

From the Price to the Crowding Effect

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1. ECONOMICS AND PSYCHOLOGY

Over the last years considerable work has been undertaken to bring economics and psychology closer together.¹ Two different approaches may be distinguished. The first is to break completely with existing (neoclassical) economics and constructing a «psychological economics» where human beings are analysed according to the ideas and concepts of psychology (e.g. FURNHAM and LEWIS, 1986; LEA, TARPY and WEBLEY, 1987). While such attempts are courageous, they have been completely disregarded within economics. Modern economics as the self-proclaimed «queen of the social sciences» has achieved a well-defined core of assumptions and models which are vigorously protected by academic economists against outside criticism (see MAYER, 1993). The second approach is to introduce *specific* psychological effects into economics and to thereby improve the rational choice view of man.

Some prominent examples are

- SCITOVSKY (1976, 1981) builds on Wundt's Law of the optimal degree of arousal, and refers to it as the «*desire for excitement*».
- HIRSCHMAN (1958, 1970) inquires into the conditions under which artistic activity, entrepreneurship and innovation can be *awakened*. He thus does not take the effort expended as given. One possibility of activating people is to consciously create *imbalances*, because they induce and even force people to become active in order to

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1. See e.g. EARL (1990), VAN RAAD, VAN VELDHoven and WARNEKYD (1988), FREY (1992). Europeans were pathbreaking, see e.g. TARDE (1907), MÜNSTERBERG (1912), SAUERMAN and SELTEN (1962), SCHMOLDERS (1962, 1975) and JOHN (1972); early American contributors were DUESENBERY (1949) and KATONA (1975).

- survive, or to at least maintain their standard of living.
- SIMON (1957, 1982), SELTEN and TIEZ (1980) and WILLIAMSON (1985) propagate that individuals are incapable of maximizing in any strict sense and propose the concept of «*bounded rationality*» as a more realistic, and psychologically adequate alternative which takes into account cognitive and motivational limitations of human thinking.
 - SCHELLING (1978, 1980), THALER and SHEFRIN (1981) and several other scholars (e.g. SEN, 1977) develop the concept of «*self-commitment*». Persons who are aware that under particular conditions they fall prey to a temptation, can try to evade the trap by binding themselves. An example is Ulysses, who had himself fastened to the mast of his ship in order not to succumb to the sirens' chant. Such theoretical ideas establish a relationship to psychological theories of how to master one's life.
 - LEIDENSTEIN (1976) develops the notion of an «*inert area*», from where individuals have no incentive to depart even when utility increasing opportunities arise. A related idea has been coined «*ipsative behaviour*» (FREY and FOPPA, 1986). It adds to the objective and the subjective (personally perceived) opportunity set of behaviour a third, radically different one: the «*ipsative*» opportunity set refers to *oneself* only, and determines one's own behaviour. What matters, for instance, is not what the objective probability of getting cancer is, nor what one thinks it is (subjective probability), but how likely one believes that one gets cancer oneself. That the ipsative opportunity set may drastically differ from the objective and subjective one, and may do so for extended periods, can be seen when it comes to divorce: Everyone knows about the high risk of divorce, but the vast majority of people believe that this happens to others, not to themselves. The systematic ipsative over- or underestimation of one's possibility set has been empirically supported for a wide number of behaviours (see WEINSTEIN, 1980).
 - SCHLICHT (1979) employs *Gestalt theory* to explain the movement towards labour management.
 - AKERLOF and DICKENS (1982), GILAD, KAISH and LOEB (1987) and various other economists use the psychological notion of «*cognitive dissonance*» (FESTINGER, 1957) to account for beliefs and consequent behaviour which are otherwise difficult to explain in the economic framework. They show in particular, that rational workers discount the risk they are exposed to in their job, and that they therefore use less safety equipment than would be optimal.
 - FRANK (1988) attributes an important role to *emotions* which are trustworthy as they are difficult to imitate. Signals such as blushing, which are firmly based in psychological thinking, are given a role in economic models of human behaviour.
 - In surveys (KAHNEMAN, KNETSCH and THALER, 1986a; FREY and POMMERERHNE, 1993) and experiments (e.g. GÜTH, SCHMITTBERGER and SCHWARZE, 1982; KAHNEMAN, KNETSCH and THALER, 1986b; also BOHNET and FREY, 1995) the notion of «*fairness*» as applied to economic issues has been explored for a large number of conditions (a review is provided, e.g. by ROTH, 1995). Fairness in terms of «*reciprocity*»

ity» (see the experiments by FEHR, KIRCHSTEIGER and RIEDL, 1993; and the survey by CAMERER and THALER, 1995) draw directly on the notions of equity developed in psychology (GOULDNER, 1960; ADAMS 1965; WALSTER, WALSTER and BERSCHIED, 1977).

Some of these efforts to integrate psychological effects into economics have been noted by mainstream economists in the sense that they are (often almost ritually) quoted at the appropriate moments, but they have had precious little effect on economic theory as a whole. The classical *Homo Oeconomicus* is still used as a matter of course. The reason might be that these extended versions do not yield empirically testable implications which differ much from the simple model of wealth maximization. The special features highlighted in the psychological effects are felt to be irrelevant under most circumstances. This position may well be tenable in some fields of economics in which abstract markets dominate but it is most doubtful as soon as one goes beyond and looks at human behaviour in more general circumstances.

