MOTIVATIONAL INTERACTIONS: EFFECTS ON BEHAVIOUR

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ABSTRACT.– The *Motivation Crowding Effect* suggests that an external intervention *via* monetary incentives or punishments may undermine (or under different identifiable conditions strengthen) intrinsic motivation. *Crowding-out* and *crowding-in* are empirically relevant phenomena, which can, in specific cases, even dominate the traditional relative price effect.
Crowding effects may also spread beyond the area and persons initially subject to *crowding-out* and *crowding-in.* The paper discusses the conditions under which such a *Motivation Transfer Effect* may obtain.

Interactions motivationelles : effets sur le comportement

RÉSUMÉ. – Les incitations monétaires influencent les motivations intrinsèques. Elles peuvent les accentuer *(crowding-in)* ou les diminuer *(crowding-out)*. Les travaux empiriques suggèrent que les réactions des motivations intrinsèques sont importantes et peuvent dominer l'effet des incitations traditionnellement pris en compte en économie et qui ne tient compte que des prix relatifs. Il apparaît, en outre, que les incitations monétaires peuvent influencer les motivations intrinsèques d'individus appartenant à des groupes qui ne sont pas directement concernés par celles-ci. Cet article discute, en particulier, des conséquences d'un tel transfert de motivations *(motivation transfer effect).*

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I. Introduction

Two quite different strands of literature in the social sciences have pointed out that rewards, and in particular monetary rewards, may crowd out intrinsic motivation.

Thirty years ago Titmuss (1970) in his book *The Gift Relationship* argued that paying for blood undermines cherished social values and would therefore reduce or totally destroy people's willingness to donate blood. Though he was unable to come up with any serious empirical evidence his thesis attracted much attention.

A second literature stems from psychology. A group of cognitive social psychologists[1] have identified that under particular conditions monetary (external) rewards undermine intrinsic motivation. The application of rewards for undertaking an activity thus has indirect negative consequences, provided intrinsic motivation is considered to be beneficial[2]. For that reason this effect has been termed „*The Hidden Cost of Reward*" (see Lepper and Greene, 1978 for an account and extensive references), „*Overjustification Hypothesis*" (Lepper, Greene and Nisbett, 1973) or „*Corruption Effect*" (Deci 1975). More recently, the idea has been known as „*Cognitive Evaluation Theory*"(Deci, Koestner and Ryan, 1999). In contrast to Timuss' mere hunch, a great many laboratory experiments support this motivational effect: 'the evidence for a detrimental effect comes from a wide variety of works in which a large number of subjects and methodological parameters have been varied' (McGraw, 1978, pp. 55-58).

The two strands of literature developed quite independent from each other judging from the missing cross references. In particular, Titmuss' idea was not connected to the psychological theories on the undermining effect of monetary rewards. As a consequence, two leading economists, and later Nobel-prize winners, Solow (1971) and Arrow (1972), who reviewed the book were at a loss and could not detect any reason why increasing monetary incentives, or the price of paying for blood, should not increase the quantity supplied.

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[1] Headed by Deci (1971, 1972, 1975). The work is summarized and extended in Deci and Ryan (1980, 1985). Extensive surveys are given e.g. in Pittmann and Heller (1987), and Lane (1991, esp. ch. 19).

[2] This is the normal assumption when one thinks of activities such as work (work ethics), tax paying (tax morale), preserving nature (environmental morale) or charitable giving (altruism). But intrinsic motivation may also be undesirable as for instance in the case of greed, envy or vengeance. Indeed, it may be argued that some ot the most hideous crimes in history were at least partly intrinsically motivated, Hitler and Stalin being examples. In contrast it has been shown that extrinsically motivated soldiers are less prone to commit crimes and tend to treat prisoners of war more humanely (Frey 1999, ch. 7).

Over the last few years a dramatic change has taken place. Many social scientists, including economists, now admit the *theoretical* possibility that part of the motivation may be negatively affected when a previously non-monetary relationship is transformed into a monetary one, and they now accept it as part of a wider concept of human incentives. However, many of them, if not most of them, take this „*crowding-out effect*" (as it is called today) to be of little *empirical* relevance.

The purpose of this paper is to demonstrate that the crowding-out effect and its correlate, the crowding-in effect, are empirically well founded and have been observed in many different areas of the economy and society. Arguably, it is one of the most important anomalies in economics as it may reverse the most fundamental economic „law", namely that raising monetary incentives increases supply. The crowding-out effect suggests that there are relevant circumstances in which it is advisable not to use the price mechanism to elicit a higher supply but to rely on a quite different type of incentive, intrinsic motivation. This conclusion is strengthened by the fact that the crowding effects may spill-over to other areas and persons not initially affected.

Section II offers a short discussion of crowding theory in economics. Section III provides the empirical evidence according to everyday experience, controlled laboratory evidence both by psychologists and economists, and field evidence by econometric studies. Section IV discusses the motivation transfer effect and section V draws conclusions.

II. Crowding Theory[3]

Types of human motivations

Monetary incentives crowding out the intrinsic motivation to undertake an activity may be considered a major anomaly because it predicts the exactly reverse reaction that the relative price effect on which much of economics is grounded[4]. The successes of the "economic approach to human behaviour" (Becker, 1976; Frey, 1999a) or of "economic imperialism" (Stigler, 1984; Hirshleifer, 1985) is due to the skillful application of the relative price effect.

Crowding theory stipulates a systematic interaction between extrinsic and intrinsic motivation. Economic theory considers the first type of motivation, only. Major schools in psychology, on the other hand, emphasize the motives coming from within the person. Following Deci (1971,

[3] Sections II and III are based on Frey and Jegen (1999); for the most up to date version, see Frey and Jegen (2001).
[4] Anomalies have received great attention in economics, see e.g the summary in Thaler 1992. However, none of the anomalies such as the endowment, sunk cost or recency effect reverses the relative price effect but rather mitigates it only.

p. 105), “one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself”. Intrinsic motivation is a firmly established concept in psychology (and partly in other social sciences such as sociology); its modern formulation goes back to De Charmes (1968) and Deci (1975).

