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Work or Die?

How Wage dependency determines the production process

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Abstract

This paper deals with the rise of the firm in market societies and the fact, that the introduction of an outside option provides an alternative to wage dependency and is thus decisive for the production process. We examine the existing literature on Transaction Costs Economics in a Coasian tradition as well as a Marxian point of view on the topic. The two contrasting angles are based on the different focuses of the authors of the two currents, namely transaction costs and power relations between workers and capitalists.

We go on by taking a look at an experiment done by Bartling et. al (2012) that checks for the emergence of sales contracts versus employment contracts, the latter referring to the emergence of an employer-employee relationship, thus the emergence of a firm. In this experiment an outside option is included, which on the one hand influences the power relationship of the employer and employee. On the other hand, the amount of this outside option is also related to the amount of transaction costs needed to insure a profitable level of production. We state a model by Bowles (1985) to show how labour effort and transaction costs, as e.g. surveillance of employees are related.

We come to the conclusion that the existence and the amount of an outside option is a crucial feature to explain wage dependency and thus the production process. In situations in which the outside is well developed the existence of firms is best describe by the transaction cost motive. On the other hand, when the outside option is poorly developed, power relations determine the production process as Marglin proposes. Nevertheless the outside option has an influence on both, labour effort and transaction costs. We also state some considerations about possible empirical investigations of the argument for future research.

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Introduction

"Indeed, even the firm itself, a central economic institution under capitalism, plays no essential role in models of the competitive economy; it is merely a convenient abstraction for the household in its role as a producer and does nothing that households could not equally well do for themselves." (Marglin, 1974, p. 65)

This quote points to the striking fact that in mainstream economic theory the role of the firm and therefore the production process plays no central role.

Obviously, the existence of firms as economic entities comes as a puzzle to many economists. At the same time production in a firm structure is one of the main characteristics of modern day capitalism and therefore shapes our understanding of capitalistic production. Therefore, a critical investigation of the mechanisms determining capitalistic production is necessary to fill this gap in the prevailing economic theory. This paper contributes to the broad existing literature in providing a strong focus on the so-called outside option, meaning some kind of alternative to survive without having to enter an employment relation.

In the following chapters, we take a deeper look into the characteristics of the capitalist production process, in which the capital owner is the residual claimant and the boss. Motivated by an experiment conducted by Bartling, Fehr and Schmidt (2012), we want to explore the importance of the outside option for the system of production. By evaluating the role of the outside option for the production process, the question arised, whether the outside option is decisive for the existence of a firm and if so, what are the mechanisms behind it?

In order to assess this question we survey existing literature on the theory of the firm. In economic theory, there are two main currents dealing with the theory of the firm. The first follows the ideas of Ronald Coase's 1937 Paper in which he emphasised the role of transaction costs for production. This current, in the following referred to as the *Coasian tradition*, sees transaction costs as the determining factor for the emergence and survival of the firm as an economic entity. The second current follows the ideas of Marx, who emphasised the role of power and class conflict in capitalist production. In this tradition the most influential work regarding the theory of the firm comes from Marglin (1974). For emphasising the role of the outside option in the production process, we refer to these two currents and their main insights. Section 2 is dedicated to a comparison of these two views.

In section 3, we explore some theoretical and methodological approaches to outline the potential role of the outside options in economic models. We begin by surveying Bartling et al.'s (2012) experiment and highlight the role of the outside option in it. Depending on the amount of the outside option, agents are more or less likely to sign employment contracts, i.e. enter a hierarchical work relationship. We conclude that the outside option is a powerful tool to alter the decision framework of agents and principals. Furthermore, we analyse an analytical model by Bowles (1985) where the outside option is decisive for labour input and thus production. We stress that the outside option in the analytical model allows to accentuate the role of power in the production process. Depending on the outside option, the ability of the employer to exercise power is strong or weak. In other words, wage dependency gives rise to an unequal power position between workers and employers and is thus a major component in the determination of the production process. In addition, some minor considerations of the empirical validation of our proposed argument are outlined.

Section 4 concludes our observations and gives an outlook to potential future research.

1. The outside option

1.1. Outside options in reality

Before starting our analysis, some clarifications regarding the meaning of the outside option are provided. As stated above the outside option is some kind of alternative to work-income which reduces the dependency from wage labour. This alternative can take different forms, especially when considered over a longer time horizon.

In societies where family bonds are very strong and dominant, or where family production is a common mode of production, this source of non-work income (namely the family's means of living) may be considered as an outside option. The whole family works for the livelihood of each member. Especially in agricultural societies, this structure may have an essential character. In advanced economies, alternative structures of living like communes of self-subsistence or sharing-economies can be attributed to an outside option provided by a social network. Also, charity of any kind can be seen as outside option provided by a social, although less personal network.

Clearly, having some kind of property or capital that can be used profitably, like a piece of land that can be rented or planted for subsistence, is seen as an outside option to wage labour. While agricultural land is less relevant these days, other forms of capital can serve as an outside option. Finance capital and real estate for instance allow for capital income, which may render wage income less important or even unnecessary. Self-employment is seen to fall into this group of outside options, although regarding the precarious nature of labour markets the option of being self-employed needs to be evaluated cautiously.

For a major part of the population in advanced economies unemployment benefits or a means-tested minimum income are the first "outside options" that come to mind. These achievements have developed over time and improved gradually since their introduction in Europe in the beginning of the 20th century. To some extent they replaced the previously mentioned outside options provided by a social network. Although national differences a pronounced, most national governments provide minimal subsistence for those external to the labour market. Also, the currently highly debated unconditional basic income can be seen as a version of an outside option.

2. The theory of the firm

Two dominating currents will be reviewed and discussed regarding the theory of the firm. Firstly, views focusing on transactions costs, generally following the work of Coase. Secondly, views focusing on power, generally in a Marxian tradition.

2.1. Coase 's view of the firm

The central issue in Coase's seminal work "The Nature of the Firm" (1937) is to bridge a gap in economic theory which exists according to him between the relevance of the price mechanism for allocating factors of production and the role of the entrepreneur/co-ordinator in this area. Why do firms emerge in a specialized exchange economy? Coase claims that the

"distinguishing mark of the firm is the supersession of the price-mechanism" (Coase, 1937, p. 389).

He rejects the description of an economic system that is working by "itself", meaning by the price mechanism. The price mechanism is not the only defining feature for the direction of resources; rather it is influencing it indirectly through a coordinating force, the entrepreneur or co-ordinator. The question is why such coordination apart from the price mechanism is necessary. In his view firms arise voluntarily thus there needs to be some kind of advantage in organising production in a "master-servant" rather than a "client-contractor" way. This advantage lies in the avoidance of transaction costs[1]. The main part of transaction costs, the contracting costs, can be strongly reduced, yet not eliminated by the firm. In place of a number of different contracts comes the labour or employment contract. This contract is characterised by obedience (in certain limits) for remuneration where merely the general terms are agreed upon. It allows the buyer (the employer) to decide on the actions the seller (the employee) should follow, which depending on the time horizon might vary significantly.

This is the main essence of Coase's view of the firm. In the Coasian tradition Alchian and Demsetz (1972) focus on transaction costs in their important mainstream contribution to the theory of the firm. However, their work concentrates on the problem of supervision.

2.2. Alchian and Demsetz and the problem of metering

Alchian and Demsetz compare the relationship between an employer and an employee to the relationship between a grocer and a consumer. They deny the role of power as being a decisive

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[1] In this case, transaction costs are costs caused by using the price mechanism. According to Coase the two main types of costs are those of "discovering what the real prices are" (Coase, 1937, p. 390) and negotiation and contract costs.

characteristic of the firm. A grocer does not have much power over the consumer as he cannot tell him what and where to buy. On the other hand the consumer cannot tell the grocer what to sell. An employer has just as much power as a purchasing consumer does.

