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FIRM-SPECIFIC HUMAN CAPITAL AS A CONTRACT DETERMINING FACTOR – A REASON FOR INTERNAL BILATERAL INTERDEPENDENCE BETWEEN THE EMPLOYER AND THE EMPLOYEE

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Introduction

This paper is devoted to a firm-specific human capital issue in transaction cost economics and the agency theory perspective. The development of a firm means not only a bigger scope of undertaken projects but also specialisation and innovativeness. Such a specialisation may be strongly linked with the employee's unique abilities. The problem domain of this paper concentrates on relations between the company owner and the employee (manager) possessing firm-specific human capital that is crucial for the whole business strategy of the firm. This sphere is relevant, because in knowledge-based economies the main asset of firms are their knowledge and know-how, especially when they are specific. This, in turn, may lead to contracting problems, which are undertaken in institutional economics.

The analysis carried out in the following sections is based on the synthesis of institutional economics branches. Firstly, it refers to the bilateral monopoly

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category and asset specificity role in transactions organising. Special attention is devoted to vertical integration as a solution to bilateral monopoly problems. Secondly, firm-specific human capital held by the employee is a crucial factor determining relations with the company owner. These subjects make contracts, but the main difference comparing to the organisation of exchange characterised by transaction cost economics is their internal character and the employee's assumed subordination to the principal. However, due to firm-specific human capital the worker has strong bargaining power in contract renegotiations. Some of the most important elements of contracts concern the issue of rewarding. This case is compared with the efficiency wage theory, which assumes that wages can affect the employee's behaviour and reduce costs of organisational supervision. As an extension to this concept, other methods of agent stimulation in order to pursue strategic goals have to be mentioned. The analysis of ownership fraction held by managers can be particularly useful. The agency theory provides well-developed research tools devoted to this problem. There are also other approaches that can be applied to the analysed field, e.g. knowledge management (knowledge division) and industry evolution in the innovativeness context, which is mentioned in the last sections.

The main purpose of this paper is to indicate the most appropriate means of reducing the costs of the organisation of internal transactions in a radical case of very high interdependence between the firm and the employee possessing firm-specific human capital.

Reflections on the mentioned issues are divided into three sections: the first concerns the bilateral monopoly situation, the asset specificity role in the organisation of transactions and vertical integration; the second is devoted to the firm-specific human capital category as well as it deals with the character of the internal bilateral monopoly between the employer and the employee; the third refers to potential solutions to the analysed problems. The purpose of this paper structure is to clearly describe transaction cost economics findings about the transaction organising attitude to special employee's and employer's interdependence within a firm.

A NOTE ON BILATERAL MONOPOLY

A bilateral monopoly occurs in an industry where two firms exist and one of them is the only producer or supplier of a good (monopolist, upstream supplier) and the second is the only buyer of this good (monopsonist, downstream buyer) (Blair, and Kaserman 1987). Subsequently, customers purchase final products.

The monopsonist's and monopolist's roles depend on the market structure and their market power. Additionally, high switching costs linked with idiosyncratic investments are typical for both sides and may affect the transactions (Tirole 1998). The case of being a price-giver or a price-taker refers also to a special relation between the subjects of bilateral monopoly. The supplier is not able to sell goods to other clients and the buyer cannot find an alternative source of commodities. The supplier tries to charge high prices to the buyer. The lone buyer expects to pay a price that is as low as possible. In order to keep the business profitable, both sides of the contract have to make a deal. As a result, firms that create the structures of a bilateral monopoly become strongly interdependent and have to face negotiations.

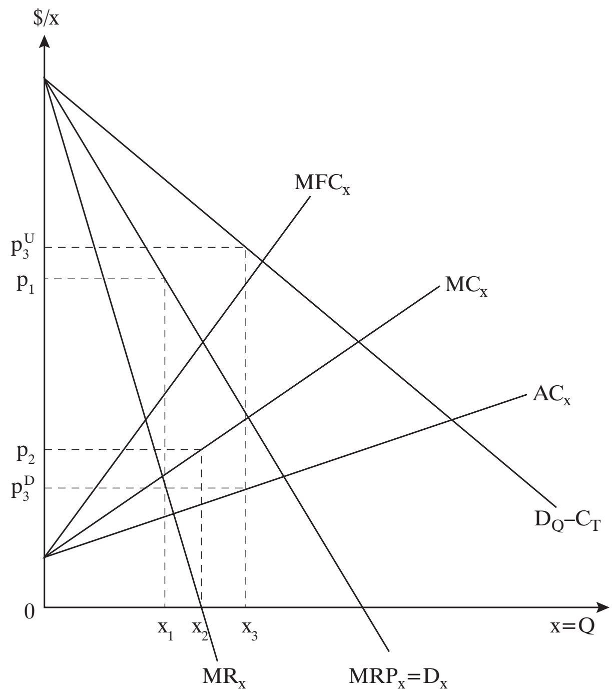
The contract construction in the case of a bilateral monopoly is very troublesome and sophisticated. Negotiations may take a lot of time and funds before an agreement is reached, if firms manage to do so. The most common factors that complicate relations between the contractors are: information asymmetry, uncertainty and the will to take advantage of eventual bargaining power. Transaction cost economics extends this concept to transaction frequency and asset specificity. Asset specificity is one of the exemplary causes of the existence of bilateral monopolies, because it creates a lock-in effect. It means that sunk investments in idiosyncratic goods result in an increase of trade value between the contractors (Williamson 1983).

