

Motivations and Incentives: from the “crowding-out effect” to “peer-production”.

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Introduction

Economic theory has been greatly influenced by the perspective of individual behaviour as the result of free and rational choice. Individuals are isolated, self-interested, and able to compute the costs and benefits of different actions with the objective of optimizing their utility (Hodgson, 2003). This view of individual agency conducts to pessimist predictions about the possibility of collective action: the pursuit of group goals eventually contradicts individual self interest and thereby produces incentives to defection.

Institutions - namely, the firm - are thus perceived as social arrangements built by rational individuals in order to overcome the social dilemma created by collective action as expressed by the influential views of agency and property rights theories of the firm (Alchian and Demsetz, 1972; Hart and More, 1990). Monitoring and property rights would create incentives that realign individual goals with collective ones. When it is inefficient to establish an individual property rights due to transaction costs as happens with organizations such as the firm (Coase, 1937), economic theory usually defends the implementation of monitoring or monetary incentives. Largely influential within firms, this theoretical perspective has been responsible for the introduction of market elements such as prices, internal competition and other types of incentives in firms as the optimal mechanisms to enhance worker's effort.

This standpoint is expanding its reach far from the exclusive of the economic theory field. Currently, due to the direct influence of the last, social sciences, such as Law (*Law and Economics*) or Political Science (*Public Choice*) have adopted the rational theory paradigm and proposed new forms of institutional design that integrate this

perspective of the individual. However, this understanding of individual action is far from being consensual even within the economics. If certain (marginal) strains of theory such the post-Keynesian or (old) institutionalists have always rejected the self-interested *homo-economicus* model as the sole acceptable pattern of behaviour to be accepted, new empirical and theoretical developments support the refusal of such model. The “crowding-out” theory, elaborated by Bruno Frey upon contributions from psychology, is central in such new developments.

In this brief survey, we will try to systematize this theory. In the first section different empirical examples from behavioural economics and experimental economics will be provided. In the second part, we will present the relevance of such contributions in one of the most influential theories: the theory of firm, specially focusing on its contribution to “knowledge-based” theories. Still in the knowledge generation domain, we will present the case of the new “peer-production” communities as the best example for the adoption of a multi-motivational framework in order to understand this new reality.

1- Crowding-out theory

Titmuss, in 1972, published a well known study about blood donors, where he argued that the introduction of payment to blood donors could be counter-productive. Indeed, the introduction of monetary rewards in the U.S. to blood donors had given rise to a substitution effect: altruistic donors defected and were substituted by donors solely interested in the monetary rewards. Such substitution resulted in a quality diminution of the donated blood, since the latter donors had normally worse social origins and health habits.

However, it was only in the mid-nineties that this empirical study began to have a theoretical basis among economic theory, through the seminal work of Bruno Frey (1997) on the “crowding-out” effect. This theory begins with the distinction between intrinsic and extrinsic motivation. The first being all forms of motivation involved when a certain activity is undertaken for one’s immediate need satisfaction. Given that there is no external, indirect, external reward, such satisfaction can be the result of two different psychological mechanisms: enjoyment-based or obligation-based. Enjoyment-based

mechanisms refer to the satisfying flows granted by an activity such as playing a game or fulfilling a challenging task with no external reward. Obligation-based mechanisms refer to the pursuit of self-defined goals or the obligations defined by personal and social norms, as, for example, tax morale and environmental ethics (Frey, 1997).

In the case of extrinsic motivation, an activity is undertaken in order to satisfy one's needs indirectly, usually involving monetary rewards, but that can also take other forms, such as the reliance on reputation effects, that would serve as signalling devices in the labour market, or the promotion of external control over one's activity (monitoring). Extrinsic motivations can be thus argued to be the basis for the economist's practice of changing relative prices, through deliberate manipulation of monetary rewards and sanctions, in order to bring individual interests into alignment with collective ones.

Frey explained that intrinsic motivations could be eroded by the promotion of extrinsic (usually pecuniary) ones. The transformation of the social relationships resulting from such promotion may induce then an overall inefficient effect. Intrinsic motivations are then "crowded out" by extrinsic ones. If this "crowding-out" effect holds, the opposite of one of the most fundamental economic laws may well be observed: raising monetary incentives can reduce, rather than increase, effort (Frey and Jegen, 2001). Hence, economic theory is today forced to acknowledge and integrate such possibility in its microeconomic framework. A need stressed by the abundant empirical evidence, put forward in the last decade, showing that the effect is far from being an odd exception to expected behaviour.

