Taxing Executive Compensation for Social Missions

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Abstract

Congress began taxing excessive executive compensation at tax-exempt organizations to discourage the diversion of resources from their social missions in 2017. I find that the policy instead increases executive compensation while reducing social benefit spending over time. In a dynamic agency model with moral hazard and social benefit provision, optimal contracts reward high earnings realizations by allocating a larger share of financial assets to CEO compensation, crowding out resources available for social benefit spending. Excise taxes erode financial assets. To deliver promised compensation, CEO claims must grow faster, further constraining social benefit provision. Empirically, using nonprofit hospitals as the setting, I find that affected organizations reduce charity care and community benefit expenditures while increasing CEO compensation following the tax introduction. Structural estimation shows that a 21% excise tax is equivalent to increasing the severity of the moral hazard friction by 2.2%, whereas governance-based interventions that directly reduce agency frictions increase organizational social value.

JEL Codes: L31, H25, J33, D82, I11.

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1 Introduction

In the United States, many sectors with significant social welfare implications, such as healthcare and education, are dominated by 501(c)(3) tax-exempt organizations, commonly referred to as the nonprofit sector. These organizations receive an implicit public subsidy through tax exemption, intended to support social benefit provision for the communities they serve. However, some tax-exempt organizations generate substantial operating surpluses. In the absence of conventional shareholder governance, executives may effectively become residual claimants of these surpluses, creating incentives to allocate resources toward compensation rather than toward social missions.

By design, nonprofit organizations commit to a non-distribution constraint, which prohibits the distribution of profits to shareholders and is intended to ensure mission fulfillment. This corporate structure presents challenges distinct from those faced by their for-profit counterparts. First, the absence of shareholders implies that traditional corporate governance mechanisms, such as shareholder voting and the market for corporate control, are not applicable. Second, boards of trustees typically consist of donors and community stakeholders with heterogeneous or even conflicting objectives. These features have led to calls for external regulatory interventions to ensure that tax-exempt organizations fulfill their stated social missions. In response, Congress introduced an excise tax on excessive executive compensation at tax-exempt organizations in 2017. The stated objective of the policy is to discourage the allocation of organizational resources toward executive pay and to promote greater provision of social benefits.

Does excise taxation achieve this objective? In this paper, I address this question in three steps. First, I develop a dynamic agency model in which trustees hire a CEO subject to moral hazard to generate earnings that can be allocated to social benefit provision, excise tax, or retained assets. The model predicts that excise taxation reduces organizational social value because it erodes financial assets and increases the effective growth rate of the CEO's claim, thereby crowding out resources available for social benefit provision. Second, I empirically test the model's predictions using nonprofit hospitals as the setting. I find that affected organizations reduce charity care and community benefit expenditures while increasing CEO compensation following the introduction of the tax. Third, I structurally estimate the model to quantify the long-run value loss from excise taxation and show that governance-based interventions, such as strengthened board oversight, improve social value, while taxation or minimum benefit requirement reduces it.

The model highlights a neglected implication of the non-distribution constraint. Many nonprofit organizations are "commercialized" in the sense that they generate earnings from operating activities to fund their social missions. When earnings depend on managerial effort, incentive provision requires performance-based compensation that effectively recreates residual claims. In the model, the organization generates earnings proportional to its financial assets, and trustees choose social benefit provision and CEO compensation in the presence of moral hazard. Unexpensed earnings are accumulated into financial assets, allowing future earnings, and thus social benefits, to grow (Fama and Jensen, 1985; Fisman and Hubbard, 2005). Earnings, however, require unobserved effort from a self-interested CEO, who derives private benefits from shirking *à la* Glaeser and Shleifer (2001) and Ghatak and Mueller (2011). Rather than maximizing profits, trustees maximize organizational social value, defined as the expected present value of net future social benefits. To solve the dynamic agency problem, trustees optimally design a contract specifying CEO compensation, social benefit provision, and termination policy. This model extends classical dynamic agency frameworks such as He (2009) by introducing social benefit provision as a competing use of financial assets and incorporating excise taxation on executive compensation. Social benefit provision reduces retained earnings and incurs adjustment costs, making it economically analogous to a disinvestment decision. The framework therefore highlights a trade-off between current social surplus and future organizational growth that parallels the investment distortions studied in DeMarzo et al. (2012), but in a nonprofit governance context.

The model generates several unique predictions. First, as is common in the dynamic agency model, I define the CEO's financial claim on the organization as the ratio of his continuation payoff to financial assets, being the state variable governing optimal policies. I show that the optimal social benefit provision policy is strictly decreasing in this state variable. This prediction implies that the common wisdom of organizations "doing good by doing well" fails in the presence of dynamic agency frictions. To provide incentives, the optimal contract allocates a larger share of financial assets to CEO compensation following a sequence of positive earnings shocks. Meanwhile, social benefit provision reduces retained earnings and slows asset accumulation. To maintain the CEO's continuation value in absolute terms, trustees must further commit additional shares of assets to the CEO, which ultimately reduces organizational value. This mechanism essentially highlights the cost of agency problems that crowd out resources for social missions.

Second, I show that excise taxation reduces organizational value at a given level of the CEO's claim. The intended rationale for the excise tax reflects a static substitution view: by raising the relative price of executive compensation, trustees are expected to reduce pay and reallocate resources toward social benefit provision. In contrast, the model implies that excise taxation erodes the organization's financial assets and increases the effective growth rate of the CEO's claim on residual assets. Because higher CEO claims crowd out resources for social benefit provision, excise taxation reduces organizational value primarily through a dynamic income effect. Intuitively, excessive CEO compensation is a manifestation of the underlying agency problem, as the CEO effectively becomes a residual claimant of organizational resources. An excise tax does not force an entrenched CEO to reduce compensation in absolute terms; instead, it induces reductions in social benefit provision to preserve the CEO's claim on assets. Consistent with this mechanism, I show that excise taxation does not even necessarily increase the instantaneous supply of social benefits at a given level of the CEO's claim.

Next, I empirically test the model's predictions using nonprofit hospitals as my empirical setting. I focus on the healthcare sector for several reasons. First, nonprofit hospitals constitute by far the largest segment of the nonprofit sector, accounting for almost half of all nonprofit revenues.[1] Their revenues are predominantly derived from program service activities, namely, the operation of hospitals, rather than from donations or grants. As of 2024, healthcare expenditures account for approximately 18% of U.S. GDP, and hospital care represents about 31% of total national health expenditures.[2] Among all U.S. hospital facilities, more than 70% are operated by nonprofit organizations. These features make the hospital sector a classic example of a "commercial nonprofit" (Hansmann, 1980) and a longstanding subject of research in nonprofit governance (e.g. Brickley and Van Horn, 2002; Eldenburg et al., 2004). Second, given the sheer scale of revenues in this sector, nonprofit hospitals are also characterized by particularly high CEO compensation, making them a central focus of nonprofit executive taxation policies. Third, nonprofit hospitals provide a clearly defined measure of social benefit provision, i.e. charity care and community benefit expenditures, which they are required to disclose in IRS Form 990. I hand-collect data on nonprofit CEO compensation, disambiguate executive names, consolidate hospital branches overseen by the same executive, and construct a panel dataset of nonprofit hospital organizations spanning 2011 to 2022.

