Shame As It Ever Was: Stigma and Personal Bankruptcy

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Bankruptcy rates have risen rapidly over the past two decades, most no-ticeably since approximately 1991, with rates doubling by 1997. To account for this rise in bankruptcy rates, researchers have advanced two—perhaps competing—hypotheses. The first hypothesis is that the avail-ability of unsecured consumer credit has expanded to wider, riskier subsets of the population in response to cost reductions arising from improvements in technology for monitoring and accounting for borrowers' activities. Fur-ther, technological improvements in payment networks have promoted the widespread adoption of credit cards as a method of payment. The recent works of Ellis (1998), Athreya (2001), and Moss and Johnson (2002) illus-trate the phenomenon of rising credit card usage as it relates to increases in bankruptcy.

A second view, and one that appears commonly held among the general public, is that bankruptcy has lost its once formidable stigma. Gross and Souleles (2002) argue that non-risk-related factors have become more impor-tant in explaining the rise in bankruptcies and attribute this to a fall in stigma. Fay, Hurst, and White (forthcoming) propose that stigma was higher in the past and that bankruptcy filing rates were therefore lower. For this reason, current research is divided on the cause of the rise in bankruptcy rates.

Anecdotally, it is not difficult to find reports like the following:

> Judge Edith Jones, a former member of the National Bankruptcy Review
> Commission, noted in Congressional testimony that "The current system

Figure 1 Total Bankruptcy Filings, United States, 1991–1997
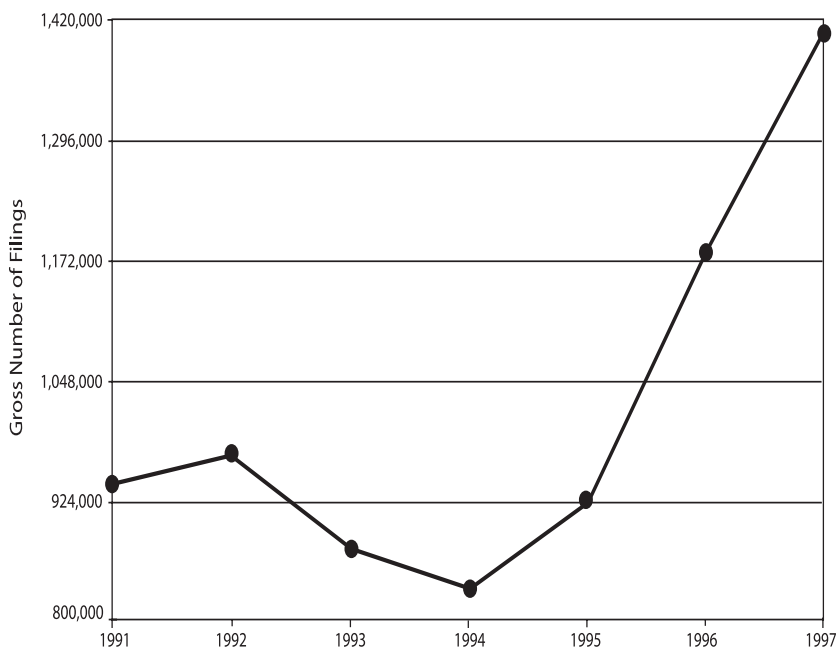
of bankruptcy law permits any person to seek relief without demonstrating financial necessity. At one time in our history, filing bankruptcy was regarded as shameful, and filers suffered social stigma and permanently ruined credit. The shame and stigma are no longer compelling…many filers now commence cases without ever having been in default on their debts. This suggests that bankruptcy is, to them, not a last resort, but a first resort" (Pomykala 1999).

A recent article in *Harvard Magazine* (Anderson 1999) also implies that stigma has fallen by noting that "Industry representatives point to the fact that personal bankruptcy filings hit an all-time high of 1.4 million in 1997, during a period of low unemployment, when consumers were in their best financial shape in many years."[1]

The purpose of this article is twofold. First, the work of the preceding authors is empirical, not "structural" in the sense that households are not modeled explicitly. An innovation of this article is to provide a clear exposition of a

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[1] This statement is misleading in the sense that while the average household experienced gains during the 1990s, it is also the case that those in bankruptcy were typically in very difficult circumstances (Sullivan et al. 2000).

structural model of lending and borrowing with bankruptcy as well as attempt to account endogenously for the expansion in unsecured credit availability and bankruptcy. This article therefore goes beyond that of Athreya (2001), where the expansion of credit was taken as exogenously given. This analysis is meant to illustrate how bankruptcy affects demand and supply in the unsecured credit market. The second goal of this article is to employ the model to study the observable implications of the widely held belief that bankruptcy is far less painful today than it was in the past.

A central challenge for explanations of rising bankruptcy rates based on falling stigma is that such a feature should generate a supply-side response whereby borrowing on the unsecured credit market grows more expensive. That is, if borrowers become more willing to default, lenders will seek higher interest rates to compensate for the greater default risk. In turn, such a price increase should be associated with smaller debt holdings across households, something that is counterfactual for the period under study. I exploit precisely this implication by studying stigma in a model where creditors must at least partially respond to borrower characteristics when pricing loans.

