

External interventions have a significant and systematic effect on preferences: Under specific conditions they crowd an individual's intrinsic motivation in or out. Rewards given or regulations applied by a principle are more likely to crowd out an agent's inner preference for a certain task. The more personal the relation between the two actors is, the more interesting the agent finds the task and the more extensive an agent's participation possibilities are. Empirical evidence supports the claim that, in many cases, agents, indeed, react to an external motivation by reducing their effort to fulfill a certain duty. This points to new limits of pricing as well as regulating, even though the price mechanism does not destroy intrinsic motivation to the same extent because it is less restrictive than regulation.

How Intrinsic Motivation Is Crowded Out and In

BRUNO S. FREY
University of Zurich

A theory of preference change is both desirable and possible in economics: this is the view I champion in this article.¹ It is desirable because important systematic effects of (economic) policy instruments on preferences exist that help us to understand phenomena, which are otherwise difficult or impossible to account for in a reasonable way. A theory of preference change is possible by focusing on specific, well identifiable, rather than on general relationships because the latter are unlikely to yield any testable implications.² One such specific preference change has been identified in social psychology, where it has been called "the hidden costs of reward." It is intended to show psychological findings that can provide empirically relevant insights useful to economic and general social science issues provided they are carefully introduced into the theoretical framework. Methodological inconsistencies can be avoided in particular by sticking to individualism and rational choice.

Author's Note: *Support is gratefully acknowledged to the Richard Büchner-Stiftung at the University of Zurich. I would also like to thank Iris Bohnet and an anonymous referee for specific comments, and Gary S. Becker for insightful discussions of the underlying issues.*

The endeavor here pursued does not, however, want to "imperialize" (Hirschleifer 1985; Stigler 1984), but, rather, to be "inspired" by the other social sciences (Frey 1992, 1993a).

THE COMPLEX RELATIONSHIP BETWEEN EXTRINSIC AND INTRINSIC PREFERENCES

CROWDING OUT AND CROWDING IN

Consider the following accounts:

1. A boy on good terms with his parents willingly mows the lawn of the house. His father then offers to pay him a fee for each time he cuts the lawn. As a result, the boy now only mows the lawn when this payment comes forth—nor is he prepared to do any other type of housework for free.
2. Some professors at a state university who are particularly committed to their profession teach more than the obligatory 8 hours per week. Some professors, however, disregard this duty and teach less than required. The ministry of education issues a general regulation whereby the teaching hours of all professors are tightly controlled. The particularly engaged professors react by reducing their teaching hours to the minimum required.

The two accounts provide instances where an *external intervention*, a reward or a regulation, undermines or "crowds out" *intrinsic motivation*. Behavior is subject to two countervailing influences: the incentive or *disciplining effect* of the reward or regulation, which induces a greater intensity of the activity in question, and the *crowding out effect*, which crowds out intrinsic motivation and reduces the corresponding activity. Consider the following further accounts:

3. A girl is given a bicycle by her father because she has been helpful in the house. The girl keeps on doing the housework.
4. Some university professors are elected to form an official delegation for an important conference. They keep on working hard.

There are instances where an external intervention, a reward or regulation, strengthens or "crowds in" intrinsic motivation ("hidden gains of reward"). The disciplining effect and the crowding-in effect work in the same direction and serve to improve performance. It should be noted that minor changes in the examples have major effects on behavior. This suggests a complex relationship between external intervention, intrinsic motivation, and behav-

ior, so far not taken into account by the social sciences, in particular economics (see Frey 1993b).

EXTRINSIC AND INTRINSIC PREFERENCES

Extrinsic preferences are those activated from outside the person concerned. The external interventions may be material in monetary or nonmonetary form, or they may be immaterial, such as fame and recognition in the media. Economics focuses on these external interventions and the corresponding extrinsic preferences or motivations when they associate changes in external constraints (or generalized relative prices) with changes in behavior.

