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ABSTRACT

When faced with financial uncertainty, rational agents have incentives to take steps ex ante to reduce the probability (self-protection) or size (self-insurance) of a loss. However, in the case of liability risk, especially physician responses to malpractice risk, most empirical analyses have focused exclusively on measuring self-protection. This paper studies whether physicians invest in self-insurance by exploring how they respond to policies that allow them to lower the financial cost of malpractice liability. Specifically, we test whether physicians exploit provisions of bankruptcy laws and adjust the value of their home purchases to protect assets from liability claims exceeding their malpractice policy limits. We find that in states with unlimited "homestead" exceptions—provisions of state law that protect home equity when individuals file for bankruptcy—physicians invest 13% more in the value of their homes compared to what they would have invested in the absence of an exemption, whereas no such effect is true for other professionals of similar family income, family size, demographics, and city of residence. Additionally, the response of physicians to unlimited homestead exemptions is larger in areas with higher liability risk, where physicians would have greater incentive to insure against financial risks. Our findings suggest that physicians take financially costly decisions to protect themselves from uninsured malpractice risk, implying more generally that individuals self-insure against liability risk when insurance markets are incomplete.

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I. INTRODUCTION

When faced with financial uncertainty, rational agents have incentives to take steps *ex ante* to reduce the probability (self-protection) or size (self-insurance) of a potential loss. But in the case of liability risk, most empirical analyses have focused on measuring the extent to which individuals engage in self-protection. For example, a number of studies have estimated the impact of no-fault automobile insurance coverage on accident rates.[1] Other work has found that limits to tort liability lead to reductions in personal injuries and accidents more generally (Rubin and Shepherd, 2007; Helland and Tabarrok, 2012). And focusing specifically on the risk of liability for medical malpractice, there is a large literature examining whether physicians practice defensively to reduce the probability of a malpractice claim.[2] All of these are examples of changes in *ex ante* behavior that influence the probability that one might be subject to tort liability but do not necessarily impact the size of a loss if liability occurs.

One likely reason that past work has focused more on measuring self-protection rather than self-insurance is the widespread insurance coverage that individuals in the US possess against potential tort liability. Individuals are often required to purchase liability insurance for automobile accidents, injuries that occur in one's home or in some cases from professional malpractice or misconduct. The classic model of insurance demand theorized by Ehrlich and Becker (1972) shows that market-insurance and self-insurance are substitutes, suggesting that the ubiquity of insurance coverage likely crowds out the need for self-insurance.[3] However, the presence of deductibles, policy limits, insurer profits and other imperfections in insurance markets makes it likely that most policies offer incomplete coverage, leaving room for rational agents to take steps to mitigate

[1] See Landes (1982), Zador and Lund (1986), or Heaton and Helland (2010).
[2] See, for example, Kessler and McClellan (1996, 2002a, 2002b), Sloan and Shadle (2009) or Lakdawalla and Seabury (2013).
[3] As an empirical example of this, Fishback and Kantor (1996) found that the adoption of mandatory workers' compensation coverage early in the 20th century crowded out private efforts to insurance against workplace accidents.

potential financial risks from excess liability. But a question remains as to whether they do so through self-protection, self-insurance or both.

This paper studies whether physicians self-insure against liability risk by exploring how they respond to policies allowing them to protect financial assets from bankruptcy risk. Medical malpractice is a source of considerable anxiety for physicians, and a substantial majority of physicians carry medical professional liability insurance to cover the financial costs of malpractice claims. The conventional wisdom is that, because of insurance, the actual financial risk to physicians from malpractice liability is miniscule. However, for reasons discussed in detail below (e.g., policy limits), it is possible that physicians bear more financial risk from malpractice than is currently appreciated, or at least that they *perceive* themselves to bear more risk. If physicians perceive themselves to have some financial risk from malpractice, then we expect that they would take steps to alleviate that risk; if they are fully insured, they should behave no differently than individuals who do not face malpractice risk.

In this paper, we assess whether physicians respond to policies that allow them to protect themselves from the financial risk of malpractice. Specifically, we test whether physicians take advantage of specific provisions of bankruptcy laws and adjust the value of their home purchases to increase their protection from liability claims. Our hypothesis is that in states with unlimited "homestead" exceptions—provisions of state law that protect home equity when individuals file for bankruptcy—physicians will purchase comparatively more expensive homes than in states without such exceptions.[4] This analysis represents a test of whether or not physicians actively attempt to reduce the financial threat from malpractice because the additional home equity does nothing to

[4] We focus on Chapter 7 bankruptcy cases because these discharge most debts including liability judgments. In practice the same is also essentially true of Chapter 13 bankruptcies since most unsecured creditors, including a plaintiff who receives a judgment or settlement, receive about 9% of the value of their debt when the debt is restructured (White and Zhu, 2010).

protect physicians from the indirect or psychic costs associated with liability. Thus, absent personal financial risk there would be no reason to make costly adjustments to their home purchases, which represents a form of self-insurance against liability risk. This assumes that, conditional on income, the primary difference in bankruptcy risk between physicians and non-physicians is driven by malpractice, an issue we discuss in detail in the paper.

We estimate the effects of unlimited homestead exemptions using data from the American Community Survey (ACS). The ACS is similar in sample design, mode of administration, and coverage to the public use file from the decennial census, but is administered over a smaller sample and on an annual basis. We use a difference-in-difference estimation that uses other, non-physician homeowners as a control group and accounts for a number of factors that influence home investment (e.g., most notably family income, but also family size and demographics). By using non-physicians as a control group, we implicitly assume that physicians have much higher litigation exposure than the general population[5] and hence have greater incentives to protect their assets. We use other medical professions and high income professions such as attorneys as control groups to verify this assumption is reasonable.

Our findings suggest that unlimited homestead exemptions induce physicians to invest approximately 13% more in the value of their homes compared to what they would have invested in the absence of an exemption. This translates into approximately $65,000 of asset protection if physicians owned their homes outright or could transfer sufficient funds to pay off their mortgage in the event of a claim.

[5] Jena et al. (2011) find that the annual risk of a malpractice claim for a physician is about 5-8%. While there is no comparable estimate for the general population in 2002 the Bureau of Justice Statistics reported that there were just 98,786 tort cases concluded. Given that the population of the US in 2002 was 287.6 million, if we assume that each of those cases involved only one plaintiff then the lower bound of annual risk of being named in a resolved lawsuit is about 0.03%. This quite a bit smaller than Posner's (1997) finding that there are 327.2 lawsuits per 100,000 in the US although his estimate includes contract cases. Posner's estimate would imply a litigation risk of 0.3%. In either estimate the liability risk for the general population is far lower than for physicians.

Several falsification and specification tests appear to verify that the results are robust and driven by fear of malpractice risk. For instance, we find no effect of unlimited homestead exemptions on the home values of nurses or pharmacists, but we do find an effect on dentists.[6] Outside of health care, we find no impact of unlimited homestead exemptions on the home values of other high-paying occupations—lawyers and engineers—with similar demographics, family income, family size or city of residence as physicians. Additionally, we find that the response of physicians to unlimited homestead exemptions is larger in areas with higher liability risk, where physicians would have greater incentive to insure against financial risks of malpractice by investing in their own homes. We also find that physician home purchases are more likely to occur during "hard markets"—periods when malpractice insurance premiums are significantly higher than average—indicating that physicians increase their self-insurance when the alternative commercial insurance becomes more expensive. Taken together, these findings suggest that physicians take financially costly decisions, namely buying more expensive houses than they would absent the threat of liability, to protect themselves from uninsured financial losses. Finally we estimate the impact of homestead exemptions on a measure of the equity physicians maintain in their home, though equity is not directly available in the ACS and so must be imputed.

The paper proceeds as follows. Section II provides background on malpractice risk for physicians and gives a brief description of US bankruptcy law and the design and function of homestead exemptions. Section III describes the different data sources we use and Section IV describes the empirical framework and outlines our identification strategy. Section V describes our results, and Section VI describes the implications of our findings and offers suggestions for future research.

[6] About 12% of medical malpractice claims in the NPDB involve dentists and 78% involve physicians, compared to just 0.5% involving pharmacists and 1.7% involving nurses.

II. BACKGROUND

II.A. Physician malpractice risk

Medical malpractice arguably represents one of the greatest sources of professional anxiety for physicians. Approximately 7% of physicians face a malpractice claim in a year and even in lower risk specialties 75% of physicians can expect to face at least one claim over the course of their career (Jena et al., 2011). With such comparatively high expected liability costs, a substantial majority of physicians carry medical professional liability insurance to cover the financial costs of malpractice claims.[7] This insurance is generally not experience rated at the individual level, meaning that when physicians experience claims it generally does not increase their future premiums.

Given the ubiquity of malpractice insurance, the conventional wisdom is that the actual financial risk to physicians from malpractice liability is miniscule. But despite this, physicians regularly report practicing defensive medicine[8] and there is an extensive literature on physician behavior that finds changes in malpractice risk weakly change physician labor supply and practice patterns.[9] The prevailing view in the literature has been that these behavioral responses of physicians to malpractice risk are driven by the non-financial "psychic" costs of malpractice, such as the time and hassle of dealing with claims[10] and personal anxiety associated with one's professional

[7] In addition to the financial incentives to purchase malpractice insurance, many states require physicians to carry coverage and most hospitals require it for admitting privileges (Mello, 2006).

[8] For example, Studdert et al. (2005) report that 93% of physicians surveyed in Pennsylvania in 2003 reported that they practice defensive medicine. Similarly, 91% of physicians agreed that defensive medicine was common in a national survey conducted in 2009 by Bishop et al. (2010). Carrier et al. (2010) found somewhat lower, but still substantial (60-78%) rates of physicians reporting behavior consistent with defensive medicine.

[9] See Encinosa and Helliger (2005), Klick and Stratmann (2007), Matsa (2007), Baicker and Chandra (2005) Kessler et al. (2005) and Helland and Showalter (2009) for evidence on physician labor supply. See Kessler and McCellan (1996, 2002), Bovbjerg, et al. (1996), Dubay et al (1999, 2001), Currie, and MacLeod (2008), Dranove et al. (2012) and Frakes (2012 and 2013) for evidence on liabilities impact on practice patterns.

[10] For instance, Seabury et al. (2013) show that a significant portion of physicians' careers (up to 25% in high risk specialties) are conducted under the shadow of an outstanding lawsuit, which could impose costs due to time or hassle of dealing with the suit or uncertainty over its outcome.

ability being called into question.[11] An additional indirect cost that potentially has both financial and non-financial ramifications is if physicians suffer reputational damage among their peers or potential patients. For example, Helland and Lee (2010) find that physicians increase their payment in malpractice claims to avoid disclosure on state webpages that list malpractice awards. This is consistent with physicians being concerned about damage to their reputations from a successful malpractice claim beyond just the direct payments. The belief that physician behavior is driven more by non-financial costs of malpractice has in part motivated many to call for reform efforts to shift away from more traditional damage caps and towards other reforms that could lower the frequency of claims or make resolving them faster and more efficient (Mello et al., 2014).