I begin with descriptive evidence to assess the model's core predictions. The 2017 reform imposed a 21% excise tax on executive compensation exceeding $1 million annually. Comparing the distribution of CEO pay before and after the reform reveals no visible bunching at the $1 million threshold afterward, indicating that organizations did not mechanically reduce compensation to avoid tax liability. Instead, the distribution shifts rightward over time, with increasingly fat tails, suggesting that the tax did not meaningfully restrain CEO pay. Next, using the number of CEO perks as a proxy for agency frictions, I find that organizations with more extensive perks exhibit lower levels of social benefit provision. This pattern is consistent with the model's prediction that agency problems divert resources away from the organization's social mission.

[1] See "Nonprofits are Financially Healthy and Doing Big Business," Tax Foundation, 2023.
[2] See "Key Facts About Hospitals," KFF, 2025.

To formally test the model's predictions, I implement an event-study design comparing organizations affected by the excise tax to those unaffected, before and after the 2017 reform. Defining treatment based on realized compensation exceeding \$1 million would introduce endogenous selection concerns. Instead, I use pre-policy organizational size, measured by the number of hospital facilities, as a predetermined proxy for tax exposure. Descriptive evidence confirms that organizations operating at least three facilities are substantially more likely to have CEO compensation above the \$1 million threshold both before and after the reform. This pattern likely reflects greater managerial complexity in larger systems, which is associated with higher compensation. Having at least three facilities is associated with a 47.5% higher probability of exposure to the excise tax (t-statistic = 17.4). Using this classification, I find that treated organizations increase CEO compensation by 0.8% of net assets annually relative to the control group, equivalent to 8% of the unconditional sample mean. At the same time, they reduce social benefit provision by 1.45% of net assets. In 2017 dollars, this corresponds to an average reduction of \$6.9 million per organization per year. The dynamic treatment effects exhibit no pre-trends and gradual post-2017 divergence, consistent with the model's dynamic income mechanism rather than an immediate substitution response.

I further provide two pieces of supporting empirical evidence. First, I show that treated hospitals significantly reduce the generosity of their discounted-care charity care policies after 2017, consistent with CEOs directly curtailing social benefit provision through formal policy. Second, treated hospitals restructure executive compensation contracts by increasing the bonus share while reducing deferred compensation and supplemental nonqualified retirement benefits, consistent with the model's prediction that organizations shift toward short-term cash payouts as CEO claims grow faster under excise taxation.

Finally, I structurally estimate the model using Simulated Method of Moments (SMM) to uncover the dynamics of unobserved CEO claims in the data and to quantify the long-run value loss from excise taxation. The key parameter of interest is the severity of the moral hazard friction, which measures the extent to which CEOs derive private benefits from shirking. To identify this parameter, I target the volatility of CEO compensation, which reflects the extent to which compensation is exposed to earnings shocks to provide incentives. The estimated moral hazard parameter is comparable to estimates in the literature on executive compensation in for-profit firms in the context of intangible investments.

I next simulate the model in the long run to quantify how excise taxation affects organizational value. When I increase the excise tax rate from 0% to 21%, average social value declines from 0.9436 to 0.9417, corresponding to a loss of 6% of the baseline standard deviation. At the same time, the distribution of CEO claims shifts rightward and becomes more dispersed, with fatter tails. This pattern aligns with the model's mechanism: excise taxation raises both the expected growth rate and volatility of CEO claims, which in turn hurts organizational value.

I then assess the economic magnitude of this distortion. I show that a 21% excise tax is equivalent to increasing the severity of the moral hazard friction by 2.2%. To establish this mapping, I simulate the model across combinations of excise tax rates and moral hazard parameters. I find clear monotonic relationships: holding the tax rate fixed, social value declines as the moral hazard parameter increases; holding the moral hazard parameter fixed, social value declines as the tax rate increases. This structure allows me to identify the level of the equivalent private benefit parameter under zero taxation that generates the same value loss as a 21% excise tax.

Economically, this equivalence implies that excise taxation imposes a wedge on the effective cost of compensating CEOs by raising the marginal cost of pay. By doing so, the tax mechanically amplifies the distortion created by private benefits. In equilibrium, the organization requires a contract that mirrors one chosen under more severe agency frictions. An alternative interpretation follows directly: if the objective is to increase social benefit provision, governance-based reforms that directly reduce agency frictions, such as strengthening board oversight, may be more effective than distortionary compensation taxes. To illustrate this point, I calibrate a governance improvement that increases social value by 8% of the baseline standard deviation, matching the compensation changes induced by the Nonprofit Revitalization Act of 2013 in New York.

Another commonly proposed intervention is a minimum social benefit requirement that mandates organizations allocate a fixed percentage of revenues to social missions. I show that this policy also reduces organizational value. In the model, the requirement binds only when CEO claims are high, forcing organizations to increase social benefit provision precisely in the region where agency friction is severe. This constraint reduces retained earnings and accelerates the growth of CEO claims, further amplifying agency distortions. Quantitatively, the model implies that the Texas policy, which requires nonprofit hospitals to spend at least 5% of revenues on charity care, lowers social value by 12.3% of the baseline standard deviation.

Finally, an alternative feature of the nonprofit sector emphasized in the theoretical literature is the existence of warm-glow utility for managers (e.g., Bénabou and Tirole, 2006; Besley and Ghatak, 2005). The model helps explain the empirical puzzle that nonprofit executives, especially in the hospital sector, do not appear to exhibit strong intrinsic motivation for social benefits. In a dynamic agency setting, warm-glow utility slows down the expected growth rate of CEO claims on organizational assets, because it substitutes for financial compensation as an incentive for effort. This mechanism generates a dynamic trade-off that depends on the severity of agency frictions and termination risk, making the net impact on social value ambiguous. When agency frictions are severe and termination risk is low, warm-glow utility can improve social value by reducing cash payouts. However, when agency frictions are mild and termination risk is high, warm-glow utility can reduce social value by slowing the growth of CEO claims and increasing the likelihood of contract termination. I further show that warm-glow utility helps alleviate the value loss from excise taxation, as it reduces the tax base and thus the dynamic distortion induced by the tax.

This paper contributes to the literature on nonprofit governance. Classic theory argues that the defining feature of nonprofit organizations is the absence of residual claimants, also known as the "non-distribution constraint" (Hansmann, 1980; Easley and O'Hara, 1983; Fama and Jensen, 1983; Glaeser and Shleifer, 2001). This constraint is intended to ensure that resources are allocated toward social missions rather than private benefits, particularly when community benefits are unverifiable in contracts. The absence of residual claimants, however, also creates governance concerns, as boards of trustees, largely consisting of donors, may lack strong monitoring incentives (Glaeser, 2002). Indeed, these boards tend to be disproportionately large (Lewellen et al., 2025) and have heterogeneous, and sometimes conflicting, objectives (Eldenburg et al., 2004). Donors may also have limited access to, or limited ability to respond to, the accounting information necessary to monitor organizations effectively (e.g. Krishnan et al., 2006; Yetman and Yetman, 2013; Harris et al., 2015). Accordingly, empirical evidence documents the existence of agency problems and the potential for executive resource diversion in nonprofit organizations (e.g. Brickley and Van Horn, 2002; Fisman and Hubbard, 2005; Core et al., 2006). Closely related, Babenko et al. (2026) show that policies addressing CEO-compromised boards in the nonprofit sector reduce executive compensation and increase contributions, grants, and volunteer engagement.

This paper contributes to this literature by highlighting a distinct implication of the non-distribution constraint. In commercial nonprofits such as hospitals, executive incentives are central to earnings generation, which necessitates compensation contracts that resemble residual claims. I characterize the dynamic interaction between asset accumulation and CEO claims and solve for the organization's optimal social benefit provision in this setting. Without a dynamic framework, it is difficult to evaluate the long-run consequences of excise taxation.