As crowding theory involves shifts in individual preferences, this concept basically differs from other phenomena that are sometimes referred to as crowding-out effects. In monetary economics, a rise in the rate of interest is taken to crowd out private investment (see any standard macroeconomic textbook, e. g. Mankiw 1994, p. 62), and in public economics, government subsidies are taken to crowd out private donations and charitable contributions (see e. g. Venti and Wise, 1990; Poterba, Venti and Wise, 1998; Bolton and Katok, 1998). In both areas, individual preference functions are unaffected, indeed the effects observed are a particular manifestation of the relative price effect.

Generalizations

For the purpose of economics, the „hidden cost of reward“ have been extended in four respects (Frey 1997a):

(a) *All interventions* emanating from outside the person considered, i.e. both positive rewards and regulations accompanied by negative sanctions, may affect intrinsic motivation;

(b) External interventions may crowd-*out* or crowd-*in* intrinsic motivation (or leave it unaffected).

(c) The Crowding Effects occur with a broad set of *non-material motivations* going beyond intrinsic motivations narrowly defined.

(d) Crowing Effects may spill over to related areas and persons in the form of the Motivation Transfer Effect.

The principal-agent context

The impact of extrinsic interventions upon behavior can best be shown in the context of a principal-agent relationship (see e.g. the recent surveys by Gibbons 1998 and Prendergast 1999). The principal uses rewards and commands in order to raise the performance P of the agent. The agent could be an employee or worker in a firm, but more general everyone who is given a task to perform.

A (representative) agent performs by considering the benefits B and the cost C (i.e. including benefits and cost from intrinsic sources). Both increase in performance, i.e.

$\partial B/\partial P \equiv B_P > 0$ and $\partial C/\partial P \equiv C_P > 0$.

Higher performance has diminishing marginal returns ($B_{PP}<0$) and is associated with increasing marginal cost ($C_{PP}>0$). Benefits and cost are also influenced by the principal's external intervention:

$$B = B(P,E);\ B_P>0,\ B_{PP}<0. \qquad (1)$$

$$C = C(P,E);\ C_P>0,\ C_{PP}>0. \qquad (2)$$

A rational agent chooses that level of performance P* which maximizes net benefits (B-C), which yields the first order condition

$$B_P = C_P. \qquad (3)$$

Differentiating this optimality condition with respect to E shows how the agent's optimal performance P* is affected when the principal changes the extent of external intervention

$$B_{PE}+B_{PP}\frac{dP^*}{dE} = C_{PE}+C_{PP}\frac{dP^*}{dE}. \text{ or}$$

$$\frac{dP^*}{dE} = \frac{B_{PE}-C_{PE} >}{C_{PP}-B_{PP} <} 0. \qquad (4)$$

Three cases may be distinguished:

(a) Following the standard economic principal-agent theory (e.g., Alchian and Demsetz 1972, Fama and Jensen 1983) external intervention raises performance by imposing higher marginal cost on shirking, or, equivalently, by lowering the marginal cost of performing, $C_{PE}<0$. This is the relative price effect of external intervention. One could also speak of a *disciplining effect* which monetary reward or commands impose on an agent. On the other hand, the crowding out effect is neglected, i.e., a change in external intervention does not affect the marginal benefit of performing ($B_{PE}=0$), as intrinsic motivation is, implicitly, taken to be a constant (or, rather absent). Thus, external intervention unequivocally raises performance:

$$dP^*/dE>0. \qquad (4a)$$

The same outcome holds if external intervention raises intrinsic motivation. In that case the marginal benefit from performing is raised ($B_{PE}>0$) and the effect through disciplining the agent is further strengthened by the *crowding-in effect*. In this case the relative price effect works in the

same direction as the crowding effect. External incentives raise agents' motivation to perform, and at the same time their intrinsic motivation to perform is raised.

(b) In contrast, when external intervention undermines intrinsic motivation and thus negatively affects the agent's marginal benefit from performing ($B_{PE}<0$, *crowding-out effect*), while the disciplining effect does not work ($C_{PE} = 0$), stronger external intervention reduces the agent's performance level

$$dP^*/dE < 0. \qquad (4b)$$

(c) In general, both the relative price effect ($C_{PE}<0$) and the crowding-out effect ($B_{PE}<0$) are active, so that external intervention has two opposite effects on the agent's performance. Whether intervening is beneficial from the principal's point of view depends on the relative size of the two countervailing effects. A more detailed formal analysis of the possibly conflicting nature of external intervention can be found in Chang and Lai (1999).

Figure 1 shows the interaction of the crowding-out effect and the price effect graphically. S is the traditional supply curve based on the relative price effect: raising the external reward for work effort form O to R increases work effort from A to A'. The crowding-out effect induces the supply curve to shift leftwards to S'. Thus, raising the reward from O to R leads to point C (instead of B). As the figure is drawn, the crowding-out effect dominates the relative price effect, and raising the reward from O to R *reduces* work effort from A to A''. Once intrinsic motivation has been crowded out completely, the normal supply curve takes over again, and raising the reward unequivocally increases work effort (movement along S').

