Internet Appendices for

Debtor Income Manipulation in Consumer Credit Contracts

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Appendix A Construction of Surplus Income

We construct Surplus Income (SI) based on OSB rules using data reported on the balance sheet and income statement of the debtor. We use the following formula to determine SI:

$$SI_{i,t} = Pro\ rate_i \times (NetFamilyIncome_i - AuthExpenses_i - Deduction_t). \quad (1)$$

$Pro\ rate_i$ is an adjustment based on whether the filing is made as a single individual or as part of a family. $NetFamilyIncome_i$ is the total monthly income after tax from all family members. $AuthExpenses_i$ includes all non-discretionary spending as defined by the OSB (which includes child support expense, spousal support expense, child care, medical expense, fines, penalties, employment expense, etc.) $Deduction_t$ is an amount published every year by the OSB to adjust for inflation, which varies over family size.

Appendix B Using the Integration Constraint to Estimate Exits above the Threshold

As explained in Section 7.2 of the paper, an alternative explanation for the bunching we document in this paper may arise from increased exits above the SI threshold. In the paper, we present several analyses that strongly suggest that this alternative explanation cannot be exclusively responsible for the observed

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bunching. Below, we exploit a feature of the Chetty et al. (2011) bunching methodology to estimate the degree of these extensive margin exits.

As we detail in Section 4 of the paper, Chetty et al. (2011) estimates bunching magnitude by modeling observation counts in bins using a high-degree polynomial regression to produce the counterfactual distribution. Satisfying the integration constraint is a crucial step in the Chetty et al. method. This integration constraint requires that the missing mass above \$200 SI equal the bunching mass in the region below \$200. Through an iterative procedure, the estimation method incrementally increases the area under the counterfactual line above \$200 SI, which simultaneously reduces the bunching mass estimate and increases the missing mass estimate until the two are equal. As a result, the integration constraint effectively imposes the assumption that there are no exits above \$200 SI due to the reform.[1]

To estimate exits above the \$200 SI threshold, we calculate bunching magnitude without enforcing the integration constraint. By ignoring the integration constraint, we allow the bunching mass to be less than the missing mass, effectively allowing extensive margin exits.[2] The difference in the bunching mass with and without an integration constraint captures the filers missing above the threshold who do not reappear in the bunching region below the threshold (i.e., do not manipulate their SI to be below \$200 SI). As such, it is an estimate of the extent of exits, as measured within the Chetty et al. framework.[3]

We run this estimation exercise on each of the eight bunching models in Table 2 of the paper and present our results in Figure A5. As the figure shows, across all the models, proposal exits constitute approximately one-sixth of the number of missing filings in the region above the \$200 SI threshold. Five times as many (five-sixths) of the missing mass filings are present in the bunching region below \$200 SI. This indicates that the vast majority of filers with true SIs over \$200 who choose not to file a proposal with an SI above the threshold after the reform choose instead to manipulate their SI and file a proposal with SI below \$200.

[1] More precisely, the integration constraint imposes the assumption that there is no extensive margin response to the reform at all. That is, it assumes the reform does not cause any exits or entries above or below the threshold. In our setting, given the counterfactual distribution, the effective assumption imposed by the integration constraint is that there are no exits above the threshold due to the reform.

[2] We are, implicitly, assuming that the unmodified initial counterfactual distribution we estimate accurately captures the total effect of the reform on filers' decisions above the threshold: SI manipulation and proposal exit.

[3] Our approach is somewhat similar in spirit to the extensive margin estimation done in DeFusco et al. (2020), which calculates the extensive margin as the difference between the bunching mass and the missing mass for a treated group of jumbo mortgages after a reform, adjusting the pre-reform distribution of this group for time-varying factors using a group of conforming mortgages not affected by the reform. In both our paper and DeFusco et al. (2020), the extensive margin is ultimately estimated as the difference between the missing mass above the cutoff and the bunching mass below the cutoff, but we are not able to follow DeFusco et al. (2020) approach exactly because we do not have a part of the sample above and below the threshold which is not treated by the reform.

Appendix C Suggestive Evidence of Fraudulent Manipulation

An important follow-up question to identifying bunching caused by SI manipulation is whether the manipulation is fraudulent or legal. For example, when the tax literature uses bunching to identify manipulation, a common follow-up question is whether that observed manipulation is either legal (i.e., tax avoidance) or fraudulent (i.e., tax evasion). Distinguishing between legal and fraudulent manipulation is difficult because, generally, agents involved in fraudulent activities expend effort to ensure that their fraud is not observable. The bunching literature thus often exploits idiosyncratic details of the setting in order to empirically isolate contexts where fraudulent behaviour can be assumed to be more or less likely.[4] Importantly, however, this kind of context-based methodological approach to identifying fraud can, at best, provide only suggestive or circumstantial evidence of fraudulent behaviour. It is not able to provide definitive evidence of fraud. Similar to these prior studies, we develop and use a context-based approach to provide suggestive evidence that some debtor data manipulation may involve fraudulent behavior.

In this section, we first describe various institutional details in the Canadian proposal system, which we exploit in our tests to provide suggestive evidence of possible fraudulent behaviour. In particular, we focus on the role of third-party intermediaries known as Licensed Insolvency Trustees (LITs), studying how these LITs may be involved in fraudulent behavior by debtors.

C.1 The Role of Trustees in Insolvency

Under OSB regulations, Licensed Insolvency Trustees (LITs) must submit and administer every insolvency filing in Canada. Trustees are typically for-profit chartered accountants, licensed and regulated by the OSB. Trustees are "officers of the court," which means that they are legally obligated to represent the interests of both the debtor and the creditors in any insolvency filing. While the main parties to a proposal negotiation and agreement are the insolvent debtors and the creditors, the trustee as a third-party intermediary also plays an important role at various stages of the proposal process, which we describe chronologically below.

First, a debtor who is planning on filing a proposal is free to select any LIT to undertake the proposal filing. While the debtor can select any licensed trustee to undertake the filing, the debtor is required to pay the trustee for these services. Under OSB rules, the price that a trustee charges a debtor to file a proposal is highly regulated (the trustee receives 20% of the total payments received by creditors under the proposal). Because of this feature, trustees are not able to directly compete on price, but rather they are forced to use other mechanisms to increase their profits, such as market share.

[4] See Kleven (2016) for a survey. Examples of bunching-based studies that identify fraudulent behavior by exploiting context specific institutional details include Almunia and Lopez-Rodriguez (2018), who examine firms bunching below a cutoff in tax enforcement, Camacho and Conover (2011), who document "corruption" based on bunching below a threshold for social programs, and Foremny et al. (2017), who document the "deliberate manipulation" of population based grants by local governments. Kleven et al. (2011) examine bunching in the context of random tax audits, and Fack and Landais (2016) examine bunching in the context of third-party reporting of tax data.

Geography could also play an important role in debtors' choice of trustees because Canadian personal insolvency law requires debtors to conduct at least three separate face-to-face meetings with the selected trustee at the trustee's office (see Ramsay, 2001).[5] These three meetings impose non-trivial travel-related transactions costs for proposal filers.

Second, once the debtor has selected a trustee, the trustee advises the debtor on various issues, including the choice between bankruptcy and proposal, how much the reported SI affects payments to creditors, the amounts likely to be acceptable to creditors, etc. While the debtor signs the proposal filing indicating that all data provided are correct, the filing also needs to be reviewed, signed, and approved by the trustee. All trustee actions are highly regulated by the OSB, and they have to approve filings based on uniform standards that apply to all trustees. Third, after the proposal filing is approved by the trustee (and agreed to by the debtor), it is then submitted to the creditors by the trustee for their acceptance or rejection. Fourth, during the multiyear repayment period of the proposal contract, it is the duty of the trustee to monitor that the agreed-upon payments are being made by the debtor at the agreed-upon dates. If the payments are not made for three consecutive months, then the trustee declares the debtor in default on the contract and the contract is voided.

C.2 Bunching and Travel-Related Costs of Proposal Filing

In this section, we examine whether the distance that the debtor travels to their selected trustee is correlated with the bunching we observe. For debtors who have no intention of manipulating their filing, all else equal, a closer trustee is preferable to a more distant one, because trustees file identical OSB forms and charge identical fees, but more distant trustees would require additional travel costs. Therefore, debtors with no intention of fraudulent SI manipulation should select the geographically-closest trustee to minimize geographic transactions costs. While there may be other reasons for preferring a more distant trustee (e.g., cultural affinity or a shared language), these factors are unlikely to be correlated with the bunching that we observe.

However, this calculation may be different for debtors who intend to fraudulently manipulate data. Potentially fraudulent debtors would like to minimize geographic transactions costs, but would also like to locate a trustee that allows them to submit a fraudulently manipulated filing. A debtor with intent to fraudulently manipulate would thus face a trade-off between the increased costs of the fraud (in our case, increased travel costs to a more distant trustee who could aid in facilitating the fraud) and the increased benefits of the manipulation (in our case, the savings from reducing reported surplus income by fraud).

Importantly, this trade-off between the costs and benefits of manipulation may be different for fraudulent income manipulation by the debtor (e.g., misreporting income) versus legal but strategic income manipulation by the debtor (e.g., reducing hours worked or filing during periods with predictably low income). The costs

[5] Before the actual filing, the debtor must meet the trustee at the trustee's office to discuss the insolvency process. Two additional meetings, again at the trustee's office, are also required later in the process to provide mandatory credit counseling.

to a trustee of agreeing to a fraudulent filing by the debtor could include having the trustee's license revoked by the OSB or other legal action by the OSB. In other words, the possible cost to the trustee, if the fraud is detected, is high. For this reason, a debtor with fraudulent intent may have to travel further distances in order to locate a trustee who would be more likely to approve a fraudulent filing.