Different examples have been put forward in order to document the existence of the crowding-out effect. Three in different contexts for the extrinsic incentives introduction can be identified: compensation, sanction or monitoring. Three different correspondent examples follow. For the introduction of extrinsic incentives as compensation, Frey and Oberholzer-Gee (1997) developed a study of the NIMBY (Not In My Backyard) effect in Switzerland. A large survey, set upon the possibility of the construction of a nuclear power plant in the surveyed individual's neighbourhoods, was put in place. The results indicated that the introduction of monetary compensations decreased the revealed acceptance of such possibility. This anomalous result can be explained through "crowding-out" theory. The possibility of pecuniary incentives may exclude intrinsic

drivers such as, in this case, the role of individual citizenship values or persuasion by public authorities, in the people's answers. The perceived fairness of burden sharing among different communities, the careful design by authorities of the criteria to select a site or the degree of authorities' legitimacy are thus more important factors to influence the acceptance of a nuclear power plant than monetary compensation (Frey, 1997).

For the introduction of monetary incentives as sanctions, Gneezy and Rustichini (2000) studied, in a field experiment in Israel, the introduction of fines, in six day-care centres, to parents arriving late to pick up their children. The fine was imposed on parents that arrived more than 10 minutes late, with four day-care centres serving as a control group. However with the introduction of the fine the number of late parents increased almost 100%. Moreover, the removal of the fine did not reverse this new pattern of behaviour: the number of parents coming late remained at the same high level. The introduction a monetary incentive (the fine) was thus counter-productive and can be interpreted as deeper proof for the existence of a "crowding-out" effect. What was before understood as violation of an (intrinsically driven) accepted social norm became only a price to be paid. Being late would have now a legitimate price. The previous social disapproval attached to this behaviour would disappear. Or, as Gneezy and Rustichini (2000a: 14) put it: "no guilt or shame (depending on the degree of internalisation of the social norm) can be attached to the act of buying a commodity at will".

Finally, crowding-out effect as the result of monitoring - the major mechanism for improvement of one's effort in Agency Theory - is also found in experimental economics. The study Dickinson and Villeval (2004), made in a real-task laboratory experiment, recognise the pertinence of the crowding-out theory in the monitoring efforts inside the firm. Particularly if there are distributional concerns involved, that may undermine trust among "principals" and "agents", the effort of "workers" diminishes. For the authors, such effect indicates that there should be an equilibrium level for the disciplining effect of monitoring.

Explaining the *crowding-out effect*

In trying to understand why individuals' behaviour often contradicts the predictions of standard game theory, experimental findings have identified multiple intrinsic motivation drivers such as trust (James 2002, McCabe et al., 2003), the desire for social approval (Falk *et al.*, 2002), inequity aversion (Fehr and Schmidt, 1999), fairness or equity (Fehr and Gächter, 2000; Nelson, 2002). Without simplifying too much one may argue that almost all the motivations referred above have been inferred from the same principle: the observation of *reciprocity* (Lopes and Rodrigues, 2004). This major behaviour driver was already identified in Karl Polanyi's *Great Transformation* in 1947. For the author, the general motive of reciprocity would guarantee reputation and trust vital to "ensure the working of an economic system without the help of written records and elaborate administrations" (p.48, 1947). Such statement can be read as the defence of institutions (other than the market), guided by reciprocity, in order to overcome the contemporary identified problems of information asymmetry and incomplete contracting. Reciprocity would then be vital to the well functioning of the economic sphere.

Lopes and Rodrigues (2004) argue that this reciprocal behaviour is double-edged in the sense that it can be responsible, under proper institutional circumstances, for the sustainability of high levels of cooperation while in some cases it can explain its decay. In experimental studies, subjects do exhibit a conditional cooperative behaviour, translated in the fact that they tend to contribute to the provision of a public good if they perceive that other subjects (or a significant number of them) will also contribute (positive reciprocity) and they tend to lower their effort, or stop contributing at all, when they feel that their effort is not being shared by others (negative reciprocity).

In order to have positive reciprocity dynamics the existence of trust among individuals is essential: if they believe that others are inclined to cooperate, individuals cooperate in turn. When one trusts someone, one is recognizably exposed and vulnerable to the actions of the trusted person. The existence of trust implies and explains the expectation of cooperative behaviour, based on commonly shared norms on the part of other members of a given community (James, 2002). In such a context, the simple existence of an incentive scheme can be seen as a signal that other individuals are not trustworthy:

if they were, incentives would be unnecessary. If people were trustworthy, that is, if they were to be expected to comply with their explicit or implicit cooperative commitments, and not to take the opportunity to free ride on the contributions of others, monetary incentives would be unnecessary.

