# Penalty Interest Rates, Universal Default, and the Common Pool Problem of Credit Card Debt

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***Preliminary and Incomplete***

## 1 Introduction

It is now reasonably well understood that unsecured credit such as credit card debt poses a common-pool problem. Since it is not secured by any collateral and since recoveries will be allocated pro rata under bankruptcy, each credit card issuer is motivated to try to collect from the "common pool" — and the attempt to collect by one issuer may pose a negative externality to other issuers. When a consumer becomes financially distressed, each credit card lender has an incentive to try to become the first to collect. For example, a lender may engage in aggressive collection efforts even if they may result in the consumer seeking protection under bankruptcy law: the benefits of collection accrue to this lender alone, while the consequences of a bankruptcy filing are distributed over all credit card lenders and other creditors.

This paper attempts to explore the recent proliferation of penalty interest rates and universal default clauses in credit card contracts. By a *penalty interest rate*, we mean the following: The fairly standard credit card offering in 2008 includes an introductory interest rate on new purchases of 0% for the first several billing periods, followed by a post-introductory interest rate on new purchases of 9.99% to 15.99%. However, if payment is received late once during the introductory period, the interest rate reverts to the post-introductory APR; and if payment is received late twice within any 12 billing periods, the interest rate reverts to a "default APR" of typically 23.9% to 29.99%. In addition to the increase in interest rate, the cardholder generally is also assessed a late payment fee of typically $39.

By a *universal default* clause, we mean the following: Many credit card contracts provide that the penalty interest rate is triggered by late payments to this credit card issuer, but it may also be triggered by late payments to other creditors. Depending on the issuer's particular practices, universal default may also be triggered by deterioration in the consumer's FICO score,

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exceeding a credit limit, utilizing a credit line beyond a particular percentage, or more generally, "based on information in your credit report." [1]

An issuer can accomplish the same effect (and more) with an *"any time, any reason" repricing* clause. An example of the relevant language is: "Account and Agreement terms are not guaranteed for any period of time; all terms, including the APRs and fees, may change in accordance with the Agreement and applicable law. We may change them based on information in your credit report, market conditions, business strategies, or for any reason." [2] Bills recently introduced in the U.S. Congress propose to regulate penalty interest rates, universal default clauses, and "any time, any reason" repricing.[3]

A useful explanation and interpretation of penalty interest rates and universal default clauses in credit card contracts is that each issuer is seeking to maximize its own individual claim on the common pool of unsecured debt of a financially-troubled consumer. To the extent that the consumer repays any debt, a high penalty rate (such as 29.99%) provides incentives for the credit-card issuer to be repaid before other lenders. And to the extent that the consumer fails to repay the debt, the high penalty rate increases the issuer's nominal loan balance and therefore the issuer's pro-rata share of recoveries following bankruptcy. Since every credit-card issuer has this unilateral incentive to charge a high penalty rate and to impose a severe universal default clause, the likely outcome in the absence of threatened or actual regulation is inefficiently-high penalty rates together with inefficiently-broad and unforgiving universal default clauses. As such, the common-pool problem of unsecured debt may be viewed as a market failure, yielding possible scope for government intervention in useful ways.

## 2 Related Literature

The premise of an externality imposed by competing creditors is related to the idea of sequential banking studied by Bizer and DeMarzo (1992). The difference here is that the externality in our model results from competition to collect from a defaulting borrower, rather than as a consequence of an increase in risk as the borrower acquires additional loans. The idea that creditors have an incentive to grab payment from borrowers, even when doing so hurts the borrower's ability to repay her total debt, is one of the fundamental principles underlying much of the US bankruptcy system.[4] Thomas H. Jackson, along with Douglas Baird and Robert Scott, has formalized this idea in a series of articles using economic models to examine the effects of these externalities.[5] Under the Jackson regime, bankruptcy can actually increase the welfare of creditors

[1]The particular language of "based on information in your credit report" is taken from the disclosure associated with a Bank of America online credit card offering. The associated URL, accessible on March 12, 2008, is: https://wwwa.applyonlinenow.com/USCCapp/Ctl/display?pageid=disclosure&cp=.

[2]This language is taken from the same Bank of America disclosure as referenced in the previous footnote.

[3]*See* H.R. 5244 ("Credit Cardholders' Bill of Rights Act of 2008"") and S. 1395 ("Stop Unfair Practices in Credit Cards Act of 2007").

[4]*See*, for example, Tene (2003).

[5]*See*, for example, Jackson (1985 and 1986), Baird and Jackson (1990) and Jackson and Scott (1989).

by forestalling destructive creditor collection and mitigating the negative externality, and these savings are passed along to the borrower in the form of lower interest rates.

Several authors have argued that Jackson's approach is overly theoretical and unsubstantiated by empirical evidence.[6] In response to this criticism, Dawsey (2007) provides an empirical test. It shows that, holding debt level constant, increasing a borrower's number of creditors increases the probability a borrower files for bankruptcy and decreases the probability she chooses informal bankruptcy, defined as long-term default without a formal bankruptcy filing. These results lend support to Jackson's hypothesis that when a creditor attempts to collect from a distressed borrower, his efforts reduce the likelihood a borrower will repay her other loans and increase her probability of filing for bankruptcy.

A few papers have examined policy tools other than bankruptcy that may reduce the negative externality of competitive collections. Williams (1998) finds some evidence that credit counseling services, by facilitating coordination among lenders, decreases competitive collections efforts. Brunner and Krahnen (2004) observe that bank pools, a legal mechanism for allowing coordination among creditors in Germany, also decrease destructive competition among creditors. Franks and Sussmen (2005) find that the British contractualist system mitigates the incentive of multiple lenders to prematurely liquidate a distressed firm.

Like Bizer and DeMarzo, the small group of papers examining the effects of "cross default" clauses have focused on the borrower's increased riskiness due to multiple loans. Like universal default clauses, cross default clauses specify that default on one loan results in default on all loans covered by the clause. Using comparative statistics, Childs et al (1996) find that cross default clauses in commercial mortgage contracts substantially reduce default risk. In the Childs model, cross default gives creditors access to additional collateral which yields diversification benefits, decreasing default frequency and severity. The Childs model differs from the one presented here in two important respects. First, the cross default clause gives the creditor access to additional collateral, which would not be a factor for the unsecured creditor in our model. Second, the Childs approach is to consider only cases involving a single creditor and borrower; the contention of this paper is that when the model is broadened to allow the borrower to interact with more than one creditor, any benefits of cross-default are mitigated by the negative externality it imposes.

Two purely theoretical papers find results that are similar to Childs'. Mohr and Thomas (1997) present a model in which a sovereign nation enters into both a loan contract and an environmental agreement, and a cross-default clause reduces the risk of default on either obligation. Mohr (1995) finds a similar result when a country is both in debt and involved in international environmental permit markets. These results are driven by the borrower's desire to avoid the double punishment that would result from defaulting on two contracts rather than only one. Again, these papers focus on borrower riskiness rather than externalities involved in collection.

[6] *See* Block-Lieb (1993) and Rothschild (2007).

# 3 The Model

A consumer wishes to consume over three periods. He earns income only in the second and third periods, and so has a consumption-smoothing motive to borrow on credit cards. More specifically, the consumer's utility is given by $U = \sum_{t=1}^{3} \delta^{t-1} u(c_t)$, where $u(c_t) = c_t^{\gamma}$ $(\gamma < 1)$, $\delta = \frac{1}{1+r_m}$ denotes the discount factor between periods, $c_t$ denotes the consumer's consumption in period *t* (*t* = 1, 2, 3), and $r_m$ denotes the market interest rate. The consumer's income in period 1, denoted $I_1$, equals zero. The consumer's income in periods 2 and 3, denoted $I_2$ and $I_3$ respectively, are drawn independently from uniform distributions on the interval $[0, \overline{I}]$. The consumer does not learn $I_2$ until period 2 and does not learn $I_3$ until period 3.

The consumer borrows on his credit card(s) in period 1 so as to maximize his expected utility. If the consumer chooses to consume $c_1$ in period 1, then he runs up a credit card balance of $c_1$, which with application of an interest rate *r* becomes a balance of $(1+r)c_1$ in period 2. To simplify the solution of the model, the consumer is permitted to borrow on his credit card(s) only in period 1. In addition, if the consumer borrows from two cards in period 1, then it is assumed that he borrows equal amounts on each of the two cards, i.e. amounts of $\frac{1}{2}c_1$ each. In period 2, the consumer's actions are limited to repaying his credit card balances (in whole, in part, or not at all). Let $\rho$ denote the fraction of his balances that he repays in period 2. If the consumer repays fraction $\rho$ in period 2, that requires him to pay $\rho(1+r)c_1$, leaving him $c_2 = I_2 - \rho(1+r)c_1$ in consumption for period 2.

The interest rate applied to the consumer's credit card balances from period 2 to period 3 may be a regular interest rate *r* or a penalty interest rate $r^p$. With one credit card lender, the regular interest rate is applicable if the consumer meets a required minimum payment $\alpha$, i.e. if $\rho \geq \alpha$. However, if the consumer does not meet the required minimum payment, i.e. if $\rho < \alpha$, then the penalty rate is applicable. With two credit card lenders, the rate depends on which (if any) lenders have received the required minimum payment, and on whether a universal default clause applies to the given credit card. These conditions are elaborated below.

In period 3, the terminal period, the consumer has no decision problem to solve. Instead, the consumer simply consumes out of his income (if any) net of debt repayment. Thus, if the consumer was subject to the regular interest rate from period 2 to period 3, then his consumption in period 3 is $c_3 = \max\{0, I_3 - (1+r)(1-\rho)(1+r)c_1\}$. However, if the consumer was subject to the penalty interest rate from period 2 to period 3, then his consumption in period 3 is $c_3 = \max\{0, I_3 - (1+r^p)(1-\rho)(1+r)c_1\}$. Note that the "$\max\{0, \bullet\}$" terms in the previous expressions reflects that the credit card lender(s) cannot collect more than $I_3$ from the consumer; the money simply is not there to collect. Period 3 marks the end of the model. With two credit card lenders, their respective interest rates (including penalty rates, when triggered) are applied to their respective balances; and if the period 3 income is less than the balances owed, the income is applied pro rata between the two lenders.

There are $n$ credit card issuers ($n \geq 3$) competing to lend to a consumer. A consumer is permitted to accept at most two credit cards at the stated terms. A credit card offer by issuer $i$ consists of a pair of interest rates, $\left(r_i, r_i^{\,p}\right)$, where $r_i$ is the regular interest rate and $r_i^{\,p}$ is the penalty interest rate. Each of these values is chosen from the closed interval $[0, \overline{r}]$, where $\overline{r}$ is the maximum interest rate that an issuer might select (e.g. a 29.99% APR). The other relevant terms of a credit card are its credit limit, $\overline{L}$, and its required minimum payment, $\alpha$, in period 2. For simplicity, $n$, $\overline{L}$ and $\alpha$ are constants that are exogenous to the model — and $\overline{L}$ is specified so that the consumer wishes to borrow from two credit cards in period 1.

### 3.1 Own default

By *own default*, we refer to the contract term that a consumer is subject to a penalty interest rate on a credit card if he has not made the minimum repayment on that credit card. (By contrast, under universal default, the consumer is subject to the penalty rate if he has not made the minimum repayment on that credit card or on any other credit card. This case is treated in the next subsection.)

Under a rule of own default, there are three relevant possibilities:

(1) The consumer makes at least the minimum payment on both cards. In that event, he is subject to the regular interest rate on both cards.

(2) The consumer makes the minimum payment on card $i$ but not on card $j$. In that event, he is subject to interest rate $r_i$ on card $i$, but subject to interest rate $r_j^{\,p}$ on card $j$.

(3) The consumer does not make the minimum payment on either card. In that event, he is subject to interest rate $r_i^{\,p}$ on card $i$ and to interest rate $r_j^{\,p}$ on card $j$.

In our preliminary results, it appears that an optimizing consumer will generally repay at least the minimum payment on a given card or else will repay zero (but will not repay an amount in between). Moreover, in the case where the consumer makes the minimum payment on only one card and the penalty rates on the two cards are different, the optimizing consumer will make the minimum payment on the card with the *higher* interest rate (i.e., it is advantageous for the consumer to repay high-interest debt before low-interest debt).

### 3.2 Universal default

Under universal default, the consumer is subject to the penalty rate if he has not made the minimum repayment on that credit card or on another credit card. Under a rule of universal default, there are three relevant possibilities:

(1) The consumer makes at least the minimum payment on both cards. In that event, he is subject to the regular interest rate on both cards.

(2) The consumer makes the minimum payment on card $i$ but not on card $j$. In that event, he is subject to interest rate $r_i^{\,p}$ on card $i$ and to interest rate $r_j^{\,p}$ on card $j$.

(3) The consumer does not make the minimum payment on either card. In that event, he is again subject to interest rate $r_i^{\,p}$ on card *i* and to interest rate $r_j^{\,p}$ on card *j*.

Repaying one card but not the other does not avert any penalty interest rates at all. In our preliminary results, and for parameter values in the relevant range, it appears that an optimizing consumer will generally repay at least the minimum payment on both cards or else will repay zero on both cards (but will not repay one card, under universal default, or repay an amount in between).

# 4 Tentative General Results

RESULT 1. *It is never an equilibrium for the penalty rate to equal the regular rate.*

REASONING. Suppose not. Since missing a minimum payment signifies that the consumer received a low realization of income, the firm's expected profits conditional on a consumer missing a minimum payment to either firm is negative. If the firm unilaterally raises its penalty interest rate by $\varepsilon$, then to the extent that it induces early repayment, it is therefore profitable. And, to the extent that raising the penalty interest rate by $\varepsilon$ does not induce early repayment, it simply yields higher revenues. ■

RESULT 2. *Symmetric equilibria under "own default" satisfy one of the following conditions:*

*(a) The penalty interest rate ≤ the maximum allowable interest rate, and the firm is indifferent between being repaid in period 2 and not being repaid in period 2.*

*(b) The penalty interest rate = the maximum allowable interest rate, and the firm strictly prefers being repaid in period 2 to not being repaid in period 2.*

REASONING. Consider all possible penalty rates in the interval from the regular interest rate to the maximum allowable interest rate. By the same reasoning as for Result 1, at the regular interest rate, default results in negative expected profits, and therefore the firm strictly prefers being repaid in period 2 to not being repaid in period 2. Suppose that the firm also strictly prefers being repaid in period 2 to not being paid in period 2 at all higher interest rates in the interval (where the associated regular interest rate has been chosen to be the equilibrium interest rate). Then either firm would profitably deviate by raising its penalty rate by $\varepsilon$ whenever possible, making the maximum allowable interest rate the unique equilibrium penalty interest rate (Case (b)). Conversely, suppose that there exists a penalty interest rate in this interval such that the firm does not strictly prefer being repaid in period 2 (where the associated regular interest rate has been chosen to be the equilibrium interest rate). Then, let $r^p$ denote the lowest such penalty interest rate. Then with a penalty interest rate of $r^p$ (and the associated regular interest rate chosen to be the regular interest rate), a continuity argument implies that the firm is indifferent between being repaid in period 2 and not being repaid in period 2 (Case (a)). ■

# 5 Preliminary Results from Simulations

Our preliminary simulations are done with the following parameter values:

$\gamma = 0.5$ (parameter in utility function)

$\overline{I} = 1$ (income is distributed on interval [0, 1])

$\overline{L} = 0.2$ (credit limit on a given card)

$\alpha = 0.2$ (minimum payment as percentage of balance)

$r_m = 8\%$ (market interest rate)

$\overline{r} = 30\%$ (maximum allowable penalty interest rate)

Repaying one card but not the other does not avert any penalty interest rates at all. In our preliminary results, it appears that an optimizing consumer will generally repay at least the minimum payment on both cards or else will repay zero on both cards (but will not repay one card, under universal default, or repay an amount in between).

## 5.1 Simulations under own default

Under own default, a candidate equilibrium in which the penalty interest rate equals the maximum allowable interest rate (Case (b) in Result 2) can first be simulated. In the simulation, we find that:

$r = 12.60\%$ (regular interest rate)

$r^p = 30\%$ (penalty interest rate)

$P_2 = 54.67\%$ (probability of full repayment after missing payments on 2 cards)

$P_1 = 61.67\%$ (probability of full repayment after missing payments on 1 card)

$EU = 147.47$ (expected utility over all states of the world $\times$ 100)

However, the candidate equilibrium of Case (b) is not a true equilibrium, for the following reason. The high penalty interest rate more than offsets the expected default losses (as a percentage of balances loaned). The firm strictly prefers *not* to be repaid in period 2 over being repaid in period 2. Thus, the firm could profitably deviate by offering a slightly lower penalty interest rate.

An interior solution, i.e., a candidate equilibrium in which the penalty interest rate is less than the maximum allowable interest rate (Case (a) in Result 2) can also be simulated. In the simulation, we find that:

$r = 14.11\%$ (regular interest rate)

$r^p = 18.89\%$ (penalty interest rate)

$P_2 = 57.40\%$ (probability of full repayment after missing payments on 2 cards)

$P_1 = 62.40\%$ (probability of full repayment after missing payments on 1 card)

$EU = 147.56$ (expected utility over all states of the world $\times$ 100)

The candidate equilibrium of Case (a) appears to be a true equilibrium. The penalty interest rate reflects the expected default losses (as a percentage of balances loaned), making the firm indifferent between being repaid in period 2 and not being repaid in period 2. This is the requirement for equilibrium in this situation.

It is illuminating to see the consumer's debt level after period 2 (and implied repayment in period 2). This is graphed in the first panel of Figure 1. At low levels of income realization, the consumer misses the minimum payment on both cards. At the next interval of income realizations, the consumer makes the minimum payment on one card but no payment on the other. At the next interval of income realizations, the consumer makes the minimum payment on both cards, but no additional repayment. Finally, at the highest income realizations, the consumer's repayment increases in income, until full repayment occurs.

### *5.2 Simulations under universal default*

Under universal default, a candidate equilibrium in which the penalty interest rate equals the maximum allowable interest rate (Case (b) in Result 2) can be simulated using the same parameter values. In the simulation, we find that:

$r = 12.79\%$ (regular interest rate)
$r^p = 30\%$ (penalty interest rate)
$P_2 = 54.80\%$ (probability of full repayment after missing payments on 2 cards)
$P_1$ : not applicable (prob. of full repayment after missing payments on 1 card)
$EU = 147.43$ (expected utility over all states of the world $\times$ 100)

The candidate equilibrium of Case (b) appears to be a true equilibrium. The high penalty interest rate more than offsets the expected default losses, and the firm strictly prefers *not* to be repaid in period 2 over being repaid in period 2. However, under universal default, this does not imply that either firm has a profitable deviation. The explanation appears to be that the consumer generally does not make a minimum payment on a single card under universal default, as the consumer would still be subject to penalty interest rates on both cards. Therefore, a modest reduction on a firm's penalty interest rate has negligible effect on the probability of repayment — but serves to reduce the firm's revenues.

It is illuminating to see the consumer's debt level after period 2 (and implied repayment in period 2). This is graphed in the second panel of Figure 1. At low levels of income realization, the consumer misses the minimum payment on both cards. There is *no* interval where the consumer makes the minimum payment on one card but no payment on the other. At the next interval of income realizations, the consumer makes the minimum payment on both cards, but no additional repayment. Finally, at the highest income realizations, the consumer's repayment increases in income, until full repayment occurs.

## 6 Discussion

Subject to the caveat that our results are only preliminary, let us compare the regimes of own default and universal default simulated in the previous section and make some observations. First, the penalty interest rate appears to be higher under universal default, and the higher interest rate exceeds the enhanced credit risk associated with missing a payment. Second, the probability of full repayment following missing the minimum payment is lower under universal default, i.e., universal default clauses tend to increase the difficulty for consumers to emerge from debt without serious defaults or bankruptcy. Third, the expected utility of consumers over all states of the world appears to be lower in the equilibrium that we have constructed under universal default, as compared to under own default. Finally, since the firms' expected profits have been held constant in this exercise, it can also be said that social welfare is expected to be lower under universal default than under own default. In short, the simulations appear to favor limitations on the practice of universal default.

Our confidence in these results needs to be tempered by their preliminary nature and by the possibility that there are other parameter values for which these results may be reversed. Still, there appears to be present a tight argument why lenders would impose universal default clauses, but society as a whole (including lenders) would benefit from a collective choice to eliminate them.

The analysis in this paper may be limited in that consumers have been assumed to make fully-optimizing decisions (subject to their uncertain future incomes). However, there exists longstanding evidence that consumers may tend to underestimate their future borrowing (see, for example, Ausubel, 1991) or otherwise be overly optimistic about their future financial prospects. Under such scenarios, consumers would likely take insufficient account of the penalty interest rates that they might face. As such, the effects and conclusions described in this paper would likely be amplified.

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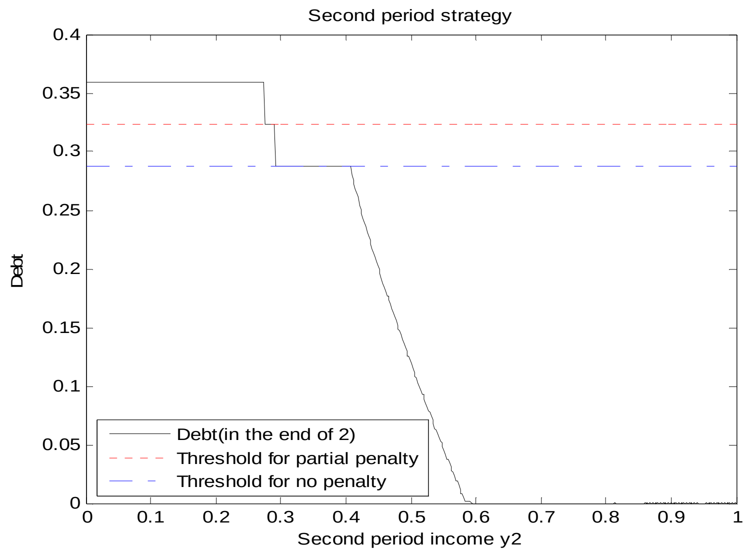
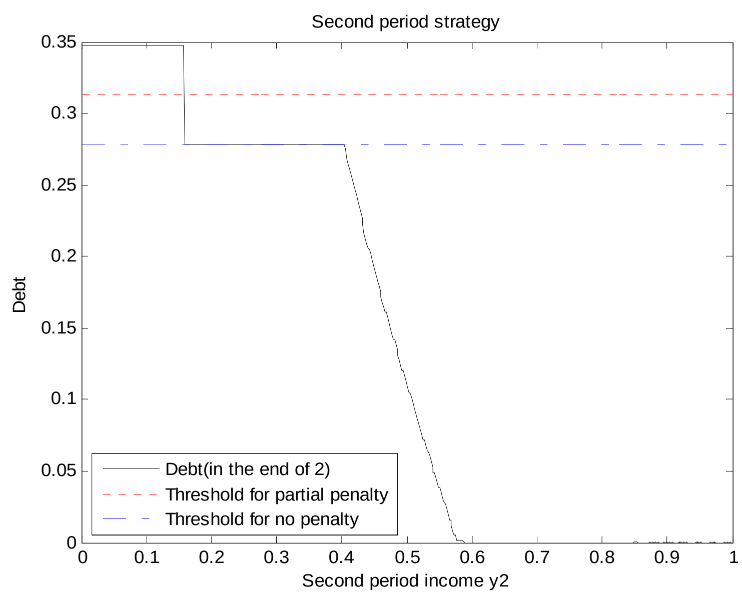
# Figure 1: Consumer Debt in Simulations




**Simulation under "Own Default"**




**Simulation under "Universal Default"**