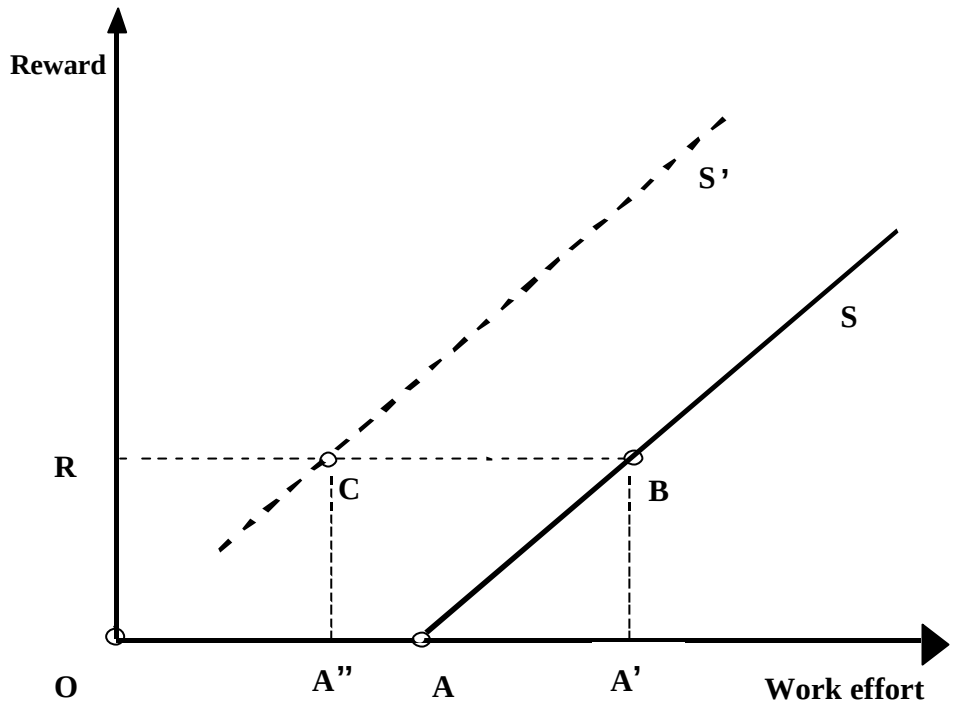

Figure 1: Net-outcome of the Price- and the Crowding-Effect

Psychological processes and conditions

The effects of external interventions on intrinsic motivation have been attributed to two psychological processes:

(a) *Impaired self-determination*. When individuals perceive an external intervention to reduce their self-determination, they substitute intrinsic motivation by extrinsic control. Following Rotter (1966), the locus of control shifts from the inside to the outside of the person affected. Individuals who are forced to behave in a specific way by outside intervention, feel overjustified if they maintained their intrinsic motivation.

(b) *Impaired self-esteem.* When an intervention from outside carries the notion that the actor's motivation is not acknowledged, his or her intrinsic motivation is effectively rejected. The person affected feels that his or her involvement and competence is not appreciated which debases its value. An intrinsically motivated person is taken away the chance to display his or her own interest and involvement in an activity when someone else offers a reward, or commands, to undertake it. As a result of impaired self-esteem, individuals reduce effort.

The two processes identified allow us to derive the *psychological conditions* under which the crowding-out effect appears:

(1) External interventions *crowd-out* intrinsic motivation if the individuals affected perceive them to be *controlling*. In that case, both self-determination and self-esteem suffer, and the individuals react by reducing their intrinsic motivation in the activity controlled.

(2) External interventions *crowd-in* intrinsic motivation if the individuals concerned perceive it as *supportive*. In that case, self-esteem is fostered, and individuals feel that they are given more freedom to act, thus enlarging self-determination.

Crowding effects are potentially relevant in many different areas of individual behavior in the economy. Examples are the labour market where the effect of higher compensation on work effort and in particular performance wages are at issue; the natural environment where the effect of pricing instruments such as pollution charges on environmental ethics is in question; social policy where it must be considered whether monetary incentives crowd out the notion of responsibility for one's own fate; subsidization policy where a possible negative effect on entrepreuneurship, innovation and creativity must be taken into account; organization theory where the limits of the firm must be reconsidered in view of possible limits of relying purely on extrinsic incentives; and contract theory where relational or „psychological contracts" (Rousseau 1995; Morrison and Robinson 1997) may require intrinsic motivation and hence crowding out should be avoided[5].

Economic Skepticism

Many traditionally oriented scholars have been disregarding Crowding Theory with the argument that the relevance of intrinsic and social motivation has not been empirically established. This skepticism has been fuelled by the publication of a meta-analysis of a large number of experimental studies undertaken by social psychologists which concluded that the crowding out effect is „largely a myth" (Cameron and Pierce, 1994; Eisenberger and Cameron, 1996). But even scholars who do not rely on experimental results are reluctant to accept the crowding-out anomaly. A statement representative for many such scholars is contained in a definite survey of „Incentives in the Firm" by Prendergast (1999, p. 18):" While this idea (crowding-out, the authors) holds some intuitive appeal, it should be noted that there is little conclusive empirical

[5] First attempts at analyzing such issues are undertaken in Frey 1997a, 2000, Osterloh and Frey 2000.

evidence (particularly in workplace settings) of these influences".[6] Gibbons (1998, p. 130), however, in his important survey of „Incentives in Organizations" concedes : „A more troubling possibility is that management practices based on economic models may dampen (or even destroy) non-economic realities such as intrinsic motivation and social relations. Field experiments on this issue would be especially useful".

Obviously unnoticed by many researchers (such as Gibbons, see the statement above), an increasing number of studies have indeed tried to find empirical laboratory as well as field evidence for the undermining effect of rewards on motivation. The following section intends to survey the present state of the empirical literature on the subject.