We argue that this trade-off is different for a debtor intent on strategic (but legal) income manipulation. This is because the cost to the trustee of approving a filing with legal income manipulation is relatively low (i.e., the trustee approving a filing with legal income manipulation cannot be legally sanctioned by the OSB). For this reason, a filer may not have to travel long distances to find and use a trustee willing to approve a legally-manipulated filing. An empirically testable implication of our argument, therefore, is that debtors with fraudulent intent are more willing to incur larger travel-related transactions costs in order to locate trustees who are more likely to approve a fraudulent filing.

To test our hypothesis, we examine the relationship between travel costs of filers and bunching below the $200 SI threshold. Because we observe the exact geographic location of every insolvency filer and every insolvency trustee, we can calculate the "excess distance" that a filer travels to their selected trustee as the additional kilometers traveled by the filer to their selected trustee compared with the average distance to their closest trustees. Using this measure of excess distance traveled to the selected trustee, we examine whether those debtors who travel excess distances to access more distant trustees (despite nearby trustees available to them) have a larger bunching magnitude below the cutoff after the reform compared with filers who do not travel these excess distances.

C.2.1 Measuring Distance between Filers and Trustees

We build our measure of travel-related filer transactions costs based on geographic locations of filers and trustees. We observe the postal code of all filers and trustees in Canada. Extracting the postal code for filers, we measure the travel distance between a filer and a trustee as the road distance between the centroids of their postal codes. As Canadian postal codes are extremely small geographic units, containing approximately 13 households, on average, the distances we calculate are generally quite precise. Our measure of travel distance uses the Google Maps API, which gives us the travel distance by car for Google Maps's suggested road route between two points. These travel distances based on Google Maps-suggested routes are longer than direct, as-the-crow-flies distances between two points.[6]

We measure travel-related transactions costs as the difference between the filer's distance to their selected trustee and the filer's average distance to their three closest trustees. To remove outliers, in building this measure, we exclude any filings where the distance from the filer to her selected trustee is more than 200 kilometers. We also remove filings where the trustee has not approved at least 5 filings in the last three years to reduce noise in our distance measures.

We construct a relative distance measure to estimate travel-related transactions costs. We calculate this

[6] As a robustness check we also examine direct, as-the-crow-flies distances, but our results are quantitatively similar.

measure as the actual travel distance to the chosen trustee divided by the average distance to the three closest trustees, indicating how many times farther than necessary the filer chooses to travel to work with her selected trustee.

The top panel of Table A2 reports summary statistics for filer-trustee distances and the travel-related transactions costs measures (based on road routes). The median distance between a filer and the three closest trustees is 4.9 km, whereas the median distance between a filer and her selected trustee is 17.5 km. The median travel-related transactions cost in multiples of average distance to the three closest trustees is 2.3.

C.2.2 Bunching in Surplus Income and Travel-Related Transactions Costs

In this subsection, we test the hypothesis that proposal filers who incur greater travel-related transactions costs are more likely to bunch below the $200 SI threshold. In particular, we estimate bunching magnitudes in various subsamples based on the travel distance to the selected trustee in excess of the average distance to the three closest trustees. In Figures A6(a) and A6(b), we present our bunching magnitude estimates for filings after the policy change across two samples: filings where debtors travel less than 130% of the minimum distance (the "Nearby Trustees" sample) and filings where they travel more than 130% of the minimum distance (the "Distant Trustees" sample). As the figures depict, there is clearly more bunching below the $200 SI cutoff in the Distant Trustees sample (Figure A6(b)).[7]

This visual analysis is corroborated by comparing the estimated bunching magnitude for the Nearby Trustees and the Distant Trustees samples. This magnitude is equal to 6.5% for the Nearby Trustees sample and 8.8% for the Distant Trustees sample (see Figures A6(a) and (b)). These results imply that there is approximately 35% more bunching in the Distant Trustees sample relative to the Nearby Trustees sample.

To more rigorously compare the two bunching magnitude distributions, we use bootstrapping methods. First, for each group, we run the Chetty et al. (2011) bunching estimation procedure on 1,000 subsamples drawn (with replacement) from the group. This provides us with 1,000 estimates of the bunching magnitude for the group. Then, we compare the Nearby and Distant Trustee filing groups' bunching magnitudes in two ways: plotting the distributions of their estimated bunching magnitudes and performing a two-sample t-test to compare the means of the distributions.

Before detailing the findings of bootstrapping analysis, we should note that these statistical tests compare the statistical differences between distributions of estimated figures. The bunching magnitudes calculated 1,000 times for each group are based on the excess mass in the exclusion region compared to a fitted polynomial, which is almost surely different for each group of filings (and likely slightly different for each draw within a group, as well). As we do not assert that the underlying population distribution of proposal filings should be identical across the groups, comparing bunching estimates using different counterfactual densities is not a problem for us. We use these bootstrapped distributions merely to compare the estimated

[7] We also assess bunching magnitude based on travel distance for other cutoffs and find similar results (see Figure A8).

level of bunching between groups.

We present the bunching magnitude estimate distributions for the Nearby and Distant Trustee groups in Figure A7(a). Clearly, the filings using more distant trustees exhibit higher levels of bunching. Moreover, our t-test shows that the mean of the Distant Trustee group is 2.3 percentage points higher than the mean of the Nearby Trustee group and this difference is highly statistically significant (t-statistic of 29.8).

To further test whether excess distances traveled to the chosen trustee are correlated with bunching magnitude, we split the sample of post-reform filings into four equal groups (quartiles) based on the distance traveled in excess of the average distance to the three closest trustees.[8] Figure A8 visually presents the bunching magnitudes and their 95% confidence intervals for each quartile. This figure shows that the bunching magnitude, $\hat{b}_n$, increases monotonically from the bottom quartile, where it is around 4.3%, to the top quartile, where it is 9.7%. Along with the previous findings, this very substantial increase in the bunching magnitude between the first and fourth quartiles, as well as the monotonic increase across the four quartiles, corroborates our hypothesis that debtors who travel excess distances to their chosen trustee are more likely to bunch below the $200 SI threshold.[9]

C.3 Measuring Trustee Leniency using Rounding in Proposals

In Section C.2, we examine the relationship between excess distance traveled to the selected trustee and bunching as a suggestive indicator of fraudulent data manipulation by the debtor. In this section, we examine the relationship between trustee "leniency" and bunching magnitude. There may exist more "lenient" trustees, who are more likely to submit fraudulently manipulated proposals on behalf of a debtor. We measure trustee leniency as the prevalence of round numbers in proposals (e.g., reporting numbers in the multiples of $100) for all filings submitted by that trustee in the past. We can calculate this trustee-level measure using an anonymized identifier of the trustee, which we observe for all proposal filings submitted to the OSB.

Our motivation for using round numbers as an indicator of trustee leniency is that more round numbers in a filing is consistent with less precision and diligence or willful ignorance on the part of the trustee. The American Institute of Certified Public Accountants (AICPA), for example, includes round numbers as a possible indicator of fraud.[10]

While rounding has the advantage of being observable to us, it is a relatively weak measure of fraudulent data manipulation. First, approval of filings with round numbers by financially sophisticated trustees may result from either low effort (i.e., shirking) or data manipulation. Second, sophisticated filers may have other

[8] We use quartiles in this section instead of octiles (as in the next section) because the excess distance measure is noisy, and splitting the distribution into smaller groups introduces noise in our bunching magnitude estimation.

[9] We also compare the bunching magnitude in the sample of filers choosing the closest trustee versus filers working with not the closest trustee and find more bunching in the second sample.

[10] In its statement on auditing standards regarding *Consideration of Fraud in a Financial Statement Audit* (AU-C Section 240), the AICPA states that fraudulent financial statements "include entries ... containing round numbers. See `https://us.aicpa.org/content/dam/aicpa/research/standards/auditattest/downloadabledocuments/au-c-00240.pdf`.

(better) ways to fraudulently manipulate data than data rounding, that may be easier to get approved by a trustee. Third, it is possible that a trustee could round numbers to the benefit of creditors (i.e., increase SI to above the cutoff), rather than to the benefit of debtors (i.e., reduce SI to below the cutoff). Analyzing filings with round numbers is thus, at best, an imperfect measure of trustee leniency in our setting, but it is the best measure available to us. It is worth noting that these measurement issues work against us finding evidence of fraud using round numbers. Therefore, any evidence of fraud we find with trustee leniency based on round numbers would arise despite these measurement issues.

C.3.1 Measuring Trustee Leniency with Rounding in Proposal Filings

We calculate our rounding measure directly from the values provided by filers about their financial condition in their filings. Recall that each filing includes data on the complete balance sheet and income statement of the insolvent debtor on the date of the filing. Our rounding measure is the proportion of a filing's numerical entries over \$100 that are rounded to the hundreds place, focusing on entries detailing the filer's assets and liabilities.[11] The precise formula we employ for calculating our rounding measure is:

$$\%RN_i = \frac{\sum_{k \in \text{A\&L vars}} \mathbb{1}\{val_{i,k} \bmod 100 = 0\}}{\sum_k \mathbb{1}\{val_{i,k} > 100\}}, \tag{2}$$

where $val_{i,k}$ is the value of financial variable k in filing i.

In our rounding measure, we focus on filing entries detailing assets and liabilities. The other numerical entries in filings detail filer income and non-discretionary expenses. We omit these two categories of entries from our measure to exclude any possibilities of a mechanical relationship between our rounding measure and SI, as SI is calculated based on reported income and non-discretionary expenses. We construct an alternate measure of historical trustee rounding using all financial filing entries and find qualitatively similar results.

As our interest here focuses on the past approvals of round number filings by trustees, we aggregate this filing-level $\%RN$ variable to the trustee-year level as well. The aggregation assigns to a trustee in a given year the rolling average of the last three years of $\%RN$ for all filings approved by that trustee. We drop a trustee-year observation if the number of filings approved by the trustee in the past three years is below 40, as the average of a small number of filings may not convey reliable information on the trustee's leniency.[12]

We present summary statistics on our rounding measure in Table A2. On average, 45% of financial data reported in a filing is rounded. There is a slight increase to 47% in rounding levels if we omit income and non-discretionary data; 75% of filings report round numbers in two-thirds or less of their financial data. Aggregating to the trustee-year level as described above collapses the distribution substantially, with the 75th percentile dropping to 55% for the aggregated measure, but it does not significantly alter the mean.