There is a conjecture that the firm with higher bargaining power will ultimately enforce the contract shape (Blair, Kaserman, and Romano 1989). The range of prices that can be negotiated by the firms is limited by p_3^U and p_3^D on Figure 1. Price p_3^U maximises the monopolist's profits and p_3^D causes profits acquisition by the monopsonist. The final result of negotiations depends on bargaining power of the firms. Other symbols on the Figure 1 are standard and stand for: D_Q – final product demand, C_T – constant cost of transforming one unit of input x into one unit of output Q, MR_x – marginal revenue from selling x to the downstream buyer, D_x – net marginal revenue product of input x, AC_x – average cost of producing input x, MC_x – marginal cost, MFC_x – marginal factor cost.

Both sides of the exchange can hypothetically avoid this kind of enforcing some negotiation rules thanks to readiness to cooperate and frankness. Another solution to the bilateral monopoly problem can be contracts based on assumed profit distribution. In this case, the product price results from the cost structure and mentioned profit distribution matters. Obviously, it requires mutual cost control (Blair, and Kaserman 1987). Apart from these findings, special attention should be paid to the role of asset specificity in determining forms of the organisation of transactions.

Figure 1

Prices and product quantity in the bilateral monopoly



Source: Blair, Kaserman, and Romano 1989: 832.

Asset specificity role in organising transactions

Williamson formalised relations between the level of asset specificity and the form of organising transactions. He examined the impact of asset specificity both on transaction costs and total production costs. Another effectual element of Williamson's research is linked with the asset specificity case is the contract theory (Williamson 1979). One can refer to classical, neoclassical or relational contractual analysis. The relational approach, concerning long-term, complex contracts related to specific assets, is especially useful for this paper. The choice of the transaction management type depends on the frequency and the level of transaction specificity[1]. Vertical integration is proper when transactions are repetitive and the specificity is high. Periodic recurrence of transactions or rare exchange and standard contracts imply market choice. Tripartite management

[1] The assumption regarding the uncertainty and future condition of nature is valid.

is effective when transactions are rare and idiosyncratic. The main reason of trilateral governance are excessive costs of forming a particular organisational structure. Figure 2 contains management structures in relation to transactions characteristics. These considerations can be enriched with the uncertainty factor. Uncertainty does not lead to a switch in the transaction organisational form only when the exchange is conventional. However, uncertainty lowers as the market branch develops.

The division presented below is based only on the organisational structure selection, depending on the transaction costs level. This point of view was expanded by adding the role of production costs (Williamson 1981). Additionally, a more complex approach to organising transactions pays attention to technological aspects likewise, thus exhibits the role of asset specificity.

Figure 2

Management structures and transactions characteristics

<table>
<tr><td></td><td></td><td colspan="3">Investment Characteristics</td></tr>
<tr><td></td><td></td><td>Nonspecific</td><td>Mixed</td><td>Indiosyncratic</td></tr>
<tr><td rowspan="2">Frequency</td><td>Occasional</td><td rowspan="2">Market Governance (Classical Contracting)</td><td colspan="2">Trilateral Governance (Neoclassical Contracting)</td></tr>
<tr><td>Recurremt</td><td>Bilateral Governance
(Relational</td><td>Unified Governance
Contracting)</td></tr>
</table>

Source: Williamson 1979: 253.

In the case of unspecific assets, it is appropriate to choose a market option (external transactions), because of the production costs and management character. Moreover, market incentives support rigorous costs controls. As the level of asset specificity rises, the exchange becomes more typical for a bilateral monopoly and it is rational to organise transactions within the firm. The relationship between contractors become more tied, which may imply some additional costs of negotiations. The function below expresses a difference between the costs of the market organisation of production and production within the company (Williamson 1981).

$$\Delta G = g(A) = \beta(A) - M(A)$$

Where A stands for the asset specificity level, $\beta(A)$: internal management costs and $M(A)$: market management costs. Because asset specificity growth causes a relative increase in the market management cost level, this function decreases in relation to A. On account of market costs control, $\Delta G > 0$. Williamson implies that the only variable factor is asset specificity (the production volume is constant). Another dependence is that $\Delta C = f(A)$, which describes the difference between the market purchase of a good and internal production. Irrespective of assets specificity (A), this difference is positive, thus ΔC is positive and diminishing. The market remains the most effective form of transaction organisation while $\Delta C + \Delta G > 0$. It could be encouraging because of economies of scale and the range of savings.