However, despite widespread medical malpractice coverage among physicians, it is possible that physicians bear more financial risk from malpractice than is currently appreciated, or at least that they perceive themselves to bear more risk. The most common malpractice policies involve coverage that is capped at $1 million per occurrence and $3 million per year. The belief that despite these limits physicians are essentially fully insured against financial risk stems from the fact that actual payments infrequently exceed this limit. For example, studies using malpractice payout data from Texas suggest that 1.5% of liability payments exceed policy limits (c.f. Black et al., 2007).[12] Moreover, in cases where jury verdicts exceed policy limits, the belief is that plaintiffs are usually willing to settle at the policy limit because attorneys are reluctant to pursue a defendant's personal

[11] In principle, the presence of insurance does not eliminate the value of self-protection from defensive medicine, as Ehrlich and Becker (1972) point out that self-protection can be complementary to market insurance because it lowers the price. However, the fact that malpractice insurance is not individually experience rated mutes this complementarity.
[12] Zeiler et al. (2007) find a 98.5% chance of a medical malpractice claim settling at or below the policy limit. It should be noted that this evidence is based on closed claim data from Texas which has unlimited homestead exemption. This appears to lead to lower settlements and policy limits in Texas relative to other states (see Baker et al. 2015).

assets (Baker 2001; Gilles, 2006). This is consistent with a more general perception that bankruptcy courts make it prohibitively difficult or costly to recover beyond the policy limits.[13]

Outside of Texas, however, a larger percentage of suits appear to exceed standard malpractice policy limits. In the National Practitioner Data Bank (NPDB), the largest publicly available repository of information on paid malpractice claims, about 5.2% of paid malpractice claims in 2014 involved a payment of more than $1 million.[14] The average payment in these cases was about $1.98 million. Some physicians seem particularly at risk of a payment exceeding policy caps; for cases involving obstetrics errors, about 11% of payments were more than $1 million and the mean payment in those cases was $2.51 million. Given that the annual risk of a physician facing a malpractice claim that ultimately results in a payment is less than 2% (Jena et al., 2011), the annual risk to physicians of facing claims that exceed the policy limits is still small (e.g., approximately 0.1%, or 5% of 2%). However, the career likelihood of facing a claim involving a payment is much higher, over 70% in high risk surgical specialties (Jena et al., 2011). Thus, if physicians consider claims over a long enough time horizon then the risk of facing a claim exceeding the policy limits is still small but not negligible, especially given the potentially large dollar values at stake.[15] And this ignores the fact that, in the face of rising malpractice premiums, an increasing number of physicians are "going bare" and self-insuring against malpractice risk (alone or as part of a practice group).

II.B. Bankruptcy laws and homestead exemptions

The US is unusual among developed nations in that it has very pro-debtor bankruptcy laws. Individual debtors who find themselves with liabilities in excess of their ability to pay may seek to

[13] LoPucki (1996) has argued for the so called "death of liability" meaning that ordinary middle class people are essentially judgment proof beyond any liability insurance they happened to hold.
[14] See http://www.npdb.hrsa.gov/resources/publicData.jsp for a description of the NPDB public use file (accessed June 15, 2015).
[15] These numbers could be enhanced when one considers the possibility of "self-liquidating" policies in which defense costs count against policy limits, reducing the effective policy limit. Another possibility that could lower the effective policy limit is when multiple claims arise for the same event, which insurers usually count as a single "occurrence" and apply a single coverage limit.

declare bankruptcy through one of two options: Chapter 7 and Chapter 13 bankruptcy. Chapter 7 requires the debtor to liquidate all nonexempt assets, if any, to repay his or her debts, but once assets are used up the defendant's future earnings cannot be touched. Chapter 13, on the other hand, is designed for debtors with regular income and establishes a court-approved re-payment plan over a 3 to 5 year period (depending on income). In the case of unsecured claims,[16] a debtor filing for Chapter 13 bankruptcy must offer a repayment plan that pays all "disposable income" and pays at least as much as what the claimants would receive if the debtor had liquidated under Chapter 7 (11 U.S.C. § 1325). While Chapter 13 requires debtors to pay back at least some of their unsecured liabilities, they do not have to pay them back in full.

While most personal assets are at risk during bankruptcy, both forms of individual bankruptcy offer protections that allow a debtor to keep at least part of the equity in their homes – so-called "homestead exemptions."[17] While these exemptions vary in size, there are some states that allow for debtors to keep the full value of their homes, called unlimited homestead exemptions.[18] The homestead value differs at the state and federal level. In 1978, federal bankruptcy law changed to require all states to declare their own exemption levels or simply adopt the federal level. By 1983 all states had decided on a level and whether or not their citizens could use the federal exemption instead. The federal bankruptcy exemptions are relatively small; in 2010, an individual could claim an exemption of $22,975 while a married couple filing jointly could claim an exemption of $45,950.

Because of these exemptions, bankruptcy can offer significant protection to defendants facing a large jury verdict against them in a tort case. Baker et al. (2015) note that bankruptcy ends

[16] Unsecured claims are those that do not include some form of collateral to secure the debt. In the case of physicians who file for bankruptcy while facing liability from a malpractice claim, the plaintiff is considered an unsecured claimant.
[17] There are limits on accumulating personal assets immediately prior to declaring bankruptcy. This is potentially important when using a the unlimited homestead exemption to protect assets as purchasing a new home or paying down an existing mortgage right after a successful malpractice claim may attract the attention of the court.
[18] Note that the homestead exemptions only apply to unsecured creditors. That is, a homestead exemption would not prevent a bank from foreclosing on a debtors house if the debtor failed to meet their mortgage obligations.

all efforts by the plaintiff to collect debt related to personal injury torts, including physicians facing verdicts from medical malpractice cases.[19] Thus, a physician could protect assets by increasing the value of the equity in their homes, thereby reducing any potential plaintiff's ability to recover beyond their insurance policy limit. This effect is direct in the case of Chapter 7 bankruptcy, in which the creditors recover from the liquidation of the debtors' nonexempt assets. In Chapter 13 bankruptcy, the value of the repayment plan is based in part on what the debtor would have had to pay under Chapter 7, so the homestead exemption lowers the minimum amount of the repayment plan. Obviously, the potential value of the homestead exemption is highest in states where the exemption is unlimited.

As an example of how this works, suppose a physician faces a $2 million malpractice verdict, but only $1 million of which was covered by her malpractice policy, so she files for bankruptcy. Further suppose she has $200,000 in equity in her home. If the state she lives in has a homestead exemption of $100,000, a bankruptcy trustee could force her to sell her home and use the $100,000 of the equity that was not protected by the exemption to pay the plaintiff (the other $100,000 would be given to the physician).[20] However, if the homestead exemption is $200,000 or more, the bankruptcy trustee cannot force her to sell her house. Thus, the higher the value of the equity she has in her home, the more financial protection she receives from bankruptcy. This motivates our primary hypothesis which we test in our empirical work: *Conditional on income, unlimited homestead exemptions increase the value of a physician's home compared to individuals in other occupations that are less subject to liability risk.*

[19] See Gilles (2006) for a discussion of bankruptcy and tort judgments. Under Chapter 7 the physician (debtor) must list all debts owed thus a pending claim would not necessarily be discharged (see *Waterson v. Hall*, 515 F.3d 852 (8th Cir. 2008*)* and *In re Parker*, 313 F.3d 1267 (10th Cir.2002)).

[20] In the case of a Chapter 13 bankruptcy, she would not necessarily have to sell her house but would have to make payments that reflected the value of the equity.

Historically, debtors had the option to choose whether to file for bankruptcy under Chapter 7 or Chapter 13. However, this changed in 2005 with the Bankruptcy Abuse Prevention and Consumer Protection Act, which was designed to make bankruptcy more costly for debtors. Prior to 2005 there was no income test for Chapter 7, meaning that anyone was eligible to file for Chapter 7, although the lender could argue that the Chapter 7 filing was abusive if a debtor had sufficient income to pay off a reasonably restructured debt. Following 2005, Chapter 7 became means tested (White 2007) at the state's median income, adjusted for expenses. The act also increased cost of filing by 50% (White 2008). The impact of this change was to dramatically increase number of filings in 2005 (prior to law change) and reduce subsequent Chapter 7 filings (See White and Zhu (2010) and Cornwell and Xu (2014)).[21]

While we are not aware of any occupation-specific data on bankruptcy filings, the effect of this policy change would almost certainly have been to make Chapter 7 less available to practicing physicians, since the vast majority would have incomes above the state median. Even if the mix of physician bankruptcies between Chapter 7 and 13 changed significantly after 2005, it should not necessarily affect our analysis, as physicians receive financial protection from homestead exemptions under either policy. Nevertheless, in our empirical work, we test separately the impact of unlimited homestead exemptions from 2000-2004 and 2005-2010.

III. DATA

Our primary data source is the American Community Survey (ACS), a nationally representative, cross-sectional survey of approximately 3 million households annually, administered by the U.S. Census Bureau. The survey is mandatory and is collected by mail, telephone, and personal-visit interviews. The ACS includes respondents from the civilian population as well as from military households, and collects information on respondent demographics, housing and

[21] Evidence suggests that the rise in fining fees contributed significantly to the drop (Gross et al. 2014).

employment. Of specific relevance for this study, the survey collects data on respondent age, sex, race, marital status, family size occupation, annual personal earned income, hours worked and housing value. Response rates vary from year to year but historically have always exceeded 90%. While the ACS has always been a national survey, in its early years it was not fully geographically representative of the US population, with rural areas being under represented until 2005. However, given the relative scarcity of physicians in rural areas, we use the 2000-2010 waves for our primary results.[22] Using these data, we construct a series of stacked, annual cross-sections of physician and non-physician respondents from 2000-2010. We adjusted all dollar values to 2012 dollars using the Consumer Price Index (CPI).

Our key outcome variable is the reported value of an individual's home. Because we are interested in how unlimited homestead exemptions impact the decisions of physicians to invest in their homes, we confine our sample to owner-occupied dwellings, which is about 74% of the sample. The ACS survey asks homeowners for their assessment of the current market value of their home. Specifically, the survey asks "About how much do you think this house and lot, apartment, or mobile home (and lot, if owned) would sell for if it were for sale?" Note that the underlying basis for respondents' beliefs about their homes' value is not captured by the survey, which raises the possibility of errors in the respondents' assessments of the property's value.