This paper is also related to the growing literature on the role of executives in the hospital sector. Recent evidence suggests that hospital CEOs are important for operational and charitable performance (Lewellen, 2025), patient mortality (Muñoz and Otero, 2025), and payer bargaining (Hankins et al., 2025). Jenkins et al. (2024) document that profits, rather than charitable spending, are the primary determinant of CEO compensation in nonprofit hospitals. These empirical patterns are consistent with the model's assumption that CEOs play a central role in earnings generation and that compensation is tied to financial performance. More broadly, this paper relates to the literature examining how nonprofit hospitals trade off their social missions against financial performance, including Adelino et al. (2015, 2022); Aghamolla et al. (2024); Gupta et al. (2024); Herpfer et al. (2024); Gao et al. (2025); Cornaggia et al. (2025).

Finally, this paper builds on the literature on dynamic agency models, including DeMarzo and Sannikov (2006); Biais et al. (2007); Sannikov (2008); He (2009). Agency frictions have been used to study investment distortions in for-profit firms (e.g. DeMarzo et al., 2012; Ai and Li, 2015; Ai et al., 2021; Chen et al., 2026). Unlike prior work that studies agency distortions in profit-maximizing firms, I characterize how incentive provision interacts with social missions under tax-exempt governance, where social benefit provision is a competing use of financial assets and excise taxation introduces a dynamic distortion to compensation. In this environment, social benefit provision is economically analogous to a disinvestment decision, echoing the implications of agency frictions for investment in the for-profit context.

2 Model

In this section, I develop a dynamic agency model that co-determines CEO compensation with social benefit provision at tax-exempt organizations. Time is continuous and infinite. Trustees, who represent donors and community stakeholders, hire a CEO to exert effort towards generating earnings for the organization. These earnings can be used to finance social benefits to the community. Moreover, the government imposes an excise tax on total CEO compensation to discourage excessive pay. The CEO faces limited liability and is risk-neutral but more impatient than trustees, discounting at rate $\gamma > r$ where r is the trustees' discount rate (DeMarzo and Sannikov, 2006).

2.1 Setup

Consider a nonprofit organization with financial assets X_t at time $t \in [0, \infty)$. The CEO exerts an unobservable effort $e_t \in \{0, 1\}$ to generate net earnings E_t as

$$E_t = g e_t X_t \, dt + \sigma X_t \, dB_t,$$

where B_t is a standard Brownian motion and $\sigma > 0$ represents the volatility of earnings. E_t represents "net" earnings, defined as total revenues minus depreciation and operating costs and expenses, but excluding social benefit spending S_t and excise-tax payments $d\mathrm{T}_t$. Once these items are deducted, retained earnings are accumulated into the financial asset for the next period:

$$dX_t = g e_t X_t \, dt - S_t dt - d\mathrm{T}_t + \sigma X_t \, dB_t.$$

Intuitively, social benefit spending directly lowers the financial resources available for future growth. Consistent with the institutional feature that excise taxes are paid at the organizational level, I treat excise taxes as a reduction in retained earnings. When the CEO shirks ($e_t = 0$), he receives private benefits proportional to expected earnings growth, $\lambda g X_t dt$, where the parameter $\lambda > 0$ measures the severity of the agency friction. Alternatively, λ can be interpreted as the enforcement of the non-distribution constraint as in Glaeser (2002), where agents must pay a cost of transforming earnings in dollars to non-pecuniary perks. Because effort choice is not observable, the trustees of the organization write a contract $\mathbb{C}$ that gives the CEO the incentive to exert effort and maximizes organizational social value V_t:

$$V_t = \max_{\mathbb{C}} \mathbb{E}\left[\int_t^{\tau_L} e^{-r(s-t)} \left(H_s \, ds - dC_s\right) + e^{-r(\tau_L - t)} l X_{\tau_L}\right]$$
$$\text{s.t. } \mathbb{C} \text{ is incentive compatible and } W_t(\mathbb{C}) \geq \underline{w} X_t, \tag{1}$$

I interpret V_t as the present value of future net social benefits, defined as the social benefit flow H_t minus CEO cash compensation $dC_t \geq 0$ in the same period. The contract can be terminated at a random time τ_L by the trustees. Termination is costly, leading to a residual social value of lX_{τ_L}, where $l \in [0, 1)$ captures the reorganization discount. I assume the CEO's outside option is proportional to organizational size, $\underline{W}_t = \underline{w}X_t$ with constant $\underline{w} > 0$, so the participation constraint requires $W_t(\mathbb{C}) \geq \underline{w}X_t$. H_t is the social benefit flow at time t. The cost of delivering these benefits is

$$S_t = X_t s(h_t) = X_t \left(h_t + \frac{\theta}{2} h_t^2 \right),$$

where $h_t = H_t/X_t$ represents the benefit flow per unit of financial assets. The first term captures the direct cost that offsets retained earnings, while the second term captures indirect adjustment costs such as organizational disruptions and employee distractions, with $\theta > 0$ measuring the degree of adjustment cost.

I assume that the organization's earnings process $\{E_t : 0 \leq s \leq t\}$ and its financial asset process $\{X_t : 0 \leq s \leq t\}$ are observable and contractible. The contract, represented by $\mathbb{C} = (h, C, \tau_L)$, specifies the benefit flow h_t, cumulative compensation C_t, which must be nondecreasing due to limited liability, and termination time τ_L as functions of time and the financial asset X_t.

Given the contract, the CEO chooses his action process to maximize his continuation value W_t, defined as the present value of future cash compensation and private benefits,

$$W_t(\mathbb{C}) = \max_{e_s \in \{0,1\}: t \leq s < \tau_L} \mathbb{E}^e \left[\int_t^{\tau_L} e^{-\gamma(s-t)} \big(dC_s + (1 - e_s)\lambda g X_s ds \big) + e^{-\gamma(\tau_L - t)} \underline{w} X_{\tau_L} \right],$$

where the expectation $\mathbb{E}^e[\cdot]$ is taken under the probability measure induced by the CEO's effort process. Following the recursive approach of Spear and Srivastava (1987), I decompose incremental total compensation into incremental current payments dC_t and incremental continuation payoffs dW_t. Thus, the incremental excise tax payment at time t is, given tax rate

$\tau \in [0, 1]$,

$$d\mathrm{T}_t = \tau \left(dC_t + dW_t \right).$$

Overall, this framework extends the canonical class of continuous-time dynamic agency models in several directions. Structurally, the model closely resembles dynamic compensation models in which organizational assets follow geometric Brownian motion (He, 2009), so that private benefits and compensation scale with organization size. I adapt this framework to the nonprofit setting by introducing three features. First, the organization allocates resources to both executive compensation and social benefit provision, which enter as competing uses of financial assets. Second, I incorporate excise taxation on executive compensation, introducing the policy environment to study its implications for social mission fulfillment. Third, the organization's objective shifts from firm value maximization to maximizing social surplus. Social benefit provision may resemble dividend payouts, but it reduces financial assets and incurs adjustment costs. These features persistently affect future organizational capacity, making social spending economically analogous to a disinvestment decision. In this sense, this model highlights a trade-off between current social surplus and future organizational growth that closely parallels the investment distortions studied in DeMarzo et al. (2012), but in a nonprofit governance context.

2.2 Model Solution

I now solve for the optimal contract and the solution to Equation (1). Recall that the contract $\mathbb{C} = (h, C, \tau_L)$ specifies the social benefit flow, compensation, and termination time. The CEO's continuation payoff W_t is a state variable that summarizes his expected path of future compensation and the likelihood of contract termination. Financial assets X_t determine the organization's capacity to generate earnings, compensate the CEO, and provide social benefits. Therefore, whatever the history of the organization up until date t, the only relevant state variables are X_t and W_t, and the trustees' value function $V(X_t, W_t)$

can be solved with a Hamilton-Jacobi-Bellman (HJB) equation.