Finally, in more formal analysis, Kreps (1997) finds two different kinds of explanations to crowding-out effect, depending on multitask or single-task context. In a multitask situation results, the introduction of “objective and formulaic” extrinsic incentives may not be enough to take into account all the complexity of the different tasks. In a single-task context, he considers that “the point is, if ‘intrinsic motivation’ is the response of workers to fuzzy, but nonetheless extrinsic incentives, explicit extrinsic incentives that are imposed may fight rather than complement pre-existing incentives.” (1997, p. 362). Intrinsic incentives would then help to process information and serve as heuristics, an explanation analogous to the knowledge-based theories of firm, developed in next section.

2- Crowding-out: from the firm to peer-production

Even though, the examples above given are not the results of real workplace studies, these results may undermine many of the prescriptions offered by various theories of the firm. The existence of the “crowding-out” effect points that intrinsic and extrinsic motivation are not merely additive as standard economics theory assume (Osterloh, Frost and Frey, 2002). In fact, the empirical evidence produced in order to sustain the introduction of pay-for-performance incentives (extrinsic motivation) as done by Pendergast (1999), in Canadian tree planting and Chinese agriculture, covers only “simple jobs” where good performance measures are available. Such evidence is the kind least relevant for the theory of the firm. When workers can be compensated according to their performance, markets, not firms, are expected to be the best arrangement for collective coordination.

As already mentioned above, high-powered incentives are dysfunctional with “multiple tasking”, where the tasks vital to the creation of value cannot be measured with reasonable accuracy. Such perspective, if on the one hand, undermines the conventional

theories of the firm (e.g. Agency Theory and Property Rights), on the other hand, may reinforce both the emergent “knowledge-based” theories of the firm (see Nelson and Winter (1982), Kogut and Zander (1996), Nonaka et al. (2000), Dosi and Marengo (2000) and all the theoretical work done around new organisational forms that do not fall either in the firm or the market, as “peer-production”.

The knowledge-based perspective of the firm departs from two assumptions very diverse from the mainstream approach: individuals are rationally “bounded”; the distinctive feature of the firm is its ability to be a collective and idiosyncratic knowledge processor. Assuming the distinction between tacit and codified knowledge (Michael Polanyi, 1968), the firm gathers particular forms of knowledge that can only be developed within a structured organization. This is the sole arrangement to be able to provide the procedures and social norms that frame the interaction of bounded rational agents. The original problem posed to the firm is thus how individual members, limited in their information processing capacities, can learn how to contribute to firms’ organizational and collective capabilities.

In evolutionary theory, from which the knowledge-based perspective on the firm evolved, little attention was initially given to the role of individual agency. Individuals were taken as “benevolent cooperators”, (Dosi and Marengo, 2000). Nonetheless, recent knowledge-based theories of the firm (as in Nonaka et al., 2000) when focusing on the transfer of individual tacit knowledge inside the firm put forward a multi-motivational notion of the individual, accounting for his disposition to disclose and share knowledge. Monetary compensation, but also intrinsic motivations – such as self-satisfaction, peer recognition, sense of belonging – are the mechanisms suggested here to account for the collaborative behaviour of individuals. Firms as social communities, where the division of labour promotes communication and coordination, provide thus a sense of collective identity.

Knowledge-based theories of the firm stress the collective and cooperative character of the firm and the need of trust and reciprocity among its workers in its endeavours. But the introduced relevance of knowledge as a central resource has implications on the need of “crowding-out” theory when studying workplaces even at the pure individual level. In fact, in order for the individual to generate knowledge (one’s creativity), the

existence of individual motivations, such as the sense of autonomy and discretion, is vital. Still, such autonomy and radical uncertainty on the outcomes makes the introduction of monetary rewards or monitoring incompatible. These incentives can be perceived as external forms of control and thus undermine one's creative work. Only intrinsic motivations can provide an enduring collective commitment with the common goals of the firm and, at the same, the required level of autonomy in one's work.