In addition to the potential for individual error, there are two limitations with the ACS data on home values. The first is that, while from 2008 onwards the variable is reported as a continuous variable, prior to that it was reported as the midpoint of an interval for values under $250,000 (the size of the interval varied from $4,999 at smaller home values up to $49,999). The second limitation is that the home value is top-coded at $1 million throughout the entire sample. Both of these

[22] Note that we have sub-analysis separating the 2000-2004 and 2005-2010 data. Though these analyses are primarily intended to control for changes to federal bankruptcy policy, they also could inform as to whether the sampling changes matter.

potentially introduce further measurement error to the measured home value and effectively reduce the observed variation in house value across respondents.

Measurement error in the dependent variable should not necessarily bias our results if it does not vary systematically across physicians and non-physicians or across limited or unlimited homestead states. Nonetheless, we conduct several robustness and specification checks to ensure that our estimates are not driven by measurement error in home value. First, we limit our analysis to individuals with income of $250,000 or below and re-test our results. These individuals are significantly less likely to buy homes of $1 million or more, so they are less likely to be affected by the top-coding. Second, we estimate a censored regression (Tobit) model that allows for top-coding of the outcome variable, and verify that these estimates confirm those of our main specification.

Finally, we also use additional data from the ACS on housing characteristics to assess whether physicians in states with unlimited homestead exemptions invest more in their homes. Specifically, these variables include: size of mortgage on the house, the number of rooms (total) in the house, the number of bedrooms in the house, and annual premium for homeowners insurance. While these are cruder measures of home value, if unlimited homestead exemptions induce physicians to invest more in the value of their homes it should be weakly reflected in these measures as well.

We merge the ACS data to information on homestead exemptions at the state-year level. The information on the state homestead policies come from the appendix of *How to File for Chapter & Bankruptcy* (Elias et al. 2000-2010), which has been previously used in several other studies (c.f., Greenhalgh-Stanley and Rohlin, 2013; Crradin et al., 2011; and Baker et al., 2015). For each state and year we take the value of any homestead exemption, if any, recording the actual dollar value for limited exemptions and an indicator for whether it is unlimited. As a quality check, we compared

the Elias et al. data against the current homestead exception values using online state bankruptcy statutes and verified the accuracy of the data.

Table 1 reports the values of the homestead exemptions by state and year from 2000-2010. Clearly there is wide variation in the amount a debtor was allowed to keep in bankruptcy. Certain states, such as Pennsylvania, have no exemption (meaning that homeowners in Pennsylvania use the federal exemption) during the study period and other states, such as Texas, allow a debtor to protect all the equity in his or her home (i.e., unlimited homestead exemption). Homestead exemptions in a given state change very little over time. The lack of change over time has costs and benefits for our analysis. On one hand, our analysis cannot rely on within-state time-series variation in homestead values for identification. However, given that homes are a durable good, the general stability in exemptions suggests that most housing decisions were made well after states had determined the level of state exceptions. In other words, the respondents in our sample made their housing decisions given full knowledge, or at least a reasonable expectation, of exactly how much income they could protect via the exemption.

Table 1 also reports the mean home value for physicians and non-physicians in the ACS sample. Not surprisingly, the homes owned by physicians in our sample exceed the value of the general population. More importantly for our study, the value of physicians' houses typically exceeds the value of the homestead exemption by a significant fraction.[23] Suppose we assume that both physicians and non-physicians have 38% equity in their homes.[24] Based on the values in Table 1, outside of unlimited states, non-physicians can protect about 59% of their equity in bankruptcy via homestead exemptions while physicians can protect only 36%. This means that investing in a more expensive home in unlimited states offers asset protection to homeowners facing a large liability

[23] This is true in all but five states, all of which have comparatively large exemptions that exceed $300 thousand: Massachusetts, Minnesota, Montana, Nevada and Rhode Island.
[24] This was the value that the Federal Reserve estimated to be the national average in 2010.

judgement, while in other states the marginal value of a larger housing investment is essentially zero in terms of asset protection from liability.

In addition to the ACS and homestead exemption data, we use two sources of information to control for state-level differences in malpractice risk. First, we use data on state-level malpractice reform measures from Ronen Avraham's Database of State Tort Law Reforms (DSTLR 5th). These data, which have been widely used in previous work, provide the effective date of the ten most prevalent kinds of tort reform measures for all 50 states and the District of Columbia during our sample period. Specifically, the variables we include are indicators for whether in a state and year there is a noneconomic damage cap, a punitive damage cap, a cap on total compensation, whether the state requires that judgments be paid as a lump sum or not (periodic payments), whether the state has modified its collateral source rule, whether the state has a higher evidence standard for punitive damages, whether the state limits lawyers contingent fees, whether the state has modified the joint and several liability rule, whether the state has a patient fund that partially pays for medical malpractice judgments or whether the state has modified the comparative fault rule.[25] All of these are commonly used measures of the degree to which the state's civil justice system is pro-plaintiff or pro-defendant and hence of liability risk.

Additionally, we use the National Practitioner Data Bank Public Use Data File (NPDB) to estimate liability risk as measured by the frequency of paid malpractice claims. Under the Health Care Quality Improvement Act of 1986, insurers must report all medical malpractice payments made on behalf of individual practitioners to the Department of Health and Human Services (HHS), and HHS then publishes that information quarterly in the NPDB.[26] We total these payments by state and year and divide by the number of physicians in the state. Our physician counts data come from the

[25] See Kachalia and Mello (2011) for a discussion of the different types of reforms and a review of the review of the evidence on their effects.
[26] See Chandra et al. (2005) or Helland and Lee (2009) for discussions of the limitations of the NPDB.

Area Health Resource File (AHRF), which is based on data from the American Medical Association (AMA) Physician Masterfile.

We present descriptive statistics for the full sample and broken down by physicians and non-physicians in Table 2. Physicians are slightly younger, more likely to be male and more likely to be married than non-physicians. Additionally, physicians have significantly higher income, work more hours and purchase more expensive homes than the general population. However, in terms of the state-level variables, including homestead exemptions, liability risk and malpractice reform, the sample is generally balanced. This suggests that while there are differences in income between physicians and non-physicians, location choices are similar and at best only modestly influenced by factors such as tort reform or homestead exemptions that could influence liability risk.

IV. EMPIRICAL SPECIFICATION

The practical impact of an unlimited homestead exemption is to allow debtors to protect financial assets that are held as home equity from creditors. Equity is simply the fair market value of a home minus the value of any liens on the property, usually the remaining principal on a home mortgage, so there are two ways equity can increase: either one's home value appreciates or they pay off more mortgage debt. Note that, conditional on bankruptcy, debtors have limited ability to move assets into their home, which means that the only way one can guarantee that the equity would be protective in a bankruptcy case is to hold the equity prior to an incident occurring. One way to generate more equity *ex ante* is to pay off more of your mortgage, say with a higher down payment or paying off principal. The other is to buy a more valuable home, which will tend to appreciate more in dollar terms and generate greater expected equity for a given level of mortgage debt.

In principle, unlimited homestead exemptions could incentivize either of these two behaviors. However, we focus the bulk of our empirical analysis on the relationship between

homestead exemptions and physician home values for two reasons. The first is the favorable tax treatment that mortgage interest receives in the US. Mortgage interest debt is tax deductible, which means that for the homestead exemption to induce a physician to pay off more of their house, the value of the subsidy from lower expected liability costs would have to outweigh the fairly substantial tax benefit. The other is more practical – house value is recorded directly in the ACS while equity (or even the remaining mortgage balance) is not. Thus, we focus on the relationship between homestead exemptions and housing value, and include some robustness checks where we discuss imputed equity and some alternative measures (such as whether the individual holds a mortgage).

In principle the argument above holds for everyone, so homestead exemptions should give all people and not just physicians the incentive to invest more in their homes. However, we rely on the fact that physicians have comparatively high liability compared to other occupations. Some other occupations, like corporate executives, may also have higher expected liability, but they are relatively small in number. Thus, comparing physicians to non-physicians allows us to estimate whether physicians in unlimited homestead exemption states engage in more asset protection than the typical individual in that state.

To motivate this analysis, we compare the average home values for physicians and non-physicians in states with limited and unlimited homestead exemptions in Table 3. Obviously, home value is so closely related to income, so we stratify the mean values according to household income by breaking individuals into 10 income categories. Home values are consistently higher in states with limited homestead exemptions for both physicians and non-physicians, largely because states with the highest housing costs, including California and New York, are states with limited homestead exemptions. Home values consistently increase with income, and the between state

differences in home values are depressed for the highest income categories (though this could be related to the top-coding).[27]

Our hypothesis that unlimited homestead exemptions give physicians the incentive to invest more in the value of their homes is borne out by Table 3. The column labeled Difference in the table reports the unadjusted difference-in-differences (DiD) estimate between physicians and non-physicians in unlimited and limited states, with the standard error of the DiD in the column labeled "Std. Error". Other than the lowest income category, below $100,000,[28] the DiD is positive for every income category. This suggests that within each income category, physicians invest relatively more (compared to non-physicians) in the value of their homes in states with unlimited homestead exemptions. At the highest income categories, physicians in limited states have very similar (or even lower) average home values compared to non-physicians, but those in the unlimited states have significantly higher average home values. While this analysis fails to adjust for other potentially important factors besides income, it is consistent with physicians using unlimited homestead exemptions to purchase additional protection against malpractice liability.

For our primary analysis we estimate the following regression specification:

$$\boldsymbol{ln(home\ value_{ist}) = \alpha + \beta_1 doctor_{ist} \times unlimited_s + \beta_2 unlimited_s + \beta_3 doctor_{ist}}$$
$$\boldsymbol{+\gamma X_{ist} + \delta Z_{st} + \eta_s + \lambda_t + \delta_{st} + \varepsilon_{ist}}$$

where *i* is denotes the individual, *s* the state, and *t* the year. The dependent variable $\boldsymbol{home\ value_{ist}}$ is the natural log of the value of observation *i*'s home as reported in the ACS. The variable $\boldsymbol{doctor_{ist}}$ is an indicator equal to one if individual *i*'s occupation is listed as a physician in the ACS.

[27] Note that the average home value for physicians with $500,000 or more exceeds $1 million, despite the top-coding, reflecting both the census's interpolation of the data and the inflation adjustment we applied to the top-code along with the fact that a majority of physicians in this bracket are top-coded.

[28] This category is somewhat odd as it represents a disproportionately small share of physicians (13% compared to 65% of the general population). These physicians are more likely to reflect physicians who work part-time work or possibly close to retirement, who might have different housing needs or less malpractice risk.

