A Tale of Two Bankruptcies: Geographic Differences in Bankruptcy Chapter Choice

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Abstract

Despite the U.S. Bankruptcy Code being federal law, there is extreme geographic variation in the relative use of the two types of consumer bankruptcy – Chapter 7 and Chapter 13 – and these differences lead to large regional disparities in debt relief and creditor repayment. This paper examines the sources driving this geographic variation. Guided by the legal literature, we develop a framework to decompose the variation into three potential sources: (i) differences in filer characteristics, (ii) differences in how courts steer filers based on those characteristics, and (iii) differences in how frequently filers deviate from court steering. The results reveal that heterogeneity surrounding a single characteristic, disposable income, explains most of the geographic variation in chapter choice. Moreover, we show that screening access to bankruptcy based on the debtor's disposable income plays a critical and overlooked role. Finally, we explore the consequences of greater uniformity in the bankruptcy system.

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1 Introduction

Where you live matters for a host of vital outcomes: earnings, education, marriage, healthcare utilization, mortality, and more (see, e.g., Chetty *et al.*, 2016; Finkelstein *et al.*, 2016; Chetty and Hendren, 2018; Finkelstein *et al.*, 2021).[1] It also appears to matter greatly for consumer bankruptcy. Around 700,000 U.S. households file for bankruptcy every year, seeking relief from more than $100 billion in liabilities. These debtors either enter Chapter 7, where they typically repay nothing to unsecured creditors, or Chapter 13, where they enter a strict multi-year repayment plan.[2] The regional differences in the relative use of these chapters, and the ensuing differences in debt relief and creditor repayment, are striking. Across the 94 federal court districts, the share of bankruptcies filed under the debtor-friendly Chapter 7 ranges from only 20% to nearly 95%.

This paper identifies the specific sources driving this geographic variation in bankruptcy chapter choice. Knowing the specific drivers is a critical input for national policy proposals, many of which aim to alter the relative use of the two chapters or to increase uniformity.[3] By identifying the specific drivers behind the variation, our results provide guidance as to which factors policies could target to most effectively alter chapter choice. Additionally, by showing the characteristics of debtors most affected by the current geographic variation, our results provide insight into the distributional incidence of the status quo or changes from it. Finally, in quantifying the sources of variation, we identify a key determinant of chapter choice that has been overlooked in much of the bankruptcy literature.

Our paper builds on the existing literature that examines the determinants of and geographic variation in chapter choice. Keys *et al.* (2020) show that location-specific fixed effects explain a significant share of the geographic variation in bankruptcy, but do not uncover what causes this variation. Legal research, often using detailed interviews with practitioners, emphasizes the role of *local legal culture* – how courts interpret and apply the uniform federal bankruptcy law – in

[1] Chyn and Katz (2021) and Deryugina and Molitor (2021) provide recent reviews of the literature on place-based effects.

[2] Between 2000 and 2013, the average disbursement to unsecured creditors per Chapter 7 case was less than $400, with half of the disbursements coming from just 0.3% of Chapter 7 cases (Hynes and Pattison, 2022).

[3] For example, the 2005 Bankruptcy Reform's flagship feature, the means test, encouraged Chapter 13 over Chapter 7. Recent policy proposals, such as Senator Warren's proposed bankruptcy reform, seek to reverse this feature of the 2005 Reform or even eliminate Chapter 13 as an option (Warren, n.d.). American Bankruptcy Institute's 2017-2019 Commission on Consumer Bankruptcy, a committee of bankruptcy judges, trustees, and attorneys concluded that "nonuniform practices are a problem in the bankruptcy system that should be minimized to the greatest extent possible" (American Bankruptcy Institute, 2019).

explaining the geographic variation (Braucher, 1993; Sullivan *et al.*, 1994; Lawless and Littwin, 2017). While identifying many ways in which legal culture varies, this research does not quantify which differences are most responsible for the geographic variation. Other papers estimate models of chapter choice, either in a single court district (Zhu, 2011) or using a national sample (Domowitz and Sartain, 1999; Gross and Souleles, 2015; Miller, 2019), but do not allow for geographic heterogeneity or attempt to explain the geographic variation.[4]

We also estimate models of chapter choice, but a key innovation in our strategy is that we capture local legal culture by estimating a separate model for each of more than seventy federal court districts, thereby allowing all parameters to be district-specific. In contrast, existing research either restricts *all* parameters to be identical across locations (Domowitz and Sartain, 1999; Gross and Souleles, 2015; Zhu, 2011; Miller, 2019) or captures geographic heterogeneity only through location-specific constants (Lawless and Littwin, 2017; Keys *et al.*, 2020). Our flexible approach is possible because we use a large dataset containing detailed, case-level information on the universe of bankruptcy filings since 2007. The main advantage is that, by comparing the full set of district-specific parameters, we identify the specific parameters and corresponding features of bankruptcy that are most responsible for the geographic variation.

The empirical strategy consists of two parts. First, we estimate district-specific models of bankruptcy chapter choice, one for each of 73 federal court districts. Guided by the existing economic and legal research, each district court *steers* filers into Chapter 7 or Chapter 13 based on the debtors' characteristics and the prevailing local legal culture. We augment the model to allow filers to *deviate* from the court's preferred chapter, and show that such deviations match bankruptcy practice and are quantitatively important.[5] Second, we extend the Blinder-Oaxaca method to decompose the cross-district variation in chapter choice into three sources: (i) differences in the distributions of filer characteristics, (ii) differences in the coefficients on those characteristics, and (iii) differences in deviation rates.

[4]Related studies estimate the causal effect of specific factors affecting bankruptcy or chapter choice, without assessing their role in the geographic heterogeneity. These factors include asset exemptions (Pattison and Hynes, 2020), liquidity constraints (Gross *et al.*, 2014; Foohey *et al.*, 2016), traffic debt (Foohey *et al.*, 2020; Morrison *et al.*, 2020), payday loans (Skiba and Tobacman, 2019), attorney incentives (Lefgren *et al.*, 2010; McIntyre *et al.*, 2015), and the filer's race (Dickerson, 2012; Braucher *et al.*, 2012a,b).

[5]Similar deviations were first included in the chapter choice model in Hackney and Friesner (2015), which examines chapter choice in a single district. We extend this by using data on more than seventy districts and allowing the frequency of these deviations to vary across districts.

Our first contribution is to decompose cross-district variation in chapter choice into several broad categories. Most of the variation is because districts face differences in the types of debtors filing for bankruptcy; differences in filer characteristics explain 61% of the geographic variation. Local legal culture also plays a role as districts differ in how they steer debtors (explaining 15% of the variation) as well as differences in filers' ability to deviate from this steering (explaining 24%). This decomposition is robust to alternative samples, specifications, and concerns about measurement error. Additionally, although our approach differs significantly from the existing literature, our findings are in line with the relative importance of individual and place-based factors for bankruptcy documented in Keys *et al.* (2020).

Our second and more significant contribution is to go beyond this broad decomposition to identify the specific factors driving the geographic variation. Much bankruptcy research focuses on two prominent features of the system: *asset exemptions*, which shield debtors assets in Chapter 7 and vary widely across states, and the *means test*'s restrictions on above-median debtors. We find that these two features explain virtually none of the geographic variation in chapter choice. Instead, a single factor – the debtor's disposable income – is *by far* the most important source of geographic heterogeneity. Differences in the distribution of filer's disposable income across districts explain 54% of the geographic variation. Differences in how districts steer filers based on this disposable income explain at least another 17%.[6] Highlighting the role of disposable income, we examine a parsimonious empirical model of bankruptcy with only differences in sorting on disposable income. This simplified model explains the vast majority of geographic variation in chapter choice. This result holds not only in the estimation sample, but using out-of-sample filings in later years as well.

Our final contribution is to examine mechanisms behind disposable income's importance. One possibility is through disposable income's role in the means test, which is the flagship feature of the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA). However, another possible mechanism is through a lesser known barrier to chapter choice: the court's ability to dismiss cases for abuse under the "totality of the circumstances" (referred to hereafter as the *totality test*). Exploiting the fact that BAPCPA's means test applies to higher income filers, we show that it is the totality test, not the means test, that is responsible for the importance of disposable

[6] At least 17%, because the deviation rates primarily reflect filers' ability to deviate from districts' sorting *on disposable income*. Thus, one could reasonably attribute to disposable income much of the 24% of the variation that is explained by deviation rates.

income in shaping chapter choice. Moreover, the totality test allows courts to use discretion in determining what constitutes abuse. As such, differences in districts' views about what constitutes abuse and how strictly districts enforce these views can be considered aspects of the local legal culture responsible for the geographic variation on chapter choice.

We find that the totality test is a central determinant of chapter choice and geographic variation, but its role has often been overlooked. Although acknowledged in legal research and texts (Waxman and Rucki, 2008; Landry III, 2008, 2014; Warren *et al.*, 2014), there was not empirical evidence of the totality test's importance. Additionally, policy discussions in the years before BAPCPA centered around abuse by can-pay debtors, often ignoring or minimizing the existing "means testing" provided by the totality test. Perhaps because of this, the totality test is absent from existing research in economics and finance. Instead, the standard view is that pre-BAPCPA debtors were free to file Chapter 7, but then the means test in BAPCPA prohibited Chapter 7 for some above-median-income debtors.[7] This view is present or implicit in discussions of bankruptcy law and the reform (White, 1998, 2007a,b), stylized models of the decision to file (Fay *et al.*, 2002; Dávila, 2020), empirical research using the means test as a treatment (Cornwell and Xu, 2014; Li *et al.*, 2011; Mahoney, 2015) and macroeconomic models evaluating the impact of BAPCPA's means testing (Athreya, 2002; Li and Sarte, 2006; Chatterjee *et al.*, 2007; Gordon, 2015; Mitman, 2016; Gordon, 2017; Nakajima, 2017).[8] Our results, however, indicate that it is a mistake to ignore screening from the totality test. Instead, the totality test plays a central role in chapter choice, largely restricting access to Chapter 7 to only those whose disposable income indicates they are unable to repay. Moreover, unlike means testing in the standard view, the totality test is a constraint that applies to debtors of *all* income levels and in the periods both before and after BAPCPA's enactment.

Recognizing the importance of the totality test helps to explain two puzzling facts about bankruptcy. First, few households file for bankruptcy despite the financial benefits. For example, White (1998) documents that at least 15% of households would benefit financially from bankruptcy, but only 1% of households file each year. Screening on disposable income through the totality test

[7] As one example, White (2007b) states "Overall, debtors' right to choose between Chapter 7 and 13 prior to the adoption of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 mean that their obligation to repay in bankruptcy bore little relationship to their ability-to-pay" and then BAPCPA "abolished the right of debtors to choose between Chapter 7 and Chapter 13."

[8] One exception is White (2007a) mentions the possibility of dismissal for "substantial abuse" in footnote 42.

provides one explanation: some households do not file because they are not eligible for Chapter 7 as judges would likely dismiss their case based on their ability to pay.[9] Second, BAPCPA's means test – referred to as "the heart of the bill" (House of Representatives, 2005) and the focus of much research – has consistently been found to have no discernible effect on filings (Lawless *et al.*, 2008; Albanesi and Nosal, 2022; Gross *et al.*, 2021). Again, screening on disposable income offers an explanation. This screening was already in place before BAPCPA, under the totality test, and continued after. As a result, the formulaic means test created in BAPCPA was largely redundant since debtors who fail the means test were likely already barred from Chapter 7 based on their disposable income. Indeed, this explanation corroborates anecdotes from bankruptcy attorneys.[10]

Another benefit to recognizing the importance of the totality test is that it should alter how one thinks about the trade-offs and models of bankruptcy. A central behavioral distortion caused by the bankruptcy system is strategic filing, whereby debtor-friendly bankruptcy rules induces some individuals that could repay their debts to default in order to take advantage of the financial benefits (Fay *et al.*, 2002). If a debtor is free to choose Chapter 7 regardless of ability to pay, strategic filings may be widespread and this moral hazard could significantly raise the costs of a more generous bankruptcy system. With courts screening for abuse using disposable income under the totality test, however, there is less scope for strategic filing. Instead, bankruptcy may be better modeled like disability insurance, where examiners determine access using noisy measures of the applicant's true condition (Haller *et al.*, 2020). Incorporating more restricted access and better targeting into quantitative models of the bankruptcy system, relative to the prevailing view, may alter the conclusions drawn.[11]

By documenting the drivers of geographic variation, our paper adds to the broader literature examining what drives differences in bankruptcy outcomes. These include the impact of location on consumer credit outcomes and financial distress (Lefgren and McIntyre, 2009; Brown *et al.*,

[9]There are likely multiple explanations, including these offered in White (1998) – a lack of non-bankruptcy debt collection and the option value of bankruptcy – and the potentially high nonpecuniary costs and credit market penalties which rationalize filing rates in quantitative models (e.g. Athreya (2002)).

[10]Interviews with bankruptcy attorneys also indicate the means test had little impact, and an important explanation offered by attorneys is that debtors already faced these barriers to Chapter 7 before BAPCPA from dismissals for abuse (Littwin, 2016). Some attorneys reported that the means test actually made it easier to qualify debtors for Chapter 7 compared to the barriers they faced pre-BAPCPA.

[11]Many papers model realistic features of the U.S. bankruptcy system (Athreya, 2006; Li and Sarte, 2006; Livshits *et al.*, 2007; Chandra and Staiger, 2007; Pavan, 2008; Chatterjee and Gordon, 2012; Hintermaier and Koeniger, 2016; Mitman, 2016; Li *et al.*, 2022). See Exler and Tertilt (2020) for a recent review of the broader literature on quantitative macroeconomic models of bankruptcy.

2019; Miller and Soo, 2021; Keys *et al.*, 2020), along with the corresponding legal literature on local legal culture (Braucher, 1993; Sullivan *et al.*, 1994; Lawless and Littwin, 2017). Related studies estimate the causal effect of specific factors affecting bankruptcy outcomes or chapter choice, without assessing their role in the geographic heterogeneity. These factors include asset exemptions (Pattison and Hynes, 2020), liquidity constraints (Gross *et al.*, 2014; Foohey *et al.*, 2016), traffic debt (Foohey *et al.*, 2020; Morrison *et al.*, 2020), payday loans (Skiba and Tobacman, 2019), attorney incentives (Lefgren *et al.*, 2010; McIntyre *et al.*, 2015), the filer's race (Dickerson, 2012; Braucher *et al.*, 2012a,b), court crowding (Iverson, 2018), or judicial tendencies and experience (Dobbie and Song, 2015; Iverson *et al.*, 2023).

2 Background

In the U.S., consumers choose to file for bankruptcy under either Chapter 7 or Chapter 13.[12] In Chapter 7, debtors obtain a quick discharge of most unsecured debts. In exchange, they must repay creditors using any nonexempt assets, but 94% of Chapter 7 filers have zero nonexempt assets and repay nothing to unsecured creditors. In Chapter 13, debtors enter a 3-5 year plan during which they repay creditors out of their disposable income. Upon completion of the plan, Chapter 13 filers obtain a discharge of remaining unsecured debts. Roughly 50% of debtors in Chapter 13 do not complete their plan, mostly because they miss scheduled payments. If a debtor fails to complete their plan, they forego any discharge of debts that would have occurred at plan completion. Thus, Chapter 7 typically results in significant debt relief and little creditor repayment, while Chapter 13 results in less debt relief and more creditor repayment. As a result, chapter choice is the key factor determining the balance between debt relief and creditor repayment in bankruptcy.

2.1 Geographic Variation in Chapter Choice

Although the U.S. bankruptcy code is primarily a uniform federal law, there is tremendous geographic variation in the relative use of the two bankruptcy chapters.[13] The bankruptcy system is administratively divided into 94 federal court districts, and a debtor must file for bankruptcy in

[12] Debtors can also file under Chapter 11 or Chapter 12, but these account for less than 0.5% of consumer bankruptcy filings.

[13] As we discuss below, the one notable exception to the uniformity of bankruptcy law is that states are allowed to set their own asset exemption levels.

the district where they reside. Across the court districts, the share of bankruptcies filed in 2010 under Chapter 7 varies from 25% to more than 90%. Within a district, the relative use of the two chapters is extremely persistent over time. For example, the correlation coefficient between the 1990 and 2010 district-level shares of bankruptcies under Chapter 7 is 0.70 (Appendix Figure A1), despite changes over this time period to credit markets, economic conditions, and bankruptcy law itself.

These differences in chapter choice lead to very different outcomes for debtors and creditors. The share of bankruptcies that successfully obtain a discharge is higher in Chapter 7 than in Chapter 13 (96% vs. 43%), while the recovery rate on unsecured debt is lower (0.5% vs. 13%).[14] Figure 1 shows that this translates into significant geographic variation, where filers are more likely to obtain a discharge in states with a high Chapter 7 incidence (Panel A), but creditors recover a lower share of unsecured debt in bankruptcy (Panel B).[15] The goal of this paper is to understand the sources of these large geographic differences in chapter choice.

2.2 Potential Sources of Variation in Chapter Choice

Chapter choice is technically decided by the debtor and the benefits, costs, and constraints of this choice will depend on the debtor's characteristics and goals. After the debtor chooses a chapter, the court's bankruptcy trustee and judge review the case and can dismiss it if the debtor is deemed ineligible for the chosen chapter. This decision depends on rules in the federal Bankruptcy Code as well as local standards and judicial discretion. Bankruptcy attorneys, aware of the court's tendencies, will often steer debtors away from a chapter that would raise objections from the court. In sum, although technically made by the debtor, the chapter choice decision reflects the combined input of the debtor and the court district's local practices and standards.

Differences in chapter choice across geographies then have three potential sources. First, debtors may have systematically different characteristics across districts, leading to differences in benefits, costs, and constraints and ultimately leading to differences in chapter choice. Second, conditional

[14] Authors estimates. We combine data from Trustee Final Reports, which detail actual payments to general unsecured creditors, with data from the Federal Judicial Center's Integrated Database. As Trustee Reports are often shared among districts within a state, we aggregate data to the state level in Figure 1. See Appendix Figure A2 for these graphs separated by chapter. See Morrison and Uettwiller (2017) for estimates from other samples of recoveries in Chapter 13.

[15] Figure 1 also reveals that districts with the lowest Chapter 7 share are in the South, where the Chapter 13 procedure originated.

on a given set of characteristics, there is known geographic variation in the chapter preferred by the local court. These persistent differences in local practices across districts are known as the local legal culture (Braucher, 1993; Sullivan *et al.*, 1994; Westbrook, 1998; Lawless and Littwin, 2017; American Bankruptcy Institute, 2019). Finally, locations may differ in how strictly they enforce the local rules, leading to differences in how frequently debtors follow or deviate from the court's preferred chapter. This section provides more background on each of these potential sources.

Debtor Characteristics

The benefits, costs, and constraints in chapter choice depend on the debtors' characteristics. Offering quick debt relief and little repayment, Chapter 7 is the better option for most debtors. But there are some benefits only available in Chapter 13. Homeownership, secured debt, and some types of nondischargeable debts make Chapter 13 more attractive because debtors are better able to deal with delinquent secured debt and threats of repossession or foreclosure (Porter, 2011; Tabb, 2020). Additionally, Chapter 13 has lower upfront costs, which may be important to liquidity-constrained debtors (Gross *et al.*, 2014; Foohey *et al.*, 2016). Debtors may also prefer Chapter 13 if they feel an obligation to repay some of their debt (Braucher, 1993; Porter, 2011), even though this does not translate into better credit scores (Jagtiani and Li, 2015). Thus, a debtor may prefer Chapter 7 or Chapter 13 depending on their characteristics and the benefits they provide.

There are also three main legal barriers that restrict the chapter choice of some filers: nonexempt assets, the means test, and the totality test. First, Chapter 7 debtors must forfeit their nonexempt assets, while Chapter 13 debtors can retain them. Which assets are exempt or nonexempt depends, in part, on state law and the protections vary across states. The largest exemption, which protects home equity, varies from less than $10,000 to more than $500,000 (and is unlimited in seven states).[16] While filers with nonexempt assets are still allowed to file for Chapter 7, they seldom do.[17] Second, in 2005, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) created a formula-based "means test" that restricts who can file Chapter 7. First, the test compares

[16] Another important aspect of home protection is tenancy-by-the-entirety, which provides additional protection for married filers (Traczynski, 2019). The district-specific coefficients on the indicator for joint filings capture the role of these tenancy-by-the-entirety laws.

[17] Only 6% of Chapter 7 filings have any nonexempt assets, and the most commonly seized asset is a small tax rebate (Flynn *et al.*, 2003; Jiménez, 2009). Among the 6% of cases with nonexempt assets, the median amount liquidated is less than $2,000 and only 0.1-0.2% of Chapter 7 filings have nonexempt home equity (Pattison, 2020).

the filer's recent income to the state median income adjusted for household size. Below-median income filers automatically pass the means test, while above-median filers may fail if their income exceeds their allowable expenses by too much. Failing the test creates a "presumption of abuse" and the debtor is barred from Chapter 7 unless they can rebut this presumption with special circumstances (e.g., recent job loss or medical expenses).

Third, judges can dismiss the debtor's Chapter 7 case if they deem it an abuse under the *totality of the circumstances*, referred to here as the *totality test*. This totality test predates BAPCPA and allows the judge to consider all facts of the case and exercise discretion when deciding what constitutes an abuse. Courts consider many factors but have settled on ability to pay, measured by the debtor's disposable income, as the most important (Waxman and Rucki, 2008; Landry III, 2008; US DOJ, 2012). While some argued that BAPCPA's means test was meant to replace the totality test, most courts have found that debtors who pass BAPCPA's means test can still have ability to pay scrutinized under the totality test (Landry III, 2008; Tabb, 2020). Also, the U.S. Trustee program makes it clear that "even if the filing is not presumed abusive, the U.S. Trustee may seek dismissal under section 707(b) if the case would be abusive considering the totality of the circumstances of the debtor's financial situation, including the debtor's ability to repay, or under a bad faith analysis" (USTP, 2012). Unlike the means test, the totality test applies to debtors of all income filers, not just those with above-median income.[18] Relatedly, disposable income also serves as a screen in Chapter 13, where a case can be dismissed if the filer's disposable income is so low as to make the repayment plan infeasible. In sum, filers with high disposable income may be barred from Chapter 7, while filers with low disposable income may be barred from Chapter 13.