Intrinsic preferences relate to activities one undertakes for one's own sake. "One is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself" (Deci 1971, 105). Many different conceptualizations of intrinsic preferences exist (see, e.g., table 1 in Deci and Ryan 1985), but the phenomenon corresponds well with many everyday observations, including scholars who do research simply because of their curiosity about life and nature. The distinction between intrinsic and extrinsic preferences has been made not only because of the different *reactions* to external interventions but also because it might lead to different *modes of behavior*. Extrinsic motivation invites, or is at least associated with, calculativeness and marginal comparisons (opportunity cost), but also with discipline and professionalism (see Hirschman 1982). Intrinsic motivation, on the other hand, leads to playfulness and idiosyncrasy, convictedness and amateurish actions, as well as to more innovativeness. Psychological research has associated intrinsic motivation with spontaneity (Koestner et al. 1984) and creativity (Amabile 1983). It would be wrong, however, to jump to the conclusion that extrinsic motivation is good for business or, more generally, market activities, whereas intrinsic motivation is good for social activities, say health care. Numerous economic studies have convincingly shown that monetary incentives may perform a most beneficial role in many such areas including health care (see, e.g., Cooper and Culyer 1973). It is also known that paid soldiers lend themselves less to atrocities in war than intrinsically motivated fighters (Frey and Buhofer 1988).

PSYCHOLOGICAL PROCESSES

Deci and Ryan (1985), who have been most strongly identified with the research on the "hidden costs of reward" (see also Lepper and Greene 1978),

distinguish two processes that lead to extrinsic motivation, resulting in the crowding out of intrinsic motivation. When individuals perceive the external intervention to be controlling in the sense of reducing the extent to which they can determine actions by themselves, they substitute intrinsic for extrinsic control. Following Rotter (1966), *the locus of control* has shifted from inside to outside the person affected. The individuals, when feeling forced to behave in a specific way by outside intervention, then feel "overjustified" if they maintained their intrinsic motivation. They are then rational in reducing the motivational factor under *their* control, that is, intrinsic motivation. Conversely, with a low level of external rewards or controls, people are faced with insufficient justification for the activity they are performing. They must somehow justify why they pursue doing the task and, therefore, increase their sense of intrinsic motivation.

According to the second psychological process, an intervention from outside undermines the actor's intrinsic motivation if it carries the notion that the actor's behavior is considered to be unsatisfactory and that the intrinsic motivation exerted is not acknowledged. The person affected feels that his or her competence is not appreciated, which leads to an impaired self-esteem (self-esteem is taken by many scholars to be of central importance for human beings; thus, Rawls [1972, 86] considers self-esteem to be the most valuable of the goods he designates as "primary"), then resulting in a reduced effort.

External intervention does not necessarily shift the locus of internal control or impair perceived competence (examples 1 and 2 given at the beginning of this section), but might also have the opposite effect, as examples 3 and 4 have illustrated. Each intervention must be carefully analyzed in order to determine in what way self-determination and self-esteem could be affected.

A PRINCIPAL-AGENT RELATIONSHIP

The effect of extrinsic intervention E upon behavior can best be shown in the context of a principal/agent context. The principal uses rewards and commands in order to raise the performance P of the agent.

THE AGENT CHOOSES THE PERFORMANCE LEVEL

A (representative) agent performs by considering the benefits B and the cost C. Both increase in performance, that is, $\partial B/\partial P \equiv B_P > 0$ 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:

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

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

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

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

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

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

$$dP^*/dE = \frac{B_{PE} - C_{PE}}{C_{PP} - B_{PP}} \geq 0. \quad (4)$$

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 disciplining effect of external intervention. On the other hand, the crowding out effect is neglected, that is, a change in external intervention does not affect the marginal benefit of performing ($B_{PE} = 0$), as intrinsic motivation is, implicitly, taken to be constant (or, rather, absent). According to orthodox principal/agent theory, external intervention raises performance:

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

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.

(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), whereas the disciplining effect does not work ($C_{PE} = 0$), stronger external intervention reduces the agent's performance level

$$\frac{dP^*}{dE} < 0. \quad (4b)$$

(c) In general, both the disciplining 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 disciplining and the crowding out effects.

THE PRINCIPAL CHOOSES THE EXTENT OF EXTERNAL INTERVENTION

Rational principals seek to maximize their utility or profit U , taking into account how the agents react to their intervention, that is, relationship (4). Profit is raised by higher output X , which depends (among other things) on the agent's performance, but with decreasing returns:

$$X = X(P); X_P > 0, X_{PP} < 0. \quad (5)$$

External intervention imposes increasing marginal cost K on the principal

$$K = K(E); K_E > 0, K_{EE} > 0. \quad (6)$$

Assume that external intervention to the level $E_0 > 0$ is costless ($K = 0$). Maximizing profit $U = X - P$ requires

$$X_P \frac{dP^*}{dE} - K_E = 0, \quad (7)$$

which determines the optimal extent of external intervention E^* . It is again useful to distinguish three cases:

- (a) External intervention does not affect the agent's optimal performance level ($\frac{dP^*}{dE} = 0$). The principal should then abstain from rewarding or regulating the agent (beyond the costless level E_0).
- (b) The disciplining effect of external intervention dominates the crowding out effect ($\frac{dP^*}{dE} > 0$), which induces the principal to intervene beyond the costless level: $E^* > E_0$. The same holds when there is a crowding in effect.
- (c) The crowding out effect overweights the disciplining effect ($\frac{dP^*}{dE} < 0$). This makes rational principals reduce their intervention below the costless level: $E^* < E_0$.