This paper follows the second tradition: it seeks to improve the model of *Homo Oeconomicus* by introducing a particular, psychologically-based effect. It thus amends the (*Relative*) *Price Effect* which is basic to economics (BECKER, 1976; HIRSHLEIFER, 1985; KIRCHGÄSSNER, 1991).

The *Price Effect* applied to supply states that a higher price (ceteris paribus) induces an increase in supply, i.e. price and quantity are positively related. The *Crowding-Out Effect* here advanced predicts an exactly opposite supply response: a higher price induces a decrease in supply. This contrasting effect may be illustrated by two examples:

«A boy on good terms with his parents willingly mows the lawn of the family home. His father then offers to pay him money each time he cuts the lawn».

The *Crowding-Out Effect* suggests that the boy will lose his intrinsic motivation to cut the lawn (but he may go on doing so but now he does it because he is paid), but he will not be prepared to do any type of housework for free.

«You have been invited to your friend's home for dinner, and he has prepared a wonderful meal. Before you leave, you take out your purse and give your friend an appropriate sum of money».

Probably nobody in his right mind would behave in this way because virtually everyone knows that this would be the end of the friendship. By paying, the relationship based on benevolence is fundamentally transformed; if it survives at all, it becomes a commercial one. Yet there is one person who would not hesitate to pay his friend for dinner: classical *Homo Oeconomicus* would do so following the *Price Effect* – and ends up without friends, to his own chagrin.

The two examples indicate that the *Price Effect* on which economics is founded is not valid under all conditions and circumstances and that the relationship between a monetary reward offered and supply must be analysed in a wider perspective. A «holy cow» of modern economics needs to be reconsidered. External, and in particular monetary incentives do not mechanically induce human beings to act in the way desired because they crowd-out intrinsic motivation under identifiable conditions. Thus, external and

internal incentives are not additive as has been assumed as a matter of course in economics (see SOLOW, 1971; ARROW, 1972). A more refined model of humans is needed, a *Homo Oeconomicus Maturus* whose behaviour to some extent relies on purely internal considerations, in particular on self-esteem and self-determination.

Section 2 of this paper develops the Crowding Theory, discussing its basis in social psychology, integrating it into economics, and analysing the conditions under which the Crowding-Out Effect takes place. Applications to important social issues are presented in Section 3: the siting of generally desired, but locally unwanted projects (such as nuclear refuse deposits), as well as tax evasion. Section 4 generalizes Crowding Theory by noting that regulations may also undermine intrinsic motivation, and by considering Spill-Over Effects to related areas. Conclusions are drawn in Section 5: both economic theory and policy are strongly affected by the existence of Crowding Effects. More care should be taken when applying incentive payments in firms or in the public sector (e.g. when following New Public Management ideas) or when using incentive instruments in economic policy (e.g. with respect to the environment).

2. CROWDING THEORY

A. Psychological Background

Social psychologists have analysed and empirically measured that an external intervention in the form of a reward reduces individuals' intrinsic incentives. This relationship has been variously termed «undermining effect» (DECI, 1971), «overjustification effect» (LEPPER, GREENE and NISBETT, 1973) «the hidden cost of reward» (LEPPER and GREENE, 1978) or «corruption effect» (HECKHAUSEN, 1980) by the psychological scholars involved.² The hidden cost of reward, for instance, has been observed in asylums where paying the patients for performing certain tasks (such as making the bed or cleaning their room) undermines their motivation to do it on their own (see e.g. LEPPER and GREENE, 1978).

The hidden cost of reward rests on the distinction between internal and external motivation. Following DECI (1971, p. 105) «one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself» (see also DECHARMS, 1968). The distinction between intrinsic and extrinsic motivation is not clear-cut. Indeed, it might be claimed that in the last instance, all motivations come from outside. On the other hand, what matters after all is the inner satisfaction one derives from one's behaviour. While the precise distinction might be important for psychology, for the purpose of explaining economically and socially relevant behaviour it suffices to

2. The major contributions have been by DECI (e.g. 1975, 1987). The work is summarized and extended in DECI and RYAN (1980, 1985). Extensive surveys are given in LEPPER and GREENE (1978), PITTMAN and HELLER (1987) and LANE (1991). Examples are provided in DECI with FLASTE (1995).

distinguish between activities which people mainly do just because they like them, and others which they mainly do because of monetary payment or command. In many cases, the two motivations go together. What matters in our context is that there exists an identifiable relationship between intrinsic and extrinsic motivations.

Three psychological processes have been identified to account for the «hidden cost of rewards»:

- (1) When individuals perceive the external intervention to be controlling in the sense of reducing the extent to which they can determine actions by themselves, intrinsic motivation is substituted by extrinsic control. Following ROTTER (1966), this *loss of self-determination* shifts the locus of control from the inside to the outside of the person affected. Individuals who are forced to behave in a specific way by outside intervention, would feel «overjustified» if they maintained their intrinsic motivation. Then, they behave rationally when reducing the motivational factor under their control, that is intrinsic motivation.
- (2) An intervention from the outside undermines the actor's intrinsic motivation if it carries the notion that the actor's intrinsic motivation is not acknowledged. The person affected feels that his or her competence is not appreciated which leads to an *impaired self-esteem*, resulting in a reduced effort. Self-esteem is taken to be of central importance for human beings by many scholars; see e.g. RAWLS (1971, p. 86) who considers self-esteem to be the most valuable of the goods he designates as «primary».
- (3) A person acting on the basis of his or her intrinsic motivation is deprived of the chance to exhibit this intrinsic motivation to other persons. Thus, when a host is paid by his guest, the host has no longer the possibility of showing that he or she values the guest's company as such. As a reaction, the persons affected exhibit «altruistic anger» and will in reaction relinquish the inner motivation and behave according to external motives.

