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Consumer Credit, Impulse Buying and Bankruptcy Law

—Time Pressure and Cognitive Dissonance Model—*

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1 Introduction

The standard economic model of consumers' choice for personal bankruptcy has been formalized with a two-period Fisherian consumption model (for example, see Jaffee & Russell (1976), Kowalewski (1982), White (1987/88)). This standard model can be extended into an infinite horizon dynamic model of optimal consumption plan (for example, models known as life cycle or permanent income hypothesis (Blanchard & Fischer (1989) chapters 2 & 5, Brito & Hartley (1995)).

The standard model implies that, when personal bankruptcy with the right of discharge of debts is legal, the optimal decision for a rational, utility-maximizing consumer is to borrow as much as possible and file for bankruptcy so long as the net economic benefit from bankruptcy is positive. White (1987/88) characterizes this type of consumer as a fully opportunistic individual, and the other type of consumer who is self-restrained from bankruptcy as an extremely

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non-opportunistic individual. White also suggests that the latter's non-opportunistic behavior, which she considers as normal, comes from his religious upbringing, social pressure, ethics or even genes. However, she did not incorporate theses factors into her formal model. On the contrary, Jaffee & Russell (1976, p. 652) characterize the non-opportunistic consumers as "pathologically" honest individuals, since the fully opportunistic consumers have been considered as normal agents in economics, in the sense that they are rational, utility-maximizing.

However, almost all consumer surveys so far conducted on their attitudes toward consumer credit or credit cards (availability of instant consumer credit in general) reveal clearly that many consumers have strong ambivalent feelings regarding the use of consumer credit or credit cards (for example, Mandell (1972), Ueda (1990), Japan Credit Industry Association (1993), to name just a few). They recognize and appreciate its convenience as a means of no delayed, immediate or imminent purchases, that is, by using consumer credit or credit cards, they can buy almost anything whose price is within a reasonable range without cash at the very moment when they feel an necessity or impulse to buy it). But, at the same time, they feel worried about their own tendency to use consumer credit or credit cards excessively. Many consumers have a fear of the possibility that the availability of instant consumer credit or credit cards may induce or facilitate so-called impulse buying so that they may have to face debt repayment problems or financial distress including personal bankruptcy in the future. One of the surveys even shows that consumers (both American and Japanese) admit that they themselves are responsible for bankruptcy as well as creditors (see White paper on consumer credit in Japan (1993)).

The standard economic model is clearly inconsistent with these survey results showing consumers' ambivalent feelings regarding con-

sumer credit (that is, appreciation of its convenience on the one hand, and anxiety, worry or fear of people's prevalent tendency to use credit excessively on the other). The standard economic model can not explain these consumers' attitudes. Therefore, any policy suggestions derived from the standard economic model can be misleading and even aggravate problems of personal bankruptcy. Any plausible models of consumers' credit behaviors should be able to explain these prevalent attitudes of consumers toward the availability of instant consumer credit, or at least must be consistent with them.

In this paper, we focus on these ambivalent feelings of consumers which have been neglected by the standard economic model, and assume that one of the basic and crucial causes of consumer's bankruptcy is people's tendency to behave time-inconsistently (that is, impulse buying or immediate and unplanned purchases on credit in this case). We propose a model of impulse buying on credit by using Hoch & Loewenstein's reference-point-shift model (1991). We extend this model to incorporate the consumers' ambivalent feelings toward the availability of instant consumer credit or credit cards by introducing some type of utility cost function associated with impulse buying.[1] Using this model, we proceed to discuss some policy questions, such as whether or not the personal bankruptcy law should be applied more strictly (that is, less leniently), roles of credit information and report

1 This model may be applied to some other problems such as dieting, alcoholism, smoking, prepareing for exams and so on. For example, consider a case where a ph.D. econ. student preparing for the coming core or preliminary exams has made rationally an optimal study plan. However, he might anticipate that he will feel an impulse of extra and unplanned distraction during his carrying through his optimal plan and sometimes gives in to this tempting impulse, even if he understands fully that this extra distraction will violate his optimal study plan and may jeopardize his final objective, passing the exams. Our model can be applied to this ph.D. student's problem.

network systems, credit education and so on, in order to curb an increasing trend of personal bankruptcy observed in the USA.[2]

One of the main implications of our model is that making the bankruptcy law more strict (or less lenient) may aggravate personal bankruptcy problems in the long-run, contrary to its initial aim. This is mainly because of the so-called cognitive dissonance which urges people to self-justify or self-rationalize their contradictory behaviors. This policy implication could be opposed to the one suggested by the standard model, that is, more strict bankruptcy law.

This paper has seven more sections. Section 2 describes the main characteristics of Hoch & Loewenstein's reference-point-shift model. Section 3 introduces general ideas of our model of consumers' impulse buying behavior and their utility function of impulse purchases. Section 4 discusses the main characteristics of their utility cost function in detail. Section 5 sets up the consumer's maximization problem, derives the optimal solutions, and discusses some characteristics of the solutions. Section 6 briefly discusses creditors' behavior focusing on the determination of optimal credit line. Section 7 discusses some plausible and rather long-range policy measures to curb impulse buying and their effectiveness. The final section is a summary and conclusion.

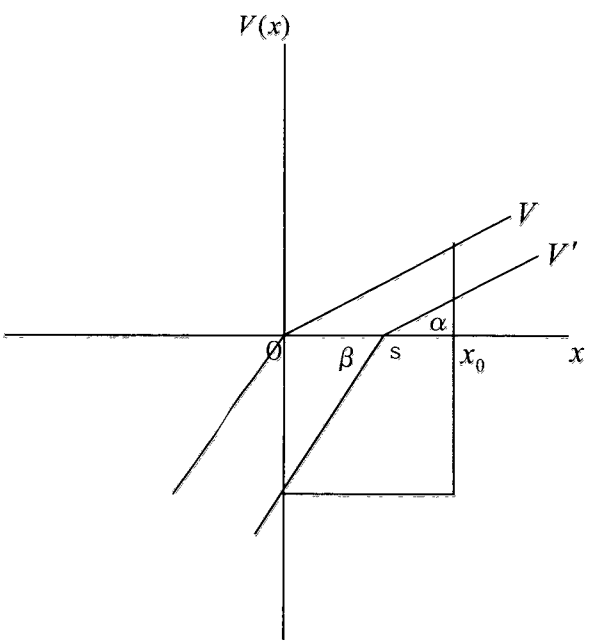
2 The bankruptcy law in the USA. has been developed to provide the "honest but unfotunate debtor" with a fresh start. From the stand point of the fresh-start policy, reducing the number of personal bankruptcies itself may not necessarily stand for an adequate objective. In this paper, however, we will take this objective for granted for the present. See also a footnote (10). Incidentally, in the world of Jaffee & Russell (1976), there happens to be no "honest but unfortunate debtor".

2 Hoch & Loewenstein's Reference-Point-Shift Model (HL model)

In their paper (1991), Hoch and Loewenstein address a topic of how and why consumers experience sudden, often powerful urges to buy something immediately. They call these urges as time-inconsistent preferences and present a reference point (shift) model of desire to explain them. The core notion of HL model is that "time-inconsistent preferences are due to sudden increase in desire brought on by a shift in the consumer's reference point (p. 494)". They also say as follows:

"After a reference point shifts, consumers not only attach positive-

Figure 1



utility to the object itself, but they also attach negative utility to failure to consume the object. Failure to purchase implies more than the foregone pleasure from consumption; the individual actually feels deprived (p.494)."

They illustrate the effect of a reference point shift using a framework introduced in Kahneman and Tversky's prospect theory (1979) and Loewenstein's study of intertemporal choice (1988). They assume a simple linear value function shown in Figure 1. This value function (for example, see the graph V in the diagram) shares two crucial characteristics of the value function in the prospect theory. First is the existence of reference point from which agents evaluate alternatives (that is, the carriers of value are changes (gains or losses) in wealth or welfare from some reference asset position, rather than final states). The original point 0 is the reference point of the function V.

Second is the existence of loss-aversion reflected in its kinked graph. Loss-aversion indicates the basic gain-loss asymmetry that people tend to evaluate the disutility of giving up an object more than the utility of acquiring it.[3] V is the original value function with no reference point shift (or, the reference point being the original point 0). x_0 is the units of some object (goods or services) which can be normalized to 1. V is a linear function and has the following form, assuming that s is a reference point:

$$V(x)=\alpha(x-s) \quad \textit{if } x \geq s$$
$$V(x)=\beta(x-s) \quad \textit{if } x \leq s.$$

3 It is said that loss-aversion could not be seen when people own the objects only for eventual resale. See, for example, Thaler (1992).

The value of x_0 to a consumer with no reference point shift ($s=0$) is $V(x_0)-V(0)=V(x_0)=\alpha x_0$. After a reference point shift to s in the diagram, the value of x_0 to him is $V'(x_0)-V'(0)=\alpha(x_0-s)-\beta(0-s)=\alpha x_0+(\beta-\alpha)s$.

Since $\beta>\alpha$, he now values x_0 more by $(\beta-\alpha)s$ than before a reference point shift and tends to purchase if instant consumer credit or credit cards are available at that very moment. In other words, when the reference point shifts, the consumer feels strongly the possible deprivation and seeks to buy or hold the goods. This creates time-inconsistent behavior that violates the original optimal plan he made before with no reference point shifts. This purchasing behavior is called time-inconsistent behavior or impulse buying.[4]

Plausible causes of reference point shift rely upon a notion of proximity (physical, temporal, or social) as a key factor to induce reference point shift. For example, the visible or sensory presence of a reward will make waiting more difficult. This is the case of physical proximity. Temporal proximity means that the immediate availability of a reward will tend to increase disproportionately the desire for it. Social proximity implies that people tend to compare themselves to their peers and try to consume or possess what their peers do.[5]

In the following discussion, we assume this type of utility function as one explaining consumer's extra or temporal utility from time-inconsistent behavior (impulse buying), that is, $(\beta-\alpha)s$. $(\beta-\alpha)$ is a degree of loss-aversion. We also assume that instant consumer credit, not cash, will be exclusively used in the impulse purchases and that the availability of instant consumer credit or credit cards may facilitate reference point shifts.[6]

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4 Several experimental results show that in general, β roughly equals to 2α. See, Thaler (1992, chapter 6).

5 As for the notion of proximity, see Hoch & Loewenstein (1991), pp.496-498.

3 General Framework of Our Model

3.1 Model Setting (1)

Our model settings are as follows. A typical consumer is assumed to have some original optimal consumption plan over a reasonably finite planning horizon, which is not associated with any reference point shifts. The "original" plan means a plan which was calculated under no reference point shift. This original optimal plan, therefore, may correspond to the usual optimal consumption plan derived from the standard dynamic consumption model when observing or not violating an intertemporal budget constraint. When a consumer makes his original optimal plan under no reference point shift, he can smooth out his consumption stream by utilizing borrowing or lending opportunities. But, he is supposed to make his borrowing plan under the condition of observing his intertemporal budget constraint, so that there will be no serious possibility of facing deep financial troubles in the future as long as his original optimal plan is concerned. This assumption is consistent with an implication of the consumers' survey results that, when making their optimal consumption plan, almost all consumers try to avoid serious financial troubles in the future. This optimal plan may also be interpreted more broadly, such as a long-run optimal or desirable life plan at each stage in a consumer's life cycle. With this original optimal life plan in mind, he lives his everyday life.

As a typical example, we can take a stochastic utility maximization problem formalized in the section 6 of Brito & Hartley (1995). In their problem setting, a consumer experiences a shock of desired consumption at each period defined by an uniform distribution. The optimal

6 This latter assumption is not necessarily crucial in the following discussion, but the fact that consumer credit and credit cards have been considered as a powerful means of sales promotion can be one of the indirect evidence supportive for that assumption.

solution for this dynamic maximization problem gives an optimal use of credit card as a function of credit card interest rate and rate of return from an investment. But, this original optimal plan will not incur a possibility of future financial troubles by credit card use during the planning period (which is actually infinite in Brito & Hartley (1995)), since the no-insolvency condition is imposed from the outset. This is what we mean by saying that the original optimal plan will not incur a serious financial troubles in the future caused by the credit use originally planned during the period.

Our story begins here. Suppose T is a maximum repayment period for typical consumer credit users (for example, credit card users), that is, the amount of available or allowance time before they repay their debts. T also could be thought of as average term (short or long term) allowed to repay consumer credit debts. For example, an introduction of revolving credit accounts could be interpreted as a longer T in our model. Moreover, T could be the same as a planning period for consumer credit users. We assume that this is the case and that each credit user has his optimal consumption (or life) plan which is based on his longer-term original optimal consumption (or life) plan, but tailored to adjust to the particular planning period T.

As HL model implies, we assume that a typical consumer knows that, as periods proceed, he will feel an impulse to buy that will be associated with reference point shift triggered by some unexpected physical, or temporary, or even social proximity. For simplicity, we assume here that he feels an impulse to buy one unit of the same goods (normalized to, say \$1, for example) once per period, and that, once he decides to buy, he carries out these impulse purchases exclusively on credit, that is, using credit cards. Here, credit cards stand for general availability of instant consumer credit.[7] Thus, in our model, even

7 Brito & Hartley (1995) defined two functions of credit cards; one as a transaction

though a consumer knows that his impulse buying may violate his original optimal consumption plan, he may carry out the impulse buying behavior. Any credit use over and above the originally planned use can be considered as an excessive credit use which means unplanned increase in debts and this originally unplanned credit use is captured by impulse buying behaviors on credit which are triggered by essentially unexpected arousal of some proximity during everyday life.

3.2 Utility Function of Impulse Buying

Applying HL model, we can write a consumer's utility function of impulse purchases as follows. Let l denote a degree of loss aversion which corresponds to $\beta-\alpha$ in Section 2, s a degree of reference point shift (normalized to $0\leq s\leq 1$). Then, ls means utility from one impulse purchase, or per period. Let x be the number of consecutive impulse purchases during the planning period T, so that the utility function as a function of the number of impulse purchases will be the following:

$$U(x)=ls(x). \tag{1}$$

To simplify our analysis, we assume now $0<s\leq 1$ and that all of x are carried out using credit cards. Here, x stands for the number of periods as well as the number of consecutive impulse purchases, since we assume one impulse purchase per period.[8]

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device and second as an alternative to bank loan. They make their assumption of no grace period for credit cards which biases their analysis against the use of credit cards as a transaction device. In this paper, we simply assume that the main function of credit cards is a means of impulse or immeidate purchases whether they serve as a transaction device or an alternative to bank loans.

8 Since we can use the usual concave utility function in stead of the linear function, the linear utility function is not a restrictive assumption. The crucial characteristics of this utility function are the existence of reference point to evaluate alternative objects and the possibility of its shift.

3.3 Utility Cost Function of Impulse Buying

The consumers' ambivalent attitudes toward the availability of instant consumer credit indicate some worry or fear of their own tendency to use excess credit which may cause financial troubles in the future. We will incorporate this aspect into our model and postulate that this worry or fear imposes some utility cost on credit users and that this utility cost comes basically from the fact that consumers do violate their own original optimal consumption plan by their impulse buying behaviors, not by any changes in external conditions. We express this utility cost as a function of x, such as $C(x)$ in its simple version. We assume the usual features of cost function, that is, $C'(x)>0$, $C''(x)>0$. Since the utility cost function serves a crucial role in our model, we will discuss in Section 4 the characteristics of this cost function and some of its possible refinements (that is, introduction of individual belief and cognitive dissonance) in more detail.

3.4 Model Setting (2)

So far, we have assumed that a typical consumer standing at the initial period (say, $t=0$) of the planning horizon T, already has the original optimal consumption plan associated with no reference point shift. We have also assumed that he anticipates having an impulse to make an unplanned purchase once per period. If he carries out the impulse by buying on credit (by using credit cards), he will get an extra utility shown by (1). But, at the same time, he incurs extra utility cost (worry or fear of violating by himself his own original optimal plan and facing financial troubles in the future) shown as $C(x)$. Therefore, he will face the following maximization problem:

$$\begin{aligned} &Max \quad U(x)-C(x), \\ &subject\ to\ 0\leq x\leq T, \end{aligned} \tag{2}$$

The solution (x^*) for this problem gives the optimal number of consecutive impulse purchases during the planning period T. Under some reasonable conditions on the utility and cost functions specified later, we can show that this maximization problem will have a meaningful (or, interior) solution. Although x should be discrete, here we treat x as if x is continuous.[9]

An increase in the optimal solution (x^*) will imply an increase in possibility of facing more severe financial troubles (including personal bankruptcy) in the future. Therefore, an increase in (x^*) can be interpreted as a proxy for an increase in the number of persons who suffer serious financial problems, or personal bankruptcies. If this is the case, and reducing personal bankruptcies is one of the important current socio-economic policy objectives, we can discuss the effectiveness of some policy measures in terms of reducing (x^*) within our model. We will discuss some policy issues related to personal bankruptcy later in this paper.[10]

4 Specifications of Utility Cost Function

In our model, like the utility function, the utility cost function is not the standard one, although preserving some of the common characteristics. We assume the existence of some utility cost associated with time-inconsistent behavior (impulse buying behavior in this case), which is implied by consumers' prevailing ambivalent feelings regarding consumer credit. In this section, we will discuss the nature of this

9 We assume that this modification is just for analytical simplification and will create no difficult problems.

10 In this paper, we take this ojective for granted. We exclude personal bankruptcy caused mainly by private business or investment failures from our discussion. Our main concern is the personal bankruptcy caused by excessive credit use on consumption goods and services.

utility cost function.

4.1 Expected Utility Loss of Time Inconsistent Behavior

A basic idea of this utility cost function is as follows. When a typical consumer makes an originally unplanned impulsive purchase, he understands that his original optimal consumption (or in much broader sense, his desirable life) plan will be violated to some extent, depending on the degree of his impulse buying behavior. This violation implies that he loses, as a kind of cost, some portion of the utility he would have received when he carried through his original optimal plan. We will denote the utility of executing and completing his original optimal consumption plan during the planning period T as k.

We also assume that he has his own subjective (average) probability (p) of facing financial troubles in the future caused by one impulse purchase. So, one impulse purchase will incur p probability of facing financial troubles like debt repayment after the end of the planning period. If he does x times of consecutive impulse purchases, then the probability becomes px and the expected loss in the utility of the original plan completion can be shown as kpx. The average probability p (that is, per one impulse purchase) may be a function of a consumer's borrowing rate of interest, his net wealth and disposable income which represent his financial ability to repay his past consumer credit debts. Here, we simply assume that p is a constant during T periods.[11]

4.2 Time Pressure Factor

Moreover, we postulate in this paper that a consumer's worry (or, fear) about suffering financial distress in the future after period T is

11 Estimating the subjective probability p, may suffer human cognitive limitations like incomplete heuristics, excessive self-confidence etc., and be biased toward underestimation. See Jackson (1985), for example.

not just a simple probability of px, but inversely proportional to the amount of available or allowance time before he has to repay his debts (that is, $1+T-x$). Therefore, the term $\frac{1}{(1+T-x)}$ is interpreted as a time pressure (or, a probability discounting) factor for px, taking account of available time or time pressure.

This term implies that, when there is ample allowance time before repayment of consumer debts, a consumer hardly feels anxious or worried about facing financial troubles in the future, but as the allowance time before repayment becomes scarce (that is, as time pressure intensifies), his fear of future financial troubles caused by impulse purchases on credit will drastically and disproportionately intensify. In other words, consumers might perceive the same probability p differently, depending on how much time they have available before the future financial troubles might happen, and tend to underestimate it when there is ample allowance time before debt repayment. This is the reason why a consumer may carry out his impulse buying behavior, even if he knows that the impulse behavior may jeopardize his original optimal plan. We will define this subjective fear of facing financial troubles in the future associated with x and a time pressure factor as $px\left(\frac{1}{(1+T-x)}\right)$.[12]

Based on the above discussions, we now have a simple version of the utility cost function of impulse purchases x in the following form:

$$C(x)=kP(T, x)=kpx\left(\frac{1}{(1+T-x)}\right). \tag{3}$$

12 Our model may be interpreted as an attempt to explain human decison making by applying "Salience effect" in immediate and certain benefits versus remote and uncertain costs. The first application of "Salience" in cognitive psychology to economics is in Akerlof (1991).

Here, k represents the utility of executing and completing the original optimal plan and $P(T, x)$ represents a degree of worry or fear (expressed as a discounted subjective probability) of future financial troubles caused by impulse purchases, so that $C(x)$ (that is, $kpx\left(\frac{1}{(1+T-x)}\right)$ implies a portion of an optimal plan completion utility lost by fear born of the consecutive impulse purchases (x).[13]

4.3 Individual Belief and Cognitive Dissonance

The other important argument in the cost function is an individual's belief about acceptable number of impulse purchases during T, that is, the number of impulse purchases that he believes reasonable or allowable. Let it be y. We assume that so long as his x is greater

13 If we interprete this time pressure factor as a time discounting factor associated with a reward k, then this is the same functional form as one version of the so-called matching law originated by Herrnstein. Frank (1988) writes about the matching law as follows:

"One of the matching law's properties is that the attractiveness of a reward is inversely proportional to its delay. In this context, "delay" means the amount of time that will elapse before the reward is received. The matching law implies that heavy discounting of distant future reward, and accords near primacy to those that occur immediately. (p.78)."

This type of hyperbolic discounting function is proved to induce discount reversal phenomena (which lead to time-inconsistent behaviors) in contrast to the usual exponential discounting function which implies always time-consistent behaviors. See Ainslie & Haslam (1992a,b), Elster (1984). Although this time pressure factor as a probability discounting can be interpreted this way, we will not take this way, but stick to our own interpretation as a time pressure factor in this paper, because we think that this interpretation fits better into our model setting. The importance of time pressure in human decision process was mentioned in Toda (1992).

than his belief (y), he feels extra utility cost from the possibility of much deeper financial troubles such as personal bankruptcy for the discrepancy range of $x-y$. We denote this extra utility cost a. We also assume that the same form as (3) applies to this part of utility cost, that is, $ap(x-y)\left(\frac{1}{(1+Y-(x-y))}\right)$. We will discuss the components of a later.

The individual belief (y) works in two opposite ways; one in reducing utility cost, and the other in increasing it. On the one hand, increasing his belief (y) will lower the utility cost from severe financial problems because the discrepancy between his deed and belief ($x-y$) gets smaller. On the other hand, an increase in y itself still incurs the utility cost of violating the original optimal plan which is an increasing function of y (see (3)). Considering all the elements mentioned above, we now rewrite $C(x)$ as a function of x and y using the same form as (3),

$$C(x, y)=ap(x-y)\left(\frac{1}{(1+T-(x-y))}\right)+kpy\left(\frac{1}{(1+T-y)}\right), \qquad (4)$$

so long as x is greater than or equal to y. When $x=y$, the utility cost function turns back to (3).

The last discussion in this subsection is about the contents of utility cost a. Here we postulate that the utility cost a has three components which add up to a, such as $a=b+c+k$. We have already discussed the meaning of k. The impulse purchases (x) greater than a consumer's own belief about acceptable number of impulse purchases (y) impose a fear of deeper financial troubles in the future like personal bankruptcy. We denote this much deeper or severe financial troubles as personal bankruptcy hereafter.

The element of b reflects utility cost associated exclusively with economic cost and (possible) benefit of personal bankruptcy. As the

standard economic model of personal bankruptcy referred to in the Introduction or some other papers (for example, Shepard (1984)) implies, this cost might be negative so that personal bankruptcy might result in net economic benefits bringing a positive utility.

The next element (c) mainly represents a psychological or moral aspect of utility cost of personal bankruptcy. Namely, c reflects utility cost such as social or moral pressure caused by social stigma associated with the personal bankruptcy, or regret, shame or guilt in terms of personal as well as social morality, resulting from bankruptcy for which a consumer's own excessive impulse buying behavior is responsible. Therefore, this part of the utility cost is deeply related to personal and social morality (or, norms). Based on some robust results from the discipline of social psychology, we postulate that c captures the utility cost from a discrepancy between his deed (x) and individual belief (y), called cognitive dissonance and that the cognitive dissonance incurs an urge of self-justification or self-rationalization to reconcile this discrepancy in the way to change his belief.[14]

An increase in c incurs higher level of cognitive dissonance given a discrepancy between his deed and belief and gives the consumer a stronger urge to reduce the dissonance by trying to self-justify his own deed, that is, by inducing him to increase his own individual belief (y). One way to incorporate this cost aspect of cognitive dissonance into our model is to assume that the utility of executing and completing an original optimal plan (k) is negatively related to c, in thesense that an increase (decrease) in c induces a consumer to value k less (more) than otherwise. In our model, this relation can be captured by assuming a

14 Cognitive dissonance was first introduced into economics by Akerlof & Dickens (1982). Recently, Dickens (1986) discussed its role in crime prevention. Rabin (1994) analyzed some influences of social beliefs on individual (immoral) behaviors.

new $k(k')$ as $k'=\frac{k}{c}$. Now, k' means the original optimal plan completion utility, given c.[15]

Finally, we can write our utility cost function as follows:

$$C(x, y)=ap(x-y)\left(\frac{1}{(1+T-(x-y))}\right)+k'py\left(\frac{1}{(1+T-y)}\right). \quad (5)$$

5 Maximization Problem and Some Comparative Statics

5.1 Maximization Problem and Optimal Solutions

Now, based on our previous discussions about the utility and cost functions of impulse purchases (time-inconsistent behaviors), we can set up the following maximization problem that a consumer will face:

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15 This specification may be too specific. There can be many ways through which cognitive dissonance would exert its effects. Here is an example of how cognitive dissonance works. (extracts from Wade & Travis (1993), p.349.)

"For example, cigarette smoking is dissonant with the awareness that "smoking causes illness." The smoker might change the behavior and try to quit. Or she might reject the cognition "smoking is bad." She could persuade herself that she will quit later on ("after these exams"). She could emphasize the benefits of smoking ("A cigarette helps me relax.") Or she could decide she doesn't want a long life, anyhow. (It will be shorter, but sweeter.") In all of these cases, the smoker is motivated to reduce dissonance because the behavior, smoking, is out of kilter with the smoker's knowledge of the dangers of that behavior."

Therefore, the current formalization of cognitive dissonance in our model is one of the many possible ways through which self-justification would work. For example, there might be another way where c can be asociated with the denominator of probability discounting factor of the individual belief term in the utility cost function, implying alleviation of worry or fear caused by time pressure.

$$Max \quad lsx-ap(x-y)\left(\frac{1}{(1+T-(x-y))}\right)-k'py\left(\frac{1}{(1+T-y)}\right) \qquad (6)$$

$$s.\ t.\ \ 0 \leq y \leq x \leq T.$$

Here, we assume the situation against impulse buying, that is, $ls < pk'$, where the utility per impulse buying (ls) is less than the expected utility loss (pk'). Our model shows that even under this unfavorable case for impulse buying, the time pressure factor introduced in our model implies that people may still carry out impulse buying.

We can solve this problem and the optimal x^* and y^* as shown below:

$$y^*=1+T-\left(\frac{k'p(1+T)}{ls}\right)^{1/2}, \qquad (7a)$$

$$x^*=1+T+y^*-\left(\frac{ap(1+T)}{ls}\right)^{1/2}. \qquad (7b)$$

The second order condition can be proved to be satisfied. For meaningful solutions (that is, $T>x^*>y^*>0$), the following conditions have to be satisfied:

$$ap<ls(1+T), \qquad (8a)$$

$$ls<p(ak')^{1/2}. \qquad (8b)$$

From the assumptions $ls<pk'$ and $k'<a$, (8b) is satisfied. And in the following discussions, we will consider the case where T is greater than $\frac{(ap-ls)}{ls}$, which is positive, so that (8a) is satisfied.

5.2 Comparative Statics

Using the optimal interior solutions of x^* and y^* (7a, b), we can derive some results of comparative statics as follows.

1. Effects of l or s

$$\frac{\partial y^*}{\partial s}=\frac{1}{2}\left(\frac{k'p(1+T)}{ls^3}\right)^{1/2}>0,$$

$$\frac{\partial x^*}{\partial s}=\frac{\partial y^*}{\partial s}+\frac{1}{2}\left(\frac{ap(1+T)}{ls^3}\right)^{1/2}>0.$$

That is, an increase in utility of impulse buying by either l or s will increase x^* and y^*.

2. Effects of p

$$\frac{\partial y^*}{\partial p}=-\frac{1}{2}\left(\frac{k'(1+T)}{lsp}\right)^{1/2}<0,$$

$$\frac{\partial x^*}{\partial p}=\frac{\partial y^*}{\partial p}-\frac{1}{2}\left(\frac{ap(1+T)}{lsp}\right)^{1/2}<0.$$

Smaller (average) probability of future financial troubles caused by one impulse purchase will lower worry or fear of financial troubles in the future, and tends to increase y^* and x^*.

3. Effects of T

$$\frac{\partial y^*}{\partial T}=1-\frac{1}{2}\left(\frac{k'p}{ls(1+T)}\right)^{1/2}>0,$$

$$\frac{\partial x^*}{\partial T}=\frac{\partial y^*}{\partial T}+1-\frac{1}{2}\left(\frac{ap}{ls(1+T)}\right)^{1/2}>0.$$

As long as (8a) holds, an increase in T means longer allowance periods for debt payments so that it will increase both y^* and x^*. Prevalence of longer-term consumer credit can be thought of as an increase in T and will have the same effect on y^* and x^*.

4. Effects of b

$$\frac{\partial y^*}{\partial b} = 0,$$

$$\frac{\partial x^*}{\partial b} = -\frac{1}{2}\left(\frac{p(1+T)}{lsa}\right)^{1/2} < 0.$$

An increase in economic cost associated with personal bankruptcy (or severe financial troubles) will lower x^* but have no effect on y^*.

5. Effects of c

$$\frac{\partial y^*}{\partial c} = \frac{1}{2}\left(\frac{kp(1+T)}{lsc^3}\right)^{1/2} > 0,$$

$$\frac{\partial x^*}{\partial c} = \frac{\partial y^*}{\partial c} - \left(\frac{1}{2c}\right)(c-k')\left(\frac{p(1+T)}{lsa}\right)^{1/2} < 0, \quad \textit{if } (ak')^{1/2} < c-k'.$$

$$\frac{\partial x^*}{\partial c} = \frac{\partial y^*}{\partial c} - \left(\frac{1}{2c}\right)(c-k')\left(\frac{p(1+T)}{lsa}\right)^{1/2} > 0, \quad \textit{otherwise.}$$

The effect of c on x^* will depend on the relative size of k' with respect to a and c. The relation, $\frac{\partial x^*}{\partial c} > 0$, is more plausible since k is usually considered to be substantially larger than c. When c is extremely large in comparison with k, $\frac{\partial x^*}{\partial c} < 0$ could be possible. This is the case where social stigma, shame or guilt of going bankrupt are so severe that people are extremely sensitive to their own misconduct (impulse purchases in this case), rather than trying to carry through their original optimal plan (or objective).

6. Effects of k

$$\frac{\partial y^*}{\partial k} = -\frac{1}{2}\left(\frac{p(1+T)}{lsck}\right)^{1/2} < 0,$$

$$\frac{\partial x^*}{\partial k} = \frac{\partial y^*}{\partial k} - \left(\frac{1}{2c}\right)\left(\frac{p(1+T)}{lsa}\right)^{1/2} < 0.$$

A higher valuation of executing and completing an original optimal plan (that is, higher k) will clearly lower both y^* and x^*. We can use these results in the following policy discussions in Section 7.

6 Credit Line and Multiple Cardholders

6.1 Determination of Credit Line (z)

In this subsection, we turn our attention from the demand side to the supply side and discuss briefly the profit-maximizing behavior of a credit company under the simple assumption of perfect competition.[16]

Under the usual assumption of expected profit maximization , we simply assume here that a typical credit company will examine qualifications of each applicant, estimate his riskiness and determine a maximum credit extended for the applicant which implies his maximum number of impulse purchases (z) during T in our model where we assume that the amount at each impulse purchase per period by using credit cards is the same.

Consider a typical credit company which tries to determine (expected) profit maximizing credit limit to each applicant. The creditor is

16 There has been a discussion on whether the consumer credit market is really competitive or not. Ausubel (1991) contended that the consumer credit is not perfectly competitive, based on the observation of high and inflexible credit rates. Recently, Brito & Hartley (1995) criticized Ausubel's argument by showing that the observation of high and inflexible credit rates can be compatible with the competitive market. See also, Calem (1992).

supposed to obtain his funds in a perfect capital market, at a constant interest rate i, with $I=1+i$, with no other extra costs.[17] Denote the credit line z, and a credit interest rate r, with $R=1+r$, and $r>1$. The creditor will examine riskiness of each applicant and estimate a default probability (Q) as an increasing function of zR (the amount with interest added). Here, we assume that this default function has a very simple linear form of zR , that is, $Q=qzR$ for a reasonable range of zR, with $q>0$ being constant . Let f be a rate of collection when the loan is in default, (i.e., % of the amount lent that is collected). Then, the expected profit for the creditor is:

$$\pi=zR(1-qzR)+(zfqzR)-zI. \tag{10}$$

Under the perfect competition, $\pi=0$, so that the optimal credit line z, is:

$$z=\frac{(R-I)}{qR(R-f)}. \tag{11}$$

Assuming that R is exogenous to an individual creditor, this determines z of individual creditors as a function of q, I, f and R. That is, z is increasing as R and f increase, and as I and q decrease.

More strict application of bankruptcy law may be captured as an increase in f (for example, wage garnishments and an increase in bankruptcy filings under the chapter 13) and possibly a decrease in q. This implies that more (less) strict application of the bankruptcy law

17 We note that this assumption of no extra costs other than fund cost was made just for analytical simplicity. It is obvious that there should be other transaction costs, especially information processing and telecommunication costs. In fact, many economists indicate that a primary cause for an upswing in the the number of personal bankruptcy filings during the 1980's in the USA is a substantial reduction in information costs due to the recent technological innovation in telecommunication and information processing, in addition to financial deregulations in those years. See, Carroll (1992), Johnson & Staten (1994).

will raise (lower) the credit line z by inducing creditors to be more (less) lenient in granting credit. This is one of the justifications for the right of discharge of debts in personal bankruptcy law proposed by Jackson (1985). He claimed that the right of discharge with personal bankruptcy will impose much of the cost burden of bankruptcy on creditors and give an strong incentive for them to examine qualifications of credit applicants and monitor credit users more rigorously than otherwise. We will discuss this aspect in Section 7.

6.2 Holding Several Credit Cards

Nowadays, we can easily observe that credit companies aggressively compete for acquiring new credit card users and are willing to extend credit even to applicants who already have several other credit cards. So, even if the applicant's x^* is greater than a credit line (z) by one credit company, it is not so difficult for him to acquire some other credit cards (let's say n different cards) so as to achieve x^* (so, $x^*=nz$). In this case, his riskiness implied by his total x^* will be much higher than his riskiness estimated by individual creditors so that creditors would have denied any credit extension to him if they had known in advance likelihood of his total credit use (x^*) from his credit history through some kind of an industry-wide credit information and reporting network system.[18] We call this pseudo-binding case ($x^*=nz$) as case 1. There is a real binding case where a consumer can not obtain credit cards enough to achieve his x^* (that is, $x^*>nz$), which will be case 2. The other case is where his x^* is below his credit line posed by one creditor. This is an unbinding case; we call this case 3.

In the following section, we focus on an important problem of how to cope with a secular trend of increasing personal bankruptcies in the

18 This is applicable especially to the case of Japan where the industry-wide credit information and report network system has not fully developed yet.

USA and discuss a policy issue of whether personal bankruptcy law should be applied more strictly or not, in addition to some other more long-term and basic policy measures like credit education and industry-wide credit information and credit reporting network system.

7 Policy Measures and Their Effectiveness in Our Model

7.1 Effects of Bankruptcy Law

We can use some results of comparative statics in Section 5 to discuss possible effects of more (or less) strict application of personal bankruptcy law. Staten (1993, p.4) points out that there are at least four different types of costs associated with personal bankruptcy: a) loss of non-exempt assets (especially for Chapter 7 bankruptcy), b) legal fees and court costs, c) restricted access to credit markets following bankruptcy (e.g., lower probability of approval, higher finance charges/fees, greater collateral requirements), and d) social and personal trauma / stigma associated with personal failure. The first three types of costs capture the economic costs of personal bankruptcy, represented by b in our model. The fourth cost is represented by c correspondingly. Therefore, more (less) strict application of the bankruptcy law implies that these punishments or penalties on consumers' financial failure will be much heavier (lighter). First, we will discuss case (1), where z is pseudo-binding ($x^*=nz$).

(a) More strict application of the bankruptcy law

First, we will analyze its possible effects on the demand side. More strict application raises b which will reduce directly x^*. But in the long-run, this will also tend to raise c by increasing social or moral stigma of being labeled as financial failure. This in turn intensifies cognitive dissonance and leads to higher individual belief (y^*) which may offset the direct effects of b and c, and eventually raise x^*. This is

the case where $\frac{\partial x^*}{\partial c} > 0$ holds. (see, Section 5.2).

Next, we will turn to the supply side. More strict policy will increase collection rate of defaulted debts (f) and may lower creditors' perceived probability of default by decreasing q, so that they are likely to be more lenient in screening and monitoring applicants and to raise z. This in turn implies that credit users can achieve their now increased x^* through an increase in each z or obtaining more credit cards. In this case, credit companies will accommodate an increase in x^*.

(b) Less strict application of the bankruptcy law

This case will be just the opposite to the more strict case discussed above in (a). As for its effects on the demand side, it lowers b. As a result, x^* will increase in the short-run. But in the long-run, this will also lower c. Although the lower c itself increases x^*, it increases k' through the alleviation of cognitive dissonance and lowers x^* through lowering y^*. In the long-run, the total effect is likely to lower x^*.

As for its effects on the supply side, it will lower collection rate of defaulted debts (f) and may raise creditors' perceived probability of default by increasing q. Therefore, this will lower z and give them stronger incentives to screen and monitor credit users. As we mentioned earlier, this line of argument can be a theoretical explanation of the justification that Jackson (1985) made for defending personal bankruptcy with the right of discharge.

Since credit companies become reluctant to issue credit cards, and more strict in screening qualifications of applicants, we can safely assume that applicants can not get more credit cards as easily as before and that n is rather fixed. This scenario implies that xx^{**} has to decrease, since $x^*=nz$. Therefore, our model predicts as for the case

(1) that more (less) strict application of personal bankruptcy law will eventually increase (decrease) both x^* and y^*.

The real binding case (2) where $x^{*>nz}$, can be analyzed similarly to the pseudo-binding case (1). Since the actual number of impulse purchases is bounded and equal to nz, we can predict as before that x^* and y^* will eventually increase (decrease) according to more (less) strict application of personal bankruptcy law. Finally, we will briefly discuss the non-binding case (3) where $z>x^*$ holds. It is fairly obvious that the analysis of its effects on both demand and supply sides in this case is essentially the same as before so that the same predictions will hold in this case too.

To summarize, our model implies that more (less) strict application of the bankruptcy law may raise (lower) x^* as well as y^* in the long-run through affecting both of demand and supply sides in the same direction. Even if the effects on the supply side are weak, the main conclusion will remain intact. The standard model is concerned mainly or even exclusively with economic net benefits from personal bankruptcy, the direct effects of b in our model. Our model shows that this is not enough and may lead to wrong predictions.

7.2 Some Other Measures

There are some other important measures to reduce personal bankruptcies in the long-run by influencing consumers' utility and cost functions. Although there are many papers that discuss self-control aspect of curbing time-inconsistent behavior (Ainslie & Haslam (1992b), Elster (1984), Hoch & Loewenstein (1991), Shelling (1984, 1992), Strotz (1956), Thaler & Shefrin (1981)), we will not refer to general discussions of self-control problems in this paper.[19] Here we will confine our discussions of curbing time-inconsistent behaviors (impulse pur

chases in this paper) within our model and consider providing credit education to consumers, and industry-wide credit information and reporting network system. Here are some main points worth noting:

(1) Credit education[20]

Our model implies that lower l or s, higher k and smaller T will decrease x. Credit education can be effective in these aspects. It can provide consumers with useful knowledge, such as good and bad points of consumer credit or credit cards, awareness of people's own tendency to buy impulsively, importance of making and executing sound consumption (or even life) plans at each life stage and so on. This might be very helpful for consumers to self-manage their credit use. Our model also points out that as far as utility coefficients of cost function are concerned, raising k is the most effective in controlling impulse buying behavior. Therefore, a credit education emphasizing the importance of making and executing plans will be the most effective in preventing the excessive use of consumer credit. Also, having shorter planning period T, that is, to tailor the original optimal plan to shorter sub-planning period T is also effective.

(2) Development of industry-wide credit information and reporting network system

This will make it possible to check each consumer's overall credit use so that more correct and strict screening and monitoring can be possible and that the credit line assessment and management by credit

19 This does not mean that the self-control or self-management aspect is not important, but just the opposite. It is so important that there should be required another independent research for the topic.

20 Credit education will include activities of credit counselling institutions whose purposes are mainly to prevent credit abuse or careless credit use planning, etc.

companies can be more effective. This will reduce x^* if x^* in general is bounded. This information and reporting network system is also useful in providing more accurate and adequate information to credit users so that they can be more aware of their credit history and reputation and be more careful and accurate about their credit use planning, such as estimating their own probability p more correctly.[21]

8 Summary and Conclusions

One of the main objectives in this paper was to set up a non-standard model which could explain people's ambivalent attitudes toward the availability of instant consumer credit which many consumer surveys reveal and yet the standard economic model could not explain satisfactorily. As far as we know, this paper is the first attempt to explain consumers' prevailing ambivalent feelings toward the availability of consumer credit or credit cards and to deal with personal bankruptcy problem in an approach other than the standard model.

We have assumed that impulse buying behavior is one of the fundamental causes of excessive credit use which may lead to personal bankruptcy and proposed the reference-point-shift model to explain the utility of impulse buying. We have also proposed the utility cost function reflecting consumers' worry or fear of excessive credit use, which incorporates two factors of time pressure and cognitive dissonance.

The other main objective was to apply this model to policy discussions of how to cope with the secular increase in personal bankruptcy in the USA, and possibly to draw some useful preventive measures for this future problem in Japan. One main implication of the

21 The need of developing this kind of industry-wide credit information network system is especially urgent in Japan.

model is that less strict application of bankruptcy law may be more effective in preventing financial troubles (including personal bankruptcy) than the more strict application. The more strict application may give rise to a backfire in the long-run. Strengthening the social pressures by social stigma of being bankrupts, or tightening moral disciplines too severely may make people more unreasonably keen or sensitive to shame or guilt to their own misbehaviors and cause a backfire in the future through cognitive dissonance.

As for some other long-term prevention policies, our model implies that credit education focusing on raising the utility of executing and completing the original optimal consumption (or, in a much broader sense, desirable life) plans could be the most effective prevention policy. Emphasizing a positive reward (k) rather than (economic, social or moral) punishments (b or c) is more effective in preventing excessive impulse purchases. And, at least in the case of Japan, development of an industry-wide credit information and reporting network system will be necessary and effective as a prevention device. It will be beneficial to both sides of creditors and credit users in reducing personal bankruptcies.

Finally, during our policy discussions, we have been taking it for granted that a primary concern about personal bankruptcy problems is to reduce personal bankruptcies. We will note that although this supposition may be reasonable and acceptable for the present, it will require some further examination to establish that this objective is really adequate.

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