> *"Telling an employee type this letter rather than to file that document is like my telling a grocer to sell me this brand of tuna rather than that brand of bread."* (Alchian & Demsetz, 1972, p.777).

According to Alchian and Demsetz the pivotal characteristic of the firm and the capitalist system lies in the nature of the production process as being a team use of inputs. Further this team use of inputs requires a centralized party making contracts with all the other team members.

In their theory the metering - meaning measuring but later on also apportioning - of productive effort or input productivity respectively and of output is crucial for the success of an economic organization. By linking productivity positively to reward it enhances the use of comparative advantages. Alchian and Demsetz argue that if reward is not tied to productivity, there will be no incentive to be productive and therefore economic organization sabotaged. The authors take the example of market exchange on a competitive market as being a type of economic organization and infer that in many situations it does well with the metering problem.

> *"This method of organizing economic activity meters the output directly, reveals the marginal product and apportions the rewards to resource owners in accord with that direct measurement of outputs."* (Alchian & Demsetz, 1972, p. 77)

The existence of such a mechanism is already assumed by the usual deduction from marginal productivity to income distribution. But according to the authors the problem of metering has only been dealt with indirectly in classical theory, "as if productivity automatically created its reward" (Alchian & Demsetz, 1972, p. 778). Alchian and Demsetz think that the causation is reversed, productivity is stimulated by the "specific system of rewarding" (Alchian/ Demsetz, 1972, p.778).

The metering becomes a problem when dealing with team production. The authors take the example of two men lifting heavy cargo into a truck. If one just observes the output, it is hard to infer the contributions of each man. The output Z is produced with at least two inputs X_i and X_j. The function is not separable into two production functions using only X_i or X_j respectively. Therefore, the team product Z cannot be treated as a sum of two separable Z^2. It will be produced in a team if the so

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[2] This can be illustrated by the inequality $\delta^2 Z/\delta X_i \delta X_j \neq 0$ meaning that the marginal productivity of X_j and X_i is dependent on X_i and X_j respectively. In the case of a separable function, let's say $Z=aX_i + bX_j$, which can be separated into $Z_i=aX_i$ and $Z_j=bX_j$, and $Z=Z_i + Z_j$, the marginal products would not be dependent on the other input factor, hence $\delta^2 Z/\delta X_i \delta X_j=0$. Such a case would not represent team production according to Alchian and Demsetz.

achieved output is greater than the output produced by each team member alone and can compensate for the costs of organizing the process.

As it does not suffice to merely observe the output to derive productivity metering the reward is costlier than without team production. The authors also assume that not all input factors are owned by one person, creating an additional difficulty for cooperation.

As the output Z is inseparable, the market mechanism can only reveal the marginal product of the team as a whole. According to Alchian and Demsetz this calls forth new methods of organization. Productivity could be assessed by observing the behaviour of inputs. If observing was costless, then there would be no incentive for shirking as no one could impose the costs associated to it on the others. In case of team production metering comes with a price and therefore the incentives to shirk are positive. Both income and leisure enter the individual's utility function. In team production, the cost of leisure is smaller for an individual than for the team, because he or she is not taking into account the effects of his or her choice on the team. Therefore, the individual will consume more leisure than would equate the marginal rate of substitution of leisure and income for the whole team and the therein caused costs fall on the team as a whole.

> *"The difficulty of detecting such actions permits the private costs of his action to be less than their full costs."* (Alchian & Demsetz, 1972, p. 780).

The authors continue and state that with costs of monitoring only the marginal gain of detection is going to be equated to the marginal costs of it. Consequently, there is a certain range for shirking. Nevertheless, people would prefer to work in an efficient team – realizing more pecuniary income and less leisure - were monitoring and detection costless.

The authors state that the market could help with this through competition. If competition is strong enough the threat of being replaced by another person which is offering the same input but for a lower share of the reward, is effective enough to decrease shirking[3]. However, Alchian and Demsetz refer to two problems. First, the new incumbent would need a lot of information about the degree of shirking. Second, as the incumbent would accept a smaller share his or her incentives for shirking are the same or bigger than those of the replaced one as he or she still does not bear the full costs of shirking.

The solution of Alchian and Demsetz offered to the problem is a centralized monitoring party. A specialized monitor could dedicate his or her time entirely on detecting shirking. Again, there is the problem of shirking monitors and again market competition could not solve this issue. Therefore, there

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[3] This issue is going to be discussed more extensively in chapter 3 in regard to the reserve army proposed by Marx.

needs to be an incentive for the monitor to do his or her work properly and enhance effort and productivity. This incentive is offered by making him or her the residual claimant. It is in his or her interest to keep output high. The monitor will get the surplus that results from the reduction of shirking.

The authors propose several tasks performed by the monitor:

> *"measuring output performance, apportioning rewards, observing the input behaviour of inputs as means of detecting or estimating their marginal productivity and giving assignments or instructions in what to do and how to do it"* (Alchian/ Demsetz, 1972, p.782)

and

> *"authority to revise and terminate contracts"* (Alchian/ Demsetz, 1972, p.782).

They state that the assignment of instructions is a way to measure the marginal productivity of inputs. The authority for dealing with contracts is important for disciplining members. Therefore, those members that truly want to be productive voluntarily make the monitor the residual claimant, including the power to terminate and revise contracts individually. In addition, the monitor can sell his or her residual claimant right.

All of this arises from Alchian and Demsetz' analysis because such a centralized party can deal better with the "shirking-information problem" (Alchian & Demsetz, 1972, p.783) than the non-centralized contractual arrangement does. They term the monitor the "owner" of the firm and state that the owner and the employee enter a pure sale and purchase relationship, where contracts can easily be terminated. Therefore, neither long-term contracts nor "authoritarian" characteristics are a crucial characteristic of the firm according to them.

Taking the three prior assumptions that pecuniary and non-pecuniary wealth enter into the utility function, that team production brings an increase in productivity and in this team production it is hard to measure the marginal product via the output hence via the market, and that productivity can be metered by observation of input behaviour but with a cost, leads to the

> *"contractual organisation of inputs known as the classical capitalist firms with (a) joint input production, (b) several input owners, (c) one party who is common to all the contracts of the joint inputs, (d) who has rights to renegotiate any input's contract independently of contracts with other input owners, (e) who holds the residual claim, and (f) who has the right to sell his central contractual residual status."* (Alchian/ Demsetz, 1972, p. 783).

In strong contrast to the view proposed above stands Marglin, who puts power in the focus of his theory. In the following his ideas are reconstructed.

2.3. Marglin and capitalism

In his 1974 work "What do bosses do?" The Origins and Functions of Hierarchy in Capitalist Production" Stephen Marglin tries to answer the question why firms (in the sense of a hierarchical order) came to be the main form of economic organization. Unlike Coase or Alchian and Demsetz who assess the question on rather theoretical grounds, Marglin concentrates on a historical perspective using a lot of empirical (anecdotal) evidence for his theory. In the following we are going to focus on the plain theory developed in the paper and do not report all the evidence. For those details see the paper.

Central to the discussion is whether technology or society determines work organization and if hierarchy is essential for economic prosperity. By reproducing Marglins ideas, we are trying to answer if hierarchy and efficiency are related.

Marglin starts by stating that neither hierarchy nor the social and technical division of labour are phenomena distinct to capitalism. They have existed before. What came to be distinct was the extreme division into minute and quite specialized tasks. The difference between the guild division of labour and the capitalist one is that in the former the worker had control over the process and a product to sell at the end. In the latter case, he or she was not able to sell his or her product at a market and therefore there was the need for an intermediary.

Adam Smith believed that the division of labour into specialized tasks served efficiency reasons; it came about because it was technologically superior, meaning producing more output with the same amount of inputs. According to Marglin, the specialization and separation of tasks actually was not technologically superior and there must have been some other reason for them to be a characteristic of the putting-out system[4]. He finds this reason in the need of the capitalist to have an essential role in the production process for securing profits. Otherwise, if the tasks performed by the contractors were neither separated nor specialized they would have had the knowledge and capacities to sell their products at the market independently of the capitalist. By taking the role of the integrator and intermediary to the wide market he or she stayed essential in the production process. Marglin concludes that the putting-out system was dependant on the capitalist and this dependency was artificially created. The division of labour was therefore crucial for the hierarchical order of society and for strengthening capitalism.