The hidden cost of reward have been extensively tested in the laboratory. In their surveys and meta-analyses, WIERSMA (1992) and CAMERON and PIERCE (1994) evaluate and compare hundreds of experiments. The motivational effect outlined has been supported by a large number of laboratory experiments: «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», and «These predictions have been upheld in studies varying the nature of the reward contingency and other kinds of extrinsic constraints...» is summarized in the surveys of MCGRAW (1978, pp. 55–58) and PITTMAN and HELLER (1987, p. 464), respectively. It has been argued that these results are purely based on laboratory experiments and are difficult or even impossible to transfer to real life settings (e.g. MUCHINSKY, 1990, p. 370 et seq). DECI and RYAN (1985, p. 299) while agreeing with the fact retort that «certainly that is unfortunate but the experimental findings from the laboratory and other applied settings are so clear and pervasive that their applicability seems well assured». One such applied setting is so-called token «economies» (see KAZDIN and BOOLZIN, 1972; KAZDIN, 1982) in which patients of

asylums were offered a monetary compensation (via tokens) for performing certain tasks. Such programmes were generally discontinued because the patients thereafter proved to behave in a less helpful way, consistent with the hidden cost of reward.

However, the experimental results are not as clear as the adherents of the hidden cost of rewards (cognitive evaluation theory) make us believe. As is normal in empirically-oriented sciences including econometrics, such effects are never undisputed. A major reason is that both sides of the relationship can be defined, operationalized and measured in many different ways. Depending on what definitions and concepts of intrinsic and extrinsic motivation are used, it is possible to produce almost any result. The usefulness of the hidden cost of reward for the social sciences does not depend on whether it always obtains. Rather the conditions under which the effect holds must be identified.

Social psychology itself knows a competing theory to the hidden cost of reward. The equity literature (based on ADAMS, 1965; WALSTER, BERSCHIED, and WALSTER, 1973) has repeatedly found that increasing pay *increases* productivity (and presumably, intrinsic motivation) whereas the cognitive evaluation literature has found that increasing pay *decreases* intrinsic motivation (hence, presumably productivity). It follows, and has been empirically supported that under some conditions increased rewards raise, and under other conditions, lower intrinsic motivation and productivity. The reverse also holds: «Providing inadequate rewards may sometimes *decrease*, and at other times *increase*, intrinsic motivation» (FOLGER, ROSENFELD and HAYS, 1978, p. 557).

B. Conditions

Psychologists have identified the following conditions under which rewards negatively or positively affect intrinsic motivation:

- (1) External interventions *crowd out* intrinsic motivation if the individuals affected perceive them to be *controlling*. Self-determination, self-esteem, and the possibility for expression 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 *supporting* (or informative in a positive way). Self-esteem is fostered, and individuals feel that their self-determination is enlarged which raises intrinsic motivation.

Both conditions are formulated in terms of subjective perceptions. Psychologists, however, have gone further and have identified conditions which apply more generally. Thus, the undermining effect is found to be the stronger (DECI and RYAN, 1987, pp. 1026-7)

- the more the rewards are expected. Unexpected rewards have a weaker or no effect;
- the more salient the reward is;
- the more contingent the reward is on the task or on performance;
- the more deadlines and threats are used;
- the more intensive surveillance is;

– the more routine the rewarded work is.

Obviously, the hidden cost of reward are only relevant if the persons concerned have some amount of intrinsic motivation. Indeed, «the most negative reactions were exhibited by those who previously felt highly committed...» (BROCKNER, TYLER and COOPER-SCHNEIDER, 1992, p. 241).

With respect to the extrinsic intervention, psychologists have found that monetary rewards are more undermining than other material rewards. Praise and social approval are more likely to be interpreted as supporting than as controlling.³

C. Integration into Economics

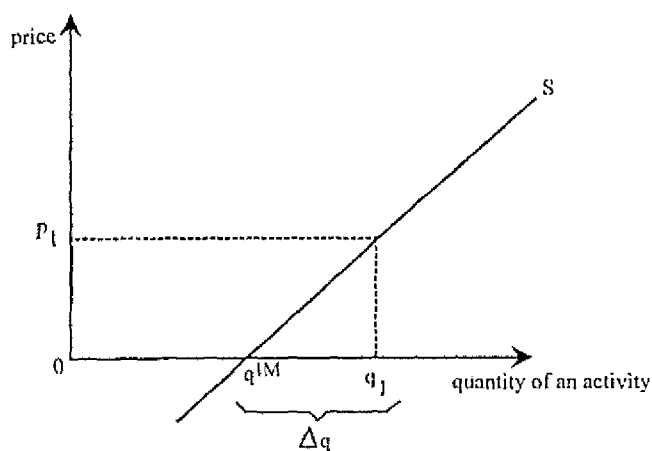
Psychological studies relate to the effect of an external intervention on intrinsic motivation (Crowding-Effect). In order to make the effect useful for our purpose, it is necessary to simultaneously take into account the Price Effect normally considered in economics. Attention is focussed here on Crowding-Out because it affects behaviour in the opposite direction to the Price Effect.

1. Supply Falls

Consider a normal, positively inclined, supply function (S in Fig. 1) for an activity. At a zero price the individuals considered are prepared to supply the quantity q^{IM} , i.e. to some extent they are assumed to undertake the activity for its own sake or intrinsically motivated. Such behaviour is perfectly consistent with economic theory (see e.g. BECKER's [1981] altruism in the family). Following the Price Effect, conventional economic theory predicts that a price rise (from O to P_I) raises supply from q^{IM} to q_I , moving along the supply curve.

