medical research to commercial demands. This means that it is possible that medicines are currently developed with another purpose than improving human health. Also, education is in uenced together with laws, rules and regulations. Moreover, despite this colonisation of cultural and rights life the pharmaceutical industty is still facing the problem of drying pipelines. This leads to the guiding intuition of this thesis that the acknowledgement of three independent yet autonomous spheres, and especially freedom of cultural life, is a possible solution for the problems of the pharmaceutical industry and for society in general.

Chapter 5

The Appropriateness of MSV, EMH, and NGT

5.1 Introduction

5.1.1 Consumer Sovereignty

We concluded the previous chapter with the presence of three spheres of which the economic sphere was dominating the remaining two. In this chapter we will investigate this configuration. We will conduct this research by investigating the status quo in the West, i.e. neoclassical economic theory. The first question which arises is whether neoclassical theory indeed includes a hierarchal order of the three spheres as we have observed in the previous chapter.

To answer the above question it is interesting to investigate the concept 'consumer sovereignty'. Consumer sovereignty is a neoclassical concept which according to a historical analysis of Persky (1993) already originates from the time of Adam Smith (1776). Adam Smith and his 'invisible hand' theory will be discussed in this thesis as it is believed to be fundamental for neoclassical economics. In short, the theory refers to the phenomenon of private profit maximisation automatically leading to social gains, as if it were direced by 'an invisible hand'.

The term consumer sovereignty was first coined by Hutt who described it as follows:

> "The consumer is sovereign when, in his role of citizen, he has not delegated to political institutions for authoritarian use the power which he can exercise socially through his power to demand (or refrain from demanding)." (Hutt, 1936, p.257)

> "it [consumers' sovereignty] simply refers to the controlling power exercised by free individuals, in choosing between ends, over the custodians of the community's resources, when the resources by which those ends can be served are scarce." (Hutt, 1940, p.66)

From these definitions we can deduce that consumer sovereignty is directly related to free individuals who are able to demand what will be produced. Consumer sovereignty thus entails freedom of the cultural sphere as this is the origin of these preferences. If the cultural sphere is not free how is it possible to have sovereign consumers? It thus appears that within neoclassical theory there is a notion of freedom of cultural life. In pracuce this however is different which we will research in the remainder of this chapter.

5.1.2 Conventional Economic Theory

The pharmaceutical market can be described as a highly dynamic environment characterized by among others fierce (generic) competition, research and development, large cash flows, extensive regulation and legislation, a substantial number of employees, and global trading(DiMasi & Grabowski, 2007, Keyhani et al., 2010, Saha et al., 2006). Such characteristics of the market are exacerbating the problems the pharmaceutical industry is currently suffering from, and which are experienced as 'market saturation' due to especially 'drying pipelines'. Where there are problems solutions are often sought, the way in which these problems are viewed however plays a fundamental role in whether or not a solution will be found and ultimately whether it will be effective. When facing a persistent problem it can be wise to adjust or even change the 'lenses' which are used to look at the problem, as these can have an obscuring effect on finding solutions. In this chapter we will discuss how such 'lenses' influence the pharmaceutical industry regarding its problem-solving capability. 'Lenses' refers in this context to the assumptions and prescriptions which are part of conventional economic theory.

The most important assumption which predominates modern economics and is widely implemented in both direct and indirect fashion is that of markets being *efficient*. The *efficient market hypothesis* (EMH) has gained prominence after Eugene F. Fama (1970) discussed the hypothesis in depth in his article *Efficient Capital Markets: A Review of Theory and Empirical Work*. The years after this publication the EMH gathered a substantial number of followers as also people who (partially) reject it. In addition to the assumption of efficient markets there is a prescription which dominates current economic theory, namely that of *maximisation of shareholder value (MSV)*. Implementation of the MSV principle has profound influence on current corporate governance and is closely linked to the EMH. Both EMH and MSV (partially) originate from an interpretation of the 'Invisible Hand' described by Adam Smith. In this chapter we will first discuss the characteristics of both principles and also touch upon the primary critiques and proposed alternatives. The discussion is aimed to provide the necessary insight to answer the question: Do the assumption of 'efficient markets' and prescription of MSV help the pharmaceutical industry to solve its real-life problems of declining profitability and market saturation? Finally, in the discussion of the principles and the answer to this question we will primarily focus on the following three core elements of a corporation: *i)* the key objective of the firm, *ii)* corporate governance and *iii)* the capital structure.

5.2 Efficient Market Hypothesis

In the previous section we briefly discussed the "invisible hand" which was described by Adam Smith and underlays the EMH. We also already briefly discussed the EMH in its core essence and will now continue with a more elaborate review.

5.2.1 Prices "Fully Reflect" All Information

Before Fama (1970) gave the status to the efficient market hypothesis it currently enjoys there already were earlier notions of the same concept to be found (Sewell, 2011). In the 1970s, Fama however revolutionized economic theory by re-introducing the concept of an efficient market which he himself simply defines as:

> "A market in which prices always "fully reflect" available information is called efficient (Malkiel & Fama, 1970, p.383)."

Important to firstly note is that prices here refers to asset prices and more specifically (often) to stock prices. The apparent simplicity can be misleading as the quotation marks already cause a form of vagueness to surround the definition. What exactly is meant by "fully reflect" is not answered directly. He first distinguishes three forms of tests which must empirically prove the EMH namely *i)* the weak form test in which historical asset prices encompass the information set, *ii)* the semi-strong test in which asset prices adjust to information which is made public and *iii)* strong tests in which investors are assumed to have complete access to all information which plays a role in asset price formations. Critically comparing these tests with reality already raises questions regarding the viability of the weak and strong test. Fama aims to concretize the EMH by using the rigor and robustness of mathematics to explain his hypothesis using the equation depicted below.

$$E(p_{j,t+1}|\Phi_t) = [1 + E(r_{j,t+1}|\Phi_t)]p_{j,t} \tag{1}$$

In this equation E represents the expected value of asset price p_j at time $(t+1)$ given all available information Φ at time t. The expected level of a future asset price $p_{j,t+1}$ is a function of its current price, $p_{j,t}$, corrected for the expected rate of return (profit), $r_{j,t+1}$, on the asset concerned. Fama uses the equation to argue that stock prices p reflect all information about the business.

The equation does effectively show how according to the EMH the information set Φ is completely utilized in order to compute the expected return and expected price $p_{j,t+1}$. Michael C. Jensen (1978) simplifies the aforementioned by describing a market as efficient with regards to Φ if it is impossible to make economic profits based on Φ, commonly known as the impossibility to beat the market. "All information" includes its correct interpretation and expectations regarding the future demand of a product or service– that is, it includes information about prices and supply and demand conditions in the real economy.

The EMH assumption that asset prices reflect expectations regarding the future demand for a product raises some questions regarding how this demand is formed. For example, can all consumers give effect to their demand in the

market (cf. the distinction between demand and effective demand made by Keynes)? Moreover, is the demand itself independent of external influences allowing the asset prices to accurately relfect the wishes of sovereign consumers? To answer the first question one can consider the purchasing power of individuals. It is currently impossible that everyone is able to purchase a certain good making them also unable to exert influence on the demand and the asset price. The answer to the second question is also negative as demand is not independent of external influences. On the contrary there are many factors which can manipulate demand which also plays an important role in the pharmaceutical market. These factors are for example advertising and the (temporary) elimination of competing firms due to laws and regulation. Research conducted by Lazonick (2014) also illustrates how asset prices can be manipulated as he points out that companies engage in large buy-backs of own corporate stocks to artificially inflate their stock prices. The pharmaceutical company Pfizer for example has spent 71 percent of its profits into buybacks and 75 percent of these profits on dividend payments in the period from 2003 to 2012. We here observe that asset prices not necessarily have a connection with the real–economy. Demand thus is often not based on a true need for a certain good, rather individuals are persuaded or coerced to demand that product. The manipulation of demand occurs because firms focus on profit maximization and not on the true need of consumers, raising the question why profit maximization is necessary or indeed desirable. EMH itself is based on the presence of profit–maximizing firms in the market which we will discuss in the next section.

5.2.2 The Relationship with Profit–Maximisation

Next to asset prices reflecting all information the most important characteristic was the fact that according to EMH capital allocation between firms is based on profit maximization. This raises the question why capital allocation has to be done by profit–maximizing firms *per se*. In order to understand this we have to have a better understanding of the term "market efficiency". Somewhat counterintuitive the EMH does mean that markets become efficient automatically, however this does not imply that market participants have to do nothing. According to Damodaran (2012) it namely are the actions of investors, who sense bargains and put into effect schemes to beat the market, that make the market efficient. For market inefficiencies to be eliminated two important criteria have to be met. First, the market ineffi-

ciency itself presupposes imperfect information which enables a firm to beat the market and earn excess returns on the asset(s) regarding which imperfect information existed. This already means that the earlier notion of not being able to beat the market has to be adjusted to not being able to beat the market consistently with a common strategy as it will be known information from the moment it is employed continuously. In other words beating the market can be done in the (temporary) absence of perfect information. Second, the transaction costs beating the market via a certain scheme have to be smaller than the expected profits from the scheme.

Is it however true that profit–maximisation is necessary to identify and eliminate super–normal profits? In neoclassical economics, profits are viewed as a signal of the needs of consumers, as there will not be any profits if society does not demand this good. Super-normal (i.e. above-zero) profits in the production of a good are a sign of excess demand for this particular good. The way to eliminate these profits, in neoclassical economics, is through profit maximisation. Profit-maximising owners of capital allocate capital to a business that runs super-normal profits; as production in this business expands, excess demand disappears and profits are restored to normal; in the process, the product price will also fall. Thus, private gain (profit maximisation) coincides with private gain (increased availability of the good at lower prices).

If profits are indeed good indicators of the true needs of consumers, then they are also good indicators of where capital is needed, (to realise increases in production with a view to meeting increased demand). However, is profit maximisation a necessary and sufficient means for achieving an allocation of capital towards the production of goods that are needed, as neoclassical economics assumes? When one assumes that profits indicate excess demand it still does not explain why profit–maximisation is needed for the allocation of capital or why only profit–maximizing owners of capital would allocate their capital to meet this demand. Following this line of reasoning every market participant searching to earn – not necessarily maximize – profit would also allocate capital to this end.

The second question regarding the support of the maximisation of profits is whether profits indeed accurately reflect the true needs of consumers. As explained in this chapter however, the demand for a good is influenced by other factors besides the needs of consumers, such as advertisements, and laws and

regulation. Protection of intellectual property rights, one-sided direct-to-consumer advertising, and legal barriers thrown up against competitors of established pharmaceutical corporations (e.g. producers of generic medicine and of innovative alternative medicine) play a particularly important role in the production of and demand for medicine, which means that profits from the sale of medicine reflect many factors besides the true consumer–need for a product . The fact that the demand for a good can be manipulated in these ways casts doubt on the assumptions that profits to reflect the needs of society and that private gains coincide with social gain, and therefore also suggests that capital allocation based on profits can be inadequate.

5.2.3 EMH: Secondary Conditions

In order for markets to be efficient Fama (1970) also formulates three secondary conditions:

1. There may be no transaction costs in the trade of securities
2. All available information is available for all market participants without them incurring any losses
3. All market participants agree on the implications of current information for the current price and distribution of every security

The three conditions for market efficiency stated above hardly seem to hold in the real world. Especially the first which discusses the requirement of absence of transaction costs is difficult to envision when one trades in securities. In reality transaction costs - e.g. drawing up contracts, control whether contract is lived up to, enquiry regarding potential trade partners etc. – can be very high and even lead to a market transaction not taking place (Coase, 1960). Fama has mentioned these conditions for market efficiency in the same paper in which he proposes the EMH so it is not surprising that he already tries to uphold the viability of the hypothesis by mentioning that they are not necessary but should be at least "sufficient" . A clear example he gives for this is that a market can still be efficient if a "sufficient number of investors have ready access to available information". In other words for the EMH to be true a market has to be "sufficiently efficient".

The EMH thus states that all information Φ is fully reflected in asset prices. In other words the financial market prices are efficient indicators, meaning

that the stock price shows the fundamental value - i.e. discounted stream of future profits – of a firm. After the article in 1970 Fama got various critiques, many of which were related to the mathematical part and therefore outside the scope and context of this thesis (LeRoy, 1989, p.1593)). As more of such critiques already started to emerge in the 1970s Fama (1976) updated his definition of an efficient market by stating that in an efficient market *i)* all information Φ is fully reflected in asset prices and *ii)* the capital market behaves as if it has 'rational expectations'. 'Rational expectations' can be explained with the concept of 'perfect foresight' which refers to each agent having all the information concerning the future. The agents will look at the future and balance future expenditures and incomes with current decisions. They thus take all the information into consideration when taking a decision. Lucas (1978) elaborated on this by stating that all the agents of an efficient market can be reduced to a single representative agent who has all the information and whose decisions are intertemporal.

5.2.4 Commentary on the EMH

Already in 1978 Jensen (1978) started to point out that there was anomalous empirical evidence concerning the viability of the EMH. He acknowledges that since the publications of Fama (1976, 1970) and the considerable amount of supportive empirical evidence an alternative theory is not likely to be accepted. He however continues that – although the hypothesis conforms to the current neoclassical economic paradigm – there is a collection of substantial anomalous evidence which suggests that this may be incorrect or at least not the complete truth. The nature of the evidence can be summarized by empirical data which show that unlike what the EMH suggests there are ways to yield abnormal returns - i.e. to beat the market - by using for example methods such as the Blacks-Scholes-Merton option-pricing (Chiras & Manaster, 1978). In retrospect Jensen concludes with correct foresight that such anomalies will not lead to complete abandonment of the efficiency concept, however economists will be forced to get a better understanding of the market.

Another notable critique which especially is gaining prominence and proof since the last two decades against the efficient market hypothesis is given in the domain of Behavioural Finance (Subrahmanyam, 2008). This school

of thought argues that people are not *Homo Economicus* i.e. rational, optimizing etc. - but that economic decisions are influenced strongly by other psychological factors. Rational here refers to making decisions which result in optimal benefit or utility. The concept of *'Homo Economicus'* and its rational behaviour are rooted in "pleasure–pain psychology" which argues that human beings seek to maximize pleasure and minimize pain. Behavioral finance economists argue that economic actors also take into account factors such as risk, which is not an issue if there are assumptions of rational expectations and an intertemporal representative agent. Such assumptions namely imply that the profit is always maximized as there is full information concerning the market. Such a refutation of the possibility of rational behaviour in real life thus makes those who adhere to behavioural finance not supportive of the assumption that markets are efficient. Shiller (2003) mentions that next to economic phenomena such as the January effect and the Day of the week effect he thinks the largest anomaly concerning the EMH is that of excess volatility[1] (Siegel & Coxe, 2002). This is based on the fact that there does not appear to be to any fundamental reason for this to occur, while on the other hand people have defended the EMH against (the other mentioned) anomalies by ascribing them to among others price stickiness, tatonnement[2] and exchange rate overshooting. Shiller mentions a model from the realm of behavioural finance which depict the non-efficiency of markets. This model is the feedback model which describes that an investor's success can influence other investors through for example the media and word of mouth. As enthusiasm among investors grows so does their demand which leads to an increased market price which can again lead to bubbles and their inevitable burst which again lowers the price (Andreassen & Kraus, 1990, Marimon et al., 1993, V. L. Smith et al., 1988). In this regard proponents of the EMH often refer to the role of 'smart money' or in other words the active involvement and participation of investors with relevant market knowledge in the management of their portfolio companies (Haagen, 2008). They claim that 'smart money' buys when ordinary investors are irrationally pessimistic and sell when they are irrationally optimistic. By doing so efficiency of the market is maintained, however Shiller refers to a large body of empirical research which suggests that the notion 'smart money' as an instrument for market ef-

[1] 'Volatility' refers to the extent to which stock prices can fluctuate

[2] 'Tatonnement' is an iterative process by which prices are increased or decreased dependent on demand and supply untill an exchange equilibrium is imagined to be achieved.

ficiency is incorrect and actually even amplifies the feedback as smart money buys ahead of traders in expectation of price increases(Goetzmann & Massa, 2002, **?**, **?**). In short we can summarize that according to behavioural finance markets are inefficient as actors, cannot behave rationally in the neoclassical meaning of the term, which also is a clear rejection of the EMH.

