Why Do Firms Exist?
Towards an Evolutionary Theory of the Firm

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The traditional explanation for the existence of firms in terms of transaction costs conceptualizes the firm as a problem in the context of neoclassical theory. The purpose of this paper is to consider the firm as a problem in the context of evolutionary theory. An evolutionary perspective calls for an explanation of the existence of firms in historical, rather than market, terms. The paper shows that such an historical explanation requires a reformulation of the question ‘why do firms exist’ into two more fundamental questions, and specifies the building blocks of an evolutionary theory of the firm that can answer these questions.

1. Introduction

Three questions are central to the theory of the firm (cf. Holmstrom and Tirole, 1989; Foss, 1996): Why do firms exist, how do they differ from each other, and how are they organized? The traditional answers to these questions have been developed in terms of contractual views of the firm. The question ‘why do firms exist’ has been answered by transaction cost theory (Coase, 1937; Williamson, 1975, 1985), which has also been used to explain the differing scale and scope of firms by predicting their efficient boundaries, while its internal organization has been addressed by agency theory (Fama, 1980). In essence, contractual theories of the firm study firms as an alternative to the market, and explain the existence, boundaries and internal organization of the firm in terms of the failure of the market to align incentives.

The way in which contractual theories of the firm frame the problem of explaining the existence of firms is an artifact of neoclassical theory. The significance of the Coasian question ‘why do firms exist’ derived from the fact that firms were an anomaly if the assumptions of the neoclassical model of perfect competition were expected to hold. Without discounting the insights that have been derived from contractual views of the firm, this paper reframes the theoretical problem of the existence of firms in the context of evolutionary theory. The purpose of the paper is to explore how evolutionary theory would answer the three questions that are central to the theory of the firm. This requires an explanation of the existence of firms in historical, rather than market, terms.

The paper will address this question from the evolutionary perspective on socio-economic organization that is now emerging in the literature that bridges evolutionary biology and the social sciences (e.g. Sober & Wilson, 1998; Bowles & Gintis, 2003; Henrich 2004; Richerson
& Boyd, 2005). The approach will be to concentrate on the question ‘why do firms exist’ and show what the implications of an evolutionary perspective on this question are for our understanding of the differences between firms and their internal organization. It will be shown that extant theories give what evolutionary theorists call ‘proximate’ explanations of the existence of firms, and it will be argued that these explanations need to be complemented with what evolutionary theorists call ‘ultimate’ explanations.

It will be argued that the search for ultimate explanations calls for translating the question ‘why do firms exist?’ into two more fundamental explananda about socio-economic organization. These explananda are the unique human ability to sustain large-scale cooperation among non-kin, and the evolution of voluntary and temporary membership of socio-economic groups. The building blocks of the evolutionary perspective that is emerging to address the first of these explananda will be specified, and it will be shown that this perspective also allows the specification of a plausible dynamic to address the second explanandum. An evolutionary explanation of the existence of firms also has implications for our understanding of the differences between them and the way that firms are organized.

2. Evolutionary reasoning and the theory of the firm

The idea to apply evolutionary reasoning to the firm is not new, so one might ask if evolutionary theory has not already been used to address the question ‘why do firms exist?’. In fact, doesn’t an evolutionary theory of the firm that answers all three questions outlined above already exist? Surprisingly, it does not.

Consider, for instance, the theory of the firm that features in Nelson and Winter’s (1982) seminal contribution to modern evolutionary economics. The organization-theoretic foundations of their theory (discussed in chapters 3-5 of the book) treat in admirable detail the nature of decision-making and of organizational skills and capabilities. It is in this part of their work that Nelson and Winter do what neoclassical theory had not done: develop a view of what happens inside firms that is consistent with reality. But the end result of this appreciative theorizing is that the subtleties of what has been discussed are reduced to the notion that the behavior of firms is routinised. This is an important step toward the models in the rest of the book, which are based on the evolutionary logic that firms respond to selection pressure from the market by local search for new behaviors that become routinised when successful. It is in this way that Nelson and Winter implement the variation (local search), selection (competitive pressure), retention (routines) logic of an evolutionary explanation. But note that this is not done to explain anything about the firm as such. In the words of Nelson (quoted in Foss, 2001):

‘The treatment of firms in our models and in neoclassical ones is similar in many respects. Our interest is in what happens to variables defined at the level of an industry or economy. The only attributes that are modeled are those that bear on these matters.’

When it comes to answering the question ‘why do firms exist’ Nelson and Winter’s approach resembles the way in which Darwin’s treated the origin of species. As Dennett (1995) has pointed out, Darwin ‘started in the middle’ by assuming that species existed, and then set out to detail the process by which they evolve. Despite the title of his major work, Darwin did not in fact explain the origin of species. Neither do Nelson and Winter explain why firms exist. They start from the entirely reasonable assumption that firms exist and detail the process by which they evolve. Given this assumption, an explanation of the origin of firms is not given,
nor, given the purpose of their work to explain phenomena at level of industries or economies, required. Nelson and Winter simply did not set out to develop a theory of the firm.

However, because Nelson and Winter’s theory of economic change is painstakingly grounded in a realistic view of the firm, we may nevertheless ask how their work contributes to developing an evolutionary perspective on the three questions of the theory of the firm. In fact, the question ‘why and how they are different’ is tackled head on (see also Nelson 1991), and answered in terms of the variation-selection-retention logic leading to differences in productive knowledge, efficiency and, as a result of this, differences in growth and profitability. The question ‘how are they organized’ is not considered in much detail, other than pointing to the central role of bounded rationality in necessitating routinised behavior. And the question ‘why do they exist’ is not considered at all.