The variable $\boldsymbol{unlimited_s}$ is an indicator variable that is equal to one if the individual's state of residence, *s*, has an unlimited homestead exemption.[29] The coefficient $\boldsymbol{\beta_1}$ on the interaction term represents the DiD estimate, the difference between physicians' home values in states with a homestead exemption relative to the difference for non-physicians.

The vector $\boldsymbol{X_{ist}}$ includes the individual demographic characteristics that influence the value of a person's home. In addition to household income, as described above, they include the individual's age and age squared, whether the person is female, married, their family size and whether they are self-employed. The vector $\boldsymbol{Z_{st}}$ is a series of indictor variables designed to capture the state's litigation environment. It is based on the DSTLR 5th edition, and includes controls for the tort variables summarized in Table 2. Finally we include state, $\boldsymbol{\eta_s}$, and year $\boldsymbol{\lambda_t}$, fixed effects and state-specific time trends, $\boldsymbol{\delta_{st}}$. The term $\boldsymbol{\varepsilon_{ist}}$ represents the robust standard errors which are calculated to allow clustering by state.

To identify the effects of bankruptcy laws on physician housing value we estimate a DiD model that compares housing values of physicians to housing values of non-physicians in states with and without an unlimited homestead exemption. In principle, we could estimate a triple difference model in which we looked at within-state changes in the actual level of the homestead exemption and compared differences between physicians and non-physicians as the homestead exemption value changed over time. However, two difficulties present themselves with this strategy. The first is that there is minimal variation in unlimited homestead exemption within states over time; only Washington DC changes to an unlimited exemption in our sample period and in fact almost no states have altered an unlimited exemption in the last 40 years. The second issue is that our data does not tell us specifically when the individual purchases their home. The ACS does contain a variable

[29] Given the inclusion of state fixed effects the coefficient on unlimited is in effect the coefficient on the omitted state plus the change resulting from Washington DC's switch in 2002 (the only "state" to switch during our time period). As such, the coefficient does not have a meaningful interpretation in our analysis.

coding tenure in a home into six broad categories.[30] Given the infrequency of home purchases, paucity of law changes, and the broad categories identifying tenure in the home it would be very difficult to pick up time series effects from a change.

One common concern with DiD strategies based on state laws is that the timing of laws could be endogenous. This is less of an issue with unlimited homestead exemptions since, with the exception of Washington DC, no state changes its law during our sample period. Moreover it appears that homestead exemptions are rarely designed specifically for physicians perhaps because there are politically more direct methods of tort reform, such as damage caps, which protect physicians from liability. The sole exception appears to be West Virginia, which raised the exemption for physicians facing a medical malpractice claim to $250,000 from the normal $50,000 available to couples.[31]

One further complication is that the existence of unlimited homestead exemptions changes the willingness of lenders to lend and the demand for housing on the part of potential buyers. For example Lin and White (2001) and Berkowitz and White (2004) find that applications are more likely to be turned down in states with unlimited homestead exemption and Corradin et al (2015) find that unlimited exemptions generally increases demand for housing. This may be a concern if credit rationing due to the existence of the unlimited homestead exemption differentially impacts

[30] The categories are 12 months or less, 13-23 months, 2-4 years, 5-9 years, 10-19 years, 20-29 years and over 30 years since the occupant moved into the residence.

[31] See §38-10-4 which states:

> (a) The debtor's interest, not to exceed twenty-five thousand dollars in value, in real property or personal property that the debtor or a dependent of the debtor uses as a residence, in a cooperative that owns property that the debtor or a dependent of the debtor uses as a residence or in a burial plot for the debtor or a dependent of the debtor: *Provided*, That When the debtor is a physician licensed to practice medicine in this state under article three or article fourteen, chapter thirty of this code, and has commenced a bankruptcy proceeding in part due to a verdict or judgment entered in a medical professional liability action, if the physician has a current medical malpractice insurance in the amount of at least one million dollars for each occurrence, the debtor physician's interest that is exempt under this subsection may exceed twenty-five thousand dollars in value but may not exceed two hundred fifty thousand dollars per household.

Note that in 2014 New Jersey has had a bill pending (SENATE, No. 1018) that would have raised the exemption for Physicians facing a medical malpractice judgment.

non-physicians, who may be less likely to go bankrupt. This concern should be substantially mitigated by adjusting for income, as higher income individuals are less likely to go bankrupt.

For these reasons, our primary identification strategy relies on a simple DiD model using cross-sectional differences in unlimited homestead exemptions across states. Given the potential limitations with this strategy, we conduct a large number of robustness and specification checks to evaluate the robustness of our results and test for other confounding sources of variation. We include different trend variables, including physician-specific and state-specific time trends. We test for differences in the magnitude of the effect across levels of malpractice risk, with the hypothesis that physician home values in unlimited exemption states (relative to limited states) should increase with the average level of malpractice risk in the state. And, importantly, we test for similar effects of unlimited homestead exemptions on the home values of non-physicians who work in other high-income or healthcare occupations. This exercise offers us a useful falsification test because these are professionals who may be similarly situated to physicians in terms of their income and home preferences, but who have much lower liability risks.

V. RESULTS

V.A. Main Results

We present the results of our DiD analysis with different combinations of covariates and fixed effects in Table 4. All models include state and year fixed effects, while the additional specifications ad controls for different tort reform, income, hours worked, state time trends, physician time trends, as well as MSA and city fixed effects. In Panel A, we present results using the full 2000-2010 sample. In column 1, where we exclude individual level control variables and law controls, we find that physicians in unlimited states have homes worth 19.6% more relative to the difference between non-physicians. In column 2 we add our control variables and find a similar

increase of 18.7%. Both estimates are consistent with the hypothesis that physicians take advantage of unlimited homestead exemptions to protect assets by purchasing a more valuable home.

Our qualitative results do not change substantially as we vary the specification to include more controls. Our baseline model excludes income and hours worked because of the possibility that these could be determined endogenously with home value. In the case of household income, it is possible that the existence of a homestead exemption allows physicians to choose lower policy limits and hence less expensive medical malpractice insurance and that this may show up as higher income. Physicians may also modify their practice in ways that increase liability but also increase income (e.g. high risk deliveries or working in the ER). In terms of hours worked, the concern is that previous studies have found an impact of liability risk on hours worked (see Helland and Showalter 2009). In column 3 we estimate the model including income and find a smaller but still significant and positive effect suggesting an increase in home value of 14.5%. If we include only hours worked (column 4), we find an effect of 18.2%. Finally in column 5 we include both income and hours worked and find an effect of approximately 13%.

In column 6 we estimate the model with a state specific time trend. The concern is that states have idiosyncratic liability trends (see Helland and Seabury 2015) which may confound our estimates (especially given the cross-sectional nature of our DiD). We again find a positive and significant effect of unlimited homestead exemptions for physicians indicating about a 13.1% increase in home value. In column 7 we provide estimates that include state-specific trends as well as physician and non-physician trends. The latter are included to capture any differential changes in the evolution of home purchases by physicians from the general public. We find that physicians in unlimited states have home values that are 15.3% higher. In columns 8 and 9 we include MSA and city fixed effects, respectively. MSA and city identifiers are only available post 2004 (so columns 8

and 9 of panel A and C identical). Again, our results are consistent with a 13-15% increase in home values for physicians in unlimited states.

The remaining panels vary in terms of the estimation sample or technique that we use. In Panel B we estimate the model using only households with family incomes under $250,000. Given that home value data is top coded at $1 million, this truncation effectively eliminates all of the top coded observations, although at the expense of a large portion of our sample of physicians. Although the estimated impacts are somewhat smaller after making this restriction, they are not substantively different from Panel A.

In Panel C, we report estimates of the model using only 2005-2010 data. Given the change in personal bankruptcy laws in 2005, it is possible that unlimited homestead exemption could have become less effective as an asset protection strategy. We cannot directly test the laws' impact in that the US Census estimates the median residential tenure at 5 years for all residences and 11 years for homeowners, meaning that most of our sample purchased their homes before the law change even in the latest cross-section in our sample. Nevertheless, it is useful to see if we can detect any differences in the post-reform period. In addition, the ACS survey underwent several changes prior to 2005 and is only geographically representative after 2004. Our estimated coefficients in Panel C are similar in magnitude to Table 4 and continue to be significant and positive.[32] Thus, changes in bankruptcy laws or to ACS sampling procedures do not appear to substantially influence our findings.

In Panel D we estimate the model using a censored regression to account for the truncation of home values at $1,000,000 nominal dollars. The results are substantively similar to Panel A (and somewhat larger than when we eliminate families with household incomes over $250,000). Again,

[32] The results are also similar for 2000-2005.

this suggests that top-coded housing values (or income) do not appear to be influencing our findings in a meaningful way.

Taken together, these findings suggest that physicians in states with unlimited homestead exemptions purchase homes that are about 13% higher than what they otherwise would purchase. Interpreting the magnitude of this effect depends on how much equity physicians actually hold in their homes. If physicians owned their homes outright, or could transfer enough money into their homes prior to bankruptcy to pay off their mortgage, then this estimate suggests that physicians in unlimited states are protecting about $73,320.[33] However, The Federal Reserve reports that in 2010 the average homeowner in the US had equity equal to 38% of the market value of their home.[34] If we apply this to our data, then the estimated amount of financial assets being protected falls to approximately $27,862.

How does this compare to the expected excess liability risk? As noted above, about 5.2% of claims in the NPDB exceed $1 million, and the average payment in these cases is $1.98 million. Jena et al. (2011) estimate that, even though the annual risk to physicians of facing a malpractice claim resulting in a payment is low, over the course of a career the threat of liability is high. By age 65, Jena et al. (2011) estimate that 19% of physicians in low risk specialties and 71% in high risk specialties will face a claim that results in an indemnity a payment. Using the numbers from the NPDB above, back-of-the-envelope estimates of the career risk of excess malpractice liability could range from about $9,700 to $36,000, depending on specialty. Given the favorable tax treatment that mortgage debt receives in the US, our estimate of about $28,000 in asset protection does not seem to imply an unreasonable level of risk aversion by physicians.

[33] The average home value of physicians in unlimited states is about $564,000 in 2012 dollars.
[34] See http://www.huffingtonpost.com/2011/06/09/home-equity-lowest-since-wwii_n_874055.html.

V.B. The Impact of Homestead Exemptions According to Malpractice Liability Risk

Overall, the results in Table 4 provide robust estimates of the relationship between the presence of unlimited homestead exemptions and physician home values that are extremely consistent with the hypothesis that physicians respond to these rules by investing more in their homes to protect their assets from the possibility of bankruptcy.[35] Taken at face value, this does not necessarily imply that the threat of excess malpractice liability is the reason that physicians respond in this manner, as physicians could have perceived bankruptcy risk for some other, unobserved reason. If the response to unlimited homestead exemptions is in fact a response due to concerns about excess malpractice liability, we should be able to observe physicians responding to the exemptions more when their expected malpractice risk is higher (or at least when they perceive it to be higher).