III. Empirical Evidence

Circumstantial Evidence

Although the basic intuition tells us that we are rather willing to undertake a task if we can expect a reward, there is a number of specific situations where the undermining effect of external incentives is also as easily understood. This is most of all the case when tasks are repeatedly performed. A good *ad hoc* example is children who are paid by their parents for mowing the family lawn. Once they expect to receive money for that task, they are only willing to do it again if they indeed receive a monetary compensation. The induced unwillingness to do anything for free may also expand to other household chores.[7]

The reward must not be monetary in the first place. Deci and Flaste (1995) discuss the case of a perfectionist child in violin class. Once 'gold-stars' were introduced as a symbolic reward for a certain amount of time spent practicing the instrument, the girl lost all her interest in trying new, difficult pieces. Instead of improving her skills, the aim shifted towards spending time playing well-learned, easy pieces in order to receive the award.

[6] It should, however, not be surprising that there is no relevant crowding effect observable in a competitive environment as it is found with firms and in workplace settings, but see also Güth (1998). It can, however, be expected that successful firms find ways (by intuition or learning from negative experiences) to use external motivators in a supporting instead of a controlling manner. That does not mean, however, that the crowding effect is irrelevant as an element and factor in the failure of firms, projects or organizational structures.

[7] This may be the main reason why all of the parents consulted by the authors (in a non-representative, small-scale survey) by intuition pay their childrens' pocket money as a lump sum (while expecting some cooperation in household tasks) instead of assigning a specific sum to a given task. Such a strategy seems to be persisting in spite of the potential unfairness between ‚buzy' and ‚lazy' siblings.

The crowding effect may also work the other way round. A patient had difficulties to regularly take her hypertension medication. Her doctor's frequent admonishing or reminders of possible consequences had no effect. Despite ending up in the emergency room a couple of times, the patient only achieved to alter her behavior when a new doctor – instead of pressuring her to take the medication – asked her what time of the day she considered best to take the pills. Thereby he reinforced her intrinsic motivation to follow the prescription.

Laboratory Evidence in Psychology

There is such a large number of laboratory experiments on the crowding effect that it is impossible to summarize the results here. Fortunately, there have already been not less than five formal meta-analytical studies of the crowding theory. Rummel and Feinberg (1988) used 45 experimental studies covering the period 1971-85, Wiersma (1992) 20 studies covering 1971-90, and Tang and Hall (1995) 50 studies from 1972-92. These meta-analyses essentially support the findings that intrinsic motivation is undermined if the externally applied rewards are perceived to be controlling by the recipients. This view was challenged by Cameron and Pierce (1994) and Eisenberger and Cameron (1996) who on the basis of their own meta-analysis of studies published in the period 1971-1991 (the two studies are based on a virtually identical set of studies) concluded that the undermining effect is largely "a myth". These studies attracted a great deal of attention, and many scholars on that basis seem to have concluded that no such thing as a crowding-out effect exists.

Deci, Koestner and Ryan (1999) conducted an extensive study to show that these conclusions are unwarranted and that the crowding-out effect is a robust phenomenon of significant size under the specified conditions. The authors identified a number of significant shortcomings and misinterpretations. One is that Cameron and Pierce omitted nearly 20 percent of the relevant studies as outliers, used mistaken control groups and misclassified some of the studies. Another is that they included dull and boring tasks for which a crowding-out effect cannot occur as the participants had no intrinsic motivation to begin with. In order to correct these failures, Deci, Koestner and Ryan conducted an extensive meta-analysis including all the studies considered by Cameron, Pierce and Eisenberger as well as several studies which appeared since then. The 128 experiments reported span the period 1971-1997. It turns out that tangible rewards undermine intrinsic motivation for interesting tasks (i.e. tasks for which the experimental subjects show an intrinsic interest) in a highly significant and very reliable way, and that the effect is moderately

large. This holds in particular for monetary compensations which are perceived to be controlling by the experimental subjects and therefore tend to crowd out intrinsic motivation. The crowding-out effect is stronger with monetary than with symbolic rewards. It is also larger with expected than with unexpected rewards. When the problems at issue are complicated, the negative relationship between reward and performance is stronger than when the problems are simple (see Deci and Ryan 1985). In all these cases, it is required that the behavior was initially perceived to be interesting and therefore intrinsically rewarding (Calder and Staw 1975). As a consequence, a bonus system usually, but not always, makes employees lose interest in the immediate goal (such as serving the customers).

Experimental evidence in Economics

Concerning crowding effects on motivation, the field of experimental economic research lacks the long and rich tradition found in psychology. There is nonetheless an increasing number of studies done on the subject. The experiments by Fehr and Gächter (1997) as well as Fehr, Gächter and Kirchsteiger (1997) proposed the possibility of a crowding-out effect for intrinsic motivation in the form of a tendency for reciprocal behavior. Zanella (1998) and Fehr and Gächter (2000) carried out laboratory experiments designed to test the hypothesis that incentive contracts crowd out reciprocity. They differentiate between a reciprocity-treatment and an incentive-treatment in a sequential game of labor contracts. Their findings confirm the crowding hypothesis. The participants playing in the reciprocity-treatment performed better (i. e. they forfeited more rents that could have been gained by not working) than in an incentive-treatment.[8]

In field experiments, Gneezy and Rustichini (2000a) found the exact relationship between pay and performance as displayed in Figure 1 in section II above. Whenever money was offered, the standard price-effect was observed, i. e. a larger amount of money produces higher performance. The mere incidence of payment, however, even lowered performance in many cases. In their experiments, of all participants performing the same task, only those groups which received a considerable amount of pay did as well as the groups that worked for free. Their evidence suggests that the type of contract and the (monetary vs. non-monetary) work environment evoke

[8] The incentive mechanism used in this experiment is based on fines. Zanella suggests, however, that other mechanisms may prove to be crowding-neutral or even crowd in motivation (1998, p. 44). This is in line with the psychological theories that incentives are only detrimental to intrinsic motivation when they are perceived to be controlling.

different responses from the agents. In a second set of experiments they find that principals systematically underestimate the undermining effect of (small) monetary incentives.