[11] We provide a full list of the data variables we use in Table A1.

[12] The 40 filing cutoff is at the 5th percentile of the trustee filing count distribution.

C.3.2 Bunching Debtors Selecting Historically Lenient Trustees

In this section, we assess whether debtors who use historically lenient trustees exhibit a greater tendency to bunch below the $200 SI threshold. One possible interpretation of bunching debtors selecting historically lenient trustees is that the debtor has an intention to fraudulently manipulate income data.

In Figure A9, we present the results of our bunching magnitude estimations for filings approved by more and less historically lenient trustees after the policy change. Figure A9(a) focuses on filings approved by trustees whose aggregated historic $\%RN$ is below the 90th percentile, and Figure A9(b) focuses on filings approved by trustees with aggregated $\%RN$ above the 90th percentile.[13] The two figures show that the bunching of filings below the $200 SI threshold among more lenient trustees is much larger than this bunching among less lenient trustees. Our estimate of bunching magnitude, $\hat{b}_n$, is nearly twice as large for filings approved by more lenient trustees than less lenient trustees (11.0% versus 6.9%).

We statistically compare the bunching estimates for the two subsamples using the bootstrapping method explained in Appendix Section C.2. Figure A7(b) shows the bunching magnitude distributions of filings with historically lenient and strict trustees. Visual inspection confirms that these distributions are quite distinct. Furthermore, our t-tests comparing the bootstrapped distributions confirm a 4.1 percentage point greater bunching magnitude for filings with lenient trustees and that this difference is highly statistically significant (t-statistic of 41.7).

When we split post-reform filings into equal octiles based on historical trustee leniency and estimate the bunching magnitude for each octile, we find similar results. Figure A10 visually presents the bunching magnitudes for each octile. As we can see in the figure, the level of bunching magnitude, $\hat{b}_n$, gradually increases from the bottom octile, where it is just above 5%, to the top octile, where it is approximately 12%. The more historically lenient a trustee is known to be, the more bunching we observe below the $200 SI threshold. This result further confirms that debtors who fraudulently manipulate data are more likely to work with historically lenient trustees, likely to improve the chances of having their filings approved.

C.4 Trustee Leniency and Market Share

We next consider why some trustees may choose to be more lenient. As described in Section C.1, the consumer insolvency process is heavily regulated and, in particular, trustees cannot adjust the fees they charge proposal filers to verify and approve their filings. As a result, these for-profit trustees cannot compete with each other on price. Leniency in filing approval may offer an alternative way for them to attract filers and increase their market share, though it comes at a potential cost of losing their license. In this section, therefore, we examine whether historical (pre-reform) trustee leniency has any effect on their future market share.

[13] Our results are robust to using 50th and 75th percentile as cutoffs. We also assess bunching magnitude based on trustee leniency octiles and find consistent results (see Figure A10).

Before presenting the results of our examination, we confirm that historical trustee leniency implies future leniency. Without this feature of trustees, fraudulent filers cannot choose lenient trustees based on their past behavior. To confirm this hypothesis, we examine the average current-year $\%RN$ value for octiles of filings based on historical trustee leniency. In Figure A11, we present our findings. Filings are split into octiles based on the historical leniency of their chosen trustees. The figure shows that the bottom octile has the lowest levels of current-year rounding levels in filing data (around 30%) and this rounding level increases monotonically over the octiles, reaching 65% for the top octile. With this result, we establish the persistence of trustee leniency.

To test whether trustee leniency has any effect on trustees' market share, we compare trustee market share across trustees with various levels of leniency. In Figure A12, we plot market share over time, for more and less lenient trustees, with a vertical line marking the September 2009 policy change. Figure A12(a) compares the number of filings for more and less lenient trustees, based on whether the trustee was above or below the 90th percentile cutoff for historical leniency in August 2009. The figure indicates that more lenient trustees have relatively lower market share prior to the policy change, but seem to gain market share afterward.

Given these patterns in the raw data, we then perform a more formal test of the hypothesis that the policy change caused an increase in the market share of more lenient trustees. Figure A12(b) shows estimates of the difference between the market share of the more and less lenient trustees in each quarter using an event study difference-in-difference specification, absorbing trustee fixed effects and using heteroskedasticity-robust standard errors. It shows an increase in the market share of more lenient trustees immediately following the policy change and no subsequent reversal later in the period. These findings suggest that the trustees who choose to be more lenient increase their market share, which may explain why they take on the potential cost of license revocation by being more lenient.

C.5 Correlation between Trustee Leniency and Excess Travel Distance

In Sections C.2 and C.3, we provide evidence that two methods of detecting fraudulent filers among bunchers (distance to the trustee and historical rounding by the trustee) are both correlated with bunching below the $200 SI threshold. In this section, we examine whether the two indicators are correlated, ignoring bunching. Correlation between these two measures would suggest that we are identifying significantly overlapping filers, which lends weight to our argument that our measures are identifying filers who are fraudulently manipulating their data. Figures A13(a) and (b) show that both the historical leniency of the trustee and the prevalence of round numbers in proposal figures are significantly higher for filers who choose trustees who operate farther from them. Figure A13(a) shows historical trustee leniency gradually increases when we vary the distance traveled by the filer to the chosen trustee (in excess of the distance to the three closest trustees). Figure A13(b) shows similarly greater prevalence of round numbers in proposal figures for filers who travel greater excess distances to their chosen trustees. These results are consistent with the argument

that filers who fraudulently manipulate data choose to travel excess distances to work with trustees who are more lenient and, therefore, more likely to approve and submit fraudulently-manipulated proposal filings.

Appendix Tables and Figures

Table A1: Description of variables used in this study

Variable name	Definition
total asset	total value of cash, furniture, personal effects, cash-surrender value of life insurance, securities, real property or immovable, motor vehicle, recreation equipment, tax refund, other assets.
unsecured debt	total value of unsecured debt of real property or immovable mortgage, bank loans, finance company loans, credit cards, taxes, student loans, loans from individuals, and others.
secured debt	total value of secured debt of real property or immovable mortgage, bank loans, finance company loans, credit cards, taxes, student loans, loans from individuals, and others.
non-discretionary spending	total value of child support expense, spousal support expense, child care, medical expenses, fines and penalties, employment expense, debts and some other expense.
discretionary spending	total value of house utility expense, personal expense, medical expense, insurance expense and some other expense.
home equity	value of real property (house) minus principle mortgage amount.
available family income	total household income of net employment income, pension, child-support income, spousal support income, insurance benefit, social assistance, self-employment income and others.
reasons for financial difficulty	marital breakdown, unemployment, insufficient income, business failure, health concerns, accidents, overuse of credit, student loans, gambling, tax liabilities, loans cosigning, poor investments, garnishee, legal actions, moving relocation, substance abuse, supporting relatives.
planned payment amount	total planned required repayment amount including monthly installment and lump sum pay.
planned payout ratio	total planned repayment amount over unsecured debt.
maturity	number of months between the planned completion date and the consumer proposal filing date.

Table A1 – continued from previous page

Variable name	Definition
monthly payment	monthly required repayment amount if the payment schedule is monthly installment.
actual payment amount	total actual required repayment amount including monthly installment and lump sum pay.
actual to planned payout ratio	total actual repayment amount over total planned repayment amount.
% of rounding numbers (assets, debt)	percentage of variables whose value is a multiple of 100 from the categories of asset, secured debt and unsecured debt.
% of rounding numbers (all)	percentage of variables whose value is a multiple of 100 from the categories of assets, secured debt, unsecured debt, income and nondiscretionary expense.
trustee % of rounding numbers (assets, debt)	average % of rounding numbers (in assets, debt) of all the proposal filings submitted by the trustee in the past three years.
trustee % of rounding numbers (all)	average % of rounding numbers (in assets, secured debt, unsecured debt, income and nondiscretionary expense) of all the proposal filings submitted by the trustee in the past three years.
distance to the trustee	road-based travel distance (based on Google maps) between the trustee postal code and the filer's residential address postal code.
distance to the nearest 3 trustees	average road travel distance to the nearest 3 available trustees from the filer's residential address.
searching cost (multiple)	distance to the chosen trustee divided by the distance to the nearest 3 trustees.
full payment	the proposal required repayment is paid in full according to the consumer proposal payment schedule.
default	the proposal filer fails to pay back consumer proposal debt according to the payment schedule in 3 consecutive months.
amendment and full payment	the consumer proposal is renegotiated and the proposal repayment is paid in full according to the new consumer proposal payment schedule.
rejection	the consumer proposal is rejected by the creditors.
withdraw	the consumer proposal is withdrawn by the debtor before approval.

Table A1 – continued from previous page

Variable name	Definition
amendment and default	the consumer proposal is renegotiated and the proposal filer fails to pay back consumer proposal debt according to the new payment schedule in 3 consecutive months.

Table A2: Summary Statistics

This table reports summary statistics for proposal filings from 2006 to 30 June 2019. It summarizes trustee-related details of a proposal, including travel distances between proposal filers and trustees and trustee leniency based on round number prevalence. We present five summary statistics: number of observations, mean, standard deviation, 25th percentile, median, and 75th percentile. Detailed definitions of all variables are available in Table A1.