To test this hypothesis, we modify our empirical model using a direct measure of liability exposure that comes from the NPDB. Specifically, we interact the unlimited homestead exemptions and physician level interactions with our liability risk measure and estimate the following regression model:

$$\begin{aligned} \boldsymbol{ln(home\ value_{ist}) = \alpha + \beta_1 liability\ risk_{st} * doctor_{ist} * unlimited_s} \\ \boldsymbol{+\beta_2 lliability\ risk_{st} * unlimited_s + \beta_3 liability\ risk_{st}} \\ \boldsymbol{+\beta_4 doctor_{ist} * unlimited_s + \beta_5 unlimited_s + \beta_6 doctor_{ist}} \\ \boldsymbol{+\gamma X_{ist} + \delta Z_{st} + \eta_s + \lambda_t + \varepsilon_{ist}} \end{aligned}$$

[35] Note that greater investment into home assets by physicians in unlimited homestead exemption states can explain the differences in settlements and premiums observed in Baker et al. (2015). Rational plaintiff's attorneys will expect that they recover personal assets and accept lower settlements or larger reductions (i.e., "haircuts") on judgments in states with unlimited homestead exemptions.

where $\boldsymbol{liability\ risk_{st}}$ is the total payments in the NPDB divided by the total number of physicians in state *s* in year *t*.[36] The results of this estimation are reported in Table 5.

When we estimate the full set of interacted variables, many of them are highly correlated and none are individually significant but they are jointly significant. In the bottom of Table 5 we break out the effect of homestead exemptions in the top three quartiles, relative to the bottom quartile of liability risk. We find that in states at the top quartile of liability risk, physicians in unlimited homestead exemption states increase their home purchase values by over 20% compared to the effect of exemptions in states in the bottom quartile. This falls to 18% for the 3rd quartile and 17% for the 2nd. The results are similar if state law controls are included. The findings are consistent with the theoretical prediction that physicians in higher liability environments should take greater advantage of the asset protection value of the unlimited homestead exemption.

To further explore how liability risk factors into the effect of homestead exemptions, we examine how malpractice insurance market conditions relate to the timing of physician's home purchases in states with and without unlimited homestead exemptions and report the results in Table 6. In the first two columns we report the results of regressions that estimate how unlimited homestead exemptions impact the value of homes that were purchased during a malpractice insurance crisis. These crises are characterized by rising insurance premiums and difficulty finding insurance, which could have the dual effects of raising physician perceptions of risk and also lowering the average level of insurance protection. Although the causes are disputed, there is general agreement that the periods 1970-78, 1984-86 and 2001-2004 were "hard markets" in the

[36] Note that if unlimited homestead exemptions successfully reduce the liability exposure of physicians conditional on a lawsuit, then they also could reduce the incentive to sue. Note that homestead exemptions only impact liability above a high threshold, so the effect should be muted, but to the extent this is true then the total payments per physician in the state could be endogenous. We tested whether the payments per physician were lower in states with unlimited homestead exemptions and found no evidence that this was the case (coefficient of unlimited against log payments in a claim of -.088 with a standard error of .154), suggesting this is not a serious concern.

sense that they are characterized by higher premiums and narrow insurance availability (see Sloan and Chepke, 2008).

As noted above our data does not provide the exact year when a home was purchased. Moreover the bands of possible purchase increase the further back in time the home purchase. For this reason, we create an indicator that equals 1 only if the earliest and latest possible dates for the home purchase fall within the confines of a hard insurance market. Clearly this definition is two narrow and will misclassify homes purchased in a hard market as purchased in a soft market for wider purchase bands. As such our estimates represent a (probably noisy) lower bound of the true impact of homestead exemptions on the value of homes purchased during periods of crisis.

We find evidence that the impact of unlimited homestead exemptions do appear to be higher during period of malpractice crisis. Specifically, we find that homes purchased in hard markets are between 5% and 7% higher even relative to physicians in unlimited states consistent with our above findings that physicians turn to self-insurance when commercial insurance grows more expensive. In columns 3 and 4 we examine a related question: Are physicians more likely to have purchased a home during a hard market? If so, combined with the higher home value, this would suggest that physicians are more likely to allocate their financial assets towards their residence during periods when malpractice insurance is less available. Our results suggest that physicians are about 1% more likely to have purchased their home during a hard market in states with unlimited homestead exemptions. This is in addition to the general increase in home purchases among physicians in all states and beyond the generally lower rates of home purchase we find for the general population in hard markets.

As noted above, if physicians alter their housing behavior in response to homestead exemptions because of the liability protection they offer, we might expect homestead exemptions to

impact other aspects of behavior, including their labor supply decisions. In Table 7 we report the estimated impact of unlimited homestead exemptions on the weekly hours worked and total family income of physicians. Previous studies have found that an increase in liability exposure leads to a reduction in physician labor supply.[37] It is possible that the ability to protect assets through the unlimited homestead exemptions also causes physicians to change their practices in ways that may increase litigation risk but also increase income, such as working more hours or treating riskier patients. We find some limited and mixed evidence of this effect in Table 5. We find that physician income is higher in unlimited states by about 9-11%, depending on whether we include state specific trends and law controls. To the extent that unlimited homestead exemptions reduce physicians' perceived liability exposure this is consistent with earlier findings. However, we find no evidence of changes in hours worked due to homestead exemptions.

V.C. Limited Homestead Exemptions

In Table 8 we estimate the model using the value of all homestead exemptions, limited and unlimited, rather than just the unlimited exemption. A challenge with this approach is that it is unclear what level to assign the exemption in states with an unlimited exemption. We simply set the exemption equal to $1,000,000 for unlimited states and we treat the exemption level as the federal level if the state has an exemption level lower than the federal level and allows its citizens to opt for the federal level. The purpose of this analysis is to use variation in the dollar value of a state's homestead exemption rather than a dichotomous comparison of physician home values in states with and without unlimited homestead exemptions. We find a positive association between the value of a homestead exemption and physician home value, though it is extremely small in magnitude. Focusing on the level of exemptions suggests that physicians increase their home purchases by about

[37] See, for example, Kessler, Sage and Becker (2005), Baicker and Chandra (2005), Klick and Stratmann (2007), Masta (2007) or Helland and Showalter (2009). For a more complete review of the literature, see Helland and Seabury (2015).

0.19% per $100,000 of exemptions (the average exemption across states without an unlimited exemption). This is a far smaller effect than our analysis above of unlimited exemptions, suggesting that the marginal value to physicians of an increase in limited exemptions is less than the increase to an unlimited exemption.[38]

V.D. Falsification Test

Table 9 shows the estimates from our falsification test, where we estimate the relationship between home values and unlimited homestead exemptions for other professionals: nurses, lawyers, engineers, dentists and pharmacists. Like physicians, these professionals have higher incomes and own more expensive homes than the average homeowner in the ACS survey. However, we generally find no significant effect of unlimited homestead exemptions on home value for these professionals. While the coefficient is positive, in most cases it is considerably smaller (ranging from one-twentieth to one-fourth the magnitude of the coefficient for physicians) and is not statistically significant.

One noteworthy exception is the coefficient for dentists, who do have higher home values in states with unlimited homestead exemptions. This actually may reflect the fact that dentists are more similar to physicians in terms of having higher liability exposure; dentists are regularly sued and do carry liability insurance. For example Milgram et al. (1994) finds that almost a quarter of dentists surveyed had experienced a malpractice claim.[39] Ultimately, this falsification test offers support for our assertion that unlimited homestead exemptions have a causal effect that leads physicians to invest more in their homes, as opposed to some state-specific effect centered on high-income individuals. While it does not confirm that the effect is driven by liability risk, the fact that

[38] We do not find an effect of the level of exemptions on home values when we estimate the model excluding the states with unlimited exemptions (as opposed to substituting a specific value), suggesting that the unlimited states are driving the association between exemptions and physician home values.

[39] According to Lydiatt (2002) fully 60% of the lawsuits against dentists are for failure to perform a biopsy in cases where the patient had cancer of the oral cavity.

physicians respond higher in high-liability states and that individuals in a profession with comparable risk (i.e., dentists) behave similarly suggest that liability risk is a driving factor.

V.E. Equity and Other Measures of Home Value

The model's predictions on the value of physician's home also hold for the amount of equity physicians hold in their home. The model is complicated since the value of a physician's home represents an upper bound on the amount of money the physician can protect for a plaintiff. One difficulty is that the predictions do not hold for negative equity. Because a homeowner can default on their mortgage and return the home, which serves as collateral for the loan, to the lender a physician who is "under water," that is owes more on their loan than the value of the home, would be better off defaulting on the home loan rather than paying down their mortgage as a form of asset protection. In effect the physician loses money either way if they have negative equity. They can pay the plaintiff or the lender but will not be better off financially. Thus our prediction deals only with positive equity. Once a physician has a loan worth less than the value of the home they can protect their wealth by paying down the value of that loan.

One issue with testing this prediction is that the ACS does not identify the loan amount. It does identify the homeowner's monthly payment, however. Unfortunately without further assumptions this does not allow a test of the impact of unlimited homestead exemptions on equity. We construct a proxy for equity using the amount of time the homeowner has held the property. Unfortunately, as noted above, this is not a specific year but rather a range, specifically a range that expands the longer the homeowner has been in the home. Because of this the exact equity cannot be reconstructed. We can however identify a high and low value of equity if we are willing to assume that all owners have a 30 year fixed mortgage, that they paid the prevailing interest rates at the time they purchased the home (specifically the 30 year fixed mortgage rate from the Federal Reserve

Bank of St. Louis's FRED database), and that they have not refinanced. Obviously these assumptions are unlikely to hold in practice but it is unclearl why they would systematically bias the results.

We then construct the average loan amount over the window for which the homeowner could have purchased their home, *t=1…n*, as

$$\overline{loan} = \frac{\sum_{t=1}^{n} monthly\ payment * \frac{\left(1+\frac{annual\ 30\ year\ rate_t}{12}\right)^{(360-12*years\ in\ home_t)-1}}{\frac{annual\ 30\ year\ rate_t}{12} * \left(1+\frac{annual\ 30\ year\ rate_t}{12}\right)^{(360-12*years\ in\ home_t)}}}{n}$$

where the monthly payment is the amount the respondent identified as their first plus their second monthly payment in the ACS, the annual 30 year rate is the prevailing rate for a 30 year mortgage in year t of the purchase window and years in the home represents the number of year the owner has occupied the home if the home was purchased in year t of the purchase window. We then compute equity by subtracting the average loan amount from the value of the home.[40]

The results are shown in Table 10. Our specifications follow the same format as the home value regressions in Table 5. We consistently find that for logged positive values of equity physicians hold more equity in their home in states with unlimited homestead exemptions. The impacts range from about 19% to 26% depending on the specification. In Panel B of Table 10 we estimate the model in levels using all values of equity. The impact is never significant and flips sign depending on the specification. In Panel C we estimate the model using levels and only positive values. Again the results are positive but not significant perhaps owing to the presence of outliers.

