Communications Costs and Authority: Towards an Economic Theory of Management

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Abstract:

I propose a cognition technology capable of generating subjective beliefs which imply costs of learning and communicating. I argue that this technology can explain the emergence of post-contractual problems akin Williamson's (1985) TCE, but can also explain the emergence of leadership positions in teams by invoking the costs of group decision-making. Authority positions, however, suffer from the problem that dissent is invoked in favor of the position, but against the person holding it. I argue that authority delivers flexibility in the short-run, but the monopolization of ideas under the authority creates costs of hierarchy in the long-run. I claim that a theory of the firm can be generated by a theory of management without recourse to the concept of opportunism, and that this paper extends TCE in this respect.

Introduction

A recent survey by Gibbons (2005) distinguishes between four different traditions to analyze the boundaries of the firm: the 'control branch' focusing on ex post decision governance, and the 'contract branch' focusing on ex ante incentive alignment. One important insight from the survey is the need to better understand the costs of hierarchy. Seventy years after Coase (1937) called for a comparative cost analysis between market and hierarchical exchange, the literature on the subject matter is booming!

While the Gibbons paper represents a heroic attempt to summarize the extant literature on firm boundaries under one conceptual lens, it still leaves out areas more remote to economic analysis, and which address the issue of management more directly.

In traditional theories of the firm, the role of management reflects the dominating forces defining the firm as an entity in the respective theory. For Alchian and Demsetz (1972) the manager is an input monitor to detect shirking. In Williamson's (1985) Transactions Cost Economics, the manager is a judge presiding over internal conflicts regarding transfer prices between units of the firm. In the 'contract branch', the 'property rights' and 'agency' literatures are more concerned with designing the proper incentive framework to coerce the manager to take decisions in a way regarded 'best' as measured by some yardstick. The actual conduct of day-to-day management is indeterminate, or 'solved' in that the manager behaves 'optimally'. In a newer approach coming out of the Law and Economics literature, Hansmann, Kraakman and Squire (2006) or Blair and Stout (2006) reason that the firm as defined by corporate law is more consistent with a view of

management being entrusted to safeguard the firm against rent-seeking efforts from all stakeholders, including its owners.

Be it management as trustee, as judge, or as monitor, there seems to be a noticeable absence of the concept of central planning on the side of management, the way Coase (1937) may have seen it: "the reason why a worker changes from department X to department Y is not a change in relative prices, but because he is ordered to do so."

Nickerson and Zenger (2004) motivate their paper in the spirit of Simon (1962) to argue that the complexity of a decision-making situation requires different governance modes of the decision-making process¹. Their approach is noteworthy since they apply a comparative cost analysis of different modes of governance by putting management squarely at the centre of attention.

This analysis is closely related to Langlois (2007). Here, it is the 'judgement' of the entrepreneur that defines the centre of attention. Similarly to the problem solving approach by Nickerson and Zenger (2004), the entrepreneur organizes the things he needs in a market environment, or has to 'train' and 'educate' employees to make things for him. The entrepreneur's 'vision' is implemented by buying products and services or labor, by training suppliers or workers what to do. For more radical innovations, there may be no market infrastructure, and the hierarchy is chosen. For smaller innovations in an established field, a conducive market may exist, and a 'virtual firm' can be created.

Interesting in the analysis of Langlois (2007) is that the entrepreneur's 'vision' defines the

¹ Some of their conjectures seem to be at variance with Radner's (1992) ideas on problem solving and hierarchy in his survey on the economics of management.

origins of the firm. Whether the boundaries of the firm are narrow or wide depends on the extent of the market, or rather the need to educate suppliers rather than employees. Presumably, it is easier to educate employees rather than suppliers when innovation is more complex and radical. Like in Nickerson and Zenger (2004), entrepreneurial problem-solving stands at the centre of the governance decision.

However, Langlois (2007) is more explicit about the cognitive framework. When the entrepreneur 'educates' or 'directs' employees, the costs of communication and learning assume centre stage. Employees receiving a fixed salary can be expected to follow orders along the entrepreneur's lines, while independent suppliers living under market incentives perceive a greater necessity to understand the entrepreneur's logic, which may be (prohibitively) costly. With low-powered incentives within the firm, the entrepreneur may merely keep the workforce committed through 'charismatic authority', since the workers obeying orders do not lose anything as long as the firm survives in the market place.

It is this scant reference to the costs of communication and learning that sets the stage for the current paper. Like in Langlois (2007), it is the 'judgement' or 'strategic guidance' of management that defines the essence of the firm. I analyze a group of individuals committed to a joint effort. Unlike in Langlois (2007), there is no one individual pre-ordained to assume the role of entrepreneur and 'leader'. Rather, the question that is posed as to why a team with ah common mission may choose to create a leadership position. A key contribution of the paper is to suggest a cognition structure in the tradition of main-stream economic analysis that is in the end symmetrical to that of Langlois (2007). Since the key question is, how a team 'gets a job done', the problem solving perspective is central to the theoretical setup.

In this setup, I intend to show how the institution of leadership and authority arises endogenously from conflict generated by subjective knowledge of the different players. To be sure, this is exactly the question asked by Van den Steen (2007) in a formal modeling effort. Van den Steen (2007) models conflict by assuming individuals to possess different Bayesian priors generating possibly different decision recommendations in the joint undertaking. He then goes on to show that the joint effort under one authority may be superior to the possibility of break-up in a team of equals. Central to this concept is that the team produces value over and above the returns to be generated elsewhere in the economy, which also follows from my analysis below.