3. LANE (1991, p. 212) offers the following observation relevant for scholars: «No author, reviewing his own insincere expressions of approval of another's manuscripts comparing it with his own belief in the sincerity of another's similar review of his own manuscript can fail to notice the way flattery is converted into authentic information. Indeed, «information» of that kind often increases intrinsic feelings of warmth». The observation is empirically supported by DECI (1971, pp. 105–15) and KOESTNER, ZUCKERMAN and KOESTNER (1987, pp. 383–90).

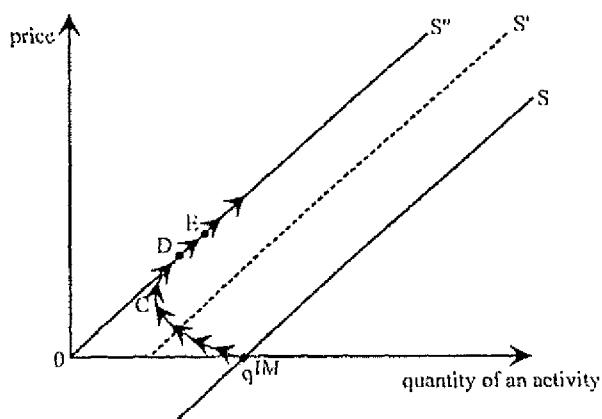
Figure 1: Conventional Supply Theory



The extrinsically induced supply increase Δq is perfectly *additive* to the intrinsically supplied quantity q^{IM} , thus $q_I = q^{IM} + \Delta q$.

In contrast, the crowding-out effect induces a shift in the supply curve to the left (Fig. 2).

Figure 2: Supply including crowding-out effect



With a positive price offered, the supply curve moves to the left (from S to S') until intrinsic motivation is completely crowded out (at S^*). More precisely, each supply curve is associated with a given *stock* of capital of intrinsic motivation. Once this capital stock is exhausted, or at least constant, supply moves along S^* as the Price Effect exists, only.

The supply response moves quite differently than suggested by conventional economic theory. In Figure 2 it is assumed that at first, the Crowding-Out Effect prevails over the Price Effect, and supply *falls*: the individuals concerned reduce the extent of their activity. Beginning at point C , the Price Effect dominates. Only when point D is reached, the quantity supplied exceeds the amount previously intrinsically supplied. At point D on supply curve S^* the stock of intrinsic capital is constant (and possibly exhausted), so that the Price Effect exclusively determines supply behaviour.

In stark contrast to the additivity assumption held in conventional economics, intrinsic and extrinsic motivation are *non-additive*. The figures serve as illustrations, only. They capture only part of the Crowding Theory. What they do show is that crowding-out is not presented as an alternative to conventional economics but rather as an *extension*. Moreover, it should be kept in mind that the Crowding-Out Effect depends on particular conditions. The following propositions on the size of the Crowding Effect can be formulated based on insights gained by psychologists. The Crowding-Out Effect is the more pronounced

- (i) the more personal the relationship between a principal and his or her agent is;
- (ii) the larger the agent's participation possibilities are;
- (iii) the more uniform the external intervention is, i.e. the less individual differences in intrinsic motivation are acknowledged by the principal; and
- (iv) the more the external intervention (in particular the rewards extended) are contingent on specific performance instead of being directed at general behaviour.

It is not difficult to see that the Crowding Effect also has important policy consequences. Thus, many seemingly «modern» compensation systems have to be reconsidered. Pay-for-performance schemes, for instance, negatively affect performance in so far as they negatively affect work morale, a specific kind of intrinsic motivation. Under some conditions, e.g. with volunteers who essentially work intrinsically motivated, it may be mistaken to introduce a monetary compensation at all.⁴

2. Supply is Transformed

An external intervention in the form of a monetary reward affects the nature, and not only the quantity, of the supply forthcoming. Quite generally, laboratory research has

4. Sometimes it makes sense to purposely pay a low salary in order to attract the right kind of intrinsically motivated persons. In his novel *Der Grosse Tyrann und das Gericht* (Munich: div. 3rd ed. 1992) WERNER BERGESGRÜEN tells of Nespoli, the chief of the security administration: «Er bezahlte seine Untergebenen niedrig, indessen nicht aus Geiz: er wollte Leute, denen dieser Beruf eine Notwendigkeit ihres Lebens war gleich wie ihm selbst» (p. 22). (I owe this citation to PETER STOLZ of Basle University).

shown that quality tends to be substituted by quantity (e.g. KRUGLANSKI, FRIEDMAN and ZEEVI, 1971; LEPPER, GREENE and NISBETT, 1973).⁵ Equally well-established is the negative effect on incidental learning that people acquire in complex tasks, because attention is focussed on the central task that is rewarded. For tasks that are not well understood, monetary incentives can be disfunctional, i.e. lead to lower performance (see e.g. HOGARTH, GIBBS, MCKENZIE and MARQUIS, 1991). Finally, external rewards have been found to decrease artistic and verbal creativity in laboratory experiments (AMABILE, 1982, 1986). These results gained by psychologists must be seen in perspective. They only refer to how intrinsic motivation is affected and do not, or insufficiently, consider the more direct incentive effects of monetary compensation on performance. Thus, it has been well-established in the economics of the arts (see e.g. FREY and POMMERHINE, 1989) that artists are able to create masterpieces even when they are doing so for monetary gain.

