Using Misclassification Analysis to Evaluate the Effectiveness of the BAPCPA Means Test

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A crucial issue in the U.S. consumer bankruptcy process is empirically distinguishing those filers who are able to repay some or all of their debts from those who cannot. The former are more effectively placed under a Chapter 13 filing (where a debtor repays a greater proportion of outstanding obligations), while the latter are more appropriately in a Chapter 7 filing (where the majority of debts are immediately discharged). Current bankruptcy law determines a debtor's ability to pay by comparing gross monthly income (adjusted for family size) to the median state income in which the bankruptcy filing occurs. This ad hoc threshold may allow certain debtors to file under a chapter that is inefficient and/or socially undesirable. This manuscript uses econometric misclassification techniques to estimate the likelihood with which a debtor files under an inappropriate chapter of the U.S. Bankruptcy Code. This technique is does not require any prior knowledge or restrictions be imposed in the determination of a filer's ability to repay her/his debts. Instead, the data determine the rates of misclassification, and implicitly identify the thresholds underlying the appropriate chapter choice. We apply the technique using a random sample of bankruptcy filers drawn from the Eastern Washington Bankruptcy Court District. We find that, holding most of the salient debtor financial and demographic characteristics constant, approximately 10 percent of Chapter 7 filers are more appropriately placed in a Chapter 13 filing. The percentage of debtors who filed under Chapter 13, but should have filed under Chapter 7, was not statistically different from zero.

INTRODUCTION AND LITERATURE REVIEW

In 2005, Congress passed, and the President signed into law, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA). One major objective of BAPCPA is to ensure that when a consumer reaches a point of financial exigency and applies for protection under the U.S. Bankruptcy Code, the consumer is appropriately evaluated based on his/her ability to repay his/her debts (Sullivan, Warren & Westbrook, 1997, 2003; Zhu, 2011). Consumers whose incomes are sufficiently positive are judged "able" to repay some or all of their debts, and are ineligible to file for Chapter 7, and must either file for Chapter 13 protection or elect a non-bankruptcy path for debt resolution. Chapter 13 requires payment into a court approved payment plan for a 36 – 60 month period. (11 U.S.C. §1322). The plan payment is based upon the debtor's net disposable income, with first priority of disbursements being made to administrative expenses (lawyers etc.) and secured claims (i.e. houses and cars). Thereafter, funds are paid in order of priority to priority unsecured (i.e. Domestic Support Obligations and taxes).

Remaining funds, if any, are dispersed to general unsecured creditors, such as credit cards and medical bills (11 U.S.C. §1322(a)(2); Loibl, Hira and Rupured, 2006; Power 2007; Hackney, McPherson & Friesner, 2010; Reilly, 2012). Any remaining debts beyond the filer's ability to pay are typically discharged.

Concomitantly, filers whose incomes are not sufficiently positive are allowed to file under Chapter 7 of the U.S. Bankruptcy Code under the assumption that they have insufficient net disposable income to fund a Chapter 13 plan that would provide some repayment of their financial obligations. Under a Chapter 7 filing, all debtor assets (net of Court-approved exemptions[1]) are immediately liquidated and the proceeds are used to repay outstanding financial obligations on a prioritized basis. Secured creditors retain rights against their collateral, and if their collateral is liquidated, receive the proceeds up to the amount of their claims. Unsecured creditors are organized in order of priorities, per 11 U.S.C §507, with the highest priority creditors being paid first. General unsecured creditors (those holding claims based on outstanding medical bills, credit card balances, etc.) have the lowest priority, and are the last class of creditors to receive payment. However, because the debtor's income is sufficiently low that he or she is deemed by the Court to be unable to pay his/her debts, this individual is not required to fund a repayment plan. Instead, any remaining dischargeable debts, over and above those repaid through asset liquidation, are immediately discharged. The benefit of this process is that the typical Chapter 7 filer, once the discharge is received in 90 days, is typically free of any unsecured debt and able to immediately begin the personal financial rehabilitation process. Moreover, because many Chapter 7 filers hold few valuable assets (and what assets that exist may be exempt from the liquidation process), there is a disproportionally higher percentage of debts (especially unsecured debts) that are discharged under a Chapter 7 filing than under a Chapter 13 filing, all else constant (Hackney, McPherson and Friesner, 2011). Hence, the criteria that are used to determine a debtor's ability to repay one's debts, and which shift a debtor into a Chapter 13 filing, rather than allowing the debtor to choose the chapter under which bankruptcy is filed (which normally, but not always, results in a Chapter 7 filing) is an important public policy issue.