Unlike Van den Steen (2007), I do not go through a full formal modeling effort. Rather, it is my ambition to show – in a modeling context – that with rather reasonable assumptions on human cognition, the whole process of theory updating becomes rather complex, which leads to costly learning, sticky beliefs, and idiosyncratic 'views of the world', which Langlois (2007) labeled the actor's information infrastructure. I then follow the logic of Van den Steen to use the conflicting views of economic agents to derive the existence of authoritative office endogenously with reference to the communications costs generated by subjective beliefs. The institution of authority economizes on these communications costs.

I also link the nature of this office to the costs of hierarchy, thus contributing to the still open question of the comparative cost analysis of governance modes. In addition, I wish to make the case that the said cognition structure is also capable of deriving the post-contractual conflict that drives vertical integration under Williamson's (1985) TCE.

The paper proceeds as follows. Chapter one discusses salient features of Transactions Costs Economics to conclude that it leaves the question of authority indeterminate. Chapter two introduces the framework of individuals' knowledge, information, and belief structures that allow for communications costs. Chapter three exposes the problem of group decision-making in this environment, and analyzes the costs and benefits of different decision-making regimes. Chapter four serves to summarize and conclude.

1 Transactions Costs Economics and Authority

Transactions Cost Economics reasons that claimants to returns on relationship specific investments may never see the fruits of their investment due to post-contractual haggling problems motivated by opportunism in the presence of bounded rationality. Vertical integration, and a corresponding centralization of the residual claims, solves the problem by eliminating the haggling problem when dividing the returns between the interested parties.

While the answer is intuitively appealing, I argue that due to the assumption of bounded rationality, the solution may be dubious in some situations. The solution is truly unproblematic only in those cases, where the post-contractual problem is perceived *ex ante* in its entirety. In cases where two contracting parties face a regime shift – say due to a technological innovation – post-contractual problems may not be perceived at the time of the idiosyncratic investment because the contracting parties do not foresee a haggling problem due to bounded rationality.

In the case of *ex post* discovery of the haggling problem (e.g. the Fisher Auto Body - General Motors case), it is no longer clear, how vertical integration solves the problem. The appropriable

quasi-rent inherent in the specific investment will be vulnerable also in the negotiations of purchase price in an acquisition, or exchange offer in a merger.

The only problem that vertical integration solves in this situation is that it replaces a continuous re-contracting cum haggling scenario to a once-and-for-all fight. This argument illustrates that Transactions Cost Economics is in part a theory about the costs of difficult negotiations. Yet, such costs are ill-defined in economics, and the purpose of this paper is to illustrate the source for such costs more precisely. Neither does Transactions Cost Economics provide clear guidance to explain the large number of authority² positions in any economy³.

Consider the case where two contracting parties have recognized a potential post-contractual problem *ex ante*, and decide to integrate their structures. It is not clear, why the new structure shouldn't be led by two managers⁴. Absent a reason for putting the new structure again under the leadership of one manager, there is then obviously also no reason for the existence of any hierarchy inside any of the pre-merger structures. Transactions Cost Economics provides a clear answer to the question of vertical integration, but not to the question of management. In the following, I wish to present a theory of hierarchy and management, which then naturally extends to a theory of the firm as a hierarchy.

² That Transactions Cost Economics has an insufficient explanation for authority structures could be seen in a challenge by Dow (1987), with an insufficient rebuttal from Williamson (1987). There is no sufficient recognition of the potential for opportunistic authority.
³Radner (1992).

⁴ If there are two managers, we are back to the insight by Grossman and Hart (1986) that rent-seeking can continue within the firm.

2 Subjective Knowledge and Communication Costs

The purpose of this section is to sketch – within the language of orthodox economics – a cognition structure capable of capturing three things. First, it should motivate the existence of idiosyncratic information infrastructures, as Langlois (2007) called it. This serves the second purpose of provoking conflicting views of the world among agents, similar to the model assumptions by Van den Steen (2007), but includes thirdly the possibility of provoking post-contractual problems as described in TCE. The cognition structure attempts to be built on the language of the economic mainstream in order to be able to jointly generate results obtained by Williamson's (1985) TCE and Van den Steen's (2007) analysis of the authority relationship.

The key to the structure introduced below is that the complexity of the cognition structure makes learning costly, and beliefs sticky, which introduces communications costs. I then argue that a world inhabited by agents experiencing communications costs features both post-contractual problems giving rise to vertical integration as in TCE, as well as endogenously generating managerial positions endowed with authority.

2.1 Subjective Knowledge

What is meant here when knowledge is treated as subjective is that ultimately our conception of reality is created by a mapping of external stimuli onto our brain. To quote von Hayek (1942, p. 280): "The knowledge and beliefs of different people, while possessing that common structure which makes communication possible, will yet be different and often conflicting in many respects". Later (1943, p. 37), he argues: "All mental phenomena, sense perceptions and images as well as the more abstract "concepts" and "ideas" must be regarded as acts of classification performed by the brain."

Following Vilfredo Pareto (1935, p. 1122) I want to stress that this not turning into a metaphysical debate whether "subjective existence" does or does not imply "objective existence". However, Pareto made an important point regarding inference between subjective and objective: "The concept of sodium chloride `exists in the minds of men'. From that it is possible to conclude - though in actual practice the opposite course is followed, that a thing called sodium chloride must `exist'." This shall be our working hypothesis: objectivity is established by consensus.⁵ Let me then propose more formally, how I want to model subjective knowledge.

As in Jensen (1983, p.320), each agent understands the world according to a positive theory:

$$Y_i = f_i(X, Y_{-i}, Z)$$

where X is the (1xK) vector of decision variables

Y_i is the (1xN-1) vector of endogenous variables except Y_i

Z is the (1xL) vector of exogenous variables

and f_i is the functional relationship determining the value of the endogenous variable Y_i .

Every individual is characterized by an information partition⁶ over each variable.

$$P = \{P_0, P_1, ..., P_n\}$$

The variable is assumed to have outcomes lying in some measurable domain, and the information partition cuts this domain into n segments, where this number n is different for each of the variables. This information partition symbolizes what I call structural equivalence. Take

⁵The notion of the subjectivity of knowledge has also received some backing by two neuroscientists, (Maturana and Varela (1987)), who studied cognitive processes taking the workings of a nervous system as a starting point. Their theory is an evolutionary theory of the interaction of the mind with its environment. It is widely recognized that also Economics studies an evolutionary process, but that we like to represent the evolutionary process by a static equilibrium. Accordingly, when I represent the theory of an individual below, it appears to be a static "equilibrium of the mind".

⁶This definition of an information partition is slightly different from Aumann's (1976). His definition is here split

for example, the vector of the exogenous variables Z. We will say that a realization Z^1 is structurally equivalent to Z^2 , or

$$Z^1 \sim Z^2$$
 iff Z^1_{j}, Z^2_{j} - $[P^j_k, P^j_{k+1}]$ for all j=1,...,L and for all k=0,...,n-1
 $f_i(X, Y_{-i}, Z^1) = f_i(X, Y_{-i}, Z^2)$ for all i=1,...,N

This holds similarly for the X or Y variables. The best information partition would be one that covers every conceivable realization of the respective variable, in the extreme case the entire real line, while the worst information partition would cover only the end points of the domain $P = \{P_{min}, P_{max}\}$. Next I define a measurement partition:

$$Q = \{Q_0, ..., Q_m\}$$

This partition splits the domain of the respective variable into segments within which the person cannot distinguish among events⁷. The measurement partition may be finer or coarser than the information partition. It is conceivable that I can exactly measure a variable, but its outcome doesn't matter in my theory. Likewise, I can measure a variable only to some extent, possibly only so bad that several segments of the information partition fall within one segment of the measurement partition. A person's knowledge is defined by an L-dimensional probability density function over all exogenous variables, g(Z).

Now define a payoff function of returns

hence

$$\mathbf{R} = \mathbf{r}(\mathbf{Y}, \mathbf{Z}) = \mathbf{r}(\mathbf{F}(\mathbf{X}, \mathbf{Y}, \mathbf{Z}), \mathbf{Z}).$$

A person's utility function, is then defined as

$$U(R) = U(r(Y,Z)) = U(r(F(X,Z),Z)),$$

up into two parts, an information partition and a measurement partition (explained below).

⁷In the sense of von Hayek (1945, p.521), the information partition and the functional relationships correspond to knowledge of general principles, while the measurement partition as well as the probability beliefs g(Z) over the exogenous variables correspond to knowledge of time and place.

where F is the reduced form functional relation between all decision and exogenous variables that determine all endogenous variables. Decisions are made to maximize expected utility:

The agents' characteristics are completely specified with the sixtupel (f, P, Q, g, r, U)⁸. I assume that refinements of the measurement and information partitions as well as updates of the functional relationships f_i and r as well as probability beliefs g(Z) can be purchased at some cost (which may be infinity). The time frame of events is such that at time 0 the decisions X are made, while in time 1 the true outcomes of Y and Z are revealed, and the associated payoffs are distributed. The payoffs are determined by the **true** realizations of Y and Z, not the ones that the agent can identify through his measurement partition Q, or that matter in his theory through the information partition P.

In this situation, the agents perceive some uncertainty *ex post*: the payoffs may be different from those expected given realizations of Y and Z. This *ex post* uncertainty has three sources:

- a) The agent cannot observationally distinguish within a given class of realizations. True realizations cannot be observed with a coarse measurement partition.
- b) The agent cannot understand, why different outcomes of Y_i matter for payoffs when the information partition is too coarse.
- c) The function r that translates true outcomes into payoffs is not correctly perceived by the agent.

In addition, there are two sources for *ex ante* uncertainty. First, there is the subjective probability distribution over the exogenous variables. Then there is uncertainty about the subjectively held functional relationships f_i .

⁸Some variables Y_i or Z_j may not matter in some people's "view of the world". This is taken care of in this setup through the information partition: in the coarsest information partition $\{P_{min}, P_{max}\}$, variation in the respective variable does not determine other variables through the function f, or payoffs through r.

2.2 Theory updating and the infinite regress of knowledge

The objective of an agent with beliefs defined in the previous section is to minimize variation between anticipated and realized payoffs, which leads to inefficient choices in the decision variables X. The method to reduce payoff uncertainty is to use past data realizations to update our "view of the world."

I argue that the economic profession has captured only some elements of uncertainty inherent in the above structure: probability distributions over the exogenous variables are updated according to Bayesian principles or hypothesis testing. Similarly, the functional forms f_i between variables or payoff functions r are improved through hypothesis testing.

The methodological innovation here is the introduction of the information partition P. Agents can reduce payoff uncertainty by redefining the general concepts that in their view "make sense" in their world. Thus, an Eskimo may know fifty types of snow, because the distinction enables him to adapt more successfully to his environment: the refined information partition reduces outcome uncertainty and leads to more efficient choices in X. At the same time, the Indian in the Amazon basin has no concept of the construct "snow", as it doesn't matter to his survival (utility).

Generally, the information partition P extends beyond the concept of variables. A more appropriate definition of P would be the following: An agent's information partition separates the totality of all observable events into different general constructs – the variables. An agent defines these variables, because variation in them ultimately affects payoffs, hence utility. The variables an agent can observe are then a result of the agent's information partition, while the different outcomes the variable can take are a further refinement of the information partition.

Now, it should be clear why P is called an information partition: it corresponds to a utilitarian definition of information. Information is defined as the way a person organizes all observable events into logical constructs. The constructs are created by the agent so as to minimize variation between anticipated and realized outcomes given his actions in order to ensure most efficient actions.

The measurement partition Q – what the agent can actually observe – can be finer or coarser than P. A theory created by deductive reasoning may allow variation in constructs that are difficult to measure. Then, Q is coarser than P. Q may be finer than P if – for example – other agents have a theory in which a certain variable matters, the variable outcomes are made public, but some agents do not have a refined concept as to how variation in these outcomes affects their payoffs.

All elements of theory updating ultimately lead into an infinite regress. In the area of probability beliefs this has been pointed out by Harsanyi (1967-1968). In a game-theoretic setting, players have to develop "compounding expectations" over the possible player types: a probability distribution over player types, a probability distribution over other players' probability beliefs, and so on *ad infinitum*. The process has to be truncated arbitrarily by assuming some probability beliefs at some level to be common knowledge. Likewise, Stigler's (1961) model of information acquisition can only work, if the agent knows the Bayesian update function. Failure to know this leads to an infinite regress⁹.

Similarly, altering the information partition after the advent of "new data" invokes an infinite regress. In the words of Machlup (1966, p.60): "there is no such thing as `mere description'. The

⁹ This is in the end also the key to understanding Van den Steen's (2007) work: he arbitrarily truncates the infinite regress by assuming the Bayesian priors of each player to be indeterminate.

pre-scientific reports are already permeated with some theorizing on the part of the reporters as well as of those whose instructions or directions they follow." New observations require the existence of a corresponding information partition, but where did that originate? If all knowledge is subjective, the infinite regress is only avoidable by choosing an arbitrary truncation level. This truncation level forms the "root knowledge" that people rarely – if ever – question. Such root knowledge can be seen as a result of successful institutionalization¹⁰, and forms the basis for habitual behavior¹¹.

Elsewhere in the social sciences, the problems arising from the recognition of an infinite regress of knowledge can be found in institutional theory¹². Accepting some knowledge as a root (whether consciously rationalized or not) can be viewed as an internal institution, which in Simon's view forms the basis of any rational reasoning process. A culture could then for example be characterized by those roots of knowledge that its members have consented on by communication. In this sense, institutional theory can talk about institutionalization as a process of *creating reality*¹³. Recognizing the inevitability of an infinite regress of knowledge opens the way to view knowledge held individually or collectively in a culture as a self-referential system such as the social systems discussed by Luhmann¹⁴ (1987).

The infinite regress of knowledge implies that the definition of root knowledge is always to some

¹⁰In Simon's (1983, p.78) view: "But institutions provide a stable environment for us that makes at least a modicum of rationality possible."

¹¹In this sense, Rothenberg (1966, p.233) argues that "utility maximization ... is compatible with habit".

¹²See Scott (1987b) for a survey of institutional theory.

¹³Scott (1987a, p. 495).

¹⁴A dictionary is a self-referential system, as all words are defined by other words.

extent arbitrary (opposing belief structures may be supported by the same set of observations) there is very little "true" knowledge. Yet, relegating decision patterns to the realm of habit is "cost-effective" for the individual decision-maker. The more deeply rooted a paradigm, the more costly to replace it.

With all the deficiencies an agent's theory may have, a fundamental shake-up such as a substantial revision of the information partition is likely to increase the subjective beliefs about the variance between anticipated and realized payoff outcomes. The result is a stickiness in the agents' belief structures know in psychology as cognitive dissonance: it is – at least to some extent – rational to discard information that seemingly contradicts my theoretical beliefs.

The updating problem is complicated by the necessity to attribute outcome variation to the correct source of *ex post* uncertainty: variable definition, refinement of the information partition and measurement partition, and the return generating function r. This further contributes to stickiness of beliefs, although the truncation point of the infinite regress is somewhat arbitrary. Sticky belief structures have one important consequence: the coexistence of at times fundamentally opposing views, which – subjectively – are not contradicted by the same set of observations.

This is how I define communications costs. Agent's belief structures not only differ with respect to probability beliefs and functional relations between variables, but more importantly between information partitions. Agents' views of the world do not overlap, and are – even if the same language is used – not costlessly communicable. Witness the instructive title of Deborah Tannan's book on gender communication titled "That's not what I said". Try to imagine a

discussion between the Eskimo and the Amazon Indian¹⁵ about what is important in their respective lives.

Using the information partition, it is possible to define a distance measure between two "views of the world." For every separation point P_k^1 of one information partition, find the separation point P_l^2 of another information partition that deviates least from it, and define distance as the numerical difference between the two points. Ignore those separation points that merely represent a refinement of the other information partition. These mean that one person can distinguish more events within a class. The communication problem is supposed to be reflected in disagreement of the definition of the class itself. The extent of the communication problem can be defined as the sum of the numerical differences in the non-overlapping separation points of the respective information partitions.

Figures one and two illustrate the principles described above with two stylized information partitions of a better informed 'agent', and a less informed 'principal'. Figure one illustrates the typical problem of asymmetric information, but no communication problem, since the state definitions of principal and agent share common boundaries of their state partitions.



Figure 1: Stylized representation of asymmetric information in an agency relationship

¹⁵Extreme cases can also illustrate contracting problems. The Maori natives of New Zealand recently challenged the purchase of the islands by Great Britain, because the Maori language then did not have a construct for "ownership"!

In contrast, figure two illustrates a principal and agent situation, in which principal and agent *think* that they have a common understanding of state partitions, but all variable outcomes falling into the shaded area generate post-contractual problems – the world of TCE.



Figure 2: Stylized representation of a communications problem leading to post-contractual problems.

Given their cognition structure, principal and agent can communicate to define a contract as the finest perceived common coarsening of their information partitions, which in this case would be the principal's information partition as the contract partition. In the case of figure 2, this would inspire opportunistic renegotiation in all events falling into the grey shaded area.

3 Group Decision-making and Subjective Knowledge: The Trade-offs

Non-overlapping information partitions generate post-contractual problems that form one of the pillars of Transactions Cost Economics. If language (even legally precise contract language) generates contracts that define states where the contracting parties have non-overlapping information partitions, then there exist events, where the contracting parties declare different states, and hence have different contract interpretations, despite the observation of the same event.

Unlike in Transactions Cost Economics, I motivate such post-contractual problems without recourse to opportunism, but merely through communications costs. In that sense, disputes may arise due to "honestly differing opinions." Clearly, opportunism exacerbates the problem, but I wish to abstract from opportunism in the following to show that authority relationships arise due to communications costs alone.

Take the team from Alchian and Demsetz (1972) as a starting point. Synergies lead to nonseparabilities: the team needs to make a joint effort to realize the synergies. In Alchian and Demsetz (1972), all team members know what to do. The problem is merely how to overcome shirking externalities. However, in the presence of subjective views of the world, team members may have different ideas as to the best realization of synergies. Before the problem of overcoming shirking externalities lies the problem of defining the team's agenda. In the case of subjectively held information structures, this may be non-trivial.

This is a group decision-making problem, which may have one of three solutions. Either, the group agrees on a joint effort with a jointly defined decision-making rule. Or the group establishes a leader, whose orders are followed. Or members of the group leave the group to try to organize a similar effort themselves. The choices are: consensus, authority, and autonomy.

3.1 The problems with consensus

If sufficiently different views are forced together in a group decision-making situation, one of the following can happen: first, one member of the team 'convinces' the others of her viewpoint, which then becomes common knowledge, secondly all team members learn from each other and together establish a decision superior to what any one of the members of the group could have

established by themselves, or "irreconcilable differences" are diagnosed, and there is no outcome.

In all situations, group decision-making favors the status quo. In the first two situations, however, it is limited to the time it takes to convince the other team members or to arrive at a superior and enlightened consensus decision. There is a mere trade-off between acting immediately without the benefit of the insights from group members learning from each other, and waiting for the time it takes to reach consensus to pass, but then enjoying the benefits of a superior decision. In the second situation, the status quo is maintained indefinitely, as the group members cannot settle for a common course of action due to "irreconcilable differences".

In Transactions Cost Economics the investor in a specific asset fears expropriation, except that the 'opinions' of the expropriating side are not honestly different, but opportunistically motivated. Here, group decision-making can fail because of irreconcilable differences of opportunistically motivated opinions. This is the case of transaction failure in a pure market setup. Rather than opportunistically motivated views, I argue here that authority structures can arise because a) the irreconcilable differences are motivated by honestly differing views of the world, and b) there is a trade-off between decision-making speed and decision quality.

The latter point deserves further analysis. A number of situations can be perceived where the 'status quo' is actually a dynamic equilibrium delivering successively worse outcomes to all players. Then, "any decision is better than no decision", as the status quo is costly. A crucial dimension is the time we perceive to have to come up with a meaningful group solution, and the time we perceive to have until the status quo leads to a dismal outcome.

3.2 Authority as a solution

Kenneth Arrow (1974) cites the military as an institution that is an extreme example of authoritative governance. Imagine a platoon in the jungle during the Vietnam War that they have no platoon leader, with all members being of the same hierarchy and making decisions democratically. Now the democratic platoon runs into an ambush. There could be two reactions. Either, the response is that "this problem calls for immediate discussion". During the deliberations of how to react best, most likely all members will be killed. Knowing this potential outcome, each soldier may quickly disperse into a different direction (autonomy), thereby effectively dissolving the platoon, and each soldier loses the protection that the proximity to the others has given him before. In this case, it is clearly preferable that one leader orders the platoon to escape into (any) one direction. A group deliberation of the problem is clearly impractical. The benefit of the authority solution here is to force a cooperative game on the players that would take too long to establish by consensus.

Yet, the decisive point of the authority solution is that any decision is made, not necessarily the benefits of playing a cooperative game. This is illustrated in Herbert Simon's (1978) example of a congressional advisory body on air pollution. The group had, after months of deliberation, come up with the recommendation that "we need more research". This is another way of saying that there was no consensus among group members of what the best course of action would be. But is doing nothing, the status quo, the best alternative in this situation? We can envision situations where it is preferable that some environmental legislation is passed even without knowing the exact causalities of air pollution. Sometimes, going somewhere is better than going nowhere. That we need authority at least in some situations seems clear. The question, however, is who should fill that role?

3.3 Who is the leader? The fundamental paradox of authority positions

Carter (1979) distinguishes authority as knowledge and authority as power. Going with the former as a normative prescription, the leader should be viewed as an expert in the field of decision-making she is supposed to fill. Yet, there are some fundamental problems with the selection mechanism and the authority position itself. When a team decides to abandon group decision-making and elect a leader whose orders are to be followed, it requires a belief from every team member that the benefits of swift action outweigh the subjective perception of inefficient decisions. Stalemate in the group decision-making procedure arose because team members were not able to adequately communicate their information partitions, and refine them in the process. Hence, even though the group decides that it is in its best interest that it elects a leader, individual group members will *ex post* dissent with the leadership¹⁶. Authority without dissent is therefore redundant. Hence, authority needs power to enforce its decisions¹⁷. This power is supported either by outright ownership or by the delegation of decision rights by the owners of the property rights. If the authoritative office is to have any meaning, its holder has to have property rights, or decision rights derived from property rights.

This implies two problems. First, while the creation of an authority position may be understandable, the selection procedure of the leader is not. Say that a person's track record is an indication for the quality of her "views of the world." Given the ambiguities of individual theories a good track record may indicate both wisdom and luck. Past performance is no

¹⁶ In a way this is synonymous to the argument of Langlois (2007) that hierarchy would become obsolete in a static world since at some point all knowledge would be out in the open and shared by everyone. The entrepreneur as a radical innovator would cease to exist. This line of reasoning shows how authority is tied to the concept of conflict. Hence also the necessity for Van den Steen (2007) to generate conflict by assuming different Bayesian priors.

indication for future performance. Furthermore, in radically changing environments, agents "partial equilibrium theories" may become obsolete, and a leader should be replaced.

This invokes a fundamental paradox. Authority without dissent is redundant. Yet, authority should be dismissed if there is "too much" dissent. Authority needs power to enforce its views in the face of dissent. Yet power creates an obstacle to change in the case of "justified dissent." As much as dissent is invoked to defend the leadership position, it is invoked against the person who fills it. This contradiction is inherent in all authority positions.

3.4 Autonomy

Because of this leadership paradox, leadership positions are 'sticky' by necessity. One answer is to enact clearly defined rules for leadership replacement: elections in a democracy, shareholder votes in corporate governance¹⁸. Yet, these rules are no more than a compromise. The crucial issue is again one of time. Frequent leadership changes leave the respective institution in a permanent state of transition. As soon as one leader's views of the world are materializing in concrete policy, leadership is changed, a new philosophy invoked. These "transition costs" establish an optimal minimum duration for leadership positions.

Yet, the potential fallacy of the leader's 'judgement' creates a need for a different solution: autonomy. The option to leave a team and establish an alternative under a different philosophy

¹⁷ The possibility that dissent continues in the firm is somehow symmetrical to the insight by Grossman and Hart (1986) that rent-seeking can continue within the firm.

¹⁸This is the note on which Kenneth Arrow (1974) ends his essay: "Authority is undoubtedly necessary for the achievement of an organization's goals, but it will have to be responsible either to some form of constitutionally planned review and exposure or to irregular and fluctuating tides of disobedience."

counteracts the potentially paralyzing monopolization of opinions in a hierarchy¹⁹. This is potentially the most important argument against a planned economy, and parallels Hayek's (1945), who argued that a market system incentivizes people to trade on privately held "knowledge of time and place" to the ultimate benefit of all. Here, I argue that a pluralistic system allows society to experiment with new ideas, or Hayek's "knowledge of general constructs." The philosopher Karl Popper once said that "science progresses through trial and error". The ultimate cost of authority is to limit "trial" through the monopolization of ideas.

The central logic of this section runs as follows. The theories economic agents hold are subjective and never totally verifiable in an objective sense, hence never "true." For one thing, this exposes a problem of group decision-making situations favoring the status quo due to communications costs. Yet, if an authority position is created to combat the costs associated with this problem, the person who fills it has ultimately no objectively legitimate reasons to monopolize his ideas, and hence must be subjected to some kind of review. As the review intervals may not be too short, society must allow the exit option to benefit from experiments with different individual theories, which – individually – are by necessity incomplete. This, however, is one of the conclusions brought forward by Karl Popper (1945) in his "The Open Society and its Enemies". While Popper as a philosopher advocated the pluralistic principle on moral grounds, we ascribe an efficiency dimension to a society allowing 'trial and error'.

The insights gained from the above analysis go beyond Transactions Cost Economics. It is possible to use the assumption of subjective and incomplete individual theories to generate a

¹⁹The experience of Ross Perot is a case in point. While working for IBM, he argued that IBM should get into the software business. After IBM's management rejected the idea, Perot took a few people from IBM with him to create EDS, and became a billionaire! The same thing happened in Germany, where IBM employees created SAP, one of the most successful addition to the German stock market ever.

theory of management without recourse to opportunism. Authority solutions economize on communications costs. At the same time, the costs of autocratic regimes are exposed, and yield powerful arguments as to why there is actually a trade-off between market and plan, autonomy and hierarchy. Transactions Cost Economics only gives a partial explanation as to the benefits of vertical integration: all other things equal, increasing asset specificity increases the desirability of vertical integration. There are no arguments for why the market is *ex ante* superior.

I am claiming here that the monopolization of ideas in a hierarchy – while beneficial in the short run – may represent the most significant cost of hierarchy in the long run. Since the authoritative office is sticky by design, exit and autonomy are more promising venues to enact socially valuable 'trial and error' than internally organized 'rebellion' and leadership transition. This is my central argument as to why the world is not (and should not be) one firm, and it mirrors Popper's (1945) advocacy of pluralism in the 'free society'.

3.5 Opportunistic Authority

It is my intention to demonstrate in this section that the introduction of opportunism merely exacerbates the problem of sticky authority positions, but does not fundamentally shift the equilibrium to a new quality. Opportunism has two consequences. First, as in Transactions Cost Economics, haggling about quasi-rents inherent in specific assets occurs because of self-interest, not only honestly differing opinions. Secondly, if people have a utility function that values autonomy or power²⁰ next to monetary gains, then they will have opportunistic motivations to seek leadership positions. In political philosophy, this was recognized by Karl Marx.

²⁰As argued by Coase (1937).

Marx studied authority also in the context of the economic system. He explicitly recognized two sides to authority: management and exploitation²¹. The former kind is needed as a condition of production. Marx's recognition of this aspect is undoubtedly proof that despite his legitimization for the rejection of authority, he was by no means an anarchist. Engels²² wrote: "There is a kind of authority, which is inseparably linked with all organization, a kind of subordination, based on functional-rational assumptions to genuine management and performance-labor discipline. Such functional authority is necessary in every social organization as a condition of production." Opportunistic authority can abuse the power that is necessary for the enforcement of authoritative rulings, which is what he calls "the private appropriation of social interests²³."

Opportunistic authority also faces opportunistic opposition. Dissent – inherent in all autocratic regimes – may be opportunistically motivated. This is an additional reason to endow the authority position with power. This power may then be used to defend the authority position in an opportunistic way. Opportunism accentuates the contradiction that dissent is invoked for the leadership position but against the leader. The means of power – an army to fight insurgents, the right to dismiss uncooperative employees – prolong the staying power of the leader, and thereby increase the value of leaving the exit option open.

Yet, the problem of opportunism merely increases the cost of authority, and also group decisionmaking, as a decision stalemate may be a result of opportunistic behavior of team members. The

²¹Marcuse (1972, p. 132).

²²Engels (1960), recited in Marcuse (1972, p. 135).

²³Marcuse (1972, p.138).

exit option, or autonomous solutions, becomes more desirable, *ceteris paribus*. The basic tradeoffs, however, between the decision-making regimes can be derived merely through recourse to subjective knowledge and the resulting communications costs. The ambiguities surrounding the nature of the authoritative office that cloud the issue of management transition define the costs of hierarchy.

With all the downsides associated with positions of authority, we have to ask again, why they should be created at all. It must be clear that there *must be economic value added* from the economic activity pursued by a team under the authority of a leader. But why should there be such value added? Van den Steen (2007) assumes such value added to exist, since his model of authority only works if the leader can pay efficiency wages to workers subordinating themselves to her authority. The efficiency wages must outpace each worker's next best options in the labor market. However, inasmuch alternative employment is available only in other authority-led teams standard labor market equilibrium obtains irrespective of the authority issue: workers migrate to employments where their ability yields the highest value added, which is independent of the authority issue²⁴. It is only if we imagine a primitive society that we see that the value added of the teams compares to self-sufficiency a là Robinson Crusoe. With this comparison in mind, it is easy to recognize the social benefits of authority led teams.

In a mature economy, however, the costs of hierarchy defined as leadership rigidities and the monopolization of ideas are constantly held in check by workers' propensities to become self-employed and create their own business.

²⁴ At least as long as we assume that different leaders cannot be distinguished by their propensity to exploit workers opportunistically.

In summary, then, I argue that leader-driven teams emerge in an economy because of the rigidities of the group decision-making process when economic agents hold subjective beliefs that inspire significant communications costs. In this world, teams choose the leadership office for reasons Coase and Hayek would label centralized planning, Langlois would call 'judgement', and I would call 'strategic guidance'. Whatever we call the phenomenon this paper has argued that it defines a theory of the firm from an economic theory of management.

The following table seeks to compare the implications of Transactions Cost Economics for management with the insights generated in this paper:

Theory	TCE	Authority	
Cognition	Bounded Rationality	Subjective Knowledge	
Source of Disagreement	Opportunism	Differences in Judgement (And Opportunism)	
Source of Rents	Specific Assets	Returns to Innovation (And Specific Assets)	
Role of Manager	Judge over Transfer Prices	Judge over Strategic Initiatives (And over Transfer Prices)	

Table 1: Comparison of theoretical structure motivated in this paper with TCE

Since bounded rationality is a consequence of the subjective beliefs defined in this paper, I view the arguments proposed here as compatible with TCE, but that they are capable of explaining the phenomenon of interpersonal authority, which is not directly addressed in TCE. A firm can be created without recourse to opportunism, but opportunism exacerbates the cost of hierarchy.

4 Conclusion

The economic theory of the firm so far contains an only insufficient theory of management. This paper introduces a cognition structure that is capable of explaining hierarchies characterized by a leadership that performs the task of economic planning for the subordinates. The trade-offs between group and autocratic decision-making originate from communications costs that result from subjectively held beliefs. Communications costs lead to consensus regimes favoring the status quo, which in a dynamic setting may be prohibitively costly to all parties.

Hierarchical solutions are superior when maintaining the status quo is too costly. Yet, the monopolization of ideas is the major cost factor of hierarchy. It necessitates the creation of review procedures of the authoritative office, and mandates that society keep the exit option open to foster a beneficial marketplace of ideas.

A fundamental paradox of all authority positions is exposed. Without dissent, the authoritative office is redundant. Yet, dissent is invoked against the leader in the review procedure. This contradiction mandates that the authoritative office be endowed with power to enforce its decisions, while at the same time creating stickiness in all authoritative positions. This problem is magnified with the introduction of the assumption of opportunism, but can be derived by merely resorting to communications costs.

In this sense, the conceptual framework presented here represents an important addition to agency theory and Transactions Cost Economics. Agency structures and agency problems arise not merely due to ill-spirited self interest seeking, but also due to the ambiguous nature of subjectively held beliefs that yield a communications problem. Agents' theories are ambiguous, because an individuals' answer to the unavoidable infinite regress of knowledge is to some extent arbitrary. Teams elect leaders to combat inertia resulting from the associated communications problem. Hierarchy structures arise endogenously because they economize on communications costs. With that, an economic theory of management is part of an economic theory of the firm. Yet, the forces contributing to the flexibility of authority-led teams are costly in the long run when leaders (opportunistically) overstay their welcome.

BIBLIOGRAPHY

Alchian, Armen A., and Demsetz, Harold (1972): "Production, Information Costs, and Economic Organization", *American Economic Review*, December.

Alchian, Armen A. and Woodward, Susan (1988): "The Firm is Dead, Long Live the Firm. A Review of Oliver E. Williamson's `The Economic Institution of Capitalism'", *Journal of Economic Literature*, March.

Aoki, Masahiko (1984): "Aspects of the Japanese Firm", in Aoki, Masahiko (ed.): "*The economic analysis of the Japanese Firm*", North Holland, Amsterdam, New York, Oxford.

Arrow, Kenneth J. (1974): "The Limits of Organization", W.W. Norton & Co. Inc., New York

Aumann, Robert J. (1976): "Agreeing to Disagree", The Annals of Statistics, Vol. 4, No. 6.

Blair, Margret M. and Lynn A. Stout (2006): "Specific Investment and Corporate Law", *European Business Organization Law Review*, Vol. 7 No. 2, pp. 473 - 500.

Carter, April (1979): "Authority and Democracy", Routledge & Kegan Paul, London, Henley and Boston.

Coase, Ronald H. (1937): "The Nature of the Firm", Economica N.S.

Dow, Gregory K. (1987): "The Function of Authority in Transaction Cost Economics", *Journal of Economic Behavior and Organization*, Vol. 8, No. 1, pp. 13-38.

Engels, Friedrich (1960): "On the Principles of Authority", Marx-Engels Werke, Berlin.

Gibbons, R. (2005): "Four Formal(izable) Theories of the Firm?", Journal of Economic Behavior and Organization, Vol. 58, pp. 200-245.

Grossman, Sanford and Oliver Hart (1986): "The costs and benefits of ownership: a theory of vertical and lateral ownership", *Journal of Political Economy*, Vol. 91, pp. 691-719.

Hansmann, Henry, Reinier Kraakman and Richard Squire (2006): "Law and the Rise of the Firm", *Harvard Law Review*, Vol. 119, pp. 1333-76.

Harsanyi, John C. (1967-1968): "Games with Incomplete Information Played by 'Bayesian' Players", Parts I-III, *Management Science*, November 1967, January 1968, March 1968

von Hayek, F.A. (1942-1944): "Scientism and the Study of Society", Parts I-III, *Economica*, August 1942, February 1943, April 1944

_____ (1945): "The Use of Knowledge in Society", American Economic Review, September

Holmström, Bengt and Paul Milgrom (1991): "Multi-task Principal-Agent Relationships: Incentive Contracts, Asset Ownership, and Job Design", *Journal of Law, Economics and Organization*, Vol. 7, pp. 24-52.

and _____ (1994): "The Firm as an Incentive System", *American Economic Review*, Vol. 84, pp. 971-991.

Klein, Benjamin, Robert G. Crawford and Armen A. Alchian (1978): "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process", *Journal of Law and Economics*, October.

Krupp, Sherman Roy (Ed.) (1966): "The Structure of Economic Science", Prentice-Hall, London, Sydney, Toronto, New Delhi, Tokyo.

Langlois, Richard N. (2007): "The Entrepreneurial Theory of the Firm and the Theory of the Entrepreneurial Firm", *Journal of Management Studies*, Vol. 44 No. 7.

Luhmann, Niklas (1987): "Soziale Systeme", Suhrkamp Verlag, Frankfurt a.M., Germany.

Machlup, Fritz (1966): "Operationalism and Pure Theory in Economics", in Krupp (1966), pp. 53-67.

Marcuse, Herbert (1972): "A Study on Authority", First published as "Studien uber Autoritat und Familie", Librairie Felix Alcan, Paris 1936, reprinted in Marcuse, Herbert: "Studies in Critical Philosophy", NLB, London.

Maturana, Humberto R. and Varela, Francisco J. (1987): "The Tree of Knowledge", New Science Library, Shambhala Publications, Boston, London.

Nickerson, Jack A. and Todd R. Zenger (2004): "A Knowledge-Based Theory of the Form – The Problemsolving Perspective", *Organization Science*, Vol. 15 No. 6, pp. 617–632.

Nickerson, Jack A. and Todd R. Zenger (2006): "Envy, Comparison Costs, and the Economic Theory of the Firm", mimeo, Olin School of Business, Washington University of St. Louis.

Pareto, Vilfredo (1935): *"The Mind and Society"*, Vols. III and IV of "A Treatise on General Sociology", Arthur Livingston, Editor, Harcourt, Brace and Company.

Popper, Karl R. (1945): "The open Society and its enemies, Vol. 2", Routledge & Kegan Paul.

Radner, Roy (1992): "Hierarchy: The Economics of Managing", Journal of Economic Literature, Vol. 30, pp. 1382-1415.

Rothenberg, Jerome (1966): "Values and Value Theory in Economics", in Krupp (1966), pp.221-242

Scott, W. Richard (1987a): "Organizations: Rational, Natural, and Open Systems", 2nd ed., Prentice Hall, Englewood Cliffs.

(1987b): "The Adolescence of Institutional Theory", Administrative Science Quarterly.

Silver, Morris (1984): "Enterprise and the Scope of the Firm", Martin Robertson, London.

Simon, Herbert (1951): "A formal theory of the employment relationship", *Econometrica*, Vol. 19, pp. 293-305.

_____ (1962): "The Architecture of Complexity", *Proceedings of the American Philosophical Society*, Vol. 106, No. 6, pp. 467-482.

(1978): "Rationality as Process and Product of Thought", American Economic Review, May.

(1983): "Reason in Human Affairs", Stanford University Press, Stanford.

Stigler, George J. (1961): "The Economics of Information", Journal of Political Economy

Van den Steen, E.J. (2007): "Interpersonal Authority in a Theory of the Firm", mimeo, MIT.

Williamson, Oliver E. (1985): "The Economic Institutions of Capitalism", Free Press, New York.

_____ (1987): "Transactions Costs Economics: The Comparative Contracting Perspective", *Journal of Economic Behavior and Organization*, Vol. 8, No. 4, pp. 617-625.