	Obs	Mean	25th %ile	Median	75th %ile	Std Dev
Travel distance and search costs						
Travel distance to chosen trustee (km)	441,826	33.1	6.9	17.5	41.2	40.2
Travel distance to nearest 3 trustees (km)	446,112	12.5	2.9	4.9	11.4	21.8
Search cost (multiple)	441,826	6.5	1.2	2.3	5.9	14.0
Trustee leniency						
% of numbers rounded (asset & debt values)	478,053	0.47	0.25	0.43	0.67	0.27
% of numbers rounded (all)	478,053	0.45	0.25	0.42	0.62	0.25
Trustee % of numbers rounded (asset & debt values)	407,261	0.48	0.39	0.46	0.55	0.12
Trustee % of numbers rounded (all)	407,261	0.45	0.37	0.44	0.52	0.11

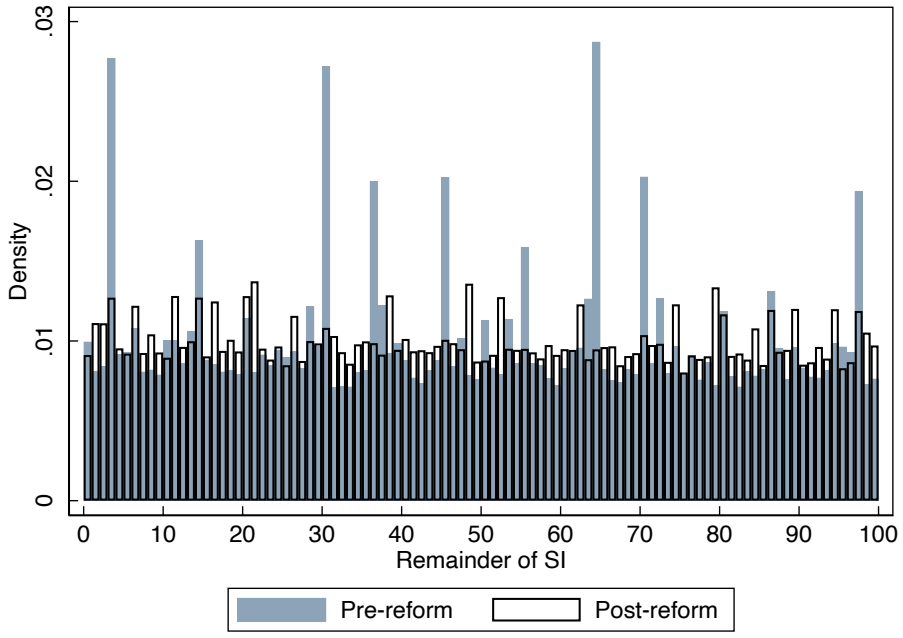
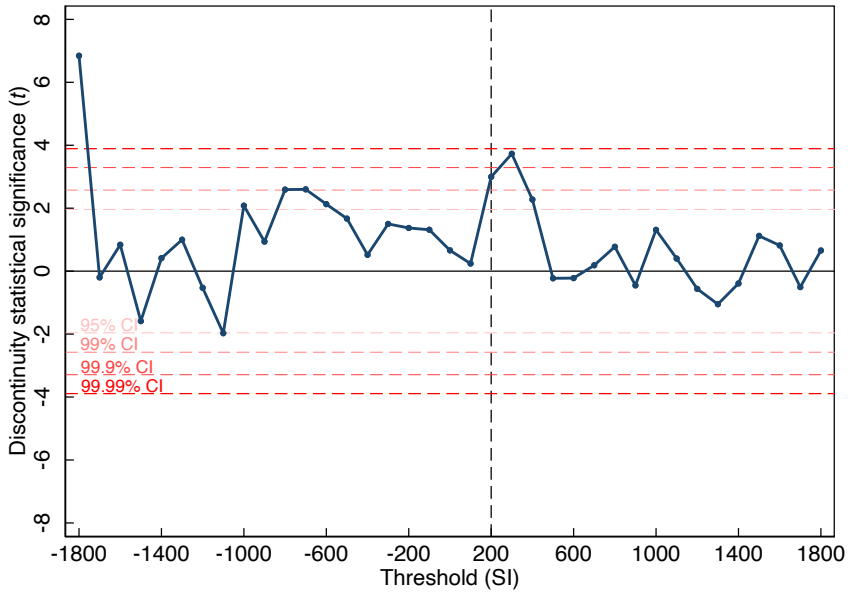
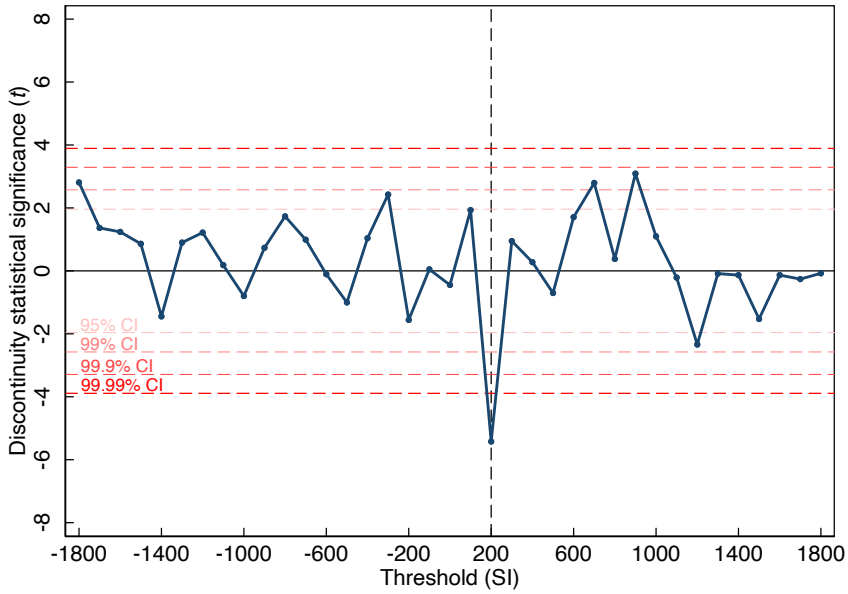


Figure A1: Distribution of SI mod 100

This figure plots the distribution of the remainder when SI is divided by 100 for the pre- and the post-reform periods. The remainder is calculated as: Remainder of SI = SI mod 100. All proposal filings are used to calculate this remainder.

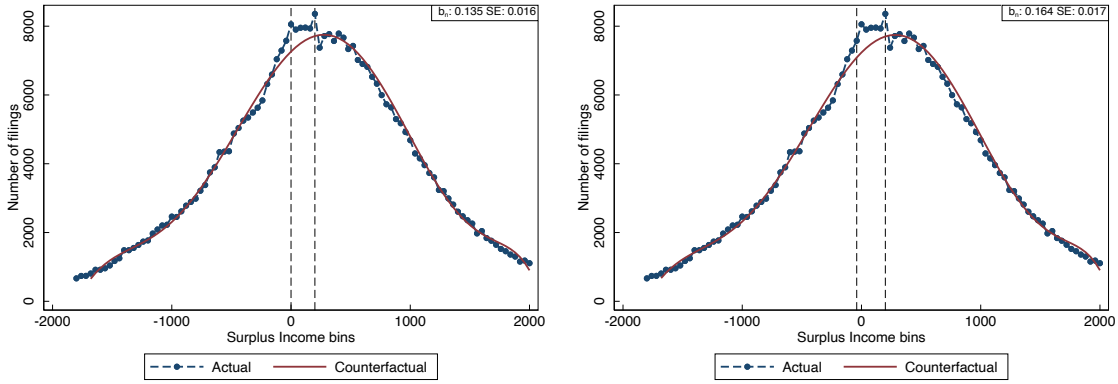


(a) Pre-Reform



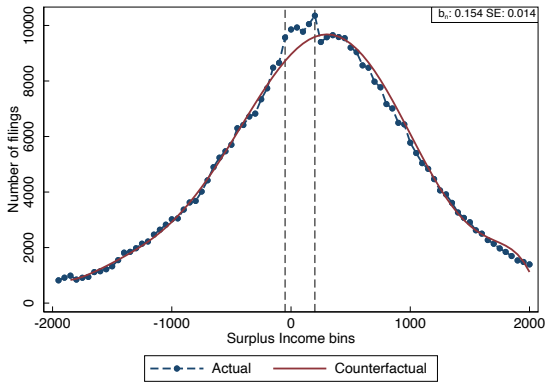
(b) Post-Reform

Figure A2: Placebo Tests for Discontinuity at Pseudo Thresholds
This figure shows the statistical significance levels (t-statistic) for Cattaneo et al. (2020) discontinuity tests at hundred-dollar Surplus Income (SI) thresholds from -$1,800 to $1,800. To maintain consistency across all tests, proposal filings with SI within $600 of each pseudo threshold are included in each test (the results are similar for other ranges). In panel (a), the discontinuity tests are performed on pre-reform filings. In panel (b), the discontinuity tests are performed on post-reform filings. The red dashed horizontal lines indicate statistical significance levels: 95%, 99%, 99.9%, and 99.99%.

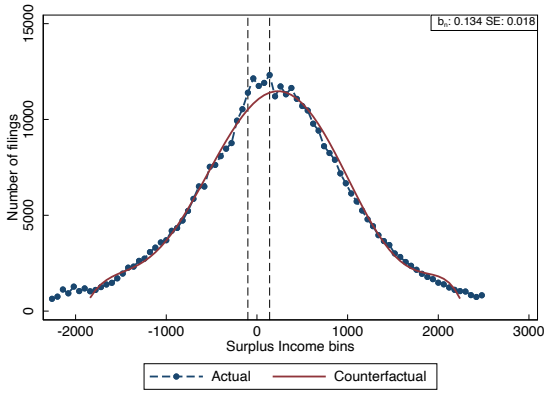


(a) Bin size: \$40, exclusion region: (-40,200)

(b) Bin size: \$40, exclusion region: (-80,200)



(c) Bin size: \$50, exclusion region: (-100,200)



(d) Bin size: \$60, exclusion region: (-100,200)

Figure A3: Bunching Magnitude Estimation Based on Alternative Bin Sizes
This figure replicates Figure 6 in the main text with different bin sizes and exclusion regions. The panel captions indicate the change in estimation methods relative to Figure 6.