An interesting view on the EMH is from George Soros, one of the world's most successful business magnates and investors of this time. Soros (2013) proposes a theory of fallibility, reflexivity and the human uncertainty principle. Fallibility can be best explained by looking at any real–life situation which has thinking participants. In such a situation the thinking participants' views of the world never perfectly corresponds to the actual state of affairs. People namely can gain knowledge of individual facts, but when it comes to formulating hypotheses or forming an overall view their perspective is bound to be either biased, inconsistent or both which is meant by the principle of fallibility. Fallibility is thus the result of people not being able to comprehend the complexity of reality due to which they use among others simplification, generalisation, and metaphors. Born from such imperfect or fallible views on the world - the cognitive function – are actions that influence and change the situation (manipulative function) which is described by the principle of reflexivity. Soros claims that when people believe in the EMH they will make investments which are based on this belief which in turn changes the way in which markets function, however he emphasizes that this does not make them efficient. While economists have made great efforts to formulate rules which almost have the rigidness and accuracy of natural laws such as the EMH there always is uncertainty. This uncertainty is inherent to limits of human cognitive capacity and is therefore closely linked to both fallibility and reflexivity resulting in Soros coining the combination of the two "the human uncertainty principle". To explain what is meant by uncertainty and especially to emphasize the difference between uncertainty and risk he uses the definition of Knight (1921). The difference lies in the presence of knowledge regarding the nature and probabilities of future states. When such knowledge is present we speak of risk while if this is not the case there is Knightian uncertainty. There thus are quantifiable risks (empirical data etc.) and Knightian uncertainties which are both grounded in fallibility while the presence of the latter is not acknowledged in the EMH. Soros uses financial markets to test whether the EMH - which he describes as markets that tend toward equilibrium and wherein deviations are the result of exoge-

nous shocks - or his theory is superior in explaining and predicting events by using data from financial crises such as the Euro crisis. Table 1 summarizes the comparison between the EMH and his own theory. The most important conclusion we can draw from this is that Soros rejects the notion of asset prices reflecting all information as the participants inside the market are not rational rather they are fallible. It is this fallibility, namely the fact that firms affect the market by acting without having full knowledge, which makes the market inefficient. Soros concludes the comparison by mentioning negative and positive feedback loops which occur in real life. Negative feedback refers to bringing participants' thoughts closer to objective reality - i.e. the factual state of affairs – and such a self-correcting process can go infinitely. When negative feedback is effective and lasts long enough (a situation which Soros claims seldom happens) it can approach reality which is what the efficient market hypothesis and its rational expectations presupposes with the concept of equilibrium. Price distortions are, according to Soros, not random errors but divergence of participants expectations from reality. Positive feedback is when perceptions grow more away from reality and is self-reinforcing but limited. Limited here means that it will stop when expectations have grown too unrealistic. Positive feedback loops are interesting in the sense that they can grow out of proportion due to their self-reinforcing character on for example market prices which can lead to bubbles a phenomenon which can not be explained when it is assumed that markets are efficient.

Table 5.1: Comparison between Soros' theory and the Efficient Market Hypothesis

Soros' concept	**Financial market characteristic/trend/ phenomenon**	**Efficient Market Hypothesis**	**Soros' Explanation**
Fallibility	Market prices(=future earning cash flows)	Market prices represent fundamental value and participants are infallible and thus do not play a role in the prices	Market prices show participants expectations of future market prices and these participants are fallible
Reflexivity	Market prices	Market prices represent fundamental value	Instead of only cognitive fallibility (which leads to mispricing of assets) the financial markets can also affect the future earning flows
Human uncertainty principle	Market equilibrium	Timeless and universal generalisation to which all market prices will tend towards	Not timeless, but rather time-bound. Equilibrium is a state in which subjective reality matches the objective reality through the cognitive function (change perceptions to reality) or manipulative function (actions which change reality to perceptions). Normally there is reflexive interaction between the two functions in the form of reflexive feedback loops which are continuously changing and characterize financial markets.

The final and probably most divergent view we will discuss regarding the EMH is that of Keynes. Where the aforementioned behavioural economics and Soros's theory of reflexivity already mostly argued against the predictable and deterministic nature of the market, Keynes takes an even more bold standpoint. He namely distances himself from the elusive concept of equilibria and describes the market as a *fundamentally uncertain* environment. Somewhat simplified this could be explained as the future being Knightian uncertain as it is impossible to conceive and attach probabilities to an infinite number of possible scenarios which could occur in the future. Instead of hiding behind intricate mathematical equations and forecasting methods Keynes views the market more as a playground of emotions which he calls "animal spirits" and like Soros he thus emphasises the human component in the functioning of markets. This however should not give the impression that he believes that the market is fully irrational. Human beings are often rational but in a fundamentally uncertain world, decision making is often not a rational process which thus immediately contradicts the EMH. The way in which such an economic decision–making process works according to Keynes is fundamental for his view on markets. As mentioned before human emotions play a crucial role, which means that markets are linked to the psychology and sociology of its participants. We here see similarities with behavioural finance; however, while behavioural economists emphasize the irrationality of market participants, for Keynes, market participants are rational but the market is inherently instable due to uncertaintity which necessitates market participants to try to find ways to deal with this uncertainty. For example, due to fundamental uncertainty rational human beings cannot predict the future which makes them look at others for the basis of their decisions, a phenomenon which is described as *social psychology*. Social psychology thus plays a crucial role in explaining how the economy functions as it encompasses not only the behaviour of consumers but also of financial markets and all other constituents of the system. Seen from this perspective, upswings or downswings in the market are dependent on the general mood, or in Keynes's terms *'animal spirits'*. These animal spirits include all the emotions, instincts and other elements of social psychology which influence human behaviour. Keynes's definition of animal spirits below also shows in which way he distances himself from rationality and efficiency to explain market behaviour.

"Most, probably, of our decisions to do something positive,

> the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits - of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities." (Keynes, 1936, Chapter 12)

As mentioned before Keynes does not speak of equilibria or other elusive states to which the market will eventually progress. His vision of markets appears to be of a sequence of short–terms and ever-changing due to animal spirits which guide investors and companies to allocate capital in a fundamentally uncertain environment in manners which are not (necessarily) efficient. Based on the outcomes of the decisions made by market participants emotions change which can lead to change or conservation of market behaviour.

Conclusion

In this section we have thus far analyzed the EMH, tracing back its origin to the "invisible hand" mentioned by Adam Smith; explored its assumptions and characteristics; and discussed alternative perspectives on the efficiency of markets. Such an analysis was important as conventional economic thinking is currently dominated by the EMH. The EMH constitutes two main characteristics. First, the EMH states that asset prices fully reflect all information making them a correct indication for the true value of a company. We however have seen that asset prices can be directly influenced by for example engaging in buy-backs of stocks which has no connection with the real economy. Moreover, the market is described by Keynes as fundamentally uncertain which means that it is impossible for market participants to know all information. In order to cope with this uncertainty market participants develop strategies which are rational, however not in the neoclassical sense. The way in which these rational participants affect the fundamentally uncertain reality (i.e. reflexivity) all affect asset prices making the assumption of asset prices fully reflecting all information unlikely. Second, the EMH assumes that the prices of goods of a firm and the profits earned from these goods reflect the true needs and demand of consumers (i.e. consumer sovereignity). In reality there are however several factors which can influence demand such as the purchasing power of consumers, different types of advertising, laws and regulation which eliminate competition and price fixing. The price of

goods and the profits earned from these goods thus do not necessarily reflect the true needs of (all) consumers making consumer souvereignity in reality often non-existent. Both the characteristics of EMH thus seem to break with reality which makes the allocation of capital based on asset prices and profits a practice which should be reconsidered.

Going back to the pharmaceutical industry it currently is the case that investors also (partially) base their allocation of capital on assumptions of the EMH. As mentioned above it is unlikely that prices of medicines will reflect demand as not all consumers posess sufficient purchasing power and there are factors which influence demand such as different type of advertising, and laws and regulations – e.g. intellectual property rights – which grant pharmaceutical companies a monopoly position on the sale of their medicine and thus eliminate competition. As mentioned before this casts doubt on the adequacy of profits (private gain) as a signal of social gain. If profits and the related asset prices are not the correct indicators for capital allocation to achieve optimal social gain how can a firm then realize this goal? In principle, pharmaceutical companies could focus directly on social gain instead of assuming that maximizing their private gain will lead social gains as well. However, this will not be considered unless companies first re-evaluate their corporate objective which today is still closely related to EMH. The pharmaceutical industry currenlty operates under the objective of maximize shareholder value due to which they try to maximize their own profits. In the next chapter we will further investigate MSV as a corporate objective and what its consequences are for a firm and society.

5.3 Maximizing Shareholder Value

In order to discuss the characteristics of the efficient market hypothesis and the closely related practice of MSV in relation to the pharmaceutical industry it is crucial to gain understanding of how markets are assumed to operate. As mentioned before, economic theory has profound effects on the way human beings think and thus also act. If markets can be seen as a dynamic environment which is made up of these thinking and acting human beings the market itself also adopts characteristics of paradigms – a self–fulfilling prophecy. Such a relation between a dynamic environment and its thinking participants is described by Soros(2013) in his *theory of reflexivity*. The

theory of reflexivity can briefly be explained as the world being constantly changed due to actions which are based on a fallible cognition of the same world. One particularly important thought is that self-interested behaviour will have altruistic results, or in other words that seeking private benefits will lead to social gains. From an economic perspective such a conception is interesting as it justifies egoistic behaviour such as personal profit maximization as being part of 'the greater good'. Keeping in mind that especially in the Anglo-Saxon world such economic line of reasoning is applied to multiple areas also outside the realm of economics – for example research which is aimed to improve human health such as the development of new drugs – the question whether egoism can truly lead to social benefits in any area becomes very important. Moreover, to answer such a question it is important to understand how such a seemingly paradoxical objective has been adopted so easily and became so widespread.

The aforementioned paradox can be traced back to the work of 'the father of modern economics' Adam Smith. In his magnus opus *An Inquiry into the Nature and Causes of the Wealth of Nations* the philosopher–economist discusses a market phenomenon which has proven to have many different interpretations in the course of time, namely the *invisible hand*. He himself mentions the 'invisible hand' in a discussion of the decision to allocate capital to support domestic industry:

> "(. . .)every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it(. . .)"(A. Smith, 1887, Volume 1, Book IV, Chapter 2)."

The true meaning of the invisible hand has proven to be quite the conundrum for economic scholars which probably is caused by the abstruseness of the

term itself. While it is not in the scope of this thesis to elaborately scrutinize and subsequently speculate what could have been meant by the invisible hand, it is important to look at the context in which Adam Smith referred to it and to look at what kind of person he himself was. To understand what Adam Smith meant with the invisible hand we should look at two other statements:

> "(...)It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages.(...)" (A. Smith, 1887, Volume 1, Book I, Chapter 2)

> "(...)But it is only for the sake of profit that any man employs a capital in the support of industry; and he will always, therefore, endeavour to employ it in the support of that industry of which the produce is likely to be of the greatest value, or to exchange for the greatest quantity either of money or of other goods(...)" (A. Smith, 1887, Volume 1, Book IV, Chapter 2)

From these two statements we can see that – based on his observations – Adam Smith describes that people allocate their capital in order to maximize their own profit which – often unintentionally– leads to benefits for others. These benefits are in terms of goods as Adam Smith mentions the terms 'produce' and 'dinner'.

As controversial as it may be and regardless of the author's true intentions the invisible hand seems to possess a somewhat deistic character. An invisible force which in an unexplainable manner directs capital to altruistic ends. Adam Smith - as every human being - was making statements based on the occurrences and influences of his time. The invisible hand hypothesis thus also inevitably is a (partial) product of the time and place in which its creator resided. Smith noticed that in the 18th century people who used their capital to maximize their own benefits were also increasing social gains. In the present context however we should be cautious to extrapolate such a finding to our economy. In the present there namely are far more options to

invest money with the intention of maximizing profit. For example, the presence of "financial instruments" such as derivates[3] has especially increased the number of options in the last decade. These "financial instruments" are not necessarily closely linked to the real economy, which raises the question whether the process of profit maximisation is still closely linked to social benefits. If a wealthy owner of capital in the past however tried to increase his wealth, capital was allocated to the real economy, which increase the overall productivity. Such an increase in productivity could for example lead to an increase in employment and available goods from which society benefitted. This raises the question whether investments today also automatically serve altruistic ends. When this is namely not the case it means that we are currently locked into an outdated economic paradigm which prevents markets and in the end human beings from progressing. In particular, if innovation in the pharmaceutical industry is directed to maximize value for shareholders, does this also promote "the interests of society"?.

Adoption of the invisible hand hypothesis has had widespread implications for the manner in which markets are currently perceived and understood. With this hypothesis as underlying fundament the efficient market hypothesis has been conceived. The belief namely entails that profit–maximizing agents acting out of self-interested motivation will allocate capital in the most efficient way. Such a continuous and interactive process of efficient capital allocation - in order to ensure maximization of profits - will in turn lead to lower prices and new products and services for consumers, thus in this way benefitting society. The market is guided by an "invisible hand" to realize the most efficient capital allocation. As the market itself already is guided to be the most efficient there is no need for centralized planned systems such as governments nor is it possible to beat the market. At first glance such a theory speaks to the imagination, however the recent euro crisis and financial crisis in 2007/8 raises the question why, then, governments and other institutions were and still are needed to recover to economy?

[3]A "derivate" is described by the U.S. Department of Treasury as "a financial contract whose value is derived from the performance of some underlying market factors, such as interest rates, currency exchange rates, and commodity, credit, or equity prices. Derivative transactions include an assortment of financial contracts, including structured debt obligations and deposits, swaps, futures, options, caps, floors, collars, forwards, and various combinations thereof."

The EMH will be elaborately discussed in section 3.3, but we will already mention its primary characteristics to illustrate how the notion of 'an invisible hand' underlays it. Moreover, it allows for a greater understanding of how the acceptance of the EMH effects the pharmaceutical industry. The EMH primarily constitutes the following two points:

1. The hypothesis concerns asset prices –primarily stock prices – which presumably include all information and the correct interpretation of this information. This means the prices also include expectations of the future demand of a product or service of a certain company.

2. Allocation of capital between firms is based on profit maximization.

As the asset prices –according to EMH – fully reflect all information, including the demand for goods, the assumption is that private gain coincides with social gain. Capital which is allocated between profit–maximizing firms will namely only lead to the creation of products which are demanded by society, otherwise it could not lead to profit.

Going back to the pharmaceutical industry: if conventional economic theory demands that also pharmaceutical companies maximize profits, the question arises whether prices in financial markets adequately reflect the needs of individuals seeking to improve their physical and/or mental health. Moreover, in the case of the pharmaceutical industry, the development and production of the good (medicines) are united in a single hand. Is the 'invisible hand', which is assumed to harmoniously coordinate the economy, also a good coordinator of research? The neoclassical answer to these questions would be positive as it would refer to the aforementioned consumer sovereignity (see section 3.1). Consumer sovereignity meant that production is determined by the preferences of consumers and assumes that "an invisible hand" will coordinate individual profit–maximizing behaviour into a whole that meets the needs of consumers. This point is especially important in the case of the pharmaceutical industry because medicines are distinct from many other products – which are used but not consumed – as they affect the physical and mental wellbeing of individuals much more directly.