BAPCPA attempts to set a threshold for a filer's ability to repay one's debts by comparing the debtor's gross monthly[2] income (over a specific period of time, usually during the six months prior to filing) to the median income in the filer's state of residence, adjusted for family size. Bankruptcy attorneys typically refer to this comparison as the "means test" (11 U.S.C. §707(b); Norberg, 1999; Norberg & Compo, 2007; Lefgren & McIntyre, 2010; McIntyre, Sullivan & Summers, 2010; Administrative Office of the Courts, 2011). If the filer's monthly income exceeds the state median income standard, the individual is said to have "failed the means test" and is presumptively ineligible for a Chapter 7 filing. If the means test presumption is not rebutted, then Chapter 13 remains as the only probable bankruptcy option.[3] Concomitantly, if income falls below the standard, the individual is said to have "passed the means test" and may file under either Chapter 7 or Chapter 13. While some filers, whether out of religious, cultural or ancillary obligations, voluntarily file under Chapter 13, the vast majority of filers who pass the means test file under Chapter 7 to obtain a discharge and avoid repaying most (if not all) of their debts (Sullivan, Warren & Westbrook, 1988, 1997; Neustadter, 1986; Braucher, 1993; Lefgren & McIntyre, 2010; Lefgren, McIntyre & Miller, 2010; McIntyre, Sullivan & Summers, 2010).

The decision to establish a debtor's ability to pay based on how the presumptive debtor compares to the median state income standard, while certainly plausible, is nonetheless ad hoc. Under BAPCPA, bankruptcy filers whose incomes fall above the median level of incomes, a statewide standard adjusted by family size, are subjected to a higher level of court scrutiny. Debtors in this category must use standardized State and Federal (IRS) expense guidelines. These external guidelines are used to screen debtors who would have sufficient disposable income to fund a Chapter 13. Debtors under the median income level are not subject to the means test expense standards and are allowed more flexibility in reporting expenses. If the presumptive debtors' actual expense characteristics provide for an "ability to pay" that is actually lower than this standard, the effectiveness of BAPCPA is reduced, because it allows some filers to who truly have an "ability to repay" some or all of their debts to escape detection by the means test. The logic holds in reverse if the debtor's individual circumstances facilitate an "ability to pay"

that is actually higher than what is specified under BAPCPA. The question that naturally arises is, "what is the rate at which debtors fail to file under the appropriate chapter of the U.S. Bankruptcy Code?" It is certainly plausible that an individual debtor might file under Chapter 13, when objectively, Chapter 7 would be the better option. Debtors might be confused by or ignorant of differences between the chapters. Additionally, Chapter 13 filings provide higher attorney's fees, providing a perverse disincentive to shift some marginal filers from Chapter 7 to Chapter 13. However, the imposition of the means test (and the fact that filers face perjury charges if they misrepresent their income, expenses, assets and liabilities when they file) and the magnitude of the financial consequences of bankruptcy, suggest that most inappropriate filing occurs when a person escapes detection by the means test and discharges an inappropriate amount of debt under a Chapter 7 filing.

The purpose of this manuscript is to use techniques drawn from the econometric misclassification literature (and more specifically, from Hausman, Abrevaya and Scott-Morton (1998)) to estimate the likelihood with which a debtor files under an inappropriate chapter of the U.S. Bankruptcy Code. This technique is especially useful because it not only can be estimated using standard regression techniques (we use non-linear least squares), but also because it does not require any prior knowledge or restrictions be imposed on what the "appropriate" level of expenses should be under the BAPCPA legislation. Instead, the information contained in the data determines the rates of misclassification, and implicitly the thresholds underlying the appropriate chapter choice.

The remainder of this manuscript proceeds in several steps. In the next section, we describe the econometric misclassification techniques that we use to estimate inappropriate and/or inefficient chapter filing choices. We apply the technique using a random sample of bankruptcy filers drawn from the Eastern Washington Bankruptcy Court District. The fourth section contains our empirical results. We conclude the paper by discussing the policy implications that arise from our empirical results, and by positing some suggestions for future research in this area.

EMPIRICAL MODEL AND DATA

Consider an individual who is inexorably nearing a point of financial exigency, and must decide as to which bankruptcy chapter is appropriate for that individual's particular circumstances. Because there are two primary chapters of the U.S. Bankruptcy Code (Chapter 7 and Chapter 13) of relevance to the consumer debtor, the chapter filing decision can be cast in a binary discrete choice framework of the following form (Hackney, McPherson and Friesner, 2011):

$$Ch_i^* = \beta_0 + \sum_{j=1}^{J} \beta_j X_i^j + u_i \tag{1}$$

where i=1,…,n denotes each observation in the sample (which we assume is drawn randomly from the underlying population), the βs are parameters to be estimated, the Xs represent a series of j=1,..,J exogenous covariates, u denotes an error term, and Ch^* is a latent variable denoting the true, underlying candidacy for the chapter under which the debtor files. In the absence of misclassification, the latent variable is realized empirically in as a binary response[4]:

$$\widehat{Ch_i} = \begin{cases} 1 \ if \ filing \ under \ Chapter \ 7 \ of \ the \ U.S. Bankruptcy \ Code \\ 0 \ if \ filing \ under \ Chapter \ 13 \ of \ the \ U.S. Bankruptcy \ Code \end{cases} \tag{2}$$