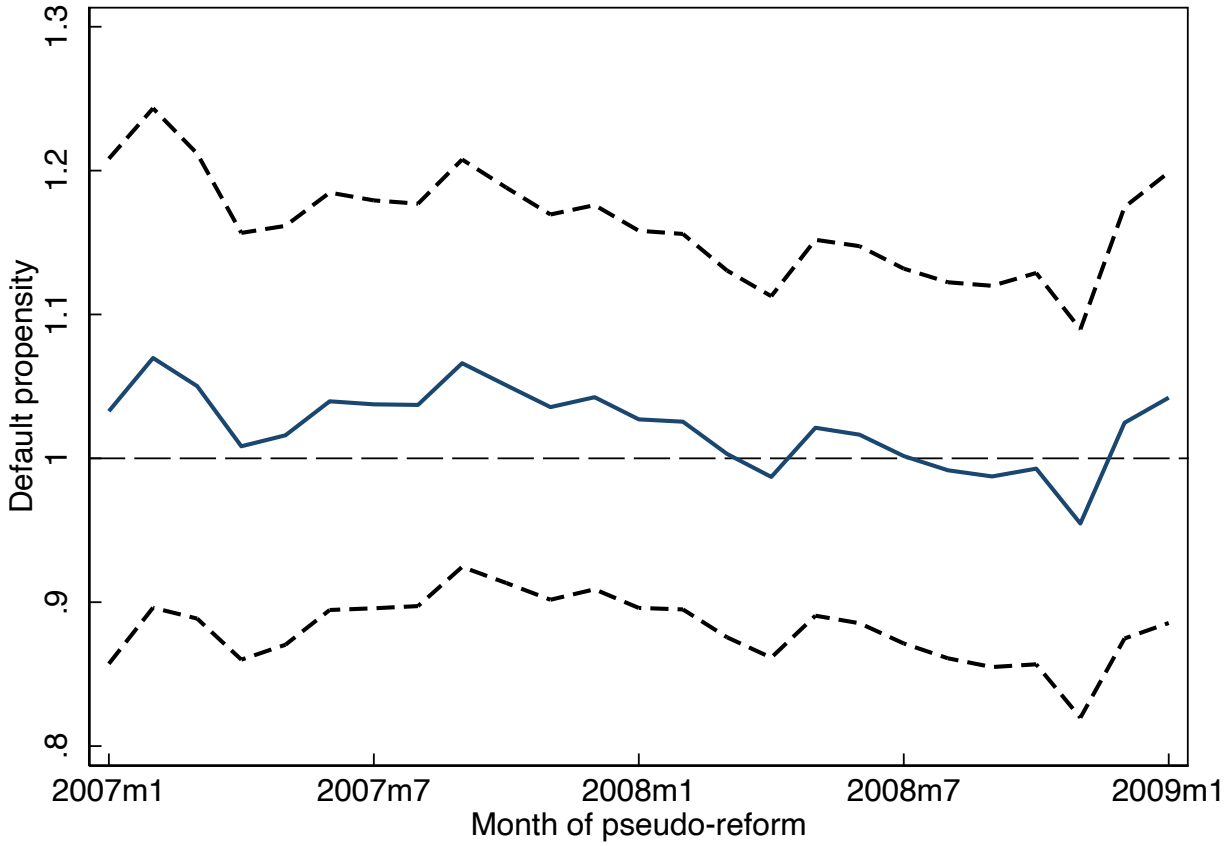


Figure A4: Pseudo Regulation Change Dates and Proposal Default

This figure reports the odds ratio and 95% confidence intervals for the effect of the policy change on proposal default (Below $200 MZ × Post) using the same regression employed for Table 4, column (1), in the paper but for placebo policy change dates. In place of using the actual policy change date, we use each month from January 2007 to December 2008 as a placebo reform date. The x-axis shows the placebo policy change dates. On the y-axis, the estimates of the effect of the placebo policy changes on default and the 95% confidence interval for the estimates are reported as odds ratios.

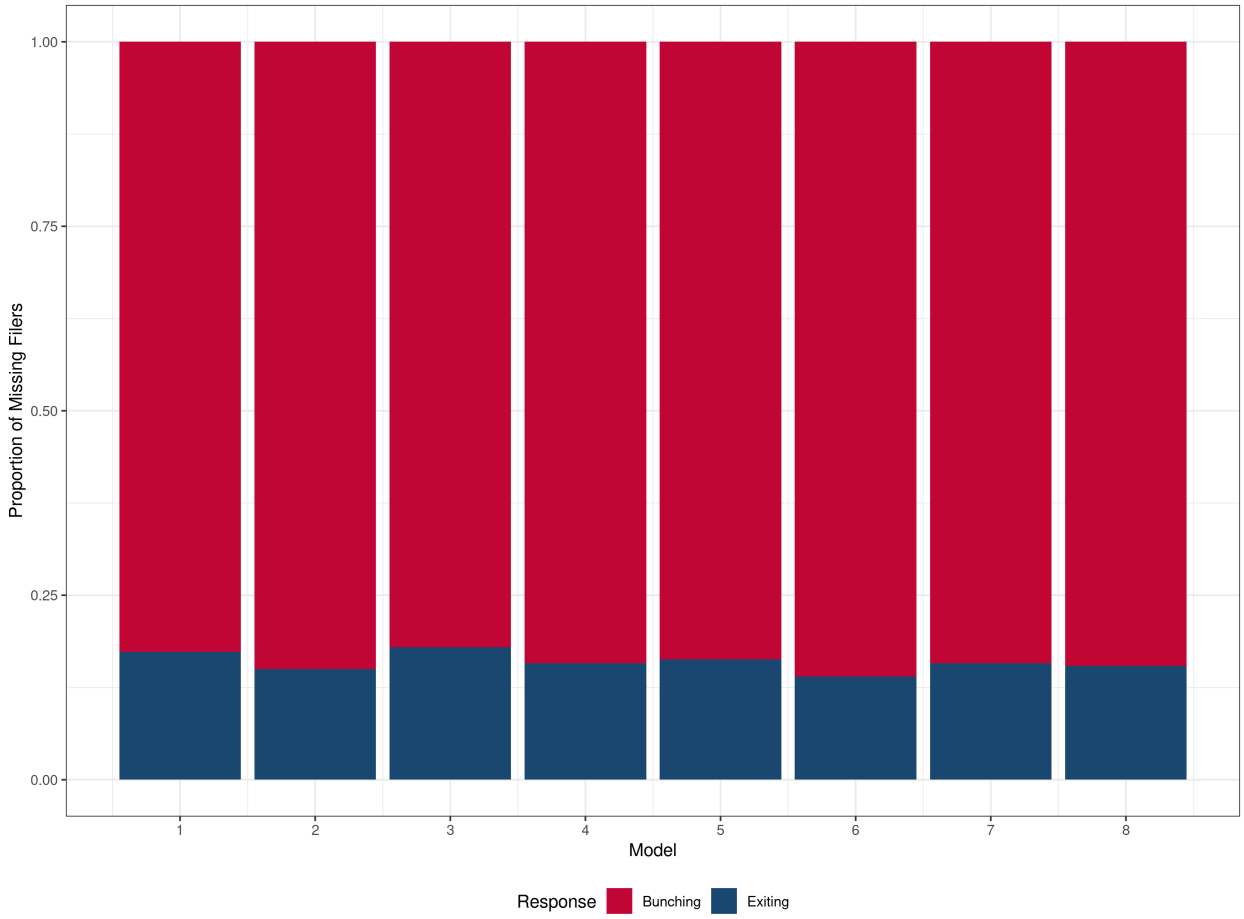
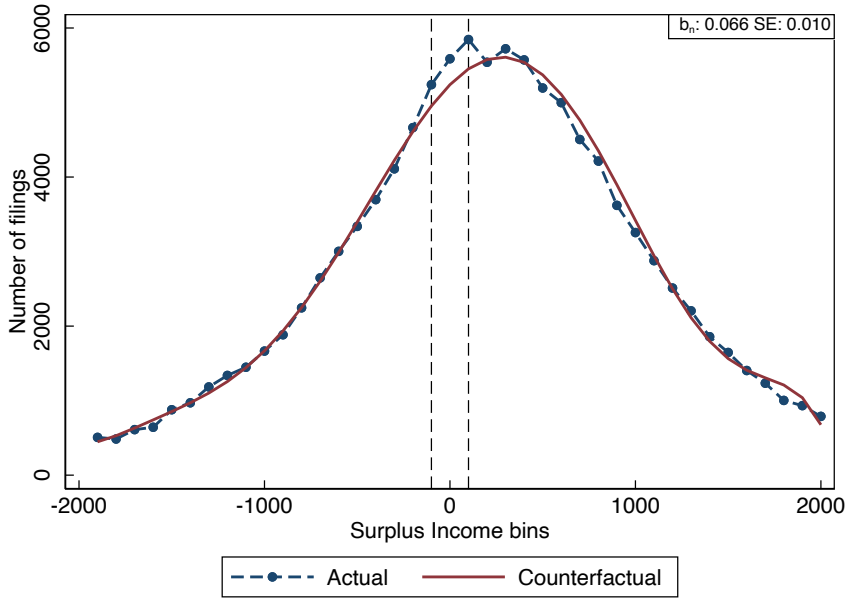
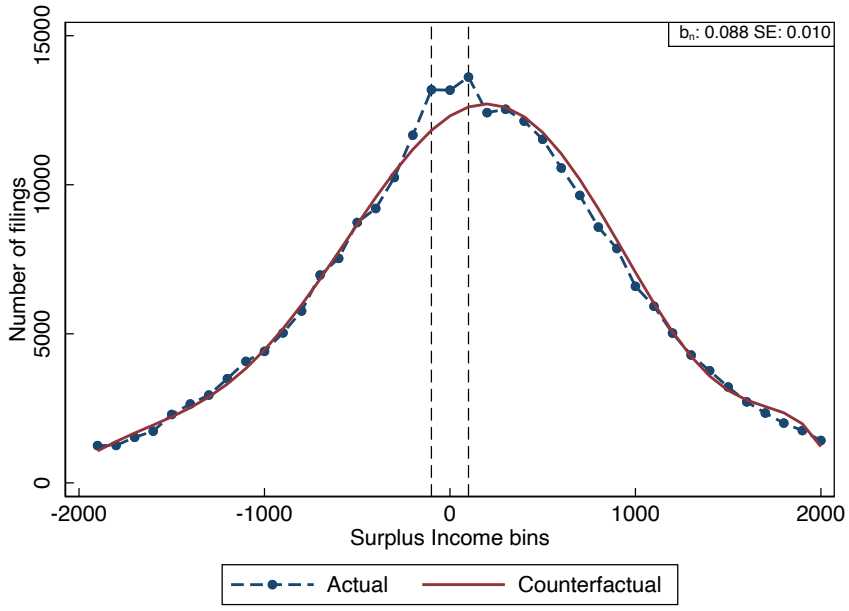