Bohnet, Frey and Huck (2000) have analyzed crowding-effects in contract enforcement in an evolutionary game model. The probability of fining agents for breach of contract is varied from one treatment to another, i. e. there are different probabilities of bearing the cost of breaching a contract. The game is designed as a repeated contract game. In every round, a first mover could or could not offer a contract and a second mover could decide to breach it or not. The goal of this experiment is to study how the participants' motivation and behavior evolves, depending on the institutional setting. When contracts are near-perfectly enforced, first movers can rely on the legal system with a high probability of being fined to deter second movers from breaching the contract offered. Personal trust is hence replaced by institutional trust. Low levels of legal enforcement, i. e. a low probability of getting caught breaching the contract, tend to crowd-in intrinsic motives to treat others fairly. When first movers in such a game decide to offer a contract (despite the fact that both participants are aware of the low probability of being fined for non-compliance), they signal their trust that the second mover will not to breach the contract. The number of contracts offered increases in the course of the game. This is contrary to standard economic expectations. An intermediate level of law enforcement turns out to be most detrimental to intrinsically motivated trustworthiness and reciprocity-driven behavior. First movers tend not to offer contracts.

Econometric studies:

Labor supply

Crowding-out theory for the case of work motivation has been subject to econometric studies. Barkema (1995) looks at firms where the intensity of the personal relationship between the principals and the agents depends on the form of *supervision*. For the case of managers as agents of a certain firm one can distinguish three major types:

(i) The managers are controlled by the parent company. This corresponds to a rather impersonal relationship, so that following our above proposition, a positive influence of monitoring on managers' performance is expected, because intrinsic motivation is little or not affected at all.

(ii) The managers are controlled by their firm's chief executive officer, which represents a personalized relationship. According to our proposition, monitoring in this case tends to reduce the agents' effort, as an external intervention shifts the locus of control towards external preferences, and the agents perceive that their competence is not acknowledged by their superior.

(iii) The managers' behavior is regulated by the board of directors. The crowding out effect is, according to our hypothesis, expected to be greater than in case (i) but smaller than in case (ii).

Barkema's data set refers to 116 managers in medium-sized Dutch firms in 1985. They range from between less than one hundred to more than 30,000 employees and cover a wide variety of industries. The managers' individual effort is in line with Holmström and Milgrom (1991) operationalized as the number of hours invested. The intensity of regulating is captured by three aspects: the regularity with which their performance is evaluated; the degree of formality of the evaluation procedure; and the degree to which the managers are evaluated by well defined criteria. A measurement model is used to empirically establish that these variables meaningfully represent the latent variable 'regulating'. A structural model is then used to show the influence of so-defined external intervention on managers' performance.

The results are consistent with the proposition advanced. The econometrically estimated parameters capturing the effect of external intervention on work performance turns out to be positive and statistically significant in case (i) of impersonal control. In case (ii) of personalized control, on the other hand, the corresponding parameter is statistically significant and negative; regulating strongly crowds out intrinsic motivation, so that the net effect of control on performance is counterproductive. In the intermediate case (iii) of somewhat personalized control, the estimated parameter does not deviate from zero in a statistically significant way.

A second econometric study (Frey and Goette 1999) looks at the voluntary sector which is of substantial size in developed economies (see the survey by Rose-Ackerman 1996, Salamon and Anheier 1997). Intrinsic motivation has been argued to be important for volunteering (Freeman, 1997).

The authors use a unique data set from Switzerland to evaluate how financial rewards to volunteers affect their intrinsic motivation. In a survey, a representative sample of Swiss workers was asked whether they have been working as volunteers and whether there has been a reward for such an engagement. The incidence of rewards (controlled by a dummy variable) is found to

reduce volunteering work efforts by approximately four hours. However, a positive coefficient is found for the size of the rewards, i.e. in line with the price effect, higher rewards induce individuals to provide more volunteer work. The crucial point is which of the countervailing effects dominates. Evaluated at the median reward paid, volunteers work indeed *less*, suggesting that the crowding-out effect dominates the relative price effect. These results are immune to possible simultaneity bias or differences in reward policies between types of organizations. These findings have important implications for policy towards volunteer work. Direct incentives may backfire, leading to less volunteering.

Services

Daycare centers are confronted with the problem that parents sometimes arrive late to pick up their children which forces teachers to stay after the official closing time. A typical economic approach (in line with the economic theory of crime, initiated by Becker, 1968) would suggest to introduce a fine for collecting children late. Such a punishment is expected to induce parents to reduce the occurrence of belatedly picking up their children. The effect of such a policy was studied by Gneezy and Rustichini (2000b) for a daycare center in Israel. They first recorded the number of late-coming parents over a particular period of time. In a second period extending over twelve weeks, a significant monetary fine for collecting children late was introduced. After an initial learning phase, the number of late-coming parents *increased* substantially, which is consistent with the crowding-out effect. The introduction of a monetary fine transformed the relationship between parents and teachers from a non-monetary into a monetary one. As a result, the parents intrinsic motivation to keep to the time schedules was reduced or was crowded out altogether; the feeling now was that the teachers are "paid" for the disamenity of having to stay longer. That parents' intrinsic motivation was crowded out for good by the introduction of a penalty system is supported by the fact that the number of late-coming parents remained stable at the level prevailing even after the fine was cancelled in third phase.

In a study not based on econometric techniques, but rather on the comparison of carefully conducted case studies, Austin and Gittell (1999) find a crowding effect with respect to performance measurement in the airline industry. The specific issue they studied is how airline carriers deal with delays and the responsible factors or persons. They found that attributing a single delay as exactly as possible to its source (as suggested by the principal agent theory), is negatively correlated with the achieved end, namely the airline's on-time flight performance. The

most successful company was the one that used the general term ‘team delay’ to indicate the source of a delay caused by the personnel. It thereby crowded in the intrinsic motivation to help out other units and groups instead of provoking disagreements, finger-pointing and cover-up activities.