In Panel D we estimate whether a homeowner has any mortgage. Although not significant at conventional levels the results are consistently negative showing about a 1% decrease in the

[40] We have also estimated the model using the larges and smallest value and treating the largest and smallest value as intervals in a tobit regression. The results are similar.

likelihood a physician owns their home outright. Finally in Panel E we estimate whether the home has a second mortgage. Again the results are not statistically significant but consistently negative.

In Table 11 we report estimates of the model using as outcomes four alternative measures of home value available in the data. The first is the monthly mortgage payment. We find that physicians in states with unlimited home exemptions have mortgage payments about 9% higher in DiD analysis. We also find a positive impact, 22%, on the annual cost of property insurance among physicians in states with homestead exemptions. Finally, unlimited homestead exemptions also increase the number of bedrooms in physician's homes. These results are consistent with the hypothesis that physicians buy relatively larger homes as an asset protection method in states with unlimited homestead exemptions.

V.F. The Role of Tenancy in the Entirety

As one final robustness check, we test whether state variation in ownership rules for married couples has any implications for our results. Specifically, we test whether our findings differ in states where married couples are allowed to jointly own property as tenancy in the entirety.[41] Essentially, when property is held as tenancy in the entirety it means that the property is owned jointly by the married couple as a single legal entity. Under this legal rule, in bankruptcy filing only joint creditors may collect from property that is held jointly. This has implications for the importance of homestead laws because in most cases a judgment in a medical malpractice case would only grant the plaintiff creditor status to the physician and not to the physician's spouse. Essentially, this offers married physicians the ability to protect their home assets in a similar manner to an unlimited homestead exemption. It is possible that confounding variation in tenancy rules could influence our

[41] Twenty five states currently have tenancy in the entirety laws (Alaska, Arkansas, Delaware, District of Columbia, Florida, Hawaii, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Wyoming,). None changed their laws during our sample period.

estimated effects of unlimited homestead exemptions, so we re-test our models including data on tenancy status.

In Table 12 we estimate our model including an indicator for tenancy by the entirety states and the interactions for married*physician, married*tenancy and married*tenancy*physician. We also include unlimited homestead exemption to see if the omission of tenancy by the entirety impacts or results. We find that our unlimited homestead exemption results are largely unchanged by the inclusion of tenancy by the entirety laws, with the main effect having the same magnitude and significance even when we include the information on tenancy rules. We do not find a consistent effect in either direction for the impact of tenancy in the entirety on home values, suggesting that physicians do not appear to be using them to shield assets in the same way that we find them using homestead rules.

There are several possibilities as to why we fail to find an effect of tenancy rules on physician home values. First, the vast majority of physicians in the ACS are married (86%), providing us a relatively small control group (unmarried physicians) to isolate the impact of tenancy rules in our estimates. Also, the overlap between unlimited states and tenancy in the entirety states is relatively high (4 of 8 states have both), limiting our ability to separately identify the effect of the two policies.[42] But perhaps most importantly, tenancy by the entirety has a potentially significant limitation with regards to asset protection compared to homestead exemptions. That is, tenancy in the entirety requires that assets be jointly held between both spouses and are thus subject to division in a divorce proceeding. In effect, asset protection via tenancy by the entirety requires a physician to determine whether bankruptcy or divorce is more likely and choose accordingly. Given the

[42] Of the eight states with unlimited homestead exemptions Arkansas, the District of Columbia, Florida and Oklahoma also have tenancy by the entirety rules.

comparatively high rate of divorce relative to bankruptcy, homestead values likely provide better asset protection *ex ante*.

VI. CONCLUSIONS

The overwhelming majority of physicians contend that malpractice liability induces them to practice defensive medicine - the ordering of tests, procedures, and other health care services – to reduce the risk of malpractice claims. Nearly all physicians maintain substantial insurance coverage against liability risk and in only a small fraction of paid malpractice claims is the typical policy limit of a physician exceeded. This fact, combined with the fact that annual rates of paid malpractice claims are approximately 2 per 100 physician-years (Jena, 2011), has been used to suggest that the threat of malpractice induces defensive medicine because physicians primarily seek to avoid non-financial costs associated with malpractice, such as time and hassle, reputational costs, and personal anxiety.

Over a career, however, the risk of losing at least one malpractice suit is substantial, approaching 70% in high-risk specialties and 20% in low-risk specialties (Jena, 2011). The lifetime risk to physicians of being involved in suit that would be large enough to place personal financial assets at risk is therefore non-negligible. We demonstrated the importance of the financial risk of malpractice to physicians, or at least perceived risk, by showing how differences in risk influence their asset allocation behavior. We used a differences-in-differences approach that compared home valuations of physicians to non-physicians in unlimited and limited homestead exemption states, holding income, age, marital status, family size, and other variables that would be expected to influence home investment, constant. With this model, we found that physicians who reside in states with unlimited homestead exemptions invest approximately 13% more into the value of their homes. Our effects were largest in states where malpractice liability risk is the highest, suggesting that the

physician response to unlimited homestead exemptions is driven by perceived malpractice liability risk. We found no effect of homestead exemptions on other high-earning non-physician professionals such as lawyers and executives, but found effects among dentists, who also face substantial malpractice liability risk.

Our findings suggest that physicians take financially costly decisions to protect themselves from the threat of uninsured malpractice losses. Our estimates suggest that physicians in unlimited homestead states purchase about $28,000 in expected asset protection, while their expected career risk of excess malpractice liability ranges from $10,000 to $40,000, depending on specialty and other factors. Of course, not all such events will necessarily trigger bankruptcy, so the $28,000 could reflect a fairly elastic response on the part of physicians in terms of asset protection relative to expected risk. There are a number of factors that could explain this strong response, including comparatively high levels of risk aversion, the possibility that investing in a larger house offers a "protective" effect that induces settlement in malpractice cases (because the plaintiff has lower potential recovery), or the idea that malpractice fears represent a "dread risk" that physicians react strongly to (Carrier et al., 2010). Regardless, our findings indicate that physicians take costly steps to self-insure and lower the potential financial costs associated with malpractice liability risk.

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Table 1: Homestead Exemption Policies in Place for Married Individuals by State and Year, 2000-2010

	Exemption Level ($)						Federal Exemption?	Average Home Value	
STATE	2000	2002	2004	2006	2008	2010		Non-Physician	Physician
Alabama	10,000	10,000	10,000	10,000	10,000	10,000	No	170,310	562,060
Alaska	62,000	64,800	64,800	67,500	67,500	70,200	No	255,016	468,579
Arizona	100,000	100,000	100,000	150,000	150,000	150,000	No	287,276	731,383
Arkansas	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Yes	141,230	467,577
California	75,000	75,000	75,000	75,000	75,000	75,000	No	572,058	1,021,855
Colorado	90,000	90,000	90,000	90,000	90,000	90,000	No	332,693	717,458
Connecticut	150,000	150,000	150,000	150,000	150,000	150,000	Yes	434,348	755,729
Delaware	0	0	0	50,000	50,000	50,000	No	286,658	621,627
District of Columbia	0	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Yes	541,223	892,203
Florida	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	No	292,421	744,539
Georgia	20,000	20,000	20,000	20,000	20,000	20,000	No	231,270	590,568
Hawaii	20,000	20,000	20,000	20,000	20,000	20,200	Yes	562,162	933,622
Idaho	50,000	50,000	50,000	50,000	50,000	100,000	No	218,184	583,185
Illinois	15,000	15,000	15,000	30,000	30,000	30,000	No	265,541	698,512
Indiana	15,000	15,000	15,000	30,000	30,000	30,000	No	167,787	496,630
Iowa	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	No	145,834	398,887
Kansas	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	No	152,615	449,741
Kentucky	10,000	10,000	10,000	10,000	10,000	10,000	No	161,035	508,729
Louisiana	15,000	25,000	25,000	25,000	25,000	25,000	No	163,703	490,749
Maine	25,000	50,000	70,000	70,000	70,000	90,000	No	219,197	428,983
Maryland	0	0	0	0	0	0	No	402,894	752,763
Massachusetts	100,000	300,000	300,000	500,000	500,000	500,000	Yes	449,906	847,756
Michigan	7,000	7,000	7,000	31,900	31,900	34,450	Yes	205,115	537,219
Minnesota	200,000	200,000	200,000	200,000	300,000	300,000	Yes	257,795	583,815
Mississippi	75,000	75,000	150,000	150,000	150,000	150,000	No	138,597	468,153
Missouri	8,000	8,000	15,000	15,000	15,000	15,000	No	183,156	555,543
Montana	60,000	60,000	200,000	200,000	500,000	500,000	No	222,111	469,532
Nebraska	12,500	12,500	12,500	12,500	60,000	60,000	No	148,652	424,586
Nevada	125,000	125,000	200,000	350,000	350,000	550,000	No	328,626	790,393
New Hampshire	60,000	60,000	200,000	200,000	200,000	200,000	Yes	305,076	548,370
New Jersey	0	0	0	0	0	0	Yes	441,104	799,186
New Mexico	60,000	60,000	60,000	60,000	120,000	120,000	Yes	207,466	486,336
New York	20,000	20,000	20,000	100,000	100,000	100,000	No	380,489	829,239
North Carolina	20,000	20,000	20,000	37,000	37,000	37,000	No	216,587	564,160
North Dakota	80,000	80,000	80,000	80,000	80,000	100,000	No	125,763	355,249
Ohio	10,000	10,000	10,000	10,000	10,000	40,000	No	184,447	487,628
Oklahoma	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	No	140,564	439,669
Oregon	33,000	33,000	33,000	39,600	39,600	39,600	No	314,116	606,155
Pennsylvania	0	0	0	0	0	0	Yes	206,951	523,717
Rhode Island	0	150,000	150,000	200,000	300,000	300,000	Yes	343,704	675,128
South Carolina	10,000	10,000	10,000	10,000	10,000	10,000	No	211,919	633,082
South Dakota	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	No	148,950	400,876
Tennessee	7,500	7,500	7,500	7,500	7,500	25,000	No	191,339	557,882
Texas	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Yes	179,604	541,168
Utah	20,000	40,000	40,000	40,000	40,000	40,000	No	268,974	609,278
Vermont	150,000	150,000	150,000	150,000	150,000	150,000	Yes	242,978	466,454
Virginia	10,000	10,000	10,000	10,000	10,000	10,000	No	345,284	703,287

Washington	30,000	40,000	40,000	40,000	40,000	125,000	Yes	362,340	727,666
West Virginia	30,000	50,000	50,000	50,000	50,000	50,000	No	132,599	421,294
Wisconsin	40,000	40,000	40,000	40,000	40,000	40,000	Yes	221,841	543,744
Wyoming	20,000	20,000	20,000	20,000	20,000	20,000	No	211,840	474,477

Source: Table reports data from Elias, Renauer, and Leonard (various years) on the maximum value of homestead exemptions for married individuals by state and year in two-year intervals from 2000-2010. Data on average home values come from the mean values for physicians and non-physicians in the American Community Survey, 2000-2010 (see text for details).