This model indicates that empirical research on the crowding effect does not require the direct measurement of intrinsic preferences.³ The relationship between extrinsic and intrinsic preferences can, as far as it is relevant for behavior, be empirically analyzed by looking at the behavior of two different actors.

First, the behavior of the persons affected by external intervention (the agents) can be empirically evaluated by the equation $P^* = P(E)$ implied by relationship (4). It reveals how the persons adjust their performance P in reaction to the external intervention E . A negative observed relationship ($dP^*/dE < 0$), and if it is known that the disciplining effect does not work ($C_{PE} < 0$), suggests that the external intervention in question crowds out intrinsic motivation.

Second, intrinsic motivation may be inferred by analyzing the behavior of the person or institution (the principal) administrating the external intervention. Given the marginal cost of intervening, a strong reliance on external intervention by a rational actor indicates that intrinsic motivation is little or not at all affected. There might even exist a crowding in effect by intervening. On the other hand, under the same conditions a low level of external intervention suggests that rational principals know that intrinsic motivation is crowded out.

EMPIRICALLY TESTABLE PROPOSITIONS

So far, it has been argued that external interventions via rewards or regulations may crowd out or crowd in intrinsic motivation. This section now looks at the *conditions* favoring one of the two outcomes. It is analyzed how external interventions affect the perceived locus of control and perceived self-esteem of the person affected. Psychological research in this area is much concerned with the individual reactions based on personality characteristics; economics, on the other hand, is interested in knowing which outcome is more likely under what circumstances. When and how should rewards and regulations be applied in order to raise performance? This question is policy oriented; in particular, the goal is to know which one among the many possible institutions should be chosen to obtain a particular result (*comparative analysis of institutions*). The empirical evidence available is restricted in this respect because laboratory and field experiments undertaken in psychology are not designed to answer this kind of question. (For a recent survey of the evidence, see Lane 1991, part 6). It is therefore necessary to theoretically derive propositions that are amenable to empirical testing.

PERSONAL RELATIONSHIP

The persons subject to external intervention may be unknown to each other and act anonymously in one extreme or, in the other extreme, be friends, family members, or lovers. The degree of "social embeddedness" (Granovetter

1985) or "conjointness" (Coleman 1990) of the two actors systematically influences crowding.

Proposition 1. The more personal the relationship between principal and agent, the more important the intrinsic motivation. An external intervention disrupts this equilibrium and shifts the locus of control from intrinsic to extrinsic motivation. A crowding out effect can be expected.

In industrial relations theory, a personalized relationship between principal and agent has been observed to lead to a "psychological contract" whose violation tends to reduce work effort and performance. This interpretation is supported by a great deal of empirical evidence (see, e.g., Beer et al. 1984; Ribeaux and Poppleton 1978). *Institutionally*, the degree of embeddedness is reflected by decision-making systems. In perfect competition or in the pure price system, the relationship between the individuals is solely guided by the price, and there is anonymity between the partners. Hence there is no place for intrinsic motivation and no crowding out is to be expected. Thus orthodox economics, as long as it is only concerned with pure market interactions, does not need to consider any effect of the constraints (relative prices determining monetary rewards) on (intrinsic) preferences, and rightly focuses on the disciplining effect of external interventions.

As soon as one moves outside the pure price system, personal interactions become important. This is obvious for decision-making systems centered on bargaining where the actors necessarily enter into social interactions. Intrinsic motivation plays a role, and sometimes a considerable one; as a consequence, external interventions may crowd out intrinsic motivation.

Within firms the intensity of the personal relationship between the principals and the agents depends on the form of *supervision*. In the case of managers as agents of a certain firm, three major types can be distinguished: (i) The managers are controlled by the parent company. This corresponds to a rather impersonal relationship, so that, according to proposition 1, a positive influence of monitoring on managers' performance is expected, because intrinsic motivation is little or not at all affected. (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' efforts, as an external intervention shifts the locus of control toward 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).