Siting Problems

An econometric test of crowding theory refers to the important real life issue of finding a site for locally unwanted projects (Frey and Oberholzer-Gee 1997). This is known as the 'Not in my backyard' or NIMBY-problem. For many different projects and major capital investments, a wide consensus exists that they are worth being undertaken. But no community is prepared to tolerate their vicinity. Such 'nimbyistic' behavior is well documented in cases where communities object to the siting of e. g. hazardous waste disposal facilities or the construction of freeways.

Economists have a handy tool to deal with such a situation. As the aggregate net benefits of undertaking the project are positive, one must simply redistribute them in an appropriate way. The communities which are prepared to accept the undesired project within their borders must be *compensated* in such a way as to make their net benefits positive (O′Hare 1977; Kunreuther and Kleindorfer 1986). This policy recommendation underestimates the true costs of price incentives in that it fails to take into account the detrimental effects of motivation crowding-out.

The hypothesis that external incentives crowd out civic duty or intrinsic motivation and therefore the willingness to accept the locally undesired project was tested by analyzing the reaction to monetary compensation offered for a nuclear waste repository. A survey was undertaken in Spring 1993 among the population of a region in Switzerland that was found to be ideal for hosting a NIMBY-type project. All respondents were asked if they were willing to permit the construction of a nuclear waste repository on the grounds of their community.

More than half of the respondents (50.8%) agreed to have the nuclear waste repository built in their community, 44.9% opposed the siting, and 4.3% did not care where the facility was built. Thus, this unfavorable siting decision is widely accepted in spite of the fact that a nuclear waste repository is mostly seen as a heavy burden for the residents of the host community. In a next step the level of external compensation was varied. To this end the respondents were asked the same questions whether they were willing to accept the construction of a nuclear waste

repository. This time, however, it was added that the Swiss parliament had decided to compensate all residents of the host community. The amount offered was varied from CHF 2500 per individual and year (N=117), to CHF 5000 (N=102), and CHF 7500 (N=86)[9]. While 50.8% of the respondents agreed to accept the nuclear waste repository without compensation, *the level of acceptance drops to 24.6%* when compensation is offered. The amount of compensation has no significant effect on the level of acceptance. About one quarter of the respondents seem to reject the facility simply because financial compensation is attached to it.

Compensation fundamentally alters the perceived nature of a siting procedure. What was observed in the analysis of verbal behavior represents precisely the type of mechanism postulated by motivation crowding theory. While external intervention, i.e. offering compensation, manages to address concerns regarding the costs of a noxious facility, it reduces the intrinsic motivation to permit the construction of such a facility. In the case studied, this latter effect even outweighs the benefits of external intervention, thereby reducing overall acceptance.

In a recent paper focusing on a related issue, Oberholzer and Kunreuther (1999) analyze the phenomenon of social pressure in local politics. They studied the case of a siting project for a radioactive waste repository in Pennsylvania, U.S.A. The developer offered a benefit package including job creation and monetary rewards and real estate price guarantees. Townships were expected to volunteer (which they did not, most probably due to peer pressure effects within the communities). The authors modeled the influence of social pressure on political decisions, i. e. they included the effects of belonging to one particular camp (with the possibility to reward or punish fellow members or outsiders, respectively) into the individual utility function. To test their model, they conducted an empirical analysis based on a survey of 509 township supervisors. They were asked what they believe to be the percentage of people endorsing the repository project in their township as well as how they would vote themselves in a referendum on the issue. To control for effects of the net size of the compensation package they also included questions on how the respondents would react to the offer of triple cash payments. Once Oberholzer and Kunreuther control for the assumed increase in public support the supervisors associate with higher benefits (and therefore a lower degree of social pressure), the effect of higher monetary incentives becomes significantly negative: A triple cash offer decreases the supervisors'

[9] The compensation offered here is quite substantial. Median household income for our respondents is CHF 5250 per month.

willingness to support the project by 11 percentage points, *ceteris paribus*. This result is attributed to a crowding-out effect.

Constitutional Design and Tax Evasion

Crowding theory can be applied to how constitutional and other legal rules affect the individual citizens. Civic virtue (a particular manifestation of intrinsic motivation) is bolstered if the public laws convey the notion that citizens are trusted. Such trust is reflected in extensive rights and participation possibilities. Citizens are given the freedom to act on their own with respect to economic affairs, the freedom to freely express themselves and to demonstrate and strike if they feel dissatisfied with particular government decisions, and most importantly to take important political decisions by themselves via referenda and initiatives. The basic notion enshrined in the constitution that citizens are on average, and in general, reasonable human beings thus generates a crowding-in effect of civic virtue. In contrast, a constitution which implies a fundamental distrust of its citizens and seeks to discipline them tends to crowd out civic virtue and undermines the support which citizens are prepared to exert towards the basic law. The effects of such a distrustful constitution show up in various ways. The citizens are dissatisfied with the political system and respond by breaking the constitution and its laws whenever they expect to be able to do so at low cost.

An important reaction to distrustful public laws is a reduction of *tax morale* and as a consequence the evasion of taxes. It has been well established that tax paying behavior cannot be explained in a satisfactory way without taking into account tax morale. Thus, based on the American Internal Revenue Service's Taxpayer Compliance Maintenance Program, Graetz and Wilde (1985: 358) conclude that 'the high compliance rate can only be explained either by taxpayers' (...) commitment to the responsibilities of citizenship and respect for the law or lack of opportunity for tax evasion'. The same authors (with Reinganum 1986) attribute the observed falling tax compliance in the United States to the erosion of tax ethics.[10]

The extent of tax morale revealed by tax paying behaviour may be shown to depend on the type of constitution existing (see more fully, Pommerehne and Frey 1993; Pommerehne and Weck-

[10] Further evidence can be found, among others, in Schwartz and Orleans (1967), Lewis (1982), Roth, Scholz and Witte (1989), Pyle (1990), and Slemrod (1992).