With innovative and complex commodities such as medicines consumer sovereignity seems to be more an ideal than a realistic concept, for several (perhaps contradictory) reasons. First, it is often argued that consumers are not able to

judge which kind of medicine they need. Research has shown that consumers in the so-called 'health care market' indeed do not possess the motivation, opportunity and knowledge to ascertain which products are highest in quality and lowest in price (Sirgy et al., 2011). Second, a significant share of the world's population lacks the purchasing power to back up their demand for medicines. Third, in practice, the demand for medicines is influenced by 'direct–to–consumer–advertising' which recommends medicines without, in most cases, giving adequate or full information about the medicines concerned (Ismail & Washington, 2008, Wilkes et al., 2000). Fourth, the demand for medicines is influenced by laws and regulations that limit or effectively eliminate competition. Are profits a clear indication, therefore, where capital is most needed in the pharmaceutical market? Should capital be directed to companies who are using innovation as a means to maximize profits for themselves and shareholders, as now is the case, or should consumer sovereignity be taken more seriously? In the remainder of this chapter we will explore the invisible hand hypothesis's most important 'progenies' – the EMH and MSV - with this question in mind.

As mentioned in the previous section, closely related to EMH is the prescription to MSV. When researching literature regarding the corporate objective of a firm the 'stakeholders versus shareholders debate' is a common theme in the discussion for whom of these two parties value should be maximized (Chilosi & Damiani, 2007, Richards, 2004). Such a discussion however will not be held in this part as we already established that in especially the Anglo-Saxon world and in the pharmaceutical industry maximisation of shareholder value is the predominant corporate objective. The practice of MSV was in line with first and foremost the invisible hand theory and also the efficient market hypothesis, however as argued before in the conclusion of the previous section these are grounded on other if not (partly) "faulty assumptions" - assumptions which may not correspond with reality in our current time. Directing capital namely to maximize profits or - since the rise of the stock corporation - to maximize shareholder value while simultaneously enhancing social welfare due to "an invisible hand" namely may have been the case in the time of Adam Smith, now this may not be the case anymore.

The MSV principle especially gained primacy after Jensen & Meckling (1976) introduced their agency theory. This theory could be explained as the proposition in which the interests of property owners such as shareholders - the

'principals' - should be the guiding principle for the executives and managers of a firm: the 'agents'. In other words managers should do what shareholders want, which in that time was quite a radical change in corporate objective. Before, corporations were namely balancing between the interests of customers, employees, investors and shareholders, however since the powerful emergence of agency theorists this changed as they claimed that a company can only thrive when it is catering to the demands of its owners, i.e. shareholders (Fligstein & Markowitz, 1993, Useem, 1993, Whitley, 1986). To understand this we can look at the following quotation of a management issue paper of Grant Thornton International[4] which illustrates the motivation behind MSV effectively:

> "One of the fundamental goals of managers, especially owner-managers, is to maximize shareholder value and the worth of their business. While some may argue that over–emphasis on monetary value is detrimental to other stakeholders, such as labour and the environment, a stronger case can be made that stakeholder positions are actually enhanced by companies that actively manage value. Here's why: Successful companies, ones that maximize shareholder value, enjoy higher overall productivity and competitiveness and are able to raise more favourable financing. These companies create employment, remunerate workers at levels that minimize dissatisfaction, and enhance job security as demand for their products and services is higher. Customers will receive higher quality goods than their competitors at a reasonable cost, and debt holders have better overall security and become eager to lend even more capital. This cycle becomes self-propelling to create momentum within companies, which strengthens the various stakeholder positions."

From this explanation of a multi–billion dollar firm we can see how companies perceive and defend the MSV principle. Next to private gains such as increased competetiveness and productivity MSV is also said to lead to social gains such as more employment and an increased quality of goods.

[4]Grant Thornton International Ltd is the world's seventh largest professional services – with revenues in 2015 of 4.6 billion US$ – network of independent accounting and consulting member firms which provide assurance, tax and advisory services to privately held businesses, public interest entities, and public sector entities.

With the EMH as the thriving economic hypothesis economists and managers were trained to believe that the market is the most efficient allocator of resources (Ghoshal, 2005). The reason for this belief can be traced back to neoclassical economics which already exists since more than two centuries. In the 1800s public firms – as we know them today – were controlled by a small number of shareholders who were actively involved in the companies' operations (Stout, 2012). These shareholders actively tried to maximize their profits and saw – conform to neoclassical theory – private gains and social gains coincide with each other. From the 1900s however, the public firm started to change as they issued larger numbers of shares to a myriad of small shareholders. Shareholders now often did not have any knowledge regarding the firm's operations and wanted to simply have an optimal return on investment. As the firms were already locked into the thought that markets allocate capital most efficiently, this thought remained, even with the change in the nature of public firms. Believing that markets are the most efficient allocators entailed a predisposition against the company and its managers to control the allocation of resources as, by assumption, they impossibly could beat the market. Agency theory therefore especially discusses the "principal–agent problem" which refers to 'principals' (shareholders) not being able to make their "agents" (managers) do what they want as there can be information asymmetry and conflict of interests. To reduce the principal-agent problem different measures are taken to make a company promote the interests of their shareholders. Till date there are *i)* stock–performance–based compensation; *ii)* disassembly of conglomerates allowing investors to make personal diversification decisions; *iii)* debt–financed acquisitions in order to prevent executives to make irresponsible choices and *iv)* extensive monitoring and disciplining of executives in order to reduce information asymmetry (Davis et al., 1994, Dobbin & Jung, 2010). Taking such measures has gradually transformed the corporate objective into one that is fully tailored in maximizing shareholder value as shareholders have been able to substantially increase their influence and role in the firm. Relating this back to the pharmaceutical industry this implies that companies are also tayloring their R&D and innovation processes to MSV. With the problem of "drying pipelines" this issue becomes especially relevant.

Another issue arises specific to the pharmaceutical market. As one can imagine agency theory is not limited to shareholders and managers but can be applied to every setting that can be modelled as a principal–agent relation-

ship. Such a relationship can also be found between patients and so–called "health care providers" such as pharmaceutical companies or physicians. Patients are in this context assumed to be the principals who entrust agents such as pharmaceutical companies to take optimal decisions regarding their treatment. The principal-agent problem however emerges when a pharmaceutical company would chose to maximize its own profits and MSV at the cost of the wellbeing of patients and consumers. Here several issues arise.

The pharmaceutical market in general is characterized by uncertainty which is twofold in nature. First, a pharmaceutical company is uncertain whether or not its operations will lead to optimal financial profits. Second, according to Arrow (1963) consumers are unaware of the optimal treatment. It is possible that the pharmaceutical company also is uncertain about the optimal treatment, however the company does often have substantially more information as the knowledge regarding medicines requires specific scientific education. This raises the question however whether or not this education is truly reliable as it is also conceived in order to maximize profits for companies. Alternative medicines are for example considered to be inferior and therefore not taught in universities as it does not conform to the current rules and regulations governing pharmaceutical research. Baugniet *et al.* (2000) elaborates on by mentioning that there is a currently is a shortage on lessons about alternative medicine and that students who have not been educated about alternative medicines are more likely to reject it. The governance of pharmaceutical research is also influenced by the pressure of pharmaceutical companies to maximize their profits. Culyer & Newhouse (2000) discuss the exploitation of this information asymmetry and mention that the largest principal–agent problem in health care is that of agent-induced demand. In this context this means that pharmaceutical companies can actively align the interest and therefore also the demand of patients with their own interest. Due to information asymmetry consumers often have no other choice than to accept that what is offered by companies is good as it difficult if not impossible for them to verify. Even if a patient would object to a certain medicine or treatment it is possible that a doctor is not free to prescribe an alternative due to limitations set by for example health insurers [5]. In the

[5]http://www.towerurology.com/insurance-companies-dictating-medical-decisions-bad-precedent. Article which discusses that insurance companies effectivey decide which treatments are given

pharmaceutical market this makes the position of the end users of medicines relatively weak which can be the reason that the corporate objective of MSV has held for quite considerable time. Companies can namely go for profit maximization and MSV while still appearing to cater to the needs of their patients. The sustainability of such an approach however now is questioned in this thesis due to the current problems in the industry.

Conclusion

Pharmaceutical companies are faced with the task of maximizing profits for which they try to innovate and subsequently push these innovations on the market. It is from this perspective that the problem of the pharmaceutical industry is perceived as one of 'drying pipelines'. The question raised in this chapter is whether this perception of the problem informed by the EMH and MSV is still viable in todays context from the perspective of consumer sovereignty. In the past – when (public) firms were owned and managed by a small number of shareholders who were directly involved in the firm's operations – capital was namely closely linked to the real economy which made the maximization of personal gain coincide with social gain. This direct relation between social gain and capital however became weaker when the number of shareholders started to rise causing a seperation between ownership and control of the firm. Currently shareholders are often less concerned with, or even unaware of, the (goal of the) firm and only search a maximum return on their investment. Is the direct relationship between shareholders' capital and the real economy and social gain however still present? A positive answer to this question is presupposed, however not researched. Instead of flowing to those firms which could use it to create social gains, capital currently flows where it can be maximized irrespective of the relation of a firm with the real economy and society as a whole. Despite the considerable differences with the economic environment from the past the same type of neoclassical reasoning is used which produced the EMH and its prescription MSV. Where MSV currently is the most dominant corporate objective the question arises whether it still fits in the current economy as a means to realize personal and social gain. Moreover, in management courses MSV is explained to students as a 'corporative objective' without mentioning the context in which it originally was conceived. The result of this is that people are applying the MSV principle and expecting the same end result, i.e. social gain, while in reality

this may no longer be the case due to changes in the economic environment since its conception. We here see that the means –MSV– is still expected to lead to the same end –social gain– however this is now more an assumption than an observation. It is this assumption that should be reconsidered.

We have seen that pharmaceutical companies are using innovation for the maximization of profits which raises the question if innovation should be guided by this principle or that it should be able to develop independently. Apart from innovation we also observed that laws, regulations and even education are taylored to the maximization of profit. While MSV is a pure economic principle we thus observe that it has increasingly come to influence other parts of society apart from the economy. In terms of the three spheres of society we described in chapter 4 (Figure 8, p.49) – economy, culture and rights life – we see that MSV (part of the economy) also increasingly dominates culture (research, invention, science and education) and rights life (laws and regulation). Now pharmaceutical companies perceive their problems from an economical perspective and search solutions in the cultural sphere. This can be seen by for example increased spending on innovation, however simultanuously constraining this innovation to demands of the market and therefore not allowing it to reach its full potential.

5.4 New Growth Theory

Paul Romer (1992) describes in his article "*Two ideas for Economic Development: Using Ideas and Producing Ideas*", ideas as economic goods which have special properties. As the title already suggests ideas are seen as economic goods which can be used and produced. He elaborates on the notion of ideas and technology being a special kind of good by explaining that they are non-rivalrous and (partially) excludable (P. Romer, 1993). Non-rivalrous refers to the fact that an idea can be used by one firm or individual without this limiting another firm or individual to use the same idea. Engineers can for example use the Pythagorean theorem all over the world at the same time without the use of one interfering with the work of another. Excludability is closely linked to rivalry, but refers to the property that others can be excluded from using a good. Such exclusion could be realized through trade secrecy, however knowledge spillovers i.e. the exchange of ideas between different parties – makes it unlikely for this to be maintained for a long and especially

controllable amount of time. With the help of patents however ideas can be transformed in partially excludable goods as a firm or individual now has the private right of capitalizing on them. Even with patent protection the idea is still only partially excludable as it can serve as the inspiration for other ideas which for example could allow other parties to produce a superior technology. The last important point made by Romer (1989) is that ideas –especially regarding technology– are primarilly conceived by profit–maximizing firms. It is this fact that underlies the excludable property of many ideas as firms want to use for example patents to have monopolistic returns which guarantee the costs incurred for conceiving the actual idea.

While the aforementioned observations of Romer may seem intuitive and logical they are a commendable extension to some of the basic assumptions underlying the neoclassical or Solow-Swan model which dominated growth theory untill then (Solow, 1956, Swan, 1956). Growth Theory – as the name already implies – refers to theories which explain growth in output or GDP (value added) from a macroeconomic perspective. The Solow-Swan model describing such growth can be explained by looking at the following equation (2):

$$Y = A(t)L^{\alpha}K^{\beta} \tag{2}$$

In this equation Y refers to the total value added which is created by labour L and capital K. From the National Accounts, we know that the value added is the sum of wage income and profit income $pY = wL + \pi K$. If we wanted to write this as a function, we could write:

$$Y = \alpha L + \beta K \tag{3}$$

This is the Leontief growth function. In growth accounting, however, this (additive) function is transformed into a multiplicative function (equation 2) with estimated coefficients α and β reflecting the shares of capital income and wage income respectively in total income Y. When estimated, however, Y is not always fully explained by K and L. A residual A remains which raises the question how this residual can be explained.

Growth theorists have named the scale factor A 'total factor productivity' (TFP). It is also called a 'measure of ignorance'. Growth theorists assume

that A reflects technology, or ideas leading to technology. This is remarkable, because knowlegde is already reflected in wL and πK. Capital goods are embodied knowledge, and knowledge is also reflected in the K/L relationship. *If* A captures knowledge, it must then be knowledge in addition to the knowlegde which is embodied in the production process. The Solow-Swan treats A (ideas) as a public good which enters the system exogenously and is freely available. Capital and labour are then sold in so–called "competitive markets" for their marginal product and the payments for K and L will add up to the price of the product.

Not satisfied with the exogeneity of A, Romer (1994) wanted to "uncover the private and public sector choices that cause the rate of growth of the residual to vary". Where the old model described ideas as an exogoneously given public good, Romer's aim was to describe the evolution of *A(t)*, and he wanted to describe it as an endogenous outcome of *economic factors*, "not the result of forces that impinge from outside" (P. M. Romer, 1994, p.4). This means that ideas are now endogenous. By investing in ideas, firms are able to obtain a competitive advantage. Assuming constant returns to scale, this can be illustrated in the following equation:

$$Y = F(A; X) = AL^{1-\beta}K^{\beta} \tag{4}$$

In the above equation (4) we now observe A as a private rivalrous variable which means that companies cannot benefit from the ideas of each other. In the Solo-Swan model ideas were assumed to be public goods which were readily available for every market participant, making it impossible to obtain a compettive advantage from this knowlegde.

We here see that output Y is described as a function of A representing ideas and X representing capital and labour illustrating the fact that ideas are indeed part of the growth model. For now, we will temporarily delay the discussion whether or not A truly represents ideas – as is mentioned by Romer – and explore in which way he further explains growth in added value. Let's first consider the case of an increase in X only, assuming constant returns to scale with respect to X (or rather, with respect to $L$and K which together create X). If we would examine the example of the production of patented computer chips – i.e. rivalrous goods – and we would increase X with a certain factor λ being more than 1 – by for example building more factories

– then we would see the following:

$$\lambda Y = F(A; \lambda X) \tag{5}$$

From equation (5) we can observe that Y rises in proportion to the increase in X, while the unit costs remain constant. Consider now the case where both X and A in the same proportion. We assume again constant returns to X, and positive returns to A(hence the complete production process exhibits increasing returns to scale). If we would increase the number of factories, workers, and raw materials as well increase the stock of relevant ideas concerning computer chips with λ then the output would increase with a factor larger than λ. The implication is that by influencing technological progress (reflected by increases in A), firms can lower unit costs which is depicted in the following equation:

$$\lambda Y < F(\lambda A; \lambda X) \tag{6}$$

Both in the Solow model and in the Romer model ideas play a crucial role in the growth of the economy. However, treating as endogenous to the economic system, Romer presents an alternative view on how knowledge is developed. An example is the sale of pharmaceutical drugs. According to the assumptions of Solow-Swan model the pharmaceutical industry should sell drugs for a price which captures the costs incurred for capital and labour. This however would not capture all the costs incurred for the idea of the formula of the working medicine. Romers growth model presents the growth of knowledge as something that can be privatised; in this model, the price of medicine covers all costs, including the costs of the development of knowledge

We can now resume, and conclude, our discussion whether or not A represents ideas as is mentioned by Romer and what the fundamental difference is between his endogenous growth model and the Solow–Swan model. Romer (1994) describes the difference with the Solow–Swan model as the fact that the latter explains the improvement of "technology" by external factors. In other words this means that the direction and rate of the "tecnological development" are determined outside of the economic system. Despite the fact that both models thus acknowledge the (economic) value of ideas the real question is, which is preferable: endogenous or exogenous technological change? Romer's growth model corresponds to the practice that has

grown in the pharmaceutical industry (of patented private knowledge creation). At first sight, the Solow-Swan model of output created by public knowledge appears to have little relevance for the pharmaceutical industry today[6]. However, the question raised here is what would lead to higher social gain: privatised knowledge creation or public knowledge? When knowledge is private, other companies are prevented from using the knowledge that is created; to answer the above question, one would have to take into account possible welfare losses due to this lack of spread of knowledge. More importantly, in Romer's model, profit-maximising firms determine what is researched based on 'market incentives'. When one believes in 'consumer sovereignty',, these market incentives (price, profits) reflect the preferences of consumers. However, as explained earlier, there are many factors which impede the sovereignty of consumers such as insufficient purchasing power of consumers, advertising, and laws and regulation which eliminate competition, which reduce the relevance of profits as a measure of what consumers want.