Additionally, in the absence of misclassification, the researcher observes the appropriate chapter filing eligibility $\widehat{Ch_i}$ directly. However, in the situation where the criteria for chapter selection are set inappropriately and/or in an ad hoc fashion, filers may file under a chapter for which they are not (or should not be) eligible. Hausman, Abrevaya and Scott-Morton (1998) demonstrate that such behavior leads to two possible types of misclassification:

$$\alpha_0 = Prob(Ch_i = 1 | \widehat{Ch_i} = 0) \tag{3}$$

$$\alpha_1 = Prob(Ch_i = 0 | \widehat{Ch_i} = 1) \tag{4}$$

where Ch_i represents an empirically observed (and possibly misclassified) realization for filer i, α_0 represents a parameter estimate of a "false positive" Chapter 7 filing (i.e., the filer should not have filed under Chapter 7, but did), and α_1 represents a parameter estimate of a "false negative" Chapter 7 filing (i.e., the filer should have filed under Chapter 7, but did not do so). Assuming that the rates of misclassification are estimable parameters, and assuming a specific cumulative distribution for the dependent variable (denoted by F(•), which is usually assumed to be a normal or logistic cumulative distribution), the expected value of the empirically realized dependent variable is:

$$E\left(Ch_i = 1 \big| X_i^1 \dots X_i^J\right) = Ch_i^* = \alpha_0 + (1 - \alpha_0 - \alpha_1)F\left(\beta_0 + \textstyle\sum_{j=1}^{J} \beta_j X_i^j\right) \tag{5}$$

Hausman, Abrevaya and Scott-Morton (1998) show that, as long as a monotonicity condition ($\alpha_0 + \alpha_1 < 1$) holds, the problem can be estimated via nonlinear least squares. That is:

$$minimize_{\alpha_0,\alpha_1,\beta_0,\dots,\beta_J} \sum_{i=1}^{n} \left(Ch_i - \alpha_0 - (1 - \alpha_0 - \alpha_1)F\left(\beta_0 + \textstyle\sum_{j=1}^{J} \beta_j X_i^j\right)\right)^2 \tag{6}$$

subject to $\alpha_0 + \alpha_1 < 1$.

The interpretation of the parameters estimates, as well as any statistical tests (both for overall model fit and for individual parameter estimates) may be analyzed analogously to other applications of nonlinear least squares (Greene, 2000). In this manuscript, the model is estimated using the PROC NLIN procedure in SAS Version 9.3 (SAS Corporation, Cary, NC). All tests of statistical significance are assessed using a five percent significance level. Traditional binary logit regressions will also be presented to give the reader a rough benchmark to assess whether (and, if so, how) accounting for misclassification affects the signs and significance of the other parameter estimates in the model.

It is important to note several considerations when estimating (6). First, examining (6) it is clear that the model's ability to successfully converge to a stable solution depends on the nonlinearity inherent in the minimization function and the quantity and quality of information contained in the regressors. Hence, estimating the model requires a relatively expansive data set, both in terms of sample size as well as the array of quantitative and qualitative regressors included in the regression. Second, a number of studies have extended this model to relax various assumptions. For example, Hausman, Abrevaya and Scott-Morton (1998) use isotonic regression to relax the assumption that F(•) be distributed as normal or logistic. Tennekoon and Rosenman (2014) extend the model to show how the misclassification probabilities (α_0, α_1) can be specified as functions of covariates. This allows researchers to not only quantify misclassification probabilities, but also to estimate the impact of various causal factors on these probabilities. But in both cases, estimating these models requires additional computational complexity and/or more detailed data to ensure that the model converges to a stable solution. Hence, this analysis focuses on the estimation of (6) using a logistic cumulative distribution. We leave an extension of the methodology as outlined by Hausman, Abrevaya and Scott-Morton (1998) and Tennekoon and Rosenman (2014), among others, as a suggestion for future research.[5] A final consideration is that the traditional issues that impact all regression analyses (including, but not limited to, proper specification of the response function and the avoidance of perfect multicollinearity) continue to apply to misclassification models. In what follows, we postulate a linear in parameters, reduced form response function. In cases where k mutually exclusive and collectively exhaustive binary covariates exist, only k-1 of these variables are included in the regression, and all estimated marginal effects and parameter estimates are interpreted relative to the omitted category (Greene, 2000).

DATA

The data used in the analysis come from the Public Access to Court Electronic Records (PACER) database for the U.S. Bankruptcy Court's Eastern Washington District for the years 2009 and 2011. All information in the database (and provided by filers through their attorneys at the time of filing) is filed under the threat of perjury, which should help ensure accurate and precise data. Because the data are collected from pre-existing, publicly available court records, the study is not subject to institutional research board review. According to the Court's website (http://www.waeb.uscourts.gov/sites/ default/files/waeb/filing_statistics/10%20Year%20History.pdf) there are approximately 7,000 filings in the District each year (7,234 in 2009 and 6,214 in 2011). Given this population size, interval random sampling techniques were used to identify a five percent random sample of filings. Given 95 percent confidence intervals and a conservative effect size (50 percent), a five percent random sample should be sufficient to yield an accurate and precise reflection of the underlying population (Dillman, 2000; page 207). This led to 399 files being selected for each year of the analysis. After eliminating six files which provided incomplete information, the working sample is comprised of 792 files.[6]