In this article I show that decreasing the nonpecuniary cost of bankruptcy, as a fall in stigma implicitly does, indeed increases bankruptcy rates but yields counterfactual implications for the time path of debt held by households. I then address the consequences of making credit more widely "available" by reducing transactions costs for intermediaries. In particular, I show that minimally vigilant creditors and optimizing households will act in a manner that prevents a fall in stigma from generating the simultaneous rise in bankruptcy and debt holdings observed in the data. Therefore, a main conclusion of this article is that stigma is by no means dead. A more plausible explanation for the simultaneous run-up in both unsecured debt levels and bankruptcy rates may lie in the implicit reduction in costs of intermediation that occurred over the past two decades. Fully accounting for the facts, however, remains a task for future work.

1. THE FACTS

What are the main facts describing bankruptcy rates and their evolution over the past two decades? Also, have the characteristics of filers changed during the period? The data presented here draw heavily on the detailed study of bankruptcy filers of Sullivan et al. (2000).

One can immediately see that bankruptcy rates have risen somewhat steadily over time, with the most spectacular rise coming in the period from 1990 to the present. Figure 1 illustrates the period from 1990 onward.

- Fact 1: Bankruptcy rates roughly doubled during the period 1991–1997.

**Figure 2 Outstanding Consumer Revolving Debt as a Percentage
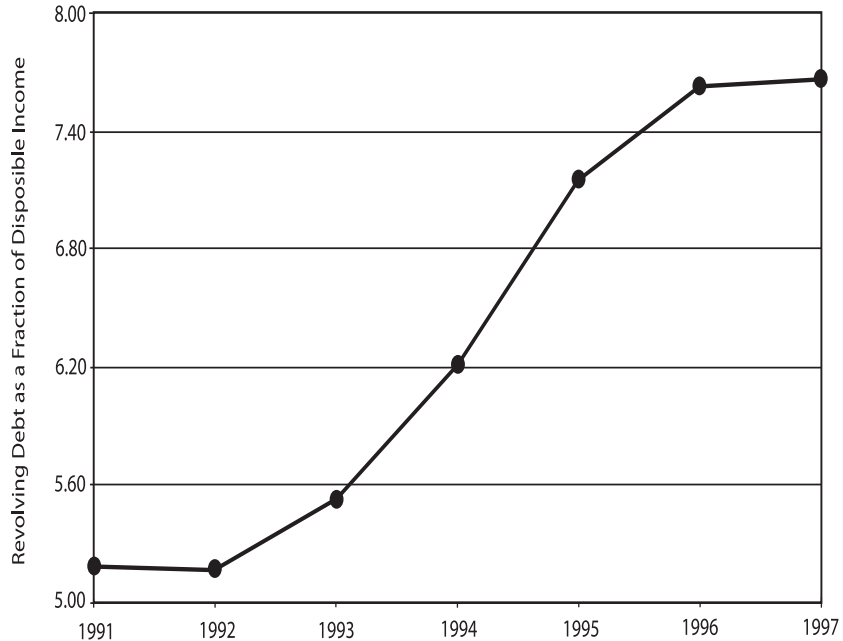of Personal Disposable Income in the United States,
1991–1997**

Figure 2 documents a measure of the indebtedness of households over the same period. The figure shows the ratio of the stock of revolving debt to personal disposable income. As is clearly visible, households did become more indebted along this dimension relative to their incomes during this period.

- Fact 2: U.S. households as a whole sharply increased their holdings of revolving debt relative to income over the period 1991–1997.

To show a more precise idea of the "profile" of a bankruptcy filer and how it has changed over time, Sullivan et al. (2000) document statistics on the characteristics of bankrupt households, presented in Table 1.

Notable in this table is the rise in the ratio of median unsecured debt in bankruptcy relative to median income at the time of filing.[2] In 1991, this ratio

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[2] All debt and income levels are in 1997 dollars.

**Table 1 Characteristics of Bankruptcy Filers in 1991 and 1997
        (in 1997 dollars)**

1991

	Income	Unsecured Debt
Mean	23,927	26,618
Standard deviation	14,357	48,461
25th percentile	14,141	8,208
Median	21,155	15,128
75th percentile	31,110	26,934
N	641	687
Missing	95	49

1997

	Income	Unsecured Debt
Mean	19,641	29,529
Standard deviation	10,482	37,618
25th percentile	12,072	12,368
Median	18,756	19,515
75th percentile	25,748	31,389
N	100	100
Missing	0	0

was roughly 0.75 (i.e., $15,128/$21,155). By 1997, the ratio had exceeded unity, at $19,515/$18,756.[3] Therefore, we have:

- Fact 3: Debt-to-income ratios for U.S. households in bankruptcy increased sharply over the period 1991–1997.

Despite the fall in median income at the time of filing during the period 1991–1997, one should note that median household income for the entire U.S. population remained essentially fixed, at roughly $40,000 (in current dollars). While the income process in the model is too discrete to allow an exact comparison with these statistics, it still will be possible to provide an approximation of these statistics to help evaluate the predictions of the falling stigma.

I now develop a simple model of unsecured borrowing and ask if falling stigma is consistent with the facts documented above. In order for a decline in stigma to be regarded as a serious explanation for the increase in bankruptcy rates between 1991 and 1997, reductions in stigma must also generate a) sharp increases in the level of unsecured debt held by households, as well as b) large increases in the median debt discharged per bankruptcy.

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[3] By contrast, in 1981, the ratio was slightly less than 0.5, as the median household in bankruptcy held $12,452 dollars of unsecured debt, relative to a median income of $26,439.

2. A MODEL OF CONSUMER DEBT AND BANKRUPTCY

The model developed here follows Athreya and Simpson (2003), and is an extension of Athreya (2002). It is richer than the latter in that creditors are allowed to condition the interest rates they charge according to an approximation of the default risk posed by each loan. Conditioning allows us to incorporate non-trivial supply side effects on credit availability, which, in turn, has implications for long-run indebtedness and default rates.

The environment under study consists of a large number of initially identical households that each receive shocks to their income in every period. Households cannot perfectly insure their income risk. Instead, they have access only to risk-free savings and debt that may be discharged subject to penalties associated with bankruptcy.

More precisely, households maximize:

$$U = E_0 \sum_{t=0}^{\infty} \beta^t u(c_t).$$

Where c_t denotes consumption within a period, β defines the rate at which households discount future consumption. In this specification, $u(.)$ denotes the period utility function, which we take to have the constant relative risk aversion (CRRA) form:

$$u(c_t) = \begin{cases} \frac{c_t^{1-\gamma}-1}{1-\gamma}, \text{ for } \gamma > 1 \\ \ln c_t, \text{ for } \gamma = 1. \end{cases}$$

The parameter γ governs how risk-averse households are, as well as how smooth they would want consumption to be over time, given prices. In each period, households draw a random endowment of income, denoted e. The randomness of income is meant to capture both variations in income among working people, such as changes in overtime, short-term disability, etc., as well as variations in income arising from becoming unemployed when working, or re-employed when not. Employed households may receive a shock that renders them unemployed. The probability of getting this shock is given by ρ. Once unemployed, the household regains employment in each period with probability π_{emp}.

Given their preferences, households would like to smooth consumption, but are assumed not to have access to explicit insurance contracts against their income risk. Instead, they must smooth consumption by either accumulating one-period risk-free claims to consumption or by borrowing. When borrowing, however, households are endowed with the option to default, which we will take as being representative of the formal process of bankruptcy. Before turning to the definition of bankruptcy, note that in this environment different debt levels will be associated with different default risks. Therefore, if financial intermediaries are allowed to observe the total debt issued by a household, competition will force firms to condition on total debt.

Let $r(a')$ denote the net interest rate associated with the amount of savings or debt a'. Households save by choosing $a' > 0$, and borrow by choosing $a' < 0$. Given that there is no default risk for savings, the interest earned on savings will not vary with the amount saved and will therefore be simply a single risk-free rate, which I denote by $r^d > 0$. That is, $r(a') = r^d$ when $a' > 0$. On the other hand, households may choose to borrow by issuing debt that matures next period. However, a central feature of the model is that agents may default on debt. I therefore follow Livshits, MacGee, and Tertilt (2003) and model the market for debt as follows.

First, assume competitive financial intermediation whereby the savings of households are taken in and then loaned to large numbers of households. Assume further that making loans entails transactions costs arising from the costs of processing applications, verification of information, etc. Let the transactions cost be denoted by τ. In this case, because of the possibility of default, the debt is effectively discounted so that $r(a') \geq r^d + \tau$. In a given period, a household must choose the amount of one-period borrowing it desires and then issue a given face-value of debt accordingly. This debt is then discounted at least at the risk-free rate. Therefore, if the household issues a given face value of debt a' in this period, it receives a smaller amount of consumption goods $\frac{a'}{1+r(a')} < a'$. In the following period, the debt matures, and the household decides either to honor the debt or to file for bankruptcy to be released of its obligation. For large debt levels, where default is relatively more likely, $r(a')$ will of course be larger.

In the limit, the household will receive nothing at all if it attempts to issue debt levels where default in the next period becomes certain, as $r(a')$ will approach infinity. This is precisely the sense in which the borrowing limits faced by households are endogenous, depending on the likelihood that the household defaults on a given amount of debt. I denote the endogenous credit limit for solvent households by $\underline{a}_s$.

Upon filing for bankruptcy, households have their debts discharged and pay two costs. First, they are restricted from future borrowing for an uncertain length of time. Specifically, in each subsequent period, the household has its ability to borrow restricted with probability $(1 - \psi) < 1$, resulting in an average length of restricted borrowing of $1/(1-\psi)$ periods. A second cost that households must pay is the stigma of bankruptcy, represented by an amount λ subtracted from the household's utility in the period it files.

The nature of the problem faced by households is such that if households derive a given value V from behaving optimally from next period onward, then their choices today are restricted by only a few variables. The first variable is household credit status. In any period, households may be solvent, S, may have just filed for bankruptcy, B, or may be "borrowing constrained" due to a past bankruptcy, denoted BC. I denote credit status by the variable $CS \in \{S, B, BC\}$. Second, households must know their current period earnings, e. Third, households must know their wealth or debt position, a. The value

V, therefore, is a function of these three pieces of information, which, when taken together, fully determine the resources available for consumption today. I therefore denote the "value function" by $V(CS, e, a)$. It is then sufficient for the household to maximize utility today, taking as given that it will choose optimally thereafter, obtaining value $V(CS', e', a')$.

Adapting slightly the notation used in Athreya (2002), we have a simple representation of the problem. The value of being solvent $V(S, e, a)$, is expressed as the better of two choices that a solvent household has in a period, namely, whether to file for bankruptcy or not. Therefore, $V(S, e, a)$ must satisfy:

$$V(S, e, a) = \max[W(S, e, a), W(B, e, a)] \tag{1}$$

where $W(S, e, a)$ denotes the value of *not* filing for bankruptcy in the current period. If the household does not file for bankruptcy, it simply chooses consumption, c, and either saves or issues debt, a', and moves to the next period as a solvent household.

Therefore, $W(S, e, a)$ satisfies:

$$W(S, e, a) = \max\{u(c) + \beta EV(S, e', a')\} \tag{2}$$

s.t.

$$c + \frac{a'}{1 + r(a')} \le e + a \tag{3}$$

s.t.

$$a' \in A_S \tag{4}$$

where $A_S = [\underline{a}_s, \infty)$, implying that a household faces an absolute credit limit of $\underline{a}_s$.

If, on the other hand, a household does choose to file for bankruptcy, its debts are erased, as seen below in the modified right-hand side of the household budget constraint, (6), leaving only current earnings for consumption and savings. The household is also hit by the stigma of filing, λ. It is λ that will be calibrated in the benchmark and then altered. It is the central parameter in the analysis that follows. In the following period, the credit market is assumed to shut the household out, and the latter obtains a value $V(BC, e, a)$ from beginning in this state. The value of filing for bankruptcy in a given period is then given by:

$$W(B, e, a) = \max\{u(c) - \lambda + \beta EV(BC, e', a')\} \tag{5}$$

s.t.

$$c + \frac{a'}{1 + r^d} \le e \tag{6}$$

s.t.

$$a' \in A_{BC.} \tag{7}$$

If a household files for bankruptcy, it is constrained from borrowing in the following period. In subsequent periods, the restriction on borrowing ends with a time-independent probability ψ. The set $A_{BC} = [\underline{a}_{BC}, \infty)$, where $0 \geq \underline{a}_{BC} \geq \underline{a}_S$. Given the preceding, the maximal utility attainable by a borrowing-constrained household satisfies equation (8) below, subject to the constraints in (9) and (10).

$$V(BC, e, a) = \max\{u(c) + \psi\beta EV(S, e', a') + (1 - \psi)\beta EV(BC, e', a')\}$$
(8)

s.t.

$$c + \frac{a'}{1 + r^d} \leq e + a$$
(9)

s.t.

$$a' \in A_{BC}.$$
(10)

3. EQUILIBRIUM

It can be shown that the savings and debt instruments allowed here are in general insufficient for households to fully protect their consumption of goods and services from fluctuations in their income. Therefore, as time evolves, households will hold different wealth levels as a function of their past incomes. Under fairly general conditions, however, the distribution of wealth across households will converge to a distribution that, once reached, will remain fixed. I will focus on the allocations associated with this fixed "long-run" distribution.

Equilibrium further requires that households act optimally; that is, their decisions must satisfy the recursive representation above, and lenders must break even. With respect to the latter, a loan of size a carries an associated default probability $\theta^{bk}(a)$ and a cost of funds (including transactions costs) of $(r^d + \tau)$. Therefore, the zero-profit interest rate for loans $r(a)$, must satisfy:

$$r(a) = \frac{(r^d + \tau)}{(1 - \theta^{bk}(a))}.$$
(11)

For those who choose to hold savings, the zero-profit interest rate will simply be r^d.[4]

4. THE EXPERIMENT

The experiment I conduct is very simple. I first set model parameters, chief among them stigma, such that the model approximately matches bankruptcy

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[4] I refer the interested reader to Athreya (2002) for more details on the stationary equilibrium concept employed here.

Table 2 The Change in Bankruptcy and Credit: 1991 and 1997

	1991	1997
Bankruptcy rate	0.13%	0.20%
Median debt/income in bankruptcy	38%	50%
Median debt in bankruptcy	$15,100	$19,500
Revolving debt/income	5.5%	8.5%
Credit card charge-off rate	0.85%	1.25%

rates, the debt discharged in bankruptcy, and charge-off rates as of 1991. I then lower the cost of stigma and ask what the model predicts for bankruptcy rates, debts discharged in bankruptcy, and interest rates. If the model is consistent with observed outcomes in 1997, it will provide some support for the idea of lower bankruptcy stigma in the present than in the past. If not, we will be left with the puzzle of why the observed changes have occurred. The observed outcomes as of 1991 and 1997 are given in Table 2. I calculate the bankruptcy target as follows. In 1991, there were approximately 900,000 filings. Of these, 70 percent were Chapter 7 filings, to which the bankruptcy procedure defined in the model best matches. Further, Sullivan et al. (2000) report that roughly 20 percent of bankruptcies involved health problems, and I have excluded those cases, as they are better modeled as shocks to "expenses," as in Livshits et al. (2003). I therefore target an annual filing incidence of 500,000. Given the approximately 100 million households in the United States, I obtain a quarterly filing rate of 0.13 percent. For the ratio of revolving debt to income, I use data from the *Economic Report of the President* (2001). Charge-off rates are taken from Stavins (2000), and the remaining facts are from Sullivan et al. (2000).

Parameters

The exogenous process for labor income shocks is given below and will take four different values: $Y \in \{Y_1, Y_2, Y_3, Y_4\}$. These shocks represent a proportional increment or decrement to average productivity. The shocks are set to allow the interpretation that households are partitioned into those who are "working," and those who are "unemployed." When households are working, income shocks take values in the set $Y_w = \{Y_1 = 1.15, Y_2 = 0.85\}$, with probabilities that depend on the previous period's shock. In each period, an employed household may receive a shock that renders it unemployed. The probability of this shock is denoted by ρ. When they are unemployed, households will draw income from a set of two substantially lower shocks, Y_3 and Y_4, where $Y_3 > Y_4$, and Y_j is a positive income amount for all j. The size of these shocks is set at: $Y_u = \{Y_3 = 0.5, Y_4 = 0.1\}$. These shock realizations

Table 3 The Income Process

Employed	$Y' = Y_1$	$Y' = Y_2$	$Y' = Y_3$	$Y' = Y_4$
$Y = Y_1$	0.9700	0.0300	0.0000	0.0000
$Y = Y_2$	0.0300	0.9700	0.0000	0.0000
Unemployed $<$ 2 Quarters	$Y' = Y_1$	$Y' = Y_2$	$Y' = Y_3$	$Y' = Y_4$
$Y = Y_3 \mid high\ productivity$	0.6790	0.0210	0.1800	0.1200
$Y = Y_4 \mid low\ productivity$	0.0210	0.6790	0.1800	0.1200
Unemployed $\geq$ 2 Quarters				
$Y = Y_3 \mid high\ productivity$	0.6790	0.0210	0.0000	0.3000
$Y = Y_4 \mid low\ productivity$	0.0210	0.6790	0.0000	0.3000

are interpreted as income received by those who qualify and those who fail to qualify for unemployment insurance. To avoid keeping track of a separate shock process for unemployed households, it is assumed that they receive high and low productivity draws even when unemployed from the same process as employed households. Therefore, if re-employed in the following period, these households will receive incomes according to the conditional probabilities of low and high productivity shocks given current period productivity. Lastly, households hit by two or more consecutive periods of unemployment no longer qualify for unemployment insurance and instead receive the shock Y_4. Table 3 describes the transition probabilities.

For expositional ease, I display the earnings process for households, given that the employment/unemployment shock has already been realized. The interpretation of this process is the following: For employed workers, the process is given by the top two rows of Table 3. Since they are employed in the current period, they face zero probabilities of drawing income levels Y_3 and Y_4. Instead, their productivity remains within the set $\{Y_1, Y_2\}$ and is drawn according to the corresponding transition probabilities. Next, consider the process for a newly unemployed worker with currently high individual productivity. This worker has a probability of 0.679 of becoming employed with high productivity and a probability of 0.0210 of becoming employed with low productivity. Additionally, the worker will remain unemployed with a probability of 0.30 (i.e., 0.18 + 0.12) and will retain high productivity with probability 0.18 and loses productivity with probability 0.12. Finally, consider a worker who is unemployed for at least two periods, as shown in the bottom two rows of Table 3. Such workers will no longer qualify for unemployment insurance benefits should they fail to find work, which occurs with probability 0.30 in a given quarter. Therefore, these households draw incomes of $Y = Y_4$. If the household does find work, it then draws from the process $Y_w = \{Y_1 = 1.15, Y_2 = 0.85\}$.

Table 4 The Parameters

Parameter	Description	Value
γ	Risk aversion	1.00
τ	Quarterly transition cost of intermediation	0.0085
ρ	Unemployment risk (quarterly)	0.05
π_{emp}	Probability of re-employment in next period	0.7
$1/(1\text{-}\psi)$	Avg. length of post-bankruptcy borrowing limit (qtrs)	$16(\Rightarrow \psi = 0.9375)$
λ	Bankruptcy cost	1.65[*]
β	Quarterly discount rate	0.9865[*]
$\underline{a}^B$, $\underline{a}^{BC}$	Borrowing limit for borrowing-constrained households	0

Table 4 below reports the remaining parameters of the model that, along with the income process, matches outcomes as of 1991. Asterisks indicate calibrated parameters. That is, parameters whose values are set such that the model matches the facts documented above, as of 1991. In 1991, the unemployment rate was 6.8 percent. The fact that 1991 was the trough of a business cycle implies that unemployment risk at this time was higher than in 1997. As a result, the benchmark estimate of stigma might be affected by the value imputed for the risk of becoming unemployed, ρ. However, the direction of any bias in measuring stigma under 1991 unemployment rates is unclear, as there are forces in both directions. Namely, in a world with relatively high unemployment risk, bankruptcy is more costly than when unemployment risk is low, as exclusion from credit markets becomes more painful. This will lead to lower debt holdings for households, all else equal. Conversely, more unemployment risk means that those with large debts are likely to find themselves in more difficult circumstances than before. It should be noted that bias in estimation of stigma arising from a higher or lower unemployment target may arise. Such bias, however, is likely to be second order with respect to the qualitative changes induced by a large fall in stigma.

The remaining parameters are chosen either with direct reference to the data, as in the case of τ and ψ, or are set at values made standard in the literature, as in the case of the risk-aversion coefficient γ and the discount factor β.[5] The stigma-related cost of bankruptcy λ, is a reduction in utility arising from filing. To be concrete, it is useful to express this reduction in terms of the consumption good or in dollars. To do this, note that the value function yields important information on the consequences of a reduction in current "cash-in-hand" for a household contemplating bankruptcy. Namely, we can ask the following questions: First, what are the financial characteristics (i.e., current earnings, e) of the median bankruptcy filer in our model? For this

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[5] For the first two parameters, see Athreya (2002) for details.

Table 5 The Benchmark Calibration

	1991 Data	**Model**
U.S. quarterly bankruptcy rate	0.13%	0.14%
Median debt/income in bankruptcy	38%	34%
Median debt in bankruptcy	$15,000	$13,700
Revolving debt/income	5.2%	6.2%
Unemployment rate	6.8%	6.9%
Credit card charge-off rate	1%	0.76%

value of earnings, how much would current earnings, e, have to be reduced in order for an optimizing household to find its utility lowered by λ units?[6] This value turns out to be approximately $4,000. Therefore, bankruptcy is not taken lightly by households. This is also consistent with the work of White (1998) who finds that while 15 percent of households would find it financially beneficial, less than 1 percent do file in any given year.

5.   RESULTS

In the benchmark case, we see that the model matches up quite well with the data along several dimensions, even though there are more targets than "free" parameters. In particular, with respect to credit market facts, I attempt to match the data along three dimensions: 1) the U.S. quarterly bankruptcy rate, 2) the ratio of median debt to median income among bankruptcy filers as well as the dollar value of the debt, 3) the ratio of total revolving debt to income for the United States, 4) the unemployment rate, and 5) the quarterly loss-rate or "charge-off" rate for credit cards—the predominant form of unsecured debt.

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[6] More precisely, we compute the following: let $x = \{CS, a, e\}$ be any value for the state vector, and let e_{med} be the median value for earnings among those filing for bankruptcy. Given our notation, the expected discounted utility from filing for bankruptcy is then given by:

$$W(B, e_{med}, a) = \max\{u(c) - \lambda + \beta EV(BC, e', a')\} \tag{12}$$

s.t.

$$c + \frac{a'}{1 + r^d} \leq e_{med} \tag{13}$$

s.t.

$$a' \geq \underline{a}_{BC} \tag{14}$$

With this, we can solve for the reduction in income such that optimizing under the remaining income, e^*, would yield utility level, $W(B, e_{med}, a)$. This will tell us how costly in real terms the penalty is to a representative member of the group who receives penality costs. In the model, the median unemployed household earns a median income of approximately 0.5 units. The median filer, on the other hand, receives an income of 0.1 units. This difference of 0.4 units of current earnings produces a utility drop of roughly 1.5 units. In dollar terms, 0.4 is 40 percent of quarterly earnings or $4,000.

Given that the benchmark model captures many of the salient features of bankruptcy, unemployment, and credit, I now evaluate the effect of a reduction in "stigma," denoted by the parameter λ. In order to avoid further lowering bankruptcy by lowering the unemployment rate, I leave the probability of unemployment, ρ, fixed, even though 1997 was characterized by a lower unemployment rate than 1991. If the model is still unable to generate an increase in bankruptcy as stigma falls, this will provide a more compelling argument against the stigma-based explanation for the observed changes. In the results above, λ is cut from its 1991 benchmark value of 1.65 to a value of 0. Beyond exclusion from credit markets, there is assumed to be no cost to bankruptcy whatsoever. This change in stigma, while perhaps stark, is useful for two reasons. The complete elimination of stigma may help generate an increase in the bankruptcy rate consistent with the enormous increase observed in the data. Additionally, in this model, I have found that the response of stigma is qualitatively similar for smaller changes, and therefore, there is no great loss in generality by considering the limiting case. I eliminated exclusion from credit markets as part of "stigma" because the common interpretation of stigma involves personal nonpecuniary suffering associated with the decision to file for bankruptcy.

It is seen that bankruptcy rates do rise, almost to levels observed in 1997. Therefore, the hypothesis that there has been a loss in stigma is not yet contradicted. However, what has happened to credit "supply" relative to the benchmark is striking. Table 6 shows that the endogenous borrowing limit, "$\underline{a}_s$," is only approximately $1,100, or *less than three percent* of annual median income. In essence, the unsecured credit market nearly disappears. By contrast, when the stigma of bankruptcy is set at the 1991 benchmark level, the endogenous limit on unsecured debt rises dramatically to the equivalent of one-third of annual income, or roughly $14,000. The debt discharged in bankruptcy under low-stigma falls to nearly zero. In this low-stigma environment, households rarely borrow, but when they do, they often default. The latter is seen in the quarterly charge-off rate, which at nearly 13 percent is wildly at odds with the roughly 1 percent rate observed in the period since approximately 1996. The results for credit loan rates are predicated on a creditor who can observe total debt. To the extent that lenders could observe more, one might expect the effects on supply to be even more severe than reported here.

Intuition

To help explain the decisionmaking of households, it is important to understand households' willingness to acquire debt and, in turn, pay premia associated both with transactions costs and with default risk. In particular, the benefits of asset accumulation and decumulation to smooth consumption are significantly reduced when shocks are very persistent—or when they are very large in magnitude. For environments similar to the present one, but without default,

Table 6 The Effect of a Fall in Stigma

	1991	**1997**
λ	1.65	0.00
Bankruptcy rate	0.13%	0.18%
Median debt/income in bankruptcy	34%	0.85%
Median debt in bankruptcy	$13,700	$340
Revolving debt/income	6.2%	0.2%
Credit card charge-off rate	0.8%	12.9%
$\underline{a}_s$	$14,000	$1,100

households can typically do a great deal of consumption smoothing without ever borrowing. For example, the classic work of Aiyagari (1994) demonstrates that for even very persistent (but not permanent) shocks, the additional amount of assets households accumulate relative to the full-insurance case is small. This finding is important for understanding why a reduction in the cost of bankruptcy leads, in equilibrium, to a substantially lower availability of credit. I now discuss the decision rules of households with respect to debt in the two environments.

Intuitively, in order for a reduction in stigma to generate increased bankruptcy filings, the "supply" effect in terms of the loan-rate schedule must be attenuated so that households are still able and willing to obtain credit cheaply and to discharge these debts at relatively higher rates than with higher stigma. For households to be willing to pay large premia to obtain credit, they must be likely to default or in dire circumstances, or both. However, for empirically plausible specifications of income risk, households in the model can effectively smooth consumption even without access to credit markets. Therefore, if a household in such an environment were given the same amount of credit as before (i.e., as much as in a "high stigma" world), they would now be far more likely to default on the debt. In turn, the competitive price for such a loan would rise substantially. If adequate consumption smoothing is then possible without recourse to borrowing, most households will be unwilling to pay large premia to borrow. Therefore, as stigma falls, equilibrium debt holding falls drastically even while bankruptcy rates rise. The central point therefore is that the "supply" side response of credit to costs of bankruptcy is intimately connected to how well consumers may smooth consumption without borrowing.

The central question now becomes: since falling stigma appears entirely unequal to the task of explaining the facts, is there a plausible alternative explanation? Improvements in technology for intermediating credit is one prominent possibility, which I now explore.

**What About Competition and Technological Change
in Unsecured Lending?**

In this section, I evaluate the possibility that competitiveness in unsecured
lending intensified, most notably in credit cards, while advances in computing
and telecommunications further lowered the costs of maintaining an unsecured
credit network, leading borrowing to rise and prices to remain steady even with
a fall in stigma. Examples include the PS2000 payments authorization system
introduced by VISA in 1992 and, more visibly, the vast array of co-branded
cards offering frequent flyer miles and other rebates that effectively lower the
price of unsecured credit. These reductions in the marginal costs of credit
supply are also consistent with the substantial entry to credit card lending
that took place in the period 1991–1995 and, in turn, greatly increased the
number and variety of credit card contracts offered, as well as the debt taken
on by households.[7] Edelberg (2003) documents very clearly that the extent to
which creditors now are able to engage in risk-based pricing has increased. In
particular, she finds a large increase in the variance in interest rates charged to
different consumers during the mid-1990s, precisely the window under study
in this article. The reduction in the marginal costs of account management thus
allowed better partitioning of high-risk borrowers from low-risk borrowers and
is also likely to have increased the lender's overall willingness to extend credit
to all households. This is the heart of the argument that the 1990s were a period
of "democratization" of credit. This means, by definition, that borrowing costs
have fallen for a large population, which is what leads them to borrowing on
mainstream unsecured credit markets, as opposed to either being denied credit
or borrowing from more expensive alternatives such as check-cashing outlets
or pawn shops. As Edelberg (2003) argues, in the current environment, "we
expect to see that very high risk borrowers are able to get credit . . . instead of
simply being denied."

   The parameter τ represents transactions costs, broadly defined. These
costs may be associated with both innovations in the technology of credit
services and more competitive lending.[8] The natural experiment is therefore
to lower τ, (set to 0.0085). To be extreme, I now evaluate outcomes for the
case where $\tau = 0$. The results are presented in the second line below. In the
second line of Table 7, I present the results that isolate the impact of tech-
nological change in intermediation alone, whereby I reinstate the benchmark
non-pecuniary cost of bankruptcy of $\lambda = 1.65$, but drop the transactions cost
τ to zero.

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[7] See Evans and Schmalensee (1999).

[8] To the extent that lending became more competitive post-1991, the purely competitive zero-
profit condition in the 1991 benchmark is not quite correct. However, it is likely to be a useful
approximation and allows us to reduce τ and interpret this meaningfully as a reduction in margins.

Table 7 The Effect of Lower Transactions Costs ($\tau = 0$)

	1991	$\tau = 0$	$\tau = 0$
λ	1.65	1.65	0.00
Bankruptcy rate	0.14%	0.19% (0.20%)	0.20%
Median debt/income in bankruptcy	34.5%	40.3% (50%)	3.3%
Median debt in bankruptcy	$13,700	$16,100 ($19,000)	$1,200
Revolving debt/income	5.2%	14.9% (8.5%)	0.001%
Credit card charge-off rate	0.8%	0.5% (1.25%)	15%

For comparison, the actual 1997 data are presented in parentheses. It is clear that the reduction in transactions costs/rents produces model outcomes closer to observed changes than reductions in stigma. In the former case, bankruptcy rates and debt holdings both rise, as the data indicate, while in the latter, rising bankruptcy rates are associated with extremely low-debt levels in bankruptcy. In fact, the low transactions cost case appears to match closely the observed increase in filings, with an implied annual rate of 0.76 percent— very close to the approximately 0.80 percent rate observed in the data. This model with lower transactions costs is also able to nearly generate the $19,000 median debt per bankruptcy seen in the data. However, the model is not able to capture this increase in charge-off rates that occurred over the period from 1991 to 1997, and this feature is related to the fact that households take on far more debt under the low-transactions regime than in the data. Nonetheless, the lower cost of unsecured borrowing clearly implies forces in a qualitative direction consistent with the observed changes.[9]

Conclusion

To the extent that the model presented here delivers counterfactual results when stigma is reduced, one might conclude that the model is flawed rather than interpret the results as suggesting that stigma has not dropped. However, the model is predicated on only a few plausible assumptions regarding household risk, credit markets, and incomplete insurance markets. Secondly, it was assumed that households could only imperfectly insure their labor income risk—a reasonable assumption. Thirdly, creditors are assumed to price

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[9] The last column of Table 7 explores the effects of the elimination of both stigma and transactions costs. These changes result in bankruptcy rates rising only slightly relative to the benchmark but also are associated with extremely small debt levels being discharged in bankruptcy. A possible reason for the fall in debt holdings is that with the elimination of stigma comes a drop in the cost of borrowing, all else equal. As a result, the incentives to borrow are greater. However, in equilibrium, the absence of stigma leads borrowers to quite readily file for bankruptcy and alters loan rates by enough to reduce equilibrium debt holdings.

loans conditioned only on total debt held by a household. This is a weak requirement as well, and allowing creditors to have more information would likely lead to even less bankruptcy, as credit limits would tighten in the face of negative shocks. Lastly, the decrease in stigma studied here led to counterfactual implications beyond bankruptcy rates, as debt levels fell and credit limits shrank. It is useful to note that in Athreya (2001), it was assumed that creditors could not condition on even debt holdings. Instead creditors imposed a fixed credit limit. Even in that environment, reductions in stigma could not account for observed simultaneous increases in both debt and bankruptcy. It is apparent that in this model, reductions in stigma have large contractionary effects on credit supply, and while bankruptcy rates might rise as stigma falls, the debts discharged in bankruptcy are predicted to shrink dramatically and not rise over time as they have.

On a more positive note, a promising explanation appears to be that falling transactions costs have led to greatly expanded borrowing possibilities. I found that this view has implications that are consistent with the facts on both filing rates as well as debt growth over the 1990s. The model did produce an excessive charge-off rate relative to the debt. Nonetheless, advances in intermediation, increased competition, and the democratization of credit, to the extent that they have effectively lowered borrowing costs, have led in this model to outcomes broadly consistent with the data.

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