Local Legal Culture

Geographic variation in chapter choice may also arise due to heterogeneity in the local legal culture that creates differences in how debtors are sorted into chapters (holding their characteristics constant). This local culture refers to the shared and persistent view of local attorneys, judges, and trustees about how to interpret and apply the law (Braucher, 1993; Sullivan *et al.*, 1994; Westbrook, 1998; Lawless and Littwin, 2017; American Bankruptcy Institute, 2019). As early as the 1960s,

[18]See Appendix B for quotes discussing this test. See In re Pennington, 348 B.R. 647, 65152 (Bankr. D. Del. 2006) for an example of the totality of the circumstances test applied to below-median income filers.

geographic differences in chapter choice have been attributed to differences in the views of local bankruptcy practitioners (McDuffee, 1961; Haden, 1966).

Local legal culture can lead to differences in how legal barriers are enforced by judges and trustees. Trustees, who represent the interests of creditors, can differ in how aggressively they seek creditor recoveries and pursue nonexempt assets (Morrison *et al.*, 2019). Under the formal means test, trustees exercise discretion when evaluating mitigating circumstances and decline to seek dismissal in 60% of presumptively abusive cases (USTP, 2012). Under the totality test, district courts differ in how ability to pay is assessed and investigated (Landry III, 2008, 2014). Trustees also vary in their informal requirement of a minimum percentage of repaid unsecured debt for debtors to file in Chapter 13 (Braucher, 1993; Morrison and Uettwiller, 2017; Morrison *et al.*, 2020). Legal culture can also affect steering by attorneys through, for example, altering attorney fees (Lefgren *et al.*, 2010), time or hassle costs (Sullivan *et al.*, 1994), filer fee structures (Foohey *et al.*, 2016), differential steering based on race (Braucher *et al.*, 2012a), or differences in which benefits from bankruptcy professionals emphasize. All of these factors can lead to observationally equivalent filers being sorted differently based on the prevailing legal culture of the district.

Deviations

While the local legal culture creates an environment whereby debtors may be steered in a particular direction, the debtor has the final say on chapter choice. In some cases, their choice will deviate from the chapter preferred by the district court. As evidence this occurs, the courts regularly dismiss cases deemed inappropriate for the chosen chapter or require the case to be converted to the other chapter. These enforcement actions are common. Between fiscal year 2010 and 2016, which overlaps with our analysis period, trustees took nearly 60,000 formal enforcement actions and 155,000 informal actions (i.e., documented inquiries) investigating abuse that led to more than $11 billion in debts not being discharged, fines, and other remedies (USTP, 2016). The ability of a debtor to deviate from the district's preferences and the consequences of doing so could also vary across districts. This variation may arise due to differences in how strongly districts steer debtors in the first place, as well as differences in the propensity for trustees and judges to dismiss cases they deem ineligible under a given chapter. We return to this in Section 7).

3 Data

The data are from the Federal Judicial Center's (FJC) Integrated Database and contain all bankruptcy cases filed in fiscal years 2008 through 2020. We restrict the main sample to new consumer Chapter 7 or Chapter 13 cases filed between 2010 and 2014, which provides enough of a post-period to observe whether Chapter 13 plans were successfully completed. We exclude cases with missing data, extreme outliers, and those that cannot file certain chapters because of debt limits or recent filings.[19] Our strategy requires some debtors in each district to have nonexempt home equity, so we exclude the fifteen districts in the seven states with unlimited homestead exemptions.[20] Our final sample consists of roughly 3 million Chapter 7 cases and 0.9 million Chapter 13 cases filed between 2010 and 2014 across 73 federal districts.

For each case in our sample, we construct case-specific variables to capture the important determinants of chapter choice.[21] The first set of characteristics captures the three legal barriers to chapter choice. For the totality test, we include the filer's disposable income.[22]. For the means test, we include an indicator for whether the filer reports above-median income for their state and the interaction of the above-median indicator and the filer's disposable income.[23] For nonexempt assets, we calculate each filer's nonexempt equity following Pattison and Hynes (2020), and we also include the value of the filer's personal (non-real-estate) assets as a proxy for other nonexempt assets.[24] Table 1 shows that the differences in these variables across Chapter 7 and Chapter 13 filers are consistent with the legal restrictions to chapter choice. Chapter 13 filers tend to have

[19] Specifically, we exclude cases with missing data on characteristics (5.7% of cases), missing plan duration (0.3% of cases, typically transfers), those involving individuals with assets or debts exceeding $5 million or monthly income or expenses exceeding $50,000 (0.2% of remaining cases), cases in which debts exceed the limits for Chapter 13 (2.2% of remaining cases) or in which individuals report a bankruptcy filing within the previous eight years (13.3% of remaining cases).

[20] We also exclude the districts covering Washington D.C. and the U.S. territories.

[21] To reduce the influence of extreme outliers, all financial variables are winsorized at the 99^{th} percentile, and the 1^{st} and 99^{th} percentile for disposable income.

[22] Disposable income is defined as Schedule I income less Schedule J expenses, adjusted for conduit districts as discussed in Appendix C.

[23] Above-median income is constructed using the filer's "current monthly income" which is the six-month average used in the means test. Because we do not observe debtors' household size, we classify debtors as below-median income if their income is below the lowest possible state median income that could apply, i.e., the median income for a single-person household in single-filer cases and the median income for a two-person household in joint cases. For the disposable income portion of the means test, captured by the interaction of the above-median indicator and disposable income, we approximate the formula used in the actual means test as detailed in Appendix F.3.1.

[24] Specifically, nonexempt equity is defined as $\max\{\text{real property value} - \text{secured debt} - \text{homestead exemption}, 0\}$, applying the married homestead exemption to joint filers and the single homestead exemption to single filers. If both federal and state exemptions are available, we take the maximum of the two. Pattison and Hynes (2020) finds that this approximation for home equity is highly correlated with actual home equity reported on bankruptcy forms.

significantly higher disposable incomes, are nearly twice as likely to have above-median income for their state, and have more nonexempt equity and other personal assets.

The other variables capture the broader financial characteristics and incentives of filers. Filer's assets-to-income and debt-to-income ratios reflect the impact of overall assets and liabilities. Chapter 13 provides ways to keep a home at risk of foreclosure and to deal with secured or nondischargeable debt, so we include controls for homeownership, the amount of negative equity, the share of total debt that is secured, and the share of debt that is nondischargeable. Finally, we include an indicator for whether the case involves joint filers (as opposed to a single filer) and the percentage of Black residents in the filer's zip code. The share of Black residents in the filer's zip code is used as a proxy for the race of the filer as studies have documented racial differences in chapter choice (Braucher *et al.*, 2012a; Lawless and Littwin, 2017), yet individual race is not available in the data. With these variables, Table 1 shows that Chapter 13 filers are much more likely to be homeowners and secured debts make up a greater share of their total debts. Racial differences in chapter choice are also evident, with Chapter 13 filers more likely to reside in zip codes with a higher share of Black residents.

4 Model and Empirical Strategy

We begin by modeling chapter choice within a district. Taking the decision to file for bankruptcy as exogenous, the district, representing the actions of the local bankruptcy practitioners, steers debtors into a chapter according to the local legal culture.[25] Filers, however, may deviate from the chapter preferred by the district. This framework yields an estimating equation that is mathematically equivalent to a binary choice model with misclassification (Hausman *et al.*, 1998). Estimating district-specific models, we then develop an extended Blinder-Oaxaca decomposition to separate the variation in Chapter 7 filing rates into portions attributable to (i) district preferences, (ii) filer characteristics, and (iii) district deviation rates.

[25] We will return to the issue of exogenous selection into the bankruptcy system in Section 6.

4.1 Model of Chapter Choice

District Preferences

The district steers filers into particular bankruptcy chapters based on filers' characteristics and the district's preferences. Let π_{id} be district d's view of the suitability of filer i for Chapter 7 relative to Chapter 13, defined as

$$\pi_{id} = \beta_{0d} + x_i^l \beta_{ld} + x_i^f \beta_{fd} + \epsilon_{id}. \tag{1}$$

If $\pi_{id} \geq 0$, district d prefers that debtor i file under Chapter 7. The covariates x_i^l and x_i^f are, respectively, the legal barriers and financial/demographic characteristics of filer i from Table 1. The coefficients β_{0d}, β_{ld}, and β_{fd} capture the local legal culture, i.e., how district d enforces the legal barriers and weights filers' financial characteristics. Allowing for district-specific coefficients adds substantial flexibility relative to earlier models of chapter choice, which either restrict all coefficients to be identical across districts (Domowitz and Sartain, 1999; Zhu, 2011) or only allow the intercept to vary across districts (Lawless and Littwin, 2017). The error term ϵ_{id} captures the role of unobserved variables or random noise in the districts' view of filers' suitability to each chapter.

The identify the parameters, we assume that the error term is independently drawn from a standard normal marginal distribution, $\epsilon_{id} \sim N(0,1)$, in each district d. This entails two key restrictions. First, the error term is independent of the observable characteristics. This will be violated if there are omitted variables that are correlated with observed characteristics. Second, it assumes that the error term is homoskedastic across districts. Because the probit normalizes coefficients by the standard deviation of the error, heteroskedasticity would cause districts' estimated coefficients to reflect differences in error variances as well as preferences. This is desirable if the heteroskedasticity itself reflects local legal culture, but could be problematic if heteroskedasticity is caused by differences in the distributions of omitted variables. Given the role that omitted variables play in both restrictions, we investigate the influence of omitted variables on our key results in Section 6.

With the normality assumption, the probability that district d prefers filer i in Chapter 7

$(c^*_{id} = 1)$ is

$$\Pr(c^*_{id} = 1|x_i) = \Phi\left(x_i\beta_d\right), \tag{2}$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function, $x_i = \left[1\ x^l_i\ x^f_i\right]$, and $\beta_d = [\beta_{0d}\ \beta_{ld}\ \beta_{fd}]'$. If filers always end up in the chapter preferred by the district (i.e., district steering is perfectly enforced), then c^*_{id} is observed and Equation (2) can be estimated using a standard probit model. In practice, steering by the district is imperfect and debtors may file under a different chapter than the one preferred by the district.

Filer Deviations

The chapter choice decision is ultimately at the discretion of the debtor, and the fact that courts dismiss or convert cases shows that debtors' choices may not follow the district's preferences. For example, a debtor with high disposable income, who the district would prefer in Chapter 13, may choose to file under Chapter 7. To allow for deviations, let c_{id} denote the actual chapter choice for filer i, equal to one if the debtor files under Chapter 7 and zero otherwise. The probability that the filer deviates from the district's preferred choice is given by

$$\begin{aligned} \alpha^d_0 &= \Pr(c_{id} = 1|c^*_{id} = 0) \\ \alpha^d_1 &= \Pr(c_{id} = 0|c^*_{id} = 1). \end{aligned} \tag{3}$$

Equation (3) imposes constant deviation probabilities within a district conditional on the district's desired chapter choice. This assumption is primarily for tractability and, in reality, some filers may have a stronger incentive to deviate from the district's preferred chapter.[26] Still, the assumption is reasonable if districts adjust the costs of deviation (e.g., through a greater risk of dismissal) across filers so that the net benefit of deviation is constant.

We refer to α^d_0 and α^d_1 as district-specific *deviation rates*. They will be heterogeneous across districts if districts differ in how strictly or successfully they enforce their preferences. For instance, some districts heavily scrutinize filings, frequently dismissing or converting inappropriate cases.

[26] In principle one could relax this assumption, allowing the deviation probabilities to depend on filer (or other) observed attributes in addition to c^*_{id}, as discussed in Lewbel (2000). Convergence of the empirical models, however, is tenuous.

Because the probability of detecting abuse in such districts is high, deviation rates will be relatively low. In contrast, other districts may only loosely enforce their preferences, leading to relatively high deviation rates. In Section 7 we examine the mechanisms underlying the deviation rates.

Complete Model and Estimation

Combining the model for c^*_{id} with the deviation probabilities, the probability of debtor i in district d filing under Chapter 7 is given by

$$\Pr(c_{id} = 1|x_i) = \alpha_0^d + (1 - \alpha_0^d - \alpha_1^d)\Phi(x_i\beta_d) = \alpha_0^d + \tilde{\alpha}_1^d\Phi(x_i\beta_d), \tag{4}$$

where $\tilde{\alpha}_1^d \equiv (1-\alpha_0^d-\alpha_1^d)$. These probabilities form the basis of district-specific likelihood functions, enabling estimation of α_0^d, α_1^d, and β_d by maximum likelihood (ML) separately for each district. The likelihood function is identical to that proposed in Hausman *et al.* (1998) to account for misclassification in a standard binary choice model. In our case, α_0^d (α_1^d) reflects the probability of a filer deviating from the district's preferred chapter choice and filing under Chapter 13 (Chapter 7) instead of the probability of a false positive (negative). Hackney and Friesner (2015) first applied this model to chapter choice using data from a single bankruptcy district.

To provide intuition concerning identification, note that $\Pr(c_{id} = 1|x_i, d) \to \alpha_0^d$ as $x\beta_d \to -\infty$. As a result, α_0^d is identified by the presence of filers whom the district strongly wishes to steer away from Chapter 7 ($x\beta_d << 0$) but are nonetheless observed in Chapter 7. Similarly, α_1^d is identified by the presence of filers whom the district strongly wishes to steer into Chapter 7 ($x\beta_d >> 0$) but are nonetheless observed in Chapter 13. Identification of the model requires that the total deviation rate is not too high; specifically, $\alpha_0^d + \alpha_1^d < 1$ (Hausman *et al.*, 1998).

4.2 Decomposing Geographic Variation

Upon estimation of the district-specific models, our goal is to use the results to understand the geographic variation in Chapter 7 rates across districts. Extending the Blinder-Oaxaca decomposition for binary choice models in Fairlie (2005) to our setup, we can decompose the difference in Chapter 7 rates across every pair of districts, d and d', into three components: the distribution of filer covariates (x_i), the district-specific coefficients (β_d), and the deviation probabilities (α_0^d and

α_1^d). However, given the large number of districts in our sample, a complete set of pairwise comparisons is unwieldy. Instead, we estimate a pooled, *national* model and compare each district to the nation as a whole. The national model, which depends on α_0^N, α_1^N, β_N, and x_N is estimated using a single model on the pooled sample of observations from all districts. The estimates of β_N convey information about the "average" sorting preferences of filers and the estimates of α_0^N and α_1^N convey information about the "average" deviation rates.

Comparison to the National Model

To decompose the difference in Chapter 7 rates between district d and the national average N, denote the observed and predicted Chapter 7 shares for district d as $\bar{P}_d^7 = \frac{1}{N_d}\sum_{i=1}^{N_d} c_{id}$ and $\tilde{P}_d^7 = \frac{1}{N_d}\sum_{i=1}^{N_d} \hat{c}_{id}$, respectively, where

$$\hat{c}_{id} \equiv \hat{\alpha}_0^d + \left(1 - \hat{\alpha}_0^d - \hat{\alpha}_1^d\right) \Phi\left(x_i \hat{\beta}_d\right) \tag{5}$$

are the predicted probabilities and N_d is the number of filers in district d. Because the sample mean of the predicted probabilities from a probit model may differ slightly from the sample mean of the binary outcome, we define $\delta_d^7 \equiv \bar{P}_d^7 - \tilde{P}_d^7$ as the residual gap.

The gap in Chapter 7 rates between a given district, d, and the nation as a whole, N, is

$$\Delta_d^T \equiv \bar{P}_d^7 - \bar{P}_N^7,$$

where $\bar{P}_N^7$ is the Chapter 7 share in the pooled national data (which is 76%). This gap can be

decomposed into four terms

$$\begin{aligned}\Delta_d^T = \quad & \underbrace{\hat{\tilde{\alpha}}_1^N \left\{ \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi(x_{id}\hat{\beta}_N) - \frac{1}{N_N} \sum_{i=1}^{N_N} \Phi(x_{iN}\hat{\beta}_N) \right\}}_{\text{Covariate Gap}} \\ & + \underbrace{\hat{\tilde{\alpha}}_1^N \left\{ \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi(x_{id}\hat{\beta}_d) - \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi(x_{id}\hat{\beta}_N) \right\}}_{\text{Coefficient Gap}} \\ & + \underbrace{\left(\hat{\alpha}_0^d - \hat{\alpha}_0^N\right) + \left(\hat{\tilde{\alpha}}_1^d - \hat{\tilde{\alpha}}_1^N\right) \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi(x_{id}\hat{\beta}_d)}_{\text{Deviation Gap}} + \underbrace{(\delta_d^7 - \delta_N^7)}_{\text{Residual Gap}}\end{aligned} \tag{6}$$

where x_{id} for $i = 1, \ldots, N_d$ and x_{iN} for $i = 1, \ldots, N_N$ are the covariates for the filers in district d and in the pooled national sample, respectively, and N_N is the total number of filers in the pooled sample.

These decomposition terms represent the portion of the gap in Chapter 7 rates due to the differences in each component. The Covariate Gap reflects the gap due to differences in the distributions of filer covariates between district d and the national sample, evaluated at the deviation rates and coefficients from the national model. The Coefficient Gap reflects the gap due to differences in legal culture as captured by the coefficients, evaluated at the distribution of filer characteristics in district d and the national deviation rates. The Deviation Gap reflects the gap due to differences in deviation rates, evaluated at the distribution of filer covariates and the coefficients for district d. The Residual Gap, which in practice is negligible, captures any residual difference between the sample means and the mean predicted probabilities from the probit models. We can further decompose the gaps into the contributions of specific subgroups of coefficients and covariates (Fairlie, 2005). We isolate the separate roles of the three legal (nonexempt assets, means test, and totality test), as well as subgroups of filer financial characteristics and race. Details are relegated to Appendix D.[27]

[27]The decomposition to subsets of the covariates is not invariant to the order of the decomposition. We address this by conducting a separate decomposition for each possible permutation of the covariate subsets and reporting the average across all permutations.

Aggregating the Decomposition Across Districts

After decomposing Δ_d^T for each district d following Equation (6), we wish to summarize the contribution of each part. To proceed, we rewrite the decomposition more compactly as

$$\underbrace{\Delta_d^T}_{\text{Total Gap}} = \underbrace{\Delta_d^C}_{\text{Coefficient Gap}} + \underbrace{\Delta_d^X}_{\text{Covariate Gap}} + \underbrace{\Delta_d^A}_{\text{Deviation Gap}} + \underbrace{\Delta_d^R}_{\text{Residual Gap}} . \tag{7}$$

We then summarize the total variation across all districts that is explained by each component using the deviation ratio (DR). The DR for component $j = C, X, A, R$ is given by

$$DR^j = \frac{\sum_{d=1}^{D} \texttt{sign}\left(\Delta_d^T\right) \cdot \Delta_d^j}{\sum_{d=1}^{D} \left|\Delta_d^T\right|}, \tag{8}$$

where D is the total number of districts. The numerator in Equation (8) multiplies each district's component gap, Δ_d^j, by the sign of the total gap for that district, Δ_d^T. The deviation ratio will be positive if component j will be positive if the component j gap and the district's total gap are of the same sign, i.e., if that component helps explain the gap. The deviation ratio for component j will be negative if the aggregate component j gap and the aggregate total gap are oppositely signed. In this case, making districts similar on component j would increase the overall gap in filing rates. The four DR^j terms must sum to one, thereby fully accounting for the geographic variation in filing rates across districts.

5 Results

5.1 Models of Chapter Choice

We begin by reporting estimates from the national and district-specific models of chapter choice. The results are shown in Table 2. As a benchmark, Columns (1) and (2) report the coefficient estimates and average marginal effects (AMEs) from a standard probit model that does not allow for deviations or disrict-specific heterogeneity. Still, the model fits the data well; the Efron pseudo R^2 is 0.48 and the area under the receiver operator curve (AUC) is 0.91.[28] The signs of several

[28]The AUC can be interpreted as the probability that, given a randomly chosen Chapter 13 and Chapter 7 case, the model will correctly assign a higher probability of Chapter 13 to the actual Chapter 13 case than the actual Chapter 7 case.

coefficients are consistent with common conceptions about chapter choice. For example, filers with greater disposable income, those with nonexempt home equity, and those with more secured or nondischargeable debt are less likely to enter Chapter 7.

The specification reported in Columns (3) and (4) allows for deviations, but still restricts the coefficients to be the same in all districts. Compared to Column (1), allowing for deviations improves the fit of the model with the Pseudo R^2 increasing to 0.63 and the AUC is 0.93. A likelihood ratio test easily rejects the null that $\alpha_0 = \alpha_1 = 0$ ($p < 0.001$), indicating that the deviation rates are statistically meaningful. The estimated deviation probabilities are $\alpha_0 = 0.15$ and $\alpha_1 = 0.02$, indicating that it is much more likely to be the case that a *district* prefers Chapter 13 but the *filer* enters Chapter 7 than the converse. Allowing for filer deviations also causes most AMEs to increase in magnitude. Notably, the AME for monthly disposable income more than doubles. This occurs for two reasons. First, deviations can rationalize observations with very low index values ($x_i\beta << 0$) observed in Chapter 7 through the deviation rate α_0, whereas a standard probit model would fit these observations by reducing the magnitude of the corresponding coefficient in β. Second, the AMEs reported in Column (4) (and Column (6)) represents the AME on the district's probability of preferring Chapter 7 from the inner probit for, whereas the AMEs on observed filing rates are smaller because some filers deviate.[29]

Finally, Columns (5) and (6) report our baseline estimates from district-specific probit models allowing for deviations. For each variable, we report the 10^{th} and 90^{th} percentiles of the distribution of district-specific coefficient estimates and AMEs. There exists substantial heterogeneity across districts that is meaningful both statistically and qualitatively. Allowing for such heterogeneity improves the fit of the model relative to those in Columns (1) and (3); the Efron Pseudo R^2 increases to 0.70 and the AUC improves to 0.96. A likelihood ratio test easily rejects the null that the parameters are equal across districts ($p < 0.001$).