Hannemann 1996; Frey 1997b). Switzerland presents a suitable test case because the various cantons have different degrees of political participation possibilities. It is hypothesized that the more extended political participation possibilities in the form of citizens' meetings, obligatory and optional referenda and initiatives are, and the broader the respective competencies are, the higher is tax morale and (ceteris paribus) tax compliance. On the basis of these characteristics, about one third of the 26 Swiss cantons are classified as pure direct democracy, another third as pure representative democracies, and the rest satisfies only some of the characteristics. A cross section / time series (for the years 1965, 1970, 1978, i.e. 78 observations) multiple regression explaining the part of income not declared yields the following results: The coefficients of the variables indicating the type of democracy - controlling for all the determinants normally used in such tax equations - have the theoretically expected signs. In cantons with a high degree of direct political control, tax morale is (cet. par.) higher. The part of income concealed falls short of the mean of all cantons by 7.7 percentage points, or in absolute terms the average amount of income concealed is about SFr. 1,600 (per taxpayer) less than the mean income concealed in all cantons. In contrast, in cantons with a low degree of political control, tax morale is (cet. par.) lower. The part of concealed income is four percentage points higher than the average income gap, and the mean income undeclared exceeds the mean of all cantons by about SFr. 1,500. The estimation results are consistent with the hypothesis that greater democratic participation possibilities crowds in intrinsic motivation in the form of civic virtue.

Another test of the crowding-out effect of public laws and institutions looks at wages in the government sector. The fact that government employees in many countries are prepared to work for a significantly lower salary (for evidence see e.g. Poterba and Rueben 1994) may be attributed to the higher motivation of the selection of people seeking employment in the public sector.[11] An example would be those teachers who want to work in government schools because they believe in the virtue of public education for society. The increasing tendency to closely supervise government employees and to curtail their discretionary room has crowded out their work morale which is consistent with a continuous reduction of private sector wage premiums.

[11] Alternative explanations for the unobserved factor producing the wage differential such as higher fringe benefits or lower work intensity are, of course, possible.

A third way to test the influence of government rules on civic virtues looks at the cost of financing public expenditures in terms of interest rates for government bonds. It has been argued (Schultz and Weingast 1994) that democracies find it less costly to finance themselves than authoritarian political systems because nations under a democratic constitution are more credible, and therefore more likely to pay back their debts. The observation of lower cost of finance under a democratic constitution is, however, also fully consistent with crowding theory: the citizens have a higher level of trust in, and attachment to, their state and are therefore more willing to grant credit to their state at more favorable financial conditions than are the subjects oppressed by a constitution.

On a more general level, there is a cumulative body of research indicating that people's perceptions of how they are treated by the authorities strongly affect their evaluation of authorities and laws, and their willingness to cooperate with them (e.g. Bardach and Kagan 1982, Lind and Tyler 1988, Tyler and McGraw 1986). Citizens who consider the constitution and its laws, and the authorities acting on their basis to be fair and to treat them respectfully, tend to be more compliant than those with more negative perceptions of government (e.g., Thibault and Walker, 1976, and for extensive empirical evidence see Tyler, 1990, 1997). In an econometric study, Kucher and Götte (1998) find evidence for a relation between a high ratio of concurrence of a city government’s suggestions on how to vote with the actual results at the ballot and lower tax evasion. Kelman (1992) furthermore shows that the extensive use of adversary institutions for resolving public conflicts (which are prevalent, e.g., in the United States) tends to crowd out civic virtue.

IV. Motivation Transfer Effect

Crowding effects on intrinsic motivation may spread beyond the area, time and persons subject to a crowding-out or crowding-in effect.

The motivation transfer effect is relevant for many economic and social issues. This may be illustrated by four examples. The first two relate to the macro, the second two to the micro economy:

1. Monetary compensation to the citizens of a commune in order to make them accept a *locally unwanted,* but socially desired, project may crowd out the civic virtue of carrying a burden for the sake of the community as a whole. As a consequence, the citizens of the respective commune are likely not to accept any further burden without monetary compensation, and so do the citizens of other communes. In such NIMBY (i.e. Not In My BackYard) situations the Motivation Transfer Effect produces a negative spillover to other decision areas as well as to other citizens.
2. A constitution for knaves may crowd out civic virtues. Distrusting public laws risk destroying the positive attitude of citizens and politicians towards the state, and therefore have Motivation Transfer Effects in many directions. Constitutions that convey trust towards citizens and politicians may have positive Motivation Transfer Effects. It has been shown that active citizen participation via popular referenda and initiatives can lead to higher tax compliance and voter turnout (Frey 1997b).
3. The introduction of *pay for performance* in firms and other organizations may crowd out intrinsic motivation in the form of work morale for the employees receiving compensation according to this payment system. The fall in work morale may moreover spread to other employees of the organization as well as to aspects of work not subject to performance pay. Most importantly, the crowding-out effect may undermine the solidarity of the groups and teams in which the work is performed and most likely lowers productivity.
4. Circumstantial evidence points to the relevance of Motivation Transfer in daily life: An example is a boy who receives money from his father to cut the lawn and afterwards is reluctant to undertake any other household task without compensation. Paying a friend an appropriate sum of money after a dinner invitation to his home almost certainly means the end of friendship.

Transfer Processes

One may distinguish three different types of processes underlying Motivation Tranfer:

(a) "Passive mental process"

The transfer of intrinsic motivation is governed by psychological factors internal to an individual. The occurrance, direction, size and speed is beyond the control of the individual concerned.