Romer described ideas as goods which again shows his belief that an idea is something which can be traded in a market. In his view, most ideas are conceived by profit maximizing firms possibly implying that profit maximization is the primary motivation behind the conception of ideas. Is it however true that the search for knowledge is motivated by profit? When considering the pharmaceutical industry the question would be: is it true that pharmaceutical companies innovate not to improve health but to maximise proftits? A survey among scientists asking whether they conduct research for profit would most probably receive a negative answer (except, perhaps, when they have been trained to do so by years of working in commercial environment). If research is conducted for profit–maximization, one may wonder what the consequences of this would be for research itself. What would and would not be researched if the ability to maximize profit is the criterion. By describing knowledge as a commercial activity Romer throws up many questions. When the formation of ideas is subjugated to commerce, knowledge cannot develop independently, for example to explore therapies that are less dependent on conventional medicine. The question then arises how research can

[6] Although in practice, as noted by Mazzucato (2013), a lot of knowledge is still created in and funded by the public sphere; pharmaceutical companies are involved only in the very last phases of the innovation process.

be linked more directly to the needs of consumers. When knowledge develops independently, naturally the economy will also benefit from it; however, when the economy restricts cultural life to serve solely commercial purposes, it will paradoxically incapacitate cultural life to support the economy more effectively.

5.5 Conclusion

In neoclassical theory, the focus on private gain (profit) is justified with reference to the social gain this will bring about (more and/or superior goods for consumers). However, in todays institutional and theoretical context of which financial liberalisation, and the demolishing of boundaries between the economic sphere on the one hand and the legal and cultural sphere on the other are important ingredients a one-sided microeconomic focus on private gain appears to reduce freedom in the cultural sphere (*i.e.* in the development of medicine). How can freedom in the cultural sphere be restored? Indeed, why is it important? These questions are explored in Chapter 4.

Chapter 6

Medicine - A Special Case

In the previous chapter we discussed the relationship between MSV and the modern materialist perspective on medicine. This entailed that medical research currently is guided by commercial demands rather than the objective of realizing social gains. In the prior chapter we recognized this to be an instance of 'economic imperialism' which referred to the economic sphere 'imperializing' the cultural and legal sphere. Till now this thesis has discussed the spheres intuitively, based on the observations regarding the pharmaceutical industry. In this chapter we will review the idea of society comprising especially in regard ti freedom of cultural life and a possible solution for the problems of the pharmaceutical industry and for society in general. In the next section we will therefore aim to estabilish why freedom of thought – part of a free cultural life – is essential in the development of medicines.

6.1 Freedom of Thought in Health Care

When one now looks at the pharmaceutical industry and especially the drug development process (see Chapter 2, Figure 3) all the complex relations between different parts of society make it difficult to understand the actual role of the pharmaceutical industry and medicine in society. In this section we will briefly explore the role of medicine and how this has changed in the course of time.

The aim of this historical overview however is to review several historical perspectives on medicine in order to gain a better understanding in which

way medicine has changed and eventually developed to the pharmaceutical industry we have today. For this historical analysis we primarily use the work of Erwin Heinz Ackerknecht[1] *'A short history of medicine'* (Ackerknecht & Haushofer, 1982).

6.1.1 Primitive Medicine

The earliest documents on the history of medicine are from the ancient Egyptians who lived approximately four thousand years ago. This however does not mean that everything before this time is completely unknown. The study of paleopathology – i.e. the study of ancient diseases – has shown that diseases have existed since a very long time. Fossils have shown that the first diseases stem from around five hundred million years ago and have continued to exist till this day affecting both human beings and animals alike. The treatment of diseases however has stayed relatively unknown till the time of more developed civilizations. By studying current tribes which have been isolated from the general community however, historians extrapolate how diseases may have been treated by people living ten thousand years ago in the Stone Age, giving the first impression of medicine in history.

This type of medicine is called *primitive medicine* and has allowed us to gain understanding how the primitive man perceived disease and treatment. The treatment often involves supernatural powers which today would be considered 'unscientific'. Ackernecht describes their perception on medicine as follows:

> If one wonders why primitives resort to these unrealistic, supernaturalistic explanations and measures, one should realize that disease is for them, even more than for us, a problem of the very greatest urgency. Under the pressure they resort to an explanation that seems for them the most plausible. For man who, unlike the animal, remains dependent for years after his birth a peculiarity already known to Locke and Rousseau - this explanation is not nature but the family or society. A fictious, supernatural

[1]Erwin Heinz Ackerknecht (1906-1988) was the first Chair in the history of medicine at the University of Wisconsin and wrote influential works on the social and ecological dimensions of disease.

> family of totemic animals, ghosts or gods send diseases arbitrarily or as a punishment for violating social rules. Disease thus becomes invested with a meaning it does not possess with us. (Ackerknecht & Haushofer, 1982, p.13)

Primitive medicine thus was directly related to society and its norms and values. Being sick caused people to think that they must have violated a certain social rule or have acted in immoral ways against themselves or somebody else. The disease was thus more seen as as something which has its origin in the inside of a human being and the treatment therefore also corresponded to this perspective as a sick person for example has to engage in a sort of spiritual healing – e.g. appeasing a totemic animal – in order to be on ' the right path' again.

6.1.2 Ancient Egyptian Medicine

Moving away from primitive medicine we continue with the first written history concerning medicine: *ancient Egyptian medicine.* Around 4000 years ago the Egyptians committed themselves to treating diseases from which their people were suffering and also elaborately documenting their findings. Ancient Egyptian medical papyri have been the source of many types of treatments and techniques we still use today in for example surgeries, rectal diseases and gynaecological complications (Nunn, 2002). The Egyptian civilisation was characterized by a close connection to the transcendental world which expressed itself in the belief in many different gods and magic. Diseases were therefore treated in ways which related to both 'magico-religious' and 'empirico-rational' elements (Reeves, 1992). Compared to primitive medicine Egyptian medicine thus already showed more resemblance to modern medicine as it started to use herbs and other natural chemicals (medicines) for the treatment of diseases. They also conducted pharmacological research in which they assessed the optimal dose of medicines, a practice which is still done by the pharmaceutical industry today. Despite this resemblance the Egyptians still perceived diseases as something which came from the gods. Being sick was thus still seen as a punishment or as a signal which indicated that you went astray from a moral and spiritual path. The treatment however now already started to become less spiritual and more

connected to matter – such as processed herbs – compared to before.

6.1.3 Graeco–Roman Medicine

From approximately 500 BC the ancient Greeks and later the Romans became one of the most developed civilizations in the world. Their perspective on medicine – Graeco–Roman medicine – is seen as the precursor of medicine as it is practiced today and the Greek Hippocrates is even called 'the father of modern medicine' (Grammaticos et al., 2008). Both the Greeks and the Romans believed in several deities and this belief played a crucial part in their daily life and also in their perception on health. Similar to the ancient Egyptians they also believed diseases to be the result of being 'astray' of a moral and spiritual path due to which they were punished by the gods. However, in the Graeco–Roman period people started to argue that the cause of diseases was not the punishment of gods or another form of divine intervention, rather the cause was rooted natural factors. This becomes evident if we look at the way in which Hippocrates himself describes the disease epilepsy – in his time considered a 'sacred disease[2].

> 'It is thus with regard to the disease called Sacred: it appears to me to be nowise more divine nor more sacred than other diseases, but has a natural cause from the originates like other affections. Men regard its nature and cause as divine from ignorance and wonder, because it is not at all like to other diseases. And this notion of its divinity is kept up by their inability to comprehend it, and the simplicity of the mode by which it is cured, for men are freed from it by purifications and incantations'.

The above statement illustrates that the perception of diseases being linked to the 'inside' of an individual referring to among other his spirituality, morality and behaviour towards society became weaker. The cause was now attributed to factors which were outside the influence of an individual – 'natural causes' and therefore treatment was also sought outside the individual.

[2]http://classics.mit.edu/Hippocrates/sacred.html
Link contains a translation by Francis Adams of Hippocrates's work *'On the Sacred Disease'*

6.1.4 Modern Western Medicine

While the ancient Greeks and Romans started to notably change the perception on medicine and health as being related to matter rather than intrinsic factors the majority still believed diseases to be closely linked to factors such as spirituality and morality. In the course of time however the view of Hippocrates became stronger in especially the West and people started to perceive the cause of disease as something external. With the advancement of science this perception became more prevalent as it for example became possible to see micro–organisms such as bacteria and viruses. Eventually diseases were seen as something which does not relate to non-material factors such as morality or societal behaviour but more as an affliction coming from outside. The result of this perception is that treatment also became 'externalized' and 'materialized' as people now want to take a medicine which takes away their suffering without reflecting about the underlying cause or reason of their current state. Ackernecht describes the modern view on diseases as follows:

> 'To modern man disease is a biological phenomenon that concerns him only as an individual and has no moral implications. When he contracts influenza or tuberculosis, he never attributes this event to his behavior toward the tax collector or his mother-in-law.'(Ackerknecht & Haushofer, 1982, p.15)

It is this perception which underlies why most medicines currently only focus on treating symptoms (Lu, 2005, McKee, 1988). An example which illustrates how the modern (Western) view on disease and treatment has become increasingly materialistic is the treatment of life–style diseases. A life–style disease refers to diseases which are primarily caused by the way in which people live referring to for example their personal hygiene; their diet; or whether they smoke or not. A well-known life–style disease is obesity which in most cases is directly related to the diet of people. As the disease is caused by an unhealthy diet and/or too less physical exercise treatment for obesity does not always address these issues. Instead of changing their unhealthy life–style many people prefer combating obesity by 'simply' taking a pill which is seen by the increasing amount of anti-obesity medicines which are developed and the fact that the size of the market is expected to grow from US$ 359 million to US$ 2.4 billion dollars from 2011 to 2021 (Adan et

al., 2008, Cooke & Bloom, 2006, Wong et al., 2012).

6.1.5 Islamic Medicine

A contemporary example of medicine which does not has a materialist perspective on disease is Islamic Medicine. When a Muslim becomes sick he should consider two options which have may have caused this. First the disease can be a punishment from God for the sins a person has committed. Second, it is a way in which God wants to raise the status of a believer with regards to the Hereafter.

Disease as Punishment

Similar to many forms of medicine practiced in the past Islam also calls for introspection when one becomes sick. Within Islam it namely is believed that diseases and other forms of calamities which can befall a human are a result of his or her transgressing actions. This relation between disease and one's sins is mentioned in the following Quranic verse:

> What comes to you of good is from Allah , but what comes to you of evil, [O man], is from yourself. And We have sent you, [O Muhammad], to the people as a messenger, and sufficient is Allah as Witness [Quran: 4:79; Translation Sahih International]

Such a direct punishment in the form of a disease is still seen by believers as a form of reward as it is seen as an expiation of sins. Moreover, the disease forces them to think of their shortcomings which may have caused the disease. Such introspection could lead them to the 'straight path' again which refers to following the Islamic rules and not committing sins.

Disease as Reward

Opposed to the aformentioned perceptions of disease as a punishment Islam also describes disease as a means which God uses to raise the believer in status with regards to the Hereafter. This can be deduced from the prophet Muhammed (peace be upon him) saying that "Great reward comes with great trials. When Allah loves a people, He tests them, and whoever accepts it attains His pleasure, whereas whoever shows discontent with it incurs His

wrath[3]." From this we see that a believer can also see the disease a way in which his status is raised which again can stimulate him to do more good deeds.

Islamic Treatment

Despite the fact that muslims can perceive disease as a indication for them being astray of the right path and as a mean to be raised in status they are not commanded to have a passive attitude towards it. The prophet Muhammed (peace be upon him) said: 'Allaah has sent down the disease and the cure, and has made for every disease the cure. So treat sickness, but do not use anything *haraam*[4]' (haraam means something which is prohibited within Islam)

The prophet Muhammad (peace be upon him) himself also used several medical treatments when he was sick, however this did not imply that he did not have faith in God. On the contrary, Islamic scholar Ibn al–Qayyim mentioned that using medical treatment does not contradict *tawaakul* (trusing God). It is considered within the essence of tawaakul to search for medical treatment as a muslim believes that God has also provided the cure for his disease. This relation between the believer as the searcher for a cure and God as the Provider of Cure is seen as a way to fortify their relation and consequently making the believer a spiritually and morally better person.

With regards to the use of modern medicine the aforementioned still holds as it also falls under the header of searching for a cure which God has provided. More importantly however is that a muslim should always remain to have trust in his Lord and use the disease as a mean to improve his life in this world and the Hereafter. In current times many muslims however also have started to rely more on physical medicines than in supplications to God and traditional Islamic medicine. This shows that in practice the materialist view on medicine also has entered the followers of Islam, however this is not the correct representation of the core essence of Islamic medicine.

[3]Narrated by at-Tirmidhi (2396); in as-Silsilah as-Saheehah, no. 146

[4]Reported by Abu Dawood, 3376

6.1.6 MSV and Modern Medicine: Shaping the Pharmaceutical Industry

When looking at the pharmaceutical industry it becomes especially interesting as medicines play an important role in society. Medicines are not goods which are used like a chair or a bicycle, but they are consumed (taken into the body) where they affect the wellbeing of individuals in a much more direct or invasive way. The purpose of medicine is to enable individuals to to fulfill other tasks in society. Such tasks could for example include educating oneself and others in arts or science illustrating the effect medicines can have on society. This raises the question whether the development of medicines - which clearly is meant for individual and societal benefit – should be guided by profit-maximisation or not.

With the perception of disease and treatment becoming more materialistic this also influenced the way in which pharmaceutical research is conducted. Where in the past the treatment of a diseases was based on its presumed cause, currently the treatment of symptoms is the most important factor determining the type of treatment. This can be seen by examining the drug development process in which new drug candidates are tested on two main criteria: safety and efficacy. Efficacy here refers to a drug candidate having a certain effect on – in most cases – symptoms of a disease such as lowering blood pressure or increasing the uptake of a certain chemical. We here see that the development process is built on the treatment of symptoms and that the treatment of the cause of a certain disease is not a criterion for a drug to be approved.

As mentioned in chapter 3 the pharmaceutical industry currently is guided by MSV. This objective has led pharmaceutical companies to shape their research in such a way that it conforms to the demands of profit–maximising shareholders. The increased dominance of MSV and the current materialistic perception on diseases and treatment are part of a peculiar positive feedback loop. If the cause of a symptom is perceived as originating in matter, the proposed treatment for a disease will also be materialist, such as a medicine or medical technology, and the importance of pharmaceutical companies (and medical technology) in health care will grow correspondingly. Vice versa, pressure from MSV pushes pharmaceutical companies to search for materialist solutions. A materialist world view and MSV go hand in hand.