Examining specific covariates, we find that disposable income is an important determinant of the chapter steering mechanism in all districts. However, the magnitude of the AME varies (across districts) from -0.96 at the 10^{th} percentile of the distribution to -0.48 at the 90^{th} percentile. Thus,

[29]Specifically, for covariate j, the AMEs in Columns (2), (4), and (6) are calculated as the average value of $\phi(x_{iN}\beta)\beta_j$ where x_{iN} is the national distribution of filers. This represents the effects of a unit change in the covariates on $\Pr(c^*_{iN} = 1|x_{iN})$. The marginal effects on actual filing rates, which are obtained by multiplying the AMEs by $(1 - \alpha^d_0 - \alpha^d_1)$, are smaller because filers may deviate from the district's preferences. These represent the effects of a unit change in the covariates on $\Pr(c_{iN} = 1|x_{iN})$.

the AME is more than double in some districts relative to others. Other coefficient estimates exhibit similar heterogeneity. For example, in some districts being a homeowner *decreases* the probability of a filer being steered into Chapter 7 by three percentage points; in others it *increases* the probability by three percentage points. The heterogeneity in these coefficients indicates that districts sort filers differently, conditional on filer characteristics, consistent with a salient role of local legal culture in bankruptcy outcomes. There is also notable heterogeneity in the deviation rates, especially deviations *into* Chapter 7 (α_0), which varies across districts from less than 0.05 to more than 0.32. This implies that nearly one-third of filers steered into Chapter 13 in some districts end up in Chapter 7, while only one in twenty do in other districts.

5.2 Decomposing Geographic Variation

We now decompose the geographic variation in Chapter 7 rates into the share explained by differences in covariates, coefficients, and deviation rates using Equation (6). We first decompose the gap between each district's Chapter 7 rate and the national average. For example, the Chapter 7 share in the Eastern District of California is 9.1 percentage points (pp) above the national average of 76.7%. The covariate gap explains 5.6 pp of this difference, the coefficient gap explains 1.4 pp, and the deviation gap explains 2.1 pp.

Using Equation (8), we then summarize the share of the total geographic variation across all districts that is explained by each component. Overall, the covariate gap explains 61% of the aggregate geographic variation, the coefficient gap explains 15%, and the deviation gap explains 24% (Panel A in Figure 2).[30] Most of the variation is due to differences in individual characteristics, but place-based differences in the local legal culture, as reflected in coefficients and the deviation rates, are also salient. Although the magnitudes are not directly comparable, this result is consistent with Keys *et al.* (2020), who find an important role for both individual and place-based factors in bankruptcy filing decisions.

Covariate Gaps Panel B in Figure 2 reports results from further decomposing the geographic variation into the role of specific variables, coefficients, and deviation rates. Among the covari-

[30] Appendix Table A1 reports the exact values from these decompositions. The residual gap is omitted from the figure as it explains only 0.09% of the variation. We show the full set of the district-specific decompositions in Appendix Figure A3.

ates, the most important, by far, is disposable income, which alone explains 54% of the aggregate geographic variation in chapter choice. This indicates a filer's disposable income is the primary cause of the geographic variation in chapter choice, reflecting a major role for the screening on disposable income in the totality test discussed in Section 2. Importantly, the portion attributable to disposable income is not due to its role in the formal means test. As the formal means test only applies to above-median-income filers, its effect is captured by the interaction of disposable income with an indicator for above-median income. We examine the distinction between screening on disposable income and the formal means test further in Section 7.

We find little role for the other legal barriers to chapter choice considered; the means test and asset exemptions together explain less than 1% of the aggregate variation. While perhaps surprising because the literature focuses solely on these two legal barriers, their small effects are consistent with external evidence. For asset exemptions, the small role reflects the fact that less than 5% of filers have nonexempt home equity, which is the one nonexempt asset measured accurately in our data. Other research with more detailed information on all nonexempt assets similarly find that only 6% of Chapter 7 filers have nonexempt assets (Jiménez, 2009; Pattison and Hynes, 2020; Hynes and Pattison, 2022). Even among Chapter 13 filers, discussions with attorneys (Braucher, 1993) and empirical evidence in Morrison and Uettwiller (2017) indicate that most Chapter 13 cases would be no-asset cases in Chapter 7.[31]

For the means test, the small role is unsurprising given that geographic variation in chapter choice predates the introduction of the means test in 2005. Additionally, the means test does not appear to be a binding constraint on the majority of Chapter 13 filers. Kiel and Fresques (2017) find that only 9% of Chapter 13 filers would have failed the means test, creating a presumption of abuse. Moreover, many filers that do create a presumption of abuse are able to rebut the presumption and still file under Chapter 7.[32]

Remaining filer characteristics also play a relatively minor role, combining to explain only 7% of the aggregate geographic variation. Separating these financial and race covariates further in

[31]The FJC data contain a variable marked "asset case," and 99% of Chapter 13 filers do mark their case as an "asset case." This variable indicates that Chapter 13 filers will distribute funds to unsecured creditors (as is required by most trustees), but it does not indicate that these funds are available because the filer has nonexempt assets.

[32]In fiscal year 2012, approximately 13% of Chapter 7 filers had income above their state's median income. Of the cases, only 6% were presumed abusive under the means test. And, after considering a debtor's special circumstances, statutory discretion was exercised and a dismissal was not sought in about 60% of the cases presumed to be abusive (USTP, 2012).

Appendix Figure A5 reveals that race plays the most important role within this subset, explaining 5% of the aggregate variation. The filer's financial characteristics explain less than 2% of the total variation. This suggests that the financial incentives to file, as determined by homeownership and share of secured debt, explain little of the aggregate geographic variation in chapter choice. While omitted filer characteristics may exist (e.g., whether the filer has delinquent secured debt), the pseudo-R^2 and AUC in Table 2 suggest that unobserved attributes explain little of the variation in chapter choice. We return to this issue in Section 6.

Coefficient Gaps The coefficient gap, which explains 15% of the geographic variation, reflects the role of local legal culture and implies that observationally identical filers are sorted differently across districts. The coefficient on disposable income plays the largest role, followed closely by the district-specific constant. Combined, heterogeneity in these two coefficients explain 33% of the aggregate geographic variation in chapter choice. Heterogeneity in the remaining coefficients offset this by reducing aggregate variation by accounting for -18% of the variation. If heterogeneity in these other coefficients were eliminated, then geographic variation in chapter choice would increase. Within these other coefficients, the coefficients on the financial characteristics explain nearly all of the variation, while the coefficients on the means test, exemption, and race variables explain virtually none (see Appendix Figure A5). Importantly, our results are consistent with racial steering being similar across districts despite differences in the covariate race explaining 5% of the aggregate geographic variation in chapter choice.

Deviation Rates Heterogeneity in the deviation rates, α_0 and α_1, explains 24% of the aggregate geographic variation, with more than two-thirds of this due to α_0. Specifically, 17% of the aggregate variation is due to differences in α_0, which is the proportion of debtors whom the district views as suited for Chapter 13 actually filing under Chapter 7. These deviation rates can also be viewed as a component of local legal culture in that they reflect, at least in part, how strictly a district enforces its preferences. Districts with low deviations strictly enforce their preferences, while districts with high deviations frequently allow debtors to decide.

6 Robustness

The results in Section 5 show that one variable, the debtor's disposable income, explains most of the geographic variation. As a covariate, differences in the distribution of disposable income across districts explain 54% of the aggregate variation; heterogeneity in the coefficient explains another 17%. In addition, given the importance of screening on disposable income, heterogeneity in the deviation rate α_0 primarily reflects the frequency with which districts allow filers with high disposable income to file under Chapter 7. Prior to investigating the mechanism(s) underlying this finding in Section 7, we undertake a number of robustness exercises.

6.1 Omitted Variables and Sample Selection

If our preferred specification omits relevant determinants of chapter choice, our estimates will be biased even if uncorrelated with included covariates. This occurs due to misspecification of the error distribution in the presence of omitted variables (Yatchew and Griliches, 1985). Similarly, differential selection into bankruptcy across districts will also bias the coefficients by altering the distribution of the error. This section evaluates the potential impact of omitted variables on our conclusions about the importance of disposable income. To do so, it is helpful to understand the consequences of omitted variables and nonrandom sample selection in a probit model.

Equation (1) posits a model for the district d's latent preferences for debtor i to file under Chapter 7. The error term is assumed to be standard normal. Consider the case where the 'true' model is instead

$$\pi_{id} = \beta_{0d} + x_i^l \beta_{ld} + x_i^f \beta_{fd} + \beta_{od} x_i^o + \epsilon_{id}, \tag{9}$$

where x_i^o is an unobserved (to us) variable with coefficient β_{od} and ϵ_{id} continues to be distributed standard normal. Omitting x_i^o from the model changes the error term to $\tilde{\epsilon}_{id} \equiv \beta_{od} x_i^o + \epsilon_{id}$. Assuming $x_i^o \sim N(\mu_o, \sigma_o^2)$, then $\tilde{\epsilon}_{id} \sim N(\mu_o, \beta_{od}^2 \sigma_o^2)$ and Equation (2) becomes

$$\Pr(c_{id}^* = 1 | x_i) = \Phi\left(\frac{x_i \tilde{\beta}_d}{\sqrt{1 + \beta_{od}^2 \sigma_o^2}} \right), \tag{10}$$

where x_i continues to only includes x_i^l and x_i^f.

Ignoring the deviations for simplicity, we can apply the result of Yatchew and Griliches (1985) to show that

$$\texttt{plim} \quad \hat{\tilde{\beta}}_d \rightarrow \frac{\beta_d + \beta_{od}\delta}{\sqrt{1 + \beta_{od}^2 \sigma_o^2}}, \tag{11}$$

where δ is the vector of coefficients from the regression of x_i^o on x_i. The impact of nonrandom sample selection is similar. Assuming the selection equation for the decision to file bankruptcy is also a probit model and there are no omitted covariates, then

$$\texttt{plim} \quad \hat{\tilde{\beta}}_d \rightarrow \frac{\beta_d + \rho_d\delta}{\sqrt{1 + \sigma_{IMR}^2}}, \tag{12}$$

where ρ is the coefficient on the Inverse Mills' Ratio (IMR) term added to Equation (1) to control for the nonrandom selection, δ is the vector of coefficients from the regression of the IMR on x_i, and σ_{IMR}^2 is the variance of the IMR. This assumes the IMR is asymptotically distributed approximately normal. Thus, in both cases, the asymptotic bias depends on the direct effect of the omitted variable (β_{od} or ρ), the (partial) relationship between the omitted and included covariates (δ), and the variance of the omitted variable (σ_o^2 or σ_{IMR}^2). As discussed next, the evidence suggests that any bias to the coefficient on disposable income is small and is unlikely to affect our conclusions.

Omitted Variables One important reason why debtors may choose Chapter 13 is the desire to save one's home from foreclosure. In fact, in a survey of debtors with failed Chapter 13 cases, 51.5% of homeowners reporting saving one's home as their primary reason for filing under Chapter 13. While we control for homeownership and measures of equity, we are missing potentially relevant variables related to mortgage delinquency and the desire or feasibility of saving one's home. To examine whether omitted variables related to these variables can explain the importance of disposable income, we re-estimate the district-specific models in a sample consisting only of renters. If omitted variables related to homeownership drive the strong effects found in the full sample, we would expect disposable income to matter much less in the sample of renters. Instead, the coefficients on disposable income for renters are similar those in the full sample, as seen in Appendix Figure A7(b). The coefficients fall close to the 45°-line, showing that the large coefficients on disposable income are not due of disposable income is not due to omitted variables related to homeownership.

This is consistent with a small direct effect of and little variance in these omitted variables, as well as little (partial) relationship between these variables and disposable income (see Equation (11)).

Another important reason why debtors may choose Chapter 13 is the desire to protect nonexempt assets. While we control for nonexempt home equity, the data do not contain good measures of nonexempt personal property. However, if nonexempt personal property is a significant source of bias, we would expect this bias to be largest in districts where nonexempt personal property is common. To investigate, we examine whether the estimated coefficient on disposable income is correlated with the district's level of personal property exemptions (sum of vehicle, financial, and wildcard) and, for comparison, the homestead exemption. Columns (1) and (2) in Table 3 show that these variables have no significant correlation with the coefficient on disposable income, explaining less than 3% of the variation in the coefficient. Again, this is consistent with a small direct effect of and little variance in these omitted variables, as well as little (partial) relationship between these variables and disposable income.

As further evidence that omitted variables are not driving our results, we examine the stability of the coefficients on disposable income as other controls are added in the spirit of Oster (2019). We begin by estimating district-specific probit models (with deviations) including disposable income as the only covariate. We then compare the estimated coefficients on disposable income to the district-specific estimates from our baseline specification (i.e., including all covariates). If the district-specific coefficient on disposable income changes significantly when additional controls are added, it suggests that omitting these observed characteristics bias the effect of disposable income. This may then lead to concern over the omission of relevant unobserved variables. Instead, we find that the coefficients on disposable income are stable when we add the additional controls. Appendix Figure A7(a) compares these coefficients form the simple model to those from the full model. The estimates are similar, lying close to the 45°-line, and the correlation coefficient is 0.93.

Finally, patterns in the data are consistent with a strong *causal* effect of disposable income on chapter choice. As discussed in Section 2, a debtor's disposable income is pivotal to chapter choice under the law due to the totality test and/or the means test. The means test provides a formal guideline that filing under Chapter 7 is presumed abuse if the debtor's disposable income exceeds $100 or $166 per month. Judges use the same standard when evaluating abuse under

the totality test (Wedoff, 2006).[33] Figure 4(b) shows that the national share of bankruptcies filed under Chapter 7 drops sharply right around this threshold, declining from 95% to 25% as disposable income increases from $50 to $250 per month. At these same levels of disposable income, Figure 5(c) shows that Chapter 7 dismissals and conversions of Chapter 7 cases to Chapter 13 rise sharply, consistent with trustees and judges screening for abuse on the basis of disposable income. These sharp shifts are what one would expect from the totality/means test. It is unlikely that another omitted variable would lead to such sudden changes around these thresholds.

In sum, while there may exist other determinants of chapter choice, the magnitude of their effect and/or (partial) correlation with disposable income are small and do not drive the strong effects of disposable income or the variation in its effects across districts.

Selection into Bankruptcy According to Equation (12), selection into bankruptcy biases our estimates of the coefficient on disposable income if disposable income is a key factor in the decision to file ($\delta \neq 0$) and unobserved determinants of filing at all and chapter choice are correlated ($\rho \neq 0$). To assess the importance of selection in explaining our findings, we examine whether measures of district-level selection into bankruptcy are correlated with the estimated coefficients in the chapter choice model. To measure the degree of selection, we use the two observed characteristics of bankruptcy filers that we can compare to the full district population: homeownership and income. We examine whether the district-specific coefficient on disposable income is related to selection on homeownership, measured as the homeownership rate of a district's bankruptcy filers minus the district's overall homeownership rate, and selection on income, measured as the district's share of bankruptcy filers that are above the median income of the district.

Columns (3) and (4) in Table 3 show that these variables explain little of the variation in the coefficient on disposable income. Finally, we include all four district-level measures of omitted variables and selection in Column (5). Together, they explain only 5% of the variation ($R^2 = 0.05$) and they are jointly insignificant ($p = 0.47$). This is consistent with the decision to file at all being essentially independent of chapter choice and/or the IMR having a small (partial) correlation with disposable income.

[33]The baseline threshold is $166 per month, but the threshold declines to $100 per month if $100 would allow for repayment of at least 25% of the debtor's (nonpriority) unsecured debt.

6.2 Manipulation of Disposable Income

Given the sharp screening based on disposable income documented in Figures 4(b) and 5(c), one might be concerned that debtors manipulate their reported disposable income. For example, a debtor seeking to file under Chapter 7 may report lower disposable income to reduce the chance that a judge will dismiss the case for abuse. Indeed, some attorneys report "tweaking" expenses to reduce the disposable income of debtors filing under Chapter 7.[34] However, features of the bankruptcy system limit the extent of such manipulation. Bankruptcy trustees, who represent the interests of creditors, regularly request additional evidence to justify reported disposable income, and will seek dismissal if the debtor cannot support the reported values. Still, the potential for manipulation remains. For our analysis, the ability to easily manipulate reported disposable income to achieve one's desired chapter choice would imply that the observed importance of disposable income actually reflects reverse causation. Moreover, with manipulation, cross-district distributions in disposable income will reflect differences in both actual disposable income and reporting behavior, potentially causing us to overstate the importance of disposable income.

We undertake three sensitivity analyses, each which suggests that our baseline conclusions are not due to manipulation. In the interest of brevity, we briefly summarize these analyses here with full details provided in Appendix E. Our first strategy is based on the idea that manipulation is most likely to occur around the threshold where disposable income affects chapter choice (roughly $100 per month in Figure 4(b)). That is, as debtors are likely to misreport by just enough to qualify for their desired chapter, misreporting should be more common around the threshold. Given this, we examine the robustness of our results to dropping filers with disposable incomes near the threshold. We find that the geographic variation in the district-specific coefficients on disposable income, as well as the overall decomposition, are robust to excluding these debtors. In fact, when debtors near the threshold are excluded, disposable income actually explains a *greater* share of the geographic variation than in our baseline decomposition.

As a second strategy to reduced the possibility of misreporting in our variable, we use a coarser

[34] See, for example, `https://www.steffenslaw.com/blog/how-to-tweak-bankruptcy-schedule-j.cfm` and `https://www.bankruptcymastery.com/twelve-ways-to-tweak-schedule-j/`. However, others emphasize the importance of accurate reporting, refraining from adjusting amounts to make the case "look better." See, for example, `https://cascadebankruptcy.com/news/schedules-i-and-j-your-income-and-expenses`.

measure of disposable income: an indicator for whether disposable income exceeds $100.[35] Disposable income also explains a similar share of the geographic variation when this coarser measure is used.

Our final strategy separates reported disposable income into two pieces, one of which is difficult to manipulate. Specifically, we separate out the portion of disposable income that comes only from the debtor's income and IRS expense allowances. The debtor's reported income is difficult to manipulate because it is easily verified with bank statements and pay stubs. IRS expenses are also difficult to manipulate as they are a deterministic function of the debtor's location, household size, and secured debt payments. We find that, by itself, this portion of disposable income explains 33% of the geographic variation in chapter choice, more than any other variable.

In sum, while we cannot rule out some manipulation, multiple methods that reduce the potential for manipulation in the data continue to find that disposable income is the most significant determinant of cross-district variation in chapter choice.

7 Mechanism

Debtor's disposable income—both its distribution and its effects—is critical to understanding the geographic variation in chapter choice. Here, we further investigate the underlying mechanism and the sources of heterogeneity in the treatment of disposable income across districts.

7.1 Totality Test vs. Means Test

As discussed in Sections 2 and 6, disposable income can restrict access to Chapter 7 bankruptcy through two separate mechanisms: (i) screening for abuse under the totality of the circumstances and (ii) BAPCPA's means test. Which matters more is important for understanding the geographic variation. The totality test relies on judicial discretion which is necessarily sensitive to local legal culture, while the foundation of BAPCPA's means test is a mathematical formula that limits discretion. Another difference is that the totality test applies to all filers, while BAPCPA's means test applies only to higher-income debtors.

[35] This binary measure eliminates the possibility of manipulation outside of cases where such manipulation leads to reported and true disposable income lying on opposite sides of the $100 threshold.

The fact that BAPCPA's means test applies only to above-median debtors (i.e., debtors whose incomes are above the median income of their state (adjusted for household size)), while the totality test applies to all filers, allows us to identify the separate effect of each. Specifically, any screening on disposable income among below-median debtors must come from the totality test. Because we do not observe debtors' household size, we classify debtors as below-median income if their income is below the lowest possible state median income that could apply. For single filers, this is the median income for a single-person household. For joint filers, this is the median income for a two-person household. Our use of the lowest possible median income implies misclassification errors are uni-directional. All debtors we classify as below the median are, in fact, below the median income, but some that we classify as above-median may truly be below the median if their true household size is larger.

With this classification, we then compare the effects of disposable income on above- and below-median debtors. If disposable income primarily matters because of its role in the means test, we would expect little impact of disposable income for below-median debtors. In our baseline specification, this would appear as small coefficients on disposable income but large coefficients on the *interaction* of disposable income with above-median debtors. The estimates from our baseline specification in Table 2 Columns (5) and (6), however, reject this prediction. The coefficients on disposable income are large while the interaction terms are small, implying the effect of disposable income is similar for above- and below-median debtors.

We further examine the differences in how disposable income affects chapter choice for below- and above-median debtors in Figure 3. Panel (a), a bin-scatter showing the share of filings under Chapter 7, shows that both groups shift sharply from Chapter 7 to Chapter 13 once disposable income exceeds roughly $100 per month. Again, the fact that this occurs in both groups, rather than above-median filers alone, supports the totality test as the binding mechanism.