> "In manufacturing industry (…) specialization has continued to sustain the illusion that hierarchy is necessary for integrating the efforts of many into a marketable product" (Marglin, 1974, p. 78).

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[4] The putting-out system is a system of production in which the capitalist advances raw materials to the workers. The intermediary product is then produced by workers at their home and then collected again by the capitalist who puts all the intermediary products together into a finished product.

Overall the author summarises his thoughts under the title "divide and conquer" which stands for the system applied in ancient Rome as well as in capitalisms division of labour.

Marglin describes the example of the British coal industry to demonstrate that when there was no challenge to the role of the capitalist ("the scarcity of coal seams and the institution of private property ensured workers would not dispense with bosses." (Marglin, 1974, p. 74)) no minute specialization took place. The sure property rights and the lack of alternative production sites due to the scarcity of coal seams secured the position of the capitalist in the production process. Therefore there was no need for creating an artificial role. And indeed, in the coal industry every man, or at least a small team, Marglin argues, knew all the steps and was capable of doing the whole process.

It is argued that property in form of expensive machines, as being alike the property of coal seams, might have contributed to the role of the capitalist in industrial capitalism . However, this role became more pronounced over time - in the early stages of industrialisation machinery was not too expensive and could be afforded by workers.

Along with the specialization and the putting-out system came the wage advances. Marglin states that these secured the dependency of the worker on the master and therefore obliged him or her to produce for the intermediary market. Nevertheless, embezzlement was a problem under the putting-out system[5]. Embezzlement hence was another reason for the "rise of the factory" (Marglin, 1974, p. 81). The writer argues that by the putting-out system with minute specialization only output could be controlled, but control over the work-process was not achieved. Although he does not give a definition of a firm from the reading of the paper it can be assumed that by factory Marglin means the gathering of workers in one place for production proposes. As stated above this enabled control over the work process.

Other authors discussing the industrial revolution and the rise of the factory ascribe major importance to the new sources of energy and machinery that made gathering of workers necessary (Marglin, 1974, pp. 81-83). Nevertheless, they acknowledge that discipline and supervision did also play a role. Marglin assess this point by saying that the concentration on the technological superiority of the factory comes out of neoclassical theory. The fact that the factory survived means that it must have been less costly than alternatives. Neoclassical theory suggests that under perfect competition the least-costly method is the most efficient one. In contrast, the acknowledgment of the role of discipline and supervision contradicts the assumptions of perfect competition (as in the perfect competition model only the market can exercise supervision and discipline).

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[5] Marglin argues that this was one of the reasons why only cotton was planted in the South of the USA after the war. It could not get eaten by the planter himself or herself nor sold elsewhere. Again, it was not technological superiority of the cotton but a choice of interest.

Marglin states that the factory was a mean to restrict the workers' control over the production process by giving it to the capitalist. In doing so the process became less costly but not technologically superior. He describes that by putting the workers all in one place and therefore controlling for the hours worked and their discipline profits could be increased[6].

Nevertheless, Marglin does not deny the importance of technology. He reverses the argument. Instead of saying that technology was the reason for the emergence of factories and the fruits of discipline and supervision it's consequences, he states that the technological change was channelled by factory organization. The main reason for the existence of factories was the need for increasing profits through "breaking" the workers' habits and imposing supervision and discipline on them. The motive for technological change to be favourable to factory organization is found in the system of rewarding inventions – the patent system. As patents are easier to enforce in factories than if production is not concentrated, inventions were channelled into this market. But again, Marglin argues that the institutional arrangement of the patent system was not given per se but rather was convenient to the capitalists. If wanted, there would have been other ways to remunerate inventive activity.

> *"Had the patent system not played into the hands of the more powerful capitalist, by favouring those with sufficient resources to pay for licenses (and incidentally contributing to the polarization of the producing classes into bosses and workers), the patent system need not have become the dominant institutional mode for rewarding inventors."* (Marglin, 1974, p. 90).

The paper then discusses why putter-outers wanted to improve discipline. As wages rose in England, the workers chose to work less but consume more of their leisure. This worked out for them but was not as good for the putter-outer. He ascribed their choice to laziness and ignorance although it was a merely "rational" according to their preferences. So, they had to change the choice.

"Capitalists' interest required that the worker's choice become one of whether or not to work at all – the only choice he was to have within a factory system." (Marglin, 1974, p. 93).

Marglin continues by stating that the factory system indeed yielded more profits, but it was not more efficient than the putting-out system ("…at least not until technological change was channelled exclusively into this mould" (Marglin, 1974, p. 95)). It did produce more output – but with more input.

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[6] As anecdotal evidence, Marglin cites the case of Wyatt and Arkwright. Both invented a spinning machine without hands and both tried to make profit out of it with the difference that Wyatt had made the invention and tried to use it several years before but failed due to the problems of organizing the workforce. In weaving the same technology was used either in cottage production or in handloom shops. Although the same technology was used, Marglin concludes, it must have been profitable for the owner to organize the workforce in one place. Even if in some places water power has been used, this was not the case in general. Marglin stresses the fact that they preferred to work at home and were somewhat in resistance against the shops.

Workers did not choose this system of production unless there was no alternative. Marglin finds evidence that when there were alternatives people tried to make use of them instead of working in the factories[7].

The question why the factory system - when having nothing to do with technology - was not introduced earlier, Marglin answers by pointing to power relations. He states that factories have in fact existed before the advent of the industrial revolution, e.g. in the Roman Empire where workers were mostly slaves. The free men were powerful enough to sustain a guild system. He further argues that those guilds then also used the "divide and conquer" concept to forge alliances and prevent factories by making use of divisions between more powerful classes. The guild system turned into the putting-out system because it was more profitable for the intermediaries and because the profits gave political power to them. At the same time, it was purely transitional, Marglin states.

In conclusion, answering the question whether efficiency and hierarchy are related, Marglin claims that the firm is characterized by power relations and a strong hierarchy that has little to do with technological superiority but rather became the least costly way of producing by history and time.

"The steam mill didn't give us the capitalist; the capitalist gave us the steam mill." (Marglin, 1974, p. 104).

In Marglin's account the important idea is the one of power. There is a group of people that did historically come to some power and now wants to enhance their advantages. Their only qualification is that they own capital, which is needed in production. Other than that, they do not have qualifying skills which obliges them to settle in a position different from team member. And they do by being putter-outers and later on owners of factories. Through those mechanisms they secured their positions in society. On similar lines, Varoufakis (2008) argues that wage advances disguised their exploiting positions for no one to see. By paying the workers in advance, workers lost control and idea over distributional issues, and it made the capital owners the residual claimants. Obviously, this description of capitalism stands in a strong Marxian tradition, who described precisely that workers became alienated from the production process. Marglin is exploring the means.

2.4. Comparing remarks

We now compare some points of the different views of the theory of the firm described above. All works under consideration deal with the question why firms emerged in the capitalist society. The first two approaches identify reasons why an organization in the form of firms did emerge. But according to Duda (1987), the Coasian explanation does not state specifically that it needs to be a capitalistic

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[7] If there was a choice at all it merely existed for the male adult, women and children did not have such a choice.

one, meaning that the owner of the capital is the central party. Coase's (1937) theory merely explains why firms emerge in a specialized exchange economy; he is not giving account of capitalism per se. It seems to him that it does not matter whether e.g., workers get a share in profits. The important aspect is the integration of the production process and the special contract characterized by hierarchy and authority (Duda, 1987). In contrast, Alchian and Demsetz (1972) claim to describe the capitalist firm. Marglin (1974) in his theory concentrates on two historical steps - the putting-out system and the firm. Both are defining parts for the capitalist production system. Table 1 provides a brief contrast of the ideas as pointed out above, featuring the most important notions.