(b) "Focusing attention"

In this case, the crowding-out process at the same time attributes increased salience to a new opportunity which was not considered before. One may speak of an enlargement of the ipsative opportunity set (see Frey and Foppa 1986, Frey 1999, chapter 12). A new possibility is opened and used. An example is again the boy who receives money from his father to cut the lawn and therewith is made aware that he can also ask money to undertake any other household task – a possibility which he did not previously consider at all.

(c) "Strategic move"

An individual subject to a crowding out of intrinsic motivation may actively exploit the opportunity to gain advantages at the cost of other persons. Such a person may use the argument that due to the crowding out effect – for which he is not responsible – he is now forced to follow the path indicated by the outside intervention. If he was payed, he can now argue that for reasons of internal consistency he must now ask for a monetary compensation for anything undertaken, or if he was ordered to do something, he can now refuse to undertake any action if not explicitly ordered. On the basis of this argument, he may improve his position relative to others.

Theoretical Approaches

Traditional Economics

The transfer of motivation may be modelled by an explicit or implicit benefit-cost calculus. The greater the benefits, and the lower the cost, involved in the motivational transfer, the larger and the speedier is the motivation transfer between areas, over time, and among persons.
The notion that there is an automatic tendency in the economy and society for disequilibria to be ironed out may also be useful to account for a motivation transfer. An individual subject to a change in intrinsic motivation has an incentive to balance the motivational disequilibria. A boy,

for instance, whose father starts to pay him for cutting the lawn (which he previously did because he felt it to be part of belonging to a family), finds himself in a disequilibrium. As his intrinsic motivation has been undermined not only with respect to cutting the lawn but also with respect to similar household tasks, he feels dissatisfied for doing any other work without payment. He only undertakes the other household task if he also receives payment.

Behavioral Economics

While no overarching theory exists several authors have contributed ideas relating to the transfer of motivations though they do not use that terminology.

(a) "Mental Accounting" (Thaler 1980)

People tend to use particular sources of money for the consumption of particular goods (including saving). The same may hold for particular motivations and activities. An example would be the idea that work in the private sector is payed while work in the non-profit sector is not. When such mental accounting loses force or breaks down motivation transfer is eased.

(b) "Functional and Attitudinal Separability" (Williamson 1993, p. 480)

These notions are used to discuss the transformation of casual social accounts into exact and legal obligations, but what matters for our purpose is partitioning into distinct spheres which may also be applied to the two kinds of motivations distinguished in crowding theory.

(c) "Spread of Conventions" (Sugden 1989, p. 93)

It is argued that conventions may spread by analogy from one context to another. If a particular convention is followed in one situation, then that convention acquires prominence for other, analogous situations. This idea may also be applied to motivations.

Psychology

There is a substantial number of psychological theories and effects which may be used to better understand the Motivation Transfer Effect:

(a) "Spreading Activation Theory" (Anderson 1983, Collins and Loftus 1975)

These theories suggest an increased transfer between areas with greater experience and easier accessability of memory.

(b) "Cognitive Consistency" or "Cross Situational Consistency" (Festinger 1957, Heider 1958)

Individuals resent internal inconsistencies and therefore make an effort to adjust to them by changing their beliefs and motivations. This is similar to the economic notion that disequilibria do not subsist.

(c) "Mental partitioning"

Individuals have a tendency to associate particular motivations with particular activities. This closely corresponds to the idea of mental accounting featured in behavioural economics.

(d) "Equity Theory" (Adams 1963)

Individuals seek to balance the relationship between the perceived inputs they contribute, and the outputs received both via intrinsic and extrinsic motivation.

Hypotheses

The Motivation Transfer Effect is strengthened by

- proximity,
- similarity with respect to content, process and actors,
- familiarity,
- norms, conventions or customs forming a bridge between areas, time and persons.

Empirical Evidence

So far, there is only scattered empirical evidence substantiating the Motivation Transfer Effect. Examples are:

- Lane (1991, p. 211) on the transfer of motivation from interesting to uninteresting activities;
- Warr (1987, pp. 72-77) on the transfer from experiences in work to leisure activities;
- Cialdini (1989, p. 215) on the extent of tax evasion being influenced by the respective behaviour of friends and collegues;
- Frey and Bohnet (1996) find a positive Motivation Transfer between persons in an extended Dictator Game setting with one allocator and two recipients. When the recipients were unknown to the allocator (anonymity), each one was given 14 per cent of the sum received. If one of the two recipients was identified to the allocator, she receives almost twice as much than under anonymity, namely 24 per cent. What matters in our context is, however, that the non-identified (that is, anonymous) second recipient also receives more than before, namely 17 per cent, which can be interpreted as a Motivation Transfer Effect.

V. Concluding Remarks

Many scholars have accepted the *theoretical* possibility of crowding effects, i. e. that an external intervention via monetary incentives or punishments may undermine (and under different indentifiable conditions strengthen) intrinsic motivation. But many of them have been critical about the *empirical relevance* of the crowding effects.

This paper shows that this skepticism is unwarranted and that there exists indeed *compelling empirical evidence* for the existence of crowding out and crowding in. This conclusion is based on circumstantial evidence, laboratory evidence by both psychologists and economists as well as field evidence by econometric studies.

Crowding effects thus are an empirically relevant phenomenon. But it does, of course, not always prevail over the traditional relative price effect. Indeed, an effort has been made both in theory and in the empirical applications to identify the conditions under which crowding-out and

crowding-in effects arise, and under which they are predicted to dominate the relative price effect.

Less is known both theoretically and empirically about the Motivation Transfer Effect but it has been shown that it can be accounted for by various economic and psychological theories.

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