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How Do Changes in Medical Malpractice Liability Laws Affect Health Care Spending and the Federal Budget?

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Abstract

Changes to malpractice liability laws intended to decrease the liability of physicians and other medical providers have an ambiguous potential effect on overall health care spending (and the federal budget). Some providers may respond by performing fewer procedures that were undertaken mainly to avoid liability, whereas other providers may pursue more risky procedures and patients. This paper reviews the recent literature on the effect of changes in traditional liability laws on health care spending and presents new analyses of how such changes affect Medicare, Medicaid, and other spending. The available evidence indicates that such changes have an uncertain effect on Medicare spending, and they decrease by a small amount the spending of privately insured patients and some Medicaid patients. The Congressional Budget Office is incorporating those assessments into its updated modeling of the budgetary effects of changes in traditional liability laws.

Keywords: medical malpractice, provider behavior, health care expenditures, tort reform, defensive medicine

JEL Classification: I11, I18, H51

Notes

Unless otherwise indicated, all years referred to in this paper are calendar years.

Numbers in the text and tables may not add up to totals because of rounding.

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Summary

To incorporate evidence from new research and data, the Congressional Budget Office is updating its approach to estimating the effects of changes to medical malpractice liability laws on federal spending. From 2009 to 2018, CBO modeled the budgetary effects of changes to six traditional components of malpractice liability laws (noneconomic damage caps, punitive damage caps, modifications to collateral source rules, modifications to joint and several liability, attorney fee caps, and shortening the statute of limitations) that are intended to decrease the liability of physicians and other medical providers.[1] Such laws could affect federal spending if they change the quantity (or intensity) of health care delivered and the prices paid for health care services under federal health care programs. The updated modeling, to be used beginning this year, improves CBO's approach for estimating the budgetary effects of changes in medical malpractice liability laws to reflect recent findings from the research literature, new analyses conducted by CBO, and input from outside experts. Work to update the modeling is ongoing. This working paper describes the status of those efforts, explains how and why the modeling is changing, and offers a preliminary estimate of the effects on the federal budget.

Ways That Malpractice Liability Laws Affect Federal Spending

The medical malpractice system aims to compensate injured patients and incentivize appropriate treatment, but the system has some associated costs. Through the malpractice system, a patient may try to recover damages from a health care provider for injuries that result from inappropriate treatment—a recourse intended to discourage inappropriate treatment. However, because of imperfections in assessing liability, the system encourages some appropriate and some inappropriate treatment behavior. The costs of the malpractice system include both direct costs to providers and indirect costs to health care payers. Direct costs to providers include malpractice insurance premiums, costs related to self-insuring for malpractice expenses, and any other settlements, awards, and administrative costs not covered by insurance, which may translate into higher health care spending if those costs lead to higher prices paid for health care services. Indirect costs to health care payers consist of any changes in the quantity of health care treatment that result from liability concerns.[2] Because direct malpractice costs are a relatively small component of health care spending, changes in malpractice liability that lower direct costs could lower prices, and therefore health care spending, by only a small amount. However, because indirect costs arise from changes in the quantity of health care treatment, changes in malpractice

[1] Because states regulate both the practice of medicine and the tort system, CBO's analysis focuses on federal legislation that would require all states to bring their liability schemes into compliance with new federal standards.

[2] Changes in health care quantity may result from a change in the number of services (such as ordering an additional procedure) or in the intensity of services delivered (such as substituting a costlier magnetic resonance imaging scan for an X-ray).

liability could have much greater potential to affect health care spending by indirectly changing treatment behavior.

Laws that decrease malpractice liability could increase or decrease health care spending and the federal budget deficit. Decreases in liability are expected to result in slightly lower prices for health care services by lowering providers' direct costs. However, the predicted effect on the quantity of health care services provided depends on the degree to which changes in liability affect different types of provider behavior in health care treatment. Capping noneconomic damages and imposing other liability limits could result in budgetary savings if fewer procedures are conducted, such as diagnostic testing undertaken mainly to avoid liability. But such changes also could result in budgetary costs if more health care is provided that would otherwise have been avoided because of the liability risk, such as furnishing care to more higher-risk patients or treating a given patient with a riskier, more intensive procedure.

Because laws that decrease liability affect provider behavior in ways that encourage some types of treatment and discourage others, CBO expects that the effect of those laws on total health care spending could differ for patients who have different health care needs and seek treatment from different types of providers. Patients who receive more of their treatment from providers who respond to changes in liability law by performing fewer procedures could have lower spending, whereas patients who receive more of their treatment from providers who respond by furnishing more risky care could have higher spending. For other patients, changes in liability law might not affect spending at all. Patients receive care from a different mix of providers depending on their age, health status, insurance status, and other factors. For example, nonelderly and able-bodied individuals tend to use mostly acute care providers (such as acute care hospitals and office-based physicians), whereas elderly or disabled individuals tend to use more post–acute care and chronic care providers (such as skilled nursing facilities and home health care providers).

Evidence of Effects on Health Care Spending

CBO surveyed the recent research literature on the effect of changes in traditional liability laws on health care spending. That survey yielded some evidence that noneconomic damage caps affect the health care spending of overall patient populations. However, the review produced no consistent evidence of an effect for five other changes in laws (punitive damage caps, modifications to collateral source rules, modifications to joint and several liability, attorney fee caps, and shortening the statute of limitations). Changes in liability laws could cause offsetting effects for different types of health care spending. That potential indicates that empirical studies that estimate how such laws affect the total spending (that is, spending not restricted to particular types of providers) of an overall patient population (that is, not restricted to patients with particular health conditions) are the most informative for CBO's modeling. Many studies estimate the effect of noneconomic damage caps on health care spending and treatment, but relatively few estimate such effects on an overall patient population. Of the recent studies that focus on overall patient populations, researchers that focus on Medicare patients find that

noneconomic damage caps increase or have no effect on total health care spending (Paik et al. 2017; Moghtaderi et al. 2019). By contrast, the findings of analyses that focus on private patients or patients from all payers indicate that noneconomic damage caps decrease treatment or spending (Cotet 2012; Avraham et al. 2012). Few studies estimate the effect of other liability laws on spending, and studies that do so find zero or inconsistent evidence of an effect on spending.

Motivated by the disparate estimates in the literature, CBO analyzed how changes in traditional liability laws, primarily noneconomic damage caps, affect Medicare and Medicaid spending. The analysis suggests that noneconomic damage caps do not decrease Medicare spending on net and may even increase it. CBO also estimates that noneconomic damage caps decrease Medicaid spending for some eligibility groups, but the size of the decrease is highly uncertain. The Medicare analysis does yield some evidence that noneconomic damage caps reduce acute hospital spending, the domain most often studied in the literature. However, that effect is offset by a larger increase in postacute and chronic care spending primarily among home health, hospice, and skilled nursing facility providers.

In light of that evidence, CBO's assessment is that noneconomic damage caps have an uncertain effect on Medicare spending, and they decrease by a small amount the spending of privately insured patients and some Medicaid patients. Although both new analyses presented here and recent studies (Paik et al. 2017; Moghtaderi et al. 2019) estimate small positive effects of damage caps on Medicare spending, CBO does not view that evidence as conclusive enough to support a positive estimate. The best available evidence from privately insured patients (Avraham et al. 2012) and some nonelderly Medicaid patients (CBO's analysis) indicates that noneconomic damage caps reduce spending for those groups by about 1 percent. The assessment that noneconomic damage caps reduce spending for privately insured and nonelderly Medicaid patients, but not for Medicare patients, is consistent with evidence that nonelderly patients are much more likely to bring a malpractice suit than elderly patients. Thus, avoiding liability may be more of a concern for providers treating nonelderly patients.

How CBO Is Updating Its Modeling

The most recent evidence indicates that changes in traditional malpractice liability laws have a smaller effect on health care spending than the available evidence indicated when CBO last comprehensively updated its approach. As a result, CBO estimates substantially lower estimated reductions in federal spending under the updated modeling approach than under the modeling approach used from 2009 to 2018. The smaller effects are due largely to using more recent research and data indicating that such laws do not reduce Medicare spending, whereas previously CBO relied on research indicating that laws reducing liability would reduce health care spending for all patient populations. After applying those updated assessments, CBO now estimates that enacting federal legislation that caps noneconomic damages at $250,000 and caps attorneys' fees would reduce direct federal spending by about $20 billion and would have a net effect of

reducing the deficit by about $28 billion over 10 years. Spending subject to appropriation would be about $2 billion lower, so long as appropriations action was consistent with the effects of the legislation.

CBO's Modeling Approach

CBO, with the staff of the Joint Committee on Taxation, models the effects of changes in traditional malpractice liability laws on federal spending and federal revenues. The approach CBO used from 2009 to 2018 relied on an estimate from the literature that was based on variation in a measure of direct malpractice costs to determine the effect of proposed federal malpractice legislation on health care spending. CBO's updated modeling will restructure that approach to base the effect of that proposed legislation on estimates generated from state variation in malpractice law changes, which are similar to proposed changes in federal law.

What CBO's Modeling Estimates

CBO has previously modeled the federal budgetary effect of legislation that includes changes to six traditional malpractice liability law components that the Congress has often considered. Those components include:

- Capping awards for noneconomic damages at $250,000;
- Capping awards for punitive damages at either $500,000 or twice the value of awards for economic damages (such as for lost income and medical costs), whichever is greater;
- Establishing a fair-share rule (under which a defendant in a lawsuit is liable only for the percentage of a final award that is equal to his or her share of responsibility for the injury) to replace the current rule of joint and several liability (under which each defendant is individually responsible for the entire amount of an award);
- Allowing evidence of claimants' income from collateral sources (such as life insurance payouts and health insurance reimbursements, which can reduce the costs to claimants of being harmed) to be introduced at trial;
- Capping attorneys' fees (typically, attorneys charge fees equal to one-third of total awards and waive their fees if no award is made; the cap would reduce that percentage for larger awards); and
- Shortening the statute of limitations to one year from the date of discovery of an injury for adults and to three years for children (existing statutes of limitations vary by state and are typically set at two or three years from the date of discovery).

Although lawmakers have more recently considered other potential changes to malpractice liability laws, such as safe harbor rules and limits on expert witnesses, CBO has not estimated the budgetary effects of legislation that includes those other components.[3]

CBO and the staff of the Joint Committee on Taxation estimate the effect of malpractice changes only on federal spending and revenues related to health, not total national health spending. In practice, doing so requires CBO to estimate the effect on private health insurance (which affects the federal budget through both subsidies available for health insurance under the Affordable Care Act and tax preferences for employment-based health insurance); the Federal Employees Health Benefits program, for which the government subsidizes premiums; care for certain enrollees in the health programs of the Departments of Defense and Veterans Affairs; Medicaid; the Children's Health Insurance Program; and Medicare.[4]

Among the types of spending excluded from CBO's analysis are spending by individuals who lack health insurance and spending on care through community health centers (CHCs). The government is the liability insurer for physicians and other providers employed by eligible CHCs. Thus, changes to state liability laws would largely not affect the liability risk of providers employed by CHCs. CBO also does not estimate any change in spending for active-duty military personnel who receive care at Department of Defense facilities: Federal statutes prevent those personnel from bringing malpractice suits against the facilities. CBO does not estimate the effect of malpractice changes on spending by specific state Medicaid programs.

CBO's 2009 to 2018 Modeling Approach

The modeling approach CBO used from 2009 to 2018 relied on the agency's internal estimates to compute the effect of frequently proposed federal legislation on providers' direct malpractice costs and an estimate from the literature to translate that estimate into the total (direct + indirect) effect on health care spending.[5]

For the effect on direct malpractice costs, the modeling used parameters internally estimated in 2009 of how much each of five malpractice law components (noneconomic damage caps, punitive damage caps, modifications to collateral source rules, modifications to joint and several

[3] For more detailed definitions of those components, and a review of the literature on their effects, see Mello and Kachalia (2016).

[4] CBO and the staff of the Joint Committee on Taxation estimate that when the price of employment-based health insurance—which is tax preferred—declines, employers increase their employees' taxable compensation, increasing federal revenues.