In a recent study, Barkema (1992) tested these specific propositions regarding the effects of the form of supervision. His data set refers to 116 managers in medium-sized Dutch firms in 1985. They range from less than 100 to more than 30,000 employees and cover a wide variety of industries. The managers' individual efforts are (in line with Holmström and Milgrom 1990) operationalized as the number of hours invested. The intensity of regulating is captured by three aspects: the performance evaluation regularity, the extent of formality of the evaluation procedure, and the extent 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 E on managers' performance P^* .

The results are consistent with the proposition advanced. The econometrically estimated parameters capturing the effect of E on P^* , that is, dP^*/dE , according to relationship (4), 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 disciplining effect is overwhelmed. In the intermediate case (iii) of somewhat personalized control, the estimated parameter does not deviate from zero in a statistically significant way.

TYPE OF ACTIVITY

The task or job at hand is perceived to be of different intrinsic interest by the agents, which implies different reactions to external interventions.

Proposition 2. The more interesting a task is for the agents, the higher is their intrinsic motivation to perform well, and the more an external intervention diminishes perceived self-determination and self-evaluation.

This proposition is supported by strong evidence from carefully controlled laboratory experiments by psychologists (see, e.g., the survey by McGraw 1978): "Task-contingent rewards impair performance on interesting (complex or conceptual) tasks but they improve performance on dull, repetitive tasks" (Deci and Ryan 1985, 84). The same results have been found for regulations.

Institutionally, it is not easy to indicate a priori which tasks and jobs are "interesting" and which are "dull," because the evaluation may vary considerably among individuals. However, it seems fair to state that liberal professions such as lawyers, architects, doctors, or artists, as well as academics tend

to consider their jobs more intrinsically interesting than little-educated employees. Following proposition 2, one would expect that in the liberal professions less external intervention is *ceteris paribus* used than in other occupations. This proposition has, indeed, been supported by much empirical evidence collected in particular by supervision theory (e.g., Donaldson 1980; Reber and van Gilder 1982).

PARTICIPATION

The formal and informal possibilities for agents to participate in the principals' decision process vary widely. In some cases, only commands are used, whereas in other cases there is extensive discussion and co-determination. There are clear effects on intrinsic motivation.

Proposition 3. The more extensive the agents' participation possibilities are, the more an external intervention shifts the locus of control, thus crowding out intrinsic motivation.

Although it has not necessarily been formulated in these terms, this proposition lies at the heart of the arguments for co-determination.

Institutionally, one may distinguish between firms that rely on a formal, strict hierarchy, and others that have a flatter hierarchy and rely on workers' participation. With respect to formal as well as informal co-determination, neat differences exist between countries as well. According to proposition 3, one expects less intensive external interventions in the latter than in the former type of firm. Among much other evidence in favor of this result, a comparison between Japanese firms relying more on consensus and collaboration of all employees, and American firms relying more on hierarchical decision making supports our conclusions (see Aoki 1990).

At the *governmental* level, even within one country, different constitutional possibilities for citizens to participate in political decision making exist. A case in point is Switzerland where some cantons have extensive possibilities for direct participation (i.e., initiatives and referenda on virtually all issues), whereas others grant these possibilities only for special issues and under specific conditions. Other cantons rely on the institutions of representative democracy. It may be hypothesized that in cantons allowing more direct participation citizens are more strongly committed. Their political loyalty is more developed and they tend to have a higher tax morale than representative communes. An econometric study has, indeed, shown (Pommerehne and Frey 1992) that the more direct a democratic institution is, the less tax cheating takes place. It has also been demonstrated that the

policy instruments are applied accordingly. In a direct democracy, an increase in tax auditing (a particular kind of regulation) is known to undermine tax morale more strongly than in a representative democracy. Based on this knowledge, citizens in a direct democracy choose a lower level of auditing than politicians in a representative democracy.

UNIFORMITY

In one extreme, all the agents are treated the same by the principal; in the other extreme, the principal makes a conscious effort to distinguish the rewards or commands according to the agents' presumed level and flexibility of intrinsic motivation.

Proposition 4. The more uniform the external intervention, the more negatively those agents are affected who have above-average intrinsic motivation. They feel that their competence is not recognized by the principal and, therefore, adjust their intrinsic motivation downward.

A case for this reaction is provided by the second example given at the beginning of this article: the more engaged professors feel unjustly treated, thus locus of control shifts from intrinsic to extrinsic motivation resulting in a reduction of their teaching to the minimum number of hours required.

