



NOTA DI LAVORO

54.2010

**”Thou shalt not covet ...”:
Prohibitions, Temptation and
Moral Values**

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GLOBAL CHALLENGES Series

Editor: Gianmarco I.P. Ottaviano

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Keywords: Prohibitions, Temptation, Self-Control, Moral Values, Crime

JEL Classification: D03, K42, Z13

This paper was presented at the international conference on “Economics of Culture, Institutions and Crime”, Milan, 20-22 January 2010. The conference was supported by FP6 Priority 7 “Citizens and governance in a knowledge-based society” Project: Sustainable Development in a Diverse World“(SUS.DIV) (Contract No. CIT3-CT-2005-513438) University of Padua Research Project “Economic analysis of crime and social interactions” (grant CPDA071899) and Fondazione Eni Enrico Mattei (FEEM). It was co-organised by SUS.DIV, FEEM, University of Padua and CEPR.

We would like to thank Giacomo Calzolari, Giacomo Corneo, Ernesto dal Bò, Davide Dragone, Sten Nyberg, conference participants at ASSET Florence, EEA-ESEM Barcelona, BOMOPA Modena, SIDE-ISLE Bologna, Social Economics Forlì, Economics of Culture, Institutions and Crime Milan, and seminar participants at Free University of Berlin and Universities of Bologna, Pavia and Padova. We gratefully acknowledge financial support from the University of Padua (research grant CPDA071899) and EIEF Rome.

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“THOU SHALT NOT COVET ...”:
PROHIBITIONS, TEMPTATION AND MORAL VALUES*

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March 20, 2010

Abstract

We propose a theory studying temptation in presence of both externally and internally sanctioned prohibitions. Moral values that (internally) sanction prohibited actions and their desire may increase utility by reducing self-control costs, thereby serving as partial commitment devices. We apply the model to crime and study the conditions under which agents would optimally adhere to moral values of honesty. Incentives to be moral are non-monotonic in the crime premium. Larger external punishments increase temptation and demand for morality, so that external and internal sanctions are complements. The model helps rationalizing stylized facts that proved difficult to explain with available theories.

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1 Introduction

A large set of activities are characterized by externally sanctioned prohibitions. These include not only formally illegal or criminal behaviors, which are sanctioned by law, but also, for instance, economic or social relationships which are constrained by norms of conduct and are subject to social sanctions. A common feature of external sanctions is that they are typically delayed in time and uncertain, since they are contingent upon detection and punishment. We consider the possibility that agents with self-control problems may be tempted to break prohibitions by the immediate returns yielded by deviation, although they understand that it does not pay off in the long run, once expected sanctions are taken into account. Prohibitions may also be subject to internalized moral sanctions, however. These are not inflicted by external parties but are associated to the experience of negative (self-regulative) emotions like guilt. Unlike external punishments, the utility costs associated to infringement of moral prescriptions can be suffered immediately upon act or even desire.

Most cultures (and religions) explicitly attach moral sanctions to many prohibited, and often formally illegal, actions. For instance, the Bible features commandments against theft and adultery, and analogous religious or moral prescriptions can be found in different cultures. The Bible does not only prohibit theft and adultery, however, but also the *desire* of other people's goods and wife.¹ In fact, as discussed in more detail in Section 2, the existence of temptation problems in association to prohibited actions appears a relevant, or even pervasive, problem. The link between prohibitions, temptations and moral values has, however, essentially been neglected in economics.²

In this paper, we propose a theory of prohibitions, temptation and moral values investigating the idea that moral values may serve the role of self-control devices. In the model, temptation results from immediate urges at the moment of action, which may induce payoff dominated choices and can be resisted by exerting costly self-control. Agents would be better off if they could exclude all tempting options from their choice set. While in practice this may not be

¹The commandment against actions is: 'You shall not commit adultery. You shall not steal.' (Exodus, 20:12). The prohibition of desire is: *You shall not covet* your neighbor's house; you shall not covet your neighbor's wife, nor his male servant, nor his female servant, nor his ox, nor his donkey, nor anything that is your neighbor's.' (Exodus, 20:13). The title of this paper comes from the ancient English version of this commandment.

²We discuss the existing evidence and related theoretical literature in Section 2.

feasible, tempting options can be made individually more costly. We propose the view that this is precisely one of the possible roles of moral values: they can serve as a ‘partial’ commitment device.³ After characterizing exposure to temptation in presence of heterogenous returns to the prohibited actions, we study individual incentives to adhere to a moral code sanctioning those actions and their desire. Specifically, we frame the problem in terms of individual choices between a legal and an illegal (or criminal) action.⁴ While this is relevant *per se* and helps drive intuition, the applicability of the theory is wider.

Despite its simplicity, the model delivers several insights. Tempted agents face a trade-off between the costs of self-control and the payoff costs of giving in to temptation. By attaching guilt costs to prohibited actions, moral values modify this trade-off and (can) allow to resist temptation. To increase utility, though, morality must sanction both actions *and* desires. The model highlights two potential sources of temptation: attraction by immediate returns, which can operate even in the absence of any morality, and morality itself. Subtly, moral prohibitions have therefore both the potential to alleviate temptation and to induce in temptation.

Morality imposes a trade-off. It saves on self-control costs, but it may also prevent to take advantage of high return illegal opportunities and it exposes agents to the cost of guilt in case they do not resist temptations. Adhering to a system of moral values (or receiving an effective moral education) is therefore beneficial only for those expecting to face temptation and, more importantly, expecting to resist it in equilibrium. The model therefore provides an answer to the question of why individuals would voluntarily adhere to a moral code that may involve utility costs. With heterogeneous returns, if crime premia are either very low (possibly negative) or very high, then legality and crime, respectively, are the unequivocally optimal choices (from an individual point of view) so that no temptation problems arise. Individuals with intermediate crime premia are those who benefit the most from moral values. The model further predicts that for most tempted individuals it is optimal to adhere to moral values if and only if these are sufficiently strict.⁵ The reason is that a weak morality would not be sufficient to resist temptation,

³While changing own moral values to avoid experiencing guilt appears possible, this is generally a long, and often hard, process. It is reasonable to assume that moral values are stable over the shorter time horizon of the exposure to the urges of temptation.

⁴We use henceforth crime and illegality as synonyms, without any further distinction.

⁵For instance, if crime premia were decreasing in socio-economic status, the middle class would be the one that mostly gains from morality, with the lower-middle class being morally stricter than the upper-middle class.

and it would only add the cost of guilt to that of forgone payoffs (in this sense morality is a risky asset).

The model allows to study the interaction between external and internal sanctions. While legal (or social) enforcement reduces crime, it also raises self-control problems and correspondingly increases the scope for moral values of honesty.⁶ So legal (or social) and moral enforcement turn out to be complements. Finally, in presence of random returns, temptation and morality may lead to two types of payoff dominated choices: agents may give in to (payoff dominated) tempting choices, but they may also abstain from payoff dominant (but morally sanctioned) opportunities. The proposed framework therefore helps reconciling two empirical regularities, which cannot be easily rationalized within available economic theories of crime: there are crimes which are not committed, although their expected economic payoff is clearly positive, and at the same time there are crimes that are committed, although their expected return is clearly negative.

The related literature is discussed in Section 2. Section 3 presents the model which is analyzed in Section 4. In Section 5 we discuss the role of the simplifying assumptions, the implications of the analysis and some possible extensions. Section 6 concludes.

2 Related Literature

This paper contributes to the literature a simple theory of temptation, prohibitions and moral values. The modeling of temptation follows the approach of Gul and Pesendorfer (2001), where the cost of self-control is correctly anticipated and individual choices are time consistent.⁷

The theory focuses attention on the role of temptation and morality, which is essentially unexplored in crime economics. The economic approach to crime, pioneered by Becker (1968), looks at it as a rational choice, based on expected costs and benefits. In an early and influential paper, Ehrlich (1973) proposes to frame crime as a risky occupational choice, essentially driven by long

⁶This result hinges upon the idea that temptation depends on the difference between static and dynamic optimality, and that, when future punishment is contingent upon detection, a higher detection probability widens this difference.

⁷Bénabou and Pycia (2002) show that Gul and Pesendorfer's (2001) axiomatic approach can be interpreted in terms of an internal conflict between different selves along the lines of Thaler and Shefrin (1981). Internal conflicts may also be represented by time inconsistent preferences, as in Strotz' (1955) seminal paper and in Laibson's (1997) analysis of hyperbolic discounting. Benhabib and Bisin (2005) offer a neuroeconomics approach to temptation.

run concerns. In this perspective temptation does not appear to be a crucial issue. Accordingly, the subsequent crime economics literature based on this approach essentially disregards it. Nonetheless, most prohibited or illegal actions are not performed by professional criminals and temptation appears a relevant and widespread problem. In fact, in contrast to economists, criminologists have long considered temptation (and thus short run concerns) as one of the deep roots of crime. Gottfredson and Hirschi (1990) argue that ‘Nearly all crimes are mundane, simple, trivial, easy acts aimed at satisfying desires of the moment [...] When [offenders’] desires conflict with [their] long term interests, those lacking self-control opt for the desires of the moment, whereas those with greater self-control are governed by the restraints imposed by the consequences of acts displeasing to family, friends and the law’ (p. xv).⁸ While the traditional economic approach to crime has greatly improved our understanding of the phenomenon, its neglect of the role of temptation and morality may represent a limit for the empirical relevance of positive theories (and, hence, for their normative implications).⁹ We propose a simple model of crime, which incorporates temptation-driven rational choices coupled with an analysis of the role of moral values as self-control devices. The predictions of the model help reconcile rational economic theories of crime with empirical stylized facts, which are puzzling for available theories. In particular, they offer a natural explanation for the stylized fact that several crimes are not committed despite having clearly positive expected returns, while many crimes are committed despite being clearly payoff dominated.¹⁰

⁸As we do here, they identify the roots of temptation in the fact that, ‘Whereas the pleasure attained by the [criminal] act is direct, obvious and immediate, the pains risked by it are not obvious, or direct, and are in any event at greater remove from it’ (p. 95).

⁹Dills et al. (2008) conclude their critical assessment of the empirical literature making the point that economists still ‘know little about the empirically relevant determinants of crime’. Approaches based on multiple equilibria, such as those proposed by the literature on social determinants of crime, may provide part of the explanation. Temptation and moral values may offer another, possibly complementary part.

¹⁰For example, calculating the expected return and punishment of tax evasion, Becker and Posner argue in their blog, available at <http://www.becker-posner-blog.com/archives/2007/11>, that ‘if taxpayers responded only to the expected cost of evading taxes, evasion would be far more widespread’. They argue that risk aversion does not appear sufficient to explain these observations, which may rather be imputed to the fact that ‘most people do not believe it is moral to steal money even when there is little chance they will be found out’. Coricelli et al. (2007) provide experimental evidence that induced shame on evaders does, indeed, favor compliance. Concerning the observation of payoff dominated crimes, we refer to Gottfredson and Hirschi (1990) for an extensive discussion of several documented instances of seemingly irrational crimes committed by individuals facing temptation. Risk

The paper also contributes to the literature studying the relationship between different types of enforcement of prohibitions. Most of the attention in economics has been devoted to external sanction mechanisms, whether legal (such as fines and jail) or social (such as stigma).¹¹ In contrast, we study the link between external and internal sanctions. To our knowledge, there are no economic studies of the link between temptation, moral values and prohibitions. The model predicts that stronger external punishment may increase the demand for moral values, since they are likely to increase individual exposure to temptation. External sanctions may therefore also increase the demand for “stricter” moral values of honesty. In particular, being externally imposed, social sanctions may be a source of temptation. The model therefore also predicts that agents may have an incentive to internalize social norms.

Finally, the paper contributes to the recent literature studying the role of moral values by explicitly modeling individual incentives to adhere to a potentially costly moral code. Moral values are modeled as working through self-regulative emotions of guilt, which reduce utility in case of deviation from morally appropriate standards of behavior.¹² The works of Lindbeck, Nyberg, and Weibull (1999) and Weibull and Villa (2005) study the role of internalized social norms that change behavior by inducing guilt (and/or shame). These papers consider individuals exogenously endowed with internalized social norms, where the utility cost of stigma depends on the share of individuals behaving in line with the norm. Differently from these works, we study individual incentives to endogenously adhere to a system of moral values. Despite the different focus, we share with Corneo and Jeanne (2009) the idea that adhering to a value system may be

aversion makes this latter evidence even harder to explain. In turn, a high exponential discount rate might help explain it, but it would make it harder to explain the other evidence, that people sometimes refrain from immediately profitable crimes.

¹¹Polinsky and Shavell (2000) review the economic theory of public enforcement of law. Posner (1997) discusses the interplay between social norms and the law. Glaeser et al. (1996), Rasmusen (1996) and Weibull and Villa (2005), among others, provide crime theories based on peer pressure, stigmatization and internalized social norms, which emphasize the potential for multiple equilibria. Furuya (2002), Blume (2003) and Funk (2004) emphasize how stigmatization may deter crime, but also raise recidivism of those stigmatized.

¹²This approach essentially follows the literature in Social Psychology. According to Crocker and Park (2003) moral values are effective in changing individual actions by inducing the immediate experience of self-regulatory emotions such as guilt or shame (which tend to reduce self-esteem) for behaviors which are not in line with moral standards.

a choice.¹³ In our model morality may increase individual utility even if it may be costly to its carrier (in terms of guilt or of forgone payoffs).¹⁴ This individual incentive provides a rationale for morality which is different from cooperation and externalities.¹⁵ Dal Bó and Terviö (2008) provide a dynamic analysis of the endogenous evolution of moral capital in terms of self-image about own moral “type”. While we focus on morality as a partial commitment device, rather than as an accumulated capital of self-image, we share with this paper the focus on prohibitions and moral values. Finally, some recent works investigate the emergence and/or transmission of different ethical or moral norms. Lindbeck and Nyberg (2006) explicitly study why parents should seek to instill in their children work values which are sustained by guilt.¹⁶ While we do not explicitly study the important issue of moral setters, our model provides predictions on the differential incentives to adhere to moral codes of honesty for individuals (or families) facing different expected returns from legal and illegal options.

3 The model

Self-control preferences are represented in terms of an internal conflict between a ‘commitment’ ranking, reflecting preferences under the possibility of commitment, and a ‘temptation’ ranking, reflecting immediate urges at the moment of action, which may induce payoff dominated choices (according to the ‘commitment’ ranking). Temptation may be resisted, but only at a cost of self-control. The decision process is represented in terms of a planning and an action stage. When evaluating things ‘coldly’ at the planning stage an individual knows that his interests are best served by a given choice, namely the one that maximally satisfies his ‘commitment’ ranking, but that he might be tempted by a different choice, the one that is best for his ‘temptation’ ranking.

¹³Differently from them we are interested in temptation and moral values rather than symbolic values and tolerance. As in their work, however, our costs of guilt can be interpreted as a reduction in self-esteem.

¹⁴ In a related way, Rotemberg (1994) asks why individuals would choose to be altruistic towards colleagues, when altruism is potentially costly. While his answer is based on strategic complementarity, ours is rooted in an individual decision problem, with temptation and self-control.

¹⁵ Moral values enhance cooperation in Frank (1987) and Tabellini (2008), among others. Dal Bó and Dal Bó (2009) provides experimental evidence for the effects of moral suasion on cooperation. In Kaplow and Shavell (2007) moral values are welfare improving in presence of externalities.

¹⁶Tabellini (2008) studies the adoption and transmission of values of pro-social behavior and values of generalized morality in a cultural transmission framework *à la* Bisin and Verdier (2001).

At the planning stage he may therefore look for commitment devices, that is, restrictions in his action stage choice set, which exclude or at least make more costly tempting options.¹⁷

3.1 Self control preferences

Formally, consider a rational individual with self-control preferences, as axiomatically characterized by Gul and Pesendorfer (2001).¹⁸ Such individual is otherwise standard, but for the fact that he may be subject to temptation. The internal conflict is reflected in two different rankings of expected outcomes, captured by two different continuous and linear (expected) utility functions, representing commitment and temptation utility, and denoted $u : \Delta \rightarrow \mathbb{R}$ and $v : \Delta \rightarrow \mathbb{R}$, respectively, where Δ is the set of all possible probability distributions over outcomes. Given a compact subset $A \subseteq \Delta$, which represents an action stage choice set, the cost of self-control associated to one of its elements, $x \in A$, is assumed to be equal to the distance between x and the most tempting alternative (in A), in the temptation utility space: $[\max_{y \in A} v(y) - v(x)]$. The expected utility associated to $x \in A$ is simply the difference between its commitment utility and the cost of self-control:¹⁹

$$u(x) - \left[\max_{y \in A} v(y) - v(x) \right]. \quad (1)$$

At the action stage the agent chooses an element $x \in A$ to maximize (1). Anticipating this, at the planning stage he chooses a compact subset $A \subseteq \Delta$ to maximize his (self-control) preferences (defined over the set of compact subsets of Δ), which are represented by the (indirect) utility

¹⁷Gul and Pesendorfer (2001) propose the example of a vegetarian restaurant chosen (at the planning stage) to avoid temptation to eat meat (at the action stage). The choice of the restaurant works as a partial commitment device for the agent by restricting his (action stage) choice set. Since a menu contains more than one possible meal, such commitment is only partial. It would be full if the chosen menu contained only one meal (a singleton choice set).

¹⁸These are preferences over sets of alternatives, satisfying a number of standard axioms (completeness, transitivity, continuity and independence), plus a ‘set betweenness’ axiom. Gul and Pesendorfer (2001) show that these axioms are characterized by a representation in terms of commitment and temptation ranking. Agents facing, and resisting, temptation sustain self-control costs. Restricting their choice set by eliminating suboptimal (but tempting) options makes them strictly better off. Self-control preferences therefore naturally generate a demand for commitment devices.

¹⁹Under full commitment, that is if $A = \{x\}$, this cost is absent: the expected utility associated to $x \in \{x\}$ is just its commitment utility $u(x)$.

function

$$U(A) = \max_{x \in A} \left\{ u(x) - \left[\max_{y \in A} v(y) - v(x) \right] \right\}. \quad (2)$$

3.2 Prohibitions, Temptation and Moral Values

Consider an individual who at the action stage has to choose between two actions. These actions differ in terms of their returns as well as for the fact that one is prohibited and externally sanctioned. We call the first action legal and the second one illegal (or criminal). At the planning stage, the agent has to choose between adhering and rejecting a (received) moral code, which condemns the prohibited action. The (action stage) choice set in case of adherence and rejection is denoted by A_μ and A_0 , respectively. Given either choice set, by choosing to commit crime with probability $a \in [0, 1]$ the agent uniquely selects a probability distribution over outcomes. The set of outcomes includes returns to each action (say, monetary returns), together with external and moral sanctions. To simplify the exposition, we develop our discussion under the benchmark assumption of a linear and additive separable utility formulation.²⁰ The commitment utility associated to a probability distribution $x \in \Delta$ over outcomes is given by

$$u(x) = r(x) + \pi(x) + \mu(x), \quad (3)$$

where $r(x)$, $\pi(x)$ and $\mu(x)$ are the expected values of (monetary) returns, external punishment and moral sanction, respectively. Whenever it is not confusing, with a slight abuse of notation we write $u(a)$ to indicate $u(x(a, A_i))$, and analogously for $r(a)$, $\pi(a)$ and $\mu(a)$, where a is the probability to commit crime and $x(a, A_i)$ is the probability distribution over outcomes implied by a , given A_i , for $i \in \{0, \mu\}$.

Independently of the choice set, the expected return to committing crime with probability a is $r(a) = ar_c + (1 - a)r_w$, where r_w and r_c denote returns to the legal and the illegal activity, respectively. External sanctions are conditional upon having committed a crime (and having been detected and punished). Let π be the expected external punishment for a criminal activity, so that $\pi(a) = a\pi$, independently of the choice set. Moral sanctions are also conditional upon having committed a crime, but differ from externally enforced sanctions in that they do not require external detection. For those who adhere to the received moral code (i.e., given A_μ),

²⁰In Section 5 we discuss a more general utility formulation: the main predictions hold even in presence of risk aversion and of interactions between external and internal sanctions.

moral sanctions attach a utility cost $\mu > 0$ to the choice of crime; for those who rejected the received morality (i.e., given A_0), such cost is absent. This implies that $\mu(x(a, A_\mu)) = a\mu$ and $\mu(x(a, A_0)) = 0$.

The temptation ranking differs from the commitment ranking for an underestimation of the disutility from external punishment,

$$v(x) = r(x) + \lambda\pi(x) + \mu(x) \tag{4}$$

where $\lambda \in [0, 1]$, parameterizes the exposure to self-control problems. The lower is λ the lower the weight attached to punishment in the temptation ranking and the more serious is the underestimation of the costs of crime.²¹

The main difference between external and moral punishment for mis-behavior is assumed to rely on the asymmetric under-evaluation of the two types of punishment. This modeling strategy appears reasonable in view of the fact that external punishment is typically deferred in time. By contrast, the moral feeling of guilt may be experienced immediately upon act, and even upon desire. The assumption that moral costs enter in both the commitment and temptation ranking is crucial for our argument. The fact that they enter exactly in the same way is not important, but it allows a clear understanding of their effects even under the assumption of separable utility.

4 Equilibrium

Let us start from a standard case, in which there are neither temptation nor moral values. Let $r \equiv r_c - r_w \geq 0$ be the (gross) utility premium to crime. The net premium is therefore $(r - \pi)$. In the absence of temptation, the optimal choice involves the maximization of the commitment utility, so that legality is chosen whenever $r < \pi$. Crime is optimal only when the crime premium more than compensates the expected punishment. Notice that, absent temptation, nobody would have an incentive to adhere to a sanctioning moral code, since this simply shifts the utility frontier inwards.

²¹It would be immediate to explicit a time structure, in which external punishment is delayed in time. If β is the discount factor in the commitment utility, temptation due to under-evaluation of future costs is expressed by a discount factor $\beta_T = \lambda\beta$ in the temptation ranking. Let p be the severity of external punishment and d the detection probability. We would then have, for a moral individual, $u(1) = r_c - \mu - \beta dp$ and $v(1) = r_c - \mu - \beta_T dp$, which equivalent to our model with $\pi = \beta dp$.

4.1 Action Choices in the Presence and Absence of Morality.

Let us first consider temptation in the absence of moral values. Given A_0 , the commitment and temptation utility are given by $u(a) = (1 - a)r_w + a(r_c - \pi)$ and $v(a) = (1 - a)r_w + a(r_c - \lambda\pi)$, respectively. It is immediate to show (the formal proof is postponed) that there is a threshold level of crime premium discriminating legality and crime. Around this threshold, there is an intermediate range of crime premia, in which legality is optimal for the commitment ranking, but crime is tempting. Within this range, the cost of self-control is increasing in the crime premium, so that below the threshold temptation is resisted, but above the threshold the cost of self-control is too high, and individuals prefer to give in. This is shown in Figure 1.

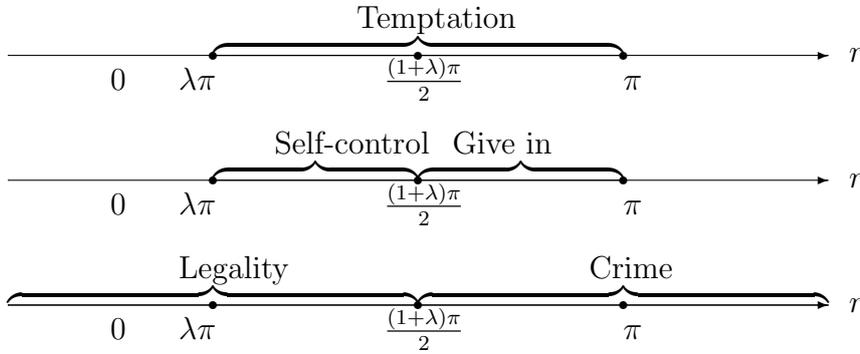


Figure 1: Ranges of temptation, self-control and legality as function of the crime premium.

Figure 2 depicts the commitment and temptation utility of crime, $u(1)$ and $v(1)$, as well as the indirect utility $U(A_0)$ (the bold line), as a function of r .²² For low levels of the crime premium, $r < \lambda\pi$, legality represents the best option according to both rankings, since $v(1) < v(0)$ and $u(1) < u(0)$, so that agents do not suffer from temptation and their indirect utility is independent of r . Symmetrically, when the crime premium is large enough, $r > \pi$, crime is the rational choice for both rankings and the indirect utility keeps increasing with r . In the intermediate range $r \in [\lambda\pi, \pi]$ agents suffer from temptation, however. In this range $u(1) < u(0) = v(0) < v(1)$: legality is optimal for the commitment ranking, but crime is optimal for the temptation ranking. The cost of self-control is given by $v(1) - v(0) = r - \lambda\pi$. In this ‘temptation range’, $r \in [\lambda\pi, \pi]$, the indirect utility is decreasing in r as long as temptation is resisted, but increasing in r when

²² For illustration it normalizes $r_w = 0$, so that $u(0) = v(0) = 0$ and $r = r_c$. Notice that, since the only difference between u and v is an under-evaluation of the external punishment, it always holds that $v(1) \geq u(1)$.

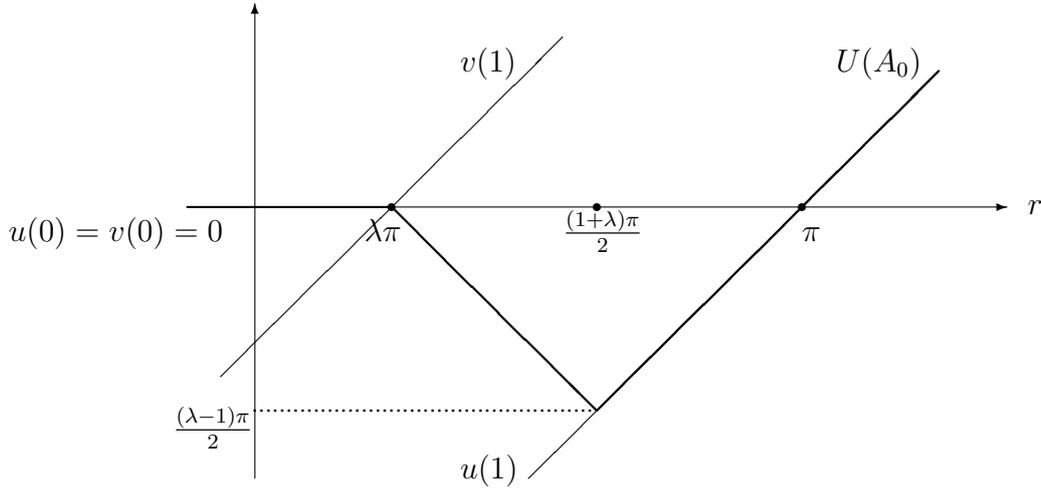


Figure 2: Indirect utility as function of the crime premium, absent moral values.

crime is chosen. The threshold discriminating between crime and legality is $r = (1 + \lambda) \pi/2$.

Let us now consider an individual who, at the action stage, is endowed with moral values of legality. Given A_μ , the commitment and temptation utility are now given by $u(a) = (1 - a)r_w + a(r_c - \pi - \mu)$ and $v(a) = (1 - a)r_w + a(r_c - \lambda\pi - \mu)$, respectively. Notice that in both rankings the expected utility from crime is reduced by the moral punishment. This shifts by μ the relevant thresholds, as stated in Proposition 1.

Proposition 1. (*Temptation and self-control*) Let A_μ be given, with $\mu \geq 0$.

- *Legality is optimal for both the commitment and temptation rankings, u and v , and the agent is not subject to temptation, if $r < \lambda\pi + \mu$;*
- *Legality delivers the largest commitment utility, $u(0) > u(1)$, but crime is tempting, $v(0) < v(1)$, if $r \in [\lambda\pi + \mu, \pi + \mu]$. In this range:
 - *Temptation is resisted, but at a self-control cost $(r - \lambda\pi - \mu)$, if $r \in (\lambda\pi + \mu, (1 + \lambda)\pi/2 + \mu)$;*
 - *Temptation is overwhelming and crime (the option with the lowest commitment utility) is chosen, if $r \in ((1 + \lambda)\pi/2 + \mu, \pi + \mu]$,*²³*
- *Crime is optimal for both commitment and temptation rankings, u and v , and the agent is not subject to temptation, if $r > \pi + \mu$.*

²³If $r = \frac{(1+\lambda)\pi}{2} + \mu$, then crime and legality are indifferent.

Proof. Recall that the action stage problem is $\max_{a \in [0,1]} \{u(a) - [\max_{b \in [0,1]} v(b) - v(a)]\}$, whose solution is equivalent to $\max_{a \in [0,1]} \{u(a) + v(a)\}$, which implies (leaving aside indifference) that:

$$a^* = 1 \iff u(1) + v(1) > u(0) + v(0)$$

Notice that $u(1) > u(0) \iff r > \pi + \mu$ and $v(1) > v(0) \iff r > \lambda\pi + \mu$. Moreover, if $r \in [\lambda\pi + \mu, \pi + \mu]$, then $u(1) + v(1) > u(0) + v(0) \iff r > (1 + \lambda)\pi/2 + \mu$. \square

Corollary 1. (*Equilibrium choices at the action stage*) *Given A_μ , with $\mu \geq 0$, crime is chosen for $r > (1 + \lambda)\pi/2 + \mu$ and legality is chosen below this threshold.*

Remark 1. (*Action stage in presence and absence of moral values*) *The analysis in the absence of moral values, that is, given A_0 , is formally identical to that with moral values for $\mu = 0$.*

The effects of the crime premium r on temptation, self-control and optimal choices have already been discussed. Let us now consider the effects of the other parameters. An increase in the expected external punishment π has three effects: first, it reduces the range of crime (Corollary 1); second, it increases the length of the temptation range, $(1 - \lambda)\pi$: this comes from the fact that the difference between u and v is due to an under-evaluation of π in the latter (Proposition 1); third, a marginal increase in the expected punishment π reduces the indirect utility of all agents choosing crime, whereas it raises the indirect utility of agents resisting temptation since it reduces the costs of self-control which are given by $v(1) - v(0) = (r - \lambda\pi - \mu)$. Finally, a reduction in λ increases the ranges of both temptation and crime, as well as the costs of self-control. Since the effect of the moral cost on indirect utility is what drives adherence or rejection of moral values, we discuss it in the context of the planning stage.

4.2 Planning stage: Moral values as Partial Commitment

A moral cost attached to crime makes it a less attractive option and shifts the range of temptation to a higher interval of crime premia. In particular, from Corollary 1, morality triggers legality for $r \in ((1 + \lambda)\pi/2, (1 + \lambda)\pi/2 + \mu)$, since for crime premia in this range, an individual without moral values would choose crime, whereas one with moral values would choose legality.²⁴ From

²⁴In fact, for any crime premium, there exists a sufficiently large μ , such that legality would be chosen (by a moral individual).

Proposition 1, all moral agents in the range $r \in ((1 + \lambda)\pi/2 + \mu, \pi + \mu]$ give in to temptation and choose illegal activities, which are payoff dominated according to the commitment ranking. The existence of a moral cost μ reduces the range in which these payoff dominated prohibited choices are made. But if the level of μ is large enough, even agents for whom it would be optimal to choose crime in the absence of moral values may choose legal activities which are payoff dominated according to the commitment ranking u . Consequently, being moral does not necessarily represent the best option at the planning stage, since morality involves both costs and benefits. While μ monotonically shrinks the range of crime premia for which a moral individual chooses crime, its effect on indirect utility may be non monotonic. From (2) and Proposition 1, the indirect utility $U(A_\mu)$ for an individual who embraced moral values is given by

$$U(A_\mu) = \begin{cases} r_w & \text{if } r < \lambda\pi + \mu \\ r_w - [r_c - r_w - \lambda\pi - \mu] & \text{if } r \in (\lambda\pi + \mu, (1 + \lambda)\pi/2 + \mu) \\ r_c - \pi - \mu & \text{if } r > (1 + \lambda)\pi/2 + \mu \end{cases}$$

Figure 3 depicts the indirect utility $U(A_\mu)$ as a function of μ for (moral) individuals with different legal returns r_w , for given levels of r_c, π and λ .

Consider an agent with $r_w = r_w^1$, so that is crime premium is large, $r > \pi$. In the absence of moral values ($\mu = 0$), this individual faces no temptation and chooses crime. As μ increases, he starts feeling guilty, but as long as $\mu < r - \pi$, the moral cost does not change the optimality of crime for both rankings. If $\mu > r - \pi$, then crime is not optimal for u , but as long as $\mu \in (r - \pi, r - \lambda\pi)$, it is still optimal for v , so that our individual faces temptation. Notice that now it is precisely the moral prohibition of crime that creates temptation. Resisting temptation would involve a cost of self-control given by $(r - \lambda\pi - \mu)$. For any $\mu \in (r - \pi, r - (1 + \lambda)\pi/2)$, self-control is still too costly, and our individual gives in to temptation and keeps choosing crime. Accordingly, in this range an increase in the strength of moral values μ leads to a reduction in indirect utility, since it raises the costs associated to the experience of guilt. For $\mu \in (r - (1 + \lambda)\pi/2, r - \lambda\pi)$, the cost of self-control is low enough and the individual resists temptation and chooses legality; the cost of guilt disappears and the cost of self-control keeps decreasing in μ , so that in this range $U(A_\mu)$ is increasing in μ . Finally, for $\mu > r - \lambda\pi$, crime stops being tempting and the self-control cost disappears, leaving $U(A_\mu) = r_w$. Notice that for this agent the indirect utility is highest for $\mu = 0$.

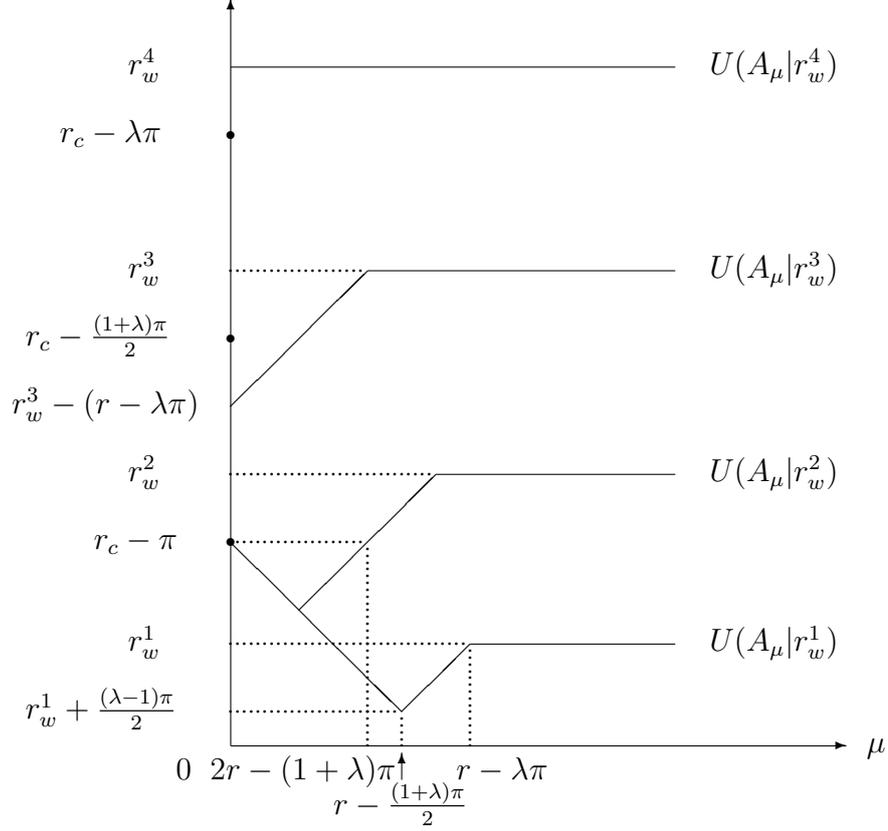


Figure 3: Indirect utility as function of μ , for different crime premia.

Consider now agents with higher legal returns, $r_w = r_w^2$, so that $r \in ((1 + \lambda)\pi/2, \pi)$. While the indirect utility is qualitatively analogous to the previous case, such agent would give in to temptation if $\mu = 0$. Yet his indirect utility is highest when the strength of moral values is large enough to eliminate temptation and let him abstain from crime. If $r_w = r_w^3$, so that $r \in (\lambda\pi, (1 + \lambda)\pi/2)$, then even with $\mu = 0$ the agent exerts self control and resists temptation. Since morality reduces the costs of self-control, the indirect utility of this agent is monotonically increasing in μ . Finally, an agent with $r_w = r_w^4$, so that the crime premium is sufficiently low, $r < \lambda\pi$, always chooses the legal option and never faces temptation and the indirect utility is independent of μ .

Notice that moral values involve two types of costs. In the first place, if moral values are weak (if μ is low), they may be insufficient to induce an agent to resist temptations. In this case, not only the agent commits crimes which are sub-optimal from the point of view of the commitment ranking, but he also pays a disutility cost associated to the experience of guilt for

behaving against his morality. A second type of cost arises if a moral agent refrains from illegal actions, which would be optimal for the commitment ranking in the absence of morality. These costs of forgone payoffs are traded off with the increase in expected utility due to the reduction in the costs of self-control. As a result, not all agents necessarily gain from adherence to a system of moral values which punish dishonesty and temptation. From the above analysis it is immediate to characterize the planning stage choice between adhering to morality, A_μ , and rejecting it, A_0 .²⁵

Proposition 2. (*Planning stage choice: moral values*) *For any given $\mu > 0$, the following holds. An individual*

- *is indifferent between A_μ and A_0 , if $r \leq \lambda\pi$;*
- *prefers A_μ if $r \in (\lambda\pi, (1 + \lambda)\pi/2)$;*
- *given $r \in ((1 + \lambda)\pi/2, \pi)$, prefers A_μ if $\mu > 2r - (1 + \lambda)\pi$ and A_0 if $\mu < 2r - (1 + \lambda)\pi$;*
- *prefers A_0 if $r > \pi$.*

To fix ideas, we call individuals moral, amoral or immoral if $U(A_\mu)$ is higher, equal or lower than $U(A_0)$, respectively. Proposition 2, states that agents with a low enough (gross) crime premium, $r \leq \lambda\pi$, are amoral. For these agents both the expected costs and benefits of morality are zero since, irrespective of μ , they choose legality and do not face temptation. At the other extreme, for agents with a large crime premium, $r > \pi$, crime is the optimal choice in the absence of morality. They are therefore immoral since morality only involves expected costs of either guilt or forgone crime payoffs. For intermediate crime premia, $r \in (\lambda\pi, \pi)$, agents face temptation in the absence of morality. Adhering to a moral code of honesty is beneficial only if it allows to resist temptation in equilibrium. Those who would resist temptation even in the absence of morality strictly gain from any $\mu > 0$, thanks to lower costs of self control. This group of agents, with $r \in (\lambda\pi, (1 + \lambda)\pi/2)$, is therefore moral for any $\mu > 0$. This is not true for those who, absent morality, would give in to temptation. For them morality is beneficial if and only if it induces to choose legality. Weak moral values, $\mu < 2r - (1 + \lambda)\pi$, are insufficient to induce them to resist temptation and only reduce expected utility. Thus agents facing strong temptations adhere to moral values if and only if these are sufficiently strict for them to resist temptation in equilibrium, that is, $\mu > 2r - (1 + \lambda)\pi$.

²⁵In what follows we focus on generic cases in the parameter space.

Let us conclude by briefly commenting on role of μ , λ and π for planning stage choice. Proposition 2 has the following,

Corollary 2. (*Morality range*) *Given $\mu > 0$, an individual strictly gains from A_μ if and only if*

$$r \in \left(\lambda\pi, \min \left\{ \pi, \frac{\mu + (1 + \lambda)\pi}{2} \right\} \right). \quad (5)$$

We refer to the interval in (5) as the morality range. Morality increases individual utility only if it allows to resist temptation. Consequently, the set of r for which morality is preferred strictly increases in μ up to the point in which nobody is tempted, which is case for $\mu = (1 - \lambda)\pi$. For larger values of μ the morality range is given by $r \in (\lambda\pi, \pi)$. An increase in temptation due to either a reduction in λ or an increase in π , expands it. Consequently, even if external and moral punishment affect utility additively, an increase in external punishment increases the demand for morality. This result may appear counterintuitive at first sight. The intuition is, however, straightforward once one considers that increased external punishments have two main effects. On the one hand they reduce the returns to illegal activities and the equilibrium level of crime. On the other hand they increase the range of temptation and this makes moral values of honesty even more valuable from an individual perspective.

5 Discussion

We have considered a simple model in partial equilibrium with separable and linear preferences, where prohibitions are subject to both external and internal sanctions. These assumptions allow to illustrate the main predictions in the simplest way although the model can be generalized in several directions or specialized for the study of problems with specific features. Let us now discuss the role of the assumptions behind our results, some further implications and some extensions of the analysis.

Actions and Desires. We considered moral values sanctioning both the action ('Thou Shalt not Steal') and its 'desire' ('Thou Shalt not Covet'). If morality sanctions actions but not desires, then it involves only costs (of either guilt or foregone payoffs) but no benefits, since it does not help

reducing the costs of self-control.²⁶ In this case A_μ would never be preferred to A_0 . Conversely, if the moral cost enters only in the temptation ranking, it is still true that agents prefer A_μ to A_0 if, and only if, morality allows to resist temptation.²⁷ The main effect of punishing only desires is to reduce the efficacy of morality, since a larger μ is required to change behavior. Therefore, while the qualitative predictions do not depend on the assumption that moral punishment is the same in both rankings, they do require some moral sanction of temptation.

Risk aversion. The main change in considering separable but non-linear preferences is that with risk aversion an increase in μ expands the morality range because morality also plays an insurance role.²⁸ A higher expected external punishment still unambiguously reduces crime and shifts the temptation range towards individuals with lower legal returns. It thus still reduces the range of immoral individuals (those who strictly prefer to reject morality) and it expands the range of amoral individuals (those who are indifferent). Yet, under risk aversion, whether it expands or shrinks the morality range depends on the different effect of marginal utility at the two thresholds. Risk aversion does not affect the prediction that more serious temptation problems due to a decrease in λ raise crime and expand both the temptation and the morality range.

Non separable Preferences. External and internal punishment may complement or substitute each other.²⁹ For instance, one more year in jail may be harder if during that time the convicted also feels guilty. Similarly, if there is a component of shame to the internal punishment, ending up in jail, or being exposed to social stigma, might increase the cost of internal punishment by adding shame to guilt. External and internal punishments may, nonetheless, also weaken each other. For instance, being fined may reduce the feeling of guilt, since the agent may perceive that he already pays enough for his mis-behavior.³⁰ The precise form of interaction might therefore be both individual and context dependent. As in the separable case stricter moral values increase the

²⁶Graphically, the indirect utility represented in Figure 3 would have no increasing range.

²⁷The only difference is that if μ enters only in v , individuals with high crime premia may have to exert self-control to resist the temptation of becoming legal. This cannot happen when μ also enters in u since guilt induces legality when crime is still tempting.

²⁸Risk aversion refers here to the fact that utility is a concave function of monetary payoffs. Of course, expected utility is still a linear function of probabilities.

²⁹To focus on interactions between external and internal punishment, we consider as a benchmark the case in which the marginal utility of money is constant and it is either not affected or reduced by higher punishments (whether external or internal).

³⁰This is coherent with the findings by Gneezy and Rustichini (2000).

incentives to be moral (i.e., a higher μ expands the morality range and reduce the set of immoral agents) and reduces crime. An increase in μ expands the temptation range if internal and external punishment reinforce each other, whereas it shrinks it if they weaken each other. The intuition is that, since temptation is due to an under-evaluation of external punishment, the indirect effect of morality on the temptation range has the same sign of the direct effect of external punishment in the former case and the opposite sign in the latter. An increase in external punishment π (beyond reducing crime) still expands the temptation range. Its effect on the morality range depends again on whether external and internal punishment are complements or substitutes. Nonetheless, as in the separable case the set of immoral agents (those that are strictly worse off by being moral) is unambiguously reduced by an increase in π . Finally, as in the separable case, a decrease in λ expands both the temptation and the morality range, beyond increasing crime.

Punishments and premia. We have restricted attention to external punishments for misbehavior but the logic of the analysis identically applies also to problems involving external rewards, which, being related to external interventions and being delayed in time, can suffer from temptation problems as well. Considering moral rewards rather than punishments would qualify the predictions in two main dimensions. First, since the indirect utility would be increasing in μ for those choosing the legal action, a large enough μ would induce some agents which in the current setting are immoral to become moral. Second, there would be no amoral individuals (since those choosing legality strictly benefit from the moral premium).³¹

Heterogenous Exposure to Temptation. We framed our analysis with reference to a single agent. The analysis can be specialized to study the equilibrium choices of different individuals facing e.g. different expected returns r or different levels of temptation λ . For example, agents might face the same illegal return r_c , but different legal returns r_w . Interpreting the results in terms of socio-economic classes, the rich would be amoral (since they expect to face less temptations), while the poor would be immoral (since illegality represents for them the payoff dominant option). Middle class individuals have the largest exposure to temptation, since they face the largest risk of indulging in payoff dominated illegal actions, and therefore, have the largest incentives to adhere

³¹This case appears of limited interest, however, since in this formulation there are no utility costs of morality which is therefore a ‘free lunch’. In particular, and trivially, if $\mu = \infty$, then all agents would be moral, legal and happy.

to moral values of honesty.³² In the same logic, since the model also predicts that the stronger the temptation the larger the level of μ required to embrace morality, the lower middle classes are expected to display a stricter morality. Similarly, different agents may face different exposure to temptation problems in terms of λ . For example, if teen-agers face larger temptation problems than adults, they would give in more frequently to payoff dominated illegal actions. They would also benefit more from a system of strict moral values compared to adults.

Social interactions. We have developed the analysis in a partial equilibrium setting. This is done to focus attention on the role of moral values as an individual self-control device. The framework can be easily extended to study the role of morality in presence of social interactions, which are likely to influence individual choices in terms of crime premia, external punishment and moral sanctions. In fact, in most of the studies cited in Section 2, the rationale for morality relates to general equilibrium effects or externalities. In general equilibrium, the endogenous choice of morality may lead to the emergence of multiple equilibria due to strategic complementarities. Recall that in equilibrium a larger μ increases the morality range, which, with heterogeneous agents, determines the share of moral individuals. If, for instance, the cost of guilt μ increases with the share of moral individuals, then we can observe multiple equilibria.³³ This possibility is illustrated in Figure 4, which plots the equilibrium share of moral agents, denoted by $\sigma(\mu, \pi_0)$, as an increasing function of μ , for a given level of expected external punishment π_0 . It also plots, a (reduced form linear) function, denoted by $\mu(\sigma)$, that links the strength of moral values to the equilibrium share of moral individuals.³⁴

³²If the rich have access to better illegal opportunities, r_w and r_c may be positively correlated. In this case also the rich may face temptation and have larger incentives to be moral. It remains true that it is individuals with intermediate crime premia who face temptation.

³³This essentially amounts to consider also a component of shame related to social norms. As in Weibull and Villa (2005), the model yields a unique equilibrium if the utility cost associated to moral values (the degree to which they generate guilt) is exogenous, whereas multiple equilibria are possible when it is endogenously related to the share of (moral) compliers. In such case, social norms effectiveness and crime rates are jointly determined in equilibrium.

³⁴As shown above the share of moral individuals in equilibrium increases until the previously characterized threshold and stabilize afterwards. Concerning the link from σ to μ , we simply postulate a linear relationship in our illustration, which delivers two corner equilibria (with shares of moral individuals equal to zero or the maximum). More generally, this framework may deliver multiple interior equilibria in presence of a non linear ‘social stigma’ function.

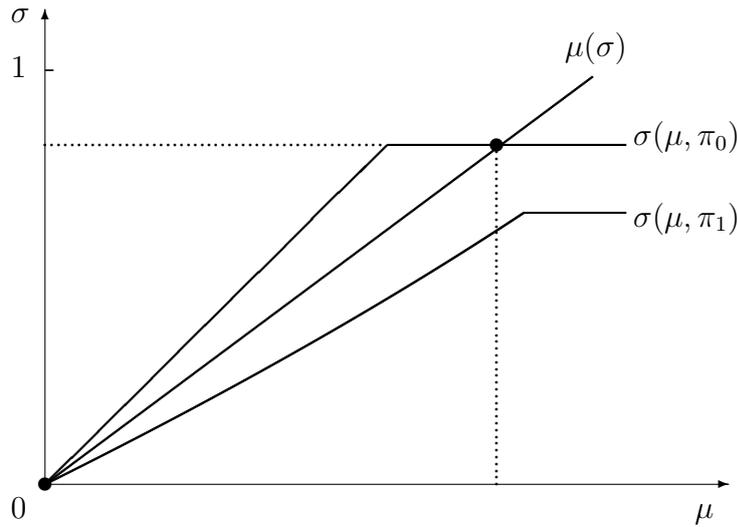


Figure 4: Social interactions and multiple equilibria.

An interesting implication of the existence of multiple equilibria is that the interaction between external and internal punishments may lead to the disappearance of equilibria with high morality and little equilibrium crime. From the previous analysis we know that a reduction in expected external punishment from π_0 to $\pi_1 < \pi_0$ tends to reduce the incentives to acquire morality. This is represented in Figure 4 by a downwards shift in the locus representing the equilibrium share of moral individuals, $\sigma(\mu, \pi_1)$. Notice that if the reduction in π is large enough, the multiplicity of equilibria may vanish and the only equilibrium is characterized by $\mu = 0$ and $\sigma = 0$. This stylized example illustrates the more general point that, in the presence of multiple equilibria induced by social interactions, even small variation in external punishment may lead to relatively large changes in the equilibrium levels of crime and morality.³⁵

Instilling Moral Values. In our analysis we have limited attention to the effect of morality, and its strength, on the individual utility. We did not explicitly investigate the process of emergence and/or transmission of moral values. As in the papers discussed in Section 2, moral education is generally performed by parents and other norms setters. The analysis provides a rationale for altruistic parents to instill moral values in their children in the face of expected future temptations. In this respect, the theory predicts that the optimal level of moral education should depend on parents' expectation about the level of temptation that will be faced by their children. For

³⁵Similarly one could consider general equilibrium effects in terms of external detection which are likely to be related to the share of criminals, as in Sah (1991).

example if parents expect their children to face some temptation they may optimally inculcate moral values. The model points out, however, that the choice of morality may be a difficult one for those parents that expect their children to be exposed to "large" temptations since they must successfully inculcate very strict moral values in order to change their children's behavior. Providing a moral education is a risky strategy, however, since failure to resist temptation exposes children to the costs of both foregone payoffs and guilt. The choice by parents may also involve costs for instilling moral values, which, presumably, are increasing with the targeted level of their 'strictness'. This would lead to large discontinuities in term of choices of moral education, since in the face of an increasing temptations the optimal moral education requires either instilling a stricter morality or a no morality at all.³⁶ This also implies that increasing exposure to temptation (which could also be induced by e.g. stricter external enforcement) may lead to more 'morally polarized' societies: for individuals it is optimal to either completely give up on morality or to adhere to even stricter moral codes.

6 Concluding Remarks

We have presented a simple theoretical framework studying the relationship between prohibitions, temptation and moral values. In presence of temptation, moral values sanctioning both actions and desires may alleviate self-control problems and work as partial commitment devices. The model allows to investigate several interesting issues like the relationship between morality and temptation, the individual incentives to adhere to potentially costly moral codes of behavior, the distribution of these incentives across the population and the interactions between external and internal sanctions in determining behavior and morality. Applied to crime economics, it highlights the so far overlooked role of temptation and morality, incorporating them into a rational theory of crime. This provides a natural explanation for two puzzling stylized facts: some crimes are not committed although their expected economic payoff is clearly positive while others are committed although their expected return is clearly negative. The framework may be applied more generally to all situation in which external sanctions may give rise to temptation, however. Given its simplicity, it can also be extended to the consideration of general equilibrium effects and

³⁶This can be seen by a simple comparative statics exercise which focus attention to the agents at the lower bound of the morality range studied in Section 4.

specialized to study economic problems involving externally sanctioned, although not necessarily illegal, prohibitions.

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(lxxxvi) *This paper was presented at the Conference on "Urban and Regional Economics" organised by the Centre for Economic Policy Research (CEPR) and FEEM, held in Milan on 12-13 October 2009.*

(lxxxvii) *This paper was presented at the Conference on "Economics of Culture, Institutions and Crime" organised by SUS.DIV, FEEM, University of Padua and CEPR, held in Milan on January 20-22 2010.*