Figure A5: Estimated Proposal Exits above $200 SI Threshold because of Reform
This figure plots estimates of the proportion of potential proposal filers with true Surplus Incomes (SIs) above the $200 threshold (in particular, between $200 and $2,000) who respond to the 2009 introduction of the threshold at $200 by strategically manipulating their income downward ("Bunching") and those who respond by not filing a proposal ("Exiting"). The estimates are based on the empirical exercise detailed in Section B, in which the integration constraint of the Chetty et al. (2011) bunching methodology is exploited to calculate the proportion of exiters and bunchers. The estimates are calculated using all post-reform proposal filings. The eight estimates provided in the figure correspond to the eight bunching models estimated in Table 2 of the paper.



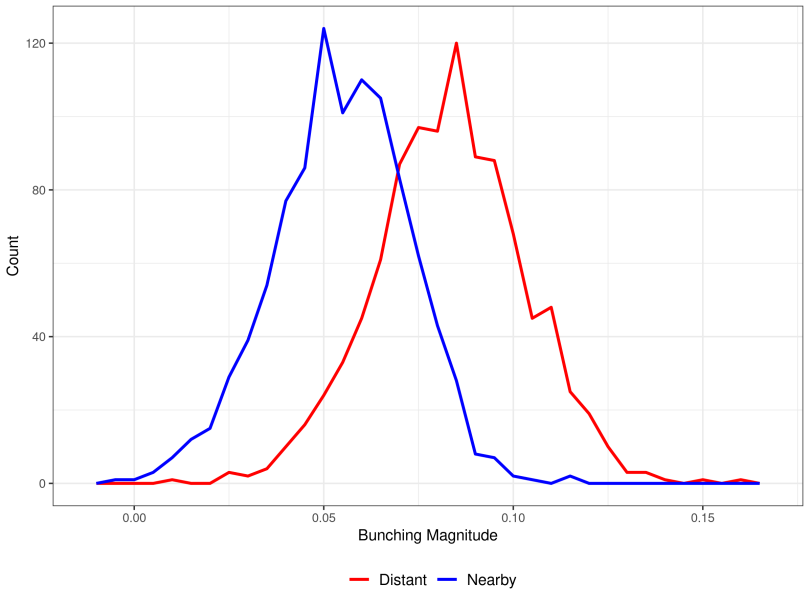
(a) Nearby Trustees



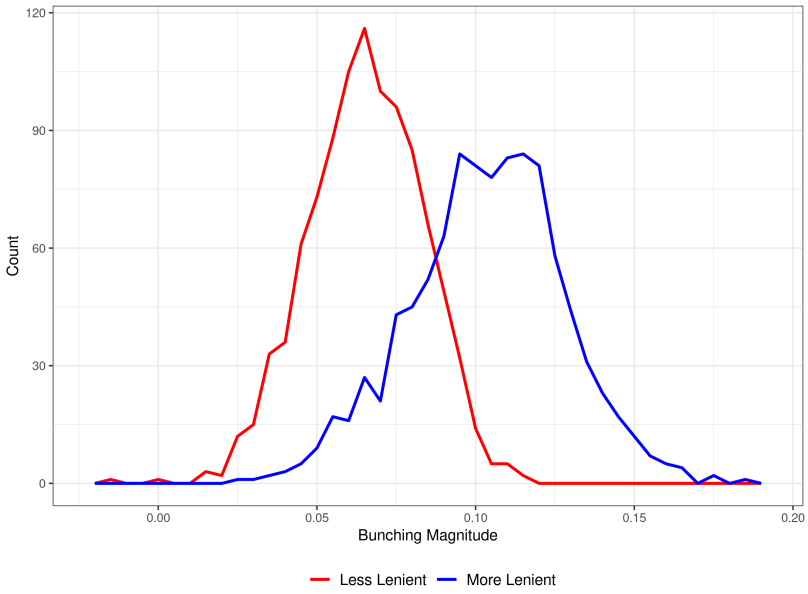
(b) Distant Trustees

Figure A6: Bunching Magnitude by Travel-Related Transactions Costs

This figure shows the estimates of bunching magnitude for subsamples based on filers' travel-related transaction costs, as measured by the excess travel distance between filers and their chosen trustee as a multiple of the average travel distance to the three nearest trustees. Panel (a) shows the bunching magnitude for filers who travel excess distances of less than 1.3 times the average travel distance to the three closest trustees, i.e., employ nearby trustees and panel (b) shows bunching magnitude for filers who travel excess distances of more than 1.3 times that threshold, i.e., employ distant trustees. As in all our primary bunching analysis, the bunching magnitude is calculated using \$100 Surplus Income (SI) bins and a 7th degree polynomial to model the counterfactual distribution. The estimated bunching magnitude, b_n, and its standard error are reported in the upper right box.



(a) Distant vs. Nearby Trustees



(b) Less vs. More Lenient Trustees

Figure A7: Bunching Magnitude Comparison

These figures present the distributions of bootstrapped estimates of the bunching magnitude, following the method detailed in Appendix C.2. Panel (a) shows the distribution of bootstrapped bunching estimates for populations of proposal filings with distant and nearby trustees in red and blue, respectively. Distant trustees are defined as trustees located 1.3 times farther from the filer than the average travel distance to the three trustees closest to the filer and nearby trustees are trustees located closer than the same threshold. Panel (b) plots the distribution of bootstrapped bunching estimates for populations of proposal filings with less and more lenient trustees in red and blue, respectively. Less lenient trustees are defined as trustees in the bottom 90 percent of trustees by three-year historic leniency and more lenient trustees are trustees in the top 10 percent. All post-reform proposal filings are used in the bunching magnitude estimation procedure.

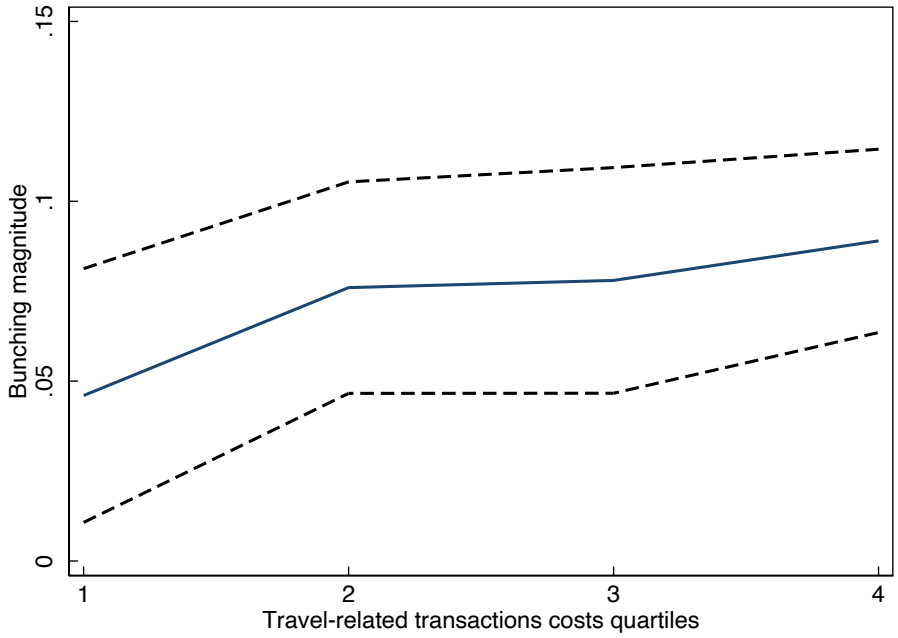
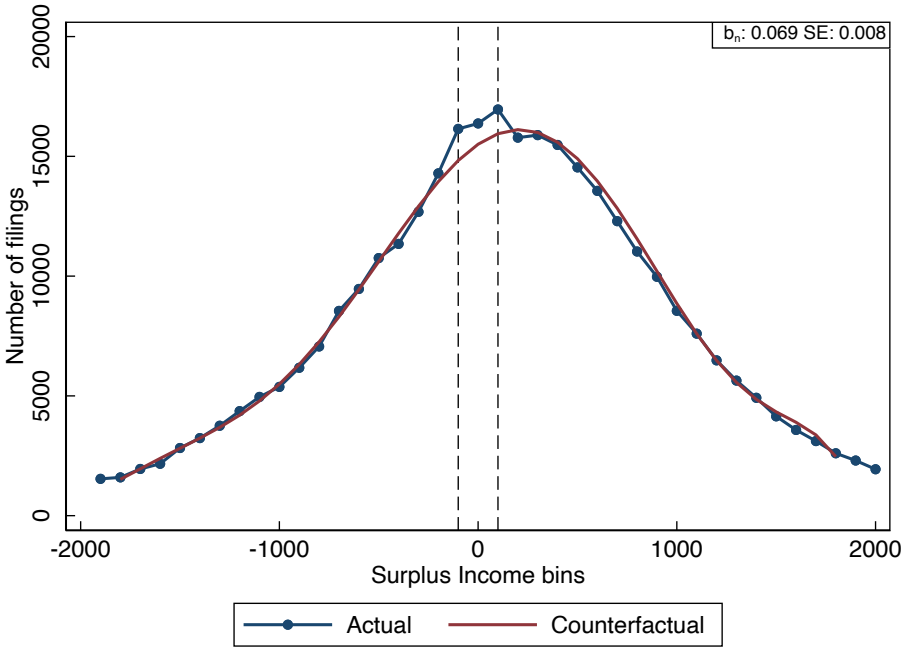
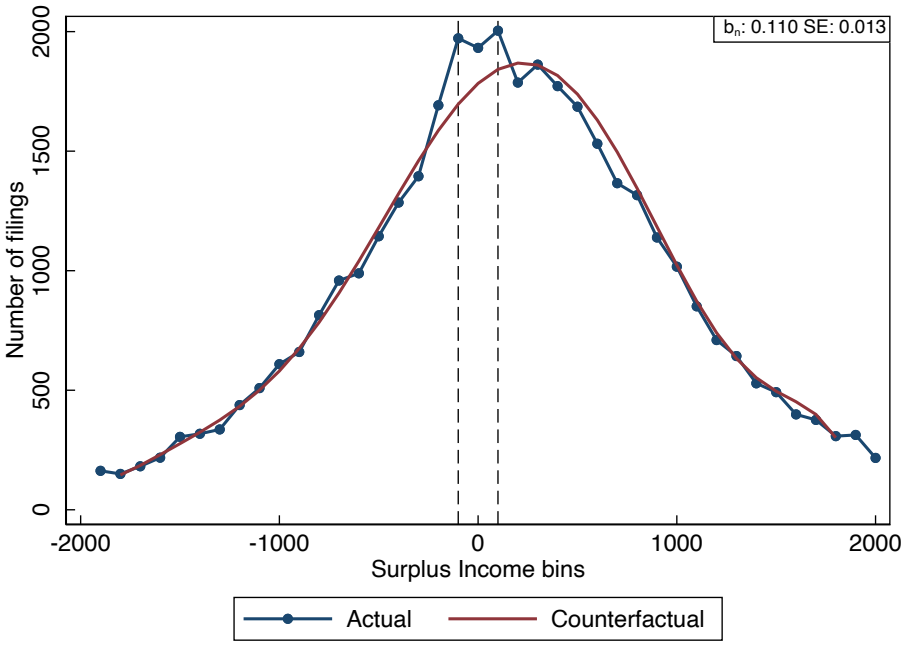


Figure A8: Bunching Magnitude over Search Cost Distribution

This figure plots the bunching magnitude estimate across the travel-related transactions costs distribution, where transactions costs are based on the excess travel distance between a proposal filer and their chosen trustee (see Section C.2 for details). All proposal filings in the post-reform period are divided into quartiles, from the lowest transactions costs (least excess travel distance) trustees (bottom quartile) to the highest transactions costs (greatest excess travel distance) trustees (top quartile). The solid line shows the bunching magnitude estimates for each quartile and the dashed lines represent the 95% confidence interval of the estimates. As in all our primary bunching analysis, the bunching magnitude is calculated using $100 Surplus Income (SI) bins and a 7th degree polynomial to model the counterfactual distribution.



(a) Less Lenient Trustees (below 90th percentile)



(b) More Lenient Trustees (above 90th percentile)

Figure A9: Bunching Magnitude by Trustee Leniency

This figure shows the bunching magnitude estimates for subsamples based on trustee leniency levels, as measured by round number prevalence in trustees' approved proposals in the last three years (see Section C.3). Panel (a) shows the bunching magnitude for trustees in the bottom 90% based on trustee leniency and panel (b) shows the bunching magnitude for trustees in the top 10% based on trustee leniency. As in all our primary bunching analysis, the bunching magnitude is calculated using \$100 Surplus Income (SI) bins and a 7th degree polynomial to model the counterfactual distribution. The estimated bunching magnitude, b_n, and its standard error are reported in the upper right box.

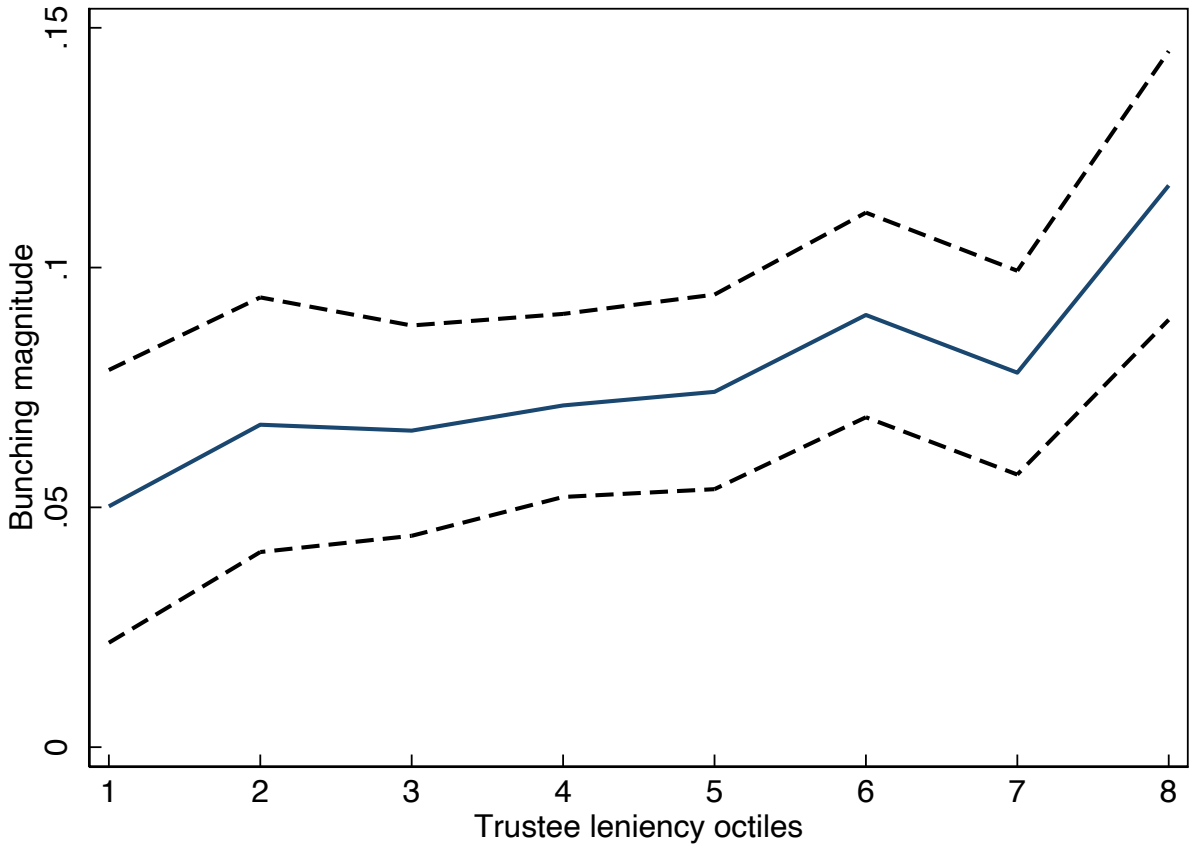


Figure A10: Bunching Magnitude over Trustee Leniency Distribution

This figure plots the bunching magnitude estimates across the trustee leniency distribution, where trustee leniency is measured by round number prevalence in trustees' approved proposals in the last three years (see Section C.3 for details). All proposal filings in the post-reform period are divided into octiles, from the least lenient trustees (bottom octile) to the most lenient trustees (top octile). The solid line shows the bunching magnitude estimates and the dashed lines represent the 95% confidence intervals for the estimates. As in all our primary bunching analysis, the bunching magnitude is calculated using $100 Surplus Income (SI) bins and a 7th degree polynomial to model the counterfactual distribution.