Institutionally, the government administration, which is bound by general rules, tends to intervene more uniformly than private institutions. In particular, the government is more bound by a general salary scale and has fewer possibilities to vary it according to the intrinsic motivation and performance of an employee. It can be hypothesized that in state-run institutions more employees reduce their intrinsic work motivation to a low level than is the case in the more flexible private institutions. This may explain why many public sector employees, after a period of adjustment,⁴ are disillusioned, so that their work morale is lower than in equivalent positions in private institutions. On the other hand, private institutions typically make a greater effort to distinguish between agents of high and low intrinsic motivation. At private universities, for instance, professors are required to document their research achievements (publications, citations). This procedure gives the most prolific and successful researchers a chance to show their competence, raising further their intrinsic academic motivation. At universities run by a central governmental institution—the typical case in Europe—the administration exhibits little or no interest in an academic's performance, so that his or her intrinsic motivation is unaffected (or diminishes over time). The higher

intrinsic interest in, coupled with higher external rewards of, research is one of the features most often remarked on by European scholars visiting the United States.

TYPE OF INTERVENTION: REWARD VERSUS COMMAND

In standard economics, rewards and commands are not differentiated. In both cases, deviating from the principal's demands entails costs. In the case of rewards, the agents suffer the opportunity cost of not receiving the maximum reward; in the case of commands, a deviation is met by a punishment. However, with rewards, the agents feel that they have a certain amount of freedom in their intensity of responding. Therefore, they perceive rewards as less restrictive to their self-determination than commands, which are felt to intrude directly into the agents' realm of self-determination. In so far as rewards are monetary, the following proposition can be put forth:

Proposition 5. External interventions via changes in relative prices and, therewith, monetary rewards crowd out intrinsic motivation less than regulations used for the same purpose, because rewards shift the locus of control less than commands do.

This proposition is of immediate institutional relevance. Consider, for example, environmental policy. Economists strongly champion the use of pricing instruments (effluent charges or taxes, tradable licenses) because they give individuals and firms incentives to act in an environmentally friendly way (see, e.g., the survey by Cropper and Oates 1992). The "control and command" approach, on the other hand, is rejected because it does not promote any incentives to safeguard the environment. According to this proposition, there is an additional advantage of using price incentives over pure commands: the intrinsic motivation to protect the environment, or "environmental ethics," is less damaged.

CONTINGENCY OF REWARDS ON PERFORMANCE

When agents get a reward only if they have performed according to the principals' wishes, their intrinsic work motivation is negatively affected.

Proposition 6. The more a reward is contingent on the performance desired by the principal, the more strongly the locus of control is shifted from intrinsic to extrinsic preferences, and the more intrinsic motivation is crowded out.

This proposition is supported by a great deal of laboratory experiments undertaken by psychologists. Deci and Ryan (1985, 81) summarize the result as follows: "contingent rewards . . . tend to decrease intrinsic motivation," and, more specifically: "Competitively contingent rewards are the most controlling, performance-contingent less so, and task-contingent even less than performance-contingent." The extent to which an agent perceives a reward as being "contingent" depends on the perceived cause of the reward, the type of reward, and the regularity of rewards. The institutional differences existing between the price system and the administrative system are closely related to various aspects of reward contingency. A monetary reward received through the functioning of the market constitutes a case where the reward depends on performance; in a perfectly competitive market, the reward (wage rate) depends exactly on the marginal product performed. The price system, therefore, tends to substitute intrinsic by extrinsic motivation due to a perceived shift in the locus of control. Instead of being perceived as a control instrument, a market reward may also indicate competence and then tends to raise intrinsic motivation. "Scientists, artists and entrepreneurs receive rewards for performance that may be described as feelings of competence and self-determination" (Lane 1991, 389), an aspect that has been emphasized by Schumpeter (1936). Within the bureaucracy of a firm or other organization, the effect of reward contingency depends very much on the context and the way rewards are being applied.

In firms, managers spend a great deal of time establishing personal relationships with their inferiors (see, e.g., Mintzberg 1975). This activity seems to build up intrinsic motivation, and as a consequence (see proposition 1), an external intervention risks crowding out the intrinsic motivation fostered. This relationship is understood by managers. It helps to explain the fact that incentive payments are so little used in reality, although standard economists strongly favor them (see, e.g., Baker, Jensen, and Murphy 1988).

Promotion based on performance if interpreted as an acknowledgment of competence tends to raise work morale, but if it is perceived as a reward contingent only on one's performance, it tends to reduce intrinsic motivation. This does not mean that in the latter case the promoted person is less motivated overall, but that his or her intrinsic motivation has marginally been substituted by the external incentive of promotion. It therefore does not contradict the basic assumption underlying the economics of tournaments (see Lazear and Rosen 1981) provided the disciplining effect is larger than the crowding out effect. As pointed out above, the way people perform depends, however, on whether they are intrinsically or extrinsically motivated.