I focus on the incentive compatible contract implementing $e_t = 1$ for all t. Given this contract, the CEO's continuation payoff is

$$W_t(\mathbb{C}) = \mathbb{E}\left[\int_t^{\tau_L} e^{-\gamma(s-t)} dC_s + e^{-\gamma(\tau_L - t)} \underline{w} X_{\tau_L}\right].$$

Following Sannikov (2008), I can formulate the incremental total compensation using martingale representation:

$$dC_t + dW_t = \gamma W_t \, dt + \beta_t X_t \sigma \, dB_t \tag{2}$$

where β_t is the exposure of the CEO's continuation payoff to the earnings shock. To maintain incentive compatibility, the contract must ensure that the CEO prefers exerting effort over shirking. A shirking CEO receives private benefits $\lambda g X_t dt$ but foregoes the drift contribution to continuation value $\beta_t g X_t dt$. Incentive compatibility is thus implemented with $\beta_t \geq \lambda$ for all t. Because termination is ex post costly to enforce, the optimal contract minimizes the likelihood of this event and sets

$$\beta_t = \lambda \text{ for all } t. \tag{3}$$

Homogeneity further allows me to write $v(w) = V(X, W)/X$ and simplify the trustees' value function to depend only on one state variable, the CEO's scaled continuation payoff $w = W/X$. I interpret this state variable as the CEO's claim on the organization's financial assets. By Ito's lemma, w_t evolves as

$$\begin{aligned} dw_t = &\Big(w_t \left(\gamma - g + s(h_t) + \tau\gamma w_t\right) + w_t \sigma^2 \left(1 - \tau\lambda\right)^2 - \lambda\sigma^2 \left(1 - \tau\lambda\right)\Big) \, dt \\ &- dc_t + \sigma \left(\lambda - w_t \left(1 - \tau\lambda\right)\right) dB_t. \end{aligned} \tag{4}$$

In Equation (4), I utilize Equation (2) and Equation (3) to substitute for $dC_t + dW_t$ and β_t. The first line captures the drift of w_t, which depends on the CEO's impatience, the organization's earnings growth, social benefit spending, and excise taxation. The second line captures the impact of incremental compensation $dc_t = dC_t/X_t$ and earnings shocks on w_t.

The trustees optimally choose the social benefit flow h_t that equates the required return to two components: the current-period payoff, and the expected instantaneous change in continuation value.

$$rX_t v(w_t) = \max_{h_t} \left\{ X_t h_t + \mathbb{E}_t \left[d(X_t v(w_t)) \right] \right\}$$

This equation's solution is jointly determined with the boundary conditions on $v(w)$ and the optimal termination policy. To begin, the trustees optimally terminate the contract when the CEO's claim w_t reaches his outside option $\underline{w} = \underline{W}/X_t$. This is because the CEO would immediately consume private benefits upon reaching this threshold and leave the organization. Thus, the value function satisfies the boundary condition

$$v(\underline{w}) = l.$$

Next, trustees can always compensate the CEO with cash. Because termination is costly, it will be optimal to grow w at low values as quickly as possible by setting dc_t in Equation (4) to zero. However, the CEO will eventually require current payments to keep his continuation value from growing beyond an endogenous boundary $\bar{w}$. $\bar{w}$ is determined by the point at which trustees are indifferent between paying the CEO directly and promising him another dollar in the future. As is common in the literature, this trade-off is captured by the following boundary conditions:

$$v'(\bar{w}) = -1, \tag{5}$$

along with the super-contact condition

$$v''(\bar{w}) = 0. \tag{6}$$

To summarize, $dc_t = 0$ within the payment and termination boundaries and $\beta_t = \lambda$ for all t.

With Equation (4), the trustees' value function $v(w)$ satisfies the HJB equation

$$
\begin{aligned}
rv(w) = \max_h \Big\{ h + v(w) \big(g - s(h) - \tau\gamma w\big) \\
+ v'(w) \cdot w \big(\gamma - g + s(h) + \tau\gamma w\big) \\
+ \frac{1}{2} v''(w) \cdot \sigma^2 \big(\lambda - w(1 - \tau\lambda)\big)^2 \Big\}.
\end{aligned} \tag{7}
$$

The optimal social benefit flow $h(w)$ solves the first-order condition

$$
1 = \big(1 + \theta h(w)\big) \left(v(w) - wv'(w)\right).
$$

This condition highlights the trade-off in social benefit provision. The marginal benefit of increasing h is one additional unit of current social surplus. The marginal cost, captured by the right hand side, combines two components. The first is the direct cost of reducing retained earnings by $1 + \theta h(w)$ per unit of assets. Each dollar of foregone assets reduces trustees' continuation value by $v(w)$. At the same time, reducing available financial assets affects the CEO's scaled claim w, and the term $-wv'(w)$ captures the value changes due to this adjustment. Rearranging gives the optimal social benefit flow as

$$
h(w) = \frac{1}{\theta} \left(\frac{1}{v(w) - v'(w)w} - 1 \right). \tag{8}
$$

2.3 Contract Characterization

In He (2009), the principal's value function is concave because incentive compatibility under geometric Brownian motion requires exposing the agent's continuation value to stochastic shocks. A higher promised continuation value increases the scale of this exposure, raising volatility and the probability of hitting costly contract boundaries. In my model, a sufficient condition ensuring concavity is $\gamma > g$, as shown in Lemma A.1 in Online Appendix Section A, and I verify this condition quantitatively in the structural estimation. Economically, this restriction prevents trustees from indefinitely postponing social missions while promising unbounded deferred compensation to the CEO. With this concavity result, I can fully characterize the policy function as follows.

[Figure I here]

Proposition 1. *The optimal social benefit provision policy $h(w)$ is strictly decreasing on $(\underline{w}, \bar{w})$. That is, $h'(w) < 0$ for all $w \in (\underline{w}, \bar{w})$.*

Proof. See Online Appendix Section A. □

Figure I illustrates the trustees' value functions and the optimal social benefit provision policies under two excise tax rates, $\tau = 0$ and $\tau = 0.21$. Consider the case without excise taxation first. In Figure I(a), the social value function $v(w)$ initially increases in w as increasing the CEO's claim avoids costly termination. However, to further motivate the agent, trustees must promise a larger fraction of financial assets to the CEO, which crowds out resources available for social benefit provision and reduces organizational value.

This trade-off generates Proposition 1, which is illustrated in Figure I(b). Intuitively, higher social benefit provision reduces retained earnings and slows asset accumulation. To maintain the CEO's continuation value in absolute terms, trustees must therefore promise a larger share of future financial assets. As a result, increasing social benefit provision requires faster growth in the CEO's claim on assets, which yields diminishing returns and eventually imposes costs on the organization as w increases. Proposition 1 further implies that the common wisdom of organizations "doing good by doing well" fails in the presence of dynamic agency frictions. Following a sequence of positive earnings shocks, the CEO's claim w rises endogenously, constraining social benefit provision through two channels. First, trustees must allocate a larger share of financial assets to compensate the CEO. Second, to limit further growth in w, trustees have incentives to accumulate earnings and cut social benefit spending.

Next, Figure I also illustrates the impact of excise taxation on the value function and social benefit provision. Figure I(a) shows that excise taxation reduces organizational value at a given level of the CEO's claim w, proved in Proposition 2 below.