Table 1 contains the variable names, definitions and descriptive statistics for each of the variables included in the analysis. The variable CH7DV is a binary variable identifying (with a value of one) those debtors who filed under Chapter 7, and all other filings (which in this study are solely comprised of Chapter 13 filings) are denoted by a zero. Debtor financial information, including monthly income, Court-approved monthly expenses, assets (both real and personal property), and liabilities (including secured, priority unsecured and general unsecured) were recorded in monetary form. To ensure comparability over time all variables were converted to real 2009 dollars using the consumer price index for all urban consumers (http://research.stlouisfed.org/fred2/release?rid=10). To reduce the potential for hetero-skedasticity, all continuous variables were transformed using the natural logarithm before including them in the regression. The distribution of assets was examined by creating a variable that quantifies the ratio of the natural logarithm of personal property to the natural logarithm of real assets (i.e., an elasticity; EPPROP). Similarly, the distribution of liabilities was captured empirically by calculating the natural logarithm of unsecured claims divided by the natural logarithm of total liabilities (EUSECCLM), and also by calculating the natural logarithm of secured claims divided by the natural logarithm of total liabilities (ESECCLM).

Several additional covariates were coded to capture debtor-specific demographics. More specifically, binary variables were created to indicate whether a debtor had previously filed for bankruptcy (PRIORBK), whether the filing was a joint filing (JOINT), whether the filer had dependents (DEPDV) at the time of filing, whether the filer was disabled (DISABLED), or whether the filer was retired (RETIRED) at the time of filing. Dummy variables were also used to capture the year of the filing (DV09), whether the filer employed the prominent bankruptcy attorneys in the District (A1, A2 and A3, respectively), and the filer's county of residence (SPOKANE, BENTF, and OTHER).[7] A potentially confounding issue is that bankruptcy attorneys tend to practice in a specific geographic area; hence the attorney of record is likely to be collinear with the filer's county of residence. To account for this, equation (6) is estimated twice, once with the attorney covariates and once with the filer's county of residence.

Examining Table 1 indicates several interesting trends which frame our misclassification results. Approximately 80 percent of the filers in the District filed under Chapter 7, a finding that is slightly higher than national averages. For example, data from the U.S. Bankruptcy Court website (http://www.uscourts.gov/Statistics/BankruptcyStatistics.aspx) indicates that in 2009, there were 1,332,361 consumer bankruptcy filings with primarily non-business debt, of which 932,566 (or 70 percent) were Chapter 7 filings. In 2011, there were 1,385,120 non-business filings, of which 984,125 (or 71 percent) were Chapter 7 filings. This suggests the possibility (but in no way proves) that some debtors in the Eastern Washington U.S. Bankruptcy Court District may be disproportionately misclassified into a Chapter 7 filing. This should be placed in the overall context that ratios between Chapter 7 and Chapter 13 filings vary dramatically nationwide, with the nationwide mean of 29 to 30 percent being Chapter 13s,

being the result of the averaging of wide variations by bankruptcy district and county filings within those districts. As noted by the monthly income and expense variables, the typical debtor in the sample (as measured by the sample mean) is cash flow insolvent, since expenses exceed income. The typical debtor is also insolvent based on balance sheet considerations, as liabilities exceed expenses. At the mean, unsecured claims represent a larger proportion of liabilities than do secured claims. Under a Chapter 7 filing, most of these unsecured claims are discharged.

Table 1 also yields some interesting filer demographics. Between 11 and 12 percent (11.74 percent) of filers had previously filed for bankruptcy protection. One-third of filers (33.33 percent) reside in Spokane County, while nearly sixteen (15.66) percent of filers reside in Benton and Franklin counties. The remaining 51.01 percent of filers live in the other 17 counties in the District. The three attorneys collectively handle over 16 percent of the District's case load. Approximately 41.04 percent of filers submit a joint bankruptcy petition, and nearly sixty (59.60) percent of filers claim dependents. Only 1.39 percent of filers report a disability, while 4.17 percent report being retired.

MISCLASSIFICATION RESULTS

Table 2 contains our misclassification analysis which includes the primary bankruptcy attorneys in the district as regressors. The overall chi-square statistic (statistic: 521.1400; prob. < 0.0001) suggests that the misclassification model predicts a significant proportion of variation in chapter filing decisions. As expected, the coefficient estimate for the natural logarithm of income is negative and statistically significant from zero, while the estimate for the natural logarithm for expenses is positive and statistically significant. Thus, holding the other specified regressors constant, a decrease in the filer's income increases the likelihood of passing the means test, and becoming eligible to file under Chapter 7. Similarly, an increase in Court-approved expenses suggest legitimate household considerations which adjust the means test standard upwards, and thereby increase the likelihood that a debtor files under Chapter 7.