Pharmaceutical companies primarily innovate to bring solutions for symptomatic relief and this research is more guided by profit–maximisation for shareholders and may now be less linked to the wellbeing of individuals and society. With this materialist perception on medicine and the influence of MSV it becomes more difficult to consider that diseases also can have a spiritual or moral cause. By allowing medical research to be guided by MSV the possibility exists that medical treatment will become less linked to the wellbeing of individuals and society and more to private materialistic goals.

Even in current times the dominant materialist perspective on disease and treatment is not shared by everybody. Many other types of medicine such as the aforementioned Islamic Medicine; traditional Chinese medicine; and other types of 'alternative medicine' perceive disease as being related to both the physical and the spiritual part of man. Ackerknecht also mentions the social and cultural aspects of disease in his introduction:

> 'It must also be emphasized that disease is more than the physiological and physiological breakdown of an individual. Powerful social factors determine whether people fall sick or not, and how and with what results they are treated. A doctor cannot appreciate too early the fact that his profession is a part and product of society and that it is always closely connected with religion, philosophy, economics, politics and the whole of human culture'. (Ackerknecht & Haushofer, 1982, Introduction)

If a materialist approach on disease is not sufficient to understand health, how could space be created for research and health care that takes also non–material aspects of disease into account? This would require MSV to stop dominating pharmaceutical research. In terms of the three spheres of society it would mean that another configuration is needed that would liberate medical research (part of the cultural sphere) from domination by demands coming from the economic sphere. In the next chapters we will explore two perspectives which would allow for the autonomy of cultural life (including the development of medicine) namely the threefold vision of society and Islamic Finance. Before giving a more in–depth analysis of Islamic Finance we will first explain the choice for this mode of finance in the context of this thesis.

6.2 Freedom in Cultural Life Requires Fraternity in Economic Life

In the previous section we discussed how the view on medicine has changed in the course of time from being something linked to both spirituality and physiology to becoming increasingly materialist. Parallel to this, economic life has become increasingly orientated towards personal material gain (Dumont, 1977, Hirschman, 1977).

Is freedom to choose in cultural life (for example between materialist and spiritual approaches to health and disease), compatible with a private gain-orientated economy? Or does the free development of medicines which are aimed to benefit the whole of society require an evolution towards an economy geared towards serving a free cultural life (in addition to meeting consumption needs)?

The current emphasis on maximizing private benefit as the guiding principle in economic life is a relatively recent phenomenon. In his historical review *'From Mandeville to Marx: Genesis and Triumph of Economic Ideology'*, social anthropologist Louis Dumont observes that in earlier civilizations and cultures such as India, or Western culture before the emergence of modern economic thought, relations between individuals were more highly valued than relations between people and things:

> "This primacy is reversed in the modern type of society, in which relations between men are subordinated to relations between men and things (...)" (Dumont, 1977, p.5)

On the basis of an analysis of exemplary texts (by Quesnay, Locke, Mandeville, Smith, and Marx) Dumont traces the progressive disengagement of the economic dimension from religion, politics, and morality in the modern West. Modern society is separated from traditional societies by a revolution in values and Dumont asks why this unique development that we call modern has occurred at all.

Dumont focuses on two values, equality and individualism. Although he does not mention liberty explicitly, Dumonts understanding of individualism

appears to come close to freedom as meant in this thesis: the individual man is an

> " independent, autonomous, and thus (essentially) non-social moral being, as found primarily in our modern ideology of man and society (Dumont, 1977, p.8)

If it is possible to interpret Dumonts equality (which he seems to link to economic life) as fraternity, and individualism as liberty, how are the two values (and the corresponding spheres, economic life and cultural life) related? Interestingly, Dumont links equality to individualism:

> "(...) it is possible for equality to be valued, even to a great extent, without its being an entailment of individualism. In such cases, however, it will not attain the status of an overall valuation" (Dumont, 1977, p.5)

Dumont appears to defend liberty ("individualism"; "morality") as a requirement for true and lasting fraternity ("equality"). Fraternity ("equality") in economic life requires morality (in cultural life).

Whereas the economy before the 1700s was seen as intertwined with morality this changed. This can be seen by Dumont's description of the work of Adam Smith in which he says

> "(...)economic activity is the one activity of man in which there is no need for anything but self-love(...)" (Dumont, 1977, p.61)

The above discussion on how the economy changed from serving society to serving the individual raises the question how this change came about. Dumont himself does not provide a clear answer as this is too complex to fully comprehend. He however does mention that it has to do with the phenomenon of the economic dimension being allowed to emancipate itself from politics and morality.

Dumont was not the only one who observed how a more fraternity–based economy became increasingly individualistic from the 1700s. Hirschman makes a similar observation in his book *'The Passions and the Interests:*

Political Arguments for Capitalism before Its Triumph' (Hirschman, 1977). Here he mentions that before – in the West – pursuing only private interests was seen as immoral and sometimes even sinful. As Christian influences were still dominant in the form of among others the teachings of St. Augustine and St. Thomas Aquinas the maximisation of personal wealth was renounced. However when the influence of the church started to recede with the Enlightenment this changed, leading to modern society and the current conventional economic theory.

From the work of both Dumont and Hirschman we can deduce that an economy in which realising societal gain is superior to the objective of maximising private gain is not strange, rather it was the common state of affairs before the rise to dominance of the pursuit of private gain, which in earlier times was seen as odd if not worse. If it is possible to re–state Dumont and Hirschman in terms of the three spheres, both seem to emphasise that fraternity requires liberty ("individualism, "morality); as we explain in this thesis, the reverse is likely to hold as well.

Fraternity as a guiding principle in the economy thus definitely is not a new phenomenon. It has existed in the past and in current times there possibly are numerous examples of funding which are in some way fraternity–based. Possibly the most established form of these is Islamic finance. It is primarily due to this reason that we have selected Islamic finance as we can easily research this to gain insight on how to finance a free cultural sphere and thus a free development of medicine. This however does not imply that Islamic finance – especially in the West – is a miracle cure for all problems in the economy. The remainder of this section will be a short nuanced explanation for our selection for Islamic finance as an instance of a fraternity–based mode of finance. In this explanation we have also based ourselves on an interview with an Islamic theologist.

As already mentioned the main reason for selecting Islamic finance is due to the fact that it (probably) is the most established mode of finance which is based on fraternity and morality in recent times. In 40 years the Islamic banking and financing (IBF) industry has grown from zero to 1.8 trillion dollars in 2012 in assets (Uppal & Mangla, 2014). Although this is still a rel-

atively small amount[5] the IBF industry grows with approximately 10 percent per annum. There also is a great amount of information available regarding both the practical and spiritual part of Islamic finance and its application in the West is the topic of both corporate and academic research.

The above features of Islamic finance however do not imply that this mode of finance is a (ready) substitute for conventional economy theory. Especially with its implementation in the West there are impediments which have been recorded by both Western and Islamic sides. Islamic finance is for example very difficult to implement in the West due to its strict prohibitions on interest. Moreover, there are no clear authoritative institutions which govern Islamic trade on an international level, making it difficult for both Western and foreign parties to understand and harmonize different interpretations. According to the Islamic theologist whom I interviewed there also is too little support from the Muslim community for the adoption of Islamic finance in the West. Finally, one can also ask whether the form of Islamic finance which exists today corresponds to how it is intended in the authentic Islamic sources or whether it is a more 'tweaked' form of conventional economic theory.

Despite the clear problems related with Islamic finance in the West it is still important to note that Islamic finance is primarily studied as a source of inspiration for learning how to possibly finance a free cultural life and the free development of medicine. It is not the purpose of this thesis to investigate the full adoption of Islamic finance and banking for the pharmaceutical industry.

6.3 Conclusion

A summary of this chapter would include the following two factors. First, the free development of medicines could be a solution for the problems of the pharmaceutical industry and also that of society as a whole. By not forcing medical research to adhere to commercial demands such as MSV it is possible to get results which do good to society directly instead of assuming that maximising behaviour will eventually lead to this same end. The second factor will be discussed in length in the upcoming two chapters. This refers to financing a free cultural life, or more specifically the free development of

[5]The fourteen largest banks each account for more than two trillion dollars.

medicines. This requires that capital is made available for this purpose, which is unlikely to happen if economic life continues to be based on the pursuit of private gain rather than fraternity. If fraternity prevailed in economic life, capital which is freed by productivity growth in the economy ('freed capital) could be used to support a free cultural life, including the free development of medicine.

Chapter 7

The Contribution of Islamic Finance

7.1 Islamic View on Trade and Freedom

In the previous chapter we have given arguments for the importance of freedom of thought in the development of medicines. In this chapter we will research whether Islamic Finance – a mode of finance which is growing in the West and is not guided by profit-maximization – also exhibits a threefold vision by especially focusing on topics such as the prohibition of interest; the purpose of trade and capital; the Islamic vision on shares and gifts. For this analysis we base ourselves on primarily Islamic sources and the interviews we conducted.

7.1.1 Islam: An Individual's Purpose in Life

Islam and Materialism

When comparing religion in general with materialism the two often seem to be antonymous (Lange, 1892). Islam is no exception to this, however it is still important to start our research with a brief comparison between the two. With the world adopting an increasingly strong materialist view it is important to understand what the position of Islam is concerning this matter. In this thesis we have seen that the perception of medicine in the West has become especially materialist and that conventional economic theory including MSV also focuses on maximizing private gains in terms of money

and other things which have their origin in matter. The moral fundament behind current economic thinking therefore also could be described as being related to materialism as people are constantly trying to maximize their profits and in this process 'sacrifice' immaterial factors such as morality, spirituality and social gains. This can be seen as the cultural being imperialized by the economic sphere as the fulfillment of our material desires – a task of the economic sphere – is seen as superior above factors which are part of the cultural sphere. Islam renounces materialism which can be seen in many verses of the Quran, of of which is the following:

> O you who have believed, let not your wealth and your children divert you from remembrance of Allah . And whoever does that – then those are the losers. [Quran: 63:9; Translation Sahih International]

This verse clearly shows that mankind is commanded to not value wordly life too much compared to the remembrance of God. This shows that, as is also the case with many other religions, material desires should be secondary in the life of a believer compared to spirituality. It is also this which illustrates the actual purpose of life according to Islam. According to Islam man's first and foremost task in life is the worship of God as this is the reason why he is created. This purpose of life is made clear in the following Quranic verse:

> And I did not create the jinn and mankind except to worship Me. [Quran: 51:56; Translation Sahih International]

One could interpret this verse as a command to mankind to live a life characterized by asceticism. While this is not incorrect, the Islamic view on asceticism seems to be different to that in the West as it does not refer to withrawing from society and all wordly pleasures and luxuries which are available in the world. Asceticism from an Islamic perspective means that somebody *i)* shuns that which is forbidden and hated by God; *ii)* avoids showing personal luxury; *iii)* does not overindulge in worldly pleasures; *iv)* focuses on doing acts of worship; and *v)* making the best preparation for the Hereafter[1]. It is this prescribed purpose of human life which underlies all his actions.

[1]Based on Fataawa al-Lajnah al-Daa'imah li'l-Buhooth al-'Ilmiyyah wa'l-Ifta (24/369)

7.1.2 Islam and Social Gains

As mentioned above a human being should strive to do acts of worship. These acts however do not only include a vertical relation – i.e. between man and God – but also a horizontal relation which refers to the relation between humans. Islam thus teaches mankind to be good for each other and forbids to engage in behaviour which could be detrimental for somebody else. Relating this to the threefold vision of society we can clearly see fraternité. Brotherhood in Islam and especially caring for each other is based on the following factors:

1. Based on the verse below scholars have deduced that mankind is an honoured creation of God and has an honourable position in Islam. It therefore is the responsibility of every human being to take good care of this creation by helping yourself and others.

   > And We have certainly honored the children of Adam and carried them on the land and sea and provided for them of the good things and preferred them over much of what We have created, with [definite] preference [Quran: 17:70; Translation Sahih International]

2. Muslim society is the society of mutual compassion and coherence. There are numerous of sayings of the prophet Muhammed (peace be upon him) and verses in the Quran which describes believers to be compassionate towards each other. An example of a Quranic verse is the following:

   > And then being among those who believed and advised one another to patience and advised one another to compassion. Those are the companions of the right (i.e. the dwellers of Paradise) [Quran: 90:17-18; Translation Sahih International]

   We here see that God describes believers as being compassionate towards each other and what their reward is in the Hereafter. A believer will always try to fit the description God has given him meaning that this verse should encourage him to be compassionate. The Prophet Muhammad (peace be upon him) described the believers as being like

a single body[2] by saying that "The likeness of the believers in their mutual love, mercy and compassion is that of the body; if one part of it complains, the rest of the body joins it in staying awake and suffering fever. He also stated that believers should not place themselves above others by saying the following[3]: "None of you truly believes until he loves for his brother what he loves for himself. These two statements also clearly indicate that muslims always should aim to be good for each other.

3. The Muslim society is a society of cooperation and mutual support. While closely linked to the previous point this point refers primarily to the 'external part of brotherhood -i.e. actions to help others in society and the previous point covered more the feeling of compassion and empathy. The meaning of cooperation and mutual support can be best summarized by the following saying of the prophet Muhammed[4] (peace be upon hm):

> "The most beloved of people to Allaah is the one who brings most benefit to people, and the most beloved of deeds to Allaah is making a Muslim happy, or relieving him of hardship, or paying off his debt, or warding off hunger from him. For me to go with my Muslim brother to meet his need is dearer to me than observing I'tikaaf [withdrawing from society in a mosque for a certain amount of time] in this mosque meaning the mosque of Madeenah for a month whoever goes with his Muslim brother to meet his need, Allaah will make him stand firm on the Day when all feet will slip."

From the Quranic verses and prophetic sayings discussed above we can conclude that Islam has a strong tendency towards altruism and social gains. Muslims are encouraged to help each other and not be egoistic. This is a large difference with the status quo in which people primarily try to promote their own egoistic interests while often neglecting the impact on others.

[2]Narrated by Muslim, 2586

[3]Narrated by al-Bukhaari, 13

[4]Saheeh al-Targheeb wal-Tarheeb, 2623.

7.1.3 Islam and Profit Maximisation

As we have already discussed, the purpose of a human being is closely related to doing good for yourself and for society and not with following materialist or earthly goals. Profit maximziming – especially when one considers that this does not lead to social gains – does not fit this purpose. While there is no source which corresponds perfectly with the concept of MSV within the Islamic sources the is the following verse in the Quran which warns mankind against the piling up of wealth and other material goods:

> Competition in [worldly] increase diverts you. [Quran: 102:1; Translation Sahih International]

An explanation of this verse[5] is that people are deluded into the wordly life due to four primary reasons. First, the desire of having many posessions. Second, competing with others to posess more. Third, taking pride in having more posessions than others. This can cause people to become arrogant and look down upon others. Finally people are deluded by the increasing urge to want more than they already have. It is this characteristic of human nature which is said to be detrimental for the individual and society. People who keep accumulating wealth – and possibly also profit–maximizers – are said to become heedless of God, the Hereafter, of the moral bounds and responsibility of the rights of others and of their own obligations towards them. They are primarily concerned about raising the their own living-standards and will not bother even if the standard of society is falling. Moreover, in the pursuit of acquiring more private wealth – what we perhaps could call maximizing profits – people are desensitized for the suffering of others. Although not referring directly to the principle of MSV, Islam clearly opposes MSV as a objective. This objection is based on moral and societal considerations showing a clear mutual interaction between economic life and cultural life.

7.1.4 Islamic Finance: Purpose and Essence of Trade

In the previous section we have discussed the purpose of a human life according to Islamic principles. As trade is an activity which is done by human beings it is logical that this also serves the same or a similar goal. A pivotal part of this goal was seeking the pleasure of God by the realisation of

[5]Explanation given in the text is based on an interpratation of the exegesis of Ibn Kathir

social gains. Shaikh Abdul 'Aziz ibn Abdullah ibn Baz describes in his work 'Warning against Riba (usury) transactions' something similar. He namely mentions that there are many verses in the Quran which order believers to help one another in what will bring about their material and religious benefit. He continues by stating that God has ordered muslims to help one another in piety and righteousness, including fulfilling the terms of their legal contracts and protecting their mutual rights using permissible means. God also warned against transgressing each other's rights and properties. By following these commandments the Islamic economy is said to thrive. From this description we can see that the manner of Islamic trade is based primarily on elements of the cultural sphere, namely morality and spirituality. By following these it is said that an optimal economy can be created which allows for people to develop themselves on a moral and spiritual level.

The Quran enunciates the fundamental principles of Islamic trade as follows[6]:

> And O my people, give full measure and weight in justice and do not deprive the people of their due and do not commit abuse on the earth, spreading corruption. What remains [lawful] from Allah is best for you, if you would be believers. But I am not a guardian over you. [Quran: 11:85-86; Translation Sahih International]

These verses indicate that Islamic trade can thrive if there is justice. The warning therefore stresses that believers should not engage in unjust transactions due to which you are expected to pay your due; not be guilty of selfish greed and not to indulge in 'profiteering'. Justice is one of the most important virtues within Islam and therefore it is also the guiding principle of Islamic trade. Study of "*Al Kitab al-Buyu*" (the book pertaining to business transactions) illustrates the example of the prophet Muhammad (peace be upon him) regarding trade in which he disapproved al types of transactions which involved injustice for either the buyer, the seller or both. Muslims are expected to follow this example which *de facto* means that both the buyer and seller should be sympathetic and considerate towards each other. In practice one should thus not take undue advantage of the ignorance of the

[6]Explanation of this verse is based on the introduction of the Book of Transactions (*Kitaab al–Buya'* described in
$http://www.iium.edu.my/deed/hadith/muslim/010_smt.html$

other as the meaning that the seller should not think that he has unrestricted liberty to extort as much as possible from the buyer.

The Prohibition of Interest and Freedom

Probably the most wellknown feature of Islamic finance in the West, and directly related to the renouncement of injustice in business transactions, is its prohibition of interest. While the pragmatic features will be discussed in the next section it is important here to mention its relation with freedom as the relation between a prohibition and freedom may appear to be antonymous at first hand. How is it possible to have both prohibitions and freedom?

The question raised above can be asked for every command or prohibition dictated by God. To answer the question we should first look at the opposite. When one is not commanded or prohibited anything, is that the definition of freedom? In the latter case mankind would be allowed to do anything he wants but if he would do this, would he not be a slave of his desires? Ibrahim Abouleish mentions in the epiloge of 'The Impulse of Freedom in Islam' that it is the possibilty to choose not to follow your desires which is true freedom (Abouleish et al., 2013). He refers to the following Quranic verse to illustrate that in Islam there is no compulsion:

> There shall be no compulsion in [acceptance of] the religion. The right course has become clear from the wrong. So whoever disbelieves in Taghut and believes in Allah has grasped the most trustworthy handhold with no break in it. And Allah is Hearing and Knowing. [Quran: 2:256; Translation Sahih International]

He continues however by mentioning that this does not mean that people are free to do what they want, this would namely mean that they are a slave of their desires as we previously argued. No compulsion for him refers to being free to find the right way which God has planned for him. The divine does not work by compulsion and who allows himself to be touched by it will experience true freedom.

Relating the aforementioned to the prohibition of interest we can already see that the prohibition itself may help mankind to liberate itself from blindly following its desires. Every man now has the choice to indulge in interest–based

transactions or not. By surrendering to this prohibition and contemplating about it man can truly be free as he now understands it, possibly causing him to even lose the desire for committing the sin.

For Muslims the prohibition in itself is already sufficient to withold themselves from dealing with any type of interest. Does this mean that Muslims are not free to think and do what they want? The answer to this question is difficult to answer. Muslims are expected to follow the commands of God, however this does not imply that they do not have the freedom to choose whether they want to do this or not. Similar to other religions such as Christianity and Judaism, obeying the command however will be rewarded while disobedience will be considered a sin. When asked concerning the relation between slavery and Islam the website www.islamqa.info[7] the following was said:

> 'Islam affirms that Allaah, may He be glorified and exalted, created man fully accountable, and enjoined duties upon him, to which reward and punishment are connected on the basis of man's free will and choice. No human being has the right to restrict this freedom or take away that choice unlawfully; whoever dares to do that is a wrongdoer and oppressor'.

From the above we see that Islam acknowledges that man has a free will. Similar to many other religions Islam provides its followers with the freedom to commit a sin or not which is a liberation from only being able to follow your desires. A Muslim who refrains from dealing with interest can have several reasons. First he can refrain from this because it is forbidden by God. Second, he refrains from it because it is forbidden, but he also understands the prohibition possibly causing him to even lose the desire for committing the sin.

One can describe Islamic finance and trade in short as economic activities which follow the basic principle *"Ta'auanu ala birri wa't-taqwa"* which means: mutual co-operation for the cause of goodness or piety. In term of the spheres one could describe this as fraternity in economic life for the cause of

[7]www.islamqa.info is an authorative Islamic website which is governed by Shaykh Muhammad Al-Munajjid and aims to give reliable answers to questions of people based on authentic evidence from the Islamic sources.

moral growth and development in cultural life. As justice is the guiding principle of trade it means that believers are free to engage in transactions as long as they are just. This means that people who adhere to – and believe in – the principles governing Islamic finance will always engage in transactions which are meant to better themselves and society. The legal sphere constitutes laws and regulations to govern just transactions, while these transactions are meant to bring bring individual and social gains in both material, moral and spiritual sense. From this we can conclude that Islamic trade exhibits the properties of a threefold society. The purpose of Islamic finance is to have a moral development in cultural life, this is facilitated on a material basis by the economy and the economy itself is governed by rights life in order to prevent it from exceeding its limits.

7.2 Islamic Finance in Practice

7.2.1 Prohibition of Interest

If the cultural sphere is an autonomous sphere with values to be respected by the other two spheres, then it will have to be funded in a way that respects its autonomy, especially its values. There are not many examples of this in reality. However, one exception is Islamic finance. Especially in the West, Islamic finance now is gaining prominence, although it is still viewed with skepticism due to pragmatic differences. The largest difference regards the prohibition of dealing with interest which is considerably different from the Western model. In this section we will give a short introduction to our investigation into the prohibition of interest: does it imply that Islamic finance does not place the economic sphere above the legal and cultural sphere by placing social gain above private commercial benefits? In Chapter 6 we will develop a concrete proposal (partially) inspired by Islamic Finance and the prohibition of interest. Here we will investigate whether the reason behind the prohibition of interest corresponds with freedom of thought. Moreover, we will especially focus on how this reason influences the perception on medicine and therefore the role of the pharmaceutical industry in society.

Western views on the Prohibition of Interest

Before discussing the Islamic reasoning behind the prohibition we will briefly discuss two Western economists who also favoured the prohibition of interest

which means that the concept is not only present within Islam.

In the 19th and 20th century Silvio Gesell (1862-1930) theorized that the economy and society as a whole were being adversely affected by the current form of capitalism. He argued that the (market) economy was about competitive entrepreneurship and not about capitalism (Onken, 2000). Capitalism here refers to 'rentier' capitalism which means that owners of capital could hoard scarce bank financing and demand interest payments as a reward for not engaging in speculative hoarding (Dillard, 1942). Hoarding capital namely disrupts the dynamic flow or money balances of economic activity, of purchases and sales, and of savings and investment. For not hoarding the money capital owners can demand interest as otherwise there will be less exchange of goods and services due to fewer investments. Another consequence of interest Gesell foresees is that by paying interest people are more guided by the return on capital which causes them to produce for the sake of higher returns than for the true needs of people. Werner Onken reviewed the work of Silvio Gesell and mentioned that Gesell also described the following disadvantages of interest:

> 'Long-term positive interest rates disturb the balance of profit and loss necessary for the decentralized operation of markets. Gesell held that this led to a dysfunction of the social system exhibiting very complex symptoms: the non-neutrality of interest-bearing money results in an inequitable distribution of income, no longer reflecting differences in productivity. This in turn leads to a concentration of monetary as well as non-monetary capital, and therefore to the predominance of monopolistic structures in everyday life'. (Onken, 2000, p.2)

Although Gesell was against interest in the form as it was present at his time he did not call for a factual prohibition of interest as is the case within Islam. He mentioned that interest should exist of three components namely a 2 to 3 percent base; a risk factor and an inflation factor. He argued that in a stable economy all these components would decrease making the system eventually only have a low interest or even interest–free. We here see that also an influential Western thinker such as Gesell, who was even honourably mentioned in John Maynard Keynes's 'The General Theory of Employment, Interest, and Money', opposed the notion of interest due to its detrimental

effects on the economy and society as a whole.

Another Western economist who opposed interest was Pierre-Joseph Proudhon (1809-1856). His objection was related more directly to the moral consequences of interest and therefore shows more similarities with the prohibition of interest within Islam. Proudhon is described as an anarchist and fitting to this title he did not call for a prohibition of interest as he did not believe in an institution which should enforce this prohibition on individuals which can be seen in his following statement[8]:

> 'I protest that when I criticized... the complex of institutions of which property is the foundation stone, I never meant to forbid or suppress, by sovereign decree, ground rent and interest on capital. I think that all these manifestations of human activity should remain free and voluntary for all: I ask for them no modifications, restrictions or suppressions, other than those which result naturally and of necessity from the universalization of the principle of reciprocity which I propose.'

The main reason for Proudhon to call for the abolishment of interest was the fact that it created inequality in society. According to him interest was a tool which capitalists used in order to exploit laborers. Capitalists can live without working as they earn money from rent and interest while laborers do not enjoy such a privelege and have to work to create returns for the capitalists. It is this inequality which Proudhon claimed to be immoral causing him to renounce interest.

Islamic Finance and the Prohibition of Interest

We have seen that the prohibition of interest is also something which has been criticized by Western economists because it is said to lead to inequality (Proudhon) and to deviate attention in economic life towards selfish goals and away from the true needs of people (Gesell). The prohibition within Islam is one that is very important as dealings with interest are considered a major sin. This can be deduced from several Islamic sources of which one

[8]http://praxeology.net/FB-PJP-DOI.htm
This link contains the Bastiat-Proudhon Debate on Interest

of the most important and clearest is the following verse directly from the Quran[9]:

> Those who consume interest cannot stand [on the Day of Resurrection] except as one stands who is being beaten by Satan into insanity. That is because they say, "Trade is [just] like interest." But Allah has permitted trade and has forbidden interest. So whoever has received an admonition from his Lord and desists may have what is past, and his affair rests with Allah . But whoever returns to [dealing in interest or usury] - those are the companions of the Fire; they will abide eternally therein. (Quran: 2:275; Translation Sahih International)

The Quranic verse above is one of the many Islamic sources which indicate that interest is strictly forbidden for mankind. As explained in section 5.1, a person is free to choose whether or not he will respect the prohibition, however his engagement with interest will be considered to be a great sin.

To give a brief explanation about the concept of interest within Islam we primarily use the answer of renowned Islamic Scholar Shaykh 'Abdullah ibn Jibreen when he was questioned regarding this matter. The Arabic word for interest or usury is *riba* and in this context refers to the increase of a particular item. In the *Jaahiliyyah*, the Pre–Islamic period of the Arabian peninsula, *riba* originated among the people as a way to handle business transactions and especially loans. When a debt became due and a borrower was unable to repay the amount he was forced to pay a higher amount for extension of the due date of which the surplus amount was called *riba al–jaahiliyah* and this increase would continue untill he was able to pay the amount with all the accumulated interest. When Islam spread among the Arabs and the prohibition was revealed to the prophet Muhammed (peace be upon him) this thus meant a great change in the way loans were handled. The Arabs no longer could use *riba al–jaahiliyah* to earn money and even 'enslave' people by issuing loans. The 'enslavement[10]' refers to the practice of lenders making a borrower who could not repay the principal amount

[9]The Quran is the most important holy text of Islam which muslims believe is revealed by God to the prophet Muhammad (peace be upon him) through the angel Gabriel.

[10]http://www.islamicperspectives.com/Riba2.htm
The website describes *riba al–jaahiliyah* and how it was used by the pre–Islamic Arabs

combined with *riba al–jaahiliyah* work for them for a certain amount of time.

Another type of interest which Islam forbade was called *riba al–fadl* which means adding to the amount when exchanging one item for another of the same type. So if silver is sold for silver, that is not permissible except if exact the same amount is exchanged. Islam stipulated that the exchange should be done hand to hand and that the items or goods should be of the same quality. Whoever gives more or asks for more has engaged in riba. This illustrates that interest is forbidden for both sides in a transaction which has interest. There also is *Riba al–nasi'ah* which is forbidden by Islam and refers to all sale transactions which unduly benefits one the counterparties in the form of a surplus or extra amount due to delay of delivery of his side of the transaction. *Riba al–nasi'ah* arises for example in loan transactions when a larger amount has to be repaid than the original principal amount and it arises with sale transactions as well when a larger price has to be paid in the future for the same commodity. An example of loan-based *riba al-nasi'ah* would be a loan with $1,500 principal on which $1,800 is to be paid next year. An example of sale-based *riba al-nasi'ah* is a sale of 50 kg of dates to be paid back with 100 kg six month later.

> 'Islam affirms that Allaah, may He be glorified and exalted, created man fully accountable, and enjoined duties upon him, to which reward and punishment are connected on the basis of man's free will and choice. No human being has the right to restrict this freedom or take away that choice unlawfully; whoever dares to do that is a wrongdoer and oppressor'.

Now that we have reviewed several types of interest within Islam and in which way interest was used before the entrance of Islam by the Arabs we can try to understand the reason behind its prohibition. When asked the question about the reason behind the prohibition of interest shaykh Mohammad Saalih Al-Munajjid listed the several other reasons. He stated that *riba* is forbidden because of the harmful effects that result from it. He divided these harmful effects in three categories: *i)* economic effects: e.g., keeping money idle instead of investing it in matters which could increase productivity; and increasing poverty; *ii)* social effects: e.g., cutting ties between people; creating enmity and hatred between the poor and the rich; and spreading corruption

and promiscuity caused by (financial) needs; *iii)* psychological and spiritual effects: e.g., arrogance; looking down on others; hard–heartedness and; exploiting the needs of the poor. In terms of the three spheres, interest is forbidden because of the negative effects it will have on the economy, in the social sphere and in the moral sphere.

On a societal level he also mentioned that countries as a whole can be weakened when their resources fall under the control of other countries and that countries can be robbed of their natural wealth. The latter could refer to the fact that interest is related to the price of land and raw materials of a country, however this is not further specified.

Thus we see that the prohibition of interest is based on several reasons which do not only include the economic sphere. Productivity for example is rooted in the economic sphere; relationships between people such as the inequality between the poor and the rich belong to the social sphere and are regulated by laws, rules and regulations (the prohibition of interest itself is part of rights life); and factors such as the effect on the 'soul' like arrogance and hard–heartedness are part of the cultural sphere. We here see that the reasons behind the prohibition of interest appear to have a threefold nature. Even if interest could potentially lead to individual gains it is still forbidden for economic, moral or spiritual reasons. From this we can deduce that Islamic Finance may be an instance in which the cultural sphere – which among others includes morality, spirituality and science – can develop more freely as it is not subjugated by commercial principles such as private profit maximisation. For the pharmaceutical industry this would mean that science would no longer be guided by commercial demands, but rather by factors such as morality and spirituality which could lead to solutions which benefit society as a whole rather than only maximize the profits of individuals[11].

In this section we have discussed the prohibition of interest within Islamic Finance. The prohibition was used as a case to investigate whether within Islam the cultural and legal sphere are not dominated by the economic sphere. We have seen that the prohibition is based on spiritual, moral, societal and economic reasons which suggests two factors. First the reasons behind the

[11]It is important to remember that – as is discussed in Chapter 3 – according to neoclassical theory private profit maximisation is assumed to lead to social gains.

prohibtion can be seen as an instance of threefolding. Second, the economy, and more specifically profit–maximisation is not allowed to dominate the cultural, social (political–juridical) and the economic sphere. Could Islamic Finance therefore help us in constructing a proposal for the pharmaceutical industry that would permit an autonomous cultural life?

7.2.2 Dealing with Shares

Untill now we have dealt with interest; however in the global financial world the role of shares is very important. This raises the question what the Islamic perspective is on shares. Is it according Islam allowed to deal with shares and if this is the case are there certain conditions to be met? It is this question which we will aim to answer in this section. In order to give a reliable answer we have based this section on several *fatawa* (legal opinions) of a panel Islamic scholars[12] and the results of an interview with an Islamic banker from the RABO Bank (see Appendix).

The basic principle within Islam is that trade in shares is allowed as trade in general is allowed. The permission of trade follows directly from the following verse which mentioned simultaneously with the prohibition of interest:

> (...)But Allah has permitted trade and has forbidden interest.(...) [Quran: 2:275; Translation Sahih International]

However, the permissibility of dealing with shares is also dependent on several criteria which we also discussed when analyzing Islamic trade. On the basis of such criteria Islamic scholars have deduced that shares can be divided inthe following three types:

1. Shares based on activities which are permitted according to the Islamic guidelines stipulated in the Quran and other Islamic sources. This for example includes companies that deal with shipping, transportation, manufacturing clothing, furniture, medicines and real estate. An important condition is that all companies are part of the real economy meaning that there may not be any trading in derivatives or other types of collaterized–dealings. When companies engage in practices which are prohibited in Islam such as interest or the nature of the companies itself

[12]The Islamic Fiqh Council of the Muslim World League

is against the rules of Islam such as casinos or wine producers, dealing in their shares is also forbidden. In practice it is especially the dealing in interest of a great number of (Western) companies which makes it not permissible to buy and sell shares their shares. Companies which are clearly rooted in the real economy and engage in permissible acts according to Islam are called 'permissible' or 'clean' companies referring to the fact that it is permissible to buy and sell their shares.

2. As mentioned before it is not allowed to buy and sell shares who engage in practices which are not allowed in Islam. Examples of such companies are companies which deal in interest, hotels that promote and aid in actions which are considered immoral, companies from the adult entertainment industry, commercial insurance companies and breweries. The Islamic prohibition on dealing in these companiess shares is clear and not debated among scholars.

3. The most difficult category regarding the permissibility of dealing in shares refers to companies whose field of work is permissible (for example a chair manufacturer), but the company engages in some acts which are impermissible. An example of such an impermissible act could be that the company has taken an interest–based loan from the bank. These companies are called 'mixed companies and contemporary scholars have differed in opinion concerning the permissibility to deal in their shares. In general, the buying and selling of these types of shares is also forbidden based on the fact that co-operating in sin and transgression is forbidden . This prohibition is based on the following Quranic verse:

> (...)And cooperate in righteousness and piety, but do not cooperate in sin and aggression. And fear Allah ; indeed, Allah is severe in penalty. [Quran: 5:2; Translation Sahih International]

We here see that in general it is allowed to deal in shares as long as the company who has issued the shares complies to the Islamic rules. Especially the prohibition of interest makes it in practice diffcult for muslims to deal in shares as most (Western) companies engage in interestbased transactions. The condition for a company to be rooted in the real economy shows that the allocation of capital has to be linked directly to society. Islam namely

does not allow capital to grow 'artifcially' as this is also a form of riba. All the constraints which are placed on dealing with shares are thus directly related to the aforementioned virtue justice which underlies Islamic finance and trade. Here we again observe the strong influence morality and spirituality have on the way in which is traded.

7.2.3 Sadaqah

In Islam there is a strong emphasis on giving *sadaqah*. *Sadaqah* is often translated as charity, however this translation is actually too narrow as can be concluded from the following saying[13] of the prophet Muhammed (peace be upon him):

> "Every good deed is *sadaqah*"

Probably the most important reason for sadaqah to be translated as charity is due to the fact that it is voluntary. This means that Muslims will not be in violation of any rules if they do not give sadaqah. It however is greatly recommended as it can lead to great rewards as can be seen from the following Quranic verses:

> "The parable of those who spend their substance in the way of Allah is that of a grain of corn: it groweth seven ears, and each ear Hath a hundred grains. Allah giveth manifold increase to whom He pleaseth: And Allah careth for all and He knoweth all things. Those who spend their substance in the cause of Allah, and follow not up their gifts with reminders of their generosity or with injury,-for them their reward is with their Lord: on them shall be no fear, nor shall they grieve". [Quran: 2:261-262; Translation Yusuf Ali]

In this verse we see the term 'gift' which is perhaps more applicable to *sadaqah* than charity as it is something which a believer gives purely to help somebody without expecting something in return (except reward from God). We here can connect giving sadaqah or gifts with fraternity as Muslims are encouraged to help others also financially if this is expected to lead to social gains. To further illustrate the difference between *sadaqah* and charity,

[13] Sahih Muslim 1005

which is wellknown in the West, we refer to an article of Martin Snow[14] – *"Rather than creating an individualized "culture of giving" we should be challenging capitalism's institutionalized taking"* – which summarizes this with the example of helping a drowning child. The normative question he asks is whether or not one should help the child. By intuition one would respond with a positive answer after which he refers to Peter Singer (1972) who believes that there should be no difference between helping the drowning child and helping people who are in mortal danger due to lack of food, water, or medical treatment – albeit when living far away – and charity.

A social movement called Effective Altruism uses the basic argument of Singer. Snow however is critical of effective altruism and points to several flaws of the movement. Most importantly charity does not allow for selfdevelopment of the recipient and keeps them dependent on external parties. A personal addition to Snow's metaphor would be to ask the question: is it not more wiser to teach children to swim than to keep having to save them from drowning?

Reviewing the critique on effective altruism and the prevalence of charity in society the question rises as to why charity enjoys the popularity it does. Snow answers this question by first commenting on effective altruism in the following manner:

> "The core problem is the bourgeois moral philosophy that the movement rests upon. Effective Altruists abstract from – and thereby exonerate– the social dynamics constitutive of capitalism. The result is a simultaneous flawed moral and structural analysis that aspires to fix the world's most pressing problems on capital's terms".

Capital creates "drowing strangers" as it does not allow people to help people in need to develop themselves. The greatest consequence of this is the fact that people stay dependent and in need for help.

According to Snow, our thinking is shaped in such a way by capitalist institutions that people are under the impression that helping others on moral

[14]https://www.jacobinmag.com/2015/08/peter-singer-charity-effective-altruism/

grounds can only be done through charity. Alternatives are not conceptualized. To illustrate this even further Snow refers to Singer who encourages young individuals to pursue high–paying careers allowing them to pay charity later. Individuals who listen to this appeal are under the impression that the wealthy are the only possible saviors and that becoming rich is therefore a prequesite to being able to help lesser fortunate. Instead of trying to solve the underlying problems of the people who need help they now direct their efforts to becoming rich in order to give charity. As the problems are not solved the need for charity also continues to exist thus consolidating the system even further. This shows how charity reinforces rather than reforms the system.

As *sadaqah* is something which only should be given for purposes which lead to social gains, or at least do not harm others, it is more fundamental than charity. It namely is not aimed to tend to the problems at the surface of a society, rather it urges – but not commands – believers to allocate their capital in such a way that society as a whole benefits. *Sadaqah* can thus be linked to fraternity, however is it also linked to liberty in cultural life? The Islamic theologist whom we interviewed described *sadaqah* as "a voluntary contribution to a good end". The question then arises whether a "free cultural life" – as described in this thesis – also falls under a "good end". The answer to this question is not easily found in literature and therefore requires further research.

7.2.4 Conclusion

In this chapter we have discussed several aspects of Islamic finance, most noteworthy were the strict Islamic prohibition on interest, investments in shares and giving sadaqah. This shows that Islamic finance is strongly influenced by moral and spiritual considerations. In this mode of finance the economic sphere does not dominate the cultural sphere, rather it allows for the cultural to develop freely. The three practical applications of Islamic Finance can therefore give valuable suggestions on how to finance the free development of medicines. For this it is important to have fraternity in the economy as society has to be willing to spend money on goals which do not benefit only yourself but others. This aspect was clearly seen in the concept of sadaqah. The prohibition of interest and the linkage between investments and shares are related. When there is no interest it becomes more impor-

tant to share financial risk which is embodied in equity–financing. Such a form of risk sharing also shows that there has to be commitment from investors as they are directly involved with the recipient of their money. This commitment of capital or "committed capital" also signifies fraternity in the economy as both the investor as the party receiving the investment share the risks and therefore benefit from a strong collaboration. Finally the moral criteria which underly all aspects of Islamic Finance are also important as they motivate society to spend on purposes which lead to social gain such as the development of medicines. In the next chapter we will propose a model based on insights of the threefold vision and Islamic Finance which could solve the problems of the pharmaceutical industry and permits a free cultural life.

Chapter 8

Modelling a Possible Solution

8.1 A General Model for Pharma based on a Threefold Society

Until now we have researched our guiding intution whether the acknowledgement of three independent yet autonomous spheres, and especially freedom[1] in cultural life, is a possible solution for the problems of the pharmaceutical industry and for society in general. For this to be realized there are two important factors which need to be changed compared to the status quo. The first is a free cultural life, or more specifcally free medicine development (see Chapter 3 and 6). Second, freedom in cultural life appears hard to achieve without fraternity in economic life. The second is something which we have seen in the previous chapter when discussing Islamic finance. In this final chapter we try to combine our insights from the threefold vision and Islamic finance to conceive a concrete model, i.e. a possible solution.

Before discussing the characteristics of the model we can already come up with a model in a more general sense. The most important characteristic

[1]Note that here, as elsewhere in this thesis, the term freedom has different meanings in different contexts. In the context of neoclassical economics, freedom (as in free market) means freedom from obstacles to the pursuit of self-interest. In the context of cultural life, freedom refers to spiritual freedom, or freedom to choose one's own path in life (including education, teaching, etc.) in conformity with one's religious, philosophical or scientific world conception.

of this model would be that the development of medicine is a public good[2] while the production and sale is the responsibilty of pharmaceutical companies and other commercial institutions. By implementing this change in the pharmaceutical industry commercial life is now relieved of the need to justify investment in R&D by ways of subsequent product sales and, therefore, profitability. In a general sense the model for funding drug development inspired by the threefold vision of society would include the following:

- The discovery and development of drugs is a **cultural** event (up to the point of 'recipe').
- Ensuring such things as safety and equitable accessibility to everyoneis a **rights** matter (protecting IPRs as a public good, not a corporate asset).
- The production and delivery of medicine are matters for **economic** entities such as corporations.

As already mentioned this model is not yet applicable in practice. In the next sections we present some first ideas towards a proposal for funding the free development of medicine.

8.2 Funding Threefold Society - Insights from Islamic Finance

To conceive a more practical variant of the above model the most important question is how to finance each sphere of society. For the economic sphere and the legal sphere this is relatively straighforward. The production of economic goods, including generic medicine, will be financed out of income from sales and rights life will be funded through taxation. These two ways of financing are currently widely applied and therefore it is not expected that this will lead to any problems. The finance of a free cultural life however is more difficult to realize. For this it is important to have an evolution from liberty to fraternity in the economy as otherwise individual profit maximizing

[2] A public good here means a good which is available for every individual irrespective of one's financial condition and is governed by an institution which not necesarilly is the government, but can also be an organisation of another type.

behaviour will make it impossible for cultural life to not be colonized by the economy. In the next sections we will therefore briefly discuss in which way the free development of medicines (part of a free cultural life) can be financed. This description is based on insights from Islamic finance – a fraternity–based mode of finance – and especially the concept of *sadaqah*(see 7.2.3) and its focus on social gain and morality.

8.2.1 Financing a Free Cultural Life

For cultural life to be financed there thus has to be fraternity in the economy. This thought is also concretized by Steiner. He mentions that in an economy it is practically impossible to have egoism without friction, which he (1933) summarized by saying that egoism is contradictory to the facts of the world economy. Nevertheless , till date fraternité still eludes reality as being a principle which can only exist in an ideal world. A world in which everybody works for each other probably is not something people will find to be realistic. Such an awareness can be the fertile ground from which fraternité potentially can grow.

Continuing from the premise that fraternity can be realized in the economy the question arises what type of capital or money should be allocated to cultural life. The money or capital that is available and eligible for this purpose in principle is the money or capital that is generated in the economy as a result of productivity growth; it has been named 'free capital' by Wilken (1982) or 'freed capital' by Naastepad & Houghton Budd (Houghton Budd et al., 2015). 'Free capital' is capital which is freed from the economy by productivity growth; it is money that is no longer needed in the economy for the purpose for which it was previously used. To further explain this concept we can look at value added in the economy. Value added is composed of three components, labor costs (L), cost of capital (K) and profits (p). With technological advancement the cost of labour decreases. Assuming that the cost of capital (interest and/or depreciation) remains relatively stable the share of profits in value added rises. This raises the question what one should do with these profits, or free capital. In general there are two options for this capital to be allocated to. The first is to fulill our material needs for which the capital is reinvested in the economy (giving rise to a new value added column or economic expansion). The second option would be to conclude that our material needs are fulfilled and to use the freed capital to fulfill our

immaterial needs.

A core question is how free capital can be made available to the cultural sphere in such a way that it the latter can develop independently from domination by the other two spheres. Ideally, freed capital allows for freedom of thought. Whether this will happen will depend on how we understand capital and its role in society. When capital is understood as linked to material gain only, freedom in the cultural sphere will be limited. Only when our understanding of capital is widened, the possibility opens up that free capital will be used to support the free development of ideas. Free thinking and free capital are intrinsically related. Free ideas are ideas that are not already moulded by demands from solely the economic sphere but are the fruit of the interworking of all three spheres and therefore harbour the potential to bring alternative and perhaps superior solutions to real-life problems.

Interestingly, CEO Kalff appears to advocate a similar idea as he mentions that capital should be allocated to ideas and not on the basis of return to investments. He mentions that the real limiting factor today is the quality of people and the quality of their ideas. The capacity to teach and to learn, the capacity to cooperate, and the capacity to deal with real-life problems "are all new and taxing requirements that are beyond the reach of many" (Kalff, 2005, p.122). This is what is holding companies and economies back. Kalff challenges the 'American Enterprise Model' because, in his view, subordination of business ideas to the creation of financial returns for shareholders is no longer a source of efficiency and competitiveness. He proposes to take a fresh look at the company and outlines a new 'European Business Model' [3] where the ownership of ideas lies with those who have conceived, developed and implemented them (Kalff, 2005, p.127). Thus, ideas rather than immediate financial returns become the focus of the company as well as its financiers, and capital would be linked to the former.

Finally we can imagine that in an economy which is led by fraternity freed capital can be used for financing cultural life. The concrete model in the

[3]Instead of proposing just one 'European Business Model' Kalff emphasizes that a key factor in Europes competitiveness is the diversity of Europe. Not one type of company but a variety of company types which differ per country and culture are an essential part of Kalff's solution. The 'European Business Model' is Kalff's model for the large-scale corporation, which is just one among a great variety of company types in Europe.

next section will therefore include freed capital as a means for financing free development of medicines.

8.2.2 A Concrete Model for Pharma based on a Threefold Society

Following from this there are, perhaps, three possibilities in principle for funding free medical research. First, companies may transfer their freed capital to the state in the form of taxes. The state then uses this type of tax income to fund cultural life and fullfil the aspirations of its constituents. Important to note is that this not necessarily implies that the state also controls cultural life by for example dictating the contents and criteria of education and research. Second, companies themselves make their surplus profits directly available for the funding of cultural life. Third, companies pay their surplus profits to their employees who use this money to fund the education, research and health care of their choice. In all three options, the free capital from all three options can be allocated to an institution in which medical professionals are present. The influence of the medical professionals should be proportionate to how much society demands their services. This gives opportunity for other types of medicine (e.g. 'alternative medicine') to also play a role. To such an institution freed capital can be allocated whether by the state, by companies or by individuals who want to make money freely available for this purpose. The medical professionals are then specialized to use this capital to fund research which they have found to be most beneficial for society.

Using this institution an individual would be liberated or 'sovereign' as he himself can choose in which way he wants to develop himself without being dependent on external factors. For this to be reality two important conditions need to be met. First, if freed capital is channelled through individuals (rather than companies or the state) who then fund fund the education, research and health care of their choice (i.e. the third option mentioned for funding free medicine research) it is necessary that there is no unemployment, otherwise there are people who are not able to fulfill their material and immaterial needs. Second, the outcome will depend on the quality of the choices made by individuals (as compared to the quality of the choices made by the state or by businesses). It thus is pivotal that human beings

(individually or as responsible persons in businesses or state institutions) are able to recognize what are the true needs of themselves and society and have the goal to develop themselves on a moralspiritual level, which, according to Aristotles, is the *telos* or end of human life.

Thus we arrive at a concrete suggestion for a model for pharma and the free development of medicines:

- As a public good, the development of drugs could be financed out of voluntary donations, the funds from which were made available to medical professionals who are organized in a special organisation.
- A body to protect the health of the population (FDA etc.) would then license the recipe in the manner of copyright or a quality guarantee mark, but not as a corporate asset. This body is funded through taxation.
- Pharmaceutical entities would then simply be relieved of the need to capitalise R&D, and so of the problems associated with MSV, EMH and NGT. Profits would be earned by selling the generic medicine for which a licence is obtained.

8.2.3 Managing Expectations

One final consideration which is important when reviewing this concrete model. It is likely that this will raise questions regarding how realistic this is to be applied in practice. Despite the fact that this model might never be taken up for all manner of reasons, it is important to note that this lack of take-up does not mean the model is invalid per se. By definition, innovation is always ahead of or beyond current cognitive frames; and this thesis is not only about innovation, it is also innovative. In a sense, the ultimate test is not whether a pharmaceutical firm would implement what is proposed, but whether they would see it as capable of implementation were it not for circumstances extraneous to the concept and the thinking underlying it. Institutions and economic practice may lag behind changes in ideas.

Chapter 9

Conclusion, Limitations and Recommendations

9.1 Conclusions

In this thesis we have aimed to answer the following main question: *Can recognition of three inherently autonomous yet interrelated spheres in society – culture, rights life and the economy – help the pharmaceutical industry to solve its problems experienced as declining R&D profitability?* The main proposition of this thesis is that the problems experienced by the pharmaceutical industry are a consequence of the lenses through which these problems are currently perceived. We propose that these lenses – i.e. our perception – are the root cause of the problems. Focusing on only the problem – as is done in current literature – displays a somewhat ironic similarity to the current perception on medicine which is often focused on symptomatic treatment while disregarding the actual cause. The usual perception which underlies these problems – and therefore also the proposed solutions – is informed by the utilitarian philosophical foundations of conventional economic theory and its modern offspring, the effcient market hypothesis (EMH), the behavioural prescription of maximisation of shareholder value (MSV), and new growth theory (NGT). The problems experienced by the pharmaceutical industry appear to have their root cause not in the economy, but in the cultural sphere, in the philosophical foundations of the currently dominant economic theory, i.e. the moral rationale behind economic activity.

The moral foundation of the theory, namely that individuals must maximise utility (and managers and owners of capital must profit-maximise) because this will lead to social gains – a core hypothesis of neoclassical economic theory inspired by (a particular interpretation of) Adam Smith's 'invisible hand' – is still presupposed but no longer researched. However, while we are still trained to think in this utilitarian–neoclassical way, economic and financial institutions today differ considerably from the historical economic and financial circumstances in which neoclassical theory emerged. For example, the separation of the ownership and management of businesses has led to speculative use of capital and deviation of asset prices from the real value of businesses. Moreover, the profits of pharmaceutical companies are increasingly derived not only from economic activity (the production and delivery of medicine) but also from activities in the legal sphere (lobbying for rules and regulation that favour the lobbying companies and create disadvantages for competitors) and the cultural sphere (such as advertising aimed at convincing rather than informing patients, and a growing influence on medical research and education). Finally, many consumers cannot express their preferences due to lack of purchasing power while medical insurance companies also increasingly restrict the choice of patients. Therefore, prices and profits can no longer be assumed to automatically reflect the (true) preferences – *i.c.* the health needs of patients. We thus have concluded that maximisation of private gain does not (necessarily) lead to social gains. Rather, when reduced to profit maximisation economic life tends to dominate the legal and cultural spheres (a phenomenon which has been called economic 'imperialism' or 'colonisation').

According to new growth theory, commercialisation of research will stimulate research and innovation and enhance economic growth and welfare. Therefore, if (pharmaceutical) research and health care (both part of the cultural sphere) they are currently dominated by MSV, why is this a problem? A short review of the history of medicine shows that views on health care evolve over time and differ also at one particular point of time. For example, in the past and also in other current 'alternative medicine' and health care, such as Chinese and Islamic medicine, health is seen as related to social and psychological factors and even to spirituality and morality; thus, illness could be too. Especially since the Graeco–Roman period, however, disease was reduced to a biochemical process with no relation to the 'inner–self'. As a consequence, treatment for a disease – which is assumed to have originated

in matter – was directed to change, this process leading to current symptomatic treatment. This materialist view on medicine appears to go hand in hand with MSV; both lead pharmaceutical companies to search for (more) materialist solutions.

The materialist view on disease and medicine, and the commercialisation of medical research have locked the pharmaceutical industry into its problem of 'drying pipelines': Innovation is seen as the solution to the problem of declining R&D profitability (which is seen as a problem of market saturation), but if demand in markets reflects the needs of sovereign consumers patients, how can market saturation be a problem? Why is the pharmaceutical industry trying to break through the boundary of market saturation rather than simply stop growing (or downscaling) in response to declining profits (as original neoclassical general equilibrium theory would advise)?

If hypotheses such as EMH, MSV and NGT drive the pharmaceutical industry to enhance efforts at raising profits in the face of declining demand (by 'endogenising' the preferences of patients and restricting their choice through lobbying and exerting influence in the legal and the cultural sphere) a solution may depend on an alternative perspective on economics and especially on the purpose of capital.

An alternative perspective would allow for the autonomy of the legal and cultural sphere in mutual interaction with the economic sphere. Freedom from commercial pressure would enable lawgivers and regulators as well as researchers, scientists and educators to take into account factors such as social gain, morality and spirituality and permit individuals and society to develop these aspects of life. In terms of the pharmaceutical industry it would mean that the development of medicine is viewed as an autonomous cultural event, protected by rights granting it the status of a public good, and funded by capital committed to the independence of medical research. Independent medical research would develop medicine up to the point of a recipe while the production and delivery of medicine would be a matter for pharmaceutical corporations.

Although the threefold vision offers a perspective in principle of an economic sphere catering to our material needs and generating a financial surplus to fund an independent cultural (and legal) sphere, there are not many practi-

cal examples of capital made available on these conditions. An exception is Islamic finance in which in which a threefolding perspective is present. The intention behind the prohibition of interest and the rules regarding trade in shares within Islam is to permit an autonomous development of spirituality, morality and the creation of social gains meaning by preventing colonisation of the cultural and legal sphere by the economic sphere. The idea and goal of Islamic finance is to allocate capital directly to ideas which promote social gains (rather than indirectly via profit maximisation) and to prevent allocation to unjust causes even if this could be beneficial on an individual level.

The thesis concludes with a proposal for a solution to the problem of the pharmaceutical industry consisting of a separation of the development and the production and delivery of medicine (an instance of threefolding of the cultural, political–juridical and economic spheres) funded by capital committed to a free development of medicine (an instance of Islamic finance committed to social gain and spiritual development). This would relieve pharmaceutical businesses of the need to capitalise their R&D.

Such a proposal may be considered utopian and naïve, and it is evident that it is not very likely that it will be welcomed without reservation or be readily adopted. Yet, the financial crisis has reduced the belief of many people in the principles currently guiding the use of capital, while the prevention of further social as well as financial crises may depend on giving more serious consideration to social gain. This may not, in the end, prove to be the automatic outcome of maximising private gain.

9.2 Limitations and Recommendations

As with every type of research there are several limitations within this thesis which can be improved. In this section we will address the most important of these limitations and try to give recommendations about how they can be overcome in future research.

Following the methodology used within this thesis the reasoning was tested among others by the use of interviews with Islamic scholars. These interviews were useful as a source of additional information but not very effective to test whether the solution was conform Islamic finance. This conformity was never

a requirement for this thesis, however if this was the case there potentially was more valuable information which could be used for conceiving a model solution. In the future perhaps other (or more) Islamic scholars could be used while additionally informing them regarding the connection between Islamic subjects such as *sadaqah* and the model solution in this thesis, something which was not possible within this thesis as the model solution itself was the endproduct.

As there were interviews with experts on (facets of) Islam the same could be done for anthroposophy. The concept of three spheres is very dominant within the thesis which would make it very useful to test the solution and the content by anthroposophic economists and entrepreneurs. Within the scope of this thesis this was unfortunately not possible, however for future research this would probably increase the practical viability of the model solution.

Probably one of the greatest limitations was the inability to test the solution in real life or have professionals in the health care industry give their educated opinion on this matter. In future research it would therefore be very effective if individuals from the pharmaceutical industry could be interviewed regarding the actual implementation of the solution.

Appendix A

Interview Questions - Islamic Banker

The following list of questions were used in the interview with the Islamic Banker of the RABO Bank conducted for this thesis.

1. Why is there a prohibition of interest within Islam?
2. Is there also a prohibition on investing in certain medicines such as anticonception, drugs which are used to induce abortion etc.?
3. How do you envision the future of Islamic Finance in the West?
4. What are the greatest obstacles for Islamic Finance in the West?
5. What are the (greatest) differences between regular banking and Islamic Finance?
6. Do you see advantages of using principles of Islamic Finance in the funding of medicine development?
7. Does Islamic finance, considering the fact that it includes norms, values and spirituality, allow for freedom of thought?
8. How should the development of medicines be done accoriding to Islamic Finance?
9. What makes Islamic Finance interesting (or not) from a Western perspective?

10. Do you see a cultural, economic and legal sphere within Islamic Finance?

11. What is the meaning of the prohibition of interest within a society which is dominated by the stock corporation?

12. How do shares and equity financing fit within Islam Finance?

13. Does the maximization of profit and MSV fit within Islamic Finance,why (not)?

14. Why is there increasing interest in Islamic Finance? Is this dependent on the interest rate?

Appendix B

Interview Islamic Banker

The interview was conducted with dr. Raphie Hayat who is currently working at Rabo Bank as a portfolio manager specialized in Islamic finance. Considering his expertise regarding Islamic finance and the fact that he is working at a Western bank made him a viable candidate to ask not only questions regarding Islamic finance but also its relation and future in the West.

The most important reason for a prohibition of interest within Islam is the fact that it is not considered fair. When one takes this approach for explaining the reason for the prohibition there is room for types of interest which are allowed. According to Dr. Hayat there are for example opinions of scholars who say that only usurious interest is forbidden, but that other types of interest are allowed. Dr. Hayat clearly adhered to the latter opinion opposed to believing that all types of interest are forbidden.

In general it is forbidden to trade in everything which is forbidden within Islam. Well known examples are the adult industry, Western banks and casinos. It however is not known whether specific types of medicine are prohibited as dealing in shares of the pharmaceutical industry in general is perceived to be allowed.

Islamic finance is currently growing rapidly, however it is still relatively small in the West. It is expected to keep growing, however it is not realistic to assume that it will be subsumed on a large scale (in a short amount of time). Due to the current image of Islam people are also apprehensive in the West which means that it probably will be adopted under other names such as

sustainable or ethical financing.

A great difference between Islamic Finance and Western Finance is that the former has a focus on social gain and not profit. It also thinks prudence is important, meaning that risk should be shared and no speculative transactions should be done. All types of investment should contribute to the real economy. Apart from this there are not many differences. Dr. Hayat also admits that there is a great difference between the actual belief and principles behind Islamic Finance and its practice. Islamic Finance currently is a variety of Western finance which is tweaked to adhere to the most important commandments within Islam, such as the prohibition of interest.

Advantages from Islamic Finance which also makes it interesting from a Western perspective is that in times of crises the losses are less severe compared to the Western version. The flipside of this however is that the returns are also less when the economy has an upswing. An important factor is also the fact that investments have to be directly linked to the real economy which means that its effects on society are more directly traceble compared to for example investments in derivatives.

An example of the benefits of Islamic Finance (which are a result of the fact that it includes norms, values and spirituality) which can be seen in practice is that it allows for financial inclusion. Financial inclusion is the delivery of financial services at affordable costs to sections of disadvantaged and low-income segments of society. Dr. Hayat also mentions that the fact that Islamic Finance has these ethical considerations makes it also less free as people are not allowed to for example open a casino.

Islamic Finance does not appear to be affected in popularity by changes in the interest rate. In this regard it is very much like the Western system of finance. This is probably due to the fact that the Islamic system of financing is not that distinct from the Western system in practice.

Risk sharing and equity financing are very important within Islamic Finance. As taking interest–based loans is not allowed within Islamic Finance people are encouraged to use their own equity and finance their operations with shares. In this regard Islamic Finance has a strong relation with the current dominance of the stock corporation.

Appendix C

Interview Questions - Islamic Theologist

The following questions were used in an interview with an Islamic theologist who graduated at Leiden University and is currently active in several projects on both a regional and national scale.

1. What does Islamic finance mean?
2. What is the purpose of Islamic finance?
3. Why is riba haram?
4. What is sadaqah? Does sadaqah only entail pecuniary gifts?
5. What do you think are the greatest hurdles of adopting Islamic finance in the West?
6. Are there (currently) disadvantages to Islamic finance in the west?
7. What would you envision to be necesary for Islamic finance to be adopted in the West?

Appendix D

Interview Islamic Theologist

Islamic finance means the operation of money, services or goods in which no monetary surplus is integrated.

The purpose of Islamic finance is to observe the Islamic prohibition on interest as stated in the Quran and several ahadith (sayings of the prophet Muhammed (peace be upon him)), which aims to realize a just and righteous financial infrastructure by which none of the parties involved are being disadvantaged.

Riba is first of all Haram because Allah has decided so. Scholars are not in total consensus whether the prohibition on riba is a rational ruling (*hukm mu'allal*), or a confessional ruling (*hukm ta'abbudi*). In either case riba bears intrinsically injustice and misuse.

Sadaqah means in the wider sense a voluntary contribution to a good end, such as poor people and the building of mosques. However, in chapter nine of the Quran the *sadaqah* means the obligatory alms which ought to be delivered to one or more of the eight defined groups of people, i.e. the zakat. When it comes to the zakat, this ought to be delivered only to Muslim receivers. When it comes to the *sadaqah*, this may be delivered also to non-Muslims.

I think that one of the greatest challenges and difficulties of adapting Islamic finances in the west is it's isolation from riba-bearing institutions. Although an Islamic financial institution would succeed in adopting non-riba systems, it would be very hard for it to not integrate within the web of other riba-

bearing institutions with which one is (almost always) forced to cooperate. We find for example the attempt made in the Netherlands where it failed given the tax-office which includes in itself *riba*.

One of the major disadvantages of Islamic finance in the west is the constitutional regulations which may make such a Islamic financial institution difficult to flourish. Additionally, the absorption of Islamic financial institutions within the web of riba -as stated earlier- makes it also very difficult to preserve a pure and isolated *riba*-free system. A third problem is the attitude of Muslims themselves (mostly wealthy Muslims) who do not work hard enough to realize an effective Islamic financial system, he thinks.

In order for Islamic finances in the west to be effective, he believes it should be more organized and more internationally structured, whereby these institutions seek cooperation with Islamic banks in the Islamic world. A second prerequisite is that there should be more promotion for it among Muslims in the west. Finally, and most importantly, there should be more intellectual academic Muslim economists in the west who may contribute to an organized and fruitful Islamic financial infrastructure.

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