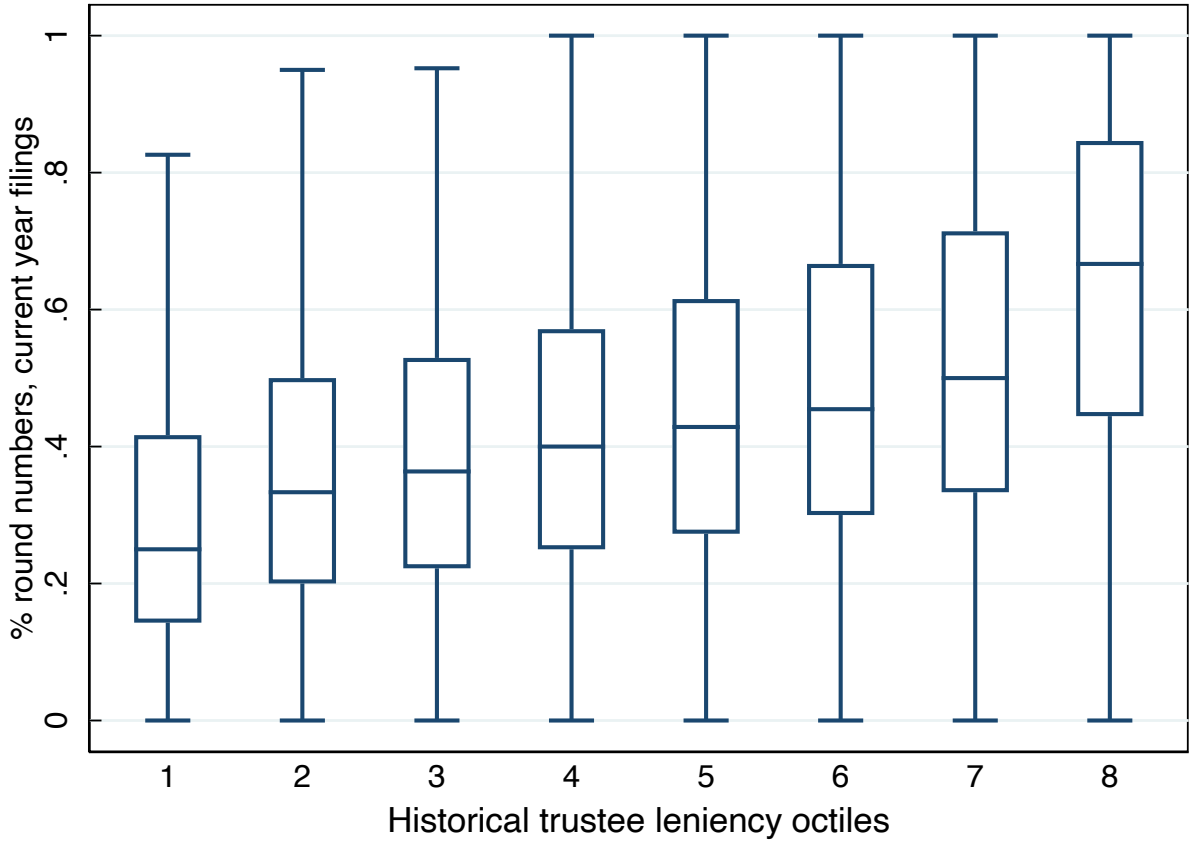
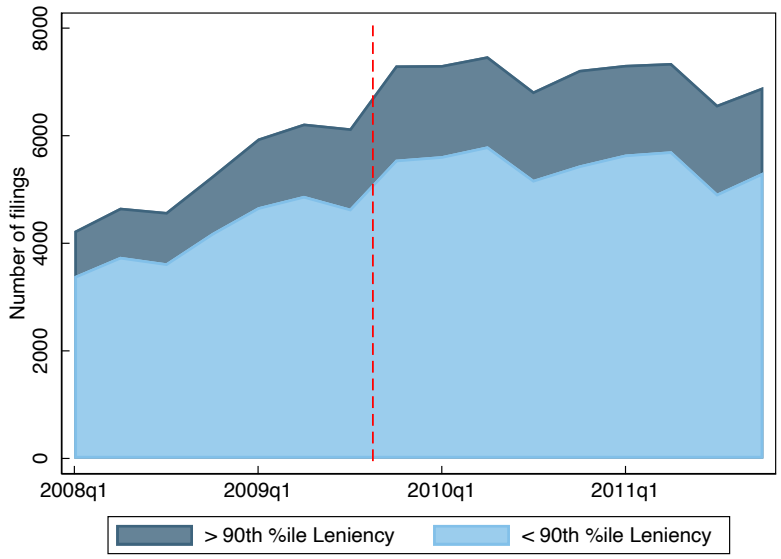
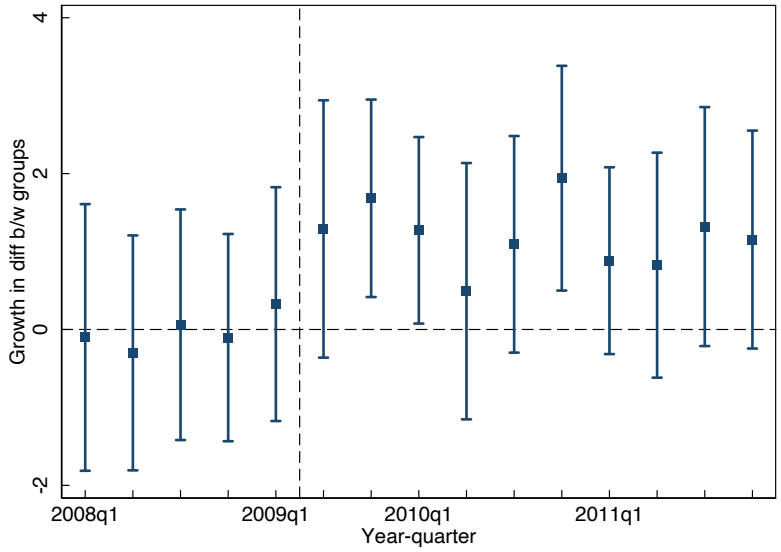


Figure A11: Use of Round Numbers Across Trustee Leniency Distribution
This figure plots the distribution of average percentage of round numbers in filings over trustee leniency groups. Percentage of round numbers in filings is measured for each post-reform proposal filing and averaged within trustee leniency octiles, where trustee leniency is the round number prevalence for trustees' approved proposals in the last three years (see Section C.3 for details). Filings are categorized into octiles based on the trustee used, from the least lenient trustees (bottom octile) to the most lenient trustees (top octile). The plots are standard box-and-whisker plots, with the box reflecting the interquartile range for the percentage of round numbers, the line in the middle of each box reflecting the median value, and the caps reflecting the value 1.3 times farther from the median than the nearest quartile.



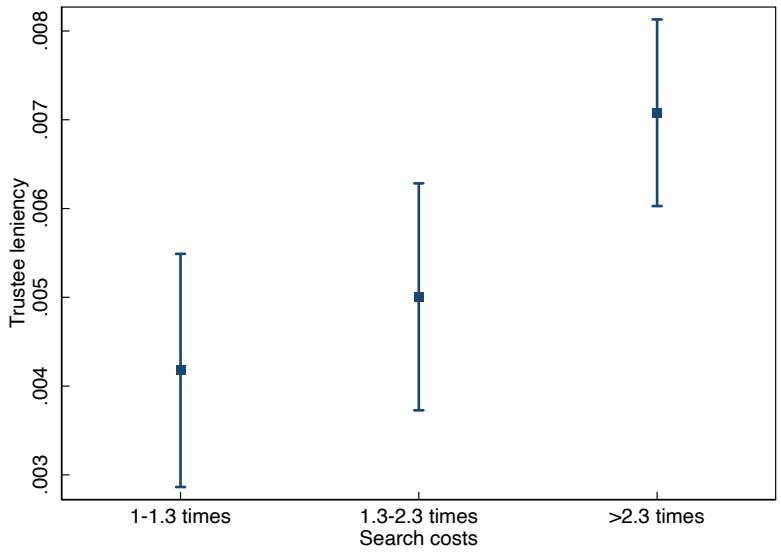
(a) Market share dynamics



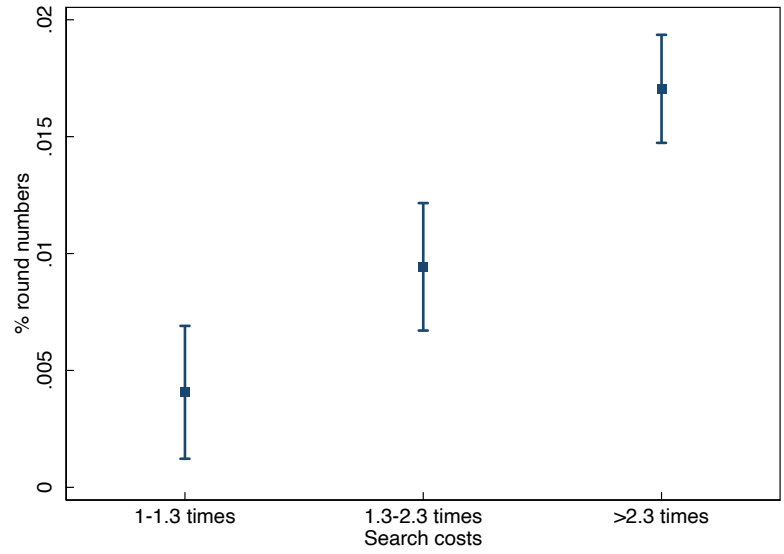
(b) Estimated change of market share

Figure A12: Trustee Market Share Dynamics by Trustee Leniency

This figure plots the dynamics of market shares of less and more lenient trustees. The groups are split based on whether the trustee used is in the bottom 90% (less lenient) or top 10% (more lenient) of trustees based on round number prevalence in each trustee's approved proposals in the three years before the reform (see Section C.3). Panel (a) plots the quarterly number of filings for the two groups. The vertical line represents Q3 2009, the quarter of the reform. Panel (b) plots the quarterly estimated change in the difference of market share between the two groups. The estimate is calculated using an event study difference-in-differences specification regressing the number of filings against filing quarter dummy and a dummy for trustee leniency groups, absorbing trustee fixed effects and using heteroskedasticity-robust standard errors. The point estimate for the difference between the two groups in each quarter, relative to Q2 2009, is represented by a filled-in square and the vertical capped bars represent 90% confidence intervals. The vertical dashed line represents Q2 2009, which is the base (omitted) category in the regression.



(a) Trustees leniency



(b) Filing % of rounding numbers

Figure A13: Trustee Leniency, % of Round Numbers and Search Cost

This figure plots trustee leniency and prevalence of round numbers across filings with different levels of travel-related transactions costs. We measure these transactions costs based on the excess travel distance between proposal filers and their chosen trustee (see Section C.2). All post-reform filings are categorized based on excess travel distance to chosen trustee: under 1 times, 1 to 1.3 times, 1.3 to 2.3 times, and over 2.3 times the average distance to the three nearest trustees. Trustees' leniency is the round number prevalence for each trustee's approved proposals in the last three years (see Section C.3) and averaged across all post-reform filings within an excess distance group. Percentage of round numbers per filing is measured for each post-reform proposal filing and averaged within excess distance groups. Differences in trustee leniency and filing round numbers are reported for each excess distance group relative to the comparison group of filers who travel under 1 times the average distance to the three nearest trustees. The point estimate for the difference for each group is represented by a filled-in square and the vertical capped bars represent 95% confidence intervals for the estimates.

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