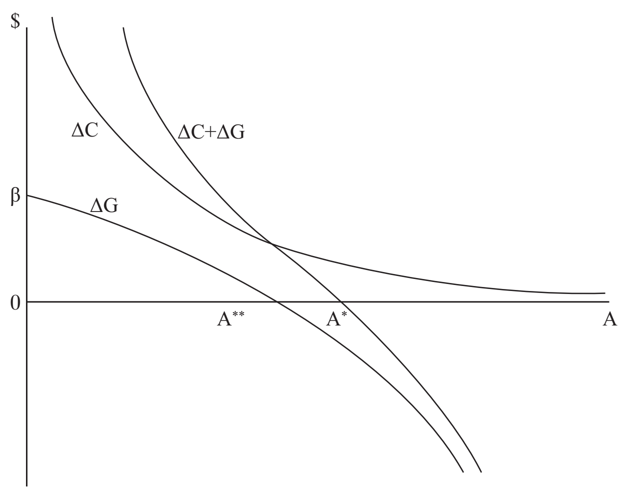
The analysis presented above pertains to the choice between the firm and the market. A more complex perspective also allows for a mixed solution that may occur when the level of asset specificity is between A^{**} and A^{*} points (Figure 3). Then some companies will produce goods and others will buy these products, but none of them will postulate to keep that relationship (Williamson 1998). Mixed management of transactions (a hybrid form) is perceived as useful when the business relationship refers to specific assets and contractors try to be independent (credible commitments). Williamson assumes that the hybrid form is typical for long-term differential contracts (Williamson 1991).

The state institutional system also has a substantial impact on the level of transaction costs (Williamson 1991). Institutions, both formal and informal, can strongly influence transaction costs depending on the organisational structure. Williamson almost does not pay attention to informal institutions. It is crucial in the case of formally unrelated contractors with personal relations and it leads to vertical integration described above. However, Williamson confirms that the role of informal institutions is also important. Moreover, he points out that institutions sometimes are inefficient. The core of Williamson's transaction cost economics is contractual analysis. The contract as a research unit enables us to verify empirically the legitimacy of transaction organisation. Operationalisation of transaction cost economics conceptual apparatus is related to asset specificity measurement.

Another fact is that not only asset specificity is significant for transaction organisation, but also knowledge about goods remaining in trade. Expenditures on goods characteristics verification constitute a noticeable fraction of market functioning costs, which Y. Barzel (1982a) emphasises. An access and possibility to measure asset characteristics depend on the information asymmetry. All of these areas are considered in the institutional perspective (Barzel 1982b). Transaction costs depend on both the organisational structure and the institutional surrounding of the firm (cf. North 1990). Outlays on quality measurement rise with the degree of production sophistication. Complicated and multi-stage processes require more financial resources to keep the desirable level of quality because of opportunism and high information asymmetry. In this case, production specialisation is crucial. The customer has to verify asset attributes on every stage of production. A direct beneficiary of information manipulation is the supplier. Once more, vertical integration is a suggested institutional solution to the presented problem. Integration entails that the supplier becomes the employee and has no incentives to manipulate the quality. Opposite to Williamson, who emphasises asset specificity, contracts incompleteness, opportunism and bounded rationality, Barzel bases his research on the costs of attribute measurement and his works have an operational character.

Figure 3

Comparative costs of production and management



Source: Williamson 1981: 560.

A different approach to the organisation of transactions is represented by A. Alchian and H. Demsetz (1972), who claim that the advantage of the firm over the market appears as a possibility to measure the effort of people involved in the production process. Difficulties in defining the effort imply ambiguity in wage setting.

K. Montewerde's and D. Teece's (1982) work also refers, inter alia, to asset specificity. They point out exceeding costs of production borne by suppliers, which may be implied by asset specificity. They do their research empirically, basing on the automotive industry. Monteverde and Teece also reach the conclusion that assets specificity affects opportunism, supplies instability and quality maintenance. What is more, they refer to business culture as an element affecting behavioural aspects of transactions. Another researcher who refers to the concept of behavioural factors is E. Gal-Or (1991), who proclaims the impossibility of information asymmetry elimination. She states that even very sophisticated contracts are not able to annihilate the risk of opportunism.

The asset specificity issue is analysed also by E. Anderson and D. Schmittlein (1984) as a reason for distribution channel acquisition. P. Joskow (1987) shows in turn that specific assets determine making contracts in the long-term perspective. Although Joskow concentrates on vertical integration analysis, he also accentuates the necessity of a precise transaction cost analysis in terms of internal organisation structures, which may be pivotal after the integration (Joskow 2003). The section below contains more information about the vertical integration process.

Vertical integration as a solution to bilateral monopoly problems

Vertical integration occurs when different phases of production, sales and distribution of some goods and other significant processes are combined together in one organisational unit (Coase 1937). Vertical integration is perceived as a management instrument for organising transactions. Firms which are vertically integrated have their own internal hierarchy used for project coordination. By taking over a semi-finished product supplier, the buyer chooses to manage key processes through his company instead of relying on the market.

There are three types of vertical integration commonly indicated: backward, forward and balanced (Perry 1998). Backward integration takes place when a company takes control over its supplier of semi-finished products that are necessary during the final production process. Thanks to that, the buyer is able to use a hierarchical form of management in order to eliminate eventual opportunism and negotiation costs. Another type of vertical integration is forward integration, as a result of which the firm has control over distribution centres and sales. Balanced vertical integration is some kind of a combination of the backward and forward models: processes dedicated to materials, semi-finished products and sales or distribution are all managed within the company. The chosen type of integration is usually determined by relations with upstream supplies and downstream buyers.

Asset specificity and opportunism could be the reasons why firms decide to integrate. A contract party that is obliged to invest in some specific assets may be forced by the only customer to lower the price below the profitable threshold. On the other hand, the only producer of this good can systematically impose high prices on the customer, who has no alternative. Problems of contractual relations are described in detail in O. Williamson's works.