Proposition 2. *The value function $v(w, \tau)$ is strictly decreasing in the tax rate τ at a given w in the continuation region. That is, $\partial_\tau v(w, \tau) < 0$ for all $w \in (\underline{w}, \bar{w})$.*

The intended effect of the excise tax reflects a static substitution-effect view: by raising the relative price of executive compensation, trustees are expected to reduce CEO pay and reallocate resources toward social benefit provision. Proposition 2 shows that excise taxation instead affects optimal policies primarily through a dynamic income effect. Excise taxes erode retained earnings, reducing the organization's financial assets. As shown in Equation (7), a higher tax rate increases the expected growth rate of the CEO's claim w over time in order to deliver the CEO's continuation value. As established in Proposition 1, higher w in turn crowds out the organization's long-run capacity to provide social benefits.

This mechanism echoes classic insights from the public finance literature on dividend taxation (e.g., Auerbach, 1979; Bradford, 1981): dividend taxes are capitalized into firm value and operate as a wealth loss on existing claims; they do not distort marginal investment through substitution effects when investment is internally financed. The key difference in my setting is that organizations are effectively financially constrained due to liquidation risk and dynamic agency frictions. This is evident in the last term of Equation (7) as taxation also increases the volatility of the CEO's claim w. Given the concavity of the value function, higher volatility raises the likelihood of hitting costly boundaries and further reduces organizational value. Consistent with this mechanism, Figure I(b) shows that excise taxes do not even necessarily increase the instantaneous supply of social benefits at a given level of w.

Proposition 3. *There exist thresholds $\underline{w}^*(\tau)$ and $\bar{w}^*(\tau)$ in $[\underline{w}, \bar{w}]$ with $\underline{w}^*(\tau) \leq \bar{w}^*(\tau)$, such* *that:*

$$\partial_\tau h(w,\tau) < 0 \quad \textit{for } w \in \left(\underline{w}, \underline{w}^*(\tau)\right),$$
$$\partial_\tau h(w,\tau) > 0 \quad \textit{for } w \in \left(\bar{w}^*(\tau), \bar{w}\right).$$

That is, higher excise taxes reduce social benefit provision when the CEO's claim is low but increase it when the CEO's claim is high.

The intuition is as follows. When the CEO's claim w is close to his outside option, the organization has strong incentives to grow w rapidly in order to avoid inefficient liquidation. Excise taxes erode retained earnings and increase the effective growth rate of the CEO's claim on residual financial assets in a manner similar to social benefit expenditures. To avoid hitting the payout boundary prematurely, trustees therefore optimally reduce social benefit provision. In contrast, when w is high, organizational value has already been substantially decreased, reducing the marginal value of retaining financial assets. In this region, social benefit provision becomes relatively "cheaper" in terms of forgone continuation value. Importantly, this increase does not raise overall social value: over-provision of social benefits at high w further accelerates the approach to the payout boundary and exacerbates the decline in organizational value.

3 Empirical Results

3.1 Institutional Details

The excise tax studied in this paper was introduced as part of the Tax Cuts and Jobs Act (TCJA), enacted on December 22, 2017, through the addition of Section 4960 to the Internal Revenue Code. Section 4960 represents a major departure from prior tax treatment of compensation at tax-exempt organizations, which historically faced no explicit federal tax penalty tied to executive pay levels. Beginning in 2018, under Section 4960, tax-exempt organizations are subject to a 21% excise tax on remuneration paid to covered employees in excess of $1 million per year (unadjusted by inflation). Remuneration is defined broadly to include wages subject to federal income tax withholding and certain forms of deferred compensation. Consistent with my model specification of excise taxes on total compensation, remuneration is treated as paid when it vests, rather than when cash is disbursed. As a result, the tax applies to the present value of deferred compensation at the time vesting occurs. Moreover, remuneration paid by related organizations, including taxable subsidiaries or affiliated entities, is aggregated when determining tax liability. For example, senior executives of a nonprofit hospital system can become covered employees even if no single hospital branch pays them more than $1 million. The excise tax is levied on the employer, not the employee, and must be reported on IRS Form 4720. When multiple related organizations pay compensation to the same covered employee, liability is allocated proportionally across payers based on their share of total remuneration.

Covered employees are the five highest-compensated employees in the current year, as well as any individual who was a covered employee in any prior year beginning after 2016. Once an individual becomes a covered employee, they remain covered indefinitely, even if their compensation later falls below the top-five threshold. Although not a "title-based" definition, Section 4960 is effectively targeting CEOs and other top executives. First, trustees and board members are generally excluded because director fees constitute self-employment income, not wages. Relevant to my empirical setting, licensed medical professionals are also excluded if their compensation is primarily for professional services. These exclusion criteria make covered employees, conditional on passing the $1 million threshold, overwhelmingly likely to be senior executives. Second, there is a practical rationale for avoiding a "title-based" definition, as nonprofit organizations vary widely in governance structures and titles. This is evident in my procedure of identifying the organization CEO in Section 3.2. A compensation-based definition cannot be easily arbitraged through re-titling.

Beyond these features, the legislative intent behind Section 4960 confirms that the tax targets executive compensation. First, because tax-exempt organizations receive an implicit public subsidy, they are expected to direct their resources toward community benefits, and the Internal Revenue Service (IRS) views excessive executive compensation as diverting resources from these purposes. Second, Section 4960 was motivated by congressional concern that senior executives at tax-exempt organizations, particularly large nonprofit hospitals and universities, were receiving compensation packages comparable to or exceeding those in the for-profit sector, despite the absence of shareholder oversight. The reform was designed to mirror the corporate executive pay limitation under Section 162(m), which restricts the deductibility of compensation above $1 million at publicly traded firms. Rather than limiting deductibility, which is irrelevant for tax-exempt entities, Congress imposed an excise tax directly on excessive compensation.

To study the impact of Section 4960, I focus on the nonprofit hospital sector as the empirical setting for several reasons. First, this sector is arguably the most economically significant segment of the tax-exempt economy. According to the Tax Foundation, nonprofit hospitals constitute the largest segment of tax-exempt organizations by assets and revenues, accounting for over 40% of the nonprofit sector's $2.5 trillion in total revenues in 2019.[3] More broadly, the healthcare sector, including tax-exempt hospitals and healthcare plans, accounts for over 55% of total nonprofit revenues, followed by higher education at approximately 12%. In addition, nonprofit hospitals are the dominant providers of U.S. healthcare services: more than 70% of non-government hospital facilities are tax-exempt, and they account for the majority of hospital inpatient admissions.

Second, nonprofit hospitals have faced more sustained public and regulatory scrutiny over executive compensation than any other segment of the tax-exempt sector. In 2023, the Health, Education, Labor, and Pensions (HELP) Committee of the U.S. Senate, chaired by Senator Bernie Sanders, launched an investigation into the compensation practices of nonprofit hospital systems. The title of the HELP Committee's report, "Executive Charity:

[3]For details, see "Reining in America's $3.3 Trillion Tax-Exempt Economy," Tax Foundation, June 18, 2024.

Major Non-Profit Hospitals Take Advantage of Tax Breaks and Prioritize CEO Pay Over Helping Patients Afford Medical Care," captures the central concern that nonprofit hospitals may be directing the benefits of tax exemption toward executives rather than toward charitable provision for patients and communities. The report documents that, among the 16 largest nonprofit hospital systems, CEOs received average compensation exceeding $8 million in 2021. Consistent with this magnitude but extending beyond the largest systems, I find in my data that average CEO compensation across all nonprofit hospital systems exceeded $1.2 million in the same year. The Senate report further estimates that nonprofit hospitals provided approximately $16 billion in charity care in 2020, representing about 57% of the value of their tax exemptions in that year.