Several debtor financial characteristics are significant determinants of the likelihood of a Chapter 7 filing (relative to a Chapter 13 filing) in the misclassification regressions, none of which are statistically significant at the five percent level in the standard logit model. Those with a greater store of personal property are less likely to file under Chapter 7, while those with greater secured claims and unsecured claims are more likely to file under Chapter 7 than under Chapter 13. Again, these results are intuitive. Non-exempt assets are liquidated under a Chapter 7 filing; however, they may be retained under a Chapter 13 filing so long as the debtor meets the terms of the repayment plan and provides the court and creditors a liquidation analysis. The purpose of the liquidation analysis is to show balance sheet evidence that retention of the asset would not provide less payment to the creditors than a Chapter 7 liquidation. Debtors with greater assets, especially personal property are also more likely to have greater non-exempt assets, which make a Chapter 7 filing less attractive than a Chapter 13 filing. More liabilities are discharged under a Chapter 7 filing than under a Chapter 13 filing, which makes a Chapter 7 filing more appealing to debtors with greater liabilities. The magnitude of the unsecured liabilities coefficient estimate (11.51) is nearly nine times larger than the magnitude of the secured liabilities coefficient estimate (1.32), which suggests a disproportionate incentive for filers with unsecured liabilities to attempt to file under Chapter 7.

Several debtor characteristics are also significant determinants of chapter filing decisions at the five percent significance level. Individuals who have previously filed for bankruptcy protection are significantly less likely to file under Chapter 7. This is likely due to the fact that a debtor who files for bankruptcy protection is ineligible to file a subsequent Chapter 7 bankruptcy petition for at least eight years after the initial filing (11 U.S.C. §727(a)(8)). All subsequent bankruptcy petitions within this time frame must be filed under Chapter 13. And these Chapter 13 filings are only allowed after a 4 year waiting period from the earlier Chapter 7 filing (11 U.S.C. §1328(f)(1)). Debtors who employ attorney A2 are more likely to submit a Chapter 7 filing relative to all other attorneys in the District. Individuals who employ bankruptcy attorneys A1 or A3 are no more or less likely than other attorneys to submit a Chapter

7 bankruptcy filing, holding the other specified regressors constant. Retired individuals are significantly more likely to file under Chapter 7 than non-retired individuals, again holding the other specified regressors constant. We note in passing that the signs and statistical significance of these estimates are consistent between the binary logit and misclassification models.

Several debtor demographic variables are statistically significant in the misclassification model, but insignificant in the binary logit model. Filers who are disabled, and who have dependents, are both significantly less likely to file under Chapter 7, relative to those who are not disabled and who have no dependents, respectively. One plausible explanation for these findings is that Chapter 13 allows the filer to retain a specific asset of importance to a debtor. For most debtors, homestead exemptions provide sufficient dollar levels so as to protect the debtor's personal residence. Debtors in a Chapter 13 can also retain non-exempt assets by providing sufficient payments to meet the liquidation analysis hurdle. This may be especially important for disabled filers and filers with children, for whom retaining position of a home or other asset is important for non-financial reasons. Filers who petitioned for bankruptcy protection in 2009 were significantly more likely to file under Chapter 7 of the bankruptcy code; a finding which may have been driven by the recession that existed in 2009, and from which the economy had begun to recover from by 2011.

Of primary importance are the statistical significance and magnitudes of the misclassification estimates. The coefficient estimate for the likelihood that a filer actually filed under Chapter 7, but should have filed under Chapter 13 is 0.0884, and is statistically significant from zero. Concomitantly, the probability that a Chapter 13 filer should have filed under Chapter 7 is statistically no different from zero. This implies two important inferences. First, those who file under Chapter 13, whether or not they pass the means test, are doing so appropriately, and very likely do so for very specific, premeditated reasons. Second, the fact that nearly 9 percent of filers should be moved from a Chapter 7 filing to a Chapter 13 filing suggests that the means test criteria is not structured with sufficient detail to identify all debtors who have an ability to repay some or all of their outstanding financial obligations.

Table 3 presents a similar analysis, except that the dummy variables for the filer's attorneys have been replaced with the filer's county of residence. As in the previous regression, filers with greater expenses and lower incomes are more likely to pass the means test, and thus are significantly more likely to file under Chapter 7, holding the effects of the other specified regressors constant. Those filers with greater amounts of secured and unsecured liabilities are also significantly more likely to file under Chapter 7 (relative to Chapter 13), holding the other specified regressors constant. However, the coefficient estimate for the natural logarithm of the ratio of personal property to the natural logarithm of real total assets is no longer statistically different from zero.

Many of the debtor demographics that were statistically significant in Table 2 remain significant in Table 3. For example, filers who have previously filed for bankruptcy, who have dependents, and who are disabled are significantly less likely to file under Chapter 7, holding the effects of the other specified regressors constant. Those who are retired, and who filed in 2009, are significantly more likely to file under Chapter 7.

Both county estimates are positive and statistically significant at the five percent level. The signs and significance of these estimates are consistent in both the binary logit and misclassification models. Hence, filers in the District's most urban areas are significantly more likely than those in other parts of the District to file for Chapter 7 bankruptcy protection.

Lastly, the misclassification estimates in Table 3 mirror those from Table 2. More specifically, the likelihood that a Chapter 13 filer should file under Chapter 7 is not statistically different from zero. However, the probability that a Chapter 7 filer should file under Chapter 13 is statistically different from zero, and the corresponding estimate is 0.1057. Hence, the means test fails to catch approximately 10 percent of filers who have an ability to repay some or all of their debts.