Williamson (1971) managed to elaborate a synthesis of economic and organisational theories that can be used in transaction internalisation analysis. Because of the market failure, internalised transactions are made better through vertically integrated organisational structures. Vertical integration replaces negotiations and judicial arbitrage by top-down management. Transaction costs of the price mechanism appear as executed incomplete *ex ante* contracts (bounded rationality of exchange partners and uncertainty). Additionally, *ex post* changes cause high costs of adjustments or opportunism. A significant fact is that opportunism may be an outcome of asset specificity. When the supplier of the final product has to use some specific semi-finished products, he may suffer their price being overstated (assuming that there are few semi-finished product producers). Moreover, the only customer for semi-finished products is prone to enforce a lower price. The situation described above is likely to be a case of a bilateral monopoly. Associated conflicts are usually frequent, expensive and hard to exclude. Williamson points out significant matters like: behavioural aspects of transactions, informal institutions, management costs and asset specificity. These issues are perceived as factors leading to vertical integration that favours harmonisation of goals and reduction of transaction costs (Williamson 1998). However, it has to be mentioned that another way to deal with opportunism and conflicts is bilateral management (Williamson 1998). The following part of this paper gets to the core of the above formulated hypothesis: the firm-specific human capital category.

Firm-specific human capital

Human capital theory foundations were formulated mainly by T. Schultz (1961) and G. Becker (1975). They claim that people spend money on themselves not only because of current enjoyment but they also take into consideration possible future revenues. These decisions may be treated as investments justified by prospective outcomes. Accumulated knowledge and capabilities are a form of capital, which is associated with human (cannot function autonomously, opposite to physical capital) or organisational relations in general terms (Kogut, and Zander 1992). Schultz (1982) concentrates exclusively on attributes that improve work performance. Human capital can be defined as a supply of knowledge, abilities, health, strength and vital energy present in man. Synthesising, human capital is a set of characteristics that enables a worker to increase his productivity.

Only actions that improve the worker's productivity are perceived as investment in human capital. Naturally, some problems with investment categorisation may occur, e.g. expenditures on alimentation result both in productiveness and individual consumption. Becker (1975) highlights the fact that revenues from investment in human capital may have a monetary or a physical form and are usually made in a long-term perspective. Ways of investing in human capital are for instance: schooling, on-the-job training, medical care, vitamin consumption and acquiring information about the economic system (Becker 1962). Those actions raise real income prospects by the improvement of physical and mental abilities. Taking into consideration the thesis of this paper, special attention should be paid to on-the-job training.

The employee's productivity can be raised by learning new skills or perfecting old ones while working (Becker 1962). In this case, future productivity raises only at a cost. Usually, higher level of human capital results in a wage rise. Some exceptions may be caused by discrimination, labour market imperfections or compensating variables such as more pleasant working conditions. Naturally, an increase in the employee's productivity affects positively the firm profits. Two types of on-the-job investment occur: general and special.

General training results in human capital increase that is useful for many firms – obtained skills are commonly applicable. After a perfectly general training, marginal products in many firms would rise by the same degree. The second type of on-the-job training is characterised by the fact that it increases the employee's productivity by a different amount in firm srealising this investment than in other firms. A perfectly specific training has no effect on the employee's productivity in other companies. As a result, rational employers pay the same wage to generally trained workers and a higher wage than could be earned elsewhere to workers with firm-specific human capital.

Another remark on firm-specific human capital states that quit and layoff rates are inversely related to the level of specific training. Firms have fewer stimuli to fire workers with firm-specific human capital and such employees have less incentive to quit because of no equivalent job opportunities (Becker 1962). An effective, long-term contract has to protect employers against quitting and insure employees against being redundant. Optimal contracting leads to higher investment in specific trainings. This paper refers to relations between the employer and the employee linked with firm-specific human capital. Thus, the presented research focuses rather on contracting and the character of transactions between these subjects instead of analysing forms of specific human capital creation (investments) (Becker 1962, Lazear 2009) or wage dynamics (Felli, and Harris 1996, Hashimoto 1981). The next section deals with the groundwork for the possibility to treat relations between the employer and the employee characterised by firm-specific human capital analogously to the bilateral monopoly problem and hence to interpret such relations as the internal bilateral monopoly. It also covers the potential application of transaction cost economics research tools.

Internal bilateral monopoly

Similarly to the bilateral monopoly, relations between the employer and the employee with firm-specific human capital involve two subjects. The employer plays the role of an upstream buyer and the employee is the a downstream supplier. Some sort of work provided by the employee is the object of this exchange. Because of the nature of firm-specific human capital, the employer is not able to replace this worker with another one having the same necessary abilities and knowledge. Moreover, the employee has no alternative equivalent job opportunity. Both parties are strongly interdependent. As a result, their relations are characterised by information asymmetry and opportunism. Like in the bilateral monopoly case, it is better for the employee and employer to reach an agreement in renegotiations rather than resign from cooperation. Transaction costs of exchange organisation between the monopolist and the monopsonist in the bilateral monopoly depend on the contract construction and execution effectiveness. Relations within a company in the case of firm-specific human capital also refer to contracting.