Lastly, it is generally difficult to quantify the social benefits provided by tax-exempt organizations. In the hospital sector, however, the IRS requires nonprofit hospitals to disclose detailed measures of community benefit spending through Schedule H of Form 990. The IRS introduced Schedule H ("Hospitals") beginning with the 2008 tax year, becoming a mandatory component of nonprofit hospitals' annual Form 990 filings afterward. The primary purpose of Schedule H is to standardize and increase transparency around the community benefits provided by tax-exempt hospitals, thereby facilitating oversight of whether these organizations deliver social benefits commensurate with the value of their tax exemption. Schedule H organizes hospital community benefits into two broad categories: financial assistance and other community benefits. Financial assistance includes charity care and unreimbursed costs from means-tested government programs, such as Medicaid and other public assistance programs. Other community benefits include community health improvement services, health professions education, subsidized health services, research, and cash or in-kind contributions to community groups. For each reported category, hospitals are required to disclose the net community benefit expense, defined as the expenses incurred in providing the service minus any direct revenue offsets, such as patient payments or reimbursements. Hospitals also report the net community benefit expense as a percentage of total hospital expenses.

3.2 Data

My empirical analysis and structural estimation require a panel dataset of nonprofit hospital organizations that identifies the CEO and records executive compensation, financial information, and community benefit spending. Constructing such a dataset presents several challenges. First, detailed employee compensation data reported in Schedule J ("Compensation Information") of Form 990 are not provided by the IRS in a centralized, machine-readable database. Second, there is no standardized reporting requirement for CEO names or titles in Schedule J. Instead, organizations list the names and titles of all employees whose total compensation exceeds $100,000 in a given year, using free-text fields that vary across filers and years. Finally, each Form 990 is filed at the Employer Identification Number (EIN) level, whereas many senior executives manage multi-EIN hospital organizations, such as parent health systems or regional networks of affiliated hospitals. Because excise tax liability under Section 4960 is determined at the aggregated level of related organizations, I must identify CEOs and aggregate compensation and community benefit spending across all EINs belonging to the same organizational group. Earlier work has linked IRS 990 compensation data to hospital financials and extracted the CEO compensation levels within AHA survey-based system definitions (e.g., Jenkins et al., 2024), with important limitations for my purposes. First, without identifying and standardizing CEO names across years, prior datasets cannot track executive turnover. Second, organizational groupings based on the AHA survey may not reflect operational management structures: in large systems, the parent CEO often delegates operational decisions to regional CEOs or directors who manage affiliated facilities. I extend their approach by addressing these limitations, and describe the construction of my dataset in detail below. To my knowledge, this is the first comprehensive panel dataset of nonprofit hospital executive compensation that enables both turnover analysis and aggregation at the managerial supervision level.

IRS Statistics of Income Exempt Organizations (SOI EO) The IRS SOI EO contains microdata of selected entries in Form 990 filings from 2011 to 2022. By default, it includes a stratified sample of organizations exempt under Internal Revenue Code sections 501(c)(3) through 501(c)(9), with sampling rates ranging from 1% for small-asset classes to 100% for large-asset classes. However, all tax-exempt hospitals are covered in this sample (GAO, 2023). Relevant to my analysis, the SOI EO includes detailed information from Part VIII "Statement of Revenue," Part IX "Statement of Functional Expenses," and Part X "Balance Sheet" of the main form, along with Schedule H. I keep all filings that are classified as hospitals in the SOI EO, and retain the list of EINs for the next step.

Form 990 Schedule J Data The SOI Exempt Organizations microdata do not include Schedule J information. I therefore obtain raw XML files of Form 990 filings from ProPublica's Nonprofit Explorer. Coverage begins in tax year 2013.[4] I harmonize these XML filings using IRS XML schema documentation and parse Schedule J data to extract employee names, titles, and total compensation amounts. This yields approximately 24,000 EIN-year observations with non-missing Schedule J data.

To identify the CEO in each filing, I first exclude all employees whose titles fall exclusively into the following three categories: (1) clinical staff (e.g., physician, pharmacist, anesthesiologist), (2) board members or trustees (e.g., director, board member, trustee), and (3) mid-level management (e.g., secretary, vice president, general counsel). Titles that combine a clinical or board role with an executive function, such as "Physician and Chief Hospital Administrator" or "Director and CEO," are retained. Next, among the remaining 257,923 employee rows, I use a large language model (LLM) algorithm to screen CEO candidates. Specifically, I use Gemini 2.5 Flash to first label the following three classes of titles: (a) CEO Strict (CEO, Chief Executive Officer, President and CEO), (b) CEO Strong (President, Executive Director, Hospital Administrator), and (c) CEO Weak (Chief Administrator,

[4]The IRS's initial public release of e-file Form 990 XML via the AWS Registry of Open Data covered returns back to tax year 2011, but public bulk access through the AWS Registry was discontinued in December 2021. Direct requests to the IRS for XML filings now only yield filings from 2013 onward, which may explain ProPublica's effective coverage starting in 2013.

Chairman, CAO). I then prompt the LLM to assign the most likely candidate based on the following criteria: (i) preference for single candidates with CEO Strict titles, (ii) if no CEO Strict title exists, preference for single candidates with CEO Strong titles (preference for CEO Weak if no CEO Strong title exists), (iii) if multiple candidates exist within the same class, preference for the system-level or region-level non-interim/acting CEO over others, and (iv) if multiple candidates still exist, preference for the highest-compensated candidate. This procedure identifies a unique CEO in 20,031 EIN-year observations. I then manually handle edge cases, such as observations with multiple or zero candidates, creating a final sample of 20,708 EIN-year observations with identified CEOs.

Lastly, I manually standardize CEO names through repeated quality-control checks. The standardization convention is "First M. Last," where "M." denotes the middle initial when available. I correct common name variations and typos in first names (e.g., "Bob" vs. "Robert"), last names (e.g., "Smith-Johnson" vs. "Smith Johnson"), and suffixes (e.g., "Jr." vs. "Junior"). During this process, I also correct misclassifications of CEO candidates identified in the previous step. A common case arises when the algorithm selects a facility-level manager because the true regional CEO holds a complex title, such as "Senior Vice President and Regional President, Central Communities," which does not map cleanly into the predefined CEO title categories. For individuals with common names appearing across multiple locations, I further verify identities using publicly available information (e.g., Google search results and LinkedIn profiles) to resolve name disambiguation. I uniquely identify 2,921 CEOs across all the remaining EIN-year observations.

Aggregation to Organizational Groups Finally, I aggregate EIN-level observations to the organizational group level based on managerial supervision. To be consistent with the tax liability under Section 4960, I would combine all related EINs under the same CEO's supervision. Depending on organizational structure, these groups may correspond to parent health systems, regional hospital networks, or standalone hospitals.[5]

[5]By default, most EINs already correspond to a single organizational group. However, multi-state hospital systems often file separate EINs for each state of operation, and additional aggregation is required to

Within each tax year, I initially group all EINs associated with the same identified CEO name into a single organizational group. Each Schedule J filing reports both the CEO's compensation received from the focal EIN and the total compensation received from all related EINs. I aggregate these components to compute total CEO compensation at the organizational group level, denoted $Comp_{i,t}$. As a consistency check, I verify that, for a given CEO-year, the reported total compensation is identical across all EINs within the same group. I then develop an algorithm to construct a unified organizational group identifier across years, allowing for CEO turnover, mergers and acquisitions (M&As), spin-offs, and organizational entry and exit. Using this procedure, I identify 1,848 unique organizational groups in total.