It is within this theoretical framework of the firm that Osterloh et al. (2002) provide some insights on the way to manage firms. Assuming existence of "crowding-out" effects, forces us to understand a systematic dynamic and complex relationship between the both forms of motivation. Strong monitoring, pressure of sanctions, high-powered incentives (piece rates, bonuses, or other forms of variable pay for performance) undermine firm members' work ethic. The authors highlight four different concerns that firms should have available for enabling motivation and regulating conflict within the firm: 1- Participation of workers in order to have a genuine agreement on common goals. Such agreement provides self-control and self-obligation, strengthening intrinsic motivation; 2- Self organization. Fostering cooperative efforts enables the willingness to conform to social norms for the workers own sake; 3- Good personal relationships. This is a precondition for establishing psychological contracts based on emotional loyalties, often understood as team spirit; 4- Finally, contingency of reward on performance, since it that may crowd out intrinsic motivation. Firms must take into account possible crowding-out effects in its incentives schemes.

Peer-production

A new form of knowledge production coordination arrangement, surpassing Coase's (1937) dichotomy between markets and firms, has emerged: peer-production (Blencker, 2002). Peer-production enjoys from the two great advantages of both markets and firms in knowledge generation. It replicates the "separation" process of markets, where each individual knows best what is "worth" and the relational and collective process that the knowledge production process involves in the firm (Caldas et. al, 2006).

FLOSS (Free/Open/Source Software) is the most famous example of a such arrangement. FLOSS production is based on free contributions of thousands of

volunteers connected by the Internet. Nonetheless, the volunteer participation does not mean the absence of a hierarchy or of an evaluation system. Indeed, given the almost non-existence of exit costs, these hierarchies – usually based on meritocratic criteria – must be legitimated and accepted by the community of participants. The democratic participation is therefore guaranteed. It is important to stress that this new mode of production is not limited to the FLOSS environment. Wikipedia, the blogosphere or the new peer-to-peer file sharing communities in the Internet, are other examples of this new digital mode of production.

Economic theory has not been at ease when explaining the motivational framework behind FLOSS developers. In an environment where there is no direct pecuniary compensation, the best explanation standard economic theory has for the volunteered developers is the existence of reputation effects among the community. Developers would rather benefit from the signalling effects in the labour market (Lerner and Tirole, 2002). Nonetheless, as recent surveys show (Ghosh, 2002), the motivations mobilized in FLOSS production are very heterogeneous, ranging from the will to cooperate in a common aim to, the more political, fight against proprietary software firms. Even so, most of the identified motivations can be taken as intrinsic ones where reciprocity plays a crucial role. It can be thus argued that we are not in face of an environment where intrinsic and extrinsic motivations must be balanced, but largely in a context where the intrinsic motivations are the only ones to be decisively involved in the success of these initiatives.

Any manipulation of the motivation of developers can easily “crowd-out” the variety of motivations here present. There is now evidence that the “crowding-out” effect is a real risk when external controls are introduced within this institutional framework. When launching the now successful FLOSS web browser Firefox, Netscape, relying only on the reputation effects that such project would provide, issued a license with important limitations to the usual “free” character of FLOSS. Such limitations, understood as an illegitimate change in the licenses that preserve the open-source character of the software (GPL-General Public Licenses), produced impaired self-determination, resulting in an insufficient number of developers and the failure of the project in its initial stage. Netscape was then forced to issue a new, closer to GPL, licence (Krishnamurthy, 2005). Since then, the project has been a huge success with more than

one hundred million downloads worldwide. We can thus conclude that, to promote peer-to-peer production, projects should focus both on having an attractive purpose and on arranging a participative and free organizational design where intrinsic motivations can flourish.

Peer-production demonstrates that the importance of intrinsic motivation is not only a reminiscence of archaic institutions, doomed by the ever expansion of the market economy. The most new challenging fields of economic enquiry stress the relevance of such theoretical concerns in large-number communities bounded together by solely digital relationships, with no face-to-face interaction.

Concluding remarks

The relation between extrinsic and intrinsic motivations is not only a minor detail or a exception in the modern economy. The integration of such complex motivational relations in economic theory obviously implies a loss of simplicity when approaching economic reality, nonetheless we believe it would grant a more robust theoretical framework. In fact, as we tried to argue, without such framework new challenging and promising realities such as the peer-production communities would be left without proper explanation. The new knowledge-based theories of the firm are already an successful example of the effort put in one of the most influential strands of literature, the theory of the firm, integrating a multi-motivational framework for workers. Indeed, it seems both efforts have been proved rewarding, since the generation and sharing of knowledge is today a fertile field of inquiry.

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