[5] See CBO (2009) for further explanation of CBO's 2009 to 2018 modeling approach and how the agency developed it.

liability, and attorney fee caps) affect malpractice insurance premiums.[6] CBO used a difference-in-differences approach to estimate those parameters by comparing changes in malpractice insurance premiums in states that enacted those laws between 1993 and 2007 with changes in premiums in states that did not change their laws during that time. The difference-in-differences regression models were estimated using data on medical malpractice insurance premiums from two sources: Medical Liability Monitor (MLM) and the National Association of Insurance Commissioners (NAIC).[7] CBO used those parameter estimates to estimate the effect of mandating that all states meet federal standards for medical liability. Following that approach, CBO projected that national-level direct costs, as measured by malpractice insurance premiums, would decrease by about 10 percent as a result of enacting federal legislation that includes the five components mentioned above.[8]

The most significant, and uncertain, aspect of the modeling is how malpractice liability laws indirectly affect health care spending through changes in treatment quantity. The 2009 to 2018 modeling relied primarily on an estimate from Lakdawalla and Seabury (2012)—which was available as a working paper at the time of CBO's last comprehensive update—that total health care spending decreases by 0.5 percent for every 10 percent decrease in direct malpractice costs, as measured by malpractice awards per capita. At the time, that paper was the only available study that estimated the effect of changes in malpractice liability on Medicare Part A and B spending with a high degree of certainty. CBO's assessment that traditional liability laws would lead to decreases in health care spending also was informed by other evidence available at the time, including Avraham and colleagues (2012)—which was then available as a working paper.

CBO combined its estimate that federal legislation containing those five components would decrease direct costs by 10 percent with the estimate from Lakdawalla and Seabury (2012) to project that such legislation would be expected to decrease health care spending by 0.5 percent.

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[6] CBO did not separately estimate a parameter for the statute of limitations component in the same way. Instead, the agency relied on evidence from the research literature to determine how the statute affected malpractice insurance premiums.

[7] Both data sources have strengths and limitations. The data from MLM have the advantage of including actual premium rates; however, the three physician specialties (internal medicine, general surgery, and obstetrics/gynecology) for which it collects data are not representative of all physician specialties or providers. The data from NAIC have the advantage of covering all physician specialties, but computing an accurate price per policy is not possible because the data include total premium revenue but not the number of policies sold. The NAIC data also include other segments of the medical liability insurance market that purchase insurance, including hospitals, nursing homes, and other providers. However, the NAIC data do not include premiums for entities that self-insure or for physician-owned mutual insurers. Because self-insurance is common among large institutions, such as hospitals, the NAIC data are probably missing a large share of those market segments. Much overlap exists in the insurers reporting to MLM and NAIC, but neither source includes all insurers.

[8] CBO obtained the national-level estimate by weighing the state-level effects according to the size of state health expenditures. States that did not have a law component in place were attributed an effect of the law equal to the estimated parameter from the regression analysis for that law, and states that did have a law component in place were attributed a zero effect. CBO did not estimate the effects of such legislation on individual states.

That 0.5 percent reduction represents the overall effect on health care spending, including the direct effect of changes in providers' medical malpractice costs on health care prices and the indirect effect of changes in provider treatment behavior on the quantity of health care services. The 2009 to 2018 modeling incorporated the estimate that health care spending decreases by 0.5 percent for the privately insured and for federal health care programs (including Medicare and Medicaid) as a result of states' adopting the mandated changes to their liability laws.[9]

Key Changes in CBO's Modeling Update

The main change in how CBO will henceforth model the budgetary effect of federal malpractice liability legislation is to base the parameter of the degree to which health care spending responds to changes in malpractice law on more recent evidence from the literature and CBO's analysis. Rather than rescale an estimated direct effect of the legislation according to the Lakdawalla and Seabury (2012) parameter, CBO's updated modeling will rely on recent estimates of the effect of state law changes on total health care spending, which includes the effect of changes in direct and indirect costs. An advantage to that more recent evidence is that estimates are generated from variation in malpractice law changes similar to those in proposed legislation rather than from variation in a proxy for changes in direct costs. Those changes both update the parameter to reflect a more recent, broader set of evidence and restructure the approach for estimating the effect such that the agency's estimates are based on the experience of states that have previously implemented such malpractice laws. CBO will rely on a combination of estimates from the literature and the agency's recent analysis of the effect of malpractice law changes on Medicare and Medicaid spending.

Potential Effects of Medical Malpractice Liability

Malpractice liability is expected to unambiguously increase providers' direct costs. But because of countervailing forces, the predicted effect on health care payers' indirect costs (which are driven by changes in treatment quantity) is theoretically ambiguous. Imperfections in assessing liability under the current malpractice system encourage defensive treatment behaviors that result in too much of some types of care and too little of other types:

- Assurance behavior, or "positive defensive medicine," refers to physicians' tendency to try to reduce the risk of a malpractice suit by providing more inappropriate services that courts may incorrectly perceive as being appropriate. Ordering unnecessary imaging and diagnostic procedures is an often-cited example of such behavior.

- Avoidance behavior, or "negative defensive medicine," refers to physicians' tendency to try to reduce the risk of a malpractice suit by providing fewer appropriate services in scenarios

[9] For Medicaid, the reduction was applied to spending for acute health care services (both fee-for-service and managed care), but not to spending for long-term care.

in which courts may misperceive adverse outcomes as being due to inappropriate behavior. Such behavior may come in the form of physicians' substituting a less risky, lower-intensity service for a given patient or by avoiding high-risk patients altogether if they are perceived as being more likely to sue.

Financial incentives also encourage profit-seeking treatment behavior that results in too much of some types of care and too little of other types:

- Overtreatment, or "induced demand," refers to physicians' tendency to provide too many inappropriate, though profitable, services. Such behavior may come in the form of physicians' performing more inappropriate and high-margin procedures, such as imaging services, or by performing more services on profitable patients (such as those with private insurance).

- Undertreatment, or "stinting," refers to physicians' tendency to provide too little appropriate care that is not profitable. Such behavior may come in the form of physicians' performing fewer appropriate, though unprofitable, procedures—a common concern under capitated payment—or by furnishing fewer services to unprofitable patients (such as Medicaid patients).

Because malpractice liability encourages both types of defensive behaviors and discourages both types of profit-seeking behaviors, laws that lower liability have a theoretically ambiguous effect on treatment and spending. Malpractice liability encourages both types of defensive behaviors because providers can reduce their risk of a malpractice suit by doing more assurance behavior (more inappropriate services perceived to lower risk) and more avoidance behavior (fewer appropriate services perceived to increase risk). Malpractice liability discourages both types of profit-seeking behaviors because providers can reduce their risk of a malpractice suit by doing less overtreatment (fewer inappropriate but profitable services that increase risk) and undertreatment (more appropriate but unprofitable services that lower risk). How much each type of behavior affects treatment after a change in malpractice liability law depends on the interaction of liability and financial concerns, along with other factors, including patient characteristics (Frakes 2015).

Table 1 depicts the four types of behavior changes that could result from laws that lower malpractice liability (such as noneconomic damage caps). The table shows that treatment quantity could both increase and decrease and that those changes could be both appropriate and inappropriate.[10] Laws that lower liability may result in less treatment in some areas as providers

[10] The potential behavioral responses described here represent simplified insights from several theoretical models in the literature, including Currie and MacLeod (2008), Shurtz (2014), and Frakes (2015).

are less encouraged to pursue assurance behavior and less restrained in undertreating unprofitable services or patients. Laws that lower liability may also result in more treatment in other areas as providers are less discouraged from providing risky services and serving high-risk patients and less restrained in overtreating profitable services and patients.

All four of those effects may happen simultaneously when malpractice liability laws change. Consequently, both the sign of the effect of those laws on health care spending and the implications for quality of care (whether any changes in spending result from changes in appropriate or inappropriate treatment) are theoretically ambiguous. CBO must therefore rely on empirical estimates to determine both the direction and magnitude of the effect of those laws on spending, with the expectation that the effects may differ depending on the type of care and patient population. Empirical studies cannot easily fully characterize the interpretation of the effect—that is, how much of a change in treatment is appropriate or inappropriate—because spending data do not include enough information on patient health and quality of treatment delivered.

Recent Research on the Empirical Effects of Malpractice Liability Laws on Health Care Spending and Treatment

From a moderate number of studies, CBO finds mixed evidence that noneconomic damage caps affect health care spending. From fewer studies, CBO does not find consistent evidence that the other five laws (punitive damage caps, modifications to collateral source rules, modifications to joint and several liability, attorney fee caps, and shortening statutes of limitations) affect spending. Some researchers estimate that noneconomic damage caps reduce health care spending, whereas the findings of other studies indicate that such caps increase spending or have little effect.

What Types of Studies Did CBO Review?

The potential for liability laws to cause offsetting effects for different types of health care spending indicates that empirical studies that estimate how such laws affect total spending are the most informative for CBO's modeling. In the agency's modeling, the effect of such laws on total health care spending of all patients within each federal health care program and the private market is relevant for determining how such laws affect federal spending and revenues. Studies that focus only on patients with particular health conditions or spending on particular types of providers are less informative because the direction of the effect for certain patients or providers may be offset by groups not included in the study. Furthermore, because some types of health care are substitutable, observing a decrease for certain types of care (such as hospital inpatient spending) could result in shifting care to another setting (such as outpatient spending), leading to no net change in overall spending.

Because of the lack of evidence that the other five law components substantially reduce liability pressure and the challenges with isolating the effects of individual law components, most studies

in the literature focus on estimating the effect of noneconomic damage caps. Malpractice liability laws would be expected to indirectly affect provider treatment behavior only if they effectively reduce the pressure of medical malpractice liability. Therefore, determining whether those laws affect liability pressure is a useful first step in determining whether they could affect provider behavior. Paik and colleagues (2013b) find that noneconomic damage caps substantially reduce the pressure of medical malpractice liability, as measured by malpractice claim payouts, indicating a potential for those laws to affect provider behavior. However, the researchers find no evidence that other traditional malpractice liability laws reduce liability pressure, indicating that those laws would not be expected to indirectly affect provider treatment behavior.[11]

CBO's review of the literature focused on studies that analyzed the effect of those six types of malpractice laws on the health care spending of an overall population (that is, not restricting to patients with particular health conditions) in the United States. All studies meeting those criteria employed a difference-in-differences approach, in which the authors estimated a law's effect by comparing changes in outcomes in a treatment group of states that enacted those laws with changes in outcomes of a control group of states that did not change their laws. The important assumption, often referred to as the "parallel trends" assumption, needed for such studies' estimates to be interpreted as valid causal effects is that the states that did change their laws would have experienced changes in outcomes similar to those of the states in the control group without a law change. That assumption is typically assessed by comparing whether trends were similar in the two groups of states before the law changes occurred.

What Are Those Studies' Findings?

Recent studies of the effect of noneconomic damage caps on Medicare spending indicate inconsistent, zero, and even increasing effects of noneconomic damage caps on overall health care spending (see Table 2). Paik and colleagues (2017) study the effect of noneconomic damage caps on Medicare fee-for-service (FFS) spending by using county-level data. The researchers estimate that noneconomic damage caps implemented between 2002 and 2006 increased Medicare Part B spending by about 4 percent and had no significant effect on Part A spending, resulting in a significant increase in total Medicare spending of about 2 percent. Their results are robust to many specification and robustness checks. Using an extension of their research design applied to individual-level Medicare claims data, Moghtaderi and colleagues (2019) estimate Part B effects that are still mostly positive but attenuated toward zero when those individual-level data and additional control variables were used (although the study did not include claims from all types of providers). In discussing their results together with the findings of Paik and colleagues (2017), the authors "suggest caution in concluding that damage caps cause higher spending. In our view, the more compelling picture, from our results as a whole, is of

[11] Paik and colleagues (2013b) did not include the shortening of statutes of limitations, characterizing that as a minor policy.

heterogeneous outcomes, with spending rising in some areas, but neutral or falling in others" (p. 54). Taken together, in CBO's assessment, those two studies are the best recent evidence available on the effects of noneconomic damage caps on overall health care spending because they used comprehensive spending data and showed support for the necessary parallel trends assumption. In CBO (2006), the agency estimated that noneconomic damage caps reduced Medicare FFS spending and total state health care spending in an earlier study period in which state-level data were used. However, CBO found that states that enacted noneconomic damage caps experienced a different rate of spending growth at least in part because of concurrent changes in Medicare payment policy and other factors unrelated to changes in malpractice liability laws. As a result, the study was inconclusive, and CBO has not used the estimates presented in that paper in modeling the budgetary effects of proposed changes to federal malpractice liability law.

The literature includes some evidence indicating that noneconomic damage caps decrease overall health care spending in other populations (see Table 2). Avraham and colleagues (2012) use a dataset of large employer plans to study the effect of noneconomic damage caps on private health insurance premiums. Their outcome measure reflects the combined direct effect (on health care prices) and indirect effect (on health care utilization) of malpractice law changes after they are passed through to health insurance premiums. The researchers find that noneconomic damage caps significantly decrease private health insurance premiums by a magnitude greater than could be explained by the direct effect alone, indicating an indirect effect on private health insurance premiums of about –1 percent. However, their result is limited to the self-insured (and mostly preferred provider organization, or PPO) portion of the sample. Further, the coefficients on some of the other law changes they study (especially modifications to collateral source rules) are implausibly large in the self-insured sample.[12] The parallel trends assumption appears to be violated for noneconomic damage caps in the fully insured (and mostly health maintenance organization, or HMO) sample, making those results difficult to interpret. Cotet (2012) studies the effect of noneconomic damage caps on hospital utilization rates by using a county-level dataset of utilization rates for short-term nongeneral hospitals, short-term general hospitals, and long-term hospitals from all patients (regardless of insurance status or insurance type). She finds that noneconomic damage caps significantly reduce rates of surgery, hospital admission, and hospital outpatient visits. In CBO's view, that paper's main weakness is the limited focus on particular hospital utilization measures. Because other research indicates that providers may

[12] Neither CBO's analysis nor studies in the research literature (Paik et al. 2013b; Mello and Kachalia 2016) show any evidence that collateral source law changes reduce providers' medical malpractice liability—the only plausible mechanism for why such laws may have an indirect effect on provider treatment behavior. In their literature review, Mello and Kachalia (2016) say that "there is no plausible theoretical link between collateral-source offsets and defensive medicine or healthcare spending" (p. 54). Those factors are not consistent with the estimate of Avraham and colleagues (2012) that collateral-source law changes reduce private health insurance premiums by 1 percent, an effect similar in size to their estimate for noneconomic damage caps.

respond to noneconomic damage caps by increasing some types of care and decreasing others (Avraham and Schanzenbach 2015; Moghtaderi et al. 2019), extrapolating those estimates to total health care spending is difficult. Evidence that noneconomic damage caps reduce hospital spending is further supported by Frakes and Gruber (forthcoming). They use a different type of difference-in-differences design to show that immunity from medical malpractice liability reduces inpatient spending among nonelderly active-duty military patients by about 2 percentage points more in states that do not have a noneconomic damage cap in place.[13] Although the focus of their study was not to estimate the effect of damage caps, that study provides evidence that noneconomic damage caps had already reduced spending by 2 percent in states that had them in place.

CBO finds no consistent evidence that the other five law changes have a meaningful effect on overall spending. Consistent with that assessment, Mello and Kachalia (2016) concluded that the evidence is too mixed to draw conclusions that laws regulating joint and several liability affect total health care spending and that no evidence exists to support an effect of collateral-source rule laws, attorney fee limits, or shortening statutes of limitations on total health care spending.[14] Mello and Kachalia (2016) also found that the evidence is too mixed to conclude that noneconomic damage caps affect total health care spending beyond a direct effect on medical malpractice insurance premiums. But those authors did conclude that noneconomic damage caps reduce certain types of health care spending through a defensive medicine effect.

Many other researchers study the effect of noneconomic damage caps on patients with specific health conditions, mostly heart conditions and obstetrics patients. Evidence from heart patients generally shows a decrease in spending (Kessler and McClellan 1996, 2002) or certain types of treatment (Avraham and Schanzenbach 2015; Farmer et al. 2018) from noneconomic damage caps. Evidence from obstetrics patients is more mixed, with some papers reporting an increase in cesarean delivery (Currie and MacLeod 2008) and others no effect (Frakes 2012) or an effect that varied by the patient's type of insurance (Shurtz 2014).

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[13] Frakes and Gruber (forthcoming) estimate the effect of being completely immune from malpractice liability on inpatient spending by comparing the treatment of active-duty military patients with the treatment of dependents of active-duty military patients receiving care in the United States. Rather than compare the two groups across different periods, the authors use a difference-in-differences design where the second difference comes from whether a patient received treatment on-base from an active-duty military provider (active-duty providers are immune from liability related to treating active-duty military patients but are not immune from liability related to treating dependents) or off-base from a civilian provider (civilian providers have no such liability protections). As a supplementary analysis, Frakes and Gruber estimate the effect of noneconomic damage caps on inpatient spending by interacting their main difference-in-differences estimate with an indicator for whether the patient was treated in a state that had a noneconomic damage cap in place.

[14] Mello and Kachalia (2016) also state that the theoretical link between health care spending and changes to both attorney fee caps and statutes of limitations is "tenuous at best" (p. 47 and p. 60) and that "no plausible" theoretical link exists between collateral source changes and health care spending (p. 54).

CBO's Empirical Analysis of the Effect of Malpractice Liability Laws on Medicare and Medicaid Spending

In light of the mixed evidence on the effect of noneconomic damage caps on health care spending, CBO conducted new analyses of how those laws affect Medicare and Medicaid spending, the largest federal health care programs. CBO's analysis of Medicare spending largely supports the conclusions of recent studies (Paik et al. 2017; Moghtaderi et al. 2019) that noneconomic damage caps do not decrease, and may lead to a small increase in, Medicare spending. CBO's analysis of Medicaid spending yielded more uncertain estimates but points to noneconomic damage caps' reducing Medicaid spending for at least one eligibility group.

CBO also estimated the effect of four other law components (punitive damage caps, modifications to collateral source rules, modifications to joint and several liability, attorney fee caps) and found no consistent evidence that they affected Medicare or Medicaid spending, consistent with the previously discussed evidence that those law components have no measurable effect on liability pressure. For brevity, this paper presents only estimates of the effect of noneconomic damage caps. Controlling for the other laws does not substantially affect the estimates for the effects of noneconomic damage caps.

Analytic Method

CBO primarily used a difference-in-differences modeling approach, which relies on variation in state law changes over time, similar to the method used in much of the related literature.[15] As in those studies, the key "parallel trends" assumption underlying the agency's approach is that states without law changes serve as an accurate counterfactual for states that did change their laws.[16]

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[15] CBO also analyzed the effect of noneconomic damage caps on Medicare and Medicaid spending by using the synthetic controls method. Instead of simply using all nontreated states as the control group, as in the difference-in-differences analysis, the synthetic control method tries to construct a control group from the set of nontreated states such that both the levels and trends in the outcomes of interest are as close as possible for the treated states and the constructed synthetic control group in the pre-period. The estimates from that analysis are omitted here for brevity, but they are largely consistent with the primary difference-in-differences estimates reported here.

[16] Eleven states implemented a noneconomic damage cap over the sample period: Florida, Mississippi, Nevada, Ohio, Oklahoma, Texas, South Carolina, Georgia, Illinois, North Carolina, and Tennessee. Two states (Oregon and Pennsylvania) are excluded from the entire analysis sample because they removed a traditional malpractice liability law over the sample period and therefore do not provide a clear treatment or control. For the Medicaid analysis sample, additional states with missing or unreliable spending data (Arkansas, Maine, Kansas, Idaho, West Virginia, and Missouri) also are excluded. CBO used the Database of State Tort Law Reforms, version 5.1, which documents each state's law status from 1980 to 2012, as the state law source (Avraham 2014), and the agency carried forward each state's law status as of 2012 through the end of the sample period in 2014. That source and previous versions of it are used in much of the related literature, including Avraham and colleagues (2012) and Paik and colleagues (2017).

CBO estimated difference-in-differences regression specifications for state s, in year t as

$$log(y_{st}) = L_{st}\alpha + X_{st}\beta + \delta_t + \gamma_s + \varepsilon_{st}$$

where y_{st} represents per-beneficiary spending in the state-year observation, L_{st} represents a set of indicator variables capturing whether a noneconomic damage cap law was in effect in each state-year, δ_t represents a set of year fixed effects, γ_s represents a set of state fixed effects, and X_{st} represents a set of state-year control variables.[17] Including state fixed effects allows each state to have a different average level of the outcome variable, and including year fixed effects allows for a common parallel time trend for all states. With the inclusion of those two sets of fixed effects, the estimated coefficients on the noneconomic damage cap law indicator variables represent the difference-in-differences estimate of the law change. Each regression is weighted by the average number of beneficiaries (Medicare or Medicaid) in the state over the sample period and clusters standard errors at the state level.

The primary data sources are Medicare spending and enrollment data from the 1999–2014 Medicare Beneficiary Summary File and Medicaid spending and enrollment data from 1999–2010 state-reported administrative data.[18] The Medicare analysis sample includes all beneficiaries who were enrolled in both Parts A and B and received care through the FFS program for the entire year (about 70 percent of beneficiaries).[19,20] The Medicaid analysis sample

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[17] For the Medicare regressions, the controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate), state-year controls of the composition of the Medicare full-year FFS program population (including percentage of beneficiaries in categories of age, sex, race, rural/urban, and original reason for entitlement), and state-year controls for the composition of enrollment for the overall Medicare population (percentage enrolled in Medicare Advantage, Part A only, Part B only, and partial-year enrollees). For the Medicaid regressions, the controls include the same state-year population controls, along with the share of Medicare beneficiaries enrolled in managed care, the share of Medicare beneficiaries enrolled in managed care squared, the income eligibility level for certain groups (children, parents, and pregnant women) as a percentage of the federal poverty guidelines (commonly known as the federal poverty level), the percentage of the state's Medicaid population enrolled in comprehensive managed care, the percentage enrolled in noncomprehensive managed care, and the percentage of spending in FFS Medicaid within each eligibility group.

[18] The Medicaid spending and enrollment data come from two sources: the Centers for Medicare & Medicaid Services' Form CMS-64 and the Medicaid Analytic eXtract (MAX) person summary file. Those data were available through 2012, but CBO chose to use only observations through 2010 because the data were less reliable for some states in 2011 and 2012 and because the Affordable Care Act changed the enrollment composition of the Medicaid population in some states in those years.

[19] This excludes beneficiaries enrolled in Medicare Advantage, those who joined Medicare midyear, those who died during the year, and individuals enrolled in Part A or B only. Although the analysis sample consists of a large share of beneficiaries, it is not entirely representative because those who died during the year tend to have higher than average spending, and those other excluded groups tend to have lower than average spending.

[20] CBO also estimated the effects of noneconomic damage caps on monthly FFS spending per FFS beneficiary months (expanding the sample to include partial-year FFS enrollees—such as those who joined Medicare midyear and those who died during the year) and finds results similar to those reported here. The agency chose to report estimates from full-year FFS enrollees as the main results here because the stable population makes the estimates easier to interpret.

includes all beneficiaries enrolled in Medicaid at any point during the year through either FFS or managed care and excludes beneficiaries enrolled in both Medicare and Medicaid. Descriptive statistics of the main outcome variables used in the regression models can be found in Appendix Table A1.

Outcome Variables. The spending outcomes are specified as the log of per-beneficiary spending in the state, meaning that the coefficients on the medical malpractice law indicator variables can be interpreted roughly as percentage changes.[21] CBO reports Medicare effects broken out by three categories of spending:

- Part A acute spending, consisting of acute hospital care;
- Part B acute spending, consisting of all services furnished by physicians, hospital outpatient departments, and ambulatory surgery centers (including office visits, tests, imaging, procedures, and Part B drugs); and
- Parts A + B nonacute (post–acute care and chronic care) spending, consisting of services furnished by skilled nursing facilities, hospices, other inpatient facilities, home health care providers, durable medical equipment, and dialysis.

Data limitations prevent decomposition of the Medicaid effects by spending category, but CBO does report Medicaid effects separately for each of three eligibility groups: children, nonelderly and able-bodied adults, and the aged and disabled not also enrolled in Medicare. The first two groups tend to use more acute health care services, whereas the last group uses more nonacute services.

For comparison, CBO also first presents estimated effects of noneconomic damage caps on measures of medical malpractice liability and costs.[22] The laws studied would be expected to affect provider behavior by affecting the pressure of medical malpractice liability, so estimating whether those laws affect liability pressure is a useful first step in determining whether they could affect provider behavior. CBO measures the extent of medical liability that providers face by the numbers of and amounts of medical malpractice claim payouts per physician in the state, using data from the National Practitioner Data Bank, which includes all closed claims paid on behalf of physicians and individual practitioners. The agency measures medical malpractice costs

[21] To obtain the exact percentage change implied by the coefficient estimates, a transformation must be applied to the coefficient estimates necessary when using dummy variables in semi-log specifications. For a coefficient estimate β, the transformation is $\exp(\beta) - 1$ (Halvorsen and Palmquist 1980). The transformed value is approximately equal to β for small values of β.

[22] Those regressions covered the same sample period (1999–2014) and used the same set of control variables and weights as the Medicare spending regressions.

by using medical malpractice insurance premiums from the National Association of Insurance Commissioners.[23]

Treatment Variables. The estimates reported here allow for the effect of the law changes to occur gradually. That is accomplished by adding lags of the implementation status of each noneconomic damage cap, where the first lag is equal to one if a law was adopted exactly one year before, and so on, for additional post-years. The coefficient estimates on those lags reveal how outcomes in treated states differed from outcomes in untreated states in the years immediately after the changes in law compared to the pre-period. The following tables report point estimates from specifications that include indicators for the enactment year and three lags, where the third lag indicates the law was enacted three or more years before.[24] In the appendix, CBO reports estimates from specifications that include both lags and leads of the implementation status in order to evaluate the parallel trends assumption underlying the difference-in-differences approach.

The estimates primarily reflect the indirect effect of noneconomic damage caps on health care spending but could include a very small direct effect. Because Medicare payment rates would be slow to change in response to changes in direct malpractice costs and because those costs account for a very small share of health care spending (Mello et al. 2010; Paik et al. 2013a), the Medicare spending estimates should be interpreted primarily as the indirect effect of malpractice law changes on the quantity of health care services delivered.[25] Because states are free to adjust Medicaid payment rates at any time, the Medicaid estimates could reflect the combined (direct + indirect) effect of malpractice law changes on both health care prices and quantity. However, because states may be slow to adjust Medicaid prices and because direct malpractice costs account for a very small share of health care spending, the Medicaid estimates probably also primarily reflect the indirect effect of malpractice law changes on the quantity of health care services delivered.

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[23] Bernard Black kindly shared his cleaned dataset of MLM and NAIC malpractice insurance premiums, described in Black and colleagues (2017).

[24] Two of the treated states, Georgia and Illinois, removed their caps later in the sample period. To identify the effect of the caps by using only the years the caps were in place, the models include an indicator for the period after noneconomic damage caps were struck down in those states. For simplicity, CBO does not report the coefficient on that parameter, but the coefficient on the post-strike indicator would be interpreted as the difference in outcomes between Georgia and Illinois and the control group in the years after the law was repealed (2010–2014) compared to before it was enacted (1999–2004/2005).

[25] Estimates presented in Mello and colleagues (2010) indicate that direct malpractice costs represent about 0.4 percent of health care spending according to data for 2008. The current figure may be even lower as a result of the recent trend of decreasing medical malpractice claim payouts (Paik et al. 2013a).

Results

CBO estimates that noneconomic damage caps led to statistically significant decreases in measures of malpractice liability and costs and to statistically insignificant changes in total Medicare and Medicaid spending. The Medicare effects are estimated with reasonable precision, and the estimates indicate at most a small effect of damage caps that might, if anything, increase total Medicare spending. The Medicaid effects, by contrast, are imprecisely estimated, but the pattern of the estimates suggests a decreasing effect of uncertain size on Medicaid spending for some eligibility groups.

Measures of Malpractice Liability and Costs. CBO estimates that noneconomic damage caps significantly decrease medical malpractice liability and costs, as measured by malpractice claim payouts and premiums, indicating that those laws do have the expected effect on liability and the potential to affect provider behavior. As reported in Table 3, the effect of noneconomic damage caps on payouts is small and not statistically different from zero in the first year of enactment.[26] However, for the year after enactment, the sign of the estimated effect is negative and grows larger over time such that the coefficient for three or more years after enactment representing the fully phased-in effect of the law, –.420, implies a 34 percent decrease in malpractice payouts. Because nearly all physicians are insured against paying the monetary costs of a malpractice suit, a reduction in the probability of being sued for malpractice and facing the reputational, psychological, and time costs associated with defending a malpractice claim may better indicate the potential for a law to affect provider behavior.[27] The next column shows that caps also reduce the number of malpractice claims per physician in the state, indicating that physicians should indeed expect to face fewer malpractice claims under a noneconomic damage cap. The final column reports that the sign of the effect on malpractice premiums also is negative and grows larger over time. The coefficient representing the equilibrium effect of the law, –.218, implies a 20 percent decrease in malpractice premiums as the fully phased-in effect of a noneconomic damage cap. Those estimates fall within range of the effects reported in Paik and colleagues (2013b) and Seabury and colleagues (2014).

Medicare Spending. CBO estimates that noneconomic damage caps do not lead to a statistically significant change in overall Medicare FFS spending, although some categories of spending do show meaningful changes. Starting in the year after the law was enacted, states that enacted

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[26] Appendix Figure A1 reports estimates from specifications that include indicator variables for leads of a law's enactment as a means of evaluating the parallel trends assumption. That set of graphs indicates strong support for the parallel trends assumption for the measures of malpractice payouts and number of malpractice claims. The patterns also match reasonably well for the measure of malpractice insurance premiums, but—similar to the patterns in the total Medicare spending estimates reported in Appendix Figure A2—appear to diverge five or more years before a law's enactment. The interpretations of similar figures and specifications are discussed more thoroughly for the estimates of spending for Medicare and Medicaid.

[27] See Frakes (2015) and Avraham and Schanzenbach (2017) for discussions of why physicians might respond to laws that lower malpractice liability in the presence of malpractice insurance.

noneconomic damage caps begin to have slightly higher Medicare spending than states that did not enact caps. The difference becomes larger over time, indicating that Medicare spending increases by about 1 percent as a result of a fully phased-in cap, although the effect is not statistically significant (Table 4, column 1). Columns 2 to 4 of Table 4 show that the change in total Medicare spending is composed of a statistically significant 3 percent decrease in Part A acute spending, a near zero change in Part B acute spending, and a more than 7 percent statistically significant increase in nonacute spending. The increase in nonacute spending is driven by increases in home health, hospice, and skilled nursing facility spending, with the largest impact coming from home health. The remaining categories of nonacute spending—durable medical equipment, dialysis, and other inpatient spending (which consists of all nonacute inpatient facilities)—do not show meaningful changes (estimates for nonacute spending categories not shown).

Because the effect of laws that reduce malpractice liability is theoretically ambiguous, the finding that noneconomic damage caps lead to increases in spending in some settings and decreases in spending in others is not necessarily contradictory. An overall small increase in spending could indicate that reduced avoidance behavior slightly dominates reduced assurance behavior among providers treating Medicare patients, leading to a small net increase in spending. In the acute hospital setting, providers may be less prone to admit low-risk patients or may treat them less aggressively (reducing assurance behavior) because of reduced liability risk. In nonacute settings, providers may be more willing to treat high-risk patients or perform high-risk services (reducing avoidance behavior) because of reduced liability risk. Because patients treated in postacute and chronic settings tend to be particularly high-risk, providers in those settings may have particular scope for reducing avoidance behavior.

Alternatively, the large increase in home health, hospice, and skilled nursing facility spending may be interpreted as an increase in overtreatment if changes in those settings consist of increases in services for risky patients that are profitable on the margin and for which demand is relatively easy to induce. Finally, if physicians change treatment of one type of service as a result of changes in liability, that may affect other services that are substitutes or complements of the affected service. For example, if lower liability causes inpatient hospital spending to decrease, care may be shifted to the outpatient setting, leading to an increase in outpatient spending. Another possibility is that if lower liability causes physicians to reduce the quality of care for each service (for example, by spending less time or devoting less attention to a patient when providing a service), that could adversely affect patient health and consequently increase spending. However, Frakes and Jena (2016) examined the effect of noneconomic damage caps on quality of care and found no relationship.

Estimates from specifications including leads of a law's implementation indicate support for the parallel trends assumption for total Medicare spending in the years immediately leading up to a law change. But those estimates offer less support for the assumption for interpreting the results

for some categories of spending. Appendix Figure A2 shows that in the two years leading up to a law change, the difference in Medicare spending between treated and control states was the same as the difference three years leading up to the change, indicating that the trends were parallel in that period. Starting in the year a law was implemented, the difference becomes slightly larger and increases in later years but is never statistically significantly different from zero (similar to the specification reported in column 1 of Table 4). However, the trends for the treated and control states diverge slightly four years before the law change and diverge more five or more years before the law change, indicating some caution.[28] The specifications reported in Appendix Figure A3 for the major subcategories of Medicare spending indicate reasonably strong support for the parallel trends assumption for Part B acute spending but weaker support for the other two subcategories. Decomposing the change in Medicare spending into finer subcategories is difficult because not all subcategories of spending exhibit similar trends in treated and control states leading up to the law change.

The main result that noneconomic damage caps do not decrease total Medicare spending is robust to several alternative specifications. Allowing for more flexible time trends, excluding individual states from the sample, controlling for other types of malpractice law changes, and allowing for different timing of the laws' effects did not change the conclusion that noneconomic damage caps do not reduce overall Medicare spending (see Appendix Tables A2 and A3). CBO also estimated the effect of noneconomic damage caps by using an alternative approach, the synthetic control method, which allows for better matching of trends between treated and control states, and the main conclusions of that analysis were similar to those presented here.

The preceding results represent CBO's best estimates of the effect of noneconomic damage caps on Medicare spending for states that adopted caps after 1999, but some limitations indicate caution in interpreting those results. Although trends in overall Medicare spending match relatively well for the treatment and control states in the years immediately before enactment of legislation, they differ more when one compares four or more years before a change. Furthermore, trends in some subcategories of spending reported here (such as Part A acute) and finer subcategories not reported here (such as imaging services) do not match as well as trends in overall spending in the pre-period, making changes in total spending hard to attribute to particular services. Next, although both theory (Frakes 2015) and anecdotal evidence indicate that laws that lower malpractice liability, such as noneconomic damage caps, would be expected to (weakly) reduce utilization of imaging and testing services, CBO estimates modest increases

[28] The coefficient on the indicator for five or more years before the law change has a less straightforward interpretation than that of the other lead indicators because the treated states implemented noneconomic damage caps in different years over the sample period. Therefore, more state-year observations from states that implemented the caps later in the sample period are available for estimating that coefficient. Similarly, fewer state-year observations from states that implemented the caps later in the sample period are available for estimating the lag greater than or equal to a coefficient of three years, meaning that coefficient is also estimated from an unbalanced number of state-year observations.

in the utilization rates of those services after the enactment of noneconomic damage caps (estimates not shown).[29] Finally, the large estimated increases in home health and hospice spending come from areas not widely identified as being sensitive to malpractice pressure. The large increases in those spending categories raise concerns about whether noneconomic damage caps are truly responsible for those changes in spending. CBO's estimated effects for total Medicare spending are consistent with the findings reported in Paik and colleagues (2017) and Moghtaderi and colleagues (2019), although neither study reports separate estimates for spending in postacute and chronic settings.

Medicaid Spending. The evidence from the Medicaid analysis points to noneconomic damage caps reducing spending for some beneficiaries, but the estimates are uncertain. As shown in Table 5, CBO estimates that noneconomic damage caps decrease Medicaid spending for all three eligibility groups for at least some years, although none of those estimates are statistically significantly different from zero. The largest and most consistently negative estimated effects are for nonelderly and able-bodied adults, with the estimate implying an approximately 10 percent decrease in per-beneficiary Medicaid spending as a result of fully phased-in noneconomic damage caps. All the reported estimates have large standard errors, indicating a large amount of uncertainty. The estimated effects on Medicaid spending are more uncertain than the Medicare estimates in part because reported state Medicaid spending was more volatile during the sample period. That volatility is most likely due to changes in state Medicaid programs' enrollment composition and program design over the sample period, along with the lower overall quality of Medicaid spending data (which is state reported).

Estimates from specifications including leads of a law's implementation indicate support for the parallel trends assumption for Medicaid spending on children and nonelderly and able-bodied adults, but less support for Medicaid spending for the aged and disabled not also enrolled in Medicare. Appendix Figure A4 shows that in the years leading up to a law change, the difference in Medicaid spending for nonelderly and able-bodied adults between treated and control states was the same as the difference three years leading up to the change, indicating that the trends were parallel in that period. Starting two years after a law was implemented and continuing three or more years after the law was implemented, the change in Medicaid spending on nonelderly and able-bodied adults was lower in treated states than in control states. The pattern for Medicaid spending on children appears to be mostly flat, with only one year of lower spending in treated states in the post-period. The divergence in spending between treated and control states in the years immediately leading up to the law's implementation in Medicaid spending for aged and disabled adults not also enrolled in Medicare makes those estimates difficult to interpret.

[29] However, the pre-trends do not look similar between treated and control states for imaging services.

As with the Medicare results, estimated changes in Medicaid spending could be interpreted as changes in defensive medicine, profit-seeking behavior, or both. One way to interpret the decreases in Medicaid spending is that reduced assurance behavior dominates reduced avoidance behavior among providers treating Medicaid patients, leading to a net decrease in spending. Another way, which also explains the difference between the Medicare and Medicaid estimates, is with a theory in which a lower liability environment causes physicians to increase overtreatment by increasing inappropriate procedures that are profitable on the margin (services for Medicare patients) and increase undertreatment by decreasing procedures that are unprofitable on the margin (services for Medicaid patients). That explanation is similar to the theoretical models used by Currie and MacLeod (2008) and Shurtz (2014) to rationalize the difference in the effect of noneconomic damage caps on cesarean deliveries for the overall patient population, privately insured patients, and Medicaid patients.

Implications for CBO's Updated Modeling

In light of evidence from the literature and CBO's analysis, the agency's updated assessment is that noneconomic damage caps have an uncertain effect on Medicare spending and decrease by a small amount health care spending for privately insured patients and federal health programs with a predominately nonelderly and able-bodied population (including some Medicaid spending). After incorporating those assessments, CBO estimates that enacting federal malpractice legislation that caps noneconomic damages at $250,000 and caps attorneys' fees would reduce the federal budget deficit by about $28 billion over 10 years. The agency estimates that legislation making four other changes (capping awards for punitive damages at the greater of $500,000 or twice the value of awards for economic damages, modifying joint and several liability to establish a fair-share rule, allowing evidence of claimants' income from collateral sources to be introduced at trial, and shortening statutes of limitations) would not affect the deficit.

CBO's Updated Assessments of the Effect of Liability Laws on Health Care Spending

Several limitations and major sources of uncertainty are associated with all available estimates of the effect of malpractice laws on health care spending, in both CBO's analysis and estimates from the literature. Both use the experiences of states that did not implement policy changes to represent the counterfactual of what would have happened had states that implemented policy changes not done so. Although CBO's analysis tries to assess the validity of that assumption and finds some support for it, the assumption is fundamentally untestable, and it is always possible that unobserved factors in the post-period are driving the observed differences in spending. Another limitation is that the estimates are based on 11 states that implemented noneconomic damage caps in that period, which may not be representative of the response of other states that would be affected by proposed federal legislation.

Estimates of the effect of damage caps on Medicare spending are based on comprehensive, high-quality data and are estimated with reasonable precision but suffer from some important

limitations that indicate uncertainty about even the direction of the effect of such laws on spending. According to the best available evidence from the literature of the effects of noneconomic damage caps on total Medicare spending (Paik et al. 2017; Moghtaderi et al. 2019), as well as CBO's analysis, noneconomic damage caps do not decrease overall Medicare spending—and might even increase it. CBO, Paik and colleagues (2017), and Moghtaderi and colleagues (2019) all estimate that noneconomic damage caps increase Medicare spending by a small amount for states that implemented caps after 1999. However, some reservations prevent CBO from concluding that caps lead to increases in Medicare spending. In particular, some departures in parallel trends are evident between treated and control states in the pre-period. Also, no other known research findings show that home health, hospice, and skilled nursing facility providers—which are responsible for much of the increase in spending—are particularly responsive to decreases in malpractice liability.

The consistent finding that caps did not reduce overall Medicare spending (together with other research showing a decrease in spending for other populations) leads CBO to view the direction of the effect of noneconomic damage caps on Medicare spending as uncertain. Consequently, CBO will not attribute an effect of damage caps on Medicare spending in its updated modeling at this time. The assessment that damage caps do not reduce spending for Medicare patients is consistent with evidence that elderly patients make up a disproportionately small share of malpractice claims, indicating that avoiding liability may be less of a concern when treating Medicare patients.[30]

More limited evidence is available with respect to the effects on Medicaid and privately insured spending. CBO finds some evidence of a decrease in Medicaid spending for some beneficiaries, although the estimates are noisy and at times implausibly large. No known studies in the literature estimate effects on overall Medicaid spending, so CBO cannot compare those estimates with those of other studies. CBO could not examine effects on private spending because of a lack of data, and few studies in the literature estimate effects on overall private spending.

Although few studies estimate the effect of noneconomic damage caps on Medicaid and privately insured spending, in CBO's assessment the preponderance of the evidence indicates that caps on noneconomic damages do reduce health care spending in those populations by a small amount. The best available evidence from the literature, in CBO's assessment, indicates

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[30] For example, Mello and Kachalia (2016) estimate that whereas the elderly (individuals age 65 or older) account for more than 40 percent of inpatient costs, individuals age 60 or older account for less than 25 percent of all paid malpractice claims (which provides an upper bound on the claims rate of the elderly population). Using a different data source, Paik and colleagues (2012) estimate that the elderly account for 35 percent of medical spending but only 10 percent of medical malpractice claim payouts and 17 percent of large paid claims (defined as claims with payouts larger than about $45,500 in 2009 dollars). Avraham and Schanzenbach (2017) review additional studies and conclude that "it seems unlikely that a great deal of medical malpractice pressure comes from [Medicare patients]" (p. 131).

that damage caps reduce private health insurance premiums by about 1 percent in an employment-based health insurance population that is predominately nonelderly and able-bodied (Avraham et al. 2012). CBO's analysis of the effects on Medicaid spending indicates that noneconomic damage caps decrease total spending for nonelderly and able-bodied adults, although those effects are imprecisely estimated. Notably, the types of postacute and chronic care providers responsible for the large increases in spending in the Medicare population are much less likely to be used by the privately insured as well as children and nonelderly, able-bodied adults insured under Medicaid. The assessment that noneconomic damage caps reduce spending for privately insured and some Medicaid patients, but not for Medicare patients, is consistent with evidence that elderly patients are much less likely to bring a malpractice suit than other patients and make up a disproportionately small share of malpractice claim payouts (Paik et al. 2012; Mello and Kachalia 2016; Avraham and Schanzenbach 2017).

Although CBO's analysis of the effect of damage caps on Medicaid spending suggests that caps decrease spending for some beneficiaries, the estimates are not precise enough to determine the size of the spending reduction. Because the size of the Medicaid effect cannot be determined from CBO's analysis, the agency has extrapolated the estimate from Avraham and colleagues (2012) that caps reduce spending by about 1 percent to the segments of the Medicaid population most similar to the population privately insured through employment-based health insurance. Children and nonelderly and able-bodied adults covered under Medicaid are most similar to the population covered through employment-based health insurance in terms of age (nonelderly), health (predominately able-bodied), and the types of services and providers used (mostly acute).[31] However, aged and disabled Medicaid beneficiaries and those dually enrolled in Medicare tend to use a much different mix of services and providers (relying heavily on nonacute long-term services and supports). Consequently, in its updated modeling CBO will attribute a decrease of 1 percent to privately insured spending and Medicaid spending for children and nonelderly and able-bodied adults as a result of proposed new legislation that includes a noneconomic damage cap. CBO also will attribute a decrease of 1 percent for federal

[31] The providers used by nonelderly individuals with private coverage are more similar to those used by children and nonelderly and able-bodied adults covered under Medicaid than to those used by other Medicaid eligibility groups, but some differences exist in provider mix. Using 2016 Medical Expenditure Panel Survey data compiled by Blewett and colleagues (2018), CBO estimates that the share of medical spending on home health care services, prescription drugs, emergency department care, miscellaneous services and equipment, and outpatient hospital care for nonelderly and able-bodied adults with Medicaid coverage was similar to that of nonelderly adults who had private insurance coverage. Nonelderly and able-bodied adults with Medicaid coverage spent disproportionately more on inpatient hospital care than nonelderly adults with private coverage (37 percent vs. 25 percent of spending) and less on care from office-based medical providers (23 percent vs. 32 percent). CBO estimates that the share of medical spending on emergency department care, miscellaneous services and equipment, and outpatient hospital care was similar between children with Medicaid coverage and children with private insurance coverage. Children with Medicaid coverage spent disproportionately more on prescription drugs than children with private coverage (20 percent vs. 12 percent of spending) and home health care (17 percent vs. 2 percent of spending) and less on inpatient hospital care (25 percent vs. 34 percent of spending) and care from office-based medical providers (25 percent vs. 37 percent of spending).

health spending on other programs that predominately serve a nonelderly and able-bodied population, including the Federal Employees Health Benefits program, care for certain enrollees in the health programs of the Departments of Defense and Veterans Affairs, and the Children's Health Insurance Program.

In CBO's view, no consistent evidence exists to indicate that changes to other traditional liability laws (punitive damage caps, modifications to collateral source rules, modifications to joint and several liability, attorney fee caps, and shortening statutes of limitations) reduce health care spending. That assessment is based on CBO's review of the research literature and analyses conducted by the agency.

Illustrative Budgetary Estimates From CBO's Updated Modeling Approach

CBO now estimates that enacting federal malpractice legislation that caps noneconomic damages at $250,000 and caps attorneys' fees would reduce the federal budget deficit by $27.9 billion over 10 years. The effect on the deficit is due to a $19.9 billion decrease in direct federal spending, primarily Medicaid spending, and an $8.0 billion increase in revenues (see Table 6). In CBO's estimates, enactment of federal legislation in a given year (for example, 2019) would result in a decline in federal spending starting in the next year. The effect would increase for the first four years after enactment and then remain constant in percentage terms for the rest of the 10-year budget window.[32]

Because many states already have a noneconomic damage cap in place and so would be largely unaffected by federal legislation, CBO applies a 1 percent reduction in health care spending only to the share of national health care spending that such legislation would affect. CBO estimates that about 50 percent of national health care spending would be affected by federal malpractice legislation. Consequently, health spending in the affected federal programs would decrease by about 0.5 percent in each year once the effect is fully phased in. The 0.5 percent reduction in health care spending is similar to the effect CBO applied to all health spending in its modeling approach of 2009 to 2018, but the estimated savings after the updated approach are much smaller because the reduction is no longer applied to Medicare spending. (Owing to a lack of consistent evidence that changes in other types of traditional liability laws reduce health care spending, CBO does not now estimate additional spending reductions for proposed federal legislation limiting malpractice claims that includes components other than a noneconomic damage cap.)

In allowing for different effects of medical malpractice laws on spending for Medicare and other payers, CBO acknowledges that changes in malpractice liability laws would have heterogeneous

[32] As is CBO's practice, the budgetary effects in Table 6 are displayed by the federal fiscal year, which runs from October 1 to September 30 and is designated by the calendar year in which it ends. The results shown here reflect CBO's January 2019 baseline. Estimates for future federal legislation would reflect CBO's baseline used for budget enforcement at the time of the estimate.

effects on different federal programs. Ideally, enough evidence would exist to estimate separate effects for all major programs and eligibility groups. CBO will incorporate such evidence if it becomes available.

By decreasing private-sector spending on health care, a noneconomic damage cap also would affect federal revenues. A substantial amount of health care is covered under employment-based health insurance, a nontaxable form of compensation. Because the premiums that employers pay are excluded from employees' taxable income, lowering that cost to employers would boost the share of employees' income subject to taxation. That shift, combined with the effect on revenues of the reduction in premium tax credits for coverage purchased through the marketplaces, would increase federal tax revenues. Also, because caps on attorneys' fees would reduce attorneys' taxable income, revenues would be reduced under proposals that include that policy. Capping attorneys' fees would not affect federal spending. All those effects are reflected in Table 6.

Other Considerations

Although the estimated effects of changes in traditional malpractice liability laws on health care spending are small, evidence from the literature indicates that laws that lead to larger changes in liability (such as safe harbor laws) could have larger effects on spending. For example, Frakes (2013) finds that large changes in the standards of care used to determine physician malpractice liability lead to large changes in treatment behavior. In another study, Frakes and Gruber (forthcoming) estimate that complete immunity from malpractice liability leads to substantial decreases in inpatient spending. Not enough evidence exists yet for CBO to estimate whether such policies, such as safe harbor laws, would affect federal spending.

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Appendix

Plots of Coefficient Estimates for Specifications Including Lead and Lagged Indicators

Appendix Figures A1 to A4 assess the plausibility of the parallel trends identification assumption by plotting difference-in-differences coefficient estimates from specifications that include lead and lagged indicators for the implementation of noneconomic damage caps.[33] The coefficient estimates on those leads and lags reveal how outcomes in treated states differed from outcomes in untreated states in the years immediately before and after the law changes compared to a reference year in the pre-period. The first lag is equal to one if a law was adopted exactly one year before, and so on, for additional post-years. Leads are similarly defined where the first lead is equal to one if a law was adopted exactly one year in the future, and so on, for additional pre-years.

The figures plot the coefficient estimates on the lagged and lead indicators, with bars representing 95 percent confidence intervals. The first year the law was implemented is represented by year = 0, with year = 1 representing the year after the law was implemented, and so on. Each coefficient can be interpreted as the difference between treated and control states in each outcome variable in that year compared to three years before the law change (year = –3, the omitted category). The coefficient for year = 3 represents three or more years after the law's implementation and can be thought of as the equilibrium, or fully phased-in, impact of the law. The coefficient for year = –5 represents five or more years before the law's implementation. All models also include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, but that indicator is not plotted.

The coefficient on the $t = -5$ indicator is harder to interpret because the treated states implemented noneconomic damage caps in different years over the sample period. Therefore, more state-year observations from states that implemented the caps later in the sample period are available for estimating that coefficient. Similarly, fewer state-year observations from states that implemented the caps later in the sample period are available for estimating the lag coefficient for greater than or equal to 3, meaning that coefficient is also estimated from an unbalanced number of state-year observations.

The main text discusses the interpretation of each figure for each outcome measure in relation to the other estimates presented in this paper.

Sensitivity Analysis

Appendix Table A2 presents further robustness checks, in the form of specifications with different control variables and treatment specifications, of the estimated effect of noneconomic

[33] Descriptive statistics of the outcome variables used in those figures can be found in Appendix Table A1.

damage caps on total Medicare spending. Column 1 shows a simple treatment status indicator, with no population controls. Column 2 adds population controls. Column 3 returns to the main specification, using three lagged indicators for a law's implementation that were used in Tables 3 to 5. Column 4 adds indicators for four other traditional malpractice liability laws enacted by states over that period. In all those specifications, the estimated effects in the years after a law change remain small, positive, and not statistically significantly different from zero.

Columns 5 and 6 allow for more flexible growth in spending across states over that period. One potential concern in interpreting the results is that Medicare introduced two new prospective payment systems (PPSs) just before the beginning of the agency's sample period for home health care providers and skilled nursing facilities. Column 5 includes additional controls for the effect of those PPSs. Because the positive spending results in Medicare are driven in large part by those two types of providers, CBO is particularly interested in whether lagged effects of those payment systems may be contributing to the agency's estimates. CBO tries to control for any lagged effect of those new payment systems by interacting each year dummy variable with the level of per capita spending on both of those categories in 1996, before the new payment systems were introduced. Doing so allows states more affected by those payment systems to follow a different time trend from those states less affected. Adding those PPS controls does not diminish, and in fact strengthens, the positive coefficient on noneconomic damage caps in column 5 of Appendix Table A2. Column 6 includes an alternative way of allowing states to experience different spending growth over the sample period by including state-specific linear time trends, which has an effect similar to that of adding the PPS controls.

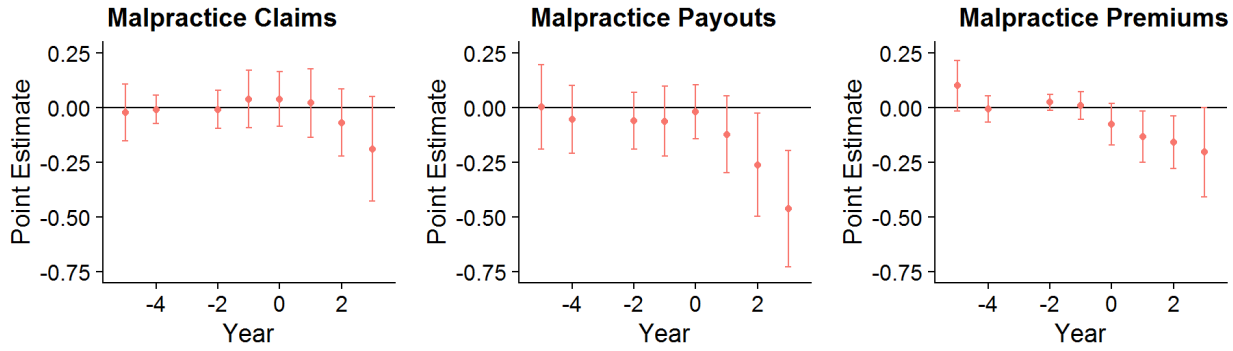
Column 7 shows a specification that reverts to the main time trend specification (year fixed effects only) with the addition of lead indicator variables for the implementation of a noneconomic damage cap that were plotted in Appendix Figures A1 to A4, and column 8 adds PPS controls to that specification. Again, adding PPS controls strengthens the estimated positive effect of noneconomic damage caps, and the concerning positive coefficient on the lead-of-five-years-or-more indicator is diminished.

Appendix Table A3 shows that the main results for total Medicare spending are robust to dropping two large states, Texas and Florida, which could have unduly influenced the results.

Appendix Tables A4 and A5 repeat the same sensitivity specifications from Appendix Table A2 for the Medicaid adult spending and Medicaid child spending analysis, respectively. The large decreasing spending effect of damage caps on Medicaid adult spending is robust to those alternative specifications, and slightly stronger decreasing spending effects for children appear in some of the alternative specifications.

Figures

Appendix Figure A1. **[Return to Text 1; 2; 3]**
Lead and Lag Estimates of the Effect of Noneconomic Damage Caps on Malpractice Liability and Premiums

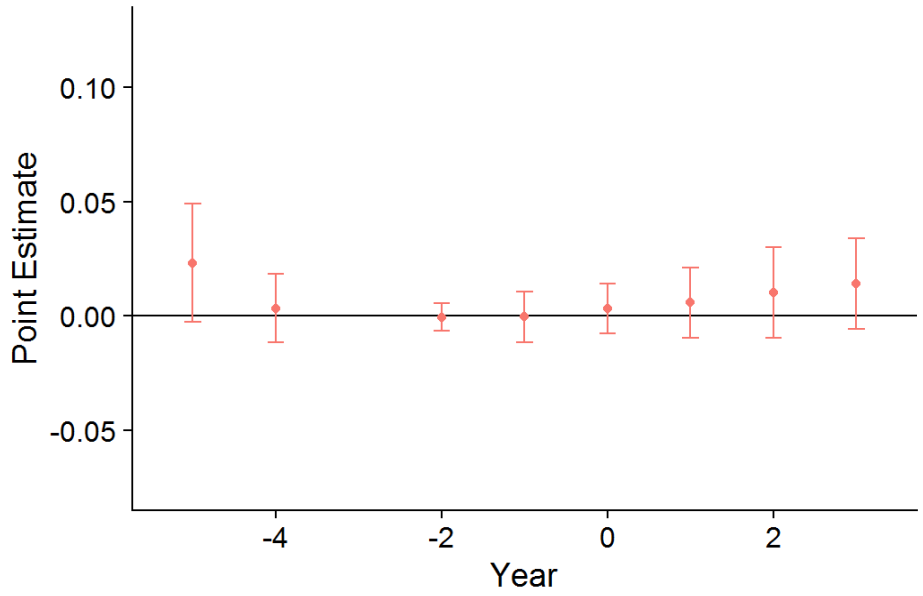


Source: Author's analysis.

Figure reports estimated coefficients from difference-in-differences regression models, where each plot represents a separate regression model. Each point represents a coefficient estimate on a lead or lagged indicator for implementation of a noneconomic damage cap, where year = 0 represents the year the law was first implemented. Each coefficient can be interpreted as the difference between treated and control states in each outcome variable in a given year compared to three years before the law change (year = –3, the omitted category). All regressions use the natural log of the indicated measure as the outcome, meaning that the coefficients on the lead or lagged indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Bars represent 95 percent confidence intervals.

Appendix Figure A2. **[Return to Text 1; 2; 3; 4]**
Lead and Lag Estimates of the Effect of Noneconomic Damage Caps on Total Medicare A + B Spending

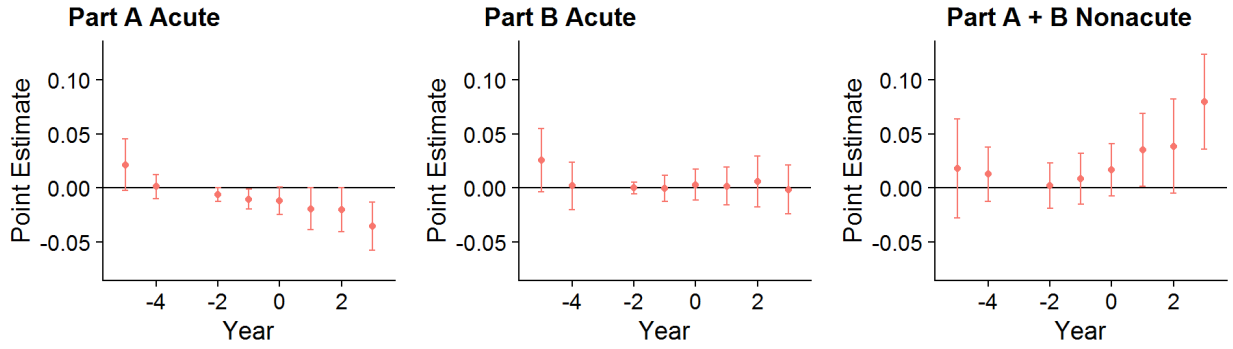


Source: Author's analysis.

Figure reports estimated coefficients from difference-in-differences regression models, where each plot represents a separate regression model. Each point represents a coefficient estimate on a lead or lagged indicator for implementation of a noneconomic damage cap, where year = 0 represents the year the law was first implemented. Each coefficient can be interpreted as the difference between treated and control states in each outcome variable in a given year compared to three years before the law change (year = –3, the omitted category). All regressions use the natural log of the indicated measure as the outcome, meaning that the coefficients on the lead or lagged indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Bars represent 95 percent confidence intervals.

Appendix Figure A3. **[Return to Text 1; 2; 3]**
Lead and Lag Estimates of the Effect of Noneconomic Damage Caps on Medicare Spending, by Category

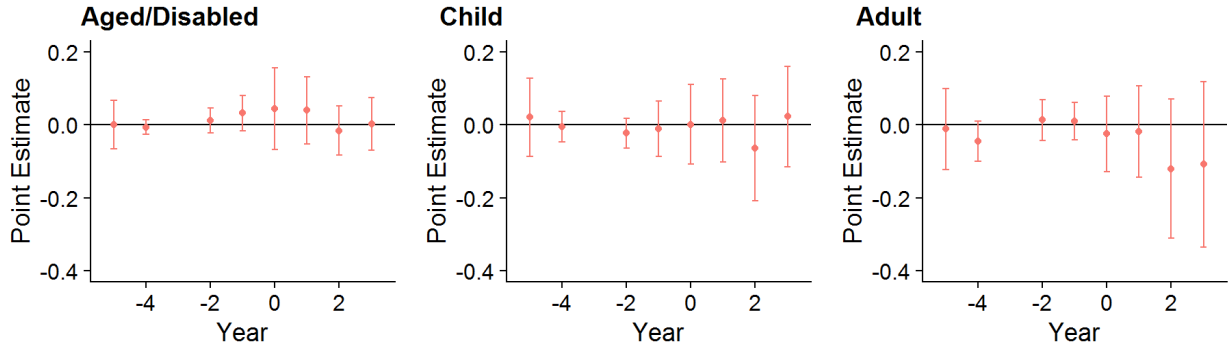


Source: Author's analysis.

Figure reports estimated coefficients from difference-in-differences regression models, where each plot represents a separate regression model. Each point represents a coefficient estimate on a lead or lagged indicator for implementation of a noneconomic damage cap, where year = 0 represents the year the law was first implemented. Each coefficient can be interpreted as the difference between treated and control states in each outcome variable in a given year compared to three years before the law change (year = –3, the omitted category). All regressions use the natural log of the indicated measure as the outcome, meaning that the coefficients on the lead or lagged indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Bars represent 95 percent confidence intervals.

Appendix Figure A4. **[Return to Text 1; 2; 3]**
Lead and Lag Estimates of the Effect of Noneconomic Damage Caps on Medicaid Spending



Source: Author's analysis.

Figure reports estimated coefficients from difference-in-differences regression models, where each plot represents a separate regression model. Each point represents a coefficient estimate on a lead or lagged indicator for implementation of a noneconomic damage cap, where year = 0 represents the year the law was first implemented. Each coefficient can be interpreted as the difference between treated and control states in each outcome variable in a given year compared to three years before the law change (year = –3, the omitted category). All regressions use the natural log of the indicated measure as the outcome, meaning that the coefficients on the lead or lagged indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Bars represent 95 percent confidence intervals.

Tables

Table 1. **[Return to Text]**
Potential Effects of Laws That Decrease Malpractice Liability

		Type of Care Affected	
		Appropriate	**Inappropriate**
Direction of Change in Treatment Level	**Increase**	Avoidance behavior, or negative defensive medicine	Overtreatment, or "induced demand"
	Decrease	Undertreatment, or "stinting"	Assurance behavior, or positive defensive medicine

Source: Author's summary of theoretical models from sources described in the text.

Table 2. [Return to Text 1; 2]

Estimated Effects of Noneconomic Damage Caps on Health Care Spending and Service Utilization

Study/Outcome	Estimate	Signif. Level	Sample	Strength of Result
Paik et al. (2017)				
Medicare Part A + B spending	2.40%	**	Medicare FFS, 1998–2011	High
Medicare Part A spending	–0.50%	n.s.	Medicare FFS, 1998–2011	High
Medicare Part B spending	4.20%	***	Medicare FFS, 1998–2011	High
Moghtaderi et al. (2019)				
Medicare Part A + B spending	$12.71	n.s.	Medicare FFS, 1999–2011	High
Medicare Part A spending	–$34.49	n.s.	Medicare FFS, 1999–2011	High
Medicare Part B spending	$47.19	**	Medicare FFS, 1999–2011	High
CBO (2006)				
Total health care spending	–1.40%	n.s.	All payers, 1980–2000	Low[a]
Medicare Parts A + B spending	–1.60%	n.s.	Medicare FFS, 1980–2003	Low[a]
Medicare Part A spending	–2.30%	n.s.	Medicare FFS, 1980–2003	Low[a]
Avraham et al. (2012)				
EHI premiums (self-insured)	–1.10%	**	EHI, 1998–2006	Moderate
EHI premiums (fully insured)	2.40%	*	EHI, 1998–2006	Low[b]
Cotet (2012)				
Surgery rate	–3.40%	**	All payers, 1990–2006	High
Hospital outpatient visit rate	–4.50%	*	All payers, 1990–2006	High
Hospital admission rate	–2.60%	**	All payers, 1990–2006	High

Source: Author's analysis.

EHI = employment-based health insurance; FFS = fee-for-service; n.s. = not statistically significantly different from zero at the 10 percent level; *** = $p < .01$; ** = $p < .05$; * = $p < .10$.

a. The CBO (2006) analysis had a strong study design, but evidence presented in that paper indicates that states that enacted damage caps experienced a different rate of spending growth at least in part because of concurrent changes in Medicare payment policy and other factors unrelated to changes in malpractice liability laws.

b. The estimates from the fully insured sample are difficult to attribute to the effect of noneconomic damage caps because states that enacted noneconomic damage caps had a different rate of premium growth from that of other states in the period before the laws changed.

Table 3. [Return to Text 1; 2]

Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Medical Malpractice Liability and Premiums

	Dependent Variable		
	Payouts	**Claims**	**Premiums**
	(1)	**(2)**	**(3)**
Year of Law Change	0.020	0.035	–0.099**
	(0.065)	(0.046)	(0.039)
1 Year Since Change	–0.082	0.017	–0.155***
	(0.061)	(0.062)	(0.047)
2 Years Since Change	–0.221**	–0.074	–0.176***
	(0.089)	(0.058)	(0.051)
≥3 Years Since Change	–0.420***	–0.195**	–0.218**
	(0.105)	(0.098)	(0.097)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Population Controls[a]	Yes	Yes	Yes
Within R^{2}[b]	0.33	0.28	0.43
Observations	784	784	784
R^2	0.837	0.914	0.926

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of the indicated measure as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect; *** = $p < .01$; ** = $p < .05$.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate), state-year controls of the composition of the Medicare full-year fee-for-service population (including percentage of beneficiaries in categories of age, sex, race, rural/urban, and original reason for entitlement), and state-year controls for the composition of enrollment for the overall Medicare population (percentage enrolled in Medicare Advantage, Part A only, Part B only, and partial-year enrollees).

b. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Table 4. [Return to Text 1; 2; 3; 4]

Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Medicare Spending

	Dependent Variable			
	Total	**Pt. A Acute**	**Pt. B Acute**	**A + B Nonacute**
	(1)	**(2)**	**(3)**	**(4)**
Year of Law Change	–0.001	–0.011*	–0.001	0.009
	(0.006)	(0.006)	(0.007)	(0.013)
1 Year Since Change	0.002	–0.018*	–0.002	0.028*
	(0.008)	(0.010)	(0.009)	(0.016)
2 Years Since Change	0.007	–0.018*	0.003	0.031*
	(0.009)	(0.010)	(0.011)	(0.018)
≥3 Years Since Change	0.012	–0.032***	–0.003	0.073***
	(0.010)	(0.011)	(0.011)	(0.021)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Population Controls[a]	Yes	Yes	Yes	Yes
Within R^{2}[b]	0.43	0.41	0.44	0.45
Observations	784	784	784	784
R^2	0.988	0.963	0.987	0.982

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of the indicated measure as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect; *** = $p < .01$; * = $p < .10$.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate), state-year controls of the composition of the Medicare full-year fee-for-service population (including percentage of beneficiaries in categories of age, sex, race, rural/urban, and original reason for entitlement), and state-year controls for the composition of enrollment for the overall Medicare population (percentage enrolled in Medicare Advantage, Part A only, Part B only, and partial-year enrollees).

b. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Table 5. [Return to Text 1; 2]

Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Medicaid Spending

	Eligibility Group			
	Average	**Aged/Disabled**	**Child**	**Adult**
	(1)	**(2)**	**(3)**	**(4)**
Year of Law Change	–0.001	0.032	0.009	–0.024
	(0.042)	(0.050)	(0.051)	(0.055)
1 Year Since Change	0.030	0.028	0.021	–0.016
	(0.037)	(0.042)	(0.052)	(0.062)
2 Years Since Change	–0.042	–0.028	–0.056	–0.118
	(0.054)	(0.037)	(0.070)	(0.093)
≥3 Years Since Change	0.008	–0.008	0.031	–0.105
	(0.061)	(0.038)	(0.065)	(0.112)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Population Controls[a]	Yes	Yes	Yes	Yes
Within R^{2}[b]	0.25	0.13	0.15	0.19
Observations	492	492	492	492
R^2	0.937	0.959	0.878	0.895

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of per beneficiary Medicaid spending for the indicated eligibility group as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

All estimates have a *p* value greater than .10, indicating that none of the estimates are statistically significantly different from zero at the 10 percent level. Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate, share of Medicare beneficiaries enrolled in managed care, share of Medicare beneficiaries enrolled in managed care squared), along with state-year-eligibility group controls for the income eligibility level for certain groups (children, parents, and pregnant women) as a percentage of the federal poverty guidelines (commonly known as the federal poverty level), percentage of the state's Medicaid population enrolled in comprehensive managed care, percentage enrolled in noncomprehensive managed care, and percentage of spending in fee-for-service within each eligibility group.

b. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Table 6. [Return to Text 1; 2; 3]

Federal Budgetary Effects of Federal Legislation That Caps Noneconomic Malpractice Damages and Attorneys' Fees

Millions of Dollars, by Fiscal Year

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2019–2024	2019–2029
Change in Mandatory Outlays[a]	0	–55	–470	–1,320	–2,145	–2,305	–2,440	–2,570	–2,705	–2,860	–3,025	**–6,295**	**–19,895**
Change in Revenues													
On-budget	0	17	120	332	545	632	665	778	832	869	906	**1,646**	**5,695**
Off-budget	0	7	53	145	245	283	294	308	321	333	344	**733**	**2,333**
Total revenues	0	24	173	477	790	915	958	1,086	1,153	1,201	1,250	**2,379**	**8,029**
Decrease (–) in the Deficit From Changes in Mandatory Outlays and Revenues[b]	0	–79	–643	–1,797	–2,935	–3,220	–3,398	–3,656	–3,858	–4,061	–4,275	**–8,674**	**–27,924**
Change in Discretionary Spending													
Budget authority	0	–8	–50	–145	–235	–240	–250	–270	–280	–295	–310	**–678**	**–2,083**
Outlays	0	–8	–50	–145	–230	–240	–250	–270	–280	–290	–310	**–673**	**–2,073**

Sources: Congressional Budget Office and the staff of the Joint Committee on Taxation.

Estimates are relative to CBO's January 2019 baseline. The estimates incorporate the assumption that legislation is enacted in 2019 and effects begin in 2020. Positive numbers indicate an increase in revenues; negative numbers indicate a decrease in spending.

The legislation would cap awards for noneconomic damages at $250,000. Typically, attorneys charge fees equal to one-third of total awards and waive their fees if no award is made; the cap would reduce that percentage for larger awards.

a. Includes estimated savings by the Postal Service, whose spending is classified as off-budget.

b. Effect on deficit includes mandatory spending and revenues; the estimate includes the effect on Social Security payroll taxes, which are classified as off-budget. Changes in discretionary spending are not included in this total because they would be realized only if future appropriations were adjusted accordingly and because the Congress uses different procedures to enforce its budgetary goals related to discretionary spending.

Appendix Table A1. Descriptive Statistics

[Return to Text 1; 2]

Panel A: Measures of Malpractice Liability and Cost per Physician (1999–2014)

Statistic	*N*	Mean	St. Dev.	Min.	Max.
Number of Malpractice Claims	784	0.016	0.008	0.002	0.056
Malpractice Payouts	784	5,154	2,807	411	19,729
Malpractice Premiums	784	15,897	7,766	3,397	146,389

Panel B: Descriptive Statistics for Medicare Spending per Beneficiary (1999–2014)

Statistic	*N*	Mean	St. Dev.	Min.	Max.
Total A + B	784	8,791	1,430	5,697	12,241
Part A Acute	784	2,717	421	1,966	4,251
Part B Acute	784	4,302	769	2,538	6,359
Part A + B Nonacute	784	1,772	540	577	3,709

Panel C: Descriptive Statistics for Medicaid Spending per Beneficiary (1999–2010)

Statistic	*N*	Mean	St. Dev.	Min.	Max.
Average Spending	492	4,740	1,274	2,553	8,778
Aged Disabled Spending	492	18,881	5,225	6,237	35,551
Child Spending	492	2,573	788	1,245	5,513
Adult Spending	492	3,854	1,226	1,715	9,648

Source: Author's analysis.

Table reports the mean, standard deviation, minimum, and maximum value of each variable over the sample periods. All statistics are unweighted, and the unit of observation is the state-year. All spending outcomes are the annual per-beneficiary spending in each state-year. The measures of malpractice liability and cost are the number or amount per physician in each state-year. All amounts in 2011 dollars.

Appendix Table A2. [Return to Text 1; 2; 3; 4]
Robustness Specifications of Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Total Medicare A + B Spending

	Total Medicare Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Noneconomic cap change	0.016	0.007						
	(0.012)	(0.008)						
Year of Law Change			–0.001	–0.001	0.005	0.009	0.003	0.007
			(0.006)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)
1 Year Since Change			0.002	0.002	0.010	0.017*	0.006	0.011
			(0.008)	(0.009)	(0.008)	(0.010)	(0.008)	(0.008)
2 Years Since Change			0.007	0.008	0.014	0.024**	0.010	0.014
			(0.009)	(0.011)	(0.009)	(0.012)	(0.010)	(0.009)
≥3 Years Since Change			0.012	0.013	0.024***	0.033**	0.014	0.023**
			(0.010)	(0.012)	(0.009)	(0.015)	(0.010)	(0.009)
1 Year Before Change							–0.001	–0.001
							(0.006)	(0.004)
2 Years Before Change							–0.001	–0.0001
							(0.003)	(0.003)
4 Years Before Change							0.003	–0.003
							(0.008)	(0.005)
≥5 Years Before Change							0.023*	0.012
							(0.013)	(0.011)
Joint and Several Liability Change				0.004				
				(0.013)				
Collateral Source Change				–0.003				
				(0.010)				
Punitive Cap Change				–0.005				
				(0.009)				
Attorney Fee Cap Change				0.023				
				(0.023)				
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population Controls[a]	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Trends[b]	No	No	No	No	No	Yes	No	No
PPS Controls[c]	No	No	No	No	Yes	No	No	Yes
Within R^2 [d]	0.04	0.42	0.43	0.43	0.56	0.76	0.45	0.56
Observations	784	784	784	784	784	784	784	784
R^2	0.979	0.987	0.988	0.988	0.990	0.995	0.988	0.990

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of Medicare A + B fee-for-service spending as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect; PPS = prospective payment system; *** = $p < .01$; ** = $p < .05$; * = $p < .10$.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate), state-year controls of the composition of the Medicare full-year fee-for-service population (including percentage of beneficiaries in categories of age, sex, race, rural/urban, and original reason for entitlement), and state-year controls for the composition of enrollment for the overall Medicare population (percentage enrolled in Medicare Advantage, Part A only, Part B only, and partial-year enrollees).

b. State trends refers to the inclusion of state-specific linear time trends.

c. PPS controls refers to the inclusion of more flexible time trends intended to allow for potential lagged effect of the introduction of new Medicare prospective payment systems for certain providers (home health care providers and skilled nursing facilities) just before the start of the sample period. See text for more details.

d. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Appendix Table A3. [Return to Text 1; 2]
Robustness of Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Total Medicare A + B Spending to Dropping Large States

	States Dropped			
	TX	TX	FL	FL
	(1)	(2)	(3)	(4)
Year of Law Change	0.002	0.003	0.002	0.003
	(0.007)	(0.006)	(0.007)	(0.006)
1 Year Since Change	0.003	0.003	0.003	0.003
	(0.009)	(0.008)	(0.009)	(0.008)
2 Years Since Change	0.004	0.004	0.004	0.004
	(0.010)	(0.009)	(0.010)	(0.009)
≥3 Years Since Change	0.014	0.012	0.014	0.012
	(0.011)	(0.010)	(0.011)	(0.010)
1 Year Before Change		–0.005		–0.005
		(0.005)		(0.005)
2 Years Before Change		–0.002		–0.002
		(0.004)		(0.004)
4 Years Before Change		–0.005		–0.005
		(0.004)		(0.004)
≥5 Years Before Change		0.015		0.015
		(0.012)		(0.012)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Population Controls[a]	Yes	Yes	Yes	Yes
Within R^{2}[b]	0.45	0.46	0.45	0.46
Observations	768	768	768	768
R^2	0.988	0.988	0.988	0.988

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of Medicare A + B fee-for-service spending as the outcome, meaning that the coefficients on the law change indicator variables can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

All estimates have a *p* value greater than .10, indicating that none of the estimates are statistically significantly different from zero at the 10 percent level. Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate), state-year controls of the composition of the

Medicare full-year fee-for-service population (including percentage of beneficiaries in categories of age, sex, race, rural/urban, and original reason for entitlement), and state-year controls for the composition of enrollment for the overall Medicare population (percentage enrolled in Medicare Advantage, Part A only, Part B only, and partial-year enrollees).

b. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Appendix Table A4. [Return to Text]
Robustness Specifications of Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Medicaid Adult Spending

	Medicaid Adult Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Noneconomic Cap Change	–0.004	–0.059						
	(0.067)	(0.070)						
Year of Law Change			–0.024	–0.076	–0.030	–0.032	–0.025	–0.033
			(0.055)	(0.051)	(0.060)	(0.047)	(0.053)	(0.062)
1 Year Since Change			–0.016	–0.087	–0.021	–0.068	–0.019	–0.026
			(0.062)	(0.053)	(0.059)	(0.056)	(0.064)	(0.062)
2 Years Since Change			–0.118	–0.197**	–0.124	–0.189*	–0.121	–0.129
			(0.093)	(0.084)	(0.103)	(0.097)	(0.097)	(0.110)
≥3 Years Since Change			–0.105	–0.192*	–0.099	–0.214**	–0.108	–0.105
			(0.112)	(0.106)	(0.112)	(0.089)	(0.116)	(0.116)
1 Year Before Change							0.010	0.011
							(0.026)	(0.036)
2 Years Before Change							0.013	0.004
							(0.029)	(0.027)
4 Years Before Change							–0.045	–0.034
							(0.028)	(0.041)
≥5 Years Before Change							–0.011	–0.022
							(0.057)	(0.063)
Joint and Several Liability Change				–0.005				
				(0.088)				
Collateral Source Change				0.346**				
				(0.162)				
Punitive Cap Change				0.046				
				(0.101)				
Attorney Fee Cap Change				–0.474***				
				(0.120)				
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population Controls[a]	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Trends[b]	No	No	No	No	No	Yes	No	No
PPS Controls[c]	No	No	No	No	Yes	No	No	Yes
Within R^{2}[d]	0.01	0.18	0.19	0.28	0.22	0.58	0.2	0.22
Observations	492	492	492	492	492	492	492	492
R^2	0.872	0.894	0.895	0.907	0.898	0.945	0.896	0.898

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of per-beneficiary Medicaid spending for nonelderly and able-bodied adults as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect; PPS = prospective payment system; *** = $p < .01$; ** = $p < .05$; * = $p < .10$.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate, share of Medicare beneficiaries enrolled in managed care, and share of Medicare beneficiaries enrolled in managed care squared), along with state-year-eligibility group controls for the income eligibility level for certain groups (children, parents, and pregnant women) as a percentage of the federal poverty guidelines (commonly known as the federal poverty level), percentage of the state's Medicaid population enrolled in comprehensive managed care, percentage enrolled in noncomprehensive managed care, and percentage of spending in fee-for-service within each eligibility group.

b. State trends refers to the inclusion of state-specific linear time trends.

c. PPS controls refers to the inclusion of more flexible time trends intended to allow for potential lagged effect of the introduction of new Medicare prospective payment systems for certain providers (home health care providers and skilled nursing facilities) just before the start of the sample period. See text for more details.

d. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.

Appendix Table A5. [Return to Text]
Robustness Specifications of Difference-in-Differences Estimated Effects of Noneconomic Damage Caps on Medicaid Child Spending

	Medicaid Child Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Noneconomic Cap Change	0.062	0.008						
	(0.045)	(0.047)						
Year of Law Change			0.009	–0.008	–0.001	0.009	0.001	–0.009
			(0.051)	(0.052)	(0.065)	(0.038)	(0.056)	(0.073)
1 Year Since Change			0.021	–0.015	0.016	0.004	0.012	0.009
			(0.052)	(0.060)	(0.059)	(0.067)	(0.058)	(0.066)
2 Years Since Change			–0.056	–0.118	–0.064	–0.081	–0.064	–0.071
			(0.070)	(0.081)	(0.078)	(0.092)	(0.074)	(0.083)
≥3 Years Since Change			0.031	–0.043	–0.020	–0.035	0.023	–0.027
			(0.065)	(0.079)	(0.068)	(0.090)	(0.070)	(0.072)
1 Year Before Change							–0.010	–0.021
							(0.039)	(0.049)
2 Years Before Change							–0.022	–0.026
							(0.021)	(0.024)
4 Years Before Change							–0.004	0.009
							(0.021)	(0.026)
≥5 Years Before Change							0.021	0.034
							(0.055)	(0.066)
Joint and Several Liability Change				–0.058				
				(0.059)				
Collateral Source Change				0.153**				
				(0.066)				
Punitive Cap Change				0.158*				
				(0.082)				
Attorney Fee Cap Change				–0.178*				
				(0.096)				
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population Controls[a]	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Trends[b]	No	No	No	No	No	Yes	No	No
PPS Controls[c]	No	No	No	No	Yes	No	No	Yes
Within R^2 [d]	0.03	0.14	0.15	0.19	0.2	0.47	0.15	0.2
Observations	492	492	492	492	492	492	492	492
R^2	0.860	0.877	0.878	0.884	0.885	0.924	0.878	0.886

Source: Author's analysis.

Table reports estimated coefficients from difference-in-differences regression models. Each column reports estimates from a separate regression using the natural log of per-beneficiary Medicaid spending for children as the outcome, meaning that the coefficients on the indicator variables for law changes can be interpreted roughly as percentage changes. All models include an indicator for the period after noneconomic damage caps were struck down in Georgia and Illinois, population control variables, state fixed effects, and year fixed effects (coefficients are not shown).

Estimated standard errors appear in parentheses. Standard errors are clustered at the state level.

FE = fixed effect; PPS = prospective payment system; ** = $p < .05$; * = $p < .10$.

a. The controls include state-year population controls (including number of medical doctors per capita, log of state population, gross state product per capita, unemployment rate, share of Medicare beneficiaries enrolled in managed care, and share of Medicare beneficiaries enrolled in managed care squared), along with state-year-eligibility group controls for the income eligibility level for certain groups (children, parents, and pregnant women) as a percentage of the federal poverty guidelines (commonly known as the federal poverty level), percentage of the state's Medicaid population enrolled in comprehensive managed care, percentage enrolled in noncomprehensive managed care, and percentage of spending in fee-for-service within each eligibility group.

b. State trends refers to the inclusion of state-specific linear time trends.

c. PPS controls refers to the inclusion of more flexible time trends intended to allow for potential lagged effect of the introduction of new Medicare prospective payment systems for certain providers (home health care providers and skilled nursing facilities) just before the start of the sample period. See text for more details.

d. The Within R^2 statistics reflect the explanatory power of the noneconomic damage cap indicator and control variables only and do not reflect the explanatory power of the state and year fixed effects.