The transaction cost economics approach to the bilateral monopoly problem is based on the frequency and specificity of exchange. Undoubtedly, cooperation between the employer and the employee is very frequent, even permanent. The question is, what could be perceived as a specific asset? The human capital theory assumes that knowledge and abilities accumulated by the worker should be treated as assets. Because human capital is inseparable from a man, the worker can be regarded as a specific asset of the firm. The employee does his job using his unique abilities on the firm's account. What is more, it has to be clearly pointed out that internal provisions have a different nature than transactions between two firms. In addition, firm-specific human capital develops gradually thanks to investments controlled by the firm owner, which is unlikely in the bilateral monopoly situation. The analysed relations caused by firm-specific human capital take place in the conditions of subordination. The employer's authority may be compared with the bargaining power of the firm, but there is a great difference between the market and internal cooperation planes. Vertical integration is recognised as the best solution to the bilateral monopoly problem. The relation between the employee and the employer cannot be vertically integrated, because it is already internal. However, both sides' interests should be convergent as much as possible, which can be achieved by changes in the ownership structure as a form of a reward.

In explicating the question of internal relations it is significant that firm-specific human capital accumulated by the worker in fact belongs to the firm. Taking into consideration interdependency mentioned above, the employee should care about himself as well as about his workplace. Besides wages, this employee is prone to strengthen his corporate position in order to gain some additional bargaining power in contract negotiations. However, those expenditures on employee's rewards that could be understood as non-pecuniary benefits, may be a value added also for the firm.

The corporate position of the employee having unique abilities can be miscellaneous. Due to the analysis simplification, it is assumed in this paper that the employee obtainsa managerial position (it is unlikely for him to be treated as an ordinary worker). It does not imply being a CEO, but this employee seems to be at least responsible for managing his department. This assumption is necessary in order to elaborate proposals of solution to the described contracting problems, which refer to the efficiency wage concept and the agency theory presented in the next section.

Taking it all into consideration, because of several fundamental differences, internal relations between the employer and the employee characterised by firm-specific human capital cannot be treated fully analogously to the bilateral monopoly problem (like the internal bilateral monopoly). However, there are conclusions from transaction cost economics that may be very useful in dealing with the described interdependent relations. The following paragraph is devoted to solution proposals inferred form the efficiency wage theory, transaction cost economics and the agency theory.

Solutions to interdependence problems arising from firm-specific human capital

Efficiency wages

The organisation of internal transactions referring to firm-specific human capital problems can be considered in the view of the theory of efficiency wages. One of popularly cited reasons for the usage of efficiency wages is the stimulation of employees' effort when employers cannot oversee their work completely. Thus, this tool substitutes the costs of monitoring. Another cause is motivation for gaining more human capital and specific abilities. Finally, efficiency wages command employees' loyalty and lead to greater effort (Yellen 1991, Katz 1986). Moreover, low wages may provoke employees not only to less effective work, but also to sabotaging their tasks in order to lower their employer's profits (Akerlof, and Yellen 1990). The efficiency wage model *implicite* assumes that wages are the only way to reward employees. Another view, containing more sophisticated methods of remuneration and ownership, is presented in a separate section.

In general, wages are not the only determinant of effort. Definitely, the key issue is that firms decide to use efficiency wages because of the limited ability to oversee their employees. The firm-specific human capital case generates particular relations, but a typical worker does not shirk in order not to lose the job and become unemployed. This situation can be generalised to difficulties with finding some alternative occupation that will suit held competences (an equal alternative job opportunity) and will provide an appropriate salary. Taking this into consideration, employees expend more effort in the case of high unemployment or high risk of not finding a job that will benefit from their competences. The below expression represents a situation when wages are the only determinant of employees' effort (Solow 1979).

$$e = e(w),\ e'(\cdot) > 0$$

Where e stands for effort and w for wages. The expanded expression includes alternative wages offered by other firms (w_a) and unemployment (u).

$$e = e(w, w_a, u), e'(\cdot) > 0, e''(\cdot) < 0, e'''(\cdot) > 0$$

The macroeconomic model of efficiency wages concerns the wage adjustment processes of the firm. It is assumed that the company maximises its profits, which result from the difference between production (Y) and expenditures on wages dependent on the number of employed people (L).

$$\pi = Y - wL$$
$$Y = F(eL), F'(\cdot) > 0, F''(\cdot) < 0$$
$$\max F(e(w, w_a, u)L) - wL$$

If the firm was free in choosing the wage level, we could derive the following expression from the first order conditions.

$$\frac{we'(w, w_a, u)}{e(w, w_a, u)} = 1$$

It means that in equilibrium the effort elasticity in relation to wage equals 1. The presented efficiency wage theory exhibits relations between wages, the employee's effort, unemployment and alternative wages. Moreover, it reveals why it is beneficial for companies to offer wages higher than the market clearing level.

Firm-specific human capital requires us to make some restrictions. Firstly, the firm profits can be taken as profits from processes based on the employee who possesses this unusual and crucial human capital. Additionally, it is assumed that the company's strategy concerns mainly these processes. In other words, without the mentioned firm-specific human capital, the market position of the firm deteriorates drastically. As it was presented in the previous sections, the firm-specific human capital we refer to is so unique that there is no other employee with such abilities. As a consequence, no other company would offer competitive goods or services. In fact, we analyse relations between the firm and one employee ($L = 1$).