We then test the robustness of this to controlling for other characteristics by re-estimating the baseline model separately on the sample of below-median debtors and, for comparison, above-median debtors. Panel (b) reports the coefficients on disposable income from these separate district-specific models. The coefficients for below-median debtors remain large and similar in magnitude to the baseline estimates in Column (5) in Table 2. Conducting the full decomposition analysis on the sample of below-median-income filers, the covariate disposable income explains 49% of the

geographic variation in chapter choice (Appendix Figure A4). Thus, the results clearly show an important role for disposable income among below-median debtors who are unaffected by the means test. If anything, the magnitudes in Panel (b) in Figure 3 suggest that disposable income matters slightly more for the chapter choice of below-median debtors.[36]

Overall, the strong effects of disposable income among below-median debtors support the totality of the circumstances as the primary screening mechanism rather than the means test. Moreover, the similarity between above- and below-median debtors suggests that BAPCPA's means test provides little additional screening beyond what is accomplished with the totality test. Anecdotal evidence from bankruptcy attorneys corroborates the view that BAPCPA did little to alter access to Chapter 7 beyond the barriers that were already in place through the totality test (Littwin, 2016). The fact that the means test provides little additional screening beyond the totality test, which was in place before BAPCPA, is consistent with empirical research repeatedly finding little effect of the means test on above-median filings (Lawless *et al.*, 2008; Albanesi and Nosal, 2022; Gross *et al.*, 2021).

7.2 Coefficients on Disposable Income

Given that the totality test relies on court discretion, it is perhaps unsurprising that there are differences in its implementation across districts. Heterogeneity in the coefficients on disposable income and the constant explain most of the variation in sorting within the coefficient gap, and together imply that districts have different thresholds for what is considered "high" disposable income. To interpret this variation, we use the estimates to compute each district's implicit threshold for disposable income in Chapter 7.

Recall from Section 4 that the index value, $x_i\beta_d$, represents the view of district d on the suitability of filer i for Chapter 7 (relative to Chapter 13). The district is indifferent between the two chapters for filers with $x_i\beta_d = 0$. Thus, for each filer i in district d, we can hold characteristics other than disposable income, $x_{i,-DI}$, fixed at the mean and solve for value of disposable income where $x_i\widehat{\beta}_d = 0$. The resulting value, DI_d^*, corresponds to the level of disposable income where

[36]One potential explanation is that some districts may defer to the means tests' standards when assessing abuse for above-median debtors, and this standard may be more lenient than the one used for below-median filers. In line with this explanation, some attorneys even report that, in some cases, the means test made it easier to qualify debtors for Chapter 7 compared to the barriers they faced pre-BAPCPA (Littwin, 2016).

the district is indifferent between chapters; the district prefers filers with disposable income above (below) this value in Chapter 13 (Chapter 7).

To proceed, we set other variables at the national average, $\bar{X}_{-DI,N}$, and all coefficients other than the constant and the coefficient on disposable income to the values from the national pooled model, $\widehat{\beta}_{-DI,N}$. This shuts down the role of heterogeneity from other characteristics and coefficients, but the results above suggest these are relatively unimportant. Each district's implied disposable income threshold (for the average filer), denoted DI_d^*, then satisfies the following equation

$$\widehat{\beta}_{0,d} + \widehat{\beta}_{DI,d} DI_d^* + \bar{X}_{-DI,N} \widehat{\beta}_{-DI,N} = 0.$$

The estimated district-specific thresholds, DI_d^*, vary from less than \$50 to more than \$2,000 in monthly disposable income, with a median of \$200. Panel (a) in Figure 4 shows these thresholds are strongly correlated with districts' Chapter 7 rates. Consistent with our interpretation, districts with low Chapter 7 rates have low thresholds, indicating tighter screening of who has access to Chapter 7. Conversely, districts with high Chapter 7 rates have high thresholds. In summary, heterogeneity in $\beta_{0,d}$ and $\beta_{DI,d}$ implies that districts have strikingly different views about the levels of disposable income that are suitable for Chapter 7, and these differences are highly correlated with overall chapter choice.

To highlight the heterogeneity, Figure 4 (b) plots a bin-scatter of Chapter 7 rates across different levels of disposable income. In the pooled national sample (labeled "National"), nearly all filers with negative disposable income are in Chapter 7, and this sharply declines to only 13% as disposable income becomes exceed \$100. We then group districts into quartiles based on the threshold estimates, and separately plot bin-scatters for these groups. For filers in a first-quartile district (median threshold of \$83), the share under Chapter 7 drops sharply around \$100, with only 24% of filers with a disposable income of \$150 in Chapter 7. In contrast, for filers in a fourth-quartile district (median threshold of \$349), the share drops much more gradually, with 73% of filers with a disposable income of \$150 in Chapter 7. Thus, the effect of screening on disposable income, as well as heterogeneity in this screening across districts, is easily visible even in this simple plot.

7.3 Deviation Rates

Knowing that disposable income is the main determinant of chapter choice helps us understand cross-district differences in deviation rates. These differences explain nearly a quarter of the geographic variation, with the majority due to differences in α_0, the propensity of debtors to file Chapter 7 when the district prefers Chapter 13. With districts' preferences driven primarily by disposable income, α_0 largely reflects how frequently debtors with high disposable income file under Chapter 7. However, attempts to file under Chapter 7 given that the district prefers Chapter 13 can be thwarted by the district's trustees and judges dismissing cases filed under Chapter 7 or converting them to Chapter 13. Thus, under our interpretation of α_0, we expect a negative relationship between a district's deviation rate into Chapter 7 and how strictly a district enforces its preferences through dismissals and conversions.[37]

To investigate this, we examine cross-district variation in the Chapter 7 *dismissal rate*, defined to include dismissals and conversions. To focus on the dismissal of cases that the district views as poorly suited for Chapter 7, we separate dismissals for filers with high disposable income (with $DI_i > \$100$) and low disposable income (with $DI_i \leq \$100$). Nationally, the Chapter 7 dismissal rate for cases with high disposable income is 4.9%; only 1.5% for cases with low disposable income. But there is significant variation across districts, with the Chapter 7 dismissal rate varying from 1% to 18% for filers with high disposable income. We expect a negative relationship between the Chapter 7 dismissal rate and deviations into Chapter 7 for filers with high disposable income, but not low disposable income. Figure 5 (a) shows this precisely to be the case. That is, deviations into Chapter 7 by high income filers are common in districts where dismissals and conversions are rare. In contrast, dismissals for debtors with low disposable income are low in all districts and uncorrelated with the estimated deviation rates. If dismissals are due to other characteristics—observed or unobserved—that are more common in some districts, rather than disposable income, we would not expect to see this contrast.

Figure 5 (b) provides additional evidence exploiting this cross-district heterogeneity in Chapter 7 dismissal rates. It plots a bin-scatter of the dismissal rate for Chapter 7 cases across one-hundred-

[37] We focus on deviations into Chapter 7, α_0, because heterogeneity in α_0 explains nearly 75% of the deviation gap, but we find a similar negative relationship between α_1 deviations and dismissals in Chapter 13 (see Appendix Figure A6).

dollar bins of disposable income, for the national sample as well as for districts grouped into quartiles by their estimated α_0. In the national sample (labeled "National"), dismissals increase sharply once monthly disposable income nears $100. For filers in a first-quartile district (median deviation rate of 6%), the share of dismissals rises sharply once disposable income becomes positive, eventually exceeding 10%. In contrast, for filers in a fourth-quartile district (median deviation rate of 30%), the share rises much more gradually once disposable income becomes positive and never exceeds 4%. These results demonstrate that the deviation rates reflect the different degrees to which districts scrutinize filings involving high disposable income in Chapter 7. Moreover, since information on the dismissal rate is not used when estimating the model, these findings provide an external test of one mechanism explaining the deviation rates.

8 Simple Model of Geographic Variation

Our analysis to this point shows that much of the geographic variation in chapter choice can be explained by variation in the distribution of and steering with respect to disposable income, as well as filer deviations from this steering. Focusing on these facets, we develop a parsimonious model of local legal culture in which districts exogenously differ only in their deviation rates and thresholds for disposable income, captured through the coefficient on disposable income and the constant. Our goal is to see how well this simple model explains geographic variation in chapter choice, both in-sample (2010-2014) and out-of-sample (2015-2017), relative to the more complex model that allows for heterogeneity in all coefficients. We then use the simple model to provide back-of-the-envelope calculations on the impact of greater uniformity in the treatment of disposable income on the trade-off between debt relief and creditor repayment.

8.1 Model Comparison

We compare three models of chapter choice. The "Full" model makes predictions about chapter choice using the full set of district-specific coefficients $\beta_d^F = [\beta_{0,d}\ \beta_{DI,d}\ \beta_{-DI,d}]$ and deviation rates $\alpha_d^F = \left[\alpha_0^d\ \alpha_1^d\right]$, where $\beta_{0,d}$ and $\beta_{DI,d}$ are the district-specific constant and coefficient on disposable income, and $\beta_{-DI,d}$ are the district-specific coefficients on the remaining covariates. The "Simple" model allows only for heterogeneity in the constant, coefficient on disposable income, and deviation

rates, so that district steering is determined by the coefficient vector $\beta_d^S = [\beta_{0,d}\ \beta_{DI,d}\ \beta_{-DI,N}]$ and deviation rates $\alpha_d^S = \left[\alpha_0^d\ \alpha_1^d\right]$, where $\beta_{-DI,N}$ are the coefficients on the remaining variables from the national model. The "National" model allows for no district-specific heterogeneity. The coefficient vector is $\beta_d^N = [\beta_{0,N}\ \beta_{DI,N}\ \beta_{-DI,N}]$ and deviation rate vector is $\alpha_d^N = \left[\alpha_0^N\ \alpha_1^N\right]$.

We use these models to predict the average Chapter 7 rate in each district, given by

$$\widehat{P}_d^7(m) = \frac{1}{N_d}\sum_{i=1}^{N_d} \hat{c}_i\left(\widehat{\beta}_d^m, \widehat{\alpha}_d^m\right), \quad m = F, S, N$$

where

$$\hat{c}_i\left(\widehat{\beta}^m, \widehat{\alpha}^m\right) \equiv \widehat{\alpha}_0^m + (1 - \alpha_0^m - \widehat{\alpha}_1^m)\Phi\left(x_i\widehat{\beta}^m\right). \tag{13}$$

These predictions then form the basis for an assessment of model fit. Specifically, we compare the share of the actual district-level variation in Chapter 7 rates that is explained by each model.[38] The Full model explains more than 99% of the *in-sample* geographic variation in chapter choice. The Simple model performs nearly as well, explaining 96% of the variation. The National model explains only 79% of the variation.

Using the estimates obtained from data over the 2010-2014 period to generate out-of-sample predictions over the 2015-2017 period, we assess out-of-sample fit and obtain similar results. The Full model explains 95% of the *out-of-sample* geographic variation in chapter choice, while the Simple model explains 93% and the National model explains 77%. We report these fit statistics as well as the fit in subsamples of filers with low and high disposable income in Appendix Table A2. This exercise shows that the simple model, including heterogeneity only in the treatment of disposable income, captures the geographic variation and performs significantly better than a national model with no heterogeneity.

[38] Specifically, fit is measured as $1 - RSS(m)/TSS(m)$, where $RSS(m) = \sum_d (P_d^7 - \widehat{P}_d^7(m))^2$ is the sum of squared residuals, $TSS(m) = \sum_d (P_d^7 - \bar{P}_d^7(m))^2$ is the total sum of squares, P_d^7 is the actual Chapter 7 share in district d, $\widehat{P}_d^7(m)$ is the predicted Chapter 7 share in district d according to model m, and $\bar{P}_d^7$ is the average Chapter 7 share observed across all districts. Because the predicted Chapter 7 shares, $\widehat{P}_d^7$, are not fitted values from a simple regression, this is not identical to a regression R^2, although it would be the R^2 from a simple regression of P_d^7 on $\widehat{P}_d^7(m)$ where the intercept (coefficient) is restricted to zero (one).

8.2 Impact of Increased Uniformity

Concern about geographic disparities in the treatment of filers has led to calls for increased uniformity in the bankruptcy system (American Bankruptcy Institute, 2019). Our results inform this discussion in two ways. First, our results identify specific sources of heterogeneity on which to focus, namely those surrounding the treatment of disposable income. Second, the model provides a framework to provide rough calculations about the impact of reducing these differences. Holding the set of bankruptcy filers constant, we examine predicted changes in chapter choice, discharge, and repayment if sorting on disposable income were uniform across all districts. An important caveat is that, by holding the set of bankruptcy filers constant, we are ignoring any changes in selection into bankruptcy that would occur from altering the treatment of disposable income. Despite this, these back-of-the-envelope calculations provide a sense of the magnitudes involved when making bankruptcy more uniform.

To proceed, we examine the changes in sorting that would occur if all districts adopted the preferences of district d^* governing the threshold for disposable income ($\beta_{0,d^*}, \beta_{DI,d^*}$) and deviation rates ($\alpha_0^{d^*}, \alpha_1^{d^*}$). Let $\beta_d^{d^*} = [\beta_{0,d^*}\ \beta_{DI,d^*}\ \beta_{-DI,d}]$ be the mixed coefficient vector where district d adopts the constant and coefficient on disposable income from district d^*. Finally, define $c_{id}^{d^*} = \hat{c}_i\left(\widehat{\beta}_d^{d^*}, \widehat{\alpha}^{d^*}\right)$, with $\hat{c}_i(\cdot)$ given in Equation (13). To summarize the effects of greater uniformity, we report the (national) expected Chapter 7 share, discharge amount, and recovery amount predicted by the model given by

$$\begin{aligned}
\widehat{P}_7^{d^*} &= \frac{1}{N}\sum_d \sum_{i\in d} c_{id}^{d^*} \\
D^{d^*} &= \frac{1}{N}\sum_d \sum_{i\in d} D_i^7 c_{id}^{d^*} + D_i^{13}\left[1 - c_{id}^{d^*}\right] \\
R^{d^*} &= \frac{1}{N}\sum_d \sum_{i\in d} R_i^7 c_{id}^{d^*} + R_i^{13}\left[1 - c_{id}^{d^*}\right]
\end{aligned}$$

where d indexes districts, $i \in d$ indexes filers within district d, N is the total number of filers, and D_i^c and R_i^c are the amounts discharged (forgiven) and repaid by consumer i under Chapter $c = 7, 13$, respectively.

Computation of these quantities requires construction of D_i^c and R_i^c. This is not straightforward

since these depend on filer i's counterfactual discharge and repayment amounts *if a discharge is achieved* under *each chapter*. We use the fact that Chapter 7 filers pay nonexempt assets and Chapter 13 filers repay all of their disposable income during a three-year or five-year repayment plan. Still, calculating these amounts is complicated and we detail our approach in Appendix F. Here, we note that our calculations, while capturing the salient features of the bankruptcy system, are necessarily approximations.

The results are presented in Figure 6, where Panel A plots (national) expected discharge amount per case against the (national) expected Chapter 7 share if all districts acted as district $d^* = 1, ..., D$, where D is the total number of districts. In other words, we make districts uniform by setting each district's constant, coefficient on disposable income, and deviation rates equal to those from district d^*. The gray circles depict the results. Panel B is identical except (national) expected repayment amount is on the vertical axis.

In each panel, the green circle labeled "Status Quo" indicates the aggregate expected discharge and repayment per case with each district following its own sorting preferences and deviation rates, $(\beta_d, \alpha_0^d, \alpha_1^d)$. In this case, with no uniformity, the national Chapter 7 share is predicted by the model to be 78% with an expected discharge (repayment) per case of \$46,600 (\$5,300). The red circle in each panel labeled "National" indicates the aggregate expected discharge and repayment per case if all districts follow the sorting preferences and deviation rates from national model, $(\beta_N, \alpha_0^N, \alpha_1^N)$. Here, the national Chapter 7 is predicted to be 75% with an expected discharge (repayment) per case of \$46,300 (\$5,600). Thus, on average, district heterogeneity marginally favors debtors.

Examining uniformity where all remaining districts behave according to district d^*, we find a wide range of outcomes. On the one hand, if all districts held the sorting preferences and deviation rates of the district that *most* favors Chapter 13, the Chapter 7 share would decline to 35%, while the expected discharge (repayment) per case would be \$43,300 (\$8,600). Alternatively, if all districts held the sorting preferences and deviation rates of the district that *least* favors Chapter 13, the Chapter 7 share would increase to 96%, while the expected discharge (repayment) per case would be \$50,200 (\$1,700).

The range of combinations in Figure 6 can be thought of as a production possibilities frontier (PPF) for bankruptcy outcomes (given the range of currently observed behaviors) according to our simple model. Varying the practices surrounding disposable income can alter the average

amount discharged and recovered in bankruptcy by around $\pm\$3,000$ relative to the status quo. As mentioned earlier, these calculations hold the set of bankruptcy filers constant. In practice, the actual PPF may diverge from our estimates if the decision by debtors to file bankruptcy at all—taken as exogenous in our model—is affected by changes in the sorting behavior of districts. The PPF also makes it clear that there are many forms of uniformity, with vastly different distributional consequences.

9 Conclusion

Within the bankruptcy system, there are persistent geographic differences in the relative use of Chapter 7 and Chapter 13, leading to geographic differences in the balance between debt relief and creditor repayment. Decomposing this geographic variation into three components, we find that geographic differences in filer characteristics are the most important, explaining 61% of the variation. The remaining variation is explained by differences in how courts steer filers (15%), which we refer to as local legal culture, and filers' ability to deviate from this court steering (24%). Examining these differences in more detail, we find that nearly all of the variation in chapter choice can be explained by a single variable: filers' disposable income. Consistent with this, we show that a parsimonious model, in which districts exogenously differ only in filer characteristics and two parameters governing the treatment of disposable income, successfully explains the geographic variation in chapter choice, both in the estimation sample and in out-of-sample predictions.

Our analysis uncovers several new and important features of the US bankruptcy system. First, filer characteristics explain most of the variation in chapter choice, with a smaller role for local legal culture. An important caveat is that our analysis explains the variation in chapter choice *conditional on filing for bankruptcy*, and it could be that legal culture plays an important role in who decides to file. Second, disposable income plays a crucial, and overlooked screening role in bankruptcy. Across all districts, filers with high disposable income enter Chapter 13, while filers with low disposable income enter Chapter 7. We discuss the legal mechanisms that lead to this screening and provide additional evidence of its importance. Finally, although legal culture plays a smaller role than filer characteristics, our back-of-the-envelope calculations show that increasing uniformity across districts could meaningfully alter bankruptcy's balance between debt relief and

creditor repayment.

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Table 1: Summary Statistics

	Chapter 7		Chapter 13		
	mean	std. dev.	mean	std. dev.	difference
	(1)	(2)	(3)	(4)	(5)
Legal Barriers					
monthly disposable inc. ($1,000s)	-0.3	0.6	0.5	0.6	-0.8
above median inc. (%)	26.8	44.3	49.2	50.0	-22.4
disp. income above-median	0.2	0.7	0.8	1.2	-0.6
nonexempt home equity ($1,000s)	0.8	6.2	3.3	12.5	-2.5
non-real assets ($1,000s)	24.1	36.6	34.9	48.3	-10.7
Financial & Race					
assets to income	3.0	3.8	3.3	3.0	-0.3
debt to income	5.3	5.5	4.3	3.6	1.0
homeowner (%)	48.7	50.0	71.3	45.2	-22.5
negative equity ($1,000s)	23.1	51.5	36.7	63.7	-13.6
secured debt share (%)	40.5	36.2	62.7	31.3	-22.2
share nondischargeable (%)	5.7	15.6	6.5	16.3	-0.8
joint filing (%)	29.8	45.7	34.8	47.6	-5.0
zip percent Black (%)	13.0	19.8	22.6	26.3	-9.6
Observations	2,984,246		904,089		

Notes: Summary statistics for the consumer bankruptcy cases in the analysis sample. Column 5 reports the difference in means.