In important cases, an external intervention via money transforms the nature of a good or relationship even more fundamentally. Sometimes, the offer of a monetary reward completely destroys the existing commodity in question. At the beginning of this paper, the example of paying a friend for his dinner invitation has been given. Romantic love is an equally striking case: It simply cannot be bought, and if an attempt were made to buy it, the good is no longer unselfish love but, in the extreme, prostitution.⁶ The same is true for trust, admiration or friendliness which change their intrinsic nature when they are bought. This is the problem of the millionaire girl who never knows whether her suitors love her, admire her, and are friendly to her because of herself or because of her money. As long as money is involved, the suitors have no means to reveal «sinceres», i.e. intrinsic love and admiration. Rulers face essentially the same problem. The literature is full of accounts of how such «unfortunate» persons undertook experiments to try to differentiate between the two, usually by faking to be poor and powerless – sometimes even with success, but revealingly so mostly in fables.

The transforming effect of money on human relationships has been discussed under the term «Commercialization Effect» (especially HIRSCH 1977, WALZER, 1983) but as HIRSCHMAN (1982) has shown, this effects can strongly vary between historical periods. Thus, for example, from the 16th to the 19th century the prevailing view in Europe was that the use of prices *improves* intrinsic motivation, and that «commerce...polishes and softens ways of behavior as we can see every day» (MONTESQUIEU 1749, vol. XX).

5. This particular effect can, of course, also be explained by conventional principal-agent theory: utility maximizing individuals concentrate on those tasks that are metered and monitored by their superiors and neglect other activities.
6. According to NOZICK (1989, p. 78) love is incompatible with any kind of exchange, not only a monetary one: «The intention in love is to form a *we* and to identify with it as an extended self, to identify one's fortunes in large part with its fortunes. A willingness to trade up, to destroy the *we* you largely identify with, would then be a willingness to destroy yourself in the form of your extended self».

3. APPLICATIONS OF CROWDING THEORY

As has been pointed out, much of the empirical evidence collected by social psychologists is based on laboratory evidence. In contrast, the undermining effect of monetary interventions has only rarely been applied to actual social issues. It is shown here that Crowding Effects are of great importance for pressing political problems. Subsection A analyses the difficulty of finding sites for generally desired, but locally unwanted projects such as clinics for physically or mentally disadvantaged persons, prisons, airports, roads or railroad tracks. It is shown that the conventional economic solution suggested, namely the offer of a financial compensation does not work in the predicted way: it crowds out civic virtue, a particular kind of intrinsic motivation.

Subsection B considers another important social and economic issue, tax evasion. It is shown that more intensive political participation possibilities in the form of popular referenda and initiatives result in lower tax evasion in the respective political units as intrinsic motivation in the form of tax morale is crowded in.

A. Crowding-Out Effect in NIMBY-Problems

The undermining effect of an offer of monetary compensation on intrinsic motivation has been empirically analysed for the case of a nuclear waste site in Switzerland (FREY, OBERHOLZER-GEE and EICHENBERGER, 1997; FREY and OBERHOLZER-GEE, 1997). The intrinsic motivation in that case consists in the civic virtue to accept an unwanted project within one's community. Such situations have been termed «Not In My Back-Yard» or NIMBY-problems.

The Swiss government intends to build two repositories to store nuclear waste (see, more fully, OBERHOLZER, FREY, HART and POMMERHNE, 1995). For low- and mid-level radioactive wastes, two adjacent communes located in central Switzerland have been designated as potential sites. 305 interviews were conducted in these communes by a professional survey institute, covering more than two thirds of all households.

An in-person interview was conducted and the contingent valuation questions utilized the referendum format which is superior to other frames used in earlier studies (PORTNEY, 1994; HANEMANN, 1994). The survey contained a detailed description of the siting procedure and the compensation mechanism. Moreover, the survey was undertaken in the week before the respondents had to decide in a referendum on an amendment to the canton constitution regarding the construction of underground facilities. At the time of the survey, the issue had been debated extensively.

All respondents were asked if they were willing to permit the construction of a nuclear waste repository for short-lived, low- and mid-level radioactive waste 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 NIMBY project is widely supported in spite

of the fact that a nuclear waste repository is mostly seen as a heavy burden for the residents of the host community. This is shown by the fact that nearly 40% of all respondents believed the risk of serious accidents in the facility and ground water contamination to be considerable. 34% were convinced that some local residents would die as a result of any environmental contamination, and close to 80% believed that many local residents would suffer long-term effects should any accident occur.

To test the effect of external compensation, the exact same question was repeated asking our respondents whether they were willing to accept the construction of a nuclear waste repository. This time, however, we 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 ($N = 86$). 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*. About one quarter of the respondents seem to reject the facility simply because financial compensation is attached to it. The amount of compensation has no significant effect on the level of acceptance. There is further evidence which suggests that it is not the level of compensation which caused so many individuals to decline the offer. Everyone who rejected the first compensation was made a better offer, thereby raising the amount of compensation from CHF 2500 to 3750, from 5000 to 7500, and from 7500 to 10,000. Despite this marked increase, only a single respondent who declined the first compensation was now prepared to accept the higher offer.

The hypothesis that financial incentives do not necessarily increase stated levels of acceptance is also supported by other research. KUNREUTHIER and EASTERLING (1990) find that increased tax rebates do not elicit an increased willingness to accept a nuclear waste facility in Nevada. They explicitly reject the possibility that the rebates offered were simply too small.

While the above results correspond to the Crowding-Out Theory, there are two alternative interpretations of the observations. Firstly, we cannot rule out that the respondents answered strategically. In order to maximize the amount of compensation received from the central government, the citizens could understate their willingness to accept the repository. This could account for the observed rejection of the compensation offered. This incentive to understate the support should be greatest at zero compensation. But we observe that the stated support was higher when no compensation was offered. This is incompatible with a strategic interpretation of the observed behavior. The rejection of this competing explanation is corroborated by additional questions included in the survey. When asked why they declined the compensation offered, only 4.9% of the respondents indicated that the amount was insufficient to win their approval. Therefore, for the majority of the respondents, strategic behavior can be ruled out.

Secondly, citizens may take the offer of a generous compensation as an indication that the facility is more hazardous than they previously thought. If this is true, a higher compensation leads to a higher risk evaluation, and *ceteris paribus* to a lower level of acceptance. This competing explanation was tested by directly asking the respondents

whether they perceived a link between the size of the compensation and the level of risk. Only 6.3% agreed with this connection. This clearly refutes the signalling hypothesis.

B. Crowding-In Effect in Taxation

The intrinsic motivation to pay one's taxes – or tax morale – depends strongly on the extent of trust the citizens have in the political system. When individuals are alienated from government, and do not think that they are treated fairly by the political process, they are more inclined to pursue their selfish interests, i.e., to evade taxes, only taking into account the expected probability of being punished (see LIND and TYLER, 1988; KRAMER and TYLER, 1996). A crucial factor increasing trust in government is the extent to which the citizens can actively participate in the political process (see, e.g., MANSBRIDGE 1994; BARBER, 1983).

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. In this empirical analysis, a Crowding-In Effect is hypothesized.

On the basis of these characteristics, about one third of the 26 Swiss cantons are classified as pure direct democracy (*D*), another third as pure representative democracies (*R*), and the rest satisfies only some of the characteristics (see more fully, POMMERHNE and FREY, 1993; POMMERHNE and WECK-HANEMANN, 1996). A cross section/time series (for the years 1965, 1970, 1978, i.e. 78 observations) multiple regression explaining the part of income not declared Y_{nd} yields the following results (*t*-values in parentheses):

$$Y_{nd} = 7.17 - 3.52p - 2.42f + 0.79t - 0.36d - 2.72 \ln(Y) + 0.57^{**}NY - 1.09^{*}A - 7.70^{**}D \\ (-1.98) \quad (-0.62) \quad (2.10) \quad (-2.51) \quad (-0.30) \quad (2.98) \quad (-2.53) \quad (3.80)$$

$$R^2(\text{adj.}) = 0.69, d.f. = 41, F = 11.08$$

*, ** indicate statistical significance at the 95% and 99% levels, respectively.

$$Y_{nd} = 8.98 - 3.22p - 2.32f + 0.59t - 0.42^{**}d + 1.03 \ln(Y) + 0.60^{**}NY - 0.82A + 4.02^{*}R \\ (-1.72) \quad (-0.36) \quad (1.70) \quad (-3.47) \quad (0.29) \quad (3.07) \quad (-1.93) \quad (2.23)$$

$$R^2(\text{adj.}) = 0.65, d.f. = 41, F = 9.43$$

p = probability of detection (the member of individual income tax audits per 1000 tax payers);

f = penalty tax rate;

t = mean marginal tax rate;

d = income deduction possibilities;

$\ln(Y)$ = natural log. of per capita income;

NY' = non-wage income;

A = old-age taxpayers' share (reflecting experience in tax matters).

The coefficients of the variables indicating the type of democracy (D , R) – the other variables are used to control for other influences – have the theoretically expected signs. In cantons with a high degree of direct political control (D), tax morale is (cet. par.) higher. The part of income concealed falls short of the mean of the other cantons by 7.7 percentage points, or in absolute terms the average amount of income concealed is about CHF 1600 (per taxpayer) less than the mean income concealed in the other cantons. In contrast, in cantons with a low degree of political control (R), 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 the other cantons by about CHF 1500. The estimation results are consistent with the hypothesis that greater democratic participation possibilities lead to higher civic virtue as reflected in taxpayer behaviour (for corresponding evidence for the United States see, e.g. SMITH 1992; and KINSEY, 1992).

The empirical evidence collected for Switzerland can be generalized. In a broad sense, two kinds of democratic tax institutions can be distinguished: One is based on the premise that the citizens are responsible persons, and that in principle they are prepared to contribute to the provision of public goods and the redistribution of income by the state, provided this process is reasonably efficient and fair (see, e.g. SMITH, 1992). The corresponding tax laws allow the citizens to declare their own income and to make generalized deductions. The tax statements are in principle accepted as trustworthy, and the tax authority bears the burden of the proof if it doubts the declarations.

The second type of tax institution starts from the assumption that all citizens want to exploit the tax laws to the fullest, and cheat whenever they can. The corresponding tax laws deduct the taxes directly from gross income, and the citizens then claim back from the government any deductions granted by the tax authorities. In the whole process the burden of proof always lies with the individual citizen.

4. GENERALIZATIONS

Crowding-Effects are relevant for a much wider range of social issues than so far considered, even taking into account the restrictive conditions under which they occur.

A. Spill-Over Effect

Consider the example of the boy willingly mowing the lawn presented at the beginning of this paper. A contingent pay by his father does not only crowd out his intrinsic motivation to cut the grass but also to do any other housework.

External interventions may thus have an *indirect* damaging effect on intrinsic motivation. The Crowding-Out Effect may spread to further areas, even into those where the external intervention has not been applied. If intrinsic motivation is crowded out in areas where it is a major (or even the only) behavioural incentive, the overall outcome of an external intervention tends to be even more strongly against the principal's interest. There may thus be an indirect «*Motivational Spill-Over Effect*» which has to be added to the direct Crowding-Out Effect. An example is provided by policy instruments such as effluent charges or tradable permits. They work efficiently where they are applied, but an induced substitution of environmental ethics by monetary incentives may well lead people to protect the environment less in areas where no external incentives exist. This undesired spill-over effect not only takes place with monetary incentives but also with rules and regulations.

That intrinsic motivations (in the broadest sense) may be linked across areas has been observed by various economists (though they have not related it to crowding-out). AKERLOF (1989: 6) notes that «sociologists and anthropologists have asserted that problems of thought concerning one area are duplicated in other seemingly unrelated areas». SUGDEN (1989: 93) stresses that norms can be spread by analogy. If an analogy can be drawn between an area in which a norm is valid and another area where the norm is not yet applied, its validity can expand to the latter area too. WILLIAMSON (1975: 37 and 1993) uses the concept of «attitudinal spillover» while JENSEN (1992) focuses on «reputational spillovers». Neurological research suggests that the molecular construction of the brain limits the power to differentiate between varying circumstances, in our case between those areas where external interventions produce overjustification, and areas where a similar type of intrinsic motivation applies, but no external intervention takes place. This is known as the «spread effect» (THORNDIKE, 1933).

Psychologists (see LANE, 1991, ch. 11) have collected considerable direct and indirect empirical evidence for the Spill-Over Effect. Intrinsic motivation is taken to transcend areas where the following conditions are met (CIALDINI, 1989, 204–222 for the case of tax morale):

- individuals strive to be consistent with their commitment to a moral principle (FESTINGER, 1957; HEIDER, 1958).
- people are used to return a favour with a favour, i.e. to act according to the principle of reciprocity (GOULDNER, 1960). When this attitude is destroyed by a monetary reward, this fall of intrinsic motivation tends to spread to related areas.
- individuals frequently use the beliefs, attitudes, and actions of others, particular similar others, as a standard of comparison. The loss of intrinsic motivation due to a monetary intervention tends to crowd out the respective intrinsic motivation of similar others. For tax evasion, for example, «there is a clear, positive relationship between self-reported evasion and the tax evasion of friends and relatives – that is, similar others» (CIALDINI, 1989, p. 215).

B. Regulations Affect Intrinsic Motivation

External interventions in the form of commands, monitoring or supervision, and threats of punishment, i.e. regulation, can be perceived as controlling by the individuals concerned and therefore tend to crowd-out intrinsic motivation. Indeed, a regulatory intervention is likely to induce a stronger Crowding-Out Effect because it is a stronger form of control than a monetary reward. Both involve cost, but in the case of a financial compensation it is in the form of forgone opportunities, only, while not following regulations is directly punished by the principle, e.g. by a dismissal.

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 employer and the employees 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. Following our above proposition, 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' effort, as an external intervention shifts the locus of control towards external preferences.
- (iii) The managers' behaviour 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 (1990) 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 significantly 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, i.e., the Price- or Disciplinary effect of the controls is

of a similar size as the Crowding-Out Effect. In contrast, regulations which support individuals' self-determination and self-esteem tend to crowd-in intrinsic motivation.

When the agents are able to *participate* in the decisions taken by the principal, work morale tends to be high. It is this relationship which lies at the heart of the arguments for co-determination, but also for flatter hierarchy within conventional firms. In Japanese firms relying on consensus processes and collaboration among employees, workers have higher work morale and more commitment to their firm than in comparable American firms relying more on hierarchical decision-making (AOKI, 1990). In an econometric cross-section study, GORDON (1994) finds that the smaller the intensity of supervision, the higher the workers' bargaining power and factual codetermination. This is consistent with the existence of a large Crowding-Out Effect and a corresponding rational reaction by the principals, namely to discipline workers less.

5. CONCLUSIONS

Crowding Theory introduces a so far disregarded, but crucial and empirically well-supported psychological effect into economics. Its integration into economics shows that it certainly does not substitute for the conventional Price Effect but that it amends it.

Crowding Theory has important implications for economic theory. In particular, a systematic relationship between intrinsic and extrinsic motivation is established; a negative relationship designates the Crowding-Out Effect, a positive one the Crowding-In Effect. Both effects are well-supported by laboratory experiments under carefully controlled conditions. In order to show the relevance for actual social issues, Crowding Theory has been applied to two pressing policy problems. Crowding-Out has been empirically analysed to take place when monetary compensations are offered to find sites for locally unwanted government projects, in particular a nuclear waste deposit in Switzerland. Crowding-In has been exemplified with the effect of different constitutional settings of direct citizen participation on tax morale.

It is important to interpret Crowding Theory here developed correctly. Three crucial aspects should be taken into account when considering the relevance of this concept:

1. The Crowding-Out Effect works in the *opposite direction* to the Price Effect. The *net effect* depends on their relative size. When Crowding-Out is small, the qualitative effects predicted by conventional economics hold. If, on the other hand, Crowding-Out is strong, the Price Effect may be dominated, and an unconventional effect of an external intervention is to be expected.

As far as I am aware, the Crowding-Out Effect is the only effect *systematically* working in the opposite direction to the Price Effect. The many anomalies and paradoxes borrowed from social-psychology (see KAHNEMAN, SLOVIC and TVERSKY, 1982; DAWES, 1988; THALER, 1992) certainly tend to weaken the effect of any given price change, but they do not reverse it. Thus, Crowding Theory makes a more far-reaching claim.

The policy consequence is straightforward: *take care not to intervene too much with what individuals want to achieve by themselves. Leave them as much as possible as they are and give them the chance to more fully follow their intrinsic motivation.* This policy conclusion does not mean that one should exclusively rely on intrinsic motivation and disregard institutional conditions shaping external incentives. Nor should it be assumed that intrinsic motivation is always «good» and «socially beneficial». Historical experience shows that many of the worst crimes in mankind were performed by people who followed inner motives and ideologies. Robespierre and Himmler provide vivid examples that intrinsically motivated people may create great evil (see also FREY, 1992, for the case of the treatment of prisoners of war). Not rarely, intrinsically motivated people think of themselves as having a particularly high morale and on that basis are prepared to fight against their own conscience to commit crimes. Thus, in his autobiography, the commandant at Auschwitz RUDOLF HESS (1959) who systematically murdered more than 2.5 million persons, claimed that for the greater good of National Socialism he «stifled all softer emotions». Passions are moreover often uncontrolled and hazardous (HIRSCHMAN, 1982).

2. Crowding Effects depend on *particular conditions*. They do not always take place, and can sometimes be neglected. In particular, when economic relationships are abstract and when personal contacts are irrelevant, as is the case for the model of a perfectly competitive market, there is no Crowding Effect. Behaviour is fully determined by relative prices, i.e. by extrinsic motivation. As traditional economics has focussed on such markets (or on markets close to it) to a large extent, it was correct to exclusively consider the Relative Price Effect. However, as soon as one leaves such abstract, impersonal markets, the conditions identified may obtain, and intrinsic motivation may be important. Then it is necessary to carefully consider how far intrinsic motivation is affected by external interventions.
3. Crowding-Out Effects are due to people's perceptions of being *controlled* by external interventions. The resulting marginal shift in the locus of control from inside to outside the person tends to undermine intrinsic motivation. External interventions can come from a variety of sources, including government. Government interventions, however, need not be connected with a feeling of being controlled. There are certainly programmes which have the opposite effect, i.e. which *support* intrinsic motivation. In so far as this is the case, morality is crowded-in, and civic virtue, tax morale and other manifestations of intrinsic motivation are strengthened.

In contrast, the price system, and in particular monetary rewards, are often perceived to be a controlling external intervention by individuals, and can therefore lead to Crowding Effects. In particular, the price system is often looked at in this light. Thus, not only government programmes and interventions have the potential to negatively affect morality. The same holds, for instance, for pay-for-performance schemes. As they are

defined to be contingent on a particular performance (output), they serve to strengthen external motivation and tend to crowd out work morale.

The social sciences, and in particular economics, should pay more attention to intrinsic motivation as an incentive, and as a viable possibility for policy-making. This applies to current policy as well as to policy at the level of the social consensus. It is an essential task to establish institutions, i.e. to take constitutional choices, which support individuals' own initiatives.

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SUMMARY

Crowding-Theory introduces a new psychological effect into economics. Under identifiable conditions, a higher price or stricter regulation reduces the intrinsic motivation to perform a task. Crowding-Out is the only effect which systematically works in the opposite direction to the Relative Price Effect.

Crowding-Out Theory is empirically applied to two issues in Switzerland: (1) The support for siting a nuclear waste repository strongly fell when the population was offered a compensation for hosting it. (2) The possibility of direct participation in politics via referenda tends to raise civic virtue, and (*ceteris paribus*) tax compliance (Crowding-In Effect).

ZUSAMMENFASSUNG

Es wird ein neuer psychologischer Effekt in die Wirtschaftstheorie eingeführt. Ein höherer Preis oder eine striktere Regulierung höhlt unter bestimmten Bedingungen die intrinsische Motivation aus, eine Aufgabe zu erledigen. Der Verdrängungs-Effekt ist der einzige Effekt, der in die genau umgekehrte Richtung wie der Preis-Effekt wirkt.

Die Verdrängungs-Theorie wird empirisch auf zwei Phänomene in der Schweiz angewandt:

(1) Die Bereitschaft, eine Nukleardeponie in der eigenen Gemeinde zu akzeptieren, fiel, als der Bevölkerung eine Kompensation angeboten wurde. (2) Die Möglichkeit, sich direkt mittels Referenden an politischen Entscheidungen zu beteiligen, erhöht den Bürgersinn und damit *ceteris paribus* auch die Steuerehrlichkeit (Verstärkungs-Effekt).

RESUME

Un nouvel effet psychologique se voit intégré dans la théorie économique. Sous des conditions qui peuvent être identifiées, une hausse de prix ou une régulation plus stricte réduit la motivation intrinsèque à accomplir une tâche. L'effet d'éviction est le seul effet à fonctionner systématiquement dans le sens opposé de l'effet prix.

Pour la Suisse, deux applications empiriques de cette théorie d'éviction de la motivation sont présentées: (1) La disposition d'accepter une décharge de déchets radioactifs dans une commune a baissé après qu'une compensation financière ait été offerte à la population. (2) La possibilité de prendre partie directement lors de décisions politiques par référendum augmente la vertu civique et ainsi (*ceteris paribus*) l'honnêteté du citoyen face au fisc (effet de renforcement).