[Table I here]

Because CEO compensation is already reported in aggregate across all related EINs, I next aggregate community benefit spending and financial information from the SOI EO data to the organizational group level. The key variables used in the empirical analysis are defined as follows. Net assets ($NA_{i,t}$), defined as total assets minus total liabilities, accumulate primarily through retained earnings and correspond to X_t in the model. Total community benefit spending ($CB_{i,t}$) combines financial assistance and other community benefit net expenses reported in Schedule H and corresponds to H_t in the model. As a robustness check, I also consider financial assistance spending alone ($FA_{i,t}$). Finally, I also include total revenues ($Rev_{i,t}$) and the total number of hospital facilities ($Size_{i,t}$). All financial variables are deflated to 2017 dollars using the Consumer Price Index (CPI), unless otherwise noted. Table I summarizes the key variables in my empirical sample of nonprofit hospital organizational groups from 2013 to 2022. The final sample contains 11,856 organizational group-year observations. On average, CEO compensation is about \$1.05 million in nominal terms, and \$991,000 in 2017 dollars, with substantial variation across organizations and over time. Social benefit spending averages 18% of the organization's net assets, or about 8.3% of total

account for mergers and acquisitions, spin-offs, and other organizational restructuring over time.

revenues.

3.3 Descriptive Evidence

I first present descriptive evidence on the impact of excise taxation on nonprofit hospital executive compensation and social benefit provision to support the model's assumptions and predictions. Figure II plots histograms of CEO compensation in 2017, 2018, and 2022, in both nominal and real terms. If excise taxation reduces CEO compensation through substitution effects, the compensation distribution should shift leftward after 2017, particularly in nominal terms. Moreover, policies with explicit thresholds in the running variable often generate discontinuities in the distribution.

[**Figure II here**]

However, Figure II(a) shows that organizations do not adjust CEO compensation downward in nominal terms from 2017 to 2018, and there is no apparent bunching behavior just below the $1 million threshold. This pattern persists through 2022, as shown in Figure II(b), with the nominal distribution shifting to the right and exhibiting greater mass at higher compensation levels ($\geq$ $2 million). Figure II(c) further shows that, adjusted for inflation, the 2018 compensation distribution closely resembles that of 2017. By 2022, Figure II(d) reveals fatter tails on both ends, indicating greater dispersion in compensation outcomes. This increased dispersion is consistent with the model's prediction that excise taxation increases the volatility of the CEO's claim on organizational financial assets. Overall, Figure II provides no evidence that excise taxation reduces CEO compensation levels. If anything, the nominal compensation distribution shifts rightward after 2017, consistent with the model's prediction that the excise tax would increase the effective growth rate of the CEO's claim on financial assets.

My model builds on a dynamic agency framework in which CEO moral hazard constrains social benefit provision. A key implication is a negative relationship between the severity of moral hazard and social benefit spending: organizations with more entrenched executives must devote a larger share of financial resources to executive compensation, leaving fewer resources for social benefits. Because moral hazard is unobservable, I proxy for it using executive perks, following the corporate governance literature (Yermack, 2006). Tax-exempt organizations disclose eight categories of non-pecuniary benefits to executives in Schedule J, including first-class or charter travel, housing allowances or residences for personal use, discretionary spending accounts, and health or social club dues.

[**Figure III here**]

Figure III examines the relationship between executive perks and social benefit provision. Figure III(a) plots average social benefit provision, measured as a percentage of net assets, for panel observations grouped by perk count. There is a clear negative relationship: organizations providing more executive perks allocate a smaller share of financial resources to social benefits. Figure III(b) shows the distribution of social benefit provision for low-perk (0–2) and high-perk (5 or more) organizations. Social benefit provision in the high-perk group is concentrated below 10% of net assets, whereas the low-perk group exhibits a fat right tail. These patterns are consistent with the model's implication that greater moral hazard is associated with lower social benefit provision.

3.4 Event Study

To evaluate the impact of excise taxation on CEO compensation and social benefit provision, I implement an event-study design comparing organizations affected by the tax to those unaffected. I define realized exposure to the excise tax, $Covered_{i,t}$, as an indicator equal to one if an organization's CEO compensation exceeded \$1 million in any year since 2017, and zero otherwise. I adopt this definition because, under Section 4960, once an individual becomes a covered employee, they remain covered indefinitely. Table I shows that approximately 19.5% of organization-year observations in the full sample are classified as exposed. This figure understates true exposure because the excise tax only applies after 2017. When restricting to the post-2017 period, the exposure rate rises to 40.7%, indicating the policy's broad reach within the nonprofit hospital sector.

An event-study analysis based directly on $Covered_{i,t}$ is likely to suffer from selection bias, since organizations endogenously determine CEO compensation levels. Hospitals with higher executive pay may differ systematically from lower-paying hospitals along unobserved dimensions that also affect social benefit provision. My identification strategy instead uses pre-policy hospital organization size, measured by the number of facilities, to define treatment and control groups. The event-study design compares organizations that are *ex ante* more likely to have covered employees after the policy's implementation to those less likely to be affected. This approach mitigates selection concerns for two reasons. First, the size measure is predetermined relative to the policy change. Second, even if organizations anticipated the policy, adjusting organizational size would be extremely costly, requiring mergers, acquisitions, or divestitures.

[**Figure IV here**]

Figure IV illustrates the relevance of organizational size for excise tax exposure. Figure IV(a) plots the share of organizations with CEO compensation above $1 million before 2017 against maximum pre-policy organizational size. Among standalone hospitals (one facility), over 83% of organization-year observations had CEO compensation below $1 million. This share is 68% for small systems with two facilities. The fraction declines gradually as organizational size increases, stabilizing around 20% for systems with more than five facilities. Larger hospital systems possess greater financial resources and operational complexity, making high CEO compensation both feasible and necessary. This pattern persists after 2017, as shown in Figure IV(b), with a similarly monotonic relationship between organizational size and excise tax exposure. For most size groups, the fraction of organizations with CEO compensation above $1 million increases modestly after 2017, largely reflecting inflation. Standalone hospitals still have approximately 77% of observations with CEO compensation below $1 million in the post-2017 period. The corresponding figure for two-facility systems is 54%, while larger systems remain below 50%. Given this, I define the treatment group as organizations that ever had three or more facilities in the pre-treatment period, and the control group as standalone hospitals and two-facility systems. Finally, $Treated_{i,t}$ is one if organization i belongs to the treatment group and year t is strictly after 2017, and zero otherwise. This classification yields an unconditional treatment rate of 9.5% in the full sample (Table I), and 19.9% in the post-2017 period. I then estimate the following event-study specification:

$$Y_{i,t} = \beta Treated_{i,t} + \delta Controls_{i,t-1} + \alpha_i + \mu_t + \varepsilon_{i,t}, \tag{9}$$

where $Y_{i,t}$ is the outcome variable of interest, and $Controls_{i,t-1}$ includes lagged values of the logarithm of net assets, logarithm of organization size, $Rev/NA_{i,t-1}$, and net operating profits over net total assets $(Rev - Exp)/NA_{i,t-1}$. The first two variables control for the differences in organizational scale between treatment and control groups, while the last variables account for differences in temporal profitability that may affect both CEO compensation and social benefit provision. α_i and μ_t are organization and year fixed effects, respectively. Standard errors are clustered at the organization level.