DISCUSSION AND CONCLUSIONS

This study used techniques drawn from the econometric misclassification literature (Hausman, Abrevaya and Scott-Morton, 1998) to estimate the likelihood with which a debtor files under an inappropriate chapter of the U.S. Bankruptcy Code. We applied the technique using a random sample of bankruptcy filers drawn from the Eastern Washington Bankruptcy Court District. We find that, holding most of the salient debtor financial and demographic characteristics constant, approximately 10 percent of Chapter 7 filers are more appropriately placed in a Chapter 13 filing. The percentage of debtors who filed under Chapter 13, but should have filed under Chapter 7, was not statistically different from zero. The policy implications of our finding are threefold. First the decision to file under Chapter 13 (where a repayment plan is established and some portion of outstanding debts is repaid) appears to be an intentional one, regardless of whether the filer passed the means test and could have filed under Chapter 7. In that sense, the U.S. Bankruptcy Code appears to function efficiently and effectively.

Second, the fact that some filers who should have filed under Chapter 13, but were allowed to file under Chapter 7 (where the vast majority of outstanding debts are immediately discharged) suggests that criteria used in the means test are not sufficiently precise to identify all bankruptcy filers who have an ability to repay some of their debts. Thus, the current version of the U.S. Bankruptcy Code fails to function efficiently and/or effectively. Perhaps more concerning is the magnitude of the misclassification, or what we term the "bankruptcy loophole". In the Eastern Washington U.S. Bankruptcy Court District, there are approximately 4,000 filings per year, of which 80 percent, or slightly more than 3,000 filings, are under Chapter 7. If ten percent of these filings are misclassified, then slightly more than 300 filers should be misclassified. According to Table 1, the average (mean) filer in the sample has $189,167 in liabilities. If even a fraction of these liabilities are discharged in a Chapter 7 filing, the social costs of misclassification in this District will be in the tens of millions of dollars. For example, if the typical misclassified filer holds liabilities equivalent to the sample average, and only 10 percent of these liabilities are discharged, then the social costs of misclassification for these 300 debtors will be in the neighborhood of $56.75 million.

Several simple mechanisms exist to close the bankruptcy loophole. One option is to reduce the means test threshold below the state median income, adjusted for family size. The benefit of this approach is that is a relatively simple adjustment. The detriment to this approach is that over-correction may occur (i.e., the threshold is set too low) and misclassification in the other direction may occur (i.e., filers may be inappropriately forced into a Chapter 13 filing). An alternative, and much more precise approach to addressing misclassification may be to apply what is known as "707 (b)3 pressure" to filers who might otherwise pass the means test. Prior to BAPCPA, U.S. Trustees used the "substantial abuse" provisions of 11 U.S.C. 707(b) to provide a legal basis to scrutinize debtor's expense schedules to identify debtors with sufficient disposable income to fund a Chapter 13. U.S. Trustees, operating in separate bankruptcy districts, used their working knowledge of local economic conditions (housing costs, transportation costs, food expenses, etc.) to individually scrutinize bankruptcy expense schedules to identify potential abusive filers. Debtors identified through this process might easily pass the means test analysis. The means test, by using regional and U.S. tax standards, would arbitrarily set median expense levels and ignore local expense differentials. After BAPCPA, 11 U.S.C. 707 (b)(3) would still allow for this particularized treatment, but the means test becomes the default standard, and, by policy, U.S. Trustee resources are primarily allocated to enforcing the "means test" application.

A final policy implication concerns the academic research investigating chapter filing decisions. Our misclassification estimates vary substantially in statistical significance from virtually identical model specifications estimated using traditional discrete choice models. Hence, a failure to account for chapter misclassification, and more specifically, to account for the underlying determinants of a filers *actual* ability to repay one's debts (over and above the means test) can lead to biased estimates and potentially misleading inferences about the factors that cause debtors to file under a specific chapter of the U.S. Bankruptcy Code.

While our analysis presents some interesting findings, our empirical results are not exhaustive and should be viewed with caution. For example, our results reflect a random sample drawn from a single U.S. Bankruptcy Court District. While our results are an accurate and precise reflection of bankruptcy filings in this district, they may or may not accurately reflect behaviors in other districts which exhibit different chapter filing patterns. Hence, replications of this analysis in other districts, or which use a nationally representative sample, are necessary to draw policy conclusions for the U.S. as a whole. Additionally, our misclassification analysis is based on the assumption of a logistic distribution, and that the likelihood of misclassification can be estimated as parameters. But if these assumptions are not appropriate, our estimates may be biased. Future research that relaxed these assumptions, especially research using the Tennekoon and Rosenman (2014) methodology to model the misclassification probabilities as a function of the model's covariates, is necessary to verify that our results before they are used to enact policy reforms. Lastly, our data set did not provide a sufficient breadth of quantitative regressors to enable us to employ the Tennekoon and Rosenman (2014) methodology. This also suggests that our empirical results may suffer from omitted variable bias. Future research that applied a more robust data set within a more robust misclassification technique would improve upon the precision and accuracy of our results.

ENDNOTES

1. Examples of exempt assets include pensions, public benefits (i.e., welfare payments), damages awarded by a jury for personal injury and household appliances. Other assets, such as automobiles, personal property (clothes, jewelry, etc.) and home equity may be exempt up to a certain dollar value.
2. This income is also known as "current monthly income".
3. Some high debt/high income individuals are able to file under Chapter 11 of the U.S. Bankruptcy Code, which is typically used as a business reorganization chapter.
4. It is theoretically possible for debtors who are small business owners, or who have other unique characteristics, to file under another chapter (usually Chapter 11) of the U.S. Bankruptcy Code. In such cases, equation (2) can be normalized such that the variable represents Chapter 7 filers (those identified with a value of one) versus those who file under all other possible chapters of the Code.
5. We note in passing that we attempted to estimate our model using Tennekoon and Rosenman's (2014) methodology. All reasonable specifications of that model failed to converge. As will be discussed in the following paragraphs, the information in our dataset contains a wide variety of variables; however, the majority of these variables are binary or qualitative in nature. The inability to ensure converge in our dataset is likely due to the lack of continuous control variables.
6. The data are identical to those used in a previous study (Hackney, Friesner, Brajcich and Hickman, 2014). We refer the interested reader to this study for a more detailed description of the data. Permission was granted by the article's publisher to reproduce descriptive statistics for these data.
7. The three attorneys were identified as those who handle the highest caseloads in the District. There are 20 counties in the District, which cover the eastern two-thirds of the state beyond the Cascade Mountains (see http://www.waeb.uscourts.gov/sites/default/files/waeb/img/WA.gif for more details). The majority of these counties are geographically large, with small populations and local economies based heavily on agriculture, mining and forestry. The two largest communities are Spokane (in Spokane County) and the Tri-Cities area of Kennewick, Pasco and Richland. The majority of the Tri-Cities populations are located in Benton and Franklin counties.

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TABLE 1
DESCRIPTIVE STATISTICS

Variable	Description	Mean or Proportion	Standard Deviation
CH7DV	Binary Variable Indicating a Chapter 7 Filing	0.8020	
RINC	Real Average Monthly Income in 2009 Dollars	2711.5000	1791.1000
LRINC	Ln(RINC)	7.619	1.1910
REXP	Real Average Monthly Expenses in 2009 Dollars	2739.0700	1750.5000
LREXP	Ln(REXP)	7.7508	0.6748
RASSETS	Real 2009 Dollar Value of Debtor Assets	113,641.4700	157832.2600
LRASSETS	Ln(RASSETS)	10.5243	1.8383
RRPROP	Real 2009 Dollar Value of Real Property	89263.3200	144179.0800
RPPROP	Real 2009 Dollar Value of Personal Property	24378.1400	38589.1300
EPPROP	Ln(Real Personal Property)/Ln(RASSETS)	0.9070	0.1079
RLIAB	Real 2009 Dollar Value of Debtor Liabilities	189167.1700	422795.4200
LRLIAB	Ln(RLIAB)	11.4106	1.2001
RSECCLM	Real 2009 Dollar Value of Secured Claims	102572.6119	182610.4981
RUSECCLM	Real 2009 Dollar Value of Unsecured Claims	84587.8589	296718.8639
ESECCLM	Ln(Real Secured Claims)/Ln(RLIAB)	0.6660	0.4217
EUSECCLM	Ln(Real Unsecured Claims)/Ln(RLIAB)	0.9263	0.0929
PRIORBK	Binary Variable Indicating a Debtor's Previous Bankruptcy Filing	0.1174	
SPOKANE	Binary Variable Indicating a Spokane County Resident	0.3333	
BENTONF	Binary Variable Indicating a Benton County or Franklin County Resident	0.1566	
OTHER	Binary Variable Indicating a Resident of Another County	0.5101	
A1	Binary Variable Indicating Attorney A1 Handled the Filing	0.0530	
A2	Binary Variable Indicating Attorney A2 Handled the Filing	0.0606	
A3	Binary Variable Indicating Attorney A3 Handled the Filing	0.0480	
JOINT	Binary Variable Indicating a Joint Filing	0.4104	
DEPDV	Binary Variable Indicating the Debtor has Dependents	0.5960	
DISABLED	Binary Variable Indicating a Disabled Debtor	0.0139	
RETIRED	Binary Variable Indicating a Retired Filer	0.0417	
DV09	Binary Variable Indicating a 2009 Filing	0.4962	
Number of Observations		792	