	Coase	Alchian/Demsetz	Marglin
Economic tradition	Transaction costs economics	Transaction costs economics/neoclassical	Marxian
Distinct feature	Transaction costs (TC)	Shirking (transaction costs)	Power relations
Starting point	Specialized exchange economy	Team use of inputs	Exchange economy
Problem	Transaction costs through price mechanism	Failure of market organization	Missing role for capitalist
Advantage of the firm over market	Reduces TC → more efficient	Reduces shirking (TC) →more efficient	Giving role for capitalist (more efficient over time)
Power through employment contract?	Yes	No	Yes
Supervision	-	Agreed upon voluntarily	Through coercion
Idleness	-	Inherent in human nature	Created through system of production

Table 1: Comparing notions of Coase, Alchian and Demsetz and Marglin, own representation

For further comparison we concentrate on Alchian and Demsetz (1972) and Marglin (1974), because of their treatment of supervision. Alchian and Demsetz aim at detecting the functions an economic organization needs to fulfill in order to be efficient. They concentrate on a system of production called team production, which they also take as their starting point. By considering transaction costs they stand in a Coasian tradition. Marglin specifically aims at explaining the firm in context with capitalism. Therefore, his starting point is one in which capitalism was not too prominent. The motivation for the existence of firms in his theory is the capitalist's aim to accumulate power. In both accounts, there seem to be similarities.

The role of supervision, motivation and productivity is decisive in both, although it is perceived differently. In Alchian and Demsetz the problem of shirking is one indirectly produced by the mode of production, but it seems to be inherent in human nature. People do shirk because they do not take

into consideration the full social implications of their doing. In Marglin people also seem to value leisure, but it is the capitalist that wants to see them more productive to enhance his or her profits. Now in Alchian and Demsetz the supervision is requested by the team members in order to foster productivity, meaning that they agree voluntarily to be supervised. In Marglin control is imposed by the capitalist to secure his or her power. And it is not at all wanted by the workers. By a reduction in alternatives (outside options) they are forced to work in the factories. Supervision in Alchian and Demsetz is installed, but again the supervisor does have shirking problems, that is why he or she needs to have a right on the residual.He or she is given additional rights in order to ensure the productivity of the supervisor. What ends up being an efficiency enhancing tool in Alchian and Demsetz view is, when considering Marglin, pure exertion of power. According to the latter, those rights are not given to the capitalist but he or she took them and ensured them by means of capital, although with some he or she was initially endowed with. Those rights, over all the residual claimant status, according to Alchian and Demsetz do have nothing to do with power, rather they are granted voluntarily. They describe the capitalist meant by Marglin without stating so and claiming that their theory is free of power issues.

Another important issue is the employment contract. In Marglin's view the contract (wage advances) plays a crucial role in obliging workers to produce. In contrast Alchian and Demsetz view the employment contract as one no different than from a sales contract.

Against their perception Simon (1951) emphasises that unlike "normal" sales contracts, an employment contract always implies a certain relationship between the employer and the employee. In Simon's paper, this is already referred to as an authority relation, because the employer is the one to choose a behaviour or task for the employee out of a set of behaviours. If the employee executes the chosen task, he or she is accepting the authority. The employment contract therefore is concluded if the employee's behaviour is determined by the employer and the latter pays some wage w to the former for the execution of the task. Fundamentally different to that, a sales contract is concluded over an a priori agreed task or service to a known price or any other consideration. Simon shows that there exists a region of bilateral acceptation of a certain task x to execute for a certain wage w. If the employee knows about the task and he or she can demand a price that compensates him or her for the costly execution of the task the two will end up at a typical sales contract.

The structure of an employment contract is essentially different in just one feature: Uncertainty. If the employee signs the employment contract for a given wage w, he or she does not know by now which task to execute in the future. We imagine the most probable procedure, where the employee can choose his or her utility maximizing task from a predetermined subset of tasks chosen by the employer. If the task is executed by definition an employment relation of authority occurs. In other words, the

employee's expectations about what task the employer is going to delegate to him or her do matter (Simon, 1951, pp. 293-302).

One can easily see the advantages and disadvantages of these two types of contract. On the one hand an employment contract yields higher flexibility and the tasks can be adapted faster to new information or circumstances. Imagine that employer and employee would have to agree on a sales contract for every single task to grasp the complications inherent in a sales contract. On the other hand, the employment contract results in a moral hazard problem of the employer, as he could choose a task for the employee, which the latter would like to reject, but which still would have to be executed (Simon, 1951, pp. 293-302).[8] [9]

In summary it can be argued that Alchian and Demsetz take team production (the mode of production) as given, deduct through the motive of transaction costs social relations and somehow a legitimization based on efficiency for power relations. Whereas Marglin states that capitalism is endogenous and was installed through power relations, he deducts from the social relations through power mechanisms the capitalistic production system.

Conclusion

What did we learn from this chapter? We gained some insight into the theory of the firm, which is the basis for understanding the importance of outside options. The difference between the ideas of transaction costs and power being decisive for the firm were highlighted. It can be concluded that through their interaction with transaction costs and power they might be important. However, in order to give a certain answer, we have to highlight the problem from different angles. That is why in the next section we are going to explore some empirical evidence from an experiment conducted by Bartling, Fehr and Schmidt (2012). Together with the third chapter, where we analyze a model made by Bowles, we hope to get a comprehensive understanding of the matter.

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[8] Some of the remarks made about the employment contract are going to be quite important for the discussion of the experiment in chapter 2.

9 We consider it important, to address some other points of Alchian and Demsetz' work here. Duda (1987, pp.71-74) argues that their reasoning is not quite sound. The main argument relies upon the fact that it is not clear why the supervisor should be the residual claimant. It could also be possible that team members share the profit without reducing the incentives for cooperation. Furthermore, through the hierarchy of control that is inherent in big capitalistic firms the residual is divided and therefore the incentive might be diminished for the supervisor. In their argumentation, the residual claim is necessary to make sure that every team member is rewarded according to his or her productivity. If the supervisor does his job properly there is no residual left, as everything is distributed according to marginal productivities and the supervisor does not add to the product directly. At another point Alchian and Demsetz argue that the supervisor will get the fruits of improvement he brings about. If he does the merit of diminishing shirking is not compensated for and the question arises why team members would then want to be controlled (Duda, 1987, pp.71-74).

For a critical discussion of Marglin's paper see the reaction of David Landes (1986) "What do bosses really do?" regarding his work.

3. Methods and analysis

In the following three different approaches to discuss our research question are presented. The first one will deal with experimental economics discussing a paper by Bartling et al. (2012). Then model theoretical approaches will be highlighted in section two and a model by Bowles (1985) presented. The last section deals with considerations concerning the empirical valuation of the theory of the firm in order to empirically determine potential theoretical derivations from our argument and to estimate the operationalizability of it.

3.1. The emergence of the firm in an experiment

In this section we summarize briefly the work by Bartling et. al (2012) to give an insight in potential experimental applications of outside options in economic analyses. Although their main goal was to show that employment contracts (and thus firms) arise in situations where one might not expect them. They construct an experimental framework that leaves individuals with the decision: Either they agree on a sales contract (fixing the terms and setting a price) or they choose an employment contract that gives them more freedom but will also lead to a moral hazard problem (e.g. shriking). Bartling et. al try to give experimental evidence for the rise of a firm (of an employment contract). They refer to both views presented in the first section. They indicate different forms of transaction costs in their experiment but are also very aware of the implied power relation as they follow Simon's (1951) definition of an employment relation.

Simon (1951) emphasised that unlike the classic sales contracts, an employment contract always implies a certain relationship between the employer and the employee. This is always a relation of authority due to uncertainty about the future. In Bartling et. al (2012) experimental proof of the importance of such an (abusive) employment relation is given. Bartling et. al investigate the trade-off between the high transaction costs associated with sales contracts and the moral hazard problem associated with employment contracts. Their main question is if employment contracts do arise despite of moral hazard problems and if so under which conditions.

One of these conditions is the opportunity for the employee to walk away from the experiment, receiving a fixed amount of reward, without signing any contract. We call this the outside option. Its existence is crucial for the formation of this special relation between employer and employee, as well as for the outcome of the experimental evidence. Nevertheless Bartling et. al did not mention this outside option in a specific way, neither emphasised their importance.

Due to the very different focus of our work we will not go into detail about the experimental outcomes and different conclusions Bartling et. al draw in their paper. They do various prediction of self-interest-model of individuals versus social preference models and support their thesis with the experimental outcomes. What we will try to do instead is to emphasise the importance of the outside option for the experiment

Bartling et. al proceed as follows: At first a principal (employer) decides whether to offer a sales or an employment contract to an agent (employee). If the agent accepts the sales contract, a clear and known task has to be executed to obtain a predefined wage. This might still be inefficient ex-post as different states of the world have different costs of task execution. If on the other hand the agent choses to sign an employment contract, the principal can choose the task to be executed after knowing the state of the world. This gives the principal higher flexibility but at the same time gives him or her power to choose a task to be executed by the agent. This is the principal exerting authority over the agent– hence exploit the agent (Bartling et al., 2012, pp. 1-5).

When it comes to uncertainty, expectations formed on experiences in the past might be the key feature. It is already mentioned by Simon (1951, p. 302) that there's a difference in long-term and short-term rationality when choosing a task/a contract. In the short run (or with one-shot games) the employer might choose the profit maximizing task. But as soon as a certain social relationship is established the employer might choose to satisfy the employee with a less costly task for cooperation motives. This is referred to as long-term-rationality. He even states that when a social relationship is built both players could be better off.

"We might say that the latter behavior represents 'short-run' rationality, whereas the former represents 'long-run' rationality when a relationship of confidence between employer and worker can be attained. The fact that the former rule leads to solutions that are preferable to those of the latter shows that it 'pays' the employer to establish this relationship." (Simon, 1951, p302)

To check for two different forms of rationality, Bartling et. al assign ID's to the participants of the experiment. One time all ID's where fixed and known by the others (treatment "FIXED"), meaning that an agent could recognize a principal who exploited him or her or who was well treating in a previous round of the game. In a second run-through, all ID's were randomized (treatment "RANDOM"), meaning, that the principals behind the number could not be identified by the agents and vice versa.

If all individuals are assumed to be rational and self-interested the number of employment contracts chosen by the participants in the experiment "RANDOM" should be close to zero, because there's always a preference to exploit others to gain higher profits for oneself. Fully rational agents would anticipate this in their wage-consideration and would only accept the employer's contract at a

relatively high wage, which compensates them even for the costliest task possible in the experiment. This however would be inefficient (by construction of the experiment), so the principal would never offer an employment contract with a wage of such amount. Furthermore, even in treatment "FIXED" participants play the game for a finite number of periods. Even if principals act fair according to long-term-rationality, fully self-interested individualism of participants would also mean that employment contracts should vanish over time. Especially when the game comes to an end, it can be assumed that the number of employment contracts signed collapses (finite number of periods).

In the experiment however, even in treatment "RANDOM" employment contracts appear. One explanation for this phenomenon is the concept of fair-minded individuals. Fehr and Schmidt show (Fehr/ Schmidt, 1999) that fairness motives and social goals affect the behaviour of people.

In the experimental framework employment contracts were popular among principals, either selfish or fair-minded. Also, agents trusted their principals and gladly took the employment contract offered. Throughout the experiment, as the rate of power abuse rose (meaning that they broke their promises on which tasks agents had to implement after signing the contract), fewer and fewer employment contracts were accepted by the agents. Close to the end of the game, the share of employment contracts has shrunk to 40%, leaving the majority of agents with sales contracts.

Interestingly, employment contracts did not vanish completely even though power abuse increased. Again, the concept of some fair-minded principals that keep the agents' trust alive offers an explanation. The authors double-checked with a third control treatment, referred to as "UNFAIR". In this setting principals were forced to impose the costliest task on the agents in 80% of the cases (by construction of the experiment). Further this is common knowledge, so also the agent knows that he or she is going to be treated unfair in a vast majority of cases. Indeed, the number of completed employment contracts in this setup converges to zero. On the contrary, in treatment "FIXED" almost 80% of contracts signed, where employment contracts.

Referring to Simon (1951), the establishment of a long-term relationship is preferable. With the agent's threat to end this relationship he or she can discipline the principal in a way that an end of the relationship would reduce the principal's future profits. We can see that both parties would have an interest in building a fair and stable, log run relationship. However, there is the need for considering the existence of an outside option in this experiment, because the possibility for the agent to "walk away" from the contract strongly depends on the opportunities that are left for him or her. Without any outside option it might be the only choice for the agent to let the principal exploit him or her.

A closer look at the efficiency considerations of Bartling et al. reveals their reference to Coase's transaction cost approach. First, rejected offers of contracts yield some opportunity costs for non-

trading. Second, sales contracts generate less profit because they are not so flexible. Third, the principal can implement an inefficient task on the agent after signing an employment contract. In the treatment "RANDOM" no clear statement about differences in transaction costs can be made, where treatment "FIXED" shows an overall lower level of transaction costs caused by employment contracts vs. sales contracts.

They show how the level of transaction costs is directly related to the probability of employment contracts to appear, thus to the probability of a firm to arise. The authors identify two behavioural strategies as the driving forces: Reputation building and fair-minded behaviour of principals.

"Viable authority relationships under employment contracts thus arise endogenously as the dominant mode of governance only when both principals' fairness preferences and reputation building mechanisms are present." (Bartling et. al, 2012, p 4)

Through the construction of three different treatments as outlined above the authors are able to isolate the effect of costs of integration. It allows them to offer causal evidence of the effect of transaction costs on the rise of a firm. Further, their contribution to Transaction Costs Economics is different to existing literature as they identify behavioural forces that influence the amount of transition costs that further negatively influence the rise of a firm.

We can detect the fundamental importance of the different viewpoints of Coase and Marx as discussed in Section 2 at this point. We would also like to mention at this point that the work of Bartling et. al cannot be compared directly to Alchian/Demsetz's propositions. They suggest complex and various forces of behaviour that influence the relationship of workers to employers that is very different than a "simple" relationship of a grocer to a consumer.

Also, we can postulate that the degree on which an employee is willing to let the principal exploit him or her must crucially depend on other options the employee has. In short, who would ever let themself be exploited if not out of a very futile situation? This led us to conclude that the outside-option is one of the most important features of this experiment, which needs to be elaborated upon.

3.1.1. Experimental setup and the role of the outside option

The experimental structure is as follows (Bartling et al., 2012, pp. 6-19): The principal can offer either a sales or an employment contract to the agent. The agent, in a second step chooses to accept or to deny the contract. When signing an employment contract, the task for execution is just reviled after the conclusion of the contract. If the commanded task is executed the agent receives a certain wage *w*. The principal receives revenue for the executed task but also has to bear the cost, leaving him or

her with a profit of revenue minus agent's wage. The agent income at the end of the day would be wage minus cost of task execution. In the following Table 2 summarises the different costs and revenues for both the agent and the principal for two different states of the world.

		Task 1	Task 2	Task 3
State 1	Revenue	160	80	190
	Cost	0	40	130
	Surplus	160	40	60
	Principal's profit	160 – wage	80 – wage	190 – wage
	Agent's income	wage	wage – 40	wage – 130
State 2	Revenue	30	200	230
	Cost	0	40	130
	Surplus	30	160	100
	Principal's profit	30 – wage	200 – wage	230 – wage
	Agent's income	wage	wage – 40	wage – 130

TABLE 1— Tasks, States, and Payoffs.

Table 2: Tasks, States, and Payoffs (Bartling et al., 2012, p.7)

Task 3 is by design inefficient, independent of the state. If we think in terms of fully rational, self-interested individuals, principals will always choose task 3 with revenues of 190 in state 1 and 230, respectively (table 2). Rational agents anticipate this in their wage considerations and will only accept a wage that compensates them for the costly task 3 (130 in every state) and the opportunity costs of 30 (which is the outside option). The principal however will never offer an employment contract at a wage of 160, which leads the fully rational individuals to the conclusion of a sales contract for task 2, at a wage of 70[10].

So even if task 3 provides revenues of 190 and 230 for state 1 and 2 respectively, the high costs of 130 for the agent will lead to inefficiency. Further we can derive from this table the most efficient tasks. For state 1 task 1 is optimal, in state 2 the efficient task is task 2.

By design, an employment contract always yields a moral hazard problem, as the principals are asked to announce a non-binding suggestion of which task the agent will have to execute after signing the employment contract (In contrast, the sales contract gives the agent clear information on which task to execute later). This is asymmetric information about which task is demanded by the principal after signing the contract. (in vague terms, if the principal keeps his or her promise or not). Furthermore there exists another situation of moral hazard at a later point in time. When the contract is signed and

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[10] This equilibrium can be derived by backward induction but cannot be supported by the empirical evidence of the experiment.

the task for execution is selected, the agent can decide how much effort he puts into the completion of the task. We already mentioned this phenomenon of shirking in the first section, when dealing with transaction costs and teamwork. The more agents shirk the more surveillance of the worker is needed, to guarantee profits for the principal. This surveillance is costly and thus part of transaction costs. Please already note at this point that surveillance is an important part of transaction costs in our discussion, even if not the only form of costs. A more detailed discussion about the correlation of labour effort, surveillance and transaction costs is given in section 3.

The employment contract however, allows to adapt to the states of the world flexibly and to assign the agent the most efficient task in either case. But, and this is Bartling et al.'s object, the principals can also choose to instruct task 3, which would give him or her the highest revenue, but would imply high costs on the agent. This is their measure the abuse of power.

Not listed in the table, but one of the main characteristics of the experiment is the outside-option for agents. If an agent for any reason does not sign a contract, he or she will still receive an amount of 30 (If principals do not sign a contract their profit is zero). This might not seem important at first sight, but we claim that the existence of this outside-option and its amount is a crucial feature for this experiment to work and that we can further derive the degree of power executed by variation in this outside-option.

The authors state some critical reflexion on their experiment, for example the solution of introduction of task-dependent wages or renegotiation of the contracts after the state of the world is revealed. But they miss out on stressing the importance of the construction of this outside-option for their experiment as well as in the derived conclusion. Given the possibility of an outside option (and the amount given in case of taking it) defines the employment relation in a whole different way (Bartling et al., 2012, pp. 11-12).

In this experimental setup, the outside option is an important tool to alter the decision framework for agents. Imagine that the agent gets a wage smaller than 160 and is urged to execute task 3, leaving the agent with a gross income of less than 30. In this case, the outside-option would be more profitable for the agent giving him or her a payoff of 30. More generally, if the offered wage in any contract is lower than the outside option of 30 units, it is reasonable to suggest that the employee will reject the contract offer. In Bartling et al. it is assumed that even in that case, if the employment contract was signed a priori the agent still has to execute task 3. Reasons the authors state, are the cost for searching for a new job or the possibility of the principal to sue the agent for infringement of contract (Bartling et al., 2012, pp. 12-13). But the example clearly shows that the outside-option is a real alternative to working (or signing a contract) for the agents, giving them a way out of the dilemma. It is questionable

if the same outcome as in treatment "UNFAIR" would be generated if there was no outside option. Would employees still reject employment offers, if their life depended on potential wage income? Probably not. Presumably, employers would only offer employment contracts and the employees would accept them because the potential income is necessary to stay alive. Indeed, employment contracts then would still appear, even if abuse is predominant. On the other hand, with a good outside option the agents' decision framework would look differently. As can be read off **Fehler! Verweisquelle konnte nicht gefunden werden.**, in case of task 1 in state 2, the given outside option would be preferable to the employee. With an even higher outside option of, say, 100 units instead of 30 units, the outside option would be preferable to the employee in even more cases. This very high outside option would hinder the employees to sign employment contracts due to the threat of power abuse. But since employers only get some profit if a contract is executed, they would then need to offer more sales contracts. In other words, the emergence of a firm structure is then less likely.

Certainly, these presumptions are highly speculative and based on the idea that employers indeed would abuse their authority if there was no threat of endangering a long-term employment relation. It is certainly worth controlling for the influence of the outside option in further experiments to get a better insight in the employment relationship.

3.1.2. Caveat

Although experiments give some interesting insights in the behaviour of individuals their external validity can be questioned. First, the experimental setup is always constructed to point out a certain phenomenon. Second, the psychological motivations for individuals when selecting their strategies might not be reveiled in an experimental framework. Therefore, an experimental analysis of the role of the outside option only allows for minor insights in the matter. However, it can serve as a first step towards a better recognition of the role of power relations in experimental economic analyses and economic theories as a whole.

3.2.   The Role of the Outside Option in the Production Process

In an experimental set-up, the outside option is an important feature to ensure an acceptable approximation to reality. The negligible existence of employment contracts in a hostile decision environment can only occur if the employees can choose an alternative, i.e. they are not "doomed to starve" if they don't accept the employment offer. This alternative for the employee is a restraint to the employer and thus determines the employee's power. This influence of the outside option on power relations of a society can be included in analytical economic models. By referring to Bowles (1985), we can evaluate situations in which the outside option is poorly developed or even absent or well-developed.

In Bowles contributions (Bowles, 1985) (Bowles, et al., 1986) power relations are explicitly modelled, including an outside option[11]. How is power incorporated in Bowles analytical models and how does it relate to our investigation of the outside option? A crucial feature in this respect is the so-called labour extraction function. In this function, the very basics of the power relation are expressed, due to the explicitly included outside option. This analytical framework enables us to analyse the role of an outside option in the production process more deeply.

Bowles sets up his model from a Marxist point of view, starting from Marx' distinction between work and labour power. Even though Bowles does not deny the importance of conflict between individual and collective interest (which is the basis for Alchian and Demsetz' analysis (Alchian & Demsetz, 1972)), he focuses on the conflict arising from ownership and thus power structures. Bowles develops a model in which class conflict plays a distinctive role. This is represented by a third essential function additional to the conventional two functions determining production (production and cost function). This third function is vital to our analysis of the importance of the outside option for power relations within a capitalist mode of production and it will be more closely examined later in this chapter. The focus lies on command relationships of the *work* place in contrast to voluntary relations of the *market* place.

What characterizes Bowles' Marxian model is the analysis of the production process itself, what generally can be called the "labour process". Especially the relation between capital and labour, which is seen as a relationship between two individuals, is important. This relationship is formally structured by the ownership of and control over the means of production and is therefore a class relationship. The arising conflict in the employment relation is that the capitalist's interest (profits) is

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[11] All model specifications and arguments in this chapter are based on Bowles' (1985) work, unless otherwise stated.

> *"enhanced by being able to compel to worker to act in a manner that he or she otherwise would not choose."* (Bowles, 1985, p. 19).

Clearly then, profits then do not reflect any "marginal productivity of capital" but rather depend – at least to some extent – on the power of capital over labour. This conflict is expressed in the extraction of work from the worker. The employers power generally is expressed by the ability to impose costs on the worker if he or she does not behave as the employer wishes them to, such as work termination, wage loss or other changes of work conditions (Bowles, 1985, pp. 19-20). Raising the wage increases the cost of job loss (a kind of opportunity cost), but also increases the cost to the employer. Also, detecting undesirable behaviour is costly to the employer and is called *surveillance cost* in Bowles' model. Generally, the means of increasing the employer's power over the worker increase the cost for the employer (Bowles, 1985, p. 20).

As in most economic models, production is a function of two inputs, labour, and material inputs:

$$Q = f(X, L), \tag{1}$$

where Q represents the units of output, X material inputs and services and L input of labour[12].

The following function, the "labour extraction function" is a crucial element in Bowles' analytical model and serves as the benchmark for an analytical incorporation of the outside option. Bowles postulates that the worker him- or herself determines the amount of work done per hour,

> *"in response to the constraints devised by the employer, <u>given the availability of other jobs, unemployment insurance, and the like</u>."* (Bowles, 1985, pp. 21, emphasis added.)

This is the very essence of the worker's power. This is what entirely is to his command.

If workers get detected following non-work activities at work, they get fired and thus loose income. Workers' expected income if fired consists of two elements: a wage in some other job if he or she can find one $\widehat{w}$ and nonwork income like unemployment benefits etc. w^c. Workers expected income loss is thus

$$\widehat{w}^d = w - [j\widehat{w} + (1-j)w^c], \tag{2}$$

where $\widehat{w}^d$ is expected income loss, w is the going wage rate, j is the probability of finding another job, $\widehat{w}$ is the wage rate in any other job, and w^c is nonwage income if not reemployed (Bowles, 1985, p. 21). Worker's choice of labour effort is a positive function of $\widehat{w}^d$, i.e. the higher the threat of income

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[12] It should be noted here that work effort bears no price, since only labour time is purchased by the employer and not effort as such (Bowles, 1985, p. 20).

loss, the more intensively he or she works. It is also a positive function of s (amount of surveillance), since the more surveillance is employed, the more likely the worker is observed exercising a non-work activity and thus the stronger is the threat of income loss. Bowles expresses the labour extraction function as

$$l^* = h(s, \widehat{w}^d) \qquad (3)$$

Where l^* is labour effort, and h is a positive function of s and $\widehat{w}^d$. This labour extraction function is crucial in our analysis of the importance of power in capitalism, since both the employer's and the worker's endowment of power can be read off.

These elements of Bowles' model of the production process in a firm setting allow us to illustrate power relations in an analytical framwork. While Bowles uses his model as a formal foundation for describing and explaining central characteristics of capitalism like persistent unemployment, inefficient technology, and the phenomenon of labour market segregation from a Marxist point of view (Bowles, 1985, pp. 24-31), we use his model as a formal foundation for emphasising the importance of an outside option for power relationships in the production process and thus for the determination of the latter.

Both of Bowles functions *(2)* and *(3)* are fundamentally important to our analysis. The former describes what the worker can expect to lose if he or she gets fired. Here, the outside option w^c explicitly influences the worker's circumstances in which he or she makes their decisions.

Regarding function *(2)*, three distinctive features can alter the expected income loss

a) The going wage rate $w=\widehat{w}$ (it is assumed to be homogeneous across all firms/employers (Bowles, 1985, p. 22)).
b) The probability of finding another job, i.e. getting reemployed (j). This feature is strongly related to the rate of unemployment[13].
c) The outside option w^c.

Clearly, a higher value of w^c implies a lower value of $\widehat{w}^d$, i.e.

$$\frac{\partial \widehat{w}^d}{\partial w^c} < 0,$$

which is intuitively clear, since a good outside option makes paid work less important or less necessary. In this first instance it gives us an idea of how strong the ability to earn one's livelihood depends on

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[13]More precisely, it is related to the rate of *employment*, since a lower value of j means a lower possibility of finding a job.

wages. The importance of the wage rate relative to the outside option gets especially clear when the exogenous parameter j is set 0, i.e. there is no chance of getting reemployed after being fired. With this assumption function *(2)* is modified to

$$\widehat{w}^d = w - w^c \tag{3'}$$

With j=0, expected income loss depends solely on the difference between the going wage rate and the outside option.

Regarding function (3) is follows that

$\frac{\partial h}{\partial s} > 0$ and $\frac{\partial h}{\partial \widehat{w}^d} > 0$ (Bowles, 1985, p. 23).

After having discussed the underlying function of $\widehat{w}^d$, this labour extraction function shows how the outside option indirectly affects labour effort. More generally, we can interpret this function as showing the prevailing structure of power. When l^* is close to zero, we can deduct that the worker is not at all afraid of losing his or her income and thus puts in no effort. In this case there is no difference between working and not working when it comes to being able to afford one's living. Vice versa, when l^* is close to 1, we can deduct that all power belongs to the employer, since the worker's capability of affording his or her living depends on the current income. Leaving surveillance and unemployment aside, the outside option must be low or non-existent for this to occur .

How can we now evaluate w^c's influence in more detail? In order to do so, it may be of interest to look at these "corner solutions", i.e. all the power belongs to the worker and the employer, respectively. For l^* to be 0, either s or $\widehat{w}^d$ must be 0. For our focus lies on the influence of the outside option, let us assume that $s \geq 0$ for the moment. Now the determining parameter is $\widehat{w}^d$, which means that with given values of w and j we can easily see that there is only one case in which all the power belongs to the worker, namely if $w=w^{c\,14}$. This can be read off a modified version of function *(2)*:

$$\widehat{w}^d = (1-j)(w - w^c) \tag{2''}$$

In this case expected income loss and thus labour extraction is 0 and the employer has no possibility to exercise power via the threat of job termination. So, if there is a well-developed outside option, one that equals the going wage rate, the worker is not subject to the employer's authority, but is equally

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[14] We will not consider values of w^c larger than w, since it would bring about need for additional information about negative values of $\widehat{w}^d$ and its impact on the labour extraction function h. For the sake of the argument it is enough to set a maximum value to w^c at $w^c = w$..

endowed with power. What can we expect in this case for the production process? We can expect that the worker either just doesn't work, or that his motivation to put in labour effort has a different origin than the need for work-income. The former case means that eventually, the firm would go out of business (because there is no labour input), the latter case opens up the possibility for other forms of work organisation. This finding relates very much to the descriptive analysis of S. Marglin (1974). If there were no such thing as unequal distribution of power, there must not necessarily be a firm structure of the production process. Unless, and this argument will be further developed below, there are other reasons for the superiority of a firm structure over other types of work organisation.

When l^* is close to or equal to 1 and with a positive parameter s and given j and w, the lower the outside option w^c, the higher expected income loss and thus labour extraction. With no outside option at all, the employer can exercise power through his offered wage, or more precisely, through the threat of withholding it. In this case, workers' dependency on wages is strong. Referring to Marglin (1974) we can expect a hierarchical firm structure where workers are subject to the capitalists' power.

So far, we didn't include surveillance cost in our analysis of Bowles' model of the production process. Bowles assumes that the effect of surveillance on labour extraction depends positively on the level of expected income loss (Bowles, 1985, p. 25), surveillance is especially effective in cases where the outside option is badly developed. The lower the level of expected income loss (i.e. the better the outside option), the lower the effectiveness of surveillance, i.e.

$$\frac{\partial h}{\partial s} \rightarrow 0 \text{ as } \widehat{w}^d \rightarrow 0 \,.$$

Also, the effect of expected income loss on labour effort depends on the level of surveillance. The threat of income loss is especially effective in cases where surveillance is wide-ranging, i.e.

$$\frac{\partial h}{\partial \widehat{w}^d} \rightarrow 0 \text{ as } s \rightarrow 0 \text{ (Bowles, 1985, p. 25).}$$

This is intuitively clear, because detection of non-work activities and resulting job loss is less threatening, when job loss does not mean a sharp decrease in income. Bowles parameter s can be interpreted as transaction cost[15]. By generating information about the worker's activity via surveillance the employer can threaten the employees to punish low work effort. In the case of detecting low work effort (i.e. non-work activities at work), the worker will be dismissed.

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[15] Surveillance is a cost arising from imperfectness of the employment contract - the "imperfectness" that the employer cannot decide about the worker's effort.

It is important to note that Bowles' considerations of surveillance bear some resemblance to Alchian and Demsetz' considerations. However, these two frameworks are not easily comparable[16]. To avoid spurious interpretations of Bowles' concept of surveillance and transaction cost, our focus within his model lies on the outside option[17]. Therefore, it would be misleading to evaluate the relationship between transaction costs and the outside option in this framework. .

Nevertheless, we can carefully consder the role of the outside option with respect to transaction costs in a thought experiment. Bearing in mind the above relations, we can expect that the better developed the outside option is, the more "equal" the contractual partners appear with respect to (bargaining) power. If these equal contractual partners negotiate for an employment contract, the transaction costs may be significantly higher than in a situation where very unequal partners get together. Insofar, the outside option may also influence transaction costs. With this in mind, it is sensible to argue that the Coasian interpretation of the existence of the firm, is reasonable as soon as the outside option equalizes the balance of power of the contratual partners.

To sum up, our analysis suggests that depending on the outside option, the ability of the employer to exercise power is strong or weak. In other words, wage dependency gives rise to an unequal power position between workers and employers and is thus a major component in the determination of the production process. Furthermore, it is reasonable to see transaction costs as less important for the emergence and survival of the firm once the outside option is very low and more important once the outside option is very high.

We argue that the Coasian and the Marxian view may be true and prevailing, but explanation of the existence of the firm es economic entity very much depends on the outside option. In general terms, this means that with a bad outside option, exertion of power is the main reason for a firm structure, while with a good outside option, the transaction cost motive may be more dominant. The extreme case of a "perfect" outside option would then mean that apart from transaction costs there is no inequality of power and thus no reason for a production process in the form of a firm structure. Whether this could still be called a "capitalist" mode of production is unclear, since the relationship between the owner of capital and the owner of labour power is altered in a way that makes them largely indistinguishable.

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[16] While surveillance is necessary to increase productivity in Alchian and Demsetz (1972), it does not increase productivity per se in Bowles (1985). Instead, it increases the amount of labour input (labour effort) (compare e.g. Marglin (1974, pp. 94-95).

[17] Albeit surveillance is a form of transaction cost, there are other forms of transaction costs which are not covered in Bowles' considerations. For example, an employment contract might also be incomplete regarding the execution of tasks by the employer, as well as there may be negotiation and contract costs.

3.3. Empirical Considerations

Outside option	Example	Proxies	data	Limitations/problems
Social bonds	Alternative living forms	self-sufficiency rate	-	Missing clear definition, data source unclear
	Inheritance (might also apply to the capital category)	Assets/inheritances	Household Finance and Consumption Survey (HFCS)	
capital	Real estate	Rent income	Income statistics (e.g. EU- SILC)	
	Financial capital	Revenues from financial capital	Income statistics (e.g. EU-SILC)	
	Land titles	tenancy		
		Percentage of people employed in agriculture		Overlap with self-sufficiency rate; extent of employment relationship unclear
	savings	Saving rate		Unfortunately not per capita
Public subsidies	Unemployment benefits	Average amount of unemployment benefits (real)	Social Protection Statistics (e.g. OECD, Worldbank, Eurostat)	
	emergency assistance	Average amount of emergency assistance (real)		
	Basic income	-		Only pilot project data available (Finnland, e.g.); otherwise fit measure

	Old age pensions	Average amount of pension payments (real)/ degree of poverty among the elderly	Social Protection Statistics (e.g. OECD, Worldbank, Eurostat)	Only concerns people less or not active on the labour market

Table 3: Empirical Considerations

In order to assess the question how to empirically measure the influence of the outside option on the production process via the wage dependency empirically one has to collect there is need for appropriate data. The table above below offers some guidance on the possibilities of measuring the extent of the outside options through proxies and the according relevant data sources. Since the concepts of production process, capitalism or power relations are analytically quite vague, measuring and quantifying them poses difficulties. Generally, one can measure the influence of the outside option on the relevant dependent variable with a regression using time series or cross section data. Again proxies are needed for the vague concepts above. The extent of capitalism or hierarchy in the production process could for instance be measured by the percentage of production schemes different to "ordinary" firms, such as cooperatives. In addition, the ratio of business executives or CEOs to employees may serve as a proxy for the pervasiveness of firm structures. To measure power relations resembled by bargaining power the degree of unionization and more generally their influence on wages can be used. A more direct measure would be the wage share or the real wage respectively as an expression of the power of workers. However, more power on the worker's side might also mean a better outside option and therefore causality might be confounded.

If using cross country data a general issue of comparability of the structure and level of the outside option. A remedy might be to assess whether the outside option suffices to cover the socio-cultural subsistence minimum. This indicator can then be used in a regression to allow comparison across countries. Also, the construction of an outside option index would be interesting. As can be seen in the table above, data sources seem limited.

4. Conclusion and Outlook

In this paper we investigated the role of the outside option in the production process. The outside option is some kind of alternative to work-income which reduces the dependency from wage labour, like unemployment benefits or a social network which supports its members. We started by contrasting two prevailing currents of the theory of the firm: On the one hand, theories in the Coasian tradition, on the other hand theories in the Marxian tradition. The former, represented by Coase and Alchian and Demsetz, focus on transaction costs including supervision as a determining factor for the existence of firms. It is argued that a firm structure allows the reduction of transaction costs, which enhances efficiency and/ or productivity. The latter, following Marglin, however, focus on power relations. The firm structure in this current is seen as a means of securing the capitalist's power position in society. These conflictive currents are the basis for our analysis of the outside option regarding surveillance and wage dependency. To investigate the role of the outside option in different economic analyses, we review the experimental work of Bartling et al. (2012). This experiment shows the influence of different kinds of contracts on the probability of a firm structure to occur. We argue that the outside option in this experiment is an important tool to alter the decision framework of agents and principals, with the result that a well developed outside option makes the firm structure to arise less likely. Furthermore, the outside option in an analytical model by Bowles (1985) is examined to emphasize the role of wage dependency in the production process. Through its influence on work effort, the outside option represents the balance of power between capitalists and workers. We argue that imbalances of power must be seen as a major determiant for a hierarchically structured production process in this model. This investigation results in the perception that the firm structure of the production process very much depends on a poorly elaborated outside option and thus on inequality of power endowment. However, when the outside option is elaborated well the power relation between employee and employer is balanced. So, both that the Coasian and the Marxian view may be true and prevailing, but explanation of the existence of the firm es economic entity very much depends on the outside option. In general terms, this means that with a bad outside option, exertion of power is the main reason for a firm structure, while with a good outside option, the transaction cost motive may be more dominant. We come to the overall conclusion that the outside option is decisive for the existence of the firm, through its influence on labour effort and transaction costs.

Bearing in mind our conclusion it might be interesting for further research to elaborate on the ideas outlined above. For an empirical assessment of the role of the outside option in the prduction process many obstacles have to be overcome. Since the dependent variable is the likeliness of a firm structure of production, or more broadly expressed a hierarchical production process, finding suitable proxies is a main task. In addtion, the very concept of the outside option must be modelled carefully, since it can

have different forms and different characterisitcs. This may especially impede a comparison over time or across countries. However, we collect some thoughts on the empirical applications of the concept of an outside option and its influence on the production process.

Appendix

Variables appearing in section 2:

Z = output

X_i, X_j = inputs

x = task

w = wage

Variables appearing in section 3:

Q = number of units of output over some period of time

X = number of material inputs and services

L = labour input

$l*$ = amount of work done per hour

$\widehat{w}^d$ = expected income loss

w = going wage rate

j = probability of finding another job

$\widehat{w}$ = wage rate in any other job

w^c = nonwage income if not reemployed (outside option)

s = amount of surveillance

h = labour extraction function

p_s = price of surveillance

List of Tables and Figures

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