An Economic Theory of Deviance

Jeong-Yoo Kim[1]
Dongguk University

Gang Lee
Columbia University

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Abstract

We develop a model of deviance by incorporating the labeling effect into rational choice theory. In our model, we provide an explanation of the process through which a deviant is being stigmatized and explore theoretically the relationship between the experience of having deviated and the incentive of deviation. Surprisingly, our study finds that an ex-deviant is not necessarily more likely to deviate, contrary to widely held belief. This is because the less experienced deviant may hesitate more to violate the norm one more time for fear of being labeled as a pathological deviant. Also, we define the concept of "complete stigma" and demonstrate that a rational individual is not completely stigmatized in equilibrium with positive probability.

1 Introduction

The term "deviance" may sound unfamiliar to economists, but it is commonly used by sociologists. It is defined by sociologists as a violation of a social norm that is a standard code about how human beings ought or ought not to act under given circumstances.[1] For instance, it includes the act of strutting along a street in a bikini, of shouting loudly in a quite place, of driving a car on a sidewalk, of walking on the left while everybody else walks on the right, of kidnapping and murdering a child, etc.

Deviant behavior usually evokes formal and informal punishment, restrictions, or other controls of society. These formal and informal controls constrain most people to conform to social norms. Despite the social sanctioning and controlling, however, we sometimes observe deviant behavior around us. Then, why do some people engage in such deviant behavior even if social punishments are expected? Sociologists have attempted to explain it in various aspects. One group of sociologists explain deviance in terms of broad social conditions in which deviance is most likely to grow by looking at the structural characteristics of society and groups within society (e.g., Merton [1938], Cloward and Ohlin [1960]). Another group explains deviant behavior using the characteristics of individuals focusing on those characteristics that are most highly associated with learning deviant acts (e.g., Sutherland [1947]). One more line of thought stresses the importance of the labeling (or stigmatizing) effect. According to this, interpersonal reactions to deviance may have a significant effect of increasing the likelihood of subsequent deviant behavior (e.g., H. Becker [1963]). Compared with the first two schools of thought which are mainly interested in primary deviance, this theory focuses on secondary deviance.[2]

However, rational choice theorists, including economists represented by Gary Becker, have argued that an individual chooses to conform or violate the social norm by calculating

[1] Criminologists usually distinguish crime from the deviance that is against unbinding social norms but that is not virtually a violation of criminal law. Noncriminal deviance includes religious fanaticism, certain political belief systems, certain dressing and hairdressing styles, excessive drinking and gambling, hooliganism, homosexuality, certain sexual patterns, nudism, mental disorder, etc. However, the difference is not essential from the economic perspective.

[2] In sociologists' terminology, secondary deviation refers to the responses that people make to problems created by the societal reaction to their deviance, while primary deviation refers to the enactment of deviant behavior itself.

the risk of social punishment or pain versus potential gain and pleasure derived from the act, and thus explaining that an individual engages in deviance since the benefit from violating the norm exceeds the cost of it.

Rational choice theory predicts that individuals in different conditions (in time or space) may have different incentives to deviate. For example, individuals living in poor quarters are more inclined to commit theft, robbery, rape, etc.[3] and the criminal rate is higher in recession than in boom.[4] Also, the theory suggests that the incentive of an individual to deviate may vary with a change of a given condition. One of the other important factors affecting an individual's incentive to deviate must be his experience of violating norms and resultant perceptions of his mentality by other community members. According to empirical data, it is indicated that about two-thirds of all current prisoners had criminal records before their current stay in prison. Also, it appears to be the case that 25% to 50% of all criminal offenders are rearrested in a short period of time (six months to one year) after their release from correctional institutions. These statistics seem to constitute strong empirical evidence for the correlation between the number of experiences in deviant behavior and the incentive to deviate. Nonetheless, to the best of our limited knowledge, there has been no theoretical study exploring the relationship between the experience in deviation and the incentive to deviate.

To establish the theoretical foundation of the relation between them may give important policy implications. If a deviant act of someone can cause harm to others as in a crime case, the public authority needs to monitor ex ante individuals who are likely to violate norms in order to deter deviances and can minimize monitoring costs by monitoring intensively individuals who are most likely to deviate. Also, if the relation is caused by the labeling of a deviant, the public authority will be able to reduce the deviance rate by taking positive policy measures to mitigate the labeling effect.

In this paper, we develop a theory of deviance by incorporating the labeling effect into Becker's (1968) framework; in other words, by combining the labeling theory with rational choice theory.[5] According to our model, a rational person may find it in his interest to follow

[3] A study found that two thirds of the homicides in Cleveland occurred in 12% of the city, primarily in black, inner-city areas (Bensing and Schroeder [1960]).

[4] Cook and Zarkin (1984) find that there is an increase in the number of robberies and burglaries during recessions.

[5] Rasmusen (1996) also considers the stigma effect within the framework of rational choice theory. How-

the social custom even if his short-run benefit from breaking it exceeds the cost of doing so, if he takes into account the long-run social interaction. By considering this general model, we will be able to tackle two important issues not addressed so far in sociology as well as in economics; through what process a deviant is being labeled and, more importantly, whether or not a deviant has more incentive to violate the norm again with more experiences of violation.

The crucial feature of this model that differentiates it from Becker (1968) is to incorporate explicitly social sanction by labeling on a deviant behavior into Becker's model. In general, two ways can be conceived of in introducing social sanction into the model explicitly. One is to assume it exogenously (e.g., Akerlof [1980], Coleman [1987]) and the other is to impose it endogenously (e.g., Bernheim [1994]). In Akerlof, deviance affects the deviant's utility directly by damaging his reputation, and in Bernheim, it affects the deviant's utility indirectly through affecting the belief of the others. In this paper, we follow the framework by Bernheim in the sense that we decompose utility into intrinsic utility derived directly from his action and extrinsic utility derived from others' perceptions and that a deviant is sanctioned endogenously by affecting the public's belief on his mentality. However, the difference from Bernheim is that he focuses mainly on conformity of behavior, whereas we focus on the deviant behavior. Also, in Bernheim, intrinsic gain from departing from social norms is fixed for any individual, so that an individual who has deviated once will keep violating norms, since he has no reputation to lose. It seems unrealistic if we consider the reality that an individual deviates at some times and does not at other times. Deviance is a phenomenon contingent on the situation, not a phenomenon structurally built into someone.

Sociologists who believe in the labeling theory of deviance (e.g. Braithwaite [1989]) assert that stigmatizing a person as delinquent or criminal more often encourages rather than discourages sequential deviant behavior and that the stigmatization of deviants puts them at high risk of behaving according to the label, playing out the role of a deviant, and developing deviant self-concepts as irrevocably deviant. However, this paper will highlight the possible positive aspect of the stigma effect, rather than its negative effect most sociological literature focuses on. The main finding is that there is some range of the public's perception within which an individual who has experienced violating norms once is less likely to redeviate than

ever, this model does not address the issue of secondary deviance which is the essence of both our paper and the labeling theory.

an individual who has no such experience. To put it another way, an experienced deviant is not necessarily more likely to deviate, contrary to widely held belief. This is because the less experienced deviant may hesitate more to violate the norm one more time lest he should be labeled as a pathological deviant. That is, the possibility of severe stigmatization has a deterrent effect.[6] To illustrate, suppose an economist keeps protesting against journal editors' editorial decisions. They may at first consider his claim seriously, but if the fact of his repeated protests is eventually known to the academic circle, other economists will be negatively impressed by him. Therefore, knowing this, he will refrain from protesting even if he does not agree to editors' decisions at some stage.

Of course, it is often observed that a feeble-minded and naive juvenile suddenly becomes a recidivist once he commits a crime. Whether an experience of deviance may reinforce or weaken the incentive of an individual to redeviate will depend on many factors including the degree of others' repugnance against the deviant behavior, the possibility that the deviant behavior was made by mistake, the possibility that it was an inevitable incidence etc. If a certain deviant behavior is considered as not serious so that its labeling effect is mild, the once-deviant would rather be reluctant to redeviate, since another deviance may cause a serious stigmatization. However, as he repeatedly perpetrates deviant behavior, his reputation becomes seriously damaged and, eventually, he will not hesitate to redeviate when he is labeled as an awful anomaly.

Some empirical evidence supporting this theoretical finding can be found in divorce cases.[7] According to the study by the Korea Legal Aid Center for Family Relations (1996), about 21 percent of the interviewed remarried women ended their second marriage in divorce after they had been married for 5-10 years and about 33 percent divorced after being married for more than 10 years. Thus, in total, 64 percent maintained their marriages for more than 5 years.[8] This appears to show that the remarriage duration is longer than the first marriage

[6] In the economic literature, this possibility was earlier recognized by Rasmusen.

[7] Although it may be the case that a divorce is no longer deviant behavior in U.S. as many sociologists argue, it is still deviant behavior in most Asian countries.

[8] A number of studies have shown that the divorce rate appears to be higher in remarriages after divorce than in first marriages (e.g., Becker, Landes and Michael [1976], Monahan [1958]). A U.S. Bureau of the Census report estimated that about 33% of all first marriages among people 25-35 years old may end in divorce, while about 40% of remarriages after divorce among people this age may end in divorce. However, this does not imply that a person is less hesitant to divorce in remarriage after divorce than in first marriage,

duration,[9] as compared with the empirical finding that the highest percentage of married couples are in their first marriage 3-4 years before they became divorced.[10] This is thought to be due to the endeavor of remarried persons not to end their remarriages even though they may not be happy with their married lives, since they are afraid that one divorce may be excused but two divorces would make people believe them abnormal.[11]

No claim similar to our main result is found in literature except in the context of divorces. (e.g. Cherlin [1978]) Cherlin noticed that "The previously divorced may be more hesitant to divorce again because of the stigma attached to divorcing twice."[12] However, it is beyond doubt that the observation of this pattern of behavior will not be limited only to divorce cases but will be universal. This paper adds values to the existing literature in the sense that it contains a formal analysis of an abstract, general model conveying a behavioral principle.

Before we close this section, we want to emphasize that the incentive to break social norms can be controlled either by informal sanctions of stigmatization or by formal sanctions of legal punishment. There is some literature on deterring criminal behavior of repeat offenders by legal sanctions (Rubinstein [1979], Polinsky and Rubinfeld [1991], Chu, Hu and Huang [1997], Polinsky and Shavell [1998])). If a certain deviant behavior incurs legal sanctions that are ex ante determined by the legal authority, the incentive of an individual to engage in deviant behavior may be affected by the legal sanction scheme as well.

The organization of this paper goes as follows; We set up a static model in Section 2. In Section 3, we make comparative static analysis and derive the main results. In Section 4, we relax some restrictive assumptions made in Section 2 and provide a stochastic dynamic model. Section 5 contains some discussions, and Section 6 draws some policy implications.

because the statistics of the divorce rate in remarriage are obtained from a sample biased towards persons deficient in marriage lives.

[9] See Korea Legal Aid Center for Family Relations (1996, 1997).

[10] Some may argue that this is because those who remarry are older, on the average, than those marrying for the first time and thus presumably more mature. This may be the case, but, if statistical data showed that the duration of third marriages or fourth marriages are shorter than the duration of second marriages, this hypothesis would be wrong. Furthermore, attribution of longer remarriage duration to maturity does not seem to correspond to U.S. data provided in Table 1.

[11] According to the U.S. Bureau of the Census (1976), the duration of the second marriage is shorter than the duration of the first marriage. As shown in Table 2 and Table 3, the median intervals from second marriage to redivorce are shorter except for women born in 1920 to 1929.

[12] quoted in Cherlin, p. 641.

Concluding remarks and caveats follow in Section 7.

2 The Model

We consider a simple model explaining deviant behavior. The population consists of two types of individuals, rational and pathological. A rational individual, by definition, makes a decision by maximizing his expected utility reflecting the cost and benefit of the deviant behavior. On the other hand, pathological individuals have quite different utility functions than ordinary rational individuals; for example, they may enjoy very high utility (e.g., $+\infty$) from committing deviant behavior. Thus we define pathological individuals as those who always engage in deviant behavior. We assume that the proportion of pathological individuals in the population is $\lambda \in (0,1)$ and that it is common knowledge. This model can be interpreted alternatively as having a single individual who can be either rational or pathological. In this interpretation, λ can be viewed as the prior belief that the individual is pathological.

A rational individual's utility function has two components. One is the intrinsic utility derived directly from a behavior and the other is the extrinsic utility derived from social interaction with other community members. If he disobeys social customs and commits an act of deviant behavior, it entails benefits and costs directly to him. Let the net benefit from the deviant behavior be denoted by v.[13] Then, v is assumed to have the non-atomic distribution function $F(v)$ over V with the corresponding density function $f(v)$ where $0 \in V \equiv [\underline{v}, \overline{v}]$. The value of v is the private information of the individual. If an individual is believed to be pathological by the whole population, it incurs disutility w to him.[14] w is assumed to be constant.[15] Then, a rational individual's utility can be written as $U = U_I + U_E$ where U_I, U_E are symbols for intrinsic and extrinsic utility respectively. We assume that $U_I = v$

[13] In this paper, externalities generated by deviant behavior are not considered explicitly, neither is the social welfare function. First, it is because deviant behavior, in most cases, has a marginal effect on others' utility. Second, it is because we are mainely interested in the individual behavior rather than in social welfare.

[14] If a person is stigmatized as abnormal, people will shun him and he will lose a lot of opportuinites to work, since firms will not hire him even though they know that he has high productivity. As for the empirical evidence of the stigma effect, see Rasmusen.

[15] A deviant behavior may be followed by social interaction with others. w can be thought as the equilibrium value endogenously determined in the subgame.

if he deviates from social norms and normalize the intrinsic utility when he conforms to social norms to $U_I = 0$. The public updates its belief that an individual is pathological, based on its observation of his behavior. Let $\hat{\lambda}$ be the posterior belief. Then, his utility is $U = v - \hat{\lambda}w$ if he deviates and $U = -\lambda w$ since $\hat{\lambda} = \lambda$ if he conforms to the social norms. The extrinsic utility $-\lambda w$ when an individual follows norms reflects the externality generated from the presence of pathological people in the population. Here, $\hat{\lambda}$ is common belief by the public and will be denominated the reputation of an individual. If $\hat{\lambda}$ is higher (lower respectively), it will be said that he has a worse (better respectively) reputation. We are implicitly assuming that, the stronger the belief that a given individual is pathological, the larger proportion of the population keeps away from him. So, the disutility a deviant must suffer from the severance of social relations will be proportional to the posterior belief. For expositional convenience, we are simply assuming that the expected disutility of violating norms from social interaction when the resulting posterior belief $\hat{\lambda}$ is $\hat{\lambda}w$.

Suppose a given individual is a rational person without social interaction by nature i.e., $w = 0$. Then, he will conform to social customs if $v < 0$, deviate if $v > 0$ and randomize if $v = 0$. As a tie-breaking rule, we assume that he deviates with probability 1 if $v = 0$. Then, the necessary and sufficient condition for a rational individual to commit an act of deviant behavior in this case is that $v \geq 0$.

Now, let us consider how the decision making of a rational individual is affected by considering the extrinsic utility from social interaction. If he conforms, he gets $-\lambda w$. If he deviates, the public updates the posterior belief that he is pathological according to the Bayes' law i.e., $\hat{\lambda} = \frac{\lambda}{\lambda+(1-\lambda)(1-F(v^*))}$ where v^* is the net benefit from deviation that makes him indifferent between deviating and conforming. Thus, the utility when he deviates is $v - \frac{\lambda}{\lambda+(1-\lambda)(1-F(v^*))}w$. Then, v^* can be determined by

$$-\lambda w = v^* - \frac{\lambda}{\lambda + (1-\lambda)(1-F(v^*))}w \tag{1}$$

Rearranging (1) yields

$$v^* = \{\frac{\lambda}{\lambda + (1-\lambda)(1-F(v^*))} - \lambda\}w \equiv \phi(v^*) \tag{2}$$

We have $\phi(\underline{v}) = 0$ and $\phi(\overline{v}) = (1-\lambda)w$. Thus, the necessary and sufficient condition for the existence of $v^* \in \text{Int}V \equiv (\underline{v}, \overline{v})$ such that $v^* = \phi(v^*)$ is

$$(1-\lambda)w < \overline{v} \qquad [NS]$$

Furthermore, if we assume that $\phi''(v) \leq 0$ for all $v \in V$, he deviates if $v \geq v^*$ and conforms if $v < v^*$, where $v^* \in (0, \overline{v})$, since $\phi'(v) > 0$.[16] (See Figure 1.) If $(1-\lambda)w = \overline{v}$, a deviant behavior may occur but only with zero probability, since $v^* = \overline{v}$ and $F(v)$ has no atom. Also, if $(1-\lambda)w > \overline{v}$, any $v \in V$ does not satisfy (2). This implies that there exists no $v \in V$ making the individual indifferent between following the norm and breaking it if the posterior belief $\hat{\lambda}$ is formed according to the Bayes' law. This in turn implies that either the individual strictly prefers conforming to the norm or strictly prefers deviating from it for all v. First, consider the possibility that an individual strictly prefers deviating for all v. If it were the case, the posterior belief would be $\hat{\lambda} = \lambda$. Then, even if an individual violated the norm, there would be no stigma effect. Therefore, an individual with $v < 0$ would conform, which is contradictory. Now, suppose that an individual strictly prefers conforming to the norm for all v in equilibrium. Then, when an individual deviates from it, he is believed to be pathological with posterior probability $\hat{\lambda} = 1$. Since $-\hat{\lambda}w = -w < \lambda w$, $\forall v$, it can be an equilibrium that a rational individual conforms to social norms for all v. This can occur especially when w is sufficiently large that a departure from the social norm seriously impairs the reputation of the deviant. The following proposition summarizes this.

Proposition 1 *Assume that $\phi''(v) \leq 0$ for all $v \in V$.*[17] *Then, the necessary and sufficient condition for a rational individual to make a deviant behavior with positive probability is that $(1-\lambda)w < \overline{v}$ [NS] i.e., $\exists v^* \in (0, \overline{v}) \ni v^* = \phi(v^*)$. Furthermore, in this case, (i) he deviates if $v \geq v^*$ and conforms if $v < v^*$ (ii) $v^* > 0$.*

If $v \geq v^*$, even a rational individual deviates at the expense of higher probability of being considered as pathological, since the cost of conforming to social norms is too high. Also, (ii) implies that a rational individual with private information $0 \leq v < v^*$ does not deviate even if his direct benefit from deviation exceeds the direct cost, lest he should lose his future benefit from social interaction.

If [NS] condition is satisfied, we have $0 < F(v^*) < 1$, so that $\lambda < \hat{\lambda} < 1$. If this condition is violated, it must be that $\hat{\lambda} = 1$.[18] Thus, in either case, we have $\hat{\lambda} > \lambda$.

Proposition 2 *Given $\lambda \in (0,1)$, $\hat{\lambda} > \lambda$.*

[16] If v is uniformly distributed i.e., $f'(v) = 0$ for all $v \in V$, this condition is satisfied.

[17] $f'(v) = 0$ i.e., a uniform distribution satisfies this condition.

[18] If $(1-\lambda)w = \overline{v}$, it is obvious that $F(v^*) = 1$, so that $\hat{\lambda} = 1$.

This proposition says that a deviant behavior strictly increases the posterior belief that he is abnormal. If $\hat{\lambda} = \lambda$, a deviant behavior would not entail any stigma effect at all, so that a rational person's decision would be identical to the myopic decision that did not take into account the future payoff. This proposition implies that a long-sighted decision by a rational person must differ from the myopic decision.

3 Comparative Statics

Assuming that [NS] condition is satisfied, we will perform the comparative static analysis. The following propositions describe the comparative static properties of the equilibirum outcome.

Proposition 3 *$v^* = 0$ if $w = 0$ and v^* is increasing in w.*

Proof. obvious from Figure 1

This proposition says that deviance is less likely to occur, as the benefit from social interaction is larger.

Corollary 1 *$\hat{\lambda}$ is increasing in w.*

Proof. $\frac{\partial \hat{\lambda}}{\partial w} = \frac{\partial \hat{\lambda}}{\partial v}\frac{\partial v^*}{\partial w} > 0$, since $\frac{\partial \hat{\lambda}}{\partial v} > 0$.

This corollary implies that a larger w makes an individual less inclined to violate the norm, so that one act of deviation hurts his reputation more seriously.

Proposition 4 *(i) $\frac{\partial v^*}{\partial \lambda} > 0$, or equivalently, $\frac{\partial \hat{\lambda}}{\partial \lambda} > 1$ for all $\lambda \in (0, \lambda_\epsilon)$ for some $\lambda_\epsilon > 0$.*[19]
(ii) $\frac{\partial v^*}{\partial \lambda} < 0$, or equivalently, $\frac{\partial \hat{\lambda}}{\partial \lambda} < 1$ for all $\lambda \in (\frac{1}{2}, 1)$.

Proof. See the appendix.

In an intermediate range of λ ($\lambda_\epsilon < \lambda < \frac{1}{2}$), however, the direction of a change in v^* with an increase in λ is ambiguous.

[19] This result is contrasted with Rasmusen's following assertion, "The stigma from a first conviction is greater than from subsequent convictions, and after enough convictions the marginal effect is negligible," quoted in Rasmusen, p. 536.

This result has an important implication. By Proposition 2, an individual is believed to be pathological with higher probability after he deviates i.e., $\hat{\lambda} > \lambda$. Then, $\hat{\lambda}$ becomes the new prior belief of the public that he is pathological throughout until he perpetrates another deviant behavior. The above result suggests that an ex-deviant does not always have a stronger incentive to deviate again. If $\hat{\lambda}$ is very small, an ex-deviant is less likely to deviate. This is because another deviation would increase the probability that he is believed to be pathological very much.[20] However, if $\hat{\lambda}$ is large, more specifically, $\hat{\lambda} > \frac{1}{2}$, we can be sure that an ex-deviant is more likely to deviate. The intuitive reason is that, if $\hat{\lambda}$ is large, the belief that he is pathological is not increased very much even if he deviates one more time. The upshot is that an ex-deviant is not necessarily more likely to deviate again. If he is, for example, the first deviant, he would rather be less inclined to commit repeat deviance in order not to be believed to be habitual. On the contrary, if he has already deviated many times, thus the belief that he is pathological is high enough, he will be more inclined to deviate again, since he does not have much reputation to lose.

Then, the natural question is to what extent this implication is applicable. For which among various kinds of deviant behavior can it provide a useful prediction? It may depend on how much one-time deviation will affect the public's perception. If it changes the public's perception to $\hat{\lambda} \in (0, \lambda_\epsilon)$, the deviant will become more hesitant to engage in another deviation. On the other hand, if it changes the perception to $\hat{\lambda} \in (\frac{1}{2}, 1)$, the stigma effect will strengthen his incentive to deviate. Various factors must be considered to tell under which case a specific type of deviant behavior falls, but the size of w is obviously one of the key determinants. According to Corollary 1, an act of deviance increases $\hat{\lambda}$ more if w is larger, where w can be interpreted as an index of others' repugnance against a particular deviant behavior. This implies that the seriousness of a deviant behavior or the degree of others' repugnance against it can be a good criterion for the applicability of our result. For example, it is quite rare to observe a famous actor or actress involved in a shameful scandal

[20] In fact, Proposition 4 (i) does not imply this statement directly, because another act of deviation does increase the posterior belief but not infinitesmally. Figures 2 to 7 provide simulated examples of the equilibrium dynamics of individual's behavior pattern. For a numerical simulation, it is assumed that v has a uniform distribution which is symmetric about 0 i.e., $\underline{v} = -\overline{v}$ and $F(v) = \frac{v+\overline{v}}{2\overline{v}}$. v_n and λ_n are defined recursively as satisfying $v_n = (\lambda_n - \lambda_{n-1})w$ and $\lambda_n = \frac{\lambda_{n-1}}{\lambda_{n-1}+(1-\lambda_{n-1})(1-F(v_n))}$ where $\lambda_0 = \lambda$. That is, v_n is the borderline type of an individual who has deviated $(n-1)$ times and λ_n is the posterior belief of the public when it has observed an individual deviating n times.

more than once for a short period of time, unless he or she is already notorious for his or her habitual misconducts. Similarly, an influential political figure is seldom accused of his misdeeds (bribery, embezzlement etc.) several times. In these types of deviance, w is considered to be relatively small. For ordinary people are not afraid of interacting with him since they do not expect any harm to be inflicted by such type of deviant behavior. On the other hand, in the case of the felony like murder and robbery, almost everybody could be a victim of the deviant behavior, implying that w is quite large. Consequently, one-time deviation in this case would make $\hat{\lambda}$ close to 1 so as to make him stigmatized.

4 Stochastic Dynamic Model

The model provided in Section 2 is restrictive in two respects. First, the rationality of rational individuals was bounded in the sense that they did not take into account the possibility that they would redeviate in the future, when they contemplate committing an act of deviant behavior. Second, an individual's reputation was updated only when he had engaged in deviant behavior. An act of following norms did not improve his reputation. This feature comes from the implicit assumption that conformed behavior was not observable to the public. Since non-deviant behavior was assumed to be unobservable, the public was not given a chance to update its posterior belief when an individual obeyed social norms.

In this section, we modify the restrictive features by assuming that individuals are forward-looking and that both deviant behavior and conformed behavior are observable. Also, to make things realistic and interesting, we introduce uncertainty on decision chances into the model.[21]

We consider the following dynamic model. An individual lives for two periods. The first period can be thought of as his adolescence and the second period as his senescence. The chances of getting short-run gains from violating the norm arrive at each period stochastically. The chances are given to an individual independently at each period and the probability that a chance arrives at each period is denoted by p. Also, net benefits from breaking the

[21] If we allow for the observability of non-deviant behavior without incorporating uncertainty, the analysis will become unrealistic and trivial, since the observation that an individual follows norms in a certain period makes the public believe for sure that he is never pathological for the rest of his life even if he makes any deviant behavior in the following period.

norm are known to the individual at the same time that the random events arrive. Let v_t denote the net benefit of deviating from the norm at period t. Then, v_t's are independently and identically distributed according to $f(v)$ over V. Values of v_t's are private information of the decision maker, while $f(v)$ is common knowledge. The action of an individual at some period affects not only his (per-period) intrinsic utility but also his (per-period) extrinsic utility as in Section 2. Second-period utility is discounted by the discount factor $\delta(< 1)$. The public's prior belief that an individual is pathological is λ_0 and it updates the posterior belief according to Bayes' law based on its observation of the individual's action at each period.

Let $d \in D \equiv \{0, 1\}$ be an action (or a decision) of the individual where $d = 1$ denotes "deviating" and $d = 0$ denotes "conforming to the norm". Also, let $\lambda_t(d_t; \lambda_{t-1})$ be the public's t-period posterior belief when it observes an action d_t at period t and the $(t-1)$-period belief is λ_{t-1}. Then, $\lambda_t(d_t; \lambda_{t-1})$ is given by

$$\lambda_t(0; \lambda_{t-1}) = \frac{(1-p)\lambda_{t-1}}{1 - p + p(1-\lambda_{t-1})F(v_t^*)} \equiv g(\lambda_{t-1}, v_t^*, p) \tag{3}$$

$$\lambda_t(1; \lambda_{t-1}) = \frac{\lambda_{t-1}}{\lambda_{t-1} + (1-\lambda_{t-1})(1-F(v_t^*))} \equiv h(\lambda_{t-1}, v_t^*, p), \tag{4}$$

where v_t^* is the type of the individual who is indifferent between $d = 0$ and $d = 1$ at period t. Notice that $h(\lambda, v, p)$ does not depend on p and that $g(\lambda, v, p) < \lambda < h(\lambda, v, p)$ for any $v > \underline{v}$, for any $p \neq 0$, for any $\lambda \in (0, 1)$. Also, notice that, if $\lambda = 1$, we have $g(1, v, p) = h(1, v, p) = 1$ for any v and p.[22] We will call this belief complete stigma, and an individual with the reputation $\lambda = 1$ to be "completely stigmatized". If an individual is competely stigmatized, his reputation cannot be recovered at all no matter what he does in the successive period.

The following lemmas will be useful to characterize our equilibrium.

Lemma 1 *$g(\lambda, v, p)$ is strictly decreasing in p, $\forall p \in (0, 1)$, $\forall v > \underline{v}$, $\forall \lambda \in (0, 1)$ and $g(\lambda, v, 0) = \lambda$.*

Proof. obvious from equation (3)

[22] In the language of stochastic processes, $\lambda_t = 1$ is an absorbing state.

The intuition is crystal clear. An individual's conformed behavior in a situation with a higher chance of getting short-run benefits by deviation should imply more likelihood that he is rational.

Lemma 2 *(i) $h(\lambda, v, p)$ is strictly increasing in v, $\forall \lambda \in (0,1)$. (ii) $g(\lambda, v, p)$ is strictly decreasing in v, $\forall p, \lambda \in (0,1)$. (iii) Accordingly, $h(\lambda, v, p) - g(\lambda, v, p)$ is strictly increasing in v, $\forall p \in [0,1]$, $\forall \lambda \in (0,1)$.*

Proof. straightforward

To go on with our analysis, we introduce some notation for various equilibrium continuation payoffs of a rational individual given his reputation λ at period t.

$U^t(\lambda)$ = the ex-ante expected payoff before a random event is realized

$U^t_Y(v, \lambda)$ = the expected payoff when the chance for a decision is given and the short-run gain from deviation is v

$U^t_N(\lambda)$ = the expected payoff when the chance is not given

$U^t_0(v, \lambda)$ = the payoff that a rational individual is expected to obtain by conforming to the norm when the chance to make a decision is given and the short-run gain from deviating is v

$U^t_1(v, \lambda)$ = the payoff that a rational individual is expected to obtain by deviating when the chance to make a decision is given and the short-run gain from deviating is v

Then, it is not difficult to see that

$$U^t(\lambda) = p \int_{\underline{v}}^{\overline{v}} U^t_Y(v, \lambda) f(v) dv + (1-p) U^t_N(\lambda) \tag{5}$$

$$U^t_Y(v, \lambda) = \max\{U^t_1(v, \lambda), U^t_0(v, \lambda)\} \tag{6}$$

$$U^t_1(v, \lambda) = \begin{cases} v - h(\lambda)w + \delta U^2(h(\lambda)) & \text{if } t = 1 \\ v - h(\lambda)w & \text{if } t = 2 \end{cases} \tag{7}$$

$$U^t_0(v, \lambda) = U^t_N(\lambda) = \begin{cases} -g(\lambda)w + \delta U^2(g(\lambda)) & \text{if } t = 1 \\ -g(\lambda)w & \text{if } t = 2 \end{cases} \tag{8}$$

We will be interested only in the equilibrium in which a rational individual deviates from norms with positive probability in both periods. This implies that $v_1^*, v_2^* \in \mathrm{Int}V$, and thus, v_t^*, $t = 1, 2$ are determined by

$$U_0^t(v_t^*, \lambda_{t-1}) = U_1^t(v_t^*, \lambda_{t-1}), t = 1, 2 \tag{9}$$

First, let us consider the decision of a rational individual in the second period. $v_2^*(\lambda_1)$ must satsfy

$$v_2^*(\lambda_1) = \varphi(v_2^*(\lambda_1), \lambda_1, p), \tag{10}$$

where $\varphi(v_2, \lambda_1, p) = \{h(\lambda_1, v_2, p) - g(\lambda_1, v_2, p)\}w$. Let φ_i and φ_{ii} be the first and the second derivative of φ with respect to the i-th argument. Then, assuming that $\varphi_{11}(v_2, \lambda_1, p) \leq 0$ for all v_2, λ_1, p, we have the following propositions.

Proposition 5 *There exists a unique $v_2^*(\lambda_1) \in (0, \overline{v})$ if and only if $w < \frac{1-p\lambda}{1-\lambda}\overline{v}$. In this case, the individual deviates in the second period if $v_2 \geq v_2^*(\lambda_1)$ and conforms if $v_2 < v_2^*(\lambda_1)$.*

Proof. The result follows from the facts that $\varphi(\underline{v_2}, \lambda_1, p) = 0$, φ is continuous in v_2 and $\varphi_1(v_2, \lambda_1, p) > 0$, $\forall p \in [0, 1]$, $\forall v_2$. (See Figure 8.)

Proposition 6 *$v_2^*(\lambda_1)$ is strictly increasing in p for all $\lambda_1 \in (0, 1)$.*

Proof. Since $\varphi_3 > 0$, the result is immediate from Figure 9.

The intuition behind this proposition is that, given the reputation, an individual has more incentive to conform to the norm in the second period as the event probability becomes higher, since a higher probability of random events will make his reputation obtained as a result of conforming better according to Lemma 1.

To see the decision of a rational individual in the first period, following lemmas are helpful.

Lemma 3 *$U^2(\lambda)$ is strictly decreasing in λ.*

Proof. This is immediate, since both of $U_1^2(v, \lambda)$ and $U_0^2(v, \lambda)$ are strictly decreasing in λ.

Lemma 4 *$v_1^*(\lambda) > v_2^*(\lambda)$ for any $\lambda \in (0, 1)$.*

Proof. Since $\lambda_1(1;\lambda_0) > \lambda_1(0;\lambda_0)$, we have $U^2(\lambda_1(0;\lambda_0)) > U^2(\lambda_1(1;\lambda_0))$ by Lemma 3. This implies that $v_1^*(\lambda) > v_2^*(\lambda)$ from equation (9). (See Figure 10.)

Finally, we have the following important lemma and proposition.

Lemma 5 *There exists a $\overline{\lambda} > 0$ such that, for all $\lambda \in (0, \overline{\lambda})$, $\varphi(v, \lambda, p)$ is strictly increasing in λ for all $v \in V$.*

Proof. See the appendix.

Proposition 7 *$v_2^*(\lambda)$ is strictly increasing in λ, for all $\lambda \in (0, \overline{\lambda})$ for some $\overline{\lambda} > 0$.*

Proof. We have $v_2^*(\lambda) = \varphi(v_2^*(\lambda), \lambda, p)$. Since $\varphi_2 > 0$ for all $\lambda \in (0, \overline{\lambda})$ for $\overline{\lambda}$ obtained from Lemma 5, it is immediate that $\frac{\partial v_2^*}{\partial \lambda} > 0$ for such λ.

This proposition suggests that, if λ is very small, it is possible that $v_2^*(\lambda_1(1, \lambda_0)) > v_2^*(\lambda_1(0, \lambda_0))$. That is, a rational individual who has an experience in engaging in deviant behavior may be less likely to deviate again, even if he is sophisticated in the sense that he takes into account the possibility of redeviation when he breaks the norm.

Before we close this section, we will discuss the probability that an individual may be completely stigmatized. It is transparent that an individual is completely stigmatized from period t on if and only if $v_t^* = \overline{v}$. This implies that a rational individual will not be completely stigmatized in equilibrium with positive probability. If $v_t^* = \overline{v}$ for some t, an act of deviant behavior would make the deviant completely stigmatized. However, the probability will be zero that an individual will deviate in equilibrium in that case. Therefore, we have the following proposition.

Proposition 8 *It is a pathological individual with certainty that is completely stigmatized.*

Tables 4 – 5 illustrate the equilibrium values for v_1^*, v_2^*, λ_1^* and λ_2^* associated with various values of p under the assumption of uniform distribution.

5 Discussions

A. Group Variations and Statistical Discrimination

Certain deviant behavior is not just individualistic. The rates of violent crimes in some age group are higher than in other groups.[23] Specifically, male teenagers, who represent 3.3 percent of the U.S. population, commit 5.6 percent of its total homicides (Fox [1993]). Also, some kind of criminal offenders are disproportionately drawn from certain racial and ethnic minorities. In a study of homicide in Philadelphia, Wolfgang reported that a homicide rate for blacks was four times as high as for whites (Wolfgang [1958]). These phenomena may provide a rationale for statistical discrimination. However, it is also obvious that such biases against those subgroups will most likely reinforce the incentive of the members within the groups to engage in deviant behavior. Our result suggests that it may be better to adopt different deviance-deterring policies for those subgroups whose respective deviance rate is relatively high and relatively low i.e., whose respective λ is different due to either biological or environmental reason.

B. Ex Ante and Ex Post Perception in the Cost of Deviance

We have assumed that the distribution of v and the magnitude of the social sanction w are constant over time and that they are common knowledge. However, in general, they may change after the deviance. For example, an experienced criminal may have lower economic and psychological costs of implementing his criminal intent since he has obtained knowledge about techniques of commiting crimes from his past experience and, besides, he is rather relieved of the anxiety, the fear of being apprehended, the remorse of conscience, etc. This may shift the distribution of v downwards after a crime is once committed. Or, it may

[23] Some subgroups of a society may develop their own norms which are not shared by the society of which they are a part. This is called a subculture. That is, a subculture is a culture within a culture. Thus, seemingly deviant behavior by the members of the subgroups may be the consequence of obeying their own norms. An example of a subculture is found in the world of outlaw motorcycle gangs, whose members refer to themselves as "1 percenters." These bikers live hedonistic lives and, by engaging in outrageous behavior, often reinforce their image of themselves as social outcasts. The subculture of "1 percenters" values mobility, mechanical ability, fighting skill, dexterity in riding very large Harley-Davidson motorcycles, etc. (See Watson [1982].)

be realistic that an individual has an uncertain estimate of w. In particular, a potential deviant has a tendency to overestimate it before he ever violates the norm. However, once he exhibits deviant behavior, he tends to begin underestimating it. This comes from the psychology that he does not want to think of himself as *persona non grata*. This may be one factor that makes an ex-deviant more likely to redeviate in many situations.

C. Observability and Heterogeneous Beliefs

In the real world, all of the community members cannot observe all the deviant actions. Accordingly, their perceptions of the potential deviant's mentality may not be the same, contrary to the assumtion of this model that all of them observe the deviant's action and form one and the same posterior belief by Bayes' law.

In general, a more serious violation usually involving a higher w could be observed by more people. The incidence of bribery by an influential political figure hits the headlines, while a similar case wherein a policeman of no distinction is involved does not attract much attention.

Also, this may explain why a less sociable person is inclined to become a deviant.[24] Since the behavior of such a person is rarely observable, his deviant behavior will not increase $\hat{\lambda}$ much. This, together with his small future payoffs from social interactions, will give him a strong incentive to deviate.[25]

6 Stigma Effect and Policy Implications

Stigmatization ex ante has the positive effect of deterring deviance, while ex post it has the negative effect of making the stigmatized person not hesitant to redeviate. That is, it can discourage current deviation, but it does encourage next deviation. For larger positive effect, a deviation must increase $\hat{\lambda} - \lambda$ very much. Therefore, the tendency to hesitate to commit another deviation for fear of being stigmatized can appear only in the early stage of a deviant career.

[24] According to control theorists in sociology, this is because a reduction in control generates more deviance by freeing people to follow their natural inclinations.

[25] Non-sociableness may be a consequence of deviant behavior as well as its cause. Persons enjoying deviant behavior, such as addiction, homosexuality etc. may avoid social gatherings and maintain an isolated status.

Now, we may obtain some policy implications in light of the nature of the stigma effect. Suppose the objective of the government is to maximize the social welfare which is approapriately defined. If the current criminal rate is exccessively high relative to the optimal level and a large proportion of crimes are committed by ex-convicts, one effective way to reduce the criminal rate will be to alleviate the stigma effect. Meanwhile, stigmatization is possible only in the case that the public can observe the action of a criminal. Thus, one way of mitigating the stigma effect would be to obliterate the criminal record after a certain period of non deviation so as to keep the public from access to it. Of course, the adoption of this policy needs some caution, because it may put innocent people at higher risks of becoming victims of crimes. To be cautious in recommending this policy, let us consider the more elaborated model that explicitly deals with externalities generated by deviant behavior. Suppose, given λ, a potential deviant's neighbors first take precausions against possible losses due to his deviance. Let c be the precaution level. For simplicity, assume that the short-run gain of the deviant v is independent of c and that precautions reduce losses. That is, letting $L(c)$ be the losses when a precaution level c is taken, we assume that $L'(c) < 0$ and that $L''(c) > 0$. After precautions are taken, the potential deviant decides whether or not to follow the norm, and as a consequence, $\hat{\lambda}$ is updated.

The potential deviant's behavior is determined independent of the precaution level due to the assumption that c does not affect v. Neighbors choose c to minimize their expected total cost $\rho L(c) + c$ where $\rho = \lambda + (1-\lambda)(1 - F(v^*))$ is the probability that the individual perpetrates a deviant act. Notice that the solution for the optimization problem, c^*, is increasing in q if it is an interior solution. If the government finds an ex-convict to whom the stigma is attached so that he has no other choice but to commit another crime for a living, the policy of obliterating his criminal record will reduce the possibility of recidivism. Knowing this, neighbors will reduce the precaution level. Therefore, in this case, this policy recommendation is clearly welfare-improving. The problem of this policy, however, lies in the case of a pathological criminal. In this case, the policy will not help deter the criminal acts and only reduce the precaution level people take. As a consequence, higher social losses are expected. Therefore, to ensure the effectiveness of this policy, it is essential to tell whether the potential deviant is rather habitual or not.

Relatedly, the Korean government recently decided to delete one's divorce record out of his (or her) family register. Since a divorce is still regarded as shameful in Korea, it has

been welcomed by many suffering divorced persons (in particular, women) who could be negatively stigmatized. However, it may also have the effect of increasing the divorce rate. If the Korean government does worry about the currently growing divorce rate and consider it as a social concern, the policy measure may backfire.

7 Conclusion

Contrary to the existing literature on the labeling theory of deviance that explicitly assumes a nonsmooth, one-time stigmatization on a deviant, this paper explores in what process a deviant is being stigmatized and stresses that stigmatization possibly has a positive effect of deterring deviance as well as a well-known negative effect. More importantly, our paper provides a theoretical analysis for the relationship between the experience of having deviated and the incentive of deviation, and suggests the possibility that an experienced deviant may be less likely to deviate, as opposed to the conventional wisdom that the reverse will be the case.

Although some empirical data have been provided, however, this paper does not contain a satisfactory empirical analysis supporting the theoretical finding due to the difficulty in collecting a large sample of data essential for meaningful empirical analysis. But, we are sure that the empirical research testing the hypothesis obtained in this paper will have substantial academic value and have a significant effect on policy making.

This model can be extended in various ways. First, we may consider a model in which the chance to make a decision is stochastically given at each period $t = 1, 2, \cdots, \infty$. Then, a deviant individual will be completely stigmatized at some time for sure, although it will not occur in equilibrium with positive probability. However, no other results we have obtained will be qualitatively affected. Alternatively, we can consider a more sophisticated model in which a sequence of chances of getting short-run gains from violating the norm are given according to a counting process (presumably Poisson process) and the public keeps updating its posterior belief every time an individual violates the norm. Also, it will be worth pursuing richer models incorporating various features not captured in this model as discussed in section 5.

Appendix

Proof of Proposition 4

Given v, let $1 - F(v) \equiv q$ and define $\Lambda = \hat{\lambda} - \lambda = \frac{\lambda}{\lambda + (1-\lambda)q} - \lambda$. If $q = 1$ i.e., $v = \underline{v}$, Λ is identically zero, so that $\frac{\partial \Lambda}{\partial \lambda} = 0$ for any λ. If $q \neq 1$, $\frac{\partial \Lambda}{\partial \lambda} > 0$ is equivalent to $\psi(\lambda; q) < 0$ where $\psi(\lambda; q) = (1-q)\lambda^2 + 2q\lambda - q$.

First, since $\psi(0; q) = -q < 0$, $\exists \lambda_\epsilon(v)(> 0) \ni \forall \lambda < \lambda_\epsilon(v), \psi(\lambda; q) < 0$ for any given v and thus we have $\frac{\partial \Lambda}{\partial \lambda} > 0$ for any $\lambda < \lambda_\epsilon(v)$. Thus, $\phi(v)$ schedule is shifted upwards with an increase in λ, so that v^* is increased as λ is increased.

On the other hand, if $\psi(\lambda; 1) = 2\lambda - 1 > 0$ i.e., $\lambda > \frac{1}{2}$, we have $\psi(\lambda; q) > 0$ for any $q \in [0, 1]$, since $\psi(\lambda; 0) = \lambda^2 > 0$ and $\frac{\partial \psi}{\partial q} = -(\lambda - 1)^2 < 0$, and thus $\frac{\partial \Lambda}{\partial \lambda} < 0$ for any $q \in [0, 1)$. Therefore, for any $v \neq \underline{v}$, $\frac{\partial \Lambda}{\partial \lambda} < 0$ which implies that an increase in λ shifts $\phi(v)$ schedule downwards, so that v^* is decreased with an increase in λ.

Proof of Lemma 5

A bit of calculus gives $\varphi(v, \lambda, p) = h(\lambda, v, p) - g(\lambda, v, p) = w \frac{F(v)}{1-p} \frac{\lambda(1-\lambda)}{\Delta_1 \Delta_2}$ where $\Delta_1 = \lambda + (1-\lambda)(1 - F(v))$ and $\Delta_2 = 1 + \frac{p}{1-p}(1-\lambda)F(v)$. Then, $\varphi_2 = w \frac{F(v)}{1-p} \frac{\Xi}{\Delta_1^2 \Delta_2^2}$ where $\Xi = \{(1+\lambda)(1-2\lambda) - \lambda(2-3\lambda)F(v)\}\Delta_2 + \lambda(1-\lambda)\Delta_1 \frac{F(v)}{1-p}$. Therefore, $\exists \lambda_\epsilon > 0$ such that, $\forall \lambda \in (0, \lambda_\epsilon), \Xi(\lambda) > 0$, so that $\varphi_2 > 0$.

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p	.1	.2	.3	.4	.5	.6	.7	.8	.9
$\lambda_1(0;\lambda_0)$	.1910	.1807	.1689	.1553	.1394	.1207	.0985	.0718	.0395
$\lambda_1(1;\lambda_0)$	.3479	.3490	.3503	.3518	.3535	.3556	.3581	.3612	.3650
$\lambda_2(0;\lambda_1(0))$	.1823	.1807	.1420	.1195	.0956	.0710	.0467	.0244	.0072
$\lambda_2(1;\lambda_1(0))$	.3346	.3490	.3029	.2823	.2573	.2265	.1881	.1396	.0780
$\lambda_2(0;\lambda_1(1))$	.3348	.3206	.3039	.2839	.2597	.2299	.1924	.1445	.0822
$\lambda_2(1;\lambda_1(1))$	.5373	.5403	.5439	.5482	.5534	.5598	.5677	.5777	.5907
$v_1^*(\lambda_0)$	.3138	.3366	.3627	.3929	.4281	.4697	.5192	.5788	.6511
$v_2^*(\lambda_1(0))$	.3045	.3142	.3218	.3257	.3234	.3110	.2828	.2303	.1414
$v_2^*(\lambda_1(1))$	.4049	.4394	.4801	.5286	.5874	.6598	.7505	.8663	1.0169

Table 4: Equilibrium values for $\lambda_0 = .2$, $w = 2$ and $\overline{v} = 5$

p	.1	.2	.3	.4	.5	.6	.7	.8	.9
$\lambda_1(0;\lambda_0)$	.4851	.4675	.4462	.4202	.3877	.3465	.2929	.2219	.1268
$\lambda_1(1;\lambda_0)$	.6903	.6927	.6956	.6992	.7037	.7096	.7174	.7281	.7430
$\lambda_2(0;\lambda_1(0))$	.4703	.4352	.3936	.3442	.2863	.2202	.1486	.0790	.0236
$\lambda_2(1;\lambda_1(0))$	.6777	.6648	.6488	.6282	.6004	.5611	.5015	.4054	.2463
$\lambda_2(0;\lambda_1(1))$	.6777	.6650	.6493	.6295	.6036	.5684	.5176	.4381	.2971
$\lambda_2(1;\lambda_1(1))$	.8282	.8309	.8343	.8385	.8437	.8505	.8597	.8725	.8916
$v_1^*(\lambda_0)$	1.0256	1.1258	1.2467	1.3949	1.5799	1.8157	2.1227	2.5309	3.0808
$v_2^*(\lambda_1(0))$	1.0370	1.1482	1.2761	1.4196	1.5704	1.7044	1.7641	1.6319	1.1135
$v_2^*(\lambda_1(1))$	.7522	.8298	.9251	1.0451	1.2007	1.4108	1.7102	2.1718	2.9724

Table 5: Equilibrium values for $\lambda_0 = .5$, $w = 5$ and $\overline{v} = 10$