TABLE 2
MISCLASSIFICATION ANALYSIS WITH ATTORNEYS AS REGRESSORS

Estimation Method:	Binary Logit						Nonlinear Least Squares Misclassification Analysis				
Dependent Variable:	CH7DV						CH7DV				
				Chi-Square		Odds					
Variable	Coefficient	Standard Error		Statistic	Prob.	Ratio	Coefficient	Standard Error	Lower 95% Confidence Int.	Upper 95% Confidence Int.	
Intercept	2.2405	4.5581		0.2416	0.6230		4.4808	5.2682	-5.8609	14.8226	
LRINC	-16.6142	1.6909	*	96.5434	<.0001	<0.0001	-46.5745	6.2729	-58.8884	-34.2605	*
LREXP	16.4462	1.7063	*	92.8965	<.0001	>999.999	45.8975	6.2041	33.7186	58.0764	*
LRASSETS	-0.1831	0.1674		1.1969	0.2739	0.8330	-0.0460	0.1725	-0.3846	0.2926	
EPPROP	-3.6623	2.3850		2.3579	0.1246	0.0260	-6.4181	2.5929	-11.5082	-1.3280	*
LRLIAB	0.1308	0.1920		0.4644	0.4956	1.1400	0.0270	0.1950	-0.3558	0.4098	
ESECCLM	0.4981	0.4837		1.0605	0.3031	1.6460	1.3244	0.5177	0.3081	2.3408	*
EUSECCLM	5.2553	2.9109		3.2594	0.0710	191.5840	11.5061	3.7498	4.1452	18.8671	*
PRIORBK	-2.4026	0.3376	*	50.6364	<.0001	0.0900	-3.5084	0.5364	-4.5613	-2.4554	*
A1	1.1947	0.6775		3.1101	0.0778	3.3030	2.6192	1.2950	0.0771	5.1613	
A2	2.1146	0.8955	*	5.5760	0.0182	8.2860	2.4173	1.1281	0.2027	4.6319	*
A3	1.4243	0.9641		2.1823	0.1396	4.1550	1.2571	1.6854	-2.0514	4.5655	
JOINT	-0.0849	0.2929		0.0841	0.7718	0.9190	-0.4191	0.3219	-1.0511	0.2129	
DEPDV	-0.1665	0.2988		0.3105	0.5774	0.8470	-1.1821	0.4032	-1.9736	-0.3906	*
DISABLED	-1.0017	0.8592		1.3592	0.2437	0.3670	-2.6138	0.8400	-4.2628	-0.9649	*
RETIRED	2.9346	1.0899	*	7.2502	0.0071	18.8130	9.6983	1.5581	6.6397	12.7569	*
DV09	0.4340	0.2710		2.5660	0.1092	1.5430	1.1116	0.3436	0.4371	1.7861	*
Prob (File 7 |Should File 13)							0.0884	0.026	0.0373	0.1395	*
Prob (File 13 |Should File 7)							0.0176	0.0116	-0.00528	0.0404	
Chi-Square Test of Overall Fit				396.3601	<0.0001	*					
F[19,773] Statistic of Overall Fit									521.1400	<0.0001	*
* indicates statistical significance at the 5% level											

Estimation Method:	Binary Logit						Nonlinear Least Squares Misclassification Analysis				
Dependent Variable:	CH7DV						CH7DV				
Variable	Odds Ratio	Coefficient	Standard Error	Chi-Square Statistic	Prob.		Coefficient	Standard Error	Lower 95% Confidence Int.	Upper 95% Confidence Int.	
Intercept		3.8123	4.5300	0.7082	0.4000		10.0531	5.3029	-0.3568	20.4629	*
LRINC	<0.0001	-16.9022	1.7693	91.2569	<.0001	*	-59.6953	8.4303	-76.2443	-43.1463	*
LREXP	>999.9999	16.7663	1.7820	88.5200	<.0001	*	58.3962	8.2594	42.1827	74.6097	*
LRASSETS	0.8260	-0.1908	0.1682	1.2871	0.2566		0.1705	0.1759	-0.1748	0.5158	
EPPROP	0.0170	-4.0685	2.4083	2.8541	0.0911		-3.0549	2.6038	-8.1662	2.0564	
LRLIAB	1.0480	0.0472	0.1881	0.0630	0.8018		-0.3142	0.1824	-0.6723	0.0440	
ESECCLM	1.7490	0.5589	0.4787	1.3629	0.2430		2.2019	0.5894	1.0449	3.3588	*
EUSECCLM	95.8610	4.5629	2.8842	2.5028	0.1136		8.3234	3.6818	1.0960	15.5508	*
PRIORBK	0.0960	-2.3485	0.3289	50.9933	<.0001	*	-3.5660	0.5570	-4.6594	-2.4726	*
SPOKANE	2.0660	0.7258	0.3159	5.2795	0.0216	*	1.8225	0.4374	0.9638	2.6812	*
BENTONF	2.4370	0.8907	0.4106	4.7058	0.0301	*	2.1062	0.5290	1.0678	3.1446	*
JOINT	0.9930	-0.0071	0.2860	0.0006	0.9803		0.0149	0.3054	-0.5845	0.6144	
DEPDV	0.8500	-0.1630	0.2975	0.3003	0.5837		-1.1216	0.3966	-1.9000	-0.3431	*
DISABLED	0.3050	-1.1866	0.8723	1.8505	0.1737		-3.0653	0.9251	-4.8813	-1.2494	*
RETIRED	18.1950	2.9012	1.0958	7.0090	0.0081	*	12.0421	1.9297	8.2541	15.8301	*
DV09	1.5550	0.4412	0.2683	2.7033	0.1001		1.3470	0.3781	0.6048	2.0892	*
Prob (File 7 |Should File 13)							0.1057	0.0248	0.0570	0.1544	*
Prob (File 13 |Should File 7)							0.0162	0.0112	-0.0057	0.0381	
Chi-Square Test of Overall Fit				391.6247	<0.0001	*					
F[18,774] Statistic of Overall Fit									554.5400	<0.0001	*

* indicates statistical significance at the 5% level