Going back to the efficiency wage model, the firm-specific human capital case implies difficulties with alternative wages offered by other firms (w_a). We can distinguish two paths. The narrower perspective means that firms would not be prone to offer any wages, because they do not have necessary infrastructure and business know-how connected with this unique human capital. The other possibility states that firms would offer market wages matching the employee's competences omitting firm-specific abilities. Thus, wages in the second option would be lower than those corresponding to gained firm-specific human capital. The main problem is that both the firm and the employee do not have any market reference in establishing wages. The lack of real market competition in the specific area of the analysed domain of the firm creates disproportional bargaining power of the employer and the employee. Assuming that the employee wants to maximise his utility from gained knowledge, the role of the labour market seems to be negligible. Wage setting becomes a subject of negotiations just between the company and the employee. As a consequence, several problems described within the contract theory and transaction cost economics occur. Conflicts, negotiations and contract creation generate costs affecting business profitability.

The efficiency wage model refers also to unemployment. Naturally, unemployment is a significant element of this theory, but the domain of this paper is firm-specific human capital. Thus, the risk and effects of losing a job, as well as obtaining an opportunity to work without using these specific skills should be taken into consideration. In general, it means lower wages and a sense of failure because of incomplete usage of accumulated human capital. Chances that the dismissed employee will find an equivalent (set on the same firm-specific human capital level) job are minimal. The labour market of employees having firm-specific human capital and firms using it in its core business is extremely inelastic.

This short section showed that the idea of rewarding based only on wages is strongly limited. Obviously, the level of productivity has the main impact on the firm-specific human capital holder's wage. Moreover, because of inelasticity of the bound labour market, wages become the matter of negotiations and exhibition of bargaining power. The irreplaceable employee and no alternative equivalent job opportunities lead to bilateral interdependence between the firm and the employee. The next section contains alternative solutions based on the transaction cost theory and the agency theory.

Ownership

Reminding the assumptions already made, it is necessary to define precisely the status of the employee characterised by firm-specific human capital. Generally, due to accumulated knowledge and seniority, this employee is responsible for some key processes. Naturally, the employee acts in the owner's interest, but he has a great information advantage resulting from special tasks and firm-specific human capital. Anyhow, he should not be treated as an ordinary worker. Thus, contracts between the firm's owner (principal) and the employee (agent) are being analysed. This relation corresponds to the agency theory.

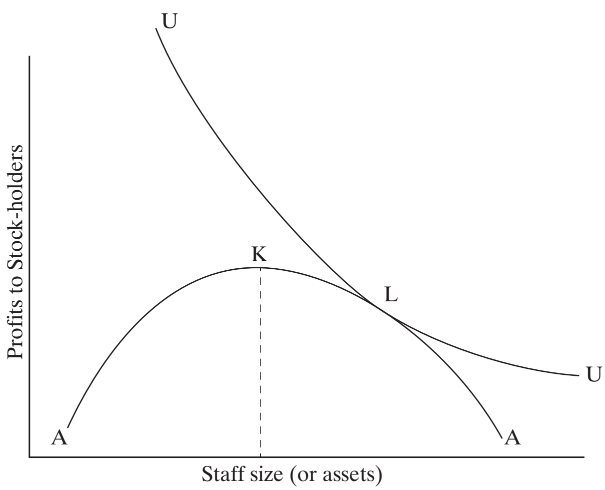
Like in the agency relationship, information asymmetry can be assumed *per se*. The agent has access to current information that can be manipulated before being transferred to the principal. As long as the principal is able to verify just the results of undertaken actions, he does not know if the agent realises his tasks with great accuracy and honesty. Because of the disparity of possessed knowledge, the risk of opportunism and departing from the firm targets arises. Information asymmetry can be reduced by supervision and extended monitoring systems, but it is not always remunerative. Like in well-developed corporations, the case of unique projects and specific human capital requires bearing high costs of sophisticated supervision. Problems with information asymmetry take place before contract establishment (*ex ante*) as well as after that (*ex post*). Furthermore, the cited information asymmetry refers also to the employee's real competences. Naturally, when these abilities are extremely specific, the principal has no opportunity to examine them clearly. Thus, the enticement for opportunistic behaviour mounts up (Samuelson, and Marks 2011).

Managers typically try to maximise their own profits, boost up carriers and stabilise current occupation. At the same time, owners would like to maximise the market value and profits of the firm (Walking, and Long 1984). The agency theory states also that managers usually take a short-term perspective unlike principals. It has to be mentioned that the agent having firm-specific human capital may have slightly different objectives. First of all, his own interests are more convergent with the owner's. The main reason for this situation is his knowledge specificity. As long as he is fully dependent on earnings from one company, he is prone to strive in order to improve his financial results. Moreover, such an agent should exert himself to keep his projects as the most important in the firm's strategy. As a result, the manager with firm-specific human capital will take care of both good short-term and long-term condition of the company. However, the analysed problem is very similar to classical agency theory assumptions: relations between the principal and the agent based on information exchange and the costs of opportunism reduction. Risk aversion, bounded rationality and utility maximising behaviour are present. Contractual problems are characterised by moral hazard, negative selection and risk participation. The relation between the principal and the agent, who may want to achieve different goals, is the essence of the problem (Eisenhardt 1989).