[Table II here]

Table II presents the event-study estimates. Column (1) confirms that my treatment definition effectively captures exposure to the excise tax. Relative to smaller organizations, pre-policy large organizations have a 47.5% higher annual likelihood of having an executive subject to the excise tax after 2017. The t-statistic of 17.4 indicates a strong first stage and satisfies the relevance condition, using the terminology of the instrumental variables (IV) framework.

I next normalize the outcome variables by net assets in Columns (2) through (4), consistent with the model's homogeneity. Column (2) shows that affected hospitals increase CEO compensation by 0.8% of net assets, corresponding to approximately 8% of the unconditional sample average. This finding is consistent with the model's prediction that excise taxation raises the effective growth rate of the CEO's claim on financial assets, resulting in higher compensation levels in equilibrium. Column (3) shows that affected hospitals reduce social benefit provision by 1.45% of net assets, suggesting that excise taxation crowds out social benefits. This magnitude likewise corresponds to approximately 8% of the unconditional sample average. In 2017 dollars, the implied increase in CEO compensation amounts to approximately $0.38 million annually, while the reduction in social benefit provision corresponds to approximately $6.90 million per year, based on average net assets in the sample. Column (4) reports similar results for financial assistance spending alone, a component more directly related to hospitals' social missions and less susceptible to accounting discretion. Columns (5) through (7) normalize outcome variables by total revenues. Although this normalization does not correspond directly to the model's specification, it is commonly used in policy discussions of nonprofit hospital community benefits. The results remain qualitatively similar.

An alternative specification is to use the $Treated_{i,t}$ variable as an instrument for actual excise tax exposure, making Column (1) of Table II the first stage of a two-stage least squares (2SLS) regression. As a robustness check, I implement this approach, with second-stage results reported in Online Appendix Table C.1. The 2SLS estimates are quantitatively similar to the reduced-form estimates in Table II, confirming the robustness of my findings. An alternative concern is that treatment assignment may be noisy for small systems near the cutoff. For organizations with two or three facilities, deals creating the addition or loss of a single hospital branch can mechanically change treatment status without meaningfully altering executive scope, compensation capacity, or exposure to the excise tax. This possibility introduces classification noise around the cutoff. To address this concern, I re-estimate the event-study specification excluding organizations with two facilities, and alternatively excluding those with two or three facilities. The results, reported in Online Appendix Table C.2 and Table C.3, are quantitatively similar to the baseline estimates.

I include additional robustness checks in the Online Appendix. The identification challenge to the empirical design is that there exist other omitted factors that differentially affect large and small hospital organizations after 2017. To be valid confounders, these factors must generate changes in CEO compensation and social benefit provision along the same timing and cross-sectional patterns as the excise tax. One potential confounder is the state-level Medicaid expansions that occurred in some states after 2017. Economically, these expansions may have increased hospital revenues and financial capacity, allowing for higher CEO compensation, and reduced demand for charity care due to improved insurance coverage. However, Online Appendix Table C.4 shows that the results are robust to excluding organizations located in states that expanded Medicaid after 2017. Furthermore, the treatment effects are not significantly larger in expansion states than in non-expansion states, as shown in Online Appendix Table C.5.

I next consider an alternative definition of treatment exposure based on pre-policy realized compensation. While a natural proxy, this measure raises two concerns. First, realized compensation is an endogenous equilibrium outcome that reflects unobserved governance characteristics. Second, it is also a noisy proxy for persistent compensation policy, as it incorporates transitory performance shocks and timing-related components. These features introduce both endogeneity and attenuation bias in treatment assignment. In addition, the statutory cutoff is not indexed to inflation, further weakening the mapping between realized compensation and effective tax exposure over time. Despite these concerns, Online Appendix Table C.6 implements this alternative approach using pre-policy compensation measured in 2017. Specifically, I define the treatment group as organizations in the top 35% of the compensation distribution, corresponding to firms located around the statutory cutoff (see Figure B.1). The resulting estimates are qualitatively similar to the baseline specification. The main coefficients retain their sign and economic magnitude, although estimates for financial assistance outcomes become statistically insignificant, consistent with greater measurement noise in this alternative exposure definition.

[**Figure V here**]

Despite generating qualitatively consistent results with the 2SLS estimates, the event-study design allows me to plot dynamic treatment effects over time, lending support to the parallel trends assumption. Figure V plots coefficients for each calendar year by interacting the treatment group indicator with year dummies, leaving out 2017 as the reference year. The other specification details remain unchanged from Equation (9).

The estimated coefficients for all outcome variables are small in magnitude and statistically insignificant from zero throughout the pre-treatment period (2013–2016), suggesting no pre-trends between treated and control organizations. Following the introduction of the excise tax in 2018, compensation relative to net assets increases gradually over time, while community benefit and financial assistance spending relative to net assets decline. These effects emerge smoothly rather than as a discrete jump at the policy date, consistent with a gradual adjustment process. This pattern aligns closely with the model's predictions: excise taxation operates through a dynamic income effect that progressively erodes organizational financial capacity and reallocates resources toward executive compensation, rather than through an immediate substitution response at the time of policy implementation.

[Table III here]

How can a CEO directly influence the provision of social benefits in practice? In Table III, I explore a distinctive institutional feature of the hospital sector. Nonprofit hospitals commonly adopt formal charity care policies that specify income thresholds for free or discounted care based on the Federal Poverty Guidelines (FPG). These policies are publicly reported in Schedule H and directly determine the level of social benefits provided. I classify organizations based on the generosity of their charity care policies, using both free-care and discounted-care FPG tiers.[6] Online Appendix Figure B.2 plots average CEO compensation and social benefit provision across FPG tiers. Not surprisingly, hospitals with more generous charity care policies provide higher social benefits. Consistent with the model's predictions, they also exhibit lower CEO compensation relative to net assets. This pattern suggests that

[6]Free-care FPG tiers are grouped as: (1) no policy or ≤100%; (2) (100%, 150%]; (3) (150%, 200%]; (4) >200%. Discounted-care FPG tiers are grouped as: (1) no policy or ≤200%; (2) (200%, 250%]; (3) (250%, 300%]; (4) (300%, 350%]; (5) (350%, 400%]; (6) >400%. These cutoffs correspond to the default threshold options provided by the IRS on Schedule H; hospitals may also enter values manually. Generous policy indicators equal one if the hospital's tier is above the median, and zero otherwise.

more generous charity care policies are associated with less entrenched executives. Table III further shows that treated hospitals significantly reduce the generosity of their discounted-care policies after 2017. I do not find significant changes in free-care policies, which may reflect the fact that free care is quantitatively less prevalent than discounted care.

[Table IV here]

Lastly, I examine how excise taxation affects the structure of CEO compensation contracts, guided by the model's mechanisms. If CEO claims grow faster under excise taxation, organizations are more likely to hit the upper boundary on cash payouts. In this region, flow compensation shifts toward short-term cash bonuses, while deferred compensation and retirement benefits are reduced to manage the CEO's continuation value. Consistent with this prediction, Table IV shows that treated hospitals significantly increase the bonus share of CEO compensation and reduce the share of deferred compensation. Moreover, they are less likely to provide supplemental nonqualified retirement benefits, such as Supplemental Executive Retirement Plans and Section 457(f) arrangements, which offer retirement payouts beyond IRS-qualified plan limits and are commonly used by nonprofits for executives.

4 Estimation of the Model

This section estimates the model in Section 2 using the empirical sample of nonprofit hospital organizations described in Section 3.2. Before describing the estimation procedure, it is useful to clarify the goal and interpretation of the exercise. The objectives are threefold. First, while the event-study estimates in Table II are consistent with the model's predictions, they do not reveal how the CEO's financial claim w evolves dynamically in response to excise taxