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Debt Relief and Debtor Outcomes: Measuring the Effects of Consumer Bankruptcy Protection

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Abstract

Consumer bankruptcy is one of the largest social insurance programs in the United States, but little is known about its impact on debtors. We use 500,000 bankruptcy filings matched to administrative tax and foreclosure data to estimate the impact of Chapter 13 bankruptcy protection on subsequent outcomes. Exploiting the random assignment of bankruptcy filings to judges, we find that Chapter 13 protection increases annual earnings by $6,288, decreases five-year mortality by 1.1 percentage points, and decreases five-year foreclosure rates by 8.3 percentage points. We conclude by using our reduced form estimates to calibrate a general equilibrium model of the credit market.

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"The Bankruptcy Act is...of public as well as private interest, in that it gives to the honest but unfortunate debtor...a new opportunity in life and a clear field for future e□ort, unhampered by the pressure and discouragement of pre-existing debt."

- U.S. Supreme Court, *Local Loan Co.* v. *Hunt*, 292 U.S. 234 (1934)

In 2010, 1.5 million Americans filed for over $450 billion in debt relief through the consumer bankruptcy system.[1] American households receive more resources through the bankruptcy system than through Temporary Assistance for Needy Families and all state unemployment insurance programs combined (Lefgren, McIntyre, and Miller 2010), with nearly one in ten American households having filed for bankruptcy at some point (Stavins 2000). The U.S. bankruptcy system is also among the most generous in the world, allowing debtors to choose between Chapter 7, which provides debt relief and protection from wage garnishment in exchange for a debtor's non-exempt assets, and Chapter 13, which adds the protection of most assets in exchange for a partial repayment of debt.

Despite providing billions in debt relief each year, it is not clear how bankruptcy protection impacts debtors. In theory, bankruptcy protection increases an individual's incentive to work and prevents any sharp drops in consumption that may have important long-term consequences, such as becoming sick through lack of medical care or losing one's home through foreclosure. Yet, in practice, households work about the same number of hours (Han and Li 2007), accumulate less wealth (Han and Li 2011), and have less access to credit (Cohen-Cole, Duygan-Bump and Montoriol-Garriga 2009) after receiving bankruptcy protection, leading some to conclude that the benefits of debt relief have been overstated (Porter and Thorne 2006). The lack of demonstrable benefits, combined with a rapid increase in the number of bankruptcy filings, led Congress to enact new barriers to filing in the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act.

Empirically estimating the impact of bankruptcy protection has been complicated by two important issues. First, there is little information on the long-term outcomes of most bankruptcy filers. Bankruptcy filers are not tracked in a systematic way after filing, and datasets such as the PSID and NLSY include only a few hundred bankrupt households. Second, selection and endogeneity problems bias most comparisons. Bankruptcy filers are likely to have had worse outcomes even before filing, biasing cross-sectional comparisons, and most proximate causes of bankruptcy such as job loss and health shocks also impact later outcomes, biasing within-individual comparisons.

In this paper, we use a new dataset linking 500,000 bankruptcy filings with administrative tax

[1] Non-business Chapter 7 and Chapter 13 filing statistics are available at
http://www.uscourts.gov/uscourts/Statistics/BankruptcyStatistics/BAPCPA/2010/Table1A.pdf
http://www.uscourts.gov/uscourts/Statistics/BankruptcyStatistics/BAPCPA/2010/Table1D.pdf

records from the Social Security Administration (SSA) and administrative foreclosure records to estimate the causal effect of Chapter 13 bankruptcy protection on subsequent earnings, mortality, and home foreclosures. Our empirical strategy exploits the fact that most U.S. bankruptcy courts use a blind rotation system to assign cases to judges, effectively randomizing filers to judges within each court. Moreover, while there are uniform criteria by which a judge may dismiss a bankruptcy filing, there is significant variation in the interpretation of these criteria across judges (Sullivan, Warren, and Westbrook 1994, Norberg and Compo 2007, Chang and Schoar 2008). As a result, otherwise identical filers are assigned to judges with substantially different rates of granting bankruptcy protection.[2]

Using these differences in judge discharge rates as an instrumental variable for bankruptcy protection, we are able to identify the ex-post impact of Chapter 13 on the marginal recipient of protection – filers whose bankruptcy decision is altered by the judge assignment due to disagreement on whether or not they should receive bankruptcy protection. The identified parameter holds fixed any ex-ante impacts of bankruptcy, such as over-borrowing, moral hazard in the workplace (White 2011), entrepreneurial risk-taking (Fan and White 2003, Armour and Cummings 2008), or the crowding out of formal insurance (Mahoney 2010). Our empirical strategy is therefore similar to Kling (2006), who uses the random assignment of judges to estimate the ex-post impact of sentence length on earnings, and subsequent research estimating the ex-post effects of foster care (Doyle 2007, 2008), corporate bankruptcy (Chang and Schoar 2008), temporary-help employment (Autor and Houseman 2010), and Disability Insurance (French and Song 2011, Maestas, Mullen, and Strand forthcoming).

We find compelling evidence that Chapter 13 bankruptcy protection benefits debtors. Over the first five post-filing years, Chapter 13 protection increases the marginal recipient's annual earnings by $6,288, a 27.5 percent increase from the pre-filing mean. Employment increases by 3.3 percentage points over the same time period, a 4.1 percent increase. Five-year mortality decreases by 1.1 percentage points, a 27.5 percent decrease from the dismissed filer mean, and five-year home foreclosure rates decrease by 8.3 percentage points.

Next, we explore two possible mechanisms through which bankruptcy protection may benefit debtors. First, we exploit within- and across-state variation in wage garnishment to assess the

[2] We are unable to estimate the impact of Chapter 7 bankruptcy protection using judge assignment, as there is relatively little variation in the treatment of Chapter 7 cases. In Online Appendix B, we use an event study design to show that filers granted protection under Chapter 7 earn $1,048 more each year, are 6.3 percentage points more likely to be employed, and are 1.45 percentage points less likely to be deceased after five years.

importance of the Chapter 13 provision protecting wages from garnishment. We find that the impact of Chapter 13 is sharply increasing in the marginal garnishment rate, with an implied earnings elasticity with respect to garnishment of 2.02. These results are consistent with the idea that bankruptcy protection increases the incentive to work by lowering the effective marginal tax rate on earnings. Second, we use information from firm EINs to estimate the impact of Chapter 13 on economic stability. We find that marginal recipient of Chapter 13 is 25.4 percentage points more likely to work in his or her pre-filing job, 25.2 percentage points more likely to work in the same industry, and 19.3 percentage points more likely to work in the same state, with larger impacts for filers facing higher marginal garnishment rates. These results suggest that Chapter 13 increases economic stability by reducing both foreclosure related moves and moves meant to evade creditors seeking repayment.

We conclude by considering our results in light of a stylized general equilibrium model of the credit market. Analyses of the consumer bankruptcy system have typically focused on changes to consumption smoothing and borrowing costs, largely ignoring the relationship between bankruptcy and earnings estimated in this paper (e.g. Athreya 2002, Li and Sarte 2006, Livshits, MacGee, and Tertilt 2007, Chatterjee and Gordon forthcoming). As a result, the existing literature is likely to have understated the potential benefits of the consumer bankruptcy system. Using our reduced form estimates to calibrate a stylized extension of these models, we find that the benefits of bankruptcy are nearly 20 times larger when bankruptcy is allowed to impact earnings.

The remainder of the paper is structured as follows. Section I provides a brief overview of consumer bankruptcy law in the United States. Section II presents a stylized model to formalize our research design. Section III describes our data and provides summary statistics. Section IV estimates the impact of Chapter 13 bankruptcy protection on labor supply, mortality, and home foreclosure. Section V discusses our results in light of a stylized general equilibrium model, and Section VI concludes.

I. Consumer Bankruptcy in the U.S.

A. Overview

Bankruptcy is the legal process to resolve unpaid debts. In the United States, individual debtors are allowed to choose between Chapter 7 and Chapter 13 bankruptcy protection.

Under Chapter 7, debtors forfeit all non-exempt assets in exchange for a discharge of eligible

debts and protection from future wage garnishment. Nearly all unsecured debts are eligible for discharge under Chapter 7, including credit card debt, installment loans, medical debt, unpaid rent and utility bills, tort judgments, and business debt. Student loans, child support obligations, and debts incurred by fraud cannot be discharged under Chapter 7, and secured debts such as mortgages, home equity loans, and automobile loans can only be discharged if debtors give up the collateral.

Under Chapter 13, filers propose a three- to five-year plan to repay part of their unsecured debt in exchange for a discharge of the remaining unsecured debt, protection from future wage garnishment, and the protection of most assets. For example, Chapter 13 allows debtors to retain assets pledged as collateral by including the collateral amount in the repayment plan. Chapter 13 also allows debtors to avoid home foreclosure by including any mortgage arrears in the repayment plan, with the original mortgage reinstated after completion of the plan. Seventy percent of Chapter 13 filers report that avoiding foreclosure is their principal reason for choosing to file under Chapter 13 (Porter 2011), with 71 percent of filers including mortgage arrears in their repayment plans. In comparison, 41 percent of filers include car loans in their repayment plan, 38 percent include priority debt, and 0.5 percent include student loans (White and Zhu 2010).[3]

Under either Chapter, a randomly assigned bankruptcy judge decides any and all matters connected to a case, including whether or not to dismiss a filing.[4] The most common reason a filing is dismissed is that it constitutes a "substantial abuse" of the bankruptcy process, typically meaning that a debtor being able to repay his or her debts without bankruptcy protection. Other commonly reasons for dismissal include a filing missing important information, a repayment plan being infeasible, or a repayment plan paying being too small (Hynes 2004).

Creditors have a number of options to collect unpaid debts if a filing is dismissed, including collection letters or phone calls, in-person visits at home or work, or seizing assets through a court order (Dawsey, Hynes, and Ausubel 2009). Creditors may also collect unpaid debts by obtaining a wage garnishment order from the state court. Federal law restricts the weekly total of most garnishments to 25 percent of disposable earnings.[5] If debtors have weekly earnings less than 40

[3] One additional difference between Chapter 7 and Chapter 13 is that dismissed Chapter 7 filers are not allowed to refile under any Chapter for at least six years, while dismissed Chapter 13 filers are allowed to refile for bankruptcy after only 180 days. While almost no dismissed Chapter 13 filers refile under Chapter 13, approximately 20 percent refile under Chapter 7. Dismissed Chapter 13 filers who refile under Chapter 7 tend to be those with fewer assets and higher debts.

[4] Procedurally, U.S. bankruptcy courts typically use a random number generator or blind rotation system to assign filings within a court. For example, Rule 1073-1 of the bankruptcy code of the Minnesota Assignment of Cases states "[e]ach case shall be assigned to a judge by random allocation as determined by order of the judges. Unless otherwise ordered, the judge assigned to the case shall thereafter hear all matters and preside at all times in the case. All adversary proceedings arising in or related to the case shall be assigned to the same judge."

[5] Federal law allows garnishments of up to 50 percent of a debtor's disposable earnings for payment related to

times the minimum wage, creditors may only garnish disposable earnings minus 30 times the federal minimum wage. Wages cannot be garnished when debtors earn less than 30 times the minimum wage. Debtors can make all of these collection efforts more difficult by ignoring collection letters and calls, changing their telephone number, or moving without leaving a forwarding address. Debtors can also leave the formal banking system to hide their assets from seizure, change jobs to force creditors to reinstate a garnishment order, or work less so that their earnings are not subject to garnishment.

B. Potential Benefits of Bankruptcy Protection

There are at least two reasons debtors may benefit from bankruptcy protection. First, bankruptcy protection may increase the incentive to work by protecting future wages from garnishment. Marginal garnishment rates can reach 100 percent, with most filers facing a 25 percent marginal garnishment rate. In *Local Loan Co.* v. *Hunt* (1934), the U.S. Supreme Court went as far as to argue that eliminating these distortions is "[o]ne of the primary purposes of the Bankruptcy Act," as "[f]rom the viewpoint of the wage earner, there is little difference between not earning at all and earning wholly for a creditor."

The second reason debtors may benefit from bankruptcy protection is an increase in economic stability. Bankruptcy protection discharges most debts, allows debtors to avoid home foreclosure, and reduces the incentive to strategically move across state lines or change jobs to avoid creditors. Bankruptcy protection may also help debtors avoid the kinds of sharp drops in consumption that have important long-term consequences, such as becoming sick through lack of medical care or losing one's car through repossession, and may reduce the psychic and time costs associated with excessive debt that may impact a debtor's health or ability to stay employed. Each of these channels contributes to an overall increase in economic stability that may benefit debtors.

There are also many reasons to believe that bankruptcy protection will have little impact on debtors. It is possible that financially distressed households have highly inelastic labor supply, or that debt relief will reduce the incentive to work through the income effect. It is also possible that debtors are able to avoid most debt collection efforts at a relatively low cost, or that garnishment amounts are too low to impact labor supply decisions. Finally, it is possible that bankruptcy filers are in financial distress due to low human capital or poor health that the bankruptcy system is

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child support or alimony if the worker is supporting another spouse or child, and up to 60 percent if the worker is not. An additional five percent may be garnished for court order payments more than 12 weeks in arrears.

unable to remedy.

II. Model and Research Design

In this section, we develop a stylized bankruptcy and labor supply model to formalize our estimation strategy and identifying assumptions. We simplify the model by assuming a single debt relief program and predetermined debt. Our model is therefore unable to shed light on any ex-ante impacts of bankruptcy or the interplay between Chapter 7 and Chapter 13.

Setup. Individuals are endowed with identical debts D, and an idiosyncratic disutility of work that captures differences in ability across individuals. We assume that $\sim [0; \bar{}]$, is known by the individual, but only partially observable to the bankruptcy court.

In the first period of the model, individuals choose whether or not to file for bankruptcy protection at cost F that includes all psychic or monetary costs of filing. Individuals pay F regardless of the bankruptcy decision, and before any labor supply decisions are made. Individuals receive a full discharge of debt if bankruptcy protection is granted, but must repay their debts out of wage earnings if bankruptcy is not granted. Conditional on filing, the probability of receiving bankruptcy protection is equal to $p(\ )$. We assume that $p(\ )$ is increasing in to capture the idea that bankruptcy judges dismiss filings from individuals who are able to repay their debts outside the bankruptcy system (e.g. filings that are a "substantial abuse" due to the filer's low disutility of work).

In the second period, individuals do or do not receive bankruptcy protection. Individuals then choose whether to work at wage W, or to not work and receive C in social welfare. If individuals leave the labor market, they cannot be made to repay their debts. Dropping out of the labor market is therefore a different type of debt relief. We assume that wage earners pay a lump sum tax that finances debt relief and social welfare payments.

An individual's utility is equal to earnings minus the disutility of work , debt D, filing costs F, and taxes . To simplify the model, we assume that all individuals prefer to work if they are given bankruptcy protection, and no one prefers to drop out of the labor force immediately over filing for debt relief. The first assumption holds if $W - \bar{} - \ - F \geq C$. The second holds if $p(\ )$ is concave and $p(\bar{}) \cdot (W - C - \bar{} - \ ) \geq F$. These conditions ensure that $p(\bar{})$ is sufficiently high and that the disutility of work $\bar{}$ is sufficiently low that individuals with $= \bar{}$ file for bankruptcy protection.

Given these assumptions, there are three utility levels to consider: $U_W(\ ) = W - \ - D -$ for workers not receiving bankruptcy protection, $U_{WB}(\ ) = W - \ -$ for workers receiving bankruptcy

protection, and $U_N(\ ) = C$ for individuals who are not working and not receiving bankruptcy protection. Given the utility functions of workers and non-workers, we can analyze which individuals prefer working to not working if they do not receive bankruptcy protection and which individuals prefer filing for bankruptcy to not filing for bankruptcy.

Proposition 1: There exists a cuto $_W$ that equates the utility of working without bankruptcy protection with the utility of not working:

$$U_W(\ _W) = U_N$$

which implies $_W = C - W + \ - D$. Thus, individuals with $\leq C - W + \ - D$ will work even if their bankruptcy filing is dismissed, while individuals with $> C - W + \ - D$ will work only if they receive bankruptcy protection. This result is the well-known debt overhang problem, where debt distorts ex-post labor supply decisions (e.g. Krugman 1988).

Proposition 2: There exists a cuto $_F$ that equates the expected utility of filing for bankruptcy protection with the known utility not filing:

$$p(\ _F) \cdot U_{WB}(\ _F) - (1 - p(\ _F)) \cdot U_W(\ _F) - F = U_W(\ _F)$$

Since the utility of working without debt is strictly greater than the utility of working with debt, the threshold for filing for bankruptcy protection is lower than the threshold for work. Thus we have $_F < \ _W$, and all individuals on the margin of filing will work even if their filing is dismissed. These individuals compare the expected benefits of filing $p(\ ) \cdot D$ with the fixed filing costs F, holding fixed the work decision. Individuals will therefore file if $p(\ ) \cdot D \geq F$, and not file if $p(\ ) \cdot D < F$.

Figure 1 illustrates individuals' labor supply and filing choices, where $P(\ )$ is the fraction of the population with disutility of labor who would be granted bankruptcy protection had they filed. Very productive individuals ($<\ _F$) work and never file for bankruptcy protection, as the expected benefit is too low to justify the fixed filing costs ($p(\ ) \cdot D < F$). Individuals who are slightly less productive file for debt relief, but will work regardless of the filing outcome as $U_W(\ _W) \geq U_N$ by Proposition 1. In contrast, individuals with $>\ _W$ will work only if they receive debt relief.

We now turn to the bankruptcy system and the optimal allocation of debt relief. We assume that each bankruptcy judge j observes a noisy but unbiased signal of the disutility of labor $\hat{}_i^j = \ _i + \ _{ij}$, where $_{ij}$ is assumed to be i.i.d. within and across judges. The problem for each bankruptcy judge is

to maximize the sum of all individual utilities subject to an economy wide resource constraint equating government revenues and expenditures. Given the above setup, this is equivalent to choosing a cuto value of observed ability $\hat{}_B$ such that all filers with $\hat{} \geq \hat{}_B$ receive bankruptcy protection and all filers with $\hat{} < \hat{}_B$ do not receive bankruptcy protection.

Proposition 3: There exists a cuto $\hat{}_B$ that maximizes the sum of all individual utilities:

$$\int_0^{F(\hat{}_B)} U_W \, dF(\ ) \quad + \quad \int_{F(\hat{}_B)}^{W} [p(\ (\hat{}_B)) \cdot (U_{WB} - F) + (1 - p(\ (\hat{}_B))) \cdot (U_W - F)] \, dF(\ )$$
$$+ \quad \int_{W}^{\bar{}} [p(\ (\hat{}_B)) \cdot (U_{WB} - F) + (1 - p(\ (\hat{}_B))) \cdot (U_N - F)] \, dF(\ )$$

subject to a budget constraint that equates tax revenue from with expenditures on debt relief D and welfare payments C:

$$\int_0^{F(\hat{}_B)} dF(\ ) + \int_{F(\hat{}_B)}^{\bar{}} (1 - p(\ (\hat{}_B))) \cdot \ dF(\ ) = \int_{F(\hat{}_B)}^{\bar{}} p(\ (\hat{}_B)) \cdot D \, dF(\ ) + \int_{W}^{\bar{}} (1 - p(\ (\hat{}_B))) \cdot C \, dF(\ )$$

Thus, the choice of cuto $\hat{}_B$ balances two opposing forces. A more lenient cuto reduces social welfare payments and increases tax revenues by providing bankruptcy protection to individuals who would have otherwise dropped out of the labor market. However, that more lenient cuto increases the number of individuals receiving bankruptcy protection who would have worked regardless. The intuition is particularly clear when is fully observable. In this scenario, the sum of individual utilities is maximized by providing bankruptcy protection to only those individuals who would have otherwise dropped out of the labor market. That is, by setting $_B = \ _W$ so that $p(\ ) = 0$ when $< \ _W$, and $p(\ ) = 1$ when $\geq \ _W$. Thus the bankruptcy judge attempts to provide bankruptcy protection to individuals with a high disutility of work in order to encourage them to stay in the labor market and contribute to the tax base, while attempting to deny bankruptcy protection to those individuals who would have worked without bankruptcy.

Estimation. Our objective is to estimate the causal impact of Chapter 13 bankruptcy protection B on outcomes Y:

$$= E[Y|B = 1] - E[Y|B = 0]$$

In the context of our model, this treatment effect is equal to the structural parameter:

$$= \cdot \frac{\int_{W}^{\bar{}} dF(\ )}{\int_{F}^{\bar{}} dF(\ )}$$

where is the change in labor market outcomes for individuals whose labor supply decisions are affected by bankruptcy protection (e.g. those with $>$ $_W$), $\int_{W}^{\bar{}} dF(\ )$ is the proportion of affected filers, and $\int_{F}^{\bar{}} dF(\ )$ is the proportion of both affected and unaffected filers. The effect of bankruptcy protection is therefore increasing in the impact on the labor supply affected filers and the fraction of affected filers in the filing population.

The problem for inference is that OLS estimates of may be biased if bankruptcy protection is correlated with the unobservable determinants of later outcomes: $E[\ _i|Bankruptcy_i] \neq 0$. For example, bankruptcy filers are likely to have had worse outcomes even before filing, biasing cross-sectional comparisons. It is also likely that the most proximate causes of bankruptcy such as job loss and health shocks also impact later outcomes, biasing both cross-sectional and within-individual comparisons.

We identify the causal impact of bankruptcy on debtors using judge leniency as an instrument for bankruptcy protection. To illustrate the intuition behind our approach, recall that judges grant bankruptcy protection to filers who the judge believes will not repay their debts outside of bankruptcy:

$$\hat{}_{ij} > \hat{}_B$$

Up to this point, we have assumed that $\hat{}_{ij}$ is unbiased. We now relax this assumption by allowing each judge's estimate of unobservable ability to be a function of individual *i*'s true ability to repay, and characteristics of the judge assigned to the case, such as previous experience or personal biases:

$$\hat{}_{ij} = i + \ _j + \ _{ij}$$

where $_j$ is the systematic component of judge *j*'s decision-making that leads her to consistently over- or under-estimate a filer's disutility of labor, and $_{ij}$ is noise in the decision-making process

that is i.i.d. within and across judges.[6] This implies that bankruptcy protection is granted if:

$$_i + \ _j + \ _{ij} > \hat{}_B$$

which implies that judge j's probability of granting bankruptcy protection is:

$$P_j = 1 - F_{\ +}(\hat{}_B - \ _i - \ _j)$$

where $F_{\ +}$ is the cumulative distribution of unobservable ability plus the idiosyncratic noise . Thus, judge leniency $_j$ is correlated with the probability of receiving bankruptcy protection, but uncorrelated with unobservable filer characteristics $_i$ due to the random assignment of filings to judges.

Formally, we estimate the causal impact of receiving bankruptcy protection through a two-stage least squares regression using judge leniency as an instrumental variable for bankruptcy protection. The second stage estimating equation is:

$$y_{it} = \ + \ _{ct} + \ X_i + \ Bankruptcy_i + "_{it} \tag{1}$$

where i denotes individuals, t is the year of observation, is the causal impact of bankruptcy protection defined above, $_{ct}$ are office by month-of-filing fixed effects, X_i includes race, gender, a quadratic in age, baseline employment, and baseline earnings, and $"_{it}$ is noise. The first stage estimating equation associated with equation (1) is:

$$Bankruptcy_i = \ + \ _{ct} + \ X_i + \ _j + "_i \tag{2}$$

where represents the impact of judge leniency on the probability of receiving bankruptcy protection.

Using an exhaustive set of judge fixed effects as instruments for bankruptcy protection yields a consistent two-stage least squares estimate of as the number of filers $i \to \infty$, but is potentially biased in finite samples. This bias is the result of the mechanical correlation between a filer's own outcomes and the estimation of that filer's judge fixed effects. There are several potential

[6] The decision problem can also be expressed as one in which estimates of θ are unbiased, but judges use different cutoff values $\hat{\theta}_B^j$ due to pro-creditor or pro-debtor preferences. In this scenario, judge j grants a filing if $\hat{\theta}_i + \eta_{ij} > \hat{\theta}_B + \sigma_j$, where σ_j represents judge specific differences in the optimal cutoff.

solutions to this own-observation issue. Jackknife IV eliminates the bias by omitting a filer's own observation when forming the instrument (Angrist, Imbens, and Krueger 1999). Split-sample two-stage IV addresses the own-observation issue by randomly splitting the sample into two groups, using judge tendencies in one part of the sample as an instrument for bankruptcy protection in the other part of the sample (Angrist and Krueger 1995). Limited information maximum likelihood (LIML) eliminates the own-observation bias by collapsing the parameter space and using maximum likelihood to obtain a consistent estimate of the effect of bankruptcy protection.

We address the own-observation problem by using a leave-one-out measure of judge leniency as an instrument for bankruptcy protection.[7] Formally, we define judge leniency Z_{icjt} as the leave-one-out fraction of filings granted by judge j in year t minus the leave-one-out fraction granted in his court c in year t:

$$Z_{icjt} = \frac{1}{n_{cjt} - 1}\left(\sum_{k=1}^{n_{cjt}}(B_k) - B_i\right) - \frac{1}{n_{ct} - 1}\left(\sum_{k=1}^{n_{ct}}(B_k) - B_i\right) \quad (3)$$

where i again denotes individuals, c denotes courts, j is the assigned judge, t is the year of observation, B_i is an indicator for receiving bankruptcy protection, n_{cjt} is the number of cases seen by a judge in year t, and n_{ct} is the number of cases seen by a court in year t. This leave-one-out procedure, essentially a reduced-form version of the Jackknife IV approach, purges the mechanical correlation between a filer's own outcomes and our measure of judge leniency.

Consistent with past research (Sullivan, Warren, and Westbrook 1994, Norberg and Compo 2007), we find considerable variation in the treatment of Chapter 13 cases within an office. The standard deviation of Z_{ijct} is 0.030 for Chapter 13 filers in our sample. In other words, moving from the 5th percentile to the 95th percentile in the filer level distribution of judge leniency is associated with a 11.76 percentage point increase in the probability of receiving Chapter 13 protection, a 26 percent increase. There is significant persistence in our measure of judge behavior. Appendix Figure 1 plots current and lagged judge discharge rates, with each point representing a separate judge by year observation. Discharge rates are highly correlated across time, with an OLS regression relating judge discharge rate to the discharge rate in the previous year yielding a coefficient of 0.814. These results suggest that we are capturing true differences in judge behavior and tendencies, and not random year to year noise.

[7] Appendix Table 1 presents results using an exhaustive set of judge fixed effects as instruments for bankruptcy protection. We estimate the judge fixed effects regressions using two-stage least squares, LIML, and Jackknife IV. The results are qualitatively similar to our preferred estimates presented in Table 3.

In contrast to Chapter 13, there is almost no variation in the treatment of Chapter 7 cases across judges within an office, likely because almost all Chapter 7 filings are granted in our sample period. The standard deviation of Z_{ijct} for Chapter 7 filers is only 0.003 in our data, making it difficult to measure the impact of bankruptcy protection for these filers using our instrumental variables strategy. In Online Appendix B, we use an event study design to estimate the impact of Chapter 7.

Using our reduced form measure of judge leniency Z_{ijct} as an instrument for bankruptcy protection, the identified two-stage least squares parameter from equation (1) measures the causal impact of Chapter 13 protection for the marginal recipient. Our estimates therefore measure the local average treatment effect for filers whose bankruptcy outcome is altered by judge assignment due to disagreement on whether they should receive bankruptcy protection.

The conditions necessary to interpret our two-stage least squares estimates as the causal impact of bankruptcy protection are: (1) that judge assignment is associated with bankruptcy protection, (2) that judge assignment only impacts debtor outcomes through the probability of receiving bankruptcy protection, and (3) that the impact of judge assignment on the probability of receiving bankruptcy protection is monotonic across filers.

The first assumption is empirically testable. Appendix Table 2 presents first stage results of the impact of judge leniency on the probability of a filer being granted Chapter 13 bankruptcy protection. The sample includes first time filers between 1992 and 2005 in the 42 offices in the 31 courts that randomly assign Chapter 13 filings to judges. The median court in our sample has two judges, with the largest court having eight judges. All specifications control for office by month-of-filing fixed effects, with column 2 adding controls for gender, race, age, and average baseline earnings. Standard errors are clustered at the office level.

Our first stage results from Appendix Table 2 show a large and precisely estimated relationship between judge leniency and the probability of receiving bankruptcy protection. While measurement error attenuates the coefficient on Z_{ijct} away from one, our reduced form measure of judge leniency is one of the strongest predictors of whether a filer receives Chapter 13 protection. With no filer level controls, a one percentage point increase in Z_{ijct} increases the probability that a debtor receives bankruptcy protection by 0.767 percentage points. Controlling for gender, race, age, and baseline earnings, a one percentage point increase in Z_{ijct} increases the probability that a debtor receives bankruptcy protection by 0.748 percentage points. Thus, moving from the 5th percentile to the 95th percentile in the filer level distribution of judge leniency increases the likelihood of receiving Chapter 13 bankruptcy protection by to 8.79 to 9.01 percentage points. To put these magnitudes in

perspective, male filers are 1.6 percentage points less likely to receive bankruptcy protection, black filers are 9.9 percentage points less likely to receive bankruptcy protection, and filers with baseline earnings that are $10,000 lower are about 0.03 percentage points less likely to receive bankruptcy protection.

Our second identifying assumption is that judge assignment only impacts debtor outcomes through the probability of receiving bankruptcy protection. This assumption would be violated if judge leniency is correlated with unobservable determinants of future outcomes: $E[\ _j\ _i] \neq 0$. Table 1 presents a series of randomization checks to partially assess the validity of this exclusion restriction. Column 2 reports results from an OLS regression of judge leniency on a filer's age, gender, race, baseline earnings, baseline employment, baseline self-employment earnings, baseline self-employment, baseline 401k contributions, baseline receipt of Disability Insurance, baseline job tenure, average wages at the baseline employer, and baseline home ownership. We control for office by month-of-filing fixed effects, and cluster standard errors at the office level. Job tenure is associated with judge leniency at the ten percent level. None of our other baseline variables are significantly related to judge leniency, and a joint F-test of the hypothesis that all baseline differences are equal to zero has a p-value of 0.331.

Columns 3 adds controls for predicted earnings, employment, and mortality. We predict each outcome over the first five post-filing years using gender, race, a quartic in age, baseline employment, and baseline earnings. Job tenure is again the only significant measure, and a joint F-test that all the baseline differences listed in column 3 are equal to zero has a p-value of 0.405.

Column 4 presents results from our final test of random assignment. We regress each baseline measure on an exhaustive set of judge fixed effects. Each regression controls for office by month-of-filing fixed effects. We report the p-value from a joint F-test that the judge effects are jointly different than zero, which provides an omnibus test for the null hypothesis that filer covariates do not differ significantly among filers assigned to judges within an office by month combination. The joint F-test for age has a p-value of 0.037. None of the other joint F-tests in column 4 suggest that there is systematic non-random assignment of filings to judges.

The exclusion restriction could also be violated if judge leniency impacts future outcomes through channels other than bankruptcy protection: $E[\ _j(\ _i - \bar{\ })] \neq 0$. For example, the exclusion restrict would be violated if more lenient judges are also more likely to provide financial counseling to debtors, and that financial counseling has an independent impact on future outcomes. If judge leniency impacts future outcomes through any other channels, then the resulting local average

treatment effect would incorporate any additional impacts associated with judge assignment. The assumption that judges only systematically affect debtor outcomes through bankruptcy is fundamentally untestable, and our estimates should be interpreted with this potential caveat in mind. However, we argue that this exclusion assumption is reasonable in our setting. Bankruptcy judges typically interact with debtors only at the confirmation hearing, with the separately assigned court trustee handling all pre- and post-filing communication. Thus, it seems unlikely that judges would confer significant benefits to debtors other than through their ruling on the bankruptcy filing.

Our third identifying assumption is that judge assignment has a monotonic impact on filers. The monotonicity assumption implies that being assigned to a more (less) lenient judge does not result in an decrease (increase) in the likelihood of receiving bankruptcy protection. This monotonicity assumption would be violated if judges differ in the types of filings they treat in a more lenient manner and the types the treat in a more strict manner. For example, monotonicity would be invalid if some judges treat women more leniently while other judges treat men more leniently. If the monotonicity assumption is violated, our estimates from equation (1) are still a weighted average of marginal treatment effects, but the weights would be outside the unit interval (Angrist, Imbens, and Ruben 1996, Heckman and Vytacil 2005).

To partially test the monotonicity assumption, Appendix Figure 2 plots judge leniency measures that are calculated separately for each judge by gender, race, baseline income, age, and home ownership status. We also report the coefficient and standard error from an OLS regression relating the separately calculated judge measures. Consistent with our monotonicity assumption, judges exhibit remarkably similar tendencies across observably different filers. Regressing the judge leniency for male filers on those for female filers yields a point estimate of 0.838. For white and non-white filers, the point estimate is 1.005, for high and low baseline earnings 0.998, for filers older and younger than 40 the coefficient is 1.104, and for home owners and non-home owners the coefficient is 0.885. None of the results suggest that the monotonicity assumption is invalid in our setting.

III. Data

To estimate the impact of bankruptcy protection on debtors, we merge information from individual bankruptcy filings, administrative tax records from the Social Security Administration (SSA), and proprietary real estate records from the data aggregator DataQuick.

Bankruptcy records are available from 1992 to 2009 for the 72 federal bankruptcy courts that allow full electronic access to their dockets. These data represent approximately three quarters of

all bankruptcy filings during this period.[8] Each record in our bankruptcy data contains information on the Chapter filed, filing date, court, office, outcome, and the judge and trustee the filing was assigned to. The data also contain information on each debtors' name, address, and social security number, whether the filing includes any assets, and whether the filing fee was paid immediately or in installments.

Our empirical strategy requires that a bankruptcy office randomly assign filings to judges. This assumption appears reasonable in our setting, as U.S. bankruptcy courts typically use a random assignment or blind rotation system to assign filings. There are two reasons that filings will not be randomly assigned in our data. First, offices sometimes assign cases geographically, such that every case from a given county or group of counties goes to a single judge. Second, offices reassign a retiring judge's cases to the other judges within an office. The reassignment of cases is problematic because cases where the repayment plan is in progress are more likely to reassigned, leading to the miss measurement of judge leniency.

To ensure the random assignment of filings to judges in our sample, we drop filings originating from counties that send all filings to a single judge, and office by year bins where a retiring judge's cases were reassigned with no documentation as to the original judge. We make two additional restrictions. First, we drop courts that assign all Chapter 13 filings to a single judge, as there is no variation in judge behavior for us to exploit. Second, we restrict the data to first time filers between 1992 and 2005 to ensure that we have five or more years of post-filing outcomes for all debtors, and that all filings occurred before the 2005 Bankruptcy Reform Act came into effect. These restrictions leave us with 534,980 Chapter 13 filings in 42 offices in 31 bankruptcy courts. This data represents just over 30 percent of the available Chapter 13 filings in the analysis period. Appendix Table 3 provides additional details on the offices in our sample.

To explore the impact of bankruptcy protection on subsequent labor supply and mortality, we matched the bankruptcy records to administrative tax records from the SSA. The SSA data are remarkably complete and include nearly every individual in the United States. Information on earnings and employment comes from annual W-2s. Individuals with no W-2 in any particular year are assumed to have had no earnings in that year. We measure non-earnings outcomes using data from three sources. Information on annual 401k contributions, job location, and firm characteristics also comes from annual W-2s. Information on Disability Insurance (DI) and Supplemental Security

[8] Our bankruptcy data are drawn from Public Access to Court Electronic Records (PACER) records provided by Tal Gross, Matthew Notowidigdo, and Jialan Wang. Additional details on the PACER data and its coverage are available in Gross, Notowidigdo, and Wang (2012).

Income (SSI) receipt comes from the Master Beneficiary Record. Information on mortality comes from the Death Master File that is compiled by the SSA and covers deaths occurring anywhere in the United States. All dollar amounts are in terms of year 2000 dollars. We match the bankruptcy data to the SSA records using last name and the last four digits of the filer's social security number. We were able to successfully match 93.0 percent of the bankruptcy data, with nearly all of the unmatched records resulting from a shared name and last four digits of the social security number in the SSA data. The probability of being matched to the SSA data is not significantly related to judge leniency.

To explore the impact of bankruptcy protection on home foreclosures, we also matched the bankruptcy records to proprietary real estate data purchased from DataQuick. The DataQuick files include information on the census of housing transactions, the most recent county assessment, and any pre-foreclosure notices. The DataQuick files are compiled by county and year, with more complete coverage for more urban areas and more recent years. We limit our home sales sample to the 286,800 bankruptcy filers matched to the SSA data, filing from a county in the DataQuick files, and in a year covered for that county in the DataQuick files. We matched these filers to the DataQuick records using last name and filing address using a nearest match algorithm. We successfully matched 26.0 percent of filers to a home transaction or home assessment in the DataQuick files. The probability of being matched to the DataQuick data is also not significantly related to judge leniency.

Table 2 presents summary statistics for a five percent random draw of all first time filers between 1992 and 2005. Consistent with previous research on bankruptcy filers, 98.3 percent of Chapter 7 filers in sample are granted bankruptcy protection, compared to 47.9 percent of Chapter 13 filers. Fifty-nine percent of Chapter 7 filers are male, 74.2 percent are white, and 13.3 percent are black. For Chapter 13, 61.3 percent of filers are male, 55.3 percent are white, and 34.1 percent are black.

The typical bankruptcy filer earns far less than the average American worker. In the five years before filing, 80.6 percent of Chapter 7 filers are employed on average, with average annual earnings of just $21,064. Eighty percent of Chapter 13 filers are employed, earning $22,460 annually in the five years before filing. Over the same five year time period, 4.8 percent of Chapter 7 filers receive DI, and 9.7 percent receive SSI. Just over four percent of Chapter 13 filers receive DI, and 7.9 percent receive SSI. Consistent with the low individual earnings we observe, average wages at a typical filer's employer are about $22,500 for both Chapter 7 and Chapter 13 filers.

Table 2 also presents summary statistics for filers in the 42 o□ces in 31 courts that randomly

assign filings to judges. This analysis sample is very similar to the full sample of filers. Forty-five percent of Chapter 13 filers in our sample are granted bankruptcy protection, 3.0 percent less than the full sample. Fifty-nine percent of filers in our sample are male, 2.0 percent less than the full sample, and 53.0 percent are white, 2.3 percent less. In the five years before filing, average annual earnings were $22,870 for filers in our analysis sample, slightly more than in the full sample.[9]

IV. The Impact of Chapter 13 Bankruptcy Protection on Labor Supply, Mortality, and Home Foreclosure

A. Labor Supply

As a benchmark for evaluating the causal effects described below, we begin with a descriptive analysis of granted and dismissed filers. Appendix Figure 3 plots pre- and post-filing earnings for a five-percent random sample of first time Chapter 13 filers between 1992 and 2005 in our full sample of 72 bankruptcy courts. We also calculate expected earnings using a filer's gender, race, a quadratic in age, a quadratic in tenure, industry fixed effects, and earnings in the previous five years. Results are identical for the sample of filers randomly assigned to judges.

Filers granted Chapter 13 bankruptcy protection earn $1,500 to $2,000 more than dismissed filers in the years leading up to filing. Earnings for both groups fall two to three years before filing, with a larger dip for dismissed filers.[10] The post-filing earnings of dismissed filers dip further, falling more than $4,000 below the expected trajectory five years after filing. In contrast to the large and permanent decline in earnings experienced by dismissed filers, individuals granted bankruptcy protection appear to have no long-term earnings losses. Taken together, our descriptive results from Appendix Figure 3 suggest that many Chapter 13 filers experience an adverse earnings shock before filing, but that bankruptcy protection may help to mitigate the long-term consequences of those earnings shocks.

Figures 2A and 2B present two-stage least squares results measuring the causal impact of Chap-

[9] Appendix Table 4 presents summary statistics separately by census region. Filers in the south are less likely to be white and more likely to be black compared to filers in the east and midwest. Filers in the west are less likely to be white or black, likely because there are more Hispanic filers. Filers in the west are also the least likely to be granted either Chapter 7 or Chapter 13 bankruptcy protection, and have relatively higher earnings than filers in other regions.

[10] The fall in pre-filing earnings is likely related to the "Ashenfelter dip" - the fact that individuals with negative earnings shocks are more likely to enroll in job training programs - discussed by Ashenfelter (1978), Ashenfelter and Card (1985), and Heckman and Hotz (1989), among many others. In our context, the selection of individuals with negative earnings shocks into bankruptcy filing will lead OLS estimates with a non-filing control group to overstate the true gains of bankruptcy if there is mean reversion in earnings, and to understate the impact of bankruptcy if shocks have consequences that increase over time. We return to this point when discussing the Chapter 7 estimates.

ter 13 bankruptcy protection on earnings and employment. The sample consists of first time filers in the 31 courts that randomly assign filings to judges. We include filings originating between 1992 and 2005. We use our reduced form measure of judge leniency Z_{ijct} as an instrumental variable for bankruptcy protection, and control for gender, race, a quartic in age, baseline employment, baseline earnings, and office by month-of-filing fixed effects. Standard errors are clustered at the office level. Table 3 presents results pooling outcomes across the first five post-filing years.

Figure 2A shows that Chapter 13 bankruptcy protection has a large and precisely estimated impact on post-filing earnings. Filers granted Chapter 13 protection due to a more lenient judge have earnings that are $4,345 greater than those of dismissed filers in the first partial year after filing. In the first full year after filing, the marginal recipient of Chapter 13 earns $6,775 more than the marginal dismissed filer. Pooling outcomes across the first five full post-filing years, the longest time period available for all filers in our sample, the marginal recipient of Chapter 13 has annual earnings that are $6,288 higher, a 27.5 percent increase from the baseline mean.[11]

Appendix Table 5 presents results for the sixth through tenth post-filing years using filings originating between 1992 and 2000. In this sample, Chapter 13 protection increases the marginal recipient's annual earnings by $6,619 in the sixth through tenth post-filing years. These results suggest that the impact of bankruptcy protection is persistent after the completion of the repayment plan.

As an additional check of our identification strategy, Figure 2A also plots two-stage least squares estimates for five pre-filing years. Consistent with our identifying assumptions discussed above, there is no systematic relationship between bankruptcy protection and earnings in the pre-filing years, with the estimated coefficients being economically and statistically insignificant.

Figure 2B presents results for employment, defined as non-zero earnings in a calendar year. Over the first five post-filing years, Chapter 13 increases by employment by 3.4 percentage points, a 4.1 percent increase from the baseline mean. The probability of being employed is also higher in the sixth through tenth post-filing years, but the point estimates are too imprecisely estimated to draw definitive conclusions.[12]

[11] One threat to our interpretation of the estimates is that dismissed filers move into the informal labor market. To partially test this hypothesis, we estimate the impact of Chapter 13 separately by baseline industry. We hypothesize that it is easier on the margin to increase informal earnings in industries such as construction and agriculture as compared to retail trade or health care. In results available upon request, we find no systematic differences in the impact of Chapter 13 across industries that may be more or less likely to use informal workers, though we cannot rule out modest differences.

[12] Appendix Table 6 presents results for a number of other labor supply outcomes available in our SSA data. Bankruptcy protection increases self-employment by 2.9 percentage points, but does not have an economically or statistically significant impact on self-employment earnings. Among eligible filers, bankruptcy protection decreases

Appendix Table 7 presents results interacted with filer gender, race, age, baseline earnings, and home ownership. Chapter 13 protection has a larger impact on filers with above median earnings, and filers who are between 25 and 60 years old at the time of filing. Chapter 13 increases annual earnings by $7,905 for filers with above median earnings, compared to only $3,859 for filers with below median earnings. The impact of Chapter 13 protection on employment is also 1.5 percentage points higher for filers with above median baseline earnings. Chapter 13 appears to have no impact on the earnings of filers older than 60, likely because these filers have already left the labor market. In contrast, Chapter 13 increases the annual earnings of filers who are between 25 to 40 years old by $8,639, and the annual earnings of filers who are between 40 and 60 years old by $7,127. Bankruptcy protection also increases annual earnings somewhat more for filers who are female and non-white, though the differences are not economically or statistically significant.

To investigate heterogeneous treatment effects across unobservable debtor characteristics, we also estimate marginal treatment effects (MTE) (Heckman and Vytlacil 2005). In our setting, the MTE estimates illustrate how the outcomes for debtors on the margin of bankruptcy protection change as we move from more strict to more lenient judges. Thus, the MTE estimates shed light on the types of filers who benefit most from bankruptcy protection. To calculate the MTE function, we predict the probability of bankruptcy protection using a quadratic in judge leniency Z_{ijct}. We then regress each outcome on a quadratic in the predicted probability of receiving bankruptcy protection, evaluating the estimate of the first derivative of this relationship at each percentile of predicted probability.

Appendix Figure 4 reports the MTE estimates for earnings and employment. The MTE function for earnings is increasing in the predicted probability of bankruptcy protection. The upward slope in the earnings MTE suggests that filers on the margin of bankruptcy who are assigned to the most lenient judges experience the largest increases in earnings when granted bankruptcy protection. These are likely filers with unobservable characteristics that make them the least likely to be granted bankruptcy in the first place, as the margin for relatively lenient judges should entail relatively less deserving filers. This interpretation of the estimates suggests that the impact of Chapter 13 on earnings is larger for less deserving debtors. The MTE function for employment outcomes is essentially flat in judge leniency, suggesting that the employment effects do not differ systematically across unobservable characteristics.

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the receipt of SSI by 7.4 percentage points, though the point estimate is not statistically significant. Bankruptcy protection appears to have little impact of the receipt of DI or on annual 401k contributions.

B. Mortality

Figure 2C presents two-stage least squares results measuring the impact of Chapter 13 bankruptcy protection on mortality. Following our labor supply results from Figures 2A and 2B, the sample includes first time filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. We use our reduced form measure of judge leniency Z_{ijct} as an instrumental variable for bankruptcy protection, and control for gender, race, a quartic in age, baseline employment, baseline earnings, and office by month-of-filing fixed effects. Standard errors are clustered at the office level. The dependent variable for each regression is an indicator for being deceased in or before the specified year. Thus, our estimates represent the impact of Chapter 13 protection on cumulative mortality.

Chapter 13 bankruptcy protection significantly lowers mortality in the first five years after filing. Chapter 13 protection decreases one-year mortality for the marginal recipient by a statistically insignificant 0.3 percentage points, and two-year mortality by a statistically significant 1.3 percentage points. Five-year mortality, the longest time period available for our entire sample, is 1.1 percentage points lower, a 27.5 percent decrease from the control mean of 4.0 percentage points. These estimates imply an increase of 0.04 in the number of years alive over the first five post-filing years. In a sample of individuals filing between 1992 and 2000, Chapter 13 protection decreases ten-year mortality by a statistically insignificant 2.1 percentage points.

To put the magnitude of these estimates in context, it is helpful to consider the effects of job loss – the most commonly reported cause of bankruptcy – on mortality. In a sample of Pennsylvania workers, Sullivan and von Wachter (2009) find that job displacement increases short-run mortality by 50 to 100 percent, and long-run mortality by 10 to 15 percent. In the specification closest to ours, they find that job displacement increases five-year mortality by 1.2 percentage points. One interpretation of our estimates is therefore that bankruptcy protection can offset much of the increased mortality risk from financial distress caused by events such as job loss.

Panel B of Appendix Table 7 reports results separately by gender, race, age, baseline earnings, and home ownership. The effect of Chapter 13 protection on mortality is larger for filers who are female, white, and who have above median baseline earnings, though none of the differences are statistically significant. The effect of Chapter 13 on mortality is also a statistically significant 2.0 percentage points higher for non-home owners. However, the most striking pattern is by age. Chapter 13 protection decreases five-year mortality by 12.2 percentage points for filers 60 and older

at the time of filing, despite little to no impact on earnings for these filers. In contrast, Chapter 13 decreases five-year mortality by 1.8 percentage points for filers between 25 and 40, and 1.4 percentage points for filers between 40 and 60. We interpret this pattern of results as being consistent with a change in earnings playing little to no role in explaining the mortality results.[13]

To further explore the extent to which the labor supply impacts estimated above can explain the impact of bankruptcy protection on mortality, we follow Sullivan and von Wachter (2009) and compare our two-stage least squares results to the effect implied by the cross-sectional correlation between mortality and both earnings and employment. Our two-stage least squares results suggest that bankruptcy protection increases annual earnings by $6,228, and employment by 3.4 percentage points. The estimated correlation between five-year mortality and $1,000 in average annual earnings is -0.00019, and the correlation with average employment is -0.00996. Thus, the change in labor supply can explain $(0.034 \cdot 0.00996 + 6.228 \cdot 0.00019) \cdot 100 = 0.15$ percentage point decrease in five-year mortality, or about 13.8 percent of the reduced form effect of 1.1 percentage points. This suggests that about 86 percent of the estimated effect of Chapter 13 on five-year mortality is driven by non-earnings channels. This result is consistent with our subsample results, which suggest that the mortality estimates are driven by filers over 60 who are likely to have exited the labor market, and hence whose earnings are relatively unaffected by bankruptcy protection.

There are of course several potentially relevant non-earnings channels that we cannot examine with our current data. For example, bankruptcy protection may decrease an individual's stress by reducing contact with creditors and allowing greater control over his or her financial future. Consistent with this idea, 84 percent of debtors report being under extreme stress before filing for bankruptcy, while only 35 percent report being under extreme stress after filing for bankruptcy (Porter 2011). Dismissed filers may also lose their health insurance or have changed family environments that could impact health. Unfortunately, it is not possible to link information on morbidity, health insurance, or family status to our data. The precise mechanisms for our estimated mortality effect therefore remain unclear, and likely include a combination of these factors.

C. Home Foreclosure

Figure 2D presents two-stage least squares results measuring the impact of Chapter 13 bankruptcy protection on home foreclosure. The sample includes individuals filing in county by year combi-

[13] Appendix Figure 4C reports the MTE estimates for five-year mortality. The MTE function for earnings is essentially flat in the predicted probability of bankruptcy protection. This implies that the mortality effects do not differ systematically across unobservable characteristics.

nations in the DataQuick data described in Section III. We instrument for bankruptcy protection using judge leniency, and control for gender, race, a quartic in age, baseline employment, baseline earnings, and office by month-of-filing fixed effects. Standard errors are clustered at the office level. The dependent variable is an indicator for a filer's home receiving a notice of default or a notice of transfer or sale, or the home having been transferred to a REO or a guarantor. Note that we are unable to estimate the impact of bankruptcy protection on pre-filing foreclosure as we only have address information for the year of filing, and are unable to match pre-filing transactions to filers.

Chapter 13 bankruptcy protection significantly lowers the probability of home foreclosure. In the raw data, five-year foreclosure rates are less than 0.5 percent for filers receiving bankruptcy protection, compared to 4.7 percent for dismissed filers. This implies that approximately one-fifth of home owners whose filings are dismissed experience home foreclosure within the first five post-filing years. In the two-stage least squares estimates, Chapter 13 decreases foreclosure by 4.2 percentage points in the first post-filing year, and by 6.3 percentage points in the second post-filing year. Foreclosure rates are 8.3 percentage points lower five years after filing, a 176 percent decrease from the dismissed filer mean. Note that the dismissed filer mean is not the counterfactual mean, so decreases of more than 100 percent are possible. Taken at face value, this pattern of results suggests that filers receiving bankruptcy protection were more likely to experience home foreclosure than dismissed filers, perhaps because bankruptcy judges are more likely to grant bankruptcy to filers at particular risk of foreclosure.

In Appendix Table 6, we show that bankruptcy protection also significantly decreases voluntary and short home sales. Distress sales, which include both foreclosures and short sales, are 11.3 percentage points lower after five years. Home sales, which include all types of housing transactions, are 16.2 percentage points lower after five years.

Panel C of Appendix Table 7 reports results separately by gender, race, age, baseline earnings, and baseline home ownership. Unsurprisingly, the effects are only present for filers who own a home at baseline. The effect of Chapter 13 protection on foreclosure is also larger for filers who filers who are female, and those with low baseline earnings.[14]

[14] Appendix Figure 4D reports the MTE estimates for five-year foreclosure and home sales. The MTE function for earnings is essentially flat in the predicted probability of bankruptcy protection. This implies that the foreclosure effects do not differ systematically across unobservable characteristics.

D. Potential Channels

Why are there such large benefits of receiving bankruptcy protection? In this section, we explore two potentially relevant explanations: (1) protection from wage garnishment, and (2) reduced economic instability.

One explanation for our results is that Chapter 13 increases the incentive to work by protecting future wages from garnishment that can total 25 percent of a debtor's disposable earnings, and up to 100 percent of a debtor's marginal earnings. Table 4 partially tests this hypothesis by estimating the impact of Chapter 13 separately by predicted garnishment before filing. Columns 1 and 2 of Table 4 present results for filers in the four states that prohibit wage garnishment - Florida, Pennsylvania, South Carolina, and Texas - and filers in states that allow at least some wage garnishment. The impact of Chapter 13 on annual earnings over the first five post-filing years is $6,412 in states that allow garnishment, compared to $1,675 in the four states that prohibit garnishment. The pattern of results is reverse for employment, however, with larger impacts in the four states that prohibit garnishment, though the difference is not statistically significant.

Columns 3 through 7 exploit both within- and across-state variation in garnishment laws to estimate results for filers who are likely to be subject to different marginal garnishment rates. Within each state, wage garnishments are a non-linear function of earnings. In states that follow the federal guidelines, creditors are allowed to garnish each additional dollar of disposable earnings between 30 and 40 times the minimum wage, and 25 cents of every additional dollar after that point. There is also across state variation in garnishment from twelve states that have additional restrictions on garnishments, ten states that have lower caps on the total amount that can be garnished, and four states that prohibit garnishment altogether.

Formally, we interact the impact of bankruptcy with the marginal garnishment rate a filer is likely to face under both state and federal law.[15] Our estimating equation is:

$$y_{it} = \quad + \quad _{ct} + \quad X_i + \quad {}^{0}_{0}B_iG^{0}_{0} + \quad {}^{25}_{25}B_iG^{25}_{25} + \quad {}^{100}_{100}B_iG^{100}_{100} + \quad {}^{25}_{0}B_iG^{25}_{0} + \quad {}^{100}_{0}B_iG^{100}_{0} + \quad "_{it} \qquad (4)$$

where G^{y}_{x} is an indicator for a filer facing a marginal garnishment rate of x in his or her state of filing and a marginal garnishment of y under federal law. We instrument for each $B_iG^{y}_{x}$ using the interaction between judge leniency and the garnishment bin $Z_{ijct}G^{y}_{x}$. We estimate the impact of

[15] We estimate disposable earnings using pre-tax earnings in the five most recent pre-filing years and the tax rate implied by the NBER TAXSIM federal and state income tax calculator.

bankruptcy separately for filers facing different state and federal garnishment rates to control for any differential effects of bankruptcy correlated with baseline earnings that are unrelated to the marginal garnishment rate. For example, $\begin{smallmatrix}25\\0\end{smallmatrix}$ measures the impact of Chapter 13 on filers with higher earnings who are exempt from garnishment in their state of filing but who would have been subject to 25 percent garnishment under federal law, while $\begin{smallmatrix}25\\25\end{smallmatrix}$ measures the impact of Chapter 13 on filers with higher earnings in states that do not exempt them from garnishment. Thus, $\begin{smallmatrix}25\\0\end{smallmatrix}$ measures the effect of bankruptcy without garnishment protections for higher-earning filers, while $\begin{smallmatrix}25\\25\end{smallmatrix}$ measures the effect of Chapter 13 with garnishment protections for higher-earning filers.

The effect of Chapter 13 protection is small and imprecisely estimated for filers unlikely to face wage garnishment. The impact on annual earnings is $312 for filers subject to no garnishment under both state and federal law, $4,850 for filers who would have been subject to marginal garnishment of 25 percent had they lived in another state, and negative $1,154 for filers who would have been subject to marginal garnishment of 100 percent had they lived in another state. None of the point estimates are statistically significant at conventional levels.

In contrast, there is a large and precisely estimated impact of Chapter 13 on filers subject to either 25 or 100 percent marginal garnishment rates in their state of filing. The impact on annual earnings is $8,670 for filers subject to marginal garnishment of 25 percent under both state and federal law, and $6,109 for those subject to marginal garnishment of 100 percent under both state and federal law. Both estimates are statistically different than the estimate for filers subject to no wage garnishment under both state and federal law (p-value = 0.000 and 0.078 for the 25 and 100 brackets respectively). The estimate for filers subject to marginal garnishment of 100 percent under both state and federal law is also statistically different than that for filers subject to no garnishment under state law but 100 percent under federal law (p-value = 0.058). Due to the imprecision of the point estimates, the estimate for filers subject to marginal garnishment of 25 percent under both state and federal law is not statistically different than that for filers subject to no garnishment under state law but 25 percent under federal law (p-value = 0.261). However, if we take these estimates from columns 4 and 6 at face value, the implied elasticity of earnings with respect to garnishment is about 2.02 for the 25 percent bracket.[16] All of the results from Table 4 are broadly consistent

[16] The earnings elasticity with respect to garnishment is equal to the log change in taxable earnings divided by the log change in the net tax rate. We assume that the state and federal earnings tax rate is 20 percent, implying that the net tax and garnishment rate is $1-(1-0.2)(1-0.25)=40$ percent. We use the mean baseline earnings among all filers to calculate the percent change in earnings associated with our estimates from Table 4. Finally, we use the impact of bankruptcy on filers facing no garnishment in their state of filing who would have faced a 25 percent garnishment under federal law as a counterfactual impact. These assumptions imply an elasticity of earnings with respect to garnishment of $\frac{log(0.379)-log(0.212)}{log(1-0.2)-log(1-0.4)}=2.02$ for the 25 percent bracket. Note that we are unable to calculate

with bankruptcy protection increasing the incentive to work by lowering the effective marginal tax rate on earnings.

A second explanation for the estimated effects is that bankruptcy protection increases economic stability. Bankruptcy protection discharges most debts, allows debtors to repay mortgage arrears, and puts a hold on almost all debt collection efforts. These features of the bankruptcy code may increase economic stability by allowing debtors to avoid eviction or home foreclosure, by reducing the incentive to strategically move across state lines or change jobs to avoid creditors, and by preventing sharp drops in consumption that have important long-term consequences. For example, recall that Chapter 13 reduces five-year foreclosure rates by 8.3 percentage points. In this section, we provide additional evidence by estimating the impact of Chapter 13 on employment stability and geographic mobility.

Table 5 presents estimates of the impact of Chapter 13 protection on the probability of working in the same baseline job, industry, county, and state. We also present results for job tenure and average firm wages. The sample is restricted to filers with at least one year of employment in both the pre- and post-filing period. Bankruptcy protection increases the probability of working in the same (2-digit NAICS) industry by 25.2 percentage points, a 77 percent change from the dismissed filer mean of 32.7 percent, and increases the probability that a filer stays at his or her baseline job by 25.4 percentage points, a 106 percent change from the dismissed filer mean of 23.9 percent. There is also a large impact of bankruptcy protection on geographic mobility, with bankruptcy protection increasing the probability that a filer works in his or her baseline county by 24.3 percentage points, a 69 percent increase, and his or her baseline state by 19.3 percentage points, a 43 percent increase. Job tenure and average firm wages are also higher, suggesting that this increase in economic stability is beneficial.

Appendix Table 8 presents mobility results interacted with garnishment regulations. The impact of Chapter 13 protection on working in the same industry, county, and state are larger in states that allow garnishment, though not all of the differences are statistically significant. The estimated impacts are also increasing in the marginal garnishment bracket, though again the differences are not statistically significant. The estimated effects also remain relatively large in many of the no garnishment brackets. Taken together with the foreclosure results, we interpret this pattern of results as suggesting that Chapter 13 increases economic security both through a reduction in forced relocations due to eviction and foreclosure, and a reduction in unforced relocations meant to

the elasticity for the 100 percent bracket, as $log(0)$ is undefined.

avoid creditors. However, the imprecision of our results makes definitive conclusions difficult.

V. Discussion

The results we have presented have potentially important implications for the modeling of the consumer bankruptcy system. The evaluation of consumer bankruptcy laws has typically involved an assessment of two second-order effects, where bankruptcy benefits individuals by providing partial insurance against consumption uncertainty at the cost of higher interest rates that make life-cycle smoothing more difficult (e.g. Athreya 2002, Li and Sarte 2006, Livshits, MacGee, and Tertilt 2007, Chatterjee and Gordon forthcoming). Importantly, the typical model does not account for the first-order relationship between bankruptcy and labor supply estimated in this paper. As a result, the existing literature is likely to have understated the potential benefits of the consumer bankruptcy system.

To see this, it is helpful to consider our earnings result in light of a stylized extension of the heterogeneous agent life cycle model of Livshits, MacGee, and Tertilt (2007). In the model, households borrow from a perfectly competitive financial market to smooth consumption from expected and unexpected changes in earnings and expenses. Bankruptcy allows households to avoid very low consumption after a particularly severe shock, but increases borrowing costs in all periods due to a higher risk of default. When calibrated to match the moments in the U.S. credit market, the model suggests that bankruptcy leads to tighter borrowing constraints early in the life-cycle, reducing a household's ability to smooth expected changes in earnings. On the other hand, bankruptcy helps households smooth income when hit by a particularly bad shock, reducing consumption variance later in life. On net, the benefits from the increased smoothing across states through bankruptcy just outweigh this distortion of the credit market. Additional details on the setup and calibration of the baseline scenario are available in Online Appendix C.

We extend the Livshits, MacGee, and Tertilt (2007) model by assuming that default outside of the bankruptcy system lowers household productivity. This assumption is meant to capture in a transparent way the earnings loss observed among dismissed filers in our data. Holding all other parameters fixed, bankruptcy is over ten times more beneficial when default lowers household productivity by 10 percent, and nearly 20 times more beneficial when default lowers household productivity by 25 percent. To put these magnitudes in perspective, the model suggests that bankruptcy is six times more beneficial when the frequency of expense shocks is doubled, and nearly 40 times more beneficial when the size of expense shocks is doubled (Livshits, MacGee, and

Tertilt 2007).

The results of this stylized exercise suggest that individual debt relief is likely to be welfare-improving. This conclusion differs substantially from a number of prominent papers, such as Athreya (2002) and Chatterjee and Gordon (forthcoming), that abstract away from the effects of bankruptcy on earnings. Even models that suggest debt relief is welfare-improving, such as Livshits, MacGee, and Tertilt (2007), likely understate the benefits of the consumer bankruptcy system by assuming little to no impact of bankruptcy on labor supply. Incorporating our health and home foreclosure results into the model would only further strengthen this conclusion.

VI. Conclusion

In this paper, we estimate the impact of Chapter 13 bankruptcy protection on subsequent labor supply, mortality, and home foreclosure. We find that Chapter 13 increases the marginal recipient's annual earnings in the first five post-filing years by $6,288, a 27.5 percent increase. Employment increases by 3.3 percentage points over the same time period, a 4.1 percent increase. Five-year mortality is 1.1 percentage points lower, a 27.5 percent decrease, with five-year foreclosure rates falling by 8.3 percentage points. There is evidence consistent with the results being driven by increased incentive to work and increased economic stability following the receipt of bankruptcy protection.

Our results provide new evidence on the ex-post benefits of debt relief. These results are particularly important in light of the on-going debate surrounding the use of debt relief and mortgage modification to stimulate the economy. Work by Mulligan (2008), Hall (2011), and Eggertsson and Krugman (forthcoming) suggests that household borrowing constraints can help explain the severity of the recession, while Mian and Sufi (2012) show that regional differences in debt overhang can explain differences in unemployment. Our estimates also suggest that the restrictions on bankruptcy filing introduced by the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act may have important adverse consequences on the economy.

The main limitation of our analysis is that we are not able to estimate the impact of bankruptcy laws on ex-ante borrowing costs or behavior. There may also be important ex-post impacts of bankruptcy protection on outcomes such as credit availability that we are unable to measure with our data. Finally, our analysis has focused on Chapter 13 bankruptcy, which makes up about 30 percent of all bankruptcy filings. This paper should therefore be viewed as a first step towards characterizing the impact of consumer bankruptcy protection on debtors.

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Figure 1
Labor Supply and Bankruptcy Protection

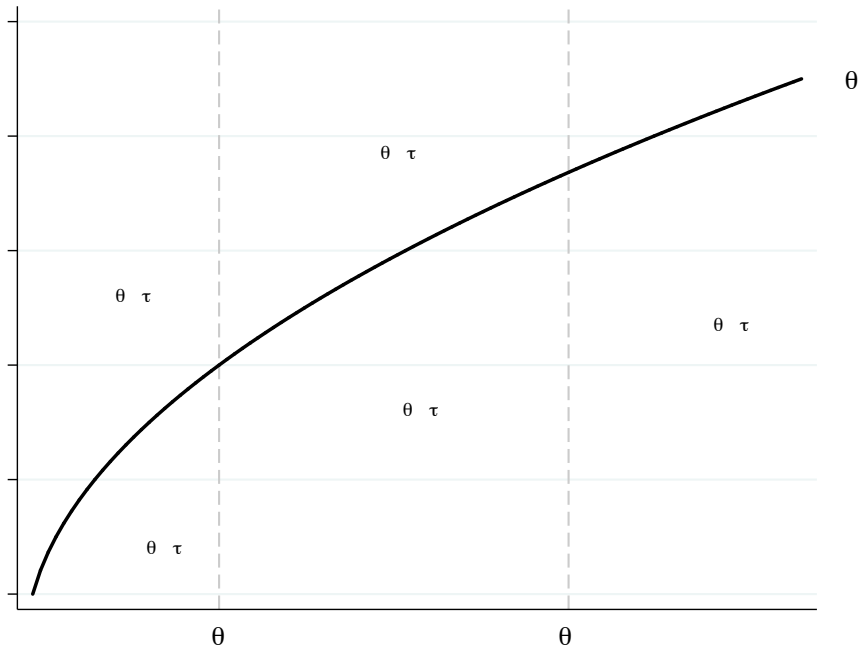


Figure 2
Impact of Chapter 13 Bankruptcy Protection on
Labor Supply, Mortality, and Home Foreclosure

Figure 2A: Earnings

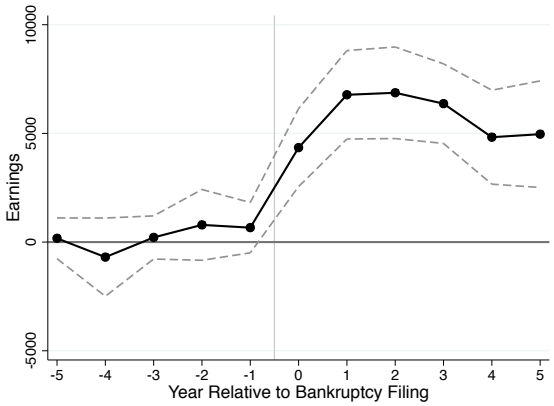


Figure 2B: Employment

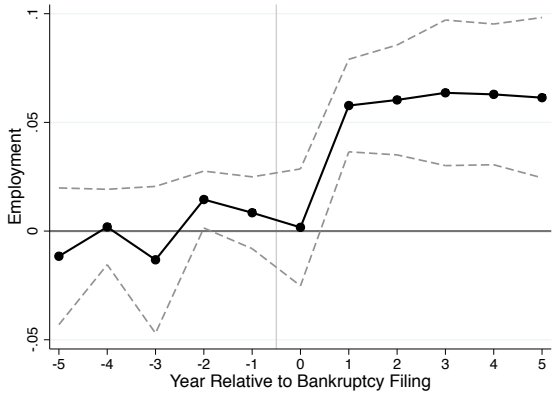


Figure 2C: Mortality

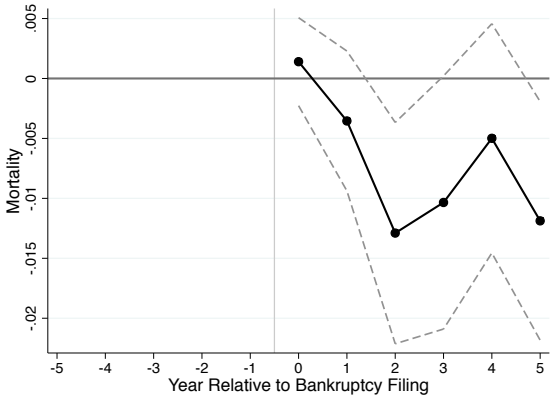
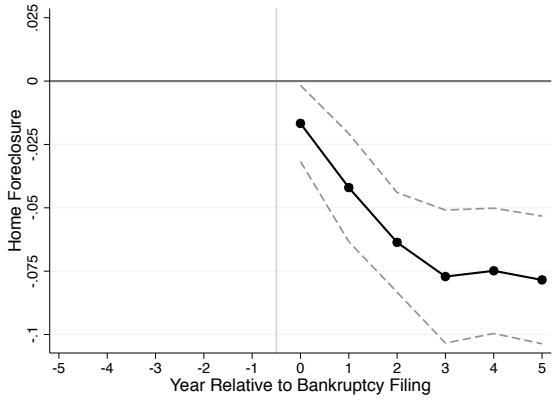


Figure 2D: Home Foreclosure



Notes: These figures plot two-stage least squares results of the impact of Chapter 13 bankruptcy protection on earnings, employment, cumulative mortality, and home foreclosure. The earnings and mortality sample includes all first time filings between 1992 and 2005 in courts that randomly assign cases to judges. The foreclosure sample includes the subset of those filings originating in county by year bins with foreclosure data coverage. We instrument for

Table 1
Test of Randomization

	Control Mean	Judge Leniency		F-test p-value
	(1)	(2)	(3)	(4)
Age	36:736	0:000007	0:000018	[0:037]
	(16:613)	(0:000006)	(0:000013)	
Male	0:578	0:000003	0:000007	[0:802]
	(0:494)	(0:000123)	(0:000129)	
White	0:474	0:000143	0:000128	[0:414]
	(0:499)	(0:000096)	(0:000083)	
Earnings	20:007	0:000002	−0:000001	[0:159]
	(18:492)	(0:000046)	(0:000043)	
Employment	0:791	0:000473	−0:000167	[0:855]
	(0:352)	(0:000372)	(0:000747)	
Self Earnings	0:667	0:000195	0:000198	[0:599]
	(3:303)	(0:000137)	(0:000136)	
Self Employment	0:066	−0:000325	−0:000336	[0:446]
	(0:189)	(0:000263)	(0:000265)	
401k Contributions	0:247	−0:000001	−0:000001	[0:469]
	(0:746)	(0:000001)	(0:000001)	
Disability Insurance	0:042	0:000625	0:000635	[0:866]
	(0:193)	(0:000555)	(0:000558)	
Job Tenure	2:814	0:000083*	0:000083*	[0:653]
	(3:044)	(0:000044)	(0:000044)	
Firm Wage	18:780	0:000001	0:000002	[0:465]
	(19:760)	(0:000002)	(0:000003)	
Home Owner	0:139	−0:000214	−0:000215	[0:196]
	(0:346)	(0:000284)	(0:000284)	
Predicted Earnings	19:998		0:000375	[0:382]
	(13:590)		(0:000413)	
Predicted Employment	0:444		0:002440	[0:848]
	(0:147)		(0:003765)	
Predicted Mortality	0:031		0:000672	[0:681]
	(0:055)		(0:005517)	
Joint F-Test		[0:331]	[0:405]	
Observations	273967	497407	497407	

Notes: This table reports reduced form results testing the random assignment of filings to judges. The sample consists of all first time Chapter 13 filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. Column 1 reports the control mean and standard deviation for each variable. Columns 2 - 3 each report estimates from an OLS regression of judge leniency on the variables listed in the row and o□ce by month-of-filing fixed e□ects. Standard errors are clustered at the court level. Judge leniency is the leave-one-out mean rate of granting bankruptcy protection for the assigned judge minus the leave-one-out mean rate of granting bankruptcy protection for the court in the same filing year. The p-value reported at bottom of columns 2 - 3 is for a F-test of the joint significance of the variables listed in the rows. Each row of column 4 reports a p-value from a separate OLS regression of the pre-determined variable listed in the corresponding row on judge and o□ce by month-of-filing fixed e□ects. The p-value is for a F-test of the joint significance of the judge fixed e□ects. Predicted earnings, employment, and mortality are formed using the other variables listed in the rows. All monetary values are expressed in real 2000 dollars divided by 1,000. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Table 2
Summary Statistics

	Full Sample		Analysis Sample
	Chapter 7	Chapter 13	Chapter 13
Demographics	(1)	(2)	(3)
Granted Bankruptcy	0.983	0.479	0.449
Age	40.399	40.892	38.145
Male	0.588	0.613	0.593
White	0.742	0.553	0.530
Black	0.133	0.341	0.359
Baseline Outcomes			
Earnings	21.064	22.460	22.870
Employment	0.806	0.802	0.813
Self Earnings	0.505	0.604	0.591
Self Emp.	0.060	0.062	0.061
401k Contributions	0.262	0.293	0.318
Disability Insurance	0.048	0.043	0.041
Sup. Security Income	0.097	0.079	0.088
Job Tenure	3.425	3.746	3.628
Firm Wages	22.413	23.006	22.899
Home Owner	–	–	0.260
Observations	367103	83552	497407

Notes: This table reports summary statistics. The full sample consists of a 5 percent random draw from first time filers between 1992 and 2005 in 72 bankruptcy courts. The analysis sample consists of all first time filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. The home outcomes sample includes the subset of those filings originating in county by year bins with real estate data coverage (N = 286800). Bankruptcy is an indicator for being granted bankruptcy protection and receiving a discharge of debt. Baseline outcomes are averaged over five pre-filing years. Earnings and employment outcomes come from 1978 - 2010 W-2s. DI and SSI receipt from the Master Beneficiary File. Home ownership comes from DataQuick real estate data. Employed is an indicator for non-zero wage earnings. Self employment is an indicator for non-zero self employment earnings, including negative earnings. Firm wages are averaged over all employees listing the same EIN in the same calendar year. All monetary values are expressed in real 2000 dollars divided by 1,000.

Table 3
Impact of Chapter 13 Bankruptcy Protection on
Labor Supply, Mortality, and Home Foreclosure

	Control Mean	2SLS Results	
Panel A: Labor Supply	(1)	(2)	(3)
Earnings	17:440	7:375***	6:288***
	(16:437)	(1:358)	(1:002)
Employment	0:432	0:051***	0:034***
	(0:217)	(0:014)	(0:010)
Panel B: Mortality			
5-year Mortality	0:040	−0:012**	−0:011**
	(0:197)	(0:005)	(0:005)
Panel C: Home Foreclosure			
5-year Foreclosure	0:047	−0:081***	−0:083***
	(0:212)	(0:017)	(0:016)
Controls	–	No	Yes
Observations	273967	497407	497407

Notes: This table reports two-stage least squares results of the impact of Chapter 13 bankruptcy protection on earnings and employment averaged over the first five post-filing years. The sample consists of all first time filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. The home outcomes sample includes the subset of those filings originating in county by year bins with foreclosure data coverage (N = 286800). Column 1 reports the mean and standard deviation for dismissed filers. Columns 2 - 3 instrument for bankruptcy protection using the reduced form measure of judge leniency described in the text. All specifications control for o□ce by month-of-filing fixed e□ects, and cluster standard errors at the court level. Column 3 also includes controls for gender, race, age, and the five year average of baseline employment and baseline earnings. All monetary values are expressed in real 2000 dollars divided by 1,000. Earnings information comes from the W-2. Employed is an indicator for non-zero wage earnings on the W-2. Mortality is an indicator for being deceased using information from the Death Master File. Foreclosure is an indicator for a filer's home receiving a notice of default, receiving a notice of transfer or sale, or being transferred to a REO or a guarantor. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Table 4
Results by Wage Garnishment Regulations

	Garnishment in State?		State/Federal Marginal Garnishment Rate				
	No	Yes	0/0	0/25	0/100	25/25	100/100
Panel A: Labor Supply	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Earnings	1.674	6.412***	0.145	4.850	−1.154	8.690***	6.100**
	(1.292)	(0.969)	(1.237)	(3.028)	(2.862)	(1.133)	(3.041)
Employment	0.054	0.034***	−0.003	0.112	−0.033	0.047***	0.050
	(0.051)	(0.010)	(0.031)	(0.076)	(0.048)	(0.010)	(0.057)
Panel B: Mortality							
Five-year Mortality	−0.019	−0.008	0.034	−0.079	0.008	−0.021***	−0.012
	(0.054)	(0.005)	(0.021)	(0.079)	(0.039)	(0.006)	(0.051)
Panel C: Home Foreclosure							
5-year Foreclosure	0.083	−0.082***	−0.108***	0.171	−0.075	−0.066***	−0.240*
	(0.052)	(0.013)	(0.021)	(0.140)	(0.051)	(0.013)	(0.138)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62041	435366	138930	37888	10044	281510	29035

Notes: This table reports two-stage least squares results of the impact of Chapter 13 bankruptcy protection interacted with state and federal garnishment laws. The sample consists of all first time filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. The home outcomes sample includes the subset of those filings originating in county by year bins with foreclosure data coverage (N = 286800). Columns 1 - 2 interact Chapter 13 with indicators for living in a state that does not allow any wage garnishment and living in a state that does allow wage garnishment. Columns 3 - 7 interact Chapter 13 with indicators for binding garnishment bracket in the filer's state of filing and the non-binding federal bracket. Each column header refers to the marginal garnishment rate in the state/federal system. Thus Column 4 (5) represents filers subject to no garnishment in their state of filing who would have been subject to 25 (100) percent marginal garnishment under federal law. All specifications control for gender, race, age, and the five year average of baseline employment baseline earnings, and o□ce by month-of-filing fixed e□ects, and cluster standard errors at the court level. All monetary values are expressed in real 2000 dollars divided by 1,000. Observations refer to the number of bankruptcy filers in the indicated group. The number of observations in each regression is the sum of all columns. See text for additional details. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Table 5
Job Mobility Results

	Control Mean	2SLS Results	
	(1)	(2)	(3)
Work in Same County	0.351	0.268***	0.243***
	(0.390)	(0.022)	(0.019)
Work in Same State	0.444	0.216***	0.193***
	(0.401)	(0.021)	(0.022)
Work in Same Job	0.239	0.282***	0.254***
	(0.363)	(0.023)	(0.022)
Work in Same Industry	0.327	0.278***	0.252***
	(0.385)	(0.029)	(0.024)
Job Tenure	2.030	0.972***	0.797***
	(2.131)	(0.167)	(0.145)
Average Firm Wage	21.618	3.691***	2.327***
	(15.442)	(1.003)	(0.847)
Controls	–	No	Yes
Observations	273967	497407	497407

Notes: This table reports two-stage least squares results of the impact of Chapter 13 bankruptcy protection on earnings and employment averaged over the first five post-filing years. The sample consists of all first time filers between 1992 and 2005 in the 31 courts that randomly assign filings to judges. Column 1 reports the mean and standard deviation for dismissed filers. Columns 2 - 3 instrument for bankruptcy protection using the reduced form measure of judge leniency described in the text. All specifications control for o□ce by month-of-filing fixed e□ects, and cluster standard errors at the court level. Column 3 also includes controls for gender, race, age, and the five year average of baseline employment and baseline earnings. All monetary values are expressed in real 2000 dollars divided by 1,000. Earnings and job information comes from the W-2. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.