Table 2: Summary Statistics

	Full Sample		Physicians		Non-Physicians	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Respondent and household characteristics:						
Age	55.17	13.64	51.22	10.85	55.19	13.65
Female	0.52	0.50	0.26	0.44	0.52	0.50
Married	0.71	0.45	0.85	0.36	0.71	0.45
Household income (2012 $s)	95,587	88,507	298,668	185,770	94,526	86,472
Family members in household	2.73	1.46	3.13	1.47	2.73	1.46
Self-employed	0.10	0.30	0.39	0.49	0.10	0.30
Usual hours worked per week	26.64	21.65	47.69	19.27	26.53	21.60
Unlimited homestead exemption	0.20	0.40	0.18	0.38	0.20	0.40
Housing characteristics						
House value (2012$s)	279,505	288,300	646,660	486,751	277,586	285,665
Monthly mortgage payment (2012$s)	811	957	2,028	1,814	804	946
Annual property insurance cost (2012$s)	753	718	1,482	1,367	749	711
Number of bedrooms	4.16	0.92	4.87	1.06	4.16	0.92
Number of rooms	6.52	1.84	8.07	2.19	6.51	1.83
Malpractice risk						
Malpractice payments per physician (2012$s)	5,252	2,952	5,364	3,020	5,251	2,951
Tort reform in state:						
Non-economic damage cap	0.46	0.50	0.47	0.50	0.46	0.50
Punitive damage cap	0.60	0.49	0.57	0.50	0.60	0.49
Cap on total recovery	0.09	0.29	0.08	0.28	0.09	0.29
Split recovery	0.12	0.33	0.12	0.33	0.12	0.33
Modified collateral source rule	0.69	0.46	0.72	0.45	0.69	0.46
Punitive damages evidence rule	0.71	0.45	0.69	0.46	0.71	0.45
Periodic payments	0.69	0.46	0.70	0.46	0.69	0.46
Contingent fee limit	0.48	0.50	0.52	0.50	0.48	0.50
Joint and several liability modification	0.75	0.43	0.75	0.43	0.75	0.43
Patient fund	0.27	0.45	0.28	0.45	0.27	0.45
Comparative fault modification	0.91	0.29	0.91	0.29	0.91	0.29
Observations	10,476,750		53,642		10,423,108	

Notes: Table reports means and standard deviations on the ACS study sample from 2000 to 2010 overall and separately for physicians and non-physicians. The sample includes respondents who are 18+, employed and who reside in an owner-occupied dwelling. The data on state liability laws come from the Database of State Tort Law Reforms, 5th edition (Avraham, 2014). Data on malpractice payments per physician combines data on paid malpractice liability aggregated to the state-year level from the National Practitioner Data Bank (NPDB) linked to state-year physician counts from the Area Health Resource File (AHRF).

Table 3: Average Home Values in Limited and Unlimited Homestead Exemption States, Physicians vs Non-Physicians

INCOME CATEGORY	Group	Mean	Std. dev.	Observations	Difference-in-difference	Std. error	*p*-value
Less than $100,000	Physicians & limited	433,136	436,613	6,244			
	Physicians & unlimited	357,799	362,729	1,606			
	Non-physicians & limited	222,471	227,503	8,652,871			
	Non-physicians & unlimited	164,075	170,953	2,386,547	-16,942	6,066	0.01
$100,000-$150,000	Physicians & limited	499,989	422,903	6,139			
	Physicians & unlimited	423,944	366,780	1,372			
	Non-physicians & limited	348,715	267,928	2,681,101			
	Non-physicians & unlimited	257,571	206,134	590,348	15,099	7,723	0.05
$150,000-$200,000	Physicians & limited	535,575	363,920	6,639			
	Physicians & unlimited	443,045	315,780	1,435			
	Non-physicians & limited	461,238	320,167	1,051,014			
	Non-physicians & unlimited	338,847	260,244	203,992	29,861	9,100	<0.01
$200,000-$250,000	Physicians & limited	605,861	440,639	6,097			
	Physicians & unlimited	514,904	393,946	1,220			
	Non-physicians & limited	563,936	391,269	446,243			
	Non-physicians & unlimited	421,683	322,675	84,084	51,296	12,066	<0.01
$250,000-$300,000	Physicians & limited	677,831	490,062	4,359			
	Physicians & unlimited	559,483	419,957	812			
	Non-physicians & limited	653,466	477,105	207,370			
	Non-physicians & unlimited	489,233	428,293	39,581	45,885	18,142	0.01
$300,000-$350,000	Physicians & limited	691,894	483,497	3,959			
	Physicians & unlimited	613,712	493,908	755			
	Non-physicians & limited	689,901	511,117	116,139			
	Non-physicians & unlimited	528,090	472,768	24,350	83,629	20,330	<0.01
$350,000-$400,000	Physicians & limited	722,252	481,963	4,311			
	Physicians & unlimited	659,696	523,463	814			
	Non-physicians & limited	718,441	535,168	91,391			
	Non-physicians & unlimited	582,178	484,807	18,993	73,707	20,504	<0.01
$400,000-$450,000	Physicians & limited	780,808	564,242	3,346			
	Physicians & unlimited	713,564	539,184	1,018			
	Non-physicians & limited	805,035	636,497	66,117			
	Non-physicians & unlimited	686,799	556,758	20,135	50,993	22,601	0.02
$450,000-$500,000	Physicians & limited	861,573	579,561	2,627			
	Physicians & unlimited	752,288	505,743	727			
	Non-physicians & limited	885,396	670,396	51,029			
	Non-physicians & unlimited	695,421	518,637	13,304	80,690	27,463	<0.01
$500,000 or greater	Physicians & limited	1,019,706	706,861	6,312			
	Physicians & unlimited	867,654	639,430	1,352			
	Non-physicians & limited	1,082,467	856,534	113,983			
	Non-physicians & unlimited	878,079	720,490	18,779	52,337	25,763	0.04

Notes: Table reports means and standard deviation of housing values separately for physicians and non-physicians in states with and without unlimited homestead exemptions by detailed income category. The column labeled “difference-in-difference” presents the coefficients for the simple difference-in-difference regression of physicians relative to non-physicians in states with and without unlimited homestead exemptions with no other covariates in the regression.

Table 4: Regression Estimates of the Effect of Unlimited Homestead Exemptions on Physician Home Values with Different Combinations of Fixed Effects and Other Covariates

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Full Sample									
Physician*Unlimited	0.197***	0.188***	0.145***	0.182***	0.130**	0.131**	0.130**	0.153**	0.135**
	(0.061)	(0.062)	(0.052)	(0.062)	(0.055)	(0.055)	(0.055)	(0.058)	(0.057)
Observations	10,476,750	10,476,750	10,434,999	6,744,019	6,741,280	6,741,280	6,741,280	5,248,173	5,248,173
R-squared	0.210	0.251	0.367	0.262	0.393	0.395	0.393	0.463	0.414
Panel B: Income under $250,000									
Physician*Unlimited	0.164***	0.157***	0.133***	0.154***	0.125***	0.125***	0.125***	0.147***	0.138***
	(0.048)	(0.047)	(0.038)	(0.047)	(0.041)	(0.041)	(0.041)	(0.051)	(0.048)
Observations	10,084,473	10,084,473	10,042,722	6,441,154	6,438,415	6,438,415	6,438,415	4,991,788	4,991,788
R-squared	0.207	0.244	0.338	0.254	0.361	0.363	0.361	0.434	0.384
Panel C: Post 2005 only									
Physician*Unlimited	0.187***	0.181***	0.147**	0.175**	0.130**	0.130**	0.130**	0.153**	0.135**
	(0.066)	(0.066)	(0.056)	(0.066)	(0.058)	(0.058)	(0.058)	(0.058)	(0.057)
Observations	8,181,049	8,181,049	8,148,429	5,250,253	5,248,173	5,248,173	5,248,173	5,248,173	5,248,173
R-squared	0.219	0.258	0.372	0.271	0.398	0.400	0.398	0.463	0.414
Panel D: Censored Regression									
Physician*Unlimited	0.194***	0.185***	0.143***	0.180**	0.128**	0.129	0.129**	0.149**	0.132**
	(0.061)	(0.055)	(0.053)	(0.070)	(0.056)	(0.000)	(0.055)	(0.061)	(0.059)
Observations	10,476,750	10,476,750	10,434,999	6,744,019	6,741,280	6,741,280	6,741,280	5,248,173	5,248,173
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Law controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Hours worked	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear trend	No	No	No	No	No	Yes	Yes	No	No
Physician/Non-physician linear trends	No	No	No	No	No	No	Yes	No	No
MSA FE	No	No	No	No	No	No	No	Yes	No
City FE	No	No	No	No	No	No	No	No	Yes

Notes: The table presents coefficients for the difference-in-difference regression of unlimited homestead exemptions interacted with physicians on the natural log of home value. Each cell presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, and whether the respondent is self-employed. MSA and City identifiers were only available from 2005 on. Robust standard errors adjusted to allow for clustering at the state level are reported in parentheses. The censored regression models cap maximum housing values at $1 million in all years, to account for top-coding in the ACS. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 5: Effect of Unlimited Homestead Exemptions on Physician Home Values According to the Liability Risk in the State

VARIABLES	(1)	(2)
Liability Risk*Unlimited	-0.011	-0.003
	(0.013)	(0.007)
Liability Risk*Unlimited*Physician	0.015	0.008
	(0.016)	(0.013)
Practicing Physician*Liability Risk	-0.009	-0.006
	(0.010)	(0.008)
Liability Risk	0.005	-0.007*
	(0.007)	(0.004)
Physician*Unlimited	0.118	0.106
	(0.125)	(0.100)
Physician	0.956***	0.377***
	(0.087)	(0.064)
Effect relative to states in the bottom quartile of liability risk:		
Effect in states in the top quartile of liability risk	0.216***	0.156*
	(0.0575)	(0.0694)
Effect in states in the third quartiles of liability risk	0.186***	0.141***
	(0.0695)	(0.0567)
Effect in states in the second quartile of liability risk	0.162*	0.129**
	(0.0863)	(0.0486)
Observations	10,476,750	10,434,999
State FE	Yes	Yes
Year FE	Yes	Yes
Law controls	No	Yes

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians and liability risk on the natural log of home value. Liability risk is measured by the total medical malpractice payment in the resident's state for the respective year divided by the number of physicians in the state that year. Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. The bottom three rows provide the significance of the unlimited homestead exemption, physician and liability risk interaction at the top, middle and bottom quartile of the liability risk distribution. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6: Effect of Homestead Exemption Value on the Likelihood that Physicians Purchased their Homes During a Malpractice Insurance 'Hard Market'

VARIABLES	(1)	(2)	(3)	(4)
	Value of Home	Value of Home	Home was Purchased in Hard Market	Home was Purchased in Hard Market
Hard Market*Unlimited*Physician	0.048	0.069		
	(0.081)	(0.088)		
Hard Market *Unlimited	0.032	0.017		
	(0.068)	(0.052)		
Physician*Hard Market	-0.162***	0.100*		
	(0.060)	(0.052)		
Hard Market	0.062***	0.051**		
	(0.023)	(0.021)		
Physician*Unlimited	0.192***	0.138**	0.007*	0.007*
	(0.061)	(0.064)	(0.003)	(0.004)
Unlimited Homestead Exemption	0.299***	0.239***	-0.000	-0.002***
	(0.027)	(0.023)	(0.000)	(0.000)
Physician	0.941***	0.089***	0.003***	0.002*
	(0.042)	(0.018)	(0.001)	(0.001)
Observations	5,925,395	5,925,395	5,925,395	5,925,395
R-squared	0.202	0.349	0.037	0.042
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Law Controls	No	Yes	No	Yes

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians and the same interaction also interacted with whether the home was purchased in a "hard market" on natural log of the value of their home. Column 3 and 4 presents the coefficients of the linear probability model estimating the impact of unlimited homestead exemptions interacted with physicians on the probability a home was purchased in a hard market. A hard market is defined as the years 1970-78, 1984-86 and 2001-2004, also referred to as periods of malpractice insurance crisis. Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7: Estimated Relationship between Unlimited Homestead Exemptions on Physicians' Income and Hours Worked

VARIABLES	(1)	(2)	(3)	(4)
	Household income	Household income	Hours worked	Hours worked
Physician*Unlimited	0.115***	0.097***	0.014	0.004
	(0.028)	(0.027)	(0.015)	(0.012)
Observations	10,434,999	10,434,999	6,744,019	6,744,019
R-squared	0.030	0.197	0.004	0.113
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Law Controls	No	Yes	No	Yes
State-specific trend	No	Yes	No	Yes

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians on natural log of household income (column 1 and 2) and hours worked (column 3 and 4). Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8: Estimating the Effect of the Value of Limited Homestead Exemptions on Physician Housing Values

VARIABLES	(1)	(2)
Physician*Value of Homestead Exemption ($10,000)	0.00019***	0.00014***
	(0.000)	(0.000)
Physician	0.90560***	0.34380***
	(0.040)	(0.026)
Value of Homestead Exemption ($10,000)	0.00006	0.00004
	(0.000)	(0.000)
Observations	10,476,750	10,434,999
R-squared	0.210	0.367
State FE	Yes	Yes
Year FE	Yes	Yes
Law Controls	No	Yes
State-specific trend	No	Yes

Notes: Table presents coefficients for the regression of value of the state's homestead exemption in $10,000, the value interacted with physicians and an indicator for whether the respondent is a physician on the natural log of home value. Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 9: Testing the Impact of Unlimited Homestead Exemptions on the Home Values of Non-Physicians in Selected Occupations

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All	Nurses	Lawyers	Engineers	Dentists	Pharmacists
Physician*Unlimited	**0.306*** **					
	(0.025)					
Physician	**0.132** **					
	(0.056)					
Nurse*Unlimited	0.019	0.017				
	(0.016)	(0.015)				
Nurse	**0.038*** **	**0.033*** **				
	(0.010)	**(0.010)**				
Lawyer*Unlimited	0.078		0.076			
	(0.059)		(0.058)			
Lawyer	**0.271*** **		**0.259*** **			
	(0.013)		**(0.012)**			
Engineer*Unlimited	0.045			0.043		
	(0.054)			(0.053)		
Engineer	**0.123*** **			**0.114*** **		
	(0.014)			**(0.014)**		
Dentist*Unlimited	**0.174*** **				**0.172*** **	
	(0.033)				**(0.032)**	
Dentist	**0.167*** **				**0.145*** **	
	(0.020)				**(0.019)**	
Pharmacist*Unlimited	0.032					0.030
	(0.023)					(0.022)
Pharmacist	**0.149*** **					**0.137*** **
	(0.015)					**(0.014)**
Observations	6,741,280	6,741,280	6,741,280	6,741,280	6,741,280	6,741,280
R-squared	0.394	0.392	0.393	0.392	0.392	0.392

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians as well as other professions on the natural log of home value. Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 10: Estimating the Effects of Unlimited Homestead Exemptions on Imputed Equity and Mortgage Levels of Physician Homes

Panel A: log(Equity>0)									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Physician*Unlimited	0.209***	0.201***	0.188***	0.200***	0.186***	0.190***	0.186***	0.261***	0.242***
	(0.076)	(0.062)	(0.062)	(0.063)	(0.064)	(0.064)	(0.064)	(0.078)	(0.073)
Observations	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	3,552,346	3,552,346
Panel B: Equity in Levels									
Physician*Unlimited	-7,895.135	-7,665.729	-10,204.343	-8,248.688	-10,796.960	-10,042.381	-10,796.897	8,377.023	3,005.704
	(17,425.594)	(16,714.728)	(14,726.807)	(16,331.036)	(14,320.126)	(14,127.472)	(14,334.813)	(20,990.829)	(22,002.092)
Observations	5,648,460	5,648,460	5,648,460	5,648,460	5,648,460	5,648,460	5,648,460	4,400,136	4,400,136
Panel C: Equity>0 levels									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Physician*Unlimited	20,251.279	18,901.540	14,470.570	18,615.191	14,168.911	15,178.553	14,093.679	41,120.310	36,274.127
	(18,793.065)	(17,752.084)	(15,742.972)	(17,250.291)	(15,199.859)	(14,929.992)	(15,227.289)	(26,339.599)	(27,826.481)
Observations	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	4,678,084	3,552,346	3,552,346
Panel D: Pr(Mortgage)									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Physician*Unlimited	-0.009	-0.014	-0.013	-0.012	-0.011	-0.011	-0.011	-0.011	-0.008
	(0.010)	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)
Observations	5,922,604	5,922,604	5,922,604	5,922,604	5,922,604	5,922,604	5,922,604	4,622,562	4,622,562
Panel E: Pr(Second Mortgage)									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Physician*Unlimited	-0.004	-0.004	-0.004	-0.004	-0.004	-0.018	-0.004	-0.012	-0.012
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.014)	(0.006)	(0.008)	(0.008)
Observations	10,472,594	10,472,594	10,472,594	10,472,594	10,472,594	10,472,594	10,472,594	8,177,882	8,177,882
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Law Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Hours Worked	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
State Specific Trend	No	No	No	No	No	Yes	Yes	No	No
Physician/Non-Physician Trends	No	No	No	No	No	No	Yes	No	No
MSA FE	No	No	No	No	No	No	No	Yes	No
City FE	No	No	No	No	No	No	No	No	Yes

Notes: Table panels A-C presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians on a measure of equity value. Equity value is computed as the remaining loan value assuming the respondent has a 30 year fixed mortgage at the average prevailing interest rate during the home purchase window. Panel D and E present the coefficients of a linear probability model. The dependent variable equals one if the respondent has any mortgage (panel D) or a second mortgage (panel E). Each cell presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, and whether the respondent is self-employed. MSA and City identifiers available only post 2005. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 11: Effect of Homestead Value Exemption on Other Measures of Physician Home Value

VARIABLES	(1)	(2)	(3)
	Monthly Mortgage Payment	Monthly Property Insurance	Number of Bedrooms
Physician*Unlimited	0.089***	0.227***	0.155***
	(0.026)	(0.076)	(0.053)
Observations	5,138,864	6,740,928	6,741,280

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians on the dollar value of the natural log of the respondent's monthly mortgage payment, the natural log of the cost of their monthly property insurance bill and the number of bedrooms in their home. The total bedrooms coefficients are estimated with a Poisson model. Each column presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, whether the respondent is self-employed, and state tort law controls. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.

Table 12: The Estimated Impact of Unlimited Homestead Exemptions on Physician Home Values while Controlling for State Policies Allowing Tenancy in the Entirety

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Physician*Unlimited	0.196***	0.189***	0.149**	0.188***	0.149**	0.151**	0.149**
	(0.065)	(0.064)	(0.062)	(0.063)	(0.062)	(0.062)	(0.061)
Married*Physician	-0.069**	-0.064**	-0.176***	-0.069**	-0.176***	-0.174***	-0.176***
	(0.033)	(0.031)	(0.030)	(0.031)	(0.030)	(0.030)	(0.030)
Married*Tenancy	0.014	0.015	0.009	0.015	0.009	0.009	0.009
	(0.027)	(0.027)	(0.029)	(0.027)	(0.029)	(0.028)	(0.029)
Married*Tenancy*Physician	0.011	0.007	-0.019	0.006	-0.019	-0.019	-0.019
	(0.064)	(0.063)	(0.066)	(0.062)	(0.066)	(0.067)	(0.066)
Married	0.349***	0.300***	0.200***	0.300***	0.201***	0.201***	0.201***
	(0.020)	(0.019)	(0.017)	(0.019)	(0.017)	(0.017)	(0.017)
Observations	10,476,750	10,476,750	10,476,750	10,476,750	10,476,750	10,476,750	10,476,750
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Law Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Income	No	No	Yes	No	Yes	Yes	Yes
Hours Worked	No	No	No	Yes	Yes	Yes	Yes
State Specific Trend	No	No	No	No	No	Yes	Yes
Physician/Non-Physician Trends	No	No	No	No	No	No	Yes

Notes: Table presents coefficients for the difference in difference regression of unlimited homestead exemptions interacted with physicians and the same interaction with whether the state has tenancy in the entirety on the natural log of home value. Each cell presents the coefficient for a separate regression. All regressions include the respondent's age, age squared, gender, marital status, family size, and whether the respondent is self-employed. Robust standard errors adjusted to allow clustering at the state level are reported in parentheses. A *, ** or *** indicates statistical significance at the 10%, 5% and 1% levels, respectively.