Titles, orders, and prizes given contingent on a particular performance tend to negatively affect intrinsic motivation, as these extrinsic factors will

take its place instead. This being understood, a lot of trouble is taken not to grant these rewards as a response to a particular performance but, rather, as a recognition of a person's dedication to his or her work or career in general. Titles and orders are normally given for one's lifelong work and are thus perceived as a recognition of one's competence, raising intrinsic motivation.

The *monetization* of rewards tends to emphasize performance contingency because agents are used to establish a relationship between the size of the income received and their performance. Nonmonetary gifts in kind (i.e., in the form of flowers, a book, or chocolates) constitute a conscious effort to disassociate the reward from any particular performance. Rather, these gifts are chosen so that the person's basic attitude is acknowledged. This effect has been well understood by firms that aim at increasing their employees' attachment not by handing out monetary rewards, but, rather, by treating them to pleasure outings and other such privileges. Within the family, gifts in terms of money are frowned at because they tend to shift the locus of control (see example 1 at the beginning of the article). Lovers like to hand out lavish presents to each other, which, were they given in monetary form, might well spoil the relationship on the grounds of too much "commercialization." Experimental evidence suggests that cash payments discourage altruistic acts. A sample of persons were interviewed to find out their attitudes toward giving blood. One group was then offered a cash inducement to give blood, the second group was not. The persons in the group offered cash inducements were actually *less* likely to donate blood than those who were not offered cash inducements (see Condry and Chambers 1978, 72; see also Titmuss 1970).

MESSAGE IMPLIED BY THE EXTERNAL INTERVENTION

A reward or regulation respectively may carry quite different information that significantly affects the way people perceive them.

Proposition 7. The more strongly an external intervention implies an acknowledgment of the agent's intrinsic motivation, the more strongly it fosters intrinsic motivation.

The *perfect market* or pure price system is free of any moral connotation; it is amoral. According to standard economics, a person or firm is completely free to act within the confines of the price set. If the price-external social costs are internalized by Pareto-optimal prices or charges, there is nothing to disapprove of morally: "If the charges were to be paid, few economists would express any criticism of a person undertaking the behaviour" (Kelman 1983, 313). Accordingly, Friedman ([1970] 1988) argues that the only business of

business is to make profit. Actors who partially act according to their intrinsic motivation are often ridiculed.

Once it is taken into account that intrinsic motivation may depend on external intervention, such global statements are no longer warranted. As soon as such a position is adopted, the locus of control over one's behavior is completely shifted to external sources, and intrinsic motivation is crowded out. Consider the case of murder. Proponents of the economics of crime (Becker 1976; McKenzie and Tullock 1975) would argue that if all costs imposed were paid,⁵ murder would not be morally condemned. As a consequence, murder would solely be a matter of calculating benefits and costs (but nobody who does not voluntarily agree with the price offered would then be killed). Most non-economists and also many economists would vehemently oppose such a proposition, not least because they feel that moral barriers against killing are important and necessary because it is impossible to adequately monitor people by applying the appropriate prices.

SPILLOVER EFFECTS

From the point of view of economics, it might be argued that the crowding effect discussed so far is of limited importance because a shift in intrinsic motivation can be compensated for as long as the "disciplining" effect dominates the crowding out effect (see, e.g., equations 4 and 4a). In the case of environmental policy, for example, the reduction in environmental morale induced by an intervention can normally be made up by a more intensive use of pricing or regulatory instruments. However, such a compensation is either unfeasible or ineffective when the application of external interventions does not only crowd out intrinsic motivation in the specific area but also spreads beyond.

The area in which an external intervention is applied need not be the same as the one where intrinsic motivation is affected. If the area covered by a specific type of intrinsic preference is larger than the area influenced by a reward or command, the crowding out of intrinsic motivation "spills over." (For empirical evidence on the "spill over effect," see Kahn and Schoeler 1983.) A case is provided by example 1 given at the beginning of the article: the boy paid for mowing the lawn has not only less intrinsic motivation to do that work but is also unwilling to do any other housework for free. The area of control by reward is smaller (it only covers lawn mowing), whereas intrinsic motivation extends over all housework. If this applies, intervening externally has higher costs than if the spillover effect did not exist; it is then

optimal, *ceteris paribus*, to apply external intervention less intensively or not at all.