Table 2: Determinants of Chapter Choice

	National Model				District Models	
	No Deviations		With Deviations		With Deviations	
	Coef.	AME	Coef.	AME	$10^{th}, 90^{th}$ Coef.	$10^{th}, 90^{th}$ AME
	(1)	(2)	(3)	(4)	(5)	(6)
monthly disposable inc.	-1.7***	-0.33***	-17***	-0.77***	[-31, -5.9]	[-0.96, -0.48]
(thousands)	(0.0022)	(<0.001)	(0.053)	(0.0011)		
above median inc.	-0.11***	-0.021***	0.098***	0.0044***	[-0.46, 0.72]	[-0.03, 0.03]
	(0.0024)	(<0.001)	(0.0066)	(<0.001)		
disp. income above-median	-0.05***	-0.0097***	-0.011**	-0.00048**	[-0.16, 0.29]	[-0.01, 0.01]
	(0.0014)	(<0.001)	(0.0044)	(<0.001)		
nonexempt home equity	-16***	-3***	-12***	-0.52***	[-39, 2.3]	[-2.4, 0.06]
(millions)	(0.11)	(0.022)	(0.32)	(0.014)		
non-real assets	0.1***	0.02***	3.1***	0.14***	[-2.2, 10]	[-0.12, 0.47]
(millions)	(0.027)	(0.0052)	(0.081)	(0.0036)		
assets to income	-0.049***	-0.0096***	-0.14***	-0.0062***	[-0.25, -0.05]	[-0.01, 0]
	(<0.001)	(<0.001)	(0.0019)	(<0.001)		
debt to income	0.039***	0.0076***	0.1***	0.0046***	[0.01, 0.18]	[0, 0.01]
	(<0.001)	(<0.001)	(0.0014)	(<0.001)		
homeowner	0.23***	0.045***	0.31***	0.014***	[-0.61, 0.7]	[-0.03, 0.03]
	(0.0031)	(<0.001)	(0.0083)	(<0.001)		
negative equity	-1.3***	-0.24***	-4.4***	-0.2***	[-6, 3.1]	[-0.33, 0.16]
(millions)	(0.021)	(0.0042)	(0.063)	(0.0028)		
secured debt share	-1.1***	-0.22***	-0.85***	-0.038***	[-2, -0.1]	[-0.13, 0]
	(0.0043)	(<0.001)	(0.011)	(<0.001)		
share nondischargeable	-0.66***	-0.13***	-0.52***	-0.024***	[-2, -0.08]	[-0.14, 0]
	(0.0056)	(0.0011)	(0.015)	(<0.001)		
joint filing	0.039***	0.0076***	0.28***	0.013***	[0, 0.66]	[0, 0.03]
	(0.002)	(<0.001)	(0.0058)	(<0.001)		
zip percent Black	-0.011***	-0.0021***	-0.015***	-0.00066***	[-0.03, 0]	[0, 0]
	(<0.001)	(<0.001)	(<0.001)	(<0.001)		
Constant	1.6***		2.9***		[2.2, 4.2]	
	(0.0023)		(0.0076)			
α_0	0		0.15***		[0.05, 0.32]	
α_1	0		0.02***		[0.01, 0.05]	
log $\mathscr{L}$	-1291456.9		-906514.4		-752533.4	
Pseudo R^2	0.48		0.633		0.698	
AUC	0.91		0.93		0.96	

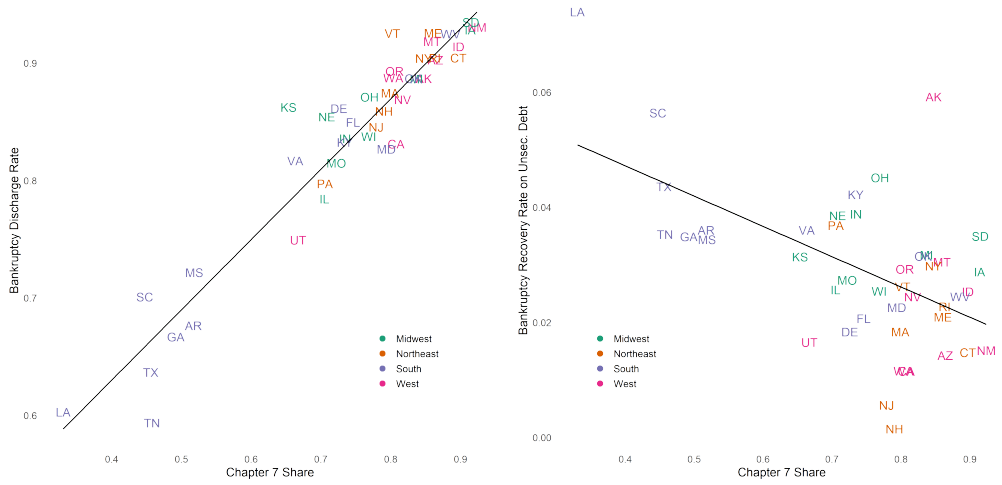
Notes: The table report the parameter estimates and average marginal effects (AME) from three chapter choice models: a national probit model (columns 1-2), a national probit model with deviations (columns 3-4), and district-specific models with deviations. The district-specific models report the $10^{\texttt{th}}$ and $90^{\texttt{th}}$ percentiles of the estimates and AMEs across districts. Standard errors in parentheses. Column headers indicate model specification. AUC = area under the receiver operator curve. α_0 and α_1 are the probability of a deviation away from Chapter 7 and Chapter 13, respectively. For the models with misclassification, the reported AME is the average marginal effect of the inner probit, i.e. the average value of $\phi(X\beta)\beta_j$. Efron's Pseudo $R^2 = 1 - \sum_i \frac{c_i - \hat{\pi}_i}{c_i - \bar{c}}$, where c_i is the indicator for debtor i filing under Chapter 13 and $\hat{\pi}_i$ is the fitted value for debtor i. In Column 6, the AMEs are evaluated using the national distribution of the covariates, but use the district-specific coefficient estimates. * p < 0.10, ** p< 0.05, *** p< 0.01.

Table 3: Investigating Omitted Variables and Selection

	Dependent variable:				
	Coefficient on Disposable Income				
	(1)	(2)	(3)	(4)	(5)
Property exemptions	−0.764				−1.093
	(0.643)				(0.691)
	p = 0.239				p = 0.119
Homestead exemptions		0.013			0.027
		(0.020)			(0.021)
		p = 0.513			p = 0.210
Diff. in Home Ownership			11.429		24.031
			(35.467)		(36.616)
			p = 0.749		p = 0.514
Share Above-Median				18.315	27.562
				(33.950)	(34.565)
				p = 0.592	p = 0.428
Observations	73	73	73	73	73
R^2	0.020	0.006	0.001	0.004	0.050
F Statistic	1.414	0.434	0.104	0.291	0.891

Notes: The column show regressions of districts' estimated disposable income coefficients on property and homestead exemptions from 2010 (measured in $1,000s of dollars), the homeownership rate of a district's bankruptcy filers minus the district's overall homeownership rate, and the district's share of bankruptcy filers that are above the median income of the district.

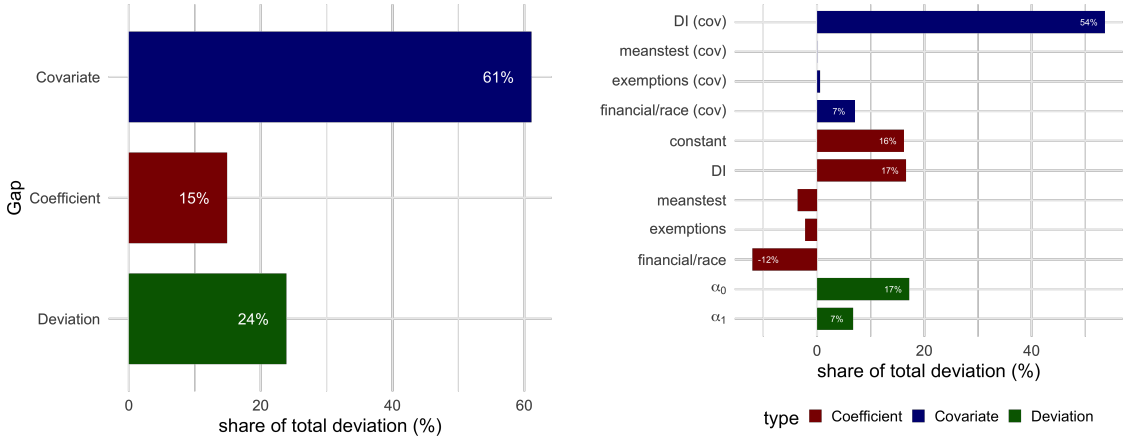
Figure 1: Discharge and Repayment by Chapter 7 Share



(a) Discharge Rate (b) Recovery Rate

Notes: The discharge rate is the share of bankruptcy filings that obtained a discharge. The recovery rate is the share of unsecured debt returned to creditors, calculated as the total amount returned by trustees to general unsecured creditors in 2010-2014 divided by the total non-priority unsecured debt of those filing in 2010-2014. Data on discharge rates and total non-priority unsecured credit are from the Federal Judicial Center's Integrated Database. Data on the amount returned are from Trustee Final Reports, which detail actual payments to creditors.

Figure 2: Decomposition of Total Geographic Variation

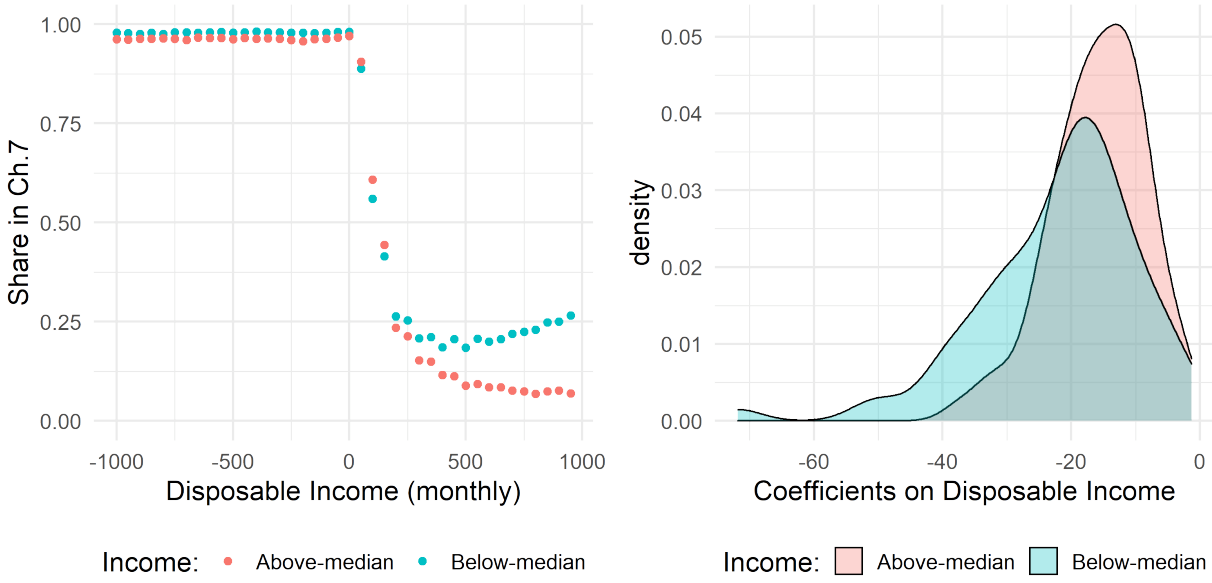


(a) Aggregate Decomposition

(b) Decomposition by Variable Groups

Notes: Figure (a) reports the aggregate decomposition according to equation (8). It omits the residual component, which explains -0.07%. Figure (b) reports the subdecomposition with coefficients and covariates grouped into the three legal barriers and other factors. It also separates the Deviation component into α_0 and α_1.

Figure 3: Below-Median vs. Above-Median Debtors

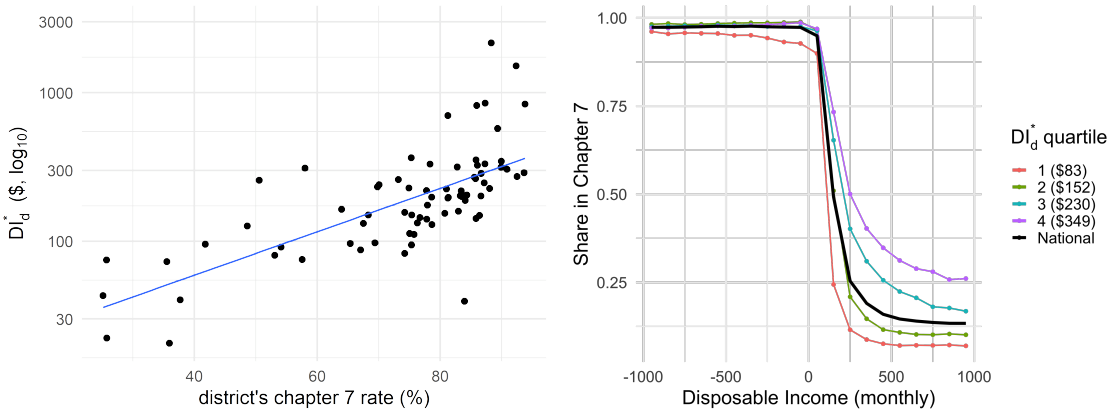


(a) Share in Chapter 7

(b) Distribution of Coefficients

These figures compare the sorting of above-median and below-median debtors. Figure (a) shows the mean Chapter 7 rate of filers grouped by disposable income into one-hundred-dollar bins. Figure (b) shows the density of the district-specific coefficients on disposable income from the baseline model (excluding above-median interactions), but estimated separately on samples of above-median and below-median income filers.

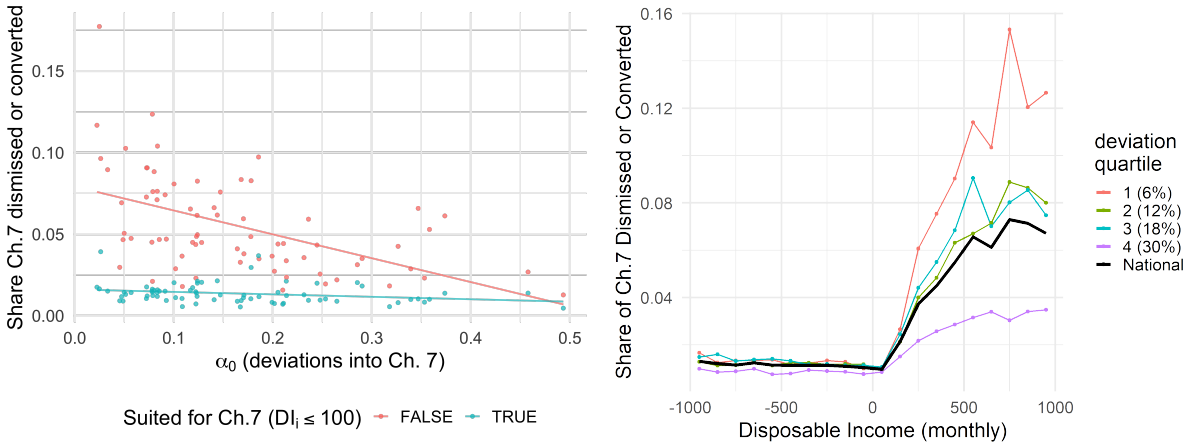
Figure 4: Heterogeneous Thresholds for Disposable Income



(a) Ch.7 rate and DI_d^* (b) Chapter Choice by Threshold Quartiles

Figure (a) plots DI_d^*, which is the level of disposable income needed to make district d indifferent between placing a filer with average characteristics in Chapter 7 or Chapter 13, against each district's Chapter 7 rate. Figure (b) groups districts into quartiles of DI_d^*, and within each quartile shows the mean Chapter 7 rate of filers grouped by disposable income into one-hundred-dollar bins. In the legend, the median threshold DI_d^* for districts in each quartile is reported in parentheses. The black line, labeled "National," shows the mean Chapter 7 rate from the national sample.

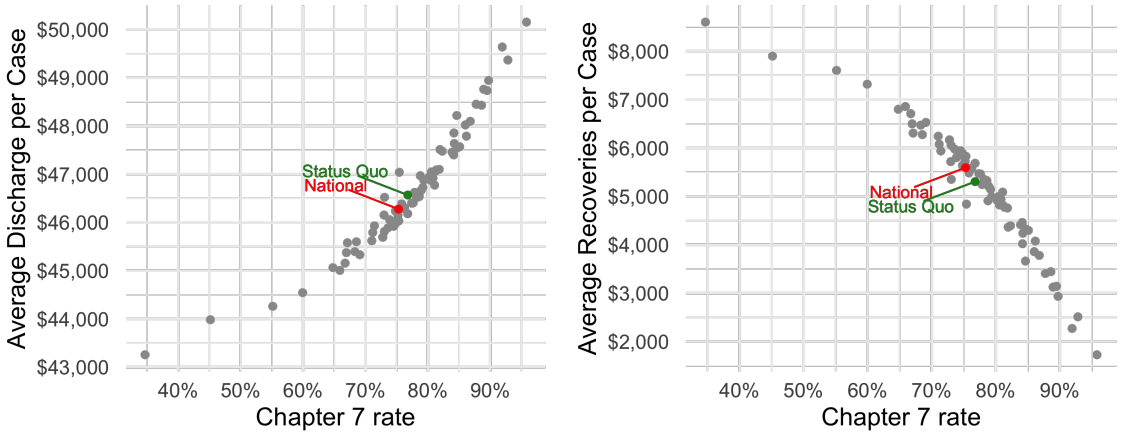
Figure 5: Heterogeneous Deviations and Dismissal Rates



(a) Ch.7 Dismissal/Conversion Rate and α_0 (b) Ch.7 Dismissal/Conversion Rate by α_0 Quartiles

Figure (a) plots the share of Chapter 7 cases that are dismissed or converted into Chapter 13 against each district's α_0 estimate, with dismissal rates reported separately for Chapter 7 filers with disposable income above or below \$100. Figure (b) groups districts into quartiles of α_0, and within each quartile shows the mean dismissal/conversion rate of Chapter 7 filers grouped by disposable income into one-hundred-dollar bins. In the legend, the median deviation rate α_0 for districts in each quartile is reported in parentheses. The black line, labelled "National," shows the mean Chapter 7 dismissal/conversion rate from the national sample.

Figure 6: Discharge and Repayment Under Uniform Steering



(a) (b)

The vertical axis figure plots the average (expected) discharge (panel a) and recoveries (panel b) obtained by sorting the national sample of 2010-2014 debtors when all districts are assigned the constant, coefficient on disposable income, and deviation rates from a single district d^*. The horizontal axis shows the national Ch.7 rate that would occur under this sorting. "Status Quo" shows the values when districts use their own sorting. "National" shows the values when all districts sort according to the constant, coefficient on disposable income, and deviation rates from the national model. See Online Appendix F.3.1 for details on the construction of discharges and recoveries.

A Tale of Two Bankruptcies: Geographic Differences in Bankruptcy Chapter Choice

Supplemental Appendices

Nathaniel Pattison & Daniel L. Millimet

Appendix A Tables and Figures

Table A1: Decomposition

component	deviation ratio (%)
Total	100.00
Coefficients	14.92
β_d constant	16.20
β_d DI	16.60
β_d exemptions	-2.22
β_d means test	-3.63
β_d financial/race	-12.03
Covariates	61.10
cov. DI	53.67
cov. exemptions	0.59
cov. means test	0.03
cov. financial/race	7.09
Deviations	23.90
a_0^d	17.18
a_1^d	6.72
Residual	0.09

Notes: This table shows the contributions of specific sub-components to the component-specific deviation ratios.

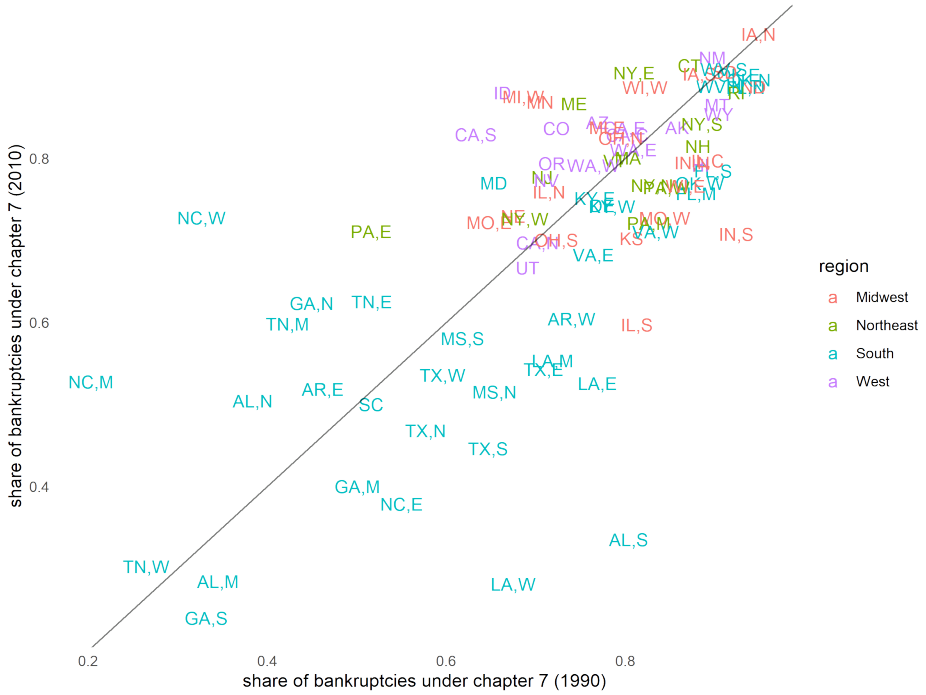
Table A2: Evaluating Model Fit

Model:	Full (1)	Simple (2)	National (3)
Coef. β:	district-spec.	mixed	national
Dev. α	district-spec.	district-spec.	national
DI sample	Share Explained		
Panel A: 2010-2014 (In-Sample)			
all	1.00	0.96	0.79
high	0.99	0.72	0.26
low	1.00	0.85	0.10
Panel B: 2015-2017 (Out-of-Sample)			
all	0.95	0.93	0.77
high	0.86	0.88	0.05
low	0.73	0.34	0.18

Notes: The model used in Column (1) corresponds to the complex model in Section 4 which uses all district-specific coefficients, β_d, and the estimated values of the deviation rates, α_0^d, α_1^d. The simple model outlined above, which uses the mixed coefficient vector, β_d^S, and the estimated values of the deviation rates, α_0^d, α_1^d, is used in Column (2). The national model, which uses β_N, α_0^N, and α_1^N and therefore imposes homogeneous sorting across districts, is used in Column (3). In each column, we measure goodness of fit using the share of the variation explained by each model.

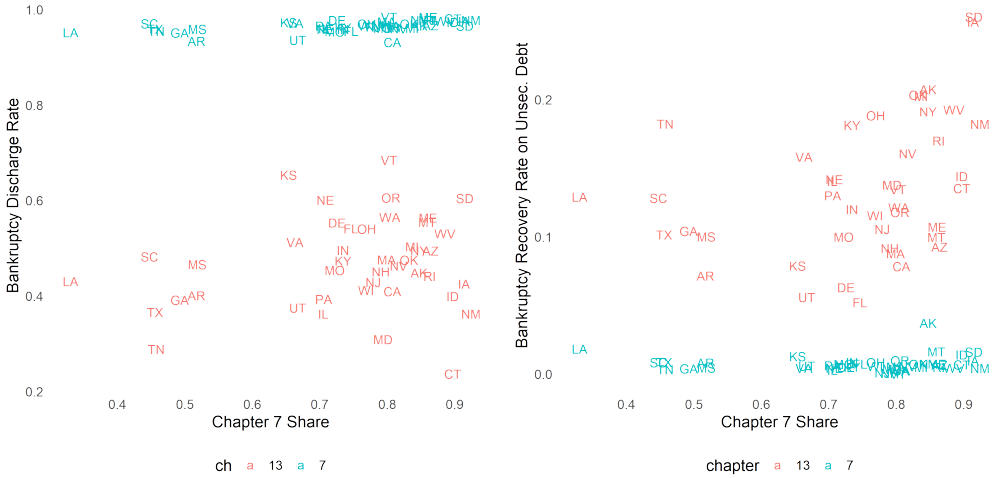
Panel A examines the in-sample model fit. The first row reports the fit measure for each model when all filers are included in the sample (DI sample = all). To focus more on heterogeneity due to sorting, we split the sample by the most important covariate, disposable income, and examine the fit of each model within more homogeneous subsamples. The high-DI (low-DI) sample consists of filers with monthly disposable income of more than (less than or equal to) $100. In Panel B, we repeat the same exercise but using out-of-sample predictions for the years 2015-2017.

Figure A1: Persistence of Districts' Ch.7 Filing Rates



Notes: Data on 1990 bankruptcy rates are from Sullivan *et al.* (1994). The 45-degree line is plotted for comparison.

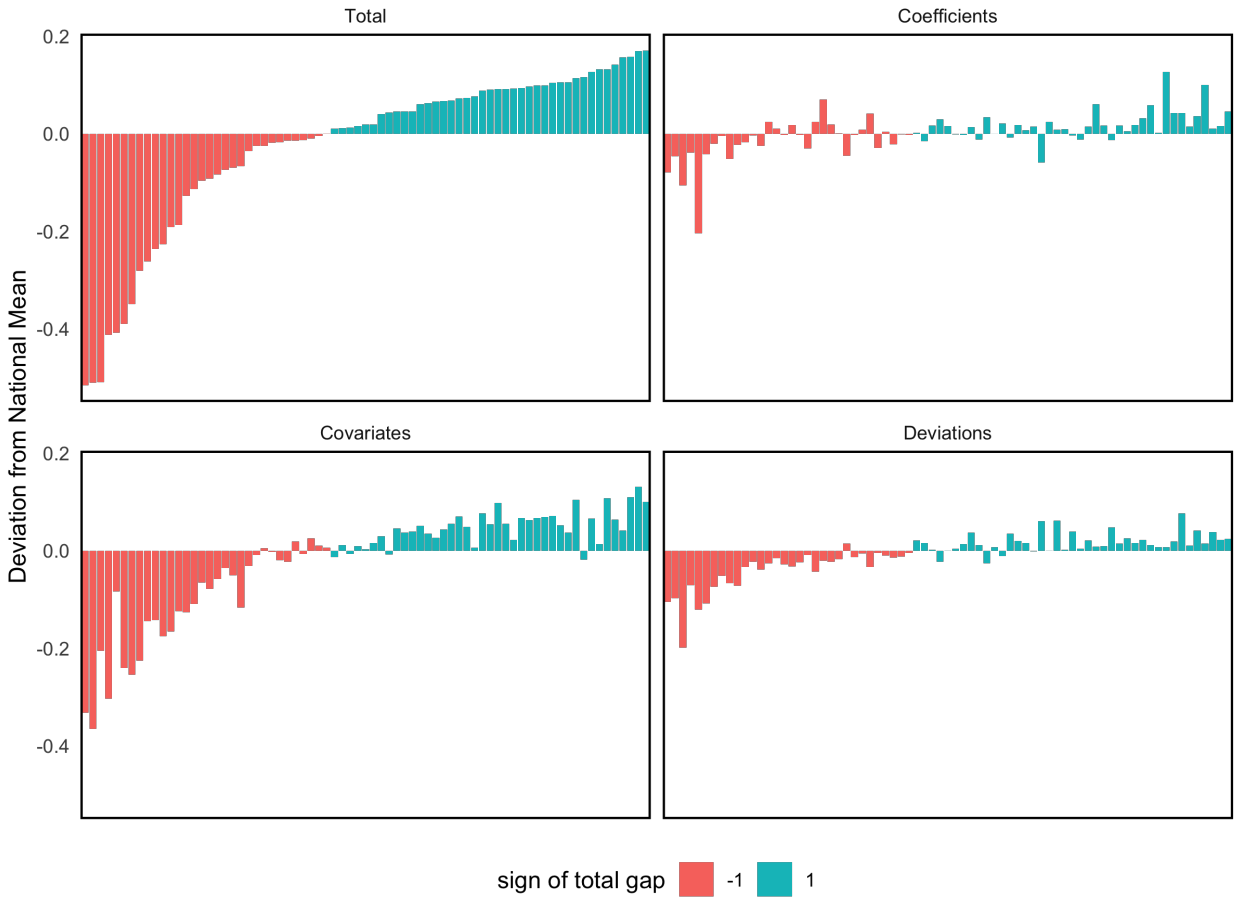
Figure A2: Discharge Rates and Recovery Rates by Chapter 7 Share



(a) Discharge Rate by Chapter (b) Recovery Rate by Chapter

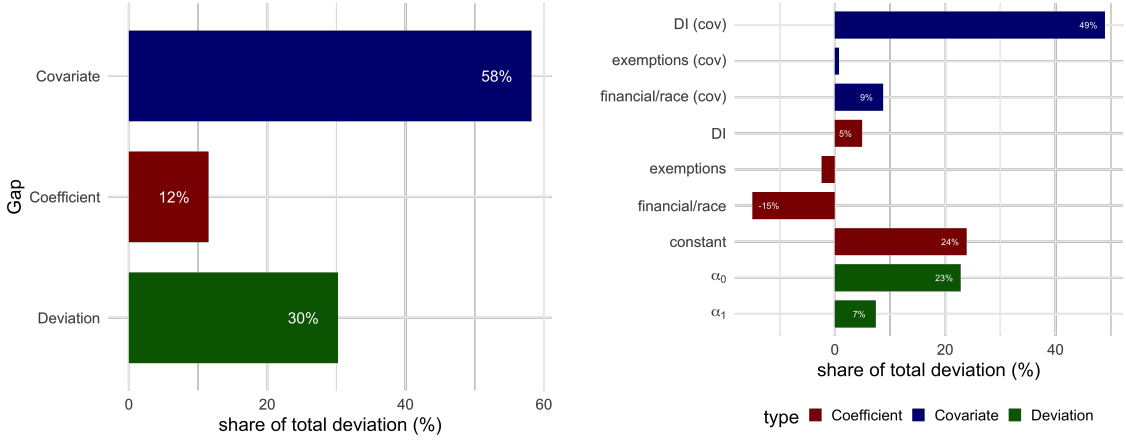
Notes: The discharge rate is the share of bankruptcy filings that obtained a discharge. The recovery rate is the share of unsecured debt returned to creditors, calculated as the total amount returned by trustees to general unsecured creditors in 2010-2014 divided by the total non-priority unsecured debt of those filing in 2010-2014. Data on discharge rates and total non-priority unsecured credit are from the Federal Judicial Center's Integrated Database. Data on the amount returned are from Trustee Final Reports, which detail actual payments to creditors.

Figure A3: Decomposition of Chapter 7 Filing Rates



Notes: Each bar represents a district, and, in all panels, districts are ordered from left to right according to the district's total gap between its Chapter filing rate and the national average of 76.7%. The top left panel displays this total gap between each district's Chapter 13 filing rate and the national mean (Δ_d^T). The remaining three panels report the district-specific gaps due to differences in coefficients (Δ_d^C), top right panel), the distributions of covariates (Δ_d^X, bottom left panel), and deviation rates (Δ_d^A), bottom right panel). Each panel also reports the deviation ratio DR for that component.

Figure A4: Decomposition for Below-Median Income Filers

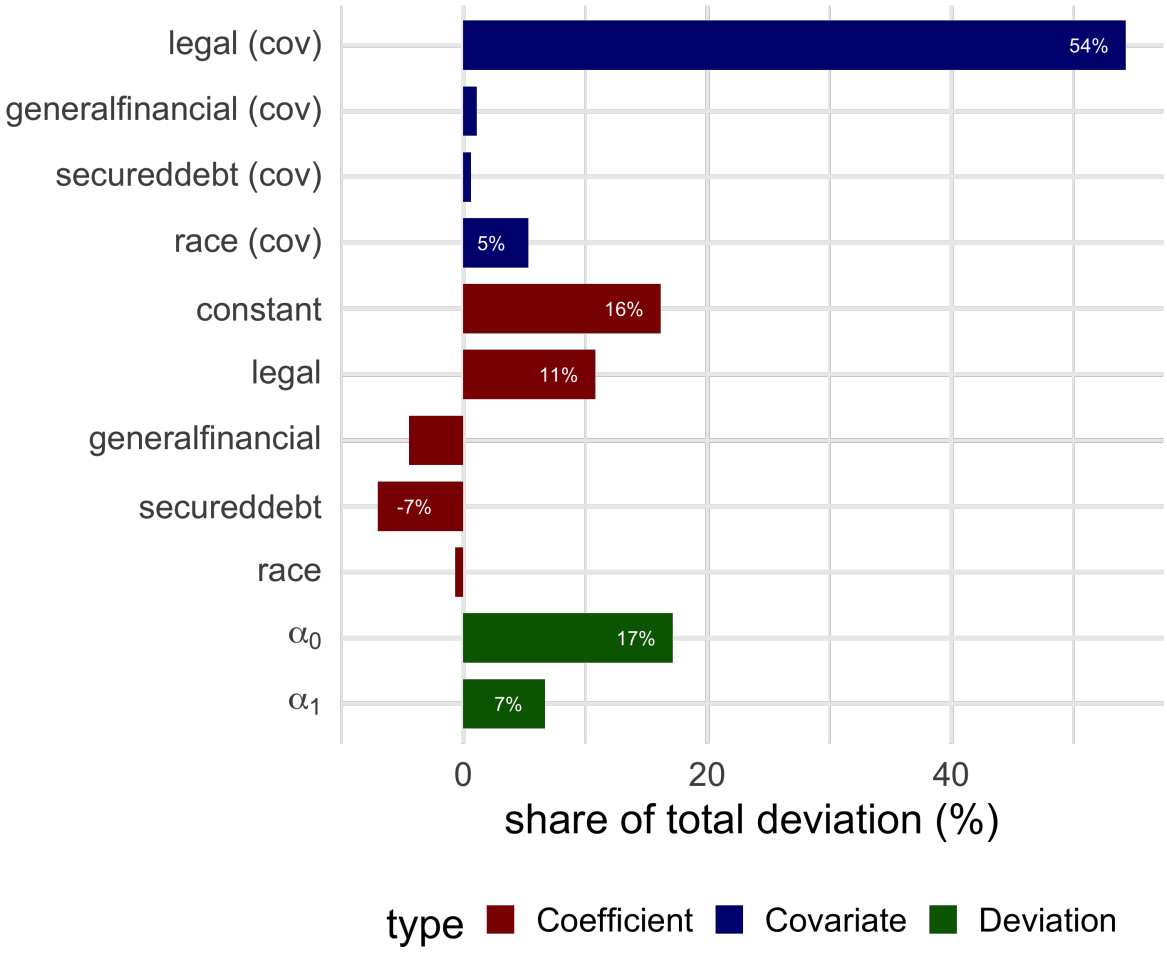


(a) Aggregate Decomposition

(b) Variable Groups

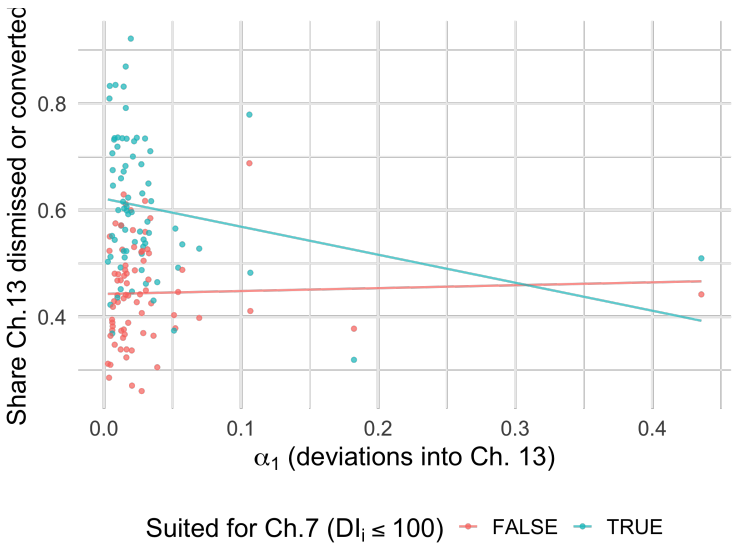
Notes: This figure recreates Figure 2, but with models estimated after restricting the sample to only below-median income filers. Figure (a) reports the aggregate decomposition according to equation (8).Figure (b) reports the subdecomposition with coefficients and covariates grouped into (i) discharges and recoveries, (ii) other factors (excluding race), and race (zip code share Black). It also separates the Deviation component into α_0 and α_1.

Figure A5: Decomposition for Financial Characteristics and Race



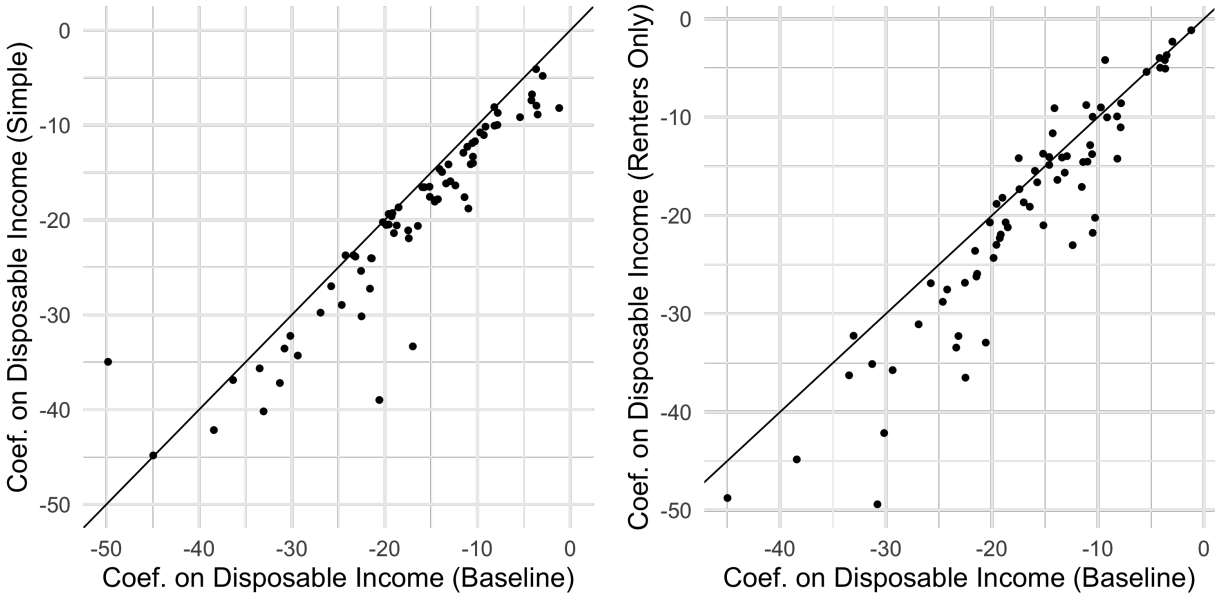
Notes: This figure reports the decomposition of the total geographic variation into different subcomponents. *Legal* consists of all of the legal variables from Table 1. *Generalfinancial* includes the assets-to-income tatio, debt-to-income ratio, and whether the filing was a joint filing. *Secureddebt* includes the indicator for homeownership, the amount of negative equity, the share of debt that is secured, and the share of debt that is nondischargeable. *Race* contains the share of Black residents in the filer's zip code.

Figure A6


Share Ch.13 dismissed or convertec
0.8
0.6
0.4
0.0
0.1
0.2
0.3
0.4
α1 (deviations into Ch. 13)
Suited for Ch.7 (DIi ≤ 100)
FALSE
TRUE

(a)

Figure A7: Coefficient Stability

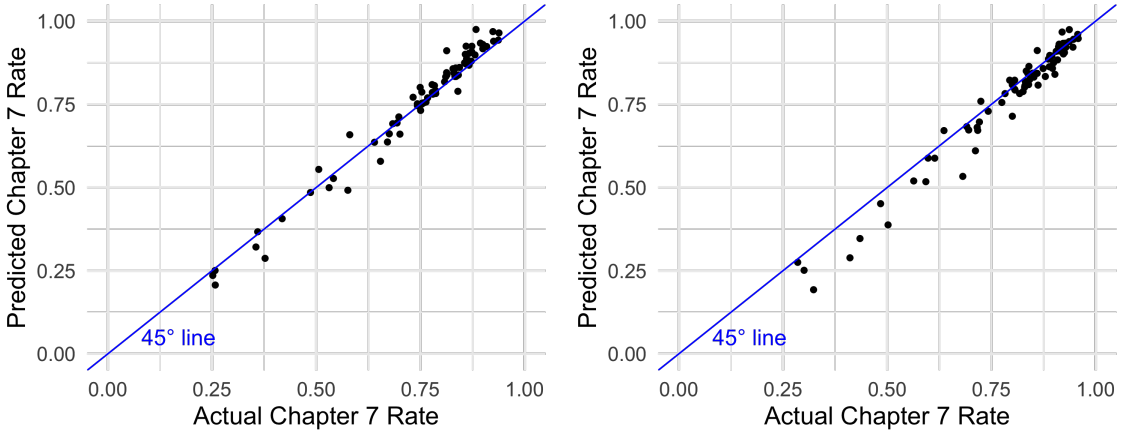


(a) Comparison with Simple Model

(b) Comparison with Renters Only

In both panels, the horizontal axis displays districts' estimated coefficients on disposable income from the baseline model. The vertical axis in panel (a) displays coefficients on disposable income estimated from a simple model with deviations that includes only the variable disposable income. The vertical axis in panel (b) displays coefficients on disposable income but estimated on a sample of renters only (real property value of zero). For scale of the graph, we exclude the two districts in panel (a) and the one district in panel (b) with coefficient estimates less than -100. Both figure also show a 45°line.

Figure A8: Evaluating Fit of Simple Model



(a) In-Sample Fit: 2010-2014 (b) Out-of-Sample Fit: 2015-2017

This figure plots districts' actual Chapter 7 rates against those predicted by the simple model, $\widehat{P}_d^7(\beta_d^S, \alpha_0^d, \alpha_1^d)$. Panel A does this for the years used in the estimation, 2010-2014, while Panel B does this using out-of-sample predictions for the years 2015-2017. Both figure also show a 45°line.

Appendix B Quotes about Screening on Disposable Income

"Merely passing the means test doesn't automatically qualify you to file for Chapter 7 bankruptcy. The court also requires you to complete Schedule I: Your Income and Schedule J: Your Expenses. After deducting your actual monthly expenses from your current monthly income, and you have enough money left over to pay something to your creditors, the court might require you to convert or switch your Chapter 7 case to a Chapter 13 bankruptcy case." (Ohio) - link

"Additional qualification requirement. Even if you're exempt or pass the means test, you might not be out of the woods. The court will compare your current income reported on Schedule I: Your Income to your current expenses reported on Schedule J: Your Expenses. If enough income remains to make meaningful creditor payments, the court will convert the case to Chapter 13. Beware, because this requirement is easy to forget." - link

"The debtor passed the means test but lost a motion to dismiss for abuse of the bankruptcy system. Schedule J, the debtor's projected future expenses, showed a monthly excess of $500. Dollars to doughnuts, the debtor's bankruptcy lawyer followed the form and the budget provided by the client. Dismissal resulted." - link

"Good news! You passed the Means Test!

Bad news! You underreported your expenses on Schedule J and the trustee has filed a Motion to Dismiss your Chapter 7 case!

Many debtors and their attorneys work hard to pass the Means Test, only to run into trouble with Schedules I and J: the debtor's monthly income and expenses. This problem arises when Schedule I shows more income that Schedule J shows expenses, leaving a significant amount of excess monthly income. This is evidence of the debtor's ability to fund a repayment case, and can form the basis of a motion to dismiss in a Chapter 7 case, even when the debtor passes the Means Test. See 11 U.S.C. 707(b)(3)." - link

"Schedule J- The Current Expenditures of Both You and Your Spouse

Schedule J is somewhat similar to Schedule I. The two Schedules work in concert to inform the bankruptcy court as to your approximate monthly budget. On Schedule J, you will include details about each of your monthly expenses. This amount will then be subtracted from the amount of net income provided on Schedule I, and will then determine what amount of disposable income you'll

have every month.

The Effect, If Any, of Your Disposable Income

You will only have qualified for Chapter 7 bankruptcy in the first place if you have passed the "means test", were not required to take the means tests, or were below the median income for your state and household size. Even if you do technically qualify for Chapter 7 bankruptcy, a bankruptcy court might nonetheless find that you are ineligible for filing for Chapter 7 bankruptcy if your budget allows for a considerable amount of disposable income every month." - link

"The next step is documenting income and expenses through the Schedule I and J forms, officially Form 106I and 106J. On Schedule I you list monthly income – every single place you get money from on a regular basis. Schedule J is for all your monthly expenses. The court uses this information to determine, even if you passed the means test, whether you have enough money to pay creditors. If the court thinks you do, it may convert the case to a Chapter 13 bankruptcy." - link

Appendix C Adjustments of Disposable Income for Conduit Districts

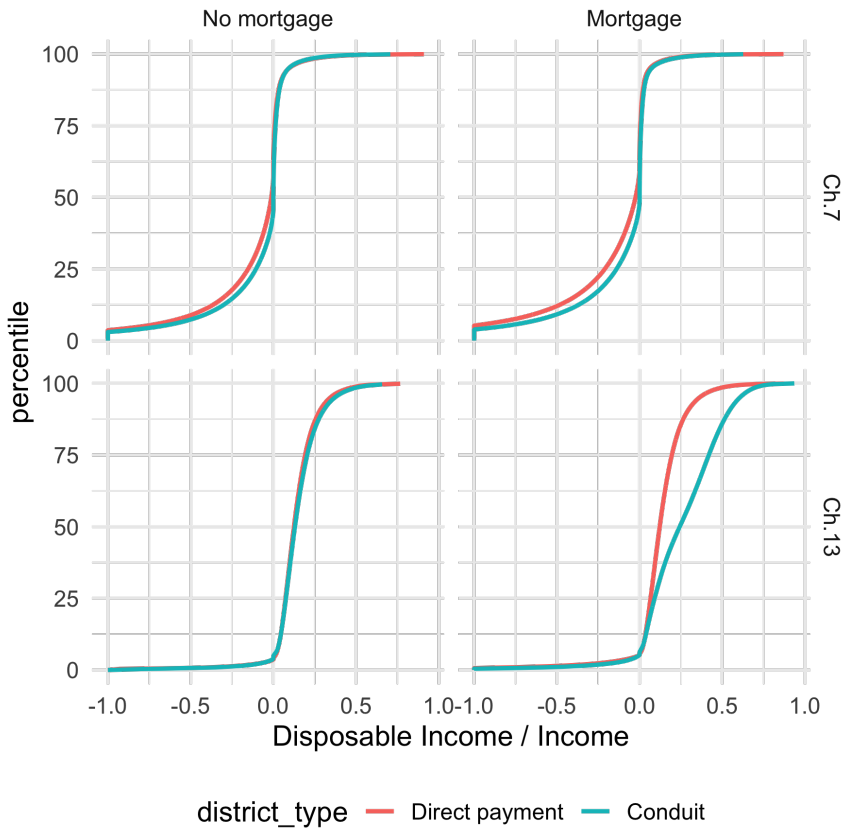
Some districts use conduit plans, in which mortgage payments are made through the Chapter 13 plan, or direct payment plans, in which debtors with a mortgage pay the mortgagor directly.[39] For our purposes, this matters because conduit districts typically exclude mortgage payments from Chapter 13 filers' Schedule J expenses. When calculating disposable income, we adjust the Chapter 13 filers' Schedule J expenses in conduit districts to account for the exclusion of mortgage payments.

We classify conduit districts and direct payments using the Chapter 13 Trustee Final Reports from 2008-2015. If ongoing mortgage payments account for at least 10% of total Chapter 13 disbursements, we classify that district as a conduit district. Districts in which ongoing mortgage payments make up less than 10% of total Chapter 13 disbursements are classified as direct payment districts.[40] Among conduit districts, ongoing mortgage payments average 30.2% of Chapter 13 total

[39] In many conduit districts, this is implemented through the local Chapter 13 plans or the practices of the local trustee. In some places, only a subset of Chapter 13 cases will be conduit plans (e.g. unless the court allows direct payment, or depending on whether a prepetition arrearage exists) (American Bankruptcy Institute, 2019).

[40] Alabama and North Carolina are not present in the Trustee Final Reports. We classify Alabama as a direct payment district and North Carolina as a conduit district, based on the similarity of Schedule J expenses to the

Figure C1: Comparing Disposable Income of Direct-Payment and Conduit Districts



The figure plots the empirical cumulative distribution functions of the share of income that is disposable. Shares below -1 are assigned a value of -1. Shares below -1 are assigned a value of -1.The sample excludes filers with less than $500 in reported monthly income.

disbursements in the average district. Among direct-payment districts, ongoing mortgage payments average 1.5% of Chapter 13 total disbursements in the average district.

Figure C1 compares the disposable income share, i.e. the share of income that is disposable, across direct-payment and conduit districts.[41] The distributions of disposable income shares are similar across direct-payment and conduit districts, except for Chapter 13 filers with a mortgage. In conduit districts, Chapter 13 filers with a mortgage report significantly higher disposable income. In conduit districts, 43% of Chapter 13 filers with mortgages report a disposable income share above 30%. In no other district-mortgage-chapter combination do more than 10% of filers report a disposable income share above 30%. This difference in the empirical CDFs reflects that conduit

districts we classify using the Final Reports.

[41] Disposable income is defined as the difference between Schedule I average monthly income and Schedule J average monthly expenses.

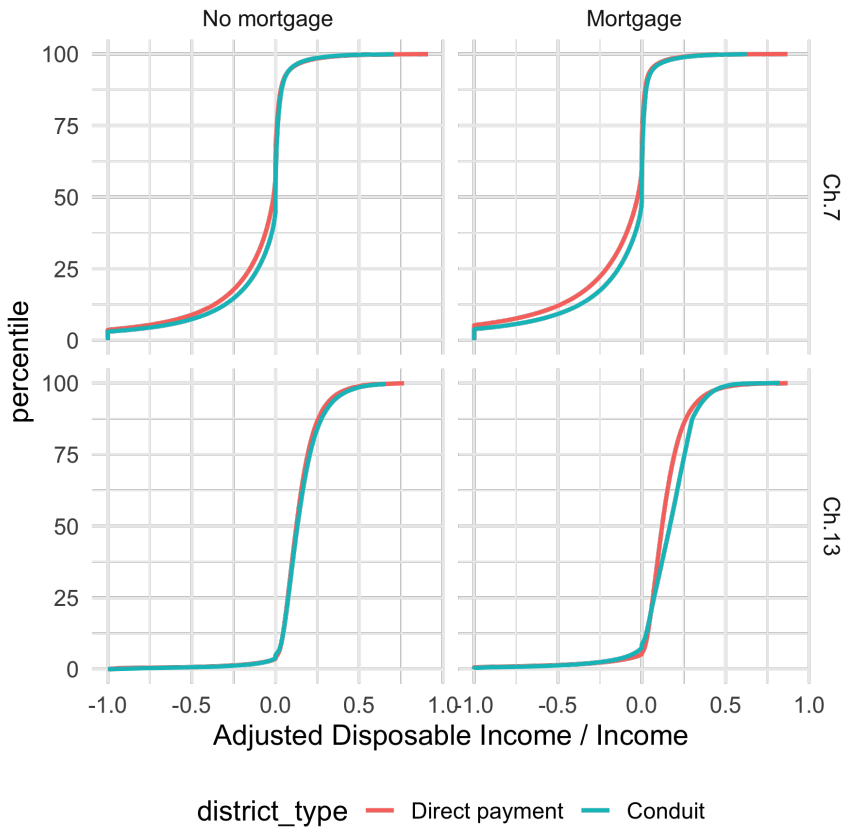
districts exclude mortgage payments from Schedule J expenses.

To account for the different treatment of mortgage payments in conduit districts, we compute each filer's expected monthly mortgage payment, assuming that the principal at origination equaled the reported real property value less a 6% down payment, and took out a 30-year mortgage with an annual interest rate of 7%.[42]

We then adjust Schedule J expenses by adding this expected mortgage payments to all Chapter 13 filers in conduit districts with a disposable income share of at least 30%. Figure C2 plots the empirical CDFs of the disposable income shares after making this adjustment. After adjustment, the distributions of disposable income are much more similar across conduit and non-conduit districts.

[42]The 6% down payment is the average down payment (see `https://www.rocketmortgage.com/learn/what-is-the-average-down-payment-on-a-house`). The 7% interest rate equals the presumptive interest rate applied to installment debt in many Chapter 13 districts at that time (see `https://www.mssb.uscourts.gov/rulesorders-procedures/presumptive-interest-rate/`.)

Figure C2: Adjusted Disposable Income of Direct-Payment and Conduit Districts



The figure plots the empirical cumulative distribution functions of the share of income that is disposable, adjusted for housing expenditures for Chapter 13 filers with mortgages in conduit districts. Shares below -1 are assigned a value of -1. The sample excludes filers with less than $500 in reported monthly income.

Appendix D Decomposition of Ch. 7 Variation

The model of observed bankruptcy in a given district d for filer i is given by equation (5), repeated here

$$\hat{c}_{id} \equiv \hat{\alpha}_0^d + \left(1 - \hat{\alpha}_0^d - \hat{\alpha}_1^d\right) \Phi\left(x_i \hat{\beta}_d\right) = \hat{\alpha}_0^d + \tilde{\alpha}_1^d \Phi\left(x_i \hat{\beta}_d\right). \tag{1}$$

where $\tilde{\alpha}_1^d = (1 - \hat{\alpha}_0^d - \hat{\alpha_1}^d)$. Denote the observed and predicted Chapter 7 shares in the sample for district d as

$$\bar{P}_d^7 = \frac{1}{N_d} \sum_{i=1}^{N_d} c_{id}$$
$$\tilde{P}_d^7 = \frac{1}{N_d} \sum_{i=1}^{N_d} \hat{c}_{id}.$$

Because the sample mean of the predicted probabilities from a probit model may differ slightly from the sample mean of the binary outcome, we define $\delta_d^7 \equiv \bar{P}_d^7 - \tilde{P}_d^7$ as the residual gap.

The gap in Chapter 7 rates between a given district, d, and the nation as a whole, N, is

$$\Delta_d^T \equiv \bar{P}_d^7 - \bar{P}_{\mathtt{N}}^7,$$

where $\bar{P}_{\mathtt{N}}^7$ is the Chapter 7 share in the pooled national data, i.e. the national share of bankruptcies

under Chapter 7, which is 76%. We decompose this gap as

$$
\begin{aligned}
\Delta_d^T &= \frac{1}{N_d}\sum_{i=1}^{N_d} c_{id} - \frac{1}{N_N}\sum_{i=1}^{N_N} c_{iN} \\
&= \frac{1}{N_d}\sum_{i=1}^{N_d}[\hat{\alpha}_0^d + \tilde{\alpha}_1^d \Phi(x_{id}\beta_d)] - \frac{1}{N_N}\sum_{i=1}^{N_N}[\alpha_0^N + \tilde{\alpha}_1^N \Phi(x_{iN}\beta_N)] + (\delta_d^7 - \delta_N^7) \\
&= (\hat{\alpha}_0^d - \hat{\alpha}_0^N) + \tilde{\alpha}_1^d \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_d) - \tilde{\alpha}_1^N \frac{1}{N_N}\sum_{i=1}^{N_N} \Phi(x_{iN}\beta_N) + (\delta_d^7 - \delta_N^7) \\
&\quad -\tilde{\alpha}_1^N \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_N) + \tilde{\alpha}_1^N \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_N) \\
&\quad -\tilde{\alpha}_1^N \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_d) + \tilde{\alpha}_1^N \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_d) \\
&= \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_d) - \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_N) \right\}}_{\text{Coefficient Gap}} + \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_N) - \frac{1}{N_N}\sum_{i=1}^{N_N} \Phi(x_{iN}\beta_N) \right\}}_{\text{Covariate Gap}} \\
&\quad + \underbrace{\left(\hat{\alpha}_0^d - \hat{\alpha}_0^N\right) + \left(\tilde{\alpha}_1^d - \tilde{\alpha}_1^N\right) \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi(x_{id}\beta_d)}_{\text{Deviation Gap}} + \underbrace{(\delta_d^7 - \delta_N^7)}_{\text{Residual Gap}}
\end{aligned}
$$

Appendix D.1 Decomposition of Subcomponents

We also decompose the role of specific groups of covariates and coefficients. For example, dividing the covariates and coefficients into two groups, $x = (x^1\ x^2)$ and $\beta_d = (\tilde{\beta}_d^1\ \beta_d^2)'$, the coefficient gap can be decomposed as

$$
\begin{aligned}
\underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi\left(x_{id}\beta_d\right) - \Phi\left(x_{id}\beta_N\right) \right\}}_{\text{Coefficient Gap}} =& \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi\left(x_{id}^1\beta_d^1 + x_{id}^2\beta_d^2\right) - \Phi\left(x_{id}^1\beta_N^1 + x_{id}^2\beta_d^2\right) \right\}}_{\beta_d^1 \text{ Gap}} \\
&+ \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d}\sum_{i=1}^{N_d} \Phi\left(x_{id}^1\beta_N^1 + x_{id}^2\beta_d^2\right) - \Phi\left(x_{id}^1\beta_N^1 + x_{id}^2\beta_N^2\right) \right\}}_{\beta_d^2 \text{ Gap}}
\end{aligned}
$$

Similarly, the covariate gap can be decomposed as

$$\underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi(x_{id}\beta_N) - \frac{1}{N_N} \sum_{i=1}^{N_N} \Phi(x_{iN}\beta_N) \right\}}_{\text{Covariate Gap}}$$

$$= \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{\tilde{N}} \sum_{i=1}^{\tilde{N}} \Phi\left(x_{id}^1\beta_N^1 + x_{id}^2\beta_N^2\right) - \frac{1}{\tilde{N}} \sum_{i=1}^{\tilde{N}} \Phi\left(x_{iN}^1\beta_N^1 + x_{id}^2\beta_N^2\right) \right\}}_{x^1 \text{ Gap}}$$

$$+ \underbrace{\tilde{\alpha}_1^N \left\{ \frac{1}{\tilde{N}} \sum_{i=1}^{\tilde{N}} \Phi\left(x_{iN}^1\beta_N^1 + x_{id}^2\beta_N^2\right) - \frac{1}{\tilde{N}} \sum_{i=1}^{\tilde{N}} \Phi\left(x_{iN}^1\beta_N^1 + x_{iN}^2\beta_N^2\right) \right\}}_{x^2 \text{ Gap}}.$$

One complication for the terms involving mixtures of x^1 and x^2 from two different samples is that $N_d \neq N_N$. Following Fairlie (2005), we set $\tilde{N} = \min\{N_d, N_N\}$ and, for the district with the larger sample, a random sample (without replacement) of size $\tilde{N}$. Extensions to more than two groups of covariates and coefficients are straightforward. However, in these decompositions, the order of decomposition matters. To overcome this, we compute the average gaps over all possible orderings.

Finally, the deviation gap can be decomposed as

$$\underbrace{\left(\alpha_0^d - \alpha_0^N\right) + \left(\tilde{\alpha}_1^d - \tilde{\alpha}_1^N\right) \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi\left(x_{id}\beta_d\right)}_{\text{Deviation Gap}}$$

$$= \underbrace{\left(\alpha_0^d - \alpha_0^N\right) \left\{ 1 - \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi\left(x_{id}\beta_d\right) \right\}}_{\text{Ch. 7 Deviation Gap}} + \underbrace{\left(-\alpha_1^d + \alpha_1^N\right) \frac{1}{N_d} \sum_{i=1}^{N_d} \Phi\left(x_{id}\beta_d\right)}_{\text{Ch. 13 Deviation Gap}}.$$

Appendix E Potential Manipulation of Disposable Income

This section investigates the sensitivity of our results to misreporting on disposable income. Misreporting creates two potential issues for our analysis. First, measurement error in a covariate leads to biased coefficient estimates.[43] As a result, misreporting leads to an inconsistent estimate of the population coefficient on *true* disposable income. However, in our context, this is not actually problematic. In our model, the inner probit model captures the steering of filers *by districts* given the *observed* attributes of filers. Thus, while misreporting will lead to an inconsistent estimate of the population coefficient on true disposable income, that is not the parameter we seek to estimate. Instead, we aim to estimate the district's steering on *reported* disposable income, and our estimate is consistent for this population coefficient. How districts respond to reported disposable income—regardless of whether or not it is accurate—is exactly the behavior we wish to identify.

Second, and more serious for our analysis, misreporting directly affects the values of disposable income observed in the data. As the coefficient estimates and covariate values form the basis of the decomposition analysis, cross-district distributions in disposable income will reflect differences in both actual disposable income and reporting behavior, potentially causing us to overstate the importance of disposable income. Moreover, if heterogeneity in reporting behavior across districts reflects, in part, local legal culture, then our analysis will understate the importance of local legal culture. We investigate sensitivity to misreporting in several ways, with the results summarized in Figure E2. The figure shows the share of the aggregate geographic variation in chapter choice explained by the covariate gap attributable to disposable income, DI, under different specifications. As a benchmark, the first bar shows that DI explains 54% of aggregate geographic variation in our baseline specification.

Donut Sensitivity Analysis Our first strategy for assessing the potential role of manipulation entails conducting a donut sensitivity analysis in which we drop debtors whose disposable income is near the threshold where disposable income affects chapter choice. The strategy is motivated by the idea that manipulation is most likely to occur around this threshold. That is, if a filer's actual disposable income is sufficiently low to qualify Chapter 7, there is no incentive to misreport because

[43] In a binary choice model, classical measurement error—mean zero, homoskedastic, and independent of other model components—leads to greater attenuation bias compared to a linear model (Yatchew and Griliches, 1985).

doing so would only increase the likelihood that the trustees raise challenges. To proceed, we omit filers with disposable income in the neighborhood of $100 per month, choosing this threshold based on the sharp drop in Chapter 7 filings in Figure 4(b). If most of the geographic variation is due to debtors near this threshold, dropping these debtors should eliminate the geographic variation in chapter choice across districts. Instead, Figure E1 shows that the geographic variation is preserved. The figure compares the districts' Chapter 7 rate in the full sample to the Chapter 7 rate omitting those near the threshold, i.e., debtors where $|DI_i - 100| \leq M$ for $M = \$100, \$250, \$500$. Even when omitting these debtors, the Chapter 7 rate varies across districts from less than 25% to more than 80%. Thus, the cross-district differences come primarily from debtors with disposable incomes far from the threshold.

We then take this analysis further by conducting the decomposition analysis on these donut samples. We do this separately for $M = \$100, \$250, \$500$, re-estimating the models on each new sample then redoing the decomposition analysis. In these decompositions, the share explained by the DI is shown in the two bars labeled "donut" in Figure E2. The results indicate that the aggregate geographic variation in chapter choice explained by the covariate gap attributable to disposable income increases from 54% in the baseline specification to 63%, 66%, and 70% when M is set to $100, $250, and $500, respectively. Thus, when these debtors are excluded, disposable income actually explains more of the geographic variation than in the baseline model.

While our main focus in this section is on robustness of the share of aggregate geographic variation in chapter choice explained by the disposable income, the full decomposition results from the new specifications used in Figure E2 are reported in Table E1. A few interesting results stand out. First, as M increases from zero to $500, the share of the variation in chapter choice explained by the covariate disposable income increases, while the share explained by estimated coefficients on disposable income decreases. This is because, for filers with reported disposable income far from $100, there is little heterogeneity across districts in how they are sorted. Specifically, the overall coefficient gap falls from 17% in the baseline model to 6% (4%) when M is set to $250 ($500). Finally, the estimated deviation rates become smaller as M increases as well. For example, α_0 declines from 17% in the baseline model to 11% (8%) when M is set to $250 ($500). Together, these results indicate that heterogeneity in the sorting preferences of districts (i.e., local legal culture) and the deviation rates of filers is a significant contributor to overall geographic variation

in chapter choice through their effect on filers with reported disposable income close to $100. This makes sense, given our discussion of heterogeneous thresholds across districts in Section 7. For filers away from this threshold, the vast majority of geographic variation in chapter choice is due to differences in the distribution of observed filer characteristics, with disposable income being the primary cause.

Binary Measure of Disposable Income As a second strategy, we replace our continuous measure of disposable income with a binary variable equal to one if reported disposable income is above $100 and zero otherwise. Measurement error in this binary indicator only occurs if manipulation by filers causes reported disposable income to cross the $100 threshold. To reduce this possibility, we also perform the previous donut sensitivity analysis using the binary disposable income measure. Specifically, we omit filers with $|DI_i - 100| < M$ for $M = \$100, \$250, \$500$ and then convert the continuous disposable income variable into its binary counterpart for the filers remaining in the sample. The results are shown in the bars labeled "binary" in Figure E2. When using the binary measure, the aggregate geographic variation in chapter choice explained by the covariate gap attributable to disposable income remains similar to the baseline specification.

Splitting Disposable Income Our final strategy splits reported disposable income—defined as the gap between reported income and reported expenses—into two parts, DI^{IRS} and DI^{res}, given by

$$\begin{aligned} DI &= \text{Income} - \text{Expenses} \\ &= \underbrace{(\text{Income} - \text{IRS Allowable Expenses})}_{DI^{\text{IRS}}} + \underbrace{(\text{IRS Allowable Expenses} - \text{Expenses})}_{DI^{\text{res}}}, \end{aligned}$$

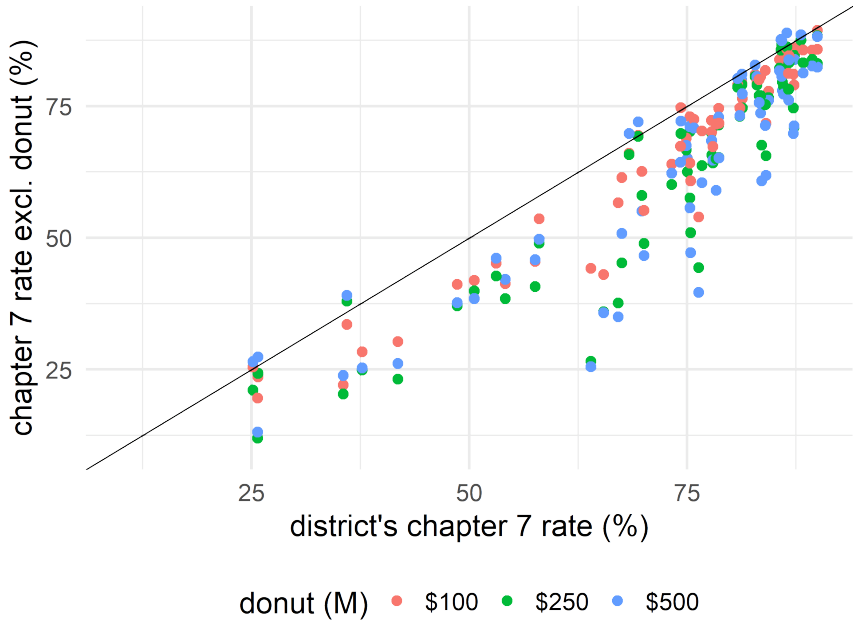
where DI^{IRS} is reported income less Internal Revenues Service (IRS) allowable expenses and DI^{res} is the difference between IRS allowable expenses and reported expenses. Because reported income can be verified with bank statements and pay stubs, misreporting, to the extent it exists, would likely occur on the expense side. DI^{IRS} replaces self-reported expenses with IRS allowable expenses. As such, there is less margin to misreport in DI^{IRS}. Misreporting, then, is more likely confined to DI^{res}, which is the difference between debtor's self-reported typical expenses and IRS allowable

expenses.

With disposable income split into two separate covariates, we re-do the decomposition treating DI^{IRS} and DI^{res} as separate covariates.[44] If the majority of the role played by disposable income in our initial analysis is due to DI^{IRS}, this is suggestive of a small role of misreporting. The results from this new decomposition are shown in the second bar, labeled "split DI", in Figure E2. We find that of the 54% of the aggregate geographic variation in chapter choice explained by the covariate gap attributable to disposable income in the baseline model, DI^{IRS} (DI^{res}) explains 33% (23%). Thus, the majority of the geographic variation explained by differences in the distribution of reported disposable income found in the baseline model is driven by differences in income and allowable expenses, which are less subject to misreporting.

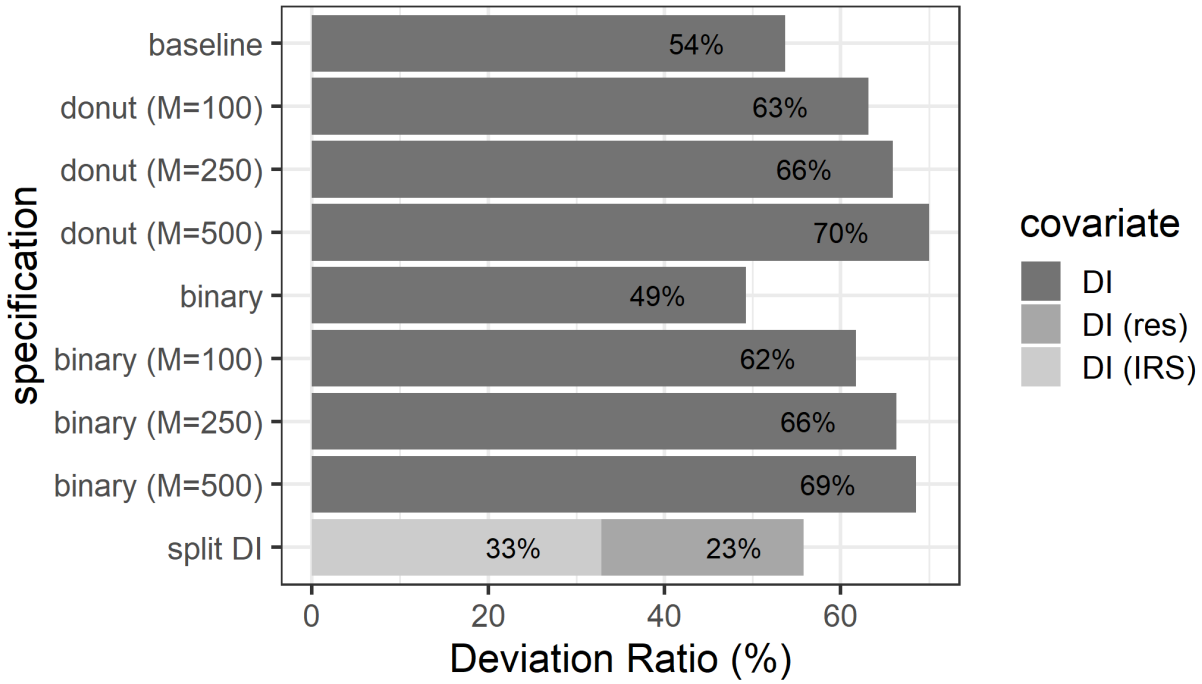
[44]Note, we do not re-estimate the models but instead assign both variables, DI^{IRS} and DI^{res}, the estimated coefficient on disposable income from the baseline model. As discussed above, although disposable income may be mismeasured, our analysis consistently estimates district responses to *reported* disposable income.

Figure E1: Sensitivity of Geographic Heterogeneity to Sample



This figure plots each district's share of bankruptcies under Chapter 7 (Chapter 7 rate) in the full sample against the share of bankruptcies under Chapter 7 in the subsample of filers with monthly disposable income far from the \$100 threshold, i.e., we exclude filers iwth $|DI_i - 100| \leq M$ for $M = \$100, \$250, \$500$.

Figure E2: Decomposition Ratio for Observed Disposable Income



Based on results in Table E1.

Table E1: Decomposition Sensitivity

	baseline	baseline ($M = 100$)	baseline ($M = 250$)	baseline ($M = 500$)	binary	binary ($M = 100$)	binary ($M = 250$)	binary ($M = 500$)	split DI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Covariates	61.1	70.4	77.4	81.5	67.7	77.0	81.7	85.0	61.1
cov. DI	53.7	63.1	65.9	70.0	49.3	61.7	66.3	68.5	
cov. DI (IRS)									32.9
cov. DI (resid)									22.9
cov. exemptions	0.6	0.3	0.6	0.8	0.7	0.7	0.7	0.9	0.4
cov. means test	0.0	0.1	0.7	2.4	2.6	3.0	5.0	9.5	0.0
cov. financial/race	7.1	6.8	9.6	8.3	15.1	11.7	9.4	5.9	5.2
Coefficients	14.9	10.9	8.3	7.2	21.7	16.7	11.9	9.5	14.9
β_d constant	16.2	12.0	11.3	5.7	32.5	24.0	11.1	4.7	14.9
β_d DI	16.6	9.9	5.5	4.4	14.5	11.4	11.8	12.5	
β_d DI (IRS)									-14.7
β_d DI (resid)									30.7
β_d exemptions	-2.2	-0.5	0.3	0.5	-3.7	-0.5	0.9	1.5	-2.1
β_d means test	-3.6	-2.9	-3.3	-2.3	-7.0	-5.9	-5.6	-4.8	-3.2
β_d financial/race	-12.0	-7.5	-5.5	-1.1	-14.6	-12.4	-6.2	-4.4	-10.8
Deviations	23.9	18.7	14.2	11.2	10.6	6.4	6.4	5.5	23.9
a_0^d	17.2	14.4	11.0	7.9	4.3	3.3	3.6	3.4	17.2
a_1^d	6.7	4.3	3.2	3.4	6.4	3.1	2.8	2.1	6.7
Residual	0.1	0.0	0.0	0.0	-0.0	-0.1	-0.0	-0.0	0.1

Notes: This table shows the contributions of specific sub-components to the component-specific deviation ratios across different specifications. Drop \$100, drop \$250 and drop \$500 drop individuals with an absolute value of reported disposable income minus \$100 less than those values. The header "baseline" indicates that disposable income (DI) is measured continuously, while "binary" indicates the use of a binary indicator for whether disposable income exceeds \$100 per month.

Appendix F Discharge and Repayment In Bankruptcy

The appendix details how we compute discharge and repayment in Chapter 7 and Chapter 13.

Appendix F.1 Overview

Calculating discharge and repayment amounts, particularly for Chapter 13 filers with income above the state median, is complicated. Our calculations provide approximations that adhere to many aspects of bankruptcy law and common practices, but necessarily abstract from some nuances and district variation.

Under Chapter 7, the amount repaid to unsecured creditors equals the minimum of (i) the filer's unsecured debt and (ii) the non-exempt assets that the filer holds, which depends on the filer's assets and state and federal asset exemptions levels. Following Pattison and Hynes (2020), non-exempt assets are approximated by subtracting the maximum applicable homestead exemption from a measure of the filer's home equity: the difference between the value of real property and secured debt. After adjusting for priority debts and non-dischargeable debts (e.g., student loans), we calculate the share of non-exempt assets that would go towards repaying dischargeable unsecured debts. Formally, the recovery and discharge amounts in Chapter 7 bankruptcy, denoted by R_i^7 and D_i^7 respectively, are

$$\begin{aligned} R_i^7 &= \min\{\texttt{nonexempt}_i, \texttt{unsecured}_i\} \\ D_i^7 &= \max\{\texttt{dischargeable unsecured}_i - \texttt{pay unsecured}_i^7, 0\}, \end{aligned}$$

where $\texttt{nonexempt}_i$ is the total non-exempt unsecured debt for filer i, $\texttt{unsecured}_i$ is total unsecured debt, $\texttt{dischargeable unsecured}_i$ is the dischargeable unsecured debt, and $\texttt{pay unsecured}_i^7$ is the amount repaid to dischargeable creditors, which equals R_i^7 multiplied by the share of unsecured debt that is dischargeable. While this is a simplification of the actual discharge and repayment under Chapter 7, it captures the significant determinants of repayment and discharge for the large majority of Chapter 7 filers, as well as what Chapter 13 filers would repay had they filed Chapter 7.

Chapter 13 requires that filers repay with their full disposable income during the length of the

plan, so the primary determinants of the amount repaid (conditional on plan completion) are (i) the length of the plan and (ii) disposable income. We set the baseline Chapter 13 plan length, T_i, to 36 months for filers with current monthly income below the state median income (adjusted for household size) and 60 months for those with income above the state median (Tabb, 2020).[45] We compute the filers' monthly repayment, m_i, as disposable income, defined as reported (Schedule I) income less expenses. Much of the complexity and disagreement across districts concerns exactly how expenses calculated, particularly for filers with income above the state median. Following common practices, we use actual reported expenses for filers with income below the state median and the maximum of reported expenses and IRS allowable expenses for filers with income above the median, with other adjustments for mortgage expenses. Finally, we apply the best interest of the creditors test, which requires that unsecured creditors receive at least as much as they would in Chapter 7. Formally, the amount recovered by general unsecured creditors in Chapter 13, denoted as R_i^{13}, is

$$R_i^{13} = \max\{m_i T_i, R_i^7\} \tag{2}$$

As with Chapter 7, we account for priority and nondischargeable debts when calculating expected discharges. The *expected* amount of debt discharged in a completed Chapter 13 plan is

$$D_i^{13} = \max\{\texttt{dischargeable unsecured}_i - \texttt{pay unsecured}_i^{13}, 0\}.$$

In the remainder of this section, we provide more details about the practices informing these calculations of discharges and repayment.

Appendix F.2 Chapter 7

In Chapter 7 bankruptcy, nearly all debtors obtain a full discharge of unsecured debts and unsecured creditors rarely receive payments. The amount repaid equals the amount of non-exempt equity debtors hold, which depends on the debtors' assets a combination of state and federal exemption levels. We measure non-exempt assets as the amount of non-exempt home equity debtors hold, where home equity is calculated as the difference between filers' real property and their secured

[45] Note, we shorten the plan length for filers whose disposable income would allow them to repay their debts in full before completion of the baseline plan.

debt. Although this measure is imperfect, Pattison and Hynes (2020) shows it closely follows actual home equity reported in a sample of bankruptcy filings. With this measure of home equity, we then calculate non-exempt home equity by subtracting the maximum applicable homestead exemption as in Pattison and Hynes (2020), using single-filer exemptions for single filings and married filer exemptions for joint filings.

The total repayment to unsecured creditors in Chapter 7 is then the minimum of non-exempt equity and the filer's total unsecured debt

$$R_i^7 = \min\{nonexempt_i, unsecured_i\}.$$

This determines the amount that will be repaid to creditors.[46] The remaining amount owed to unsecured creditors may be discharged, depending on whether it is dischargeable.

The amount of debt discharged by the debtor upon completion of the plan depends on the total amount paid to unsecured creditors and the types of unsecured debt that the filer holds. Priority debts (e.g., domestic support arrears, taxes, and some civil claims) must be paid in full before disbursements to general unsecured creditors. The money left after priority debts have been paid is disbursed pro rata among general unsecured creditors, i.e., in proportion to the creditor's share of the debtor's total general unsecured debt. Some types of general unsecured debt, such as student loans, pension obligations) are nondischargeable.[47] Thus, the amount paid to dischargeable general unsecured creditors is

$$pay\_unsecured_i^7 = \max\{(R_i^7 - priority\_unsecured_i)share\_dischargeable_i, 0\}$$

where $share\_dischargeable_i$ is the share of general unsecured debt that is dischargeable. The total amount discharged in Chapter 7 is then

$$D_i^7 = \max\{dischargeable\_unsecured_i - pay\_unsecured_i^7, 0\}.$$

Our measures of repayment and discharge are a simplification of the actual discharge and

[46] We could subtract the percentage paid to a Chapter 7 trustee, but it makes little difference.

[47] We calculate these nondischargable general unsecured debts as $\max\{total\_nondischargeable_i - priority\_unsecured_i, 0\}$.

repayment in Chapter 7. Debtors may be denied a discharge and others may be required to forfeit unmeasured non-exempt assets to repay creditors. In practice, however, both of these events are rare. As seen in Table 1, 96% of Chapter 7 filers obtain a discharge. As for non-exempt assets, only 5% of Chapter 7 cases have any non-exempt assets, and the assets collected in these cases are primarily small-dollar items such as tax rebates that repay little to creditors (Flynn *et al.*, 2003; Jiménez, 2009; Hynes and Pattison, 2022). Even among cases with nonexempt, then, most cases return very little to unsecured creditors. Indeed, more than half of all disbursements to creditors in Chapter 7 come from top 0.3% percent of cases.

One potential concern is that we use the formulas above to calculate counterfactual repayment and discharge in Chapter 7 by current Chapter 13 filers. It is possible that Chapter 13 filers, if they had filed Chapter 7, would have had to forfeit assets (other than home equity) more frequently than current Chapter 7 filers. The available evidence suggests, however, that this is not the case. Using detailed data from Chapter 13 cases filed in Cook County, Illinois, however, Morrison and Uettwiller (2017) found that 58% of successful Chapter 13 cases and 77% of unsuccessful (no discharge) Chapter 13 cases would have paid unsecured creditors nothing in Chapter 7.

Appendix F.3 Chapter 13

Repayment in Chapter 13 is substantially more complex. This appendix provides additional information on how we calculate Chapter 13 plan recoveries unsecured creditors and the discharge of unsecured debt. The total Chapter 13 payments to (general) unsecured creditors, conditional on completion of the repayment plan, depends on (i) the monthly plan payments, (ii) the duration of the plan, and (iii) the types of unsecured debt (general, priority, and nondischargeable). We summarize our method for computing repayment and discharge first, and provide additional institutional details below.

The Bankruptcy Code requires that the monthly plan payments are equal to the debtor's disposable income, and we discuss how we calculate disposable income below. From the monthly payment, the Chapter 13 trustee takes a percentage fee to cover administrative expenses, which averages 6.5% across trustees during our sample period. As a result, the total amount paid to creditors each month is $m_i = (1 - 0.065) \cdot disposable\_income_i$.

We set the baseline Chapter 13 plan length to 36 months for filers with current monthly income

below the state median income (adjusted for household size) and 60 months for those with above-median income (Tabb, 2020). If, however, a debtor's monthly payments would allow them to repay unsecured creditors in full before the baseline plan length, we set the plan length, T_i, to this shorter duration.

Thus far, the total plan payments to unsecured creditors for a completed plan are $m_i T_i$. We then apply the best interest of the creditors test, which requires that unsecured creditors receive at least as much as they would in Chapter 7, i.e., ${R_i}^7$. Thus, the total amount recovered by all unsecured creditors is

$$R_i^{13} = \max\{m_i T_i, R_i^7\}. \tag{3}$$

As described for Chapter 7, the amount discharged also depends upon the amount of debt that is priority and nondischargeable. Thus, the amount paid to dischargeable general unsecured creditors is

$$pay\_unsecured_i^{13} = \max\{(R_i^{13} - priority\_unsecured_i) share\_dischargeable_i, 0\}$$

where $share\_dischargeable_i$ is the share of general unsecured debt that is dischargeable. The total amount of debt discharged in a completed Chapter 13 plan is

$$D_i^{13} = \max\{dischargeable\_unsecured_i - pay\_unsecured_i^{13}, 0\}.$$

Appendix F.3.1 Disposable Income and Monthly Payments

How to calculate disposable income is a complicated issue, particularly for above-median-income debtors, with variation across districts and over time from district practices and court rulings. The lack of detailed knowledge about the practices in each district, which are often embedded in unwritten local practices, as well as the lack of some variables in the data, make it impossible to accurately capture exactly how chapter 13 disposable income is calculated in every district. Instead, we adopt a measure of disposable income that is uniform across all districts and reflects recent interpretations of the Bankruptcy Code.

Prior to BAPCPA, bankruptcy required that debtors' monthly payment equal their disposable income, defined as income less "reasonable and necessary expenses" (Showel, 2008). This was

calculated as the filer's income listed on Schedule I, less the filer's actual expenses listed on Schedule J, although there was some judicial discretion as to what expenses and amounts were "reasonable and necessary." After BAPCPA, the disposable income calculations for below-median income filers remain largely the same. For below-median filers, the "difference between your income on Schedule I and your expenses on Schedule J will be your Chapter 13 plan payment " (O'Neill, 2022). Consequently, we calculate the monthly payments for below-median income debtors as the difference between the debtor's (forward-looking) average monthly income and expenses as reported on Schedule I and J (adjusted for conduit districts, discussed below). This is a close approximation to actual Chapter 13 payments for below-median-income filers.

For above-median filers, BAPCPA requires that they repay their "projected disposable income," a phrase that was not defined. As a result, "[a]rguably no change in BAPCPA has generated as fundamental a difference in the bankruptcy courts' reported opinions as how to determine projected disposable income for above median family income debtors in chapter 13 and, therefore, what such debtors are required to pay to unsecured creditors in their chapter 13 plans" (Waldron and Berman, 2007). The main issues were that BAPCPA provided a mechanical formula using past income and standard IRS expense allowances, but the law did not detail what to do when a filer's forward-looking income or actual expenses deviated from the mechanical calculations (Leyba, 2012; Radwan, 2012). Two Supreme Court cases resolved some of the issues, ruling that courts can use forward-looking incomes to calculate plan payments when there are discrepancies between past income and forward-looking income, and that filers cannot deduct IRS allowable vehicle ownership expenses when the filer does not have a lease or car payment. Still differences across districts in disposable income calculations remain.[48] Two approaches exist to resolving issues with the IRS standard expenses (Radwan, 2012): (i) the cap approach, which deducts from income the minimum of the actual and IRS standard expenses, and (ii) the allowance approach, which deducts the IRS standard expenses, even if actual expenses are below the allowance. Courts uniformly prohibit the debtor from including expenses in excess of the allowance amounts, except for mortgage expenses which are allowed to exceed the IRS standard (Radwan, 2012).

For above-median income filers, our goal is to calculate projected disposable income in a way that

[48] Lanning examines the mechanical vs. forward-looking in a case involving a change in income, while Ransom v. FIA Card Services examines the issue with respect to actual vs. IRS standard allowable expenses.

adheres to common practices and is possible to compute with the available data. In all districts, disposable income is some measure of the filers monthly income less reasonable expenses. For monthly income, we use the filer's forward-looking average monthly income reported on Schedule I. While, technically, the formulaic approach for above-median filers uses the gross current monthly income (CMI) reported on form 122 with adjustments for deductions, the Schedule I income closely approximates this adjusted net income.[49]

For expenses, we adopt the cap approach to IRS standard expenses. Specifically, we first calculate the IRS standard expenses, which depend on the filer's family size, the number of family members above age 65, the number of vehicles, and the county of residence. We assume that single filers have a family size of one and joint filers have a family size of two, that everyone is below age 65, and that each person has one vehicle. These assumptions, combined with the filer's county, allow us to calculate the formulaic portion of the standard expenses. The bankruptcy expense calculations then allow filers to adjust the formulaic portion with selected allowable expenses, the largest of which is the mortgage payment. For the mortgage payment, we calculate the monthly expenditure assuming that the filer financed the total value of the reported real property using a 30-year standard mortgage with a 6% down payment and a 7% interest rate.[50] We then set the IRS mortgage payment as the maximum of the estimated mortgage payment and the IRS standard mortgage/rent expense for the filer's county. This provides an estimate of the filer's formulaic IRS expenses. To implement the cap approach, we then set the filer's expenses to the minimum of the IRS expenses and the actual expenses reported in Schedule J. For above median-income filers, we then subtract these cap-approach expenses from the average monthly income reported in Schedule I.

[49]There are two reasons to prefer the Schedule I income over form 122 current monthly income when calculating projected disposable income. First, only gross current monthly income is available in the FJC bankruptcy data, while the appropriate income measure would be the net current monthly income after subtracting taxes, involuntary payroll deductions, domestic support obligations, etc. Schedule I income already net of these adjustments. Second, using Schedule I income is consistent with the forward-looking approach adopted in many districts. Thus, we think Schedule I income is a more accurate reflection of the actual income level used for determining chapter 13 plan payments.

[50]If the filer's secured debt amounts to less than 10% of his or her total debt, we set the predicted mortgage payment to zero.

Appendix F.3.2 Chapter 13 Plan Durations

Section 1322(d) of the bankruptcy code sets the baseline plan duration as three years for filers with current monthly income below the state median income (adjusted for household size) and five years for those with above-median income (Tabb, 2020). However, below-median filers' plans can be extended for "cause," which can include greater payment ability, the filer needing a longer plan to pay priority debts or cure defaults, or to repay a certain share to unsecured creditors.[51] Additionally, the Bankruptcy Code does not include a minimum plan duration, and filers may have shorter plans confirmed if, for example, they are able to repay unsecured creditors in full. Figure G1 plots the distributions of Chapter 13 plan durations for successfully discharged Chapter 13 plans.

[51] Tabb (2020) notes that debtors who repay at least 70% to general unsecured creditors avoid the 6-year bar for a subsequent bankruptcy discharge.

Figure G1: Plan Durations for Discharged Chapter 13 Plans