The company owner is able to impose on managers acting fully convergent with his goals only when there are no supervision costs. When these costs do not equal zero, a monitoring system will be undertaken only if profits from better control of agents exceed the cost of the adjusted supervision system (Marris 1964). The supervision cost issue is taken up also by O. Williamson who points to the relation between managers' behaviour and costs of measuring their effort. Williamson (1964) managed to show that positive costs of supervision lead to the discrepancy between choices of owners and managers.

Figure 4

Optimal employment level for firm owners and managers



Source: Alchian 1965: 36.

The firm profits (π) depend on the staff size (S), production volume (X) and external factors (E). Assuming that the optimal production volume is equal to $\acute{X} = f(S)$, the following expression is obtained: $\pi = g(\acute{X}, S, \acute{E}) = g'(S, E)$ (Williamson 1964). Profits of the firm are marked as *AA* curve and managers' utility as *UU*. Williamson states that managers' choice (point *L*) will not maximise the owners' profits (point *K*) if monitoring costs exist.

Also S. Ross (1973) did research on relations between the principal and the agent. He claims that agency relations should be perceived as social interaction between the two subjects. Ross pays great attention to information asymmetry. The key issue is the uncertainty if the employee does his work with maximal effort. More complex analyses of agency relations are conducted by M. Jensen and W. Meckling (1976).

Jensen and Meckling, apart from the supervision mechanism, propose developing some incentives structure. As an example, an employee who acts differently from the designated strategy is charged with bonding costs. The avoidance of all costs of agency relation is impossible. Manager's decisions that reduce the firm owner's utility generate residual loss. Agency costs are a sum of monitoring costs, bonding costs and residual loss. A lot of attention is devoted to the supervision issue. In view of firm-specific human capital singularity, monitoring employees with those special abilities is especially difficult and expensive. That is so because such an employee has an opportunity to strongly manipulate information. Of course, it depends also on the manager's position and the ownership structure. For instance, there are differences between monitoring in dispersed ownership and blockholder cases. There are disproportionately high costs of monitoring agents in the situation of dispersed ownership. Thus, rational apathy takes place, because supervision remains unworthy. On the other hand, managers are more prone to realise blockholders' interests instead of fulfilling other expectations. The next paragraph deals with the other mentioned incentive to fulfil the firm strategy – the agent's participation in ownership.

Reward systems are treated as motivators for efficient work and a toll for keeping the best managers in the company for a long time. When an agent gains a portion of the firm shares, besides his own interests, he pursues goals of the whole firm. The thing is that he starts to identify himself with the corporation. Of course, firm-specific human capital naturally causes that the employee takes care about the company but when he also possesses a fraction of shares, the risk of being redundant or completely subordinated disappears. Jensen and Meckling carry out an analysis of the relation between the agent's ownership degree and his tendency to disburse on non-pecuniary benefits. They postulate that a lower fraction of the agent's ownership results in higher expenditures on non-pecuniary benefits instead of investing in strategic projects of the firm. The main conclusion is that the manager's ownership of company shares positively affects the market value of the firm. The interests of the employee having firm-specific human capital may become convergent with those of the employer thanks to this form of rewarding. This method is far more certain than relying on the wage level.

Other notes– knowledge management and industry development impact

As it was mentioned previously, firm-specific human capital may emerge with corporate development and depends on investments made. According to that, the process of the employee's firm-specific human capital development can be somehow designed and planned (Bukowitz, and Williams 1999). Thus, knowledge management methods can be used.

Due to an interactive approach to knowledge management and learning organisation, the firm may implement procedures of knowledge accumulation often identified with knowledge codification. It is necessary to: define the purpose of codification, determine different forms of knowledge occurrence, rate the knowledge in terms of its usefulness and choose the right form of knowledge codification and distribution (Davenport, and Prusak 2000). Thanks to that, special knowledge forming firm-specific human capital can be stored and diffused to other employees. It is significant to concentrate not only on formal skills and abilities, but also on tacit knowledge (Polanyi 1966). The worker who holds unique human capital exchanges his knowledge with his colleagues. As a result, his bargaining power, while contracting with the employer, falls down. It happens because this employee becomes less irreplaceable and has to cooperate with the team. Additionally, it can boost the creativeness and innovativeness of the whole organisation. Concluding, management tools also play a role in relations between the employer and the firm-specific human capital holder.

Going back to the innovativeness issue, it is worthwhile to define precisely the time frames for the analysis of the interdependence between the employer and the employee presented in the previous sections. One of the assumptions states that firm-specific human capital evolution is linked with a problem of finding an alternative job opportunity that would correspond to possessed knowledge. Mechanisms of the contract construction should cause long-term convergence of the employee's and employer's targets in order to avoid high costs of renegotiations and internal conflicts. If there is one company which offers goods or services that require using firm-specific knowledge, such an organisation can be perceived as innovative. The entrepreneur is able to obtain profits, e.g. thank to innovation implementation. Corresponding to the Schumpeterian theory of the firm (Schumpeter 1934) and several modern approaches to innovation diffusion theories (Rogers 2003), after the phases of invention and innovation, innovation becomes widespread. Extraordinary profits encourage other companies to imitate innovations. As a result, firm-specific human capital becomes industry-specific human capital and its holder is able to find an alternative job opportunity in the case of being redundant. It means changes in bargaining power in contracting after some period. The entrepreneur should be, therefore, interested in concluding an optimal contract primarily in order to maximise profits from innovations.

Summary and conclusions

As the hypothesis states, the problem domain of this paper refers to relations between the firm owner and the employee characterised by firm-specific human capital. Problems generated within these relations were analysed using different institutional economics approaches.

Bilateral monopoly problems cause an increase in the transaction costs level. Information asymmetry, opportunism and tedious contract negotiations lower the ability to gain profits of both parties of the exchange. Vertical integration is considered to be the best solution to these issues. Asset specificity as well as transaction frequency (observed commonly in bilateral monopolies) are factors that definitely lead to vertical integration.

The human capital theory provides numerous findings about on-the-job trainings resulting in firm-specific human capital. This unique asset increases the worker's productivity only in one firm. There are some similarities between the described employer-employee relations and classical bilateral monopolies like both sides' strong interdependence or exchange subject specificity. However, due to other features, e.g. the transaction plane, the employee's subordination and a different nature of bargaining power in contracting, it is impossible to accept the assumption that relations between the employer and employee holding firm-specific human capital can be treated as an internal bilateral monopoly. Thus, the first part of the hypothesis has to be negated.

The second part of this paper referred to some proposals of solutions to interdependence caused by firm-specific human capital occurrence. The efficiency wage theory is insufficient in this case because of the employee's inability to find an equivalent alternative job and the absence of attractive wages outside the firm (adjusted to his competences). On the basis of transaction cost economics and the agency theory we were able to come to the conclusion that an offer of ownership fraction proposed to the employee holding firm-specific human capital makes his and the employer's interests convergent and contributes to decreased contracting costs. This solution is the best in the context of long-term cooperation, which confirms the second sentence of the hypothesis.

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Firm-specific Human Capital as a Contract Determining Factor – a Reason for Internal Bilateral Interdependence between the Employer and the Employee

Summary

As a result of its own strategy, gradual development, vertical integration or other factors, a firm may experience employing a worker with some firm-specific human capital. This situation implies a kind of interdependence between the employer and the employee whose knowledge and abilities can be perceived as a specific asset. Both parties become strongly interdependent: the employer has to rely on the employee and, on the other hand, the employee cannot change his workplace easily. The presented relations are compared to a bilateral monopoly situation in order to examine the possibility of using analogous research tools. This paper identifies difficulties accompanying the functioning of the firm, when the core business is based on firm-specific human capital and contains solutions referring to transaction costs economics and the agency theory.

Key words: transaction costs economics, vertical integration, human capital, specific assets, interdependence, efficiency wages, ownership, agency theory

Kapitał ludzki specyficzny dla przedsiębiorstwa jako czynnik determinujący kontrakt – przyczyna wewnętrznej wzajemnej zależności między pracodawcą a pracownikiem

Streszczenie

Firma, wskutek własnej strategii, rozwoju, integracji pionowej, lub innych czynników, może doświadczyć zatrudnienia pracownika o kapitale ludzkim specyficznym dla tejże firmy. Taka sytuacja implikuje pewien rodzaj współzależności między pracodawcą a pracownikiem, którego wiedza i umiejętności mogą być postrzegane jako aktywo specyficzne. Obie strony są silnie współzależne: pracodawca musi polegać na pracowniku, a ten z kolei nie jest w stanie łatwo znaleźć alternatywnej pracy opartej na wspomnianym kapitale ludzkim. Wskazane relacje są zestawione z problematyką monopolu bilateralnego, celem zweryfikowania możliwości zastosowania analogicznych narzędzi badawczych. W ramach tekstu skonceptualizowane zostały czynniki negatywnie oddziałujące na funkcjonowanie firmy, gdy podstawowa działalność opiera się na kapitale ludzkim specyficznym dla firmy. Artykuł prezentuje propozycje rozwiązania tego typu problemu, przy odwołaniu do teorii ekonomii kosztów transakcyjnych i teorii agencji.

Słowa kluczowe: ekonomia kosztów transakcyjnych, integracja pionowa, kapitał ludzki, aktywa specyficzne, współzależność, płace efektywnościowe, własność organizacji, teoria agencji

Человеческий капитал, присущий предприятию как фактор, определяющий контракт – причина внутренней взаимозависимости между работодателем и работником

Резюме

Компания, благодаря своей стратегии, развитию, вертикальной интеграции и другим факторам, может иметь дело с трудоустройством сотрудника, обладающего человеческим капиталом, соответствующим данной компании. Такая ситуация предполагает наличие определенной взаимозависимости между работодателем и работником, чьи знания и навыки могут восприниматься как конкретный актив. Обе стороны в значительной степени взаимозависимы: работодатель должен полагаться на сотрудника, которому, в свою очередь, не так уж легко найти альтернативную вакансию в другой компании, соответствующую упомянутому человеческому капиталу. Установлена связь этих отношенияй с проблематикой двусторонней монополии с целью верификации возможности использования аналогичных инструментов исследования. В тексте были подвергнуты концептуализации факторы, негативно влияющие на функционирование компании, когда основная деятельность основана на человеческом капитале, характерном для компании. Статья содержит конкретные предложения по решению этих проблем, со ссылкой на теорию экономики транзакционных издержек и теории агентств.

Ключевые слова: экономика транзакционных издержек, вертикальная интеграция, человеческий капитал, конкретный актив, взаимозависимость, эффективная заработная плата, теория агентств.

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