RELEVANCE OF CROWDING EFFECTS

The harmful, and sometimes beneficial, influence of external interventions on intrinsic motivation is an important topic for all social sciences, as it constitutes a well-identified and empirically supported case of a *preference change induced by a change in constraints*. It thus deviates from the standard case assumed in rational choice theory that constraints may be manipulated without shifting preferences. It is also important because a so far little-considered *limit of applying the price system* is identified. Under the specific institutional conditions in which pricing is likely to crowd out intrinsic motivation to a significant degree, pricing becomes less effective as a means of influencing individual behavior. This also applies to other external interventions, including regulations. The analysis thus also points to new *limits of regulating* going beyond those extensively dealt with in the orthodox (economic) literature. Indeed, the existence of crowding out suggests that there are serious limits to external intervention whatever their form. The analysis here undertaken posits that under more circumstances than so far taken into account no external intervention at all is the best policy. Individuals guided by their intrinsic preferences in some circumstances perform well, and an interference from outside is harmful. This is, of course, no appeal for a complete "laissez-faire"; a scientific analysis must identify as precisely as possible under what (institutional) conditions it is reasonable to interfere or not, and what the circumstances are under which external interventions build up intrinsic motivation.

NOTES

1. In formal, model-oriented economics, several attempts have been made to analyze preference changes. The major strand has been to take the present valuation of goods to depend on past consumption (e.g., Pollak 1970; Weizsäcker 1971), which essentially involves adjustment effects and completely neglects findings in other social sciences. Often, these studies have degenerated into analyses of purely logical possibilities without any empirically testable propositions. Exceptions are econometric estimates of "individual welfare functions" (Kapteyn and Wansbeek 1985; Van Praag 1968), which look at how consumers adapt to higher consumption levels. It has been found that although economic growth at first raises utility this effect diminishes over time because consumers get more used to consumption. The welfare effect of growth is, therefore, higher *ex ante* than *ex post*.

2. See the approaches by Scitovsky (1976), Hirschman (1977), or Frank (1985, 1988), who consider specific cognitive processes.
3. This is analogous to standard economic theory in which the demand for a good depends on marginal utility but the empirical (econometric) analysis of demand does not require the direct measurement of a utility function.
4. It may well be that many intrinsically highly motivated persons who endeavor to promote the "public good" join the public sector, so that at the time of entrance they exhibit a higher work morale than persons in a corresponding position in the private sector.
5. In practice this would, of course, be difficult to evaluate and administrate.

REFERENCES

- Alchian, Armen A., and Harold Demsetz. 1972. Production, information costs and economic organization. *American Economic Review* 62:777-95.
- Amabile, T. 1983. *The social psychology of creativity*. New York: Lawrence Erlbaum.
- Aoki, Masahiko. 1990. Towards an economic model of the Japanese firm. *Journal of Economic Literature* 28:1-27.
- Baker, George P., Michael C. Jensen, and Kevin J. Murphy. 1988. Compensation and incentives: Practice versus theory. *Journal of Finance* 43:593-616.
- Barkema, Harry G. 1992. Do job executives work harder when they are monitored? Evidence from the Netherlands. Department of Business Administration, University of Tilburg, The Netherlands. Mimeo.
- Becker, Gary S. 1976. *The economic approach to human behavior*. Chicago: University of Chicago Press.
- Beer, Michael, Bert Spector, Paul R. Lawrence, D. Quinn Mills, and Richard E. Walton. 1984. *Managing human assets*. New York: Macmillan.
- Coleman, James S. 1990. *Foundations of social theory*. Cambridge, MA: Harvard University Press.
- Condry, John, and James Chambers. 1978. Intrinsic motivation and the process of learning. In *The hidden costs of reward*, edited by Mark R. Lepper and David Greene, 68-81. New York: Lawrence Erlbaum.
- Cooper, Michael H., and Anthony J. Culyer, eds. 1973. *Health economics*. Harmondsworth, Middlesex, England: Penguin.
- Cropper, Maureen L., and Wallace E. Oates. 1992. Environmental economics: A survey. *Journal of Economic Literature* 30:675-740.
- Deci, Edward L. 1971. Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology* 18:105-15.
- Deci, Edward L., and Richard M. Ryan. 1985. *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Donaldson, Les. 1980. *Behavior supervision*. Reading, MA: Addison-Wesley.
- Fama, Eugene F., and Michael C. Jensen. 1983. Separation of ownership and control. *Journal of Law and Economics* 26:301-51.
- Frank, Robert H. 1985. *Choosing the right pond*. New York: Oxford University Press.
- . 1988. *Passions within reason: The strategic role of the emotions*. New York: Norton.
- Frey, Bruno S. 1992. *Economics as a science of human behaviour*. Boston and Dordrecht: Kluwer.