This last assertion may seem to run counter to the views of proponents of a view of the firm that is linked to Nelson and Winter’s approach, and is in part descendant from it. The competence, capabilities, or knowledge-based view of the firm looks upon the firm as a repository of productive knowledge, or capabilities (Kogut and Zander, 1992, 1996; Conner and Prahalad 1996; Grant 1996; Spender 1996; Hodgson, 1998; Loasby, 1998). Whereas Nelson and Winter developed their view of the firm as an alternative to neoclassical theory, the proponents of the knowledge-based theory of the firm see their view as an alternative to contractual theories of the firm in general, and transaction cost theory in particular (Foss, 1993, 1996). One of the claims of the knowledge-based view of the firm is that it offers an alternative explanation of the existence of firms. Whereas contractual theories of the firm explain the existence of firms in terms of minimizing transaction costs, knowledge-based views of the firm point to the firm’s role as a carrier of knowledge and its superiority in transferring this knowledge in space and time. However, this approach still conceptualizes the firm as a problem that needs to be explained in terms of an alternative to the market and thus upholds a neoclassical perspective. Without discounting the view of the firm as carrier of productive knowledge, the question remains: how did firms become this vehicle? As will be argued below, a properly evolutionary explanation of why firms exist needs to cast in historical terms.

Foss (2001, p.325) sums up the state of affairs:

‘…I think it is fair to say that within recent evolutionary economics the theory of the firm has not at all been given the attention on a par with the attention given to, for example, technological change. That firms are normally featured in evolutionary economic theory as agents of change, embodiments of productive knowledge, and representations of diversity in microbehaviors does not fundamentally challenge this observation: what is key is that firms are not explananda, but are intermediate steps in the explanatory logic. Thus the role of firms in most of evolutionary economics is not fundamentally different from the role of firms in standard neoclassical economics – they are part of the explanans, not of the explanandum.’

3. Why Do Firms Exist? An Evolutionary Perspective

What can an evolutionary perspective tell us about why firms exist? In 1963, the ethologist and Nobel prize winner Niko Tinbergen (the brother of the economist and Nobel laureate Jan Tinbergen) formulated four famous ‘why’s’ that encapsulate the evolutionary perspective. These four questions incorporate the equally famous distinction by the late Ernst Mayr (1961) between proximate and ultimate causes in biological explanation (Table 1). Mayr’s distinction
and Tinbergen’s four questions provide a fruitful framework to reconsider the problem of the firm in an evolutionary context.

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<tr>
<th>Mayr (1961)</th>
<th>Tinbergen (1963)</th>
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<td>Proximate (how?)</td>
<td>-Mechanistic explanation</td>
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<td>-Ontogenetic (developmental) explanation</td>
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<td>-Phylogenetic (evolutionary) explanation</td>
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**Table 1: Evolutionary explanations**

Tinbergen pointed out that when a biologist asks why an animal behaves the way it does, there are four types of explanation that can be called upon. A *mechanistic* explanation would explain the behavior of an animal in terms of its immediate causes, for instance the migratory behavior of a bird that is triggered by the shortening of the days or a drop in temperature. An *ontogenetic*, or developmental, explanation would explain this behavior in terms of the genetic endowment that underlies this revealed behavior, or in other words in terms of the genes inherited by the bird and the way in which these genes are expressed in the physiology that makes the bird react to the shortening of the days. In Mayr’s terms, these are *proximate* explanations, which is to say that they explain *how* the behavior of the individual animal comes about by pointing to the immediate causes of that behavior. In biology, such explanations are the domain of molecular biologists and anatomists. But the logic of biological explanation doesn’t stop there. In fact, evolutionary biologists are more concerned with the remaining two types of explanation. A *functional* explanation would explain the behavior of an animal in terms of its survival value, for instance the migratory behavior of birds that eat insects is explained by the fact that they would starve if they would spend the winter in a cold place that doesn’t support insects. And a *phylogenetic*, or evolutionary, explanation would explain how a history of natural selection has shaped the gene pool of the species so that it can adequately respond to the stimuli from its environment such as the drop in temperature. In Mayr’s terms, these are *ultimate* explanations, which is to say that they explain the *why* of the behavior of the species by pointing to its evolutionary history.

How would we look upon firms if we adopt Tinbergen’s explanatory framework? Rather than considering firms in the abstract terms of a (binary) decision between market and hierarchy as the most efficient form of governance, we would want to study them in terms of the variety of the actual firms we observe in the real world and the ways in which they behave. We would then want to explain this behavior in terms of its proximate mechanisms and ultimate causes. Such explanation would involve uncovering the mechanisms that explain how the firm’s specific way of responding to environmental cues comes about (a mechanistic explanation), and a consideration of the (dis)functionality of this way of responding, or, in other words, why the firm would behave this way (a functional explanation). In addition to these comparatively static analyses, it would also involve a consideration of the dynamics of how the individual firm has developed its specific way of responding to environmental cues (an ontogenetic explanation), as well as an historic explanation of why certain ways of responding to environmental cues have evolved over economic history (a phylogenetic explanation).

When seen against this backdrop, extant theories turn out to concentrate on mechanistic and functional explanations, with knowledge-based theories beginning to address developmental explanations. Transaction cost theory focuses on the subset of firm behavior that involves
make or buy decisions and gives a mechanistic explanation in terms of a decision that is made in response to environmental cues about such things as asset specificity. The functional explanation of the resulting behavior is in terms of efficiency. Knowledge-based theories consider the subset of firm behavior that is directly linked to productive activities and gives a mechanistic explanation in terms of search behavior that is triggered by competitive pressures. The functional explanation of the resulting behavior is in terms of competitive advantage, while the incorporation of organizational learning also invokes the logic of a developmental explanation.

What extant theories don’t do is give a phylogenetic explanation of why firms are what they are. In biology, phylogeny considers the way in which life on earth has changed over evolutionary history. That it has changed was the centerpiece of Darwin’s theory of evolution, and his explanation of how the interplay of variation and selective retention explained the process and its adaptive outcomes has been his lasting contribution to evolutionary theory. An evolutionary theory of the firm that would take inspiration from Darwin’s contribution, then, would first and foremost want to explain the process by which firms have evolved. Such an explanation is of necessity an historical explanation, which traces the ‘tree of life’ of socio-economic organization back to its origins and explains how the process that gave rise to this evolutionary tree has unfolded over time.

Tracing socio-economic organization back to its origins is an elaborate task that is far beyond what we could hope to accomplish here. It would trace the variety in modern economic organization all the way back to its common origins in the earliest forms of human socio-economic organization that emerged in the Pleistocene. Note that such an evolutionary tree depicting the common origins of all forms of organization would be descriptive. As such it is the typical domain of economic historians. An evolutionary theory of the firm would then want to explain how this tree has unfolded over evolutionary time, and would do so in terms of a process of variation, selection and retention. It is this explanatory task that concerns us here.

From an evolutionary perspective, a theory of why firms exist needs to explain two things. The first of these is human ability to sustain large-scale cooperation among non-kin. This ability is unique in the animal kingdom, and therefore presents a puzzle that is fundamental to the development of an evolutionary theory that can bridge the gap between biology and the social sciences (Bowles & Gintis, 2003; Fehr & Fischbacher, 2003). Yet, solving this puzzle would only allow us to tell half the story. In addition to explaining the emergence of our unique ability to sustain large-scale cooperation, we also need to account for the evolutionary trajectory by which the earliest forms of human socio-economic organization have subsequently evolved into modern forms like the firm. In other words, in the historical context of evolutionary theory, the question ‘why do firms exist?’ translates into two more fundamental explananda for a theory of the firm:

-How did the human capability to sustain large-scale cooperation among non-kin evolve?
-How did early forms of human organization evolve into modern forms?

1 Even though the functional logic that they invoke requires such a foundation. Without a proper historical account, functional explanations become the Panglossian just-so stories that we have been warned for by such people as Gould and Lewontin. Ultimate explanations require the combination of a functional logic and an historical account, if only to be able to distinguish between adaptive behaviors and currently maladaptive behaviors that may have evolved to meet past selection pressures.
4. Explanandum 1: Large-scale cooperation among non-kin

While cooperative behavior and altruism are widespread in nature, human socio-economic organization is an anomaly in the animal world. We are the only species that can sustain large-scale cooperation based on a detailed division of labor among individuals that are not genetically related. Biologists, economists and other social scientists alike now recognize that explaining this anomaly is a necessary step in the development of an evolutionary theory that can bridge the gap between biology and the social sciences (Gintis, 2000; Fehr and Fischbacher, 2003; Henrich, 2004; Richerson and Boyd, 2005). Explaining our unique ability to sustain large-scale cooperation among non-kin ties in with one of the most fundamental puzzles in evolutionary theory: the ubiquity of altruistic behavior. Altruism is a puzzle for evolutionary theory because it would seem that the evolutionary process can only reward selfish behavior. The logic of natural selection dictates that only those behavioral dispositions that increase the reproductive success of an individual animal will increase in frequency over the generations. So how can altruistic behavior spread, which, by definition, benefits the reproductive success of others at a cost to the reproductive success of the individual displaying the behavior? This is a question that already bothered Darwin himself, and that has over the last 40 years spurred important theoretical developments in evolutionary theory (Cronin 1991; Sober and Wilson 1998).

A number of explanations for altruism have been put forward over the years, beginning with theories of group selection in the 1960s. Group selection holds that certain behaviors evolve because they are beneficial to the group. For instance, in times of scarcity, groups that consist of individuals that suppress their reproductive activity to reflect the limited supply of food may leave more surviving descendants than groups that do not. If this is the case, the genes that gave rise to the altruistic behavior in the former groups will increase in frequency in the overall population at the expense of the genes that prevail in the selfish groups, and the altruistic behavior will spread. Unfortunately, there is a fatal flaw in this theory, which overlooks how the competitive dynamics within the competing groups affects the overall selective outcome. Consider a group that consists entirely of altruistic individuals. In such a group, each individual bears the costs of its altruistic behavior, but reaps the benefits of the altruistic behavior of others. The net effect of these behaviors may well be positive, and this may indeed explain how such a group could out-compete a group consisting of entirely selfish individuals. But now consider that a chance mutation would introduce an individual that is not altruistically inclined in the group of altruists. This individual would benefit from the altruistic behavior of its group members, without incurring the costs of reciprocating their altruism. The reproductive advantage that this would give the selfish individual would lead to more offspring, and over the generations the within-group competition for reproductive success would drive out the altruistic genes.

Group selection arguments became anathema to biologists for most of the 1970s and 1980s, and explanations of altruistic behavior turned to theories of inclusive fitness (Hamilton 1964) and reciprocity (Trivers, 1971; Axelrod 1984). Inclusive fitness, or kinship selection, explains altruistic behavior in terms of genetic relatedness, and is nicely captured in the quip of population geneticist J.B.S. Haldane that he would lay down his life for two brothers or eight cousins. Its logic is based on the fact that kinship is based on sharing genes, and that in addition to furthering their own reproductive success, individuals can also increase the number of copies of their own genes in the next generation by increasing the reproductive success of their relatives. This logic applies very well to the large-scale organization of social
insects, which can be entirely explained in terms of kinship. Reciprocity is a theory that explains altruistic behavior in terms of the benefits of this behavior to the individual that displays it. Help given today will be returned in the future. This logic applies well for species that are organized in small groups characterized by repeated face-to-face interactions.

However, neither of these theories is able to explain experimental findings on altruistic human behavior, or to account for the scale of human socio-economic organization and the fact that it extends beyond kin. Humans even display altruistic behavior in one-shot interactions with anonymous strangers without reputation effects (Fehr and Fischbach 2003). Kinship selection cannot explain that humans behave altruistically towards strangers, and that human cooperation extends beyond kin. Reciprocity cannot explain the fact that humans behave altruistically in one-shot interactions. Moreover, cooperation based on reciprocity quickly breaks down when group size increases (Boyd et al. 2003). In other words, human socio-economic organization is an anomaly in terms of both its nature and its scope, and the puzzle of our first explanandum still stands. However, a theoretical framework that seems capable of addressing it is now emerging at the nexus of evolutionary theory and its application to the social sciences.

This theoretical framework encapsulates a modern and more sophisticated form of group selection that does recognize the tensions between within-group and between-group selection (Sober and Wilson, 1998). This framework, which has also been referred to as ‘multi-level selection’ distinguishes the effects of within-group competition, which favors behavior that is beneficial to the individual, and between-group competition, which favors behavior that is beneficial to the group. Whenever individuals are organized in groups that compete with each other, the selection pressure on individual behavior is the net effect of the selection pressures that result from the competition within the group on the one hand, and the competition between groups on the other. When the tension between these two is taken into account, the net effect may in principle favor behaviors that are beneficial to the group, although the circumstances under which this will occur on the basis of the genetic mechanisms alone require small groups and very limited migration of individual between groups.

The explanatory value of the multi-level selection framework for human social organization is much increased if we also allow socio-cultural mechanisms to play a role. This is the approach of gene-culture co-evolution, which looks into the interaction between genetic and cultural mechanisms for passing on information about adaptive behaviors (Boyd & Richerson, 1985; Richerson & Boyd, 2005). While our capacity for culture, typically defined as the ability to imitate, is not entirely unique, it is vastly more developed than in other species. Cultural mechanisms are therefore the most likely source for an explanation of the anomaly of human socio-economic organization. They can help create and maintain the conditions that are needed for group selection effects to take hold: the stabilization of cooperation within the group and the maintenance of variety between groups.

The tensions between within-group and between-group competition and the interaction between genetic and cultural mechanisms are the major elements of an evolutionary theory to explain our unique ability to sustain large-scale cooperation among non-kin (cf. Bowles & Gintis, 2003; Henrich, 2004; Richerson and Boyd, 2005). The general rationale of the explanation of the origins of human socio-economic organization that would result from such a theory is as follows. Humans are a species among many others and our evolution has been subject to the same evolutionary dynamics as the rest of the living world. This means that much of our behavior is determined by genetic dispositions that have evolved as the result of
selection pressures faced by our historical ancestors. However, at some point in evolutionary history, the evolutionary process gave rise to the human ability to develop culture. While the emergence of this ability needs to be understood in terms of genetic mechanisms (that is in terms of natural selection pressures on heritable traits), the ability to develop culture itself introduced an additional mechanism that is likely to have played an important role in the competition between groups. After all, in the competition between groups it is not genes that are selected for, but rather groups of individuals expressing culturally transmitted ideas and behaviors (Richerson and Boyd, 2005). Groups that evolved cultural mechanisms that supported altruism would, *ceteris paribus*, be able to out-compete other groups, and cultures that favored altruism could thus have spread. These cultures, in turn, may have changed selection pressures so as to favor altruistic genes in the competition within groups.

While this is an admittedly sketchy version of the emerging theory that circumvents most of the subtleties and complications of the dynamics involved, it does capture the general structure of the explanation of the unique human ability to sustain large-scale socio-economic organization. The three major building blocks of the explanatory structure are as follows. The core of the explanatory logic is the Darwinian notion that in the long run natural selection will only retain the genes of those individuals that have a reproductive advantage over others. This central notion is supplemented by a multi-level selection logic that recognizes that competition between groups may change the selection pressure on individual behavior, but that the effect of selection pressures in favor genetic dispositions that benefit the group are always undermined by selection pressures in favor of genetic dispositions that benefit the individual in the competition with its group members. The third element of the explanation is the interaction between genetic dispositions and cultural mechanisms, which can stabilize the circumstances needed to sustain large-scale cooperation among non-kin.

Within this explanatory framework, the question which specific genetic dispositions and socio-cultural mechanisms explain the origins of human socio-economic organization is still being debated. ² Among the candidates for relevant genetic dispositions are altruism itself (Sober & Wilson, 1998; Gintis, 2000), fairness (Sigmund, Hauert & Nowak, 2001), docility (Simon, 1990; Knudsen 2003; Gintis 2003), and ‘tribal instincts’ (Richerson & Boyd, 2005). Among the candidates for relevant socio-cultural mechanisms are costly signaling (Zahavi & Zahavi, 1997; Gintis et al. 2001), reputation (or, ‘indirect reciprocity’, Nowak & Sigmund 1998; Sigmund, Hauert & Nowak, 2001), altruistic punishment (or, ‘strong reciprocity’, Fehr & Gaechter 2000, 2002; Fehr & Fischbacher 2003; Gintis et al. 2003), conformity transmission (Richerson & Boyd, 2005), and assortative interactions (Wilson & Dugatkin, 1997; Sober & Wilson 1998).

**5. Explanandum 2: The firm as a voluntary tribe**

While the explanation of altruism and its role in sustaining human socio-economic organization has recently been at the center of a substantial stream of research, such explanation can only tell half the story of why firms exist. In the words of Bowles and Gintis ‘It would be modest and perhaps even wise to resist drawing strong conclusions about cooperation in the 21st century on the basis of our thinking about the origins of cooperation in the Late Pleistocene’ (2003, p. 16). An ultimate explanation of the existence of the firm

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² But see Fowler (2005) and Sanchez & Cuesta (2005) for recent attempts to explain altruism without taking recourse to multi-level selection.
should also account for the trajectory by which the earliest forms of human socio-economic organization have evolved into the modern firm. This second explanandum of an evolutionary theory of the firm has yet to be given proper attention.

To begin to address this explanandum we need to ask ourselves how modern firms differ from the type of socio-economic organization that prevailed during most of human history. One obvious difference is that of the scale of modern socio-economic organization. However, in addition to the quantitative difference in scale, there are two other characteristics of the modern firm that need to be explained. These are the voluntary and temporary membership of firms. These two characteristics of the modern firm (and of most other forms of modern organization) are qualitatively different from characteristics of the socio-economic organization that dominated human history. During most of our evolutionary history, membership of a social group was largely fixed, as our ancestors were born into the families, tribes, clans, or social castes that were the primary socio-economic units of their time. This is in sharp contrast to the way in which membership of modern firms is determined, where individuals have a choice in which firm to join, and typically change their allegiance over time, while still being able to maintain cooperation. In a historical context, the firm emerges as a voluntary tribe. An evolutionary theory of the firm also needs to explain how and why this particular form of organization has evolved. Can the emerging multi-level evolutionary framework also give a plausible explanation for the evolution of socio-economic organization based on voluntary and temporary membership? Let us consider this question by focussing, first, on the dynamics of within-group competition, second, on the dynamics of between-group competition, and third, on how these two types of competition might interact.

Within group competition: Status hierarchies, cooperation and exploitation

One of the hallmarks of social organization is that it involves status hierarchies. This is a dimension of social organization that is typically sidestepped in the sort of game theoretic explanations of the dynamics between altruists and free riders discussed above. Yet, status and dominance hierarchies are widespread in nature, ubiquitous among primates, and an obvious dimension of human social organization. In fact, given their ubiquity among primates, status hierarchies most likely preceded the evolution of our ability to sustain large-scale cooperation among non-kin, so that this evolution needs to be explained within the context of groups consisting of individuals of different status. When seen in the context of a multi-level selection framework, status hierarchies are double-edged swords. They can help increase the stability of a group and enforce cooperative behavior among group members. However, they can also lead to exploitation of the group by the dominant members. This is a problem in terms of the group’s likely success in the competition with other groups, because large differences in a group can reinforce within-group competition in ways that come at the expense of the competitiveness of the group as a whole.

Now consider the situation of an isolated social group where membership is fixed. In such a case, there is no incentive for the dominant individuals not to exploit the other group members. If we assume that there is some minimal benefit to membership of a group (say, protection against predators) and that individuals are born into the group with a random endowment of what determines their social rank (say, strength), then, given fixed membership, dominant individuals can exploit their lower-ranked group members with

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3 Buss (2004) summarizes some of the evidence of the prevalence of status hierarchies
4 Note that a status hierarchy also benefits the lower ranked individuals. A status hierarchy stabilizes the group by reducing within group conflict and thus eliminates the costs that would ensue when the group would have to continuously reassess the rank of each individual.
impunity. In survival terms, they can only do this to the point where a sufficient number of members survive to keep group size at the level where the benefit of living in a group is sustained. In terms of reproduction, they can only do this to the point where sufficient genetic variability is maintained to produce healthy offspring. But within these natural constraints, the logic of the evolutionary process does not put any limits on monopolizing resources and mating opportunities.

The effect of between group competition and voluntary membership on exploitation

Next, consider the dynamics of between-group competition. When the social group is no longer isolated but competes with other groups, the survival and reproductive success of all group members also depends on how the group fares in the competition with other groups. What are the characteristics of a group that might affect its success in the competition with other groups? Imagine, for instance, two hunter-gatherer bands involved in competition for scarce resources. One of these groups might out-compete the other for a number of reasons. In a direct confrontation, the most obvious characteristic to influence the outcome is the size of the group. But there are other factors that may play a role as well. These would include the relative health of the members of the two groups, the level of skill of the members of the groups in the activities that decide the outcome of the confrontation, the level of coordination that each of the groups achieves among its members, the level of technology that each group has mastered, and the resolve of their individual members to reach the common goal of the group.

What would be the effect of introducing between-group competition on the outcome of within-group competition discussed above? There is experimental evidence that the presence of between-group competition increases the level of cooperation within groups (Bornstein 2003). However, this research does not allow for status differentials within the competing groups. When this mechanism also plays a role, the impact of between-group competition depends on the effect of exploitation by the dominant individuals on the group’s size, health, skill, cooperation, technology and resolve. If exploitation of lower ranked individuals would, over time, enhance these traits in the group, within and between group competition would reinforce each other. If exploitation would reduce the competitiveness of the group, between-group competition would counteract the effect of within group competition. It is difficult to say how this interaction would play out. In a purely biological scenario, intense within-group competition could well strengthen the very traits that also increase the group’s competitiveness as a whole: good health, strength, fighting skills and aggression would likely lead to success in both within-group competition and between-group competition. We could then expect the outcome of within-group competition to be the ubiquity of genetic dispositions that would also enhance the group’s success in the competition with other groups. When cultural mechanisms also play a role, the dynamics may change and lead to different outcomes. We might expect cooperation, technology and the resolve of individuals to be positively affected by forms of within-group competition that are not as ruthlessly individualistic as those pictured above. In fact, when our altruistic tendencies are indeed what underwrite our ability to sustain large-scale cooperation, less exploitation would, ceteris paribus, lead to a larger sized group and its attendant advantages in between-group competition. We could thus easily imagine a dynamic by which the presence of between-group competition keeps the exploitation of lower ranked individuals by those that dominate the group in check.

Such an expectation is reinforced when we also introduce the possibility that individuals can change their membership from one group to another. If there is between group competition
and individual group membership is voluntary, dominant individuals can no longer exploit the lower ranked with impunity. Doing so would mean the risk of losing members and its attendant losses in the competitiveness of the group. In the presence of between-group competition, voluntary membership thus emerges as a solution to the problem of exploitation within the group. We would expect the combination of between-group competition and voluntary membership to keep leaders honest.

The tension between voluntary membership and between-group competition
But if membership is voluntary, another dynamic has to be taken into account. For between-group competition to work well in overcoming the within-group selection pressures in favor of selfish behaviors, situations with small groups, limited immigration, and frequent conflicts between groups work best. In other words, we should expect group boundaries to be strictly maintained to limit immigration. This is consistent with what Richerson and Boyd (2005) refer to as our ‘tribal instincts’ and Bowles and Gintis’ (2003) notion of ‘parochialism’. The first of these is an individual trait and refers to the human tendency to organize the social world in terms of in-group and out-group perceptions and adopt external markers of group membership. The second is a group trait and refers to a group’s selectiveness in accepting group members. We can expect our evolutionary heritage to include psychological and social mechanisms that reinforce the maintenance of differences between groups by increasing cooperation between in-group members, excluding individuals on the basis of group markers (e.g. genetic, ethnic, linguistic, dress), and reinforcing between-group competition. But if this is so, how can the voluntary and ever changing membership that is typical of the modern firm have developed at all?

Consider, again, groups in competition. Any form of human organization can be seen as a collection of individuals in pursuit of a common goal. We have listed above the conditions that would decide the outcome of between-group competition. Let us now abstract from the purely biological characteristics of individual group members, such as health and strength, and well as from possible differences in the size of groups. Let us also, for the moment, abstract from differences in technological endowment. What remains are the characteristics of groups that are related to group composition: the variety in individual skills, and the level of cooperation towards the common goal. In the competition between groups, then, there are two ways to out-compete other groups: having individual members with more skills than other groups and achieving more cooperation towards the common goal. When membership is fixed, so is the group’s ‘endowment’ of individual skills, and the only way in which to increase its success in between-group competition is to achieve more cooperation. However, when membership is voluntary, a group can also increase its success by attracting members with more skills.

The tension between high levels of skill and cooperation
This leads to an interesting trade-off between achieving high levels of cooperation and attracting members with superior skills. Genetic relatedness and reciprocal relationships increase cooperation, and this would favor the maintenance of strict boundaries between the group and the external world. However, variety in skills puts groups that can sustain cooperation among strangers at an advantage. Once genetic dispositions and social mechanisms that can support such cooperation are in place, groups that can attract members with more skills are at a competitive advantage. In other words, in addition to the detrimental effects of within-group selection, we should expect a second tension to affect the outcome of

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5 Note that this is a plausible dynamic for the co-evolution of social mechanisms to reduce within group differences and a genetic disposition towards fairness.
evolution at the group level. Genetic dispositions and social mechanisms that lead to groups that close themselves off from the outside world are likely to increase the level of cooperation, while genetic dispositions and social mechanisms that lead to groups that are open to the outside world are likely to destabilize cooperation, but increase the level of skill. This tension would put groups that are able to evolve social mechanisms to counteract the detrimental effects of readily accepting new members on cooperation at an advantage in between-group competition. It seems likely that such an advantage is reinforced if we also allow technological change, or in other words the accumulation of knowledge, to play a role in the competition between groups (cf. Mokyr 1991). And given technological change, groups that are able to change their composition to fit the changing technological landscape would have an additional advantage.

All in all, the puzzle of voluntary and temporary membership points to two important tensions that may help explain the evolution of the modern firm. The first of these is the tension between within-group and between-group selection, which needs to be overcome to counteract the negative effects of within-group competition on the success of the group as a whole. This is an especially important problem because the evolution of the earliest forms of human organization needs to be understood in the context of social organization characterized by the very status differentials that increase within-group competition. The second tension is that between high levels of cooperation and high levels of skill. Parochialism increases the former, but puts a group at a disadvantage in attracting members with higher levels of skill. Groups that are able to incorporate new members with high levels of skill without undermining high levels of cooperation would increase their chances in the competition with other groups.

6. Towards an Evolutionary Theory of the Firm

Considering the firm as a problem in the context of evolutionary theory calls for a historical explanation of its existence. From a historical perspective, explaining the existence of firms as an alternative for the market is a somewhat odd idea that is best understood as an artifact of a neoclassical worldview. The concept of transaction costs, for sure, is an important building block of any theory of the firm because it can help explain the scale and scope of firms. But its role in explaining why firms exist is lost outside the context of a neoclassical view that posits the primacy of markets. In fact, in the context of evolutionary theory, the neoclassical view of the firm is reminiscent of the Aristotelian essentialism that Darwin’s theory of evolution did away with; species do not exist in fixed idealtype form but are made up of variegated individuals and evolve. Likewise firms: they differ from each other, have individual histories and share a common ancestry.

The point of departure of this paper has been that an evolutionary theory of the firm should not consider firms as abstractions but explain them in terms of their evolution, diversity and actual behaviors. Moreover, an evolutionary theory of the firm should be able to offer both proximate and ultimate explanations of the behavior of firms. Extant contractual theories of the firm give proximate explanations for why firms exist and how they differ from each other in terms of mechanisms that enhance efficiency. These theories are not only compatible with an evolutionary perspective, but in fact need evolutionary theory to complement the functional logic they use to buttress their arguments. The contribution of an evolutionary perspective on the theory of the firm, then, is that it puts this functional logic center stage, offers an explanatory structure to account for (in)efficient outcomes in terms of the Darwinian
variation-selection-retention algorithm, and calls for ultimate explanations that can account for the historical path by which firms have evolved.

While the project to develop an evolutionary theory of the firm as envisioned in this paper is an ambitious one, the purpose of the paper as such has been rather more modest. Its main purpose has been to reframe the problem of developing a theory of the firm in evolutionary terms, and to discuss the contours of a theory that may be able to give an ultimate explanation for the existence of the modern firm. Its main contribution is twofold. First, it has been show that the historical perspective needed for such an ultimate explanation points to two explananda for an evolutionary theory of the firm. From a historical perspective, we need to explain both how humans developed the ability to sustain large-scale cooperation among individuals that are not genetically related, and how early forms of human socio-economic organization subsequently evolved into modern forms like the firm. While the former of these explananda has recently been the subject of a substantial stream of research at the nexus of biology and the social sciences, the latter has not yet received the attention it warrants. Second, it has been shown that the combination of multi-level selection and gene-culture co-evolution that is now being advocated as an explanatory structure to address the first puzzle can also be fruitfully applied to the second.

Much work remains to be done before we will be able to fill in the details of the evolutionary dynamics that explain the origins and evolution of modern firms. But the explanatory framework that combines Darwin’s variation-selection-retention logic with a multi-level selection perspective that can separate within and between-group selection and allows for the interaction of genetic and socio-cultural mechanisms offers a solid underpinning for an evolutionary theory of the firm. This explanatory framework can ground further research into the specific combinations of genetic dispositions and social mechanisms that explain the evolution of the modern firm. In addition to solving the puzzle of our pro-sociality, such research should also address the puzzle of the evolution of a form of socio-economic organization characterized by voluntary and temporary membership.

The theory of the firm advocated here differs in its use of evolutionary theory from the approach suggested by Nelson (1995). In his review of evolutionary theorizing, Nelson rightly states that theories of evolution in biology, sociobiology, and the study of culture have ‘not as yet come to grips with the dynamics of change in modern industrial societies’ (p.60). He then argues that evolutionary theorists that work in these traditions ‘have by and large assumed that selection mechanisms are individualistic, transmission mechanisms are person to person, and that ‘memes’ like genes are carried by individuals. Yet these perceptions seem quite inadequate for analysis of how science or modern technology evolves, or forms of business organization, or law’ (p.61). The perspective advocated here differs from this assessment in the sense that these perceptions of evolutionary theorists, while maybe not sufficient, are not only adequate, but in fact constitute a necessary part of the explanation of socio-cultural evolution. Individual behavior is the historical and ontological linking pin between biological and cultural evolution. Within the context of evolutionary theory proper, a theory of the firm would of necessity take its starting point in the selection pressures acting on individual behavior and would thus have to be built from ‘the bottom up’.

From an evolutionary perspective, any form of coordination at the level above the individual needs explanation, because without a countervailing mechanism it is undermined by within-group competition. An evolutionary theory of the firm can therefore not take the existence of the firm as a given, but needs to explain the stability of such a complex social solution to the
economic problem. Human organization then needs to be understood as a social solution to the individual problem of survival, and the stability of this solution needs to be explained. Once this has been achieved, the firm as such may also be seen as a unit of selection in its own right. It too, is an open, complex system that competes for scarce resources. But its success in this competition, or lack thereof, needs to be understood in terms of the behavior of its members and the social mechanisms that allow it to coordinate their actions. This social dimension of the firm has been conspicuously absent in economic theories of the firm.

This approach to building an evolutionary theory of the firm combines what Witt (2003) calls the principle of ‘ontological continuity’ and what Hodgson (Hodgson 2002) calls the principle of ‘ontological similarity’. The principle of ontological continuity holds that because humans are the products of evolution, there is an essential continuity in the evolutionary process. This means that genetic mechanisms are still an important part of the evolutionary dynamic that shapes modern society. However, because genetic mechanisms drive an evolutionary process that is much slower than the process of cultural evolution, we can for explanatory purposes treat our genetic dispositions as the relatively stable foundations upon which the much faster process of cultural evolution rests. The principle of ontological similarity holds that the evolution of all open, complex systems can be explained in terms of the Darwinian variation-selection-retention algorithm. Firms are an example of open, complex systems whose evolution can be explained with Darwinian logic. The specific mechanisms that drive the evolution of firms are different from the mechanisms that drive biological evolution as such, but the explanatory logic still applies.

The notions of ontological continuity and ontological similarity combine in a historical perspective in which the human capacity for culture is seen as a major transition in the evolutionary process. Maynard-Smith and Szathmary (1995) define major transitions as involving the emergence of a new mechanism to transfer information that allows coordination on a larger scale than before. Culture is a powerful mechanism to transfer information and has indeed led to coordination on a larger scale than before. Like genes, culture is a way to pass on information about what works. But culture allows a much larger scale of coordination at a level of organization above the individual than genes do. In the context of between-group competition (a context that likely co-evolved with our capacity for culture) this level of organization then becomes a unit of selection in its own right. There have been a number of major transitions in evolutionary history, and none of them has changed the basic logic of the Darwinian algorithm, so there is no ex-ante reason to expect the major transition involving our capacity for culture to involve a departure from the process of variation-selection-retention. Of course, the specific mechanisms by which the higher levels of organization that culture has allowed evolve are different, and need to be detailed. But the basic logic of the evolutionary process still holds, even when we should now allow for the interaction of genetic and cultural mechanisms.

While we do not yet know how to best explain our pro-sociality or the evolutionary trajectory that has led to modern firms, the explanatory structure advocated here allows us to offer plausible explanations. Some of these explanations have been developed above. They await further research to be substantiated and elevated beyond evolutionary ‘just-so stories’. On the puzzle of our pro-sociality, a combination of historical, ethnographic, experimental, and modeling efforts is now quickly amassing the evidence we need to draw more definitive conclusions. On the puzzle of the evolutionary trajectory that has led to modern firms, much more work remains to be done. Pending this work, a number of implications of an evolutionary perspective for the theory of the firm are nevertheless apparent.
First of all, an evolutionary perspective suggests that a theory of the firm should incorporate more behavioral assumptions than bounded rationality and opportunism. These two assumptions are consistent with evolutionary theory, but not enough to explain the human ability to sustain large-scale cooperation among non-kin, and by extension the firm. At a minimum, we need additional behavioral assumptions related to our pro-sociality, be they altruism itself, fairness, docility, and/or any other notion that either alone or in combination with others can explain the experimental evidence that humans do not always act in their own rational self-interest. Moreover, given their historical precedence and ubiquitous nature in the living world, we need to incorporate behavioral assumptions to account for the importance of status hierarchies in the modern firm. From an evolutionary perspective it is not enough to simply equate the firm with a dominance hierarchy and not explain the origins of this form of organization. Both our pro-sociality and status drive are well established by empirical research and are necessary components of an evolutionary theory of the firm.

Second, an evolutionary perspective suggests that firms need to be understood as the result of an evolutionary trajectory that has been shaped by a number of tensions. The most important of these tensions is the one between selection within and selection between groups. Much of what firms are about can be understood in terms of this tension, but extant theories of the firm have sidestepped this issue. They either abstract from the social aspects of the internal organization of the firm altogether (transaction cost theory), or take a static and rational view that abstracts from the competitive dynamics within the firm (agency theory). How firms coordinate the behaviors of their employees towards a common goal needs to be understood in the context of this tension.

7. Conclusion

This paper has reexamined the question ‘why do firms exist?’ within the context of evolutionary theory. Evolutionary theory calls for proximate explanations of the diversity in the forms and behaviors of firms, and for ultimate explanations of their origins. An ultimate explanation for the existence of firms can only be given by taking a historical view. Such a view shows that firms exist because the evolutionary process led to the human ability to sustain cooperation among non-kin, and because the interaction between genetic and cultural mechanisms led to a subsequent historical trajectory that gave rise to a form of socio-economic organization characterized by voluntary and temporary membership. The emergence of this unique ability and the evolutionary trajectory of human socio-economic organization are the central explananda of an evolutionary theory of the firm. They can be addressed by an explanatory framework that combines the Darwinian variation-selection-retention algorithm with an understanding of the tension between within and between-group selection and an eye for the interactions between genetic and cultural mechanisms to transfer information. The resulting theory of the firm would be built from the bottom-up and take its starting point in individual behavior and the universality of the genetic dispositions that underlie it. The level of organization above the individual would need to be understood as a social solution to the economic problem that can be undermined by within-group competition. Such a theory also provides the logic necessary for the proximate explanations of the diversity of firms given by extant theory. The logic of evolutionary theory shows that the specific nature of socio-economic organization in firms needs to be understood in terms of tensions between within and between-group selection, and between openness and parochialism.
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