- _____. 1993a. From economic imperialism to social science inspiration. *Public Choice* 77:95-105.
- _____. 1993b. Does monitoring increase work effort? The rivalry with trust and loyalty. *Economic Inquiry* 31:663-70.
- Frey, Bruno S., and Heinz Buhofer. 1988. Prisoners and property rights. *Journal of Law and Economics* 31:19-46.
- Friedman, Milton. [1970] 1988. The social responsibility of business is to increase its profits. In *Ethical theory and business*, edited by T. Beauchamp and N. Bowie, 110-27. Englewood Cliffs, NJ: Prentice-Hall.
- Granovetter, Mark. 1985. Economic action and social structure: The problem of imbeddedness. *American Journal of Sociology* 91:481-510.
- Hirschman, Albert O. 1977. *The passions and the interests: Political arguments for capitalism before its triumph*. Princeton, NJ: Princeton University Press.
- _____. 1982. Rival interpretations of market society: Civilizing, destructive, or feeble? *Journal of Economic Literature* 20:1463-84.
- Hirschleifer, Jack. 1985. The expanding domain of economics. *American Economic Review* 75:53-68.
- Holmstrøm, Bengt, and Paul Milgrom. 1990. Multi-task principle-agent analysis: Incentive contracts. Asset ownership and job design. Mimeo.
- Kahn, Melvin L., and Carmi Schooler. 1983. *Work and personality*. Norwood, NJ: Ablex.
- Kapteyn, Tom, and Tom Wansbeek. 1985. The individual welfare function: A review. *Journal of Economic Psychology* 6:333-63.
- Kelman, Steven. 1983. Economic incentives and environmental policy: Politics, ideology and philosophy. In *Incentives for environmental protection*, edited by Thomas C. Schelling, 291-331. Cambridge: MIT Press.
- Koestner, Richard, Richard M. Ryan, Frank Bernieri, and Kathleen Holt. 1984. Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity. *Journal of Personality* 52 (3): 233-48.
- Lane, Robert E. 1991. *The market experience*. Cambridge: Cambridge University Press.
- Lazear, E., and Sherwin Rosen. 1981. Rank order tournaments as optimum labor contracts. *Journal of Political Economy* 89:1045-64.
- Lepper, Mark R., and David Greene, eds. 1978. *The hidden costs of reward: New perspectives on the psychology of human motivation*. New York: Lawrence Erlbaum.
- McGraw, Kenneth O. 1978. The detrimental effects of reward on performance: A literature review and a prediction model. In *The hidden costs of reward: New perspectives of human behaviour*, edited by Mark R. Lepper and David Greene, 33-60. New York: Lawrence Erlbaum.
- McKenzie, Richard, and Gordon Tullock. 1975. *The new world of economics*. Homewood, IL: Irwin.
- Mintzberg, Henry. 1975. The manager's job: Folklore and fact. *Harvard Business Review* 53 (July-August): 49-61.
- Pollak, Robert A. 1970. Habit formation and dynamic demand functions. *Journal of Political Economy* 78:745-63.
- Pommerehne, Werner W., and Bruno S. Frey. 1992. The effects of tax administration on tax morale. Paper presented at the Conference on Tax Administration and Tax Evasion of the International Seminar in Public Economics (ISPE), June, at El Escorial, Spain.
- Rawls, John. 1972. *A theory of justice*. London: Oxford University Press.

- Reber, Ralph W., and Gloria van Gilder. 1982. *Behavioral insights for supervision*. Englewood Cliffs, NJ: Prentice-Hall.
- Ribeaux, Peter, and Stephen E. Poppleton. 1978. *Psychology of work: An introduction*. London: Macmillan.
- Rotter, Julian B. 1966. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs* 80 (1, Whole No. 609).
- Schumpeter, Joseph A. 1936. *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Scitovsky, Tibor. 1976. *The joyless economy: An inquiry into human satisfaction and consumer dissatisfaction*. New York: Oxford University Press.
- Stigler, George J. 1984. Economics—The imperial science? *Scandinavian Journal of Economics* 86:301-13.
- Titmuss, Richard M. 1970. *The gift relationship*. London: Allen & Unwin.
- Van Praag, Bernhard M. S. 1968. *Individual welfare functions and consumer behavior*. Amsterdam: North Holland.
- Weizsäcker, Carl-Christian von. 1971. Notes on endogenous changes of tastes. *Journal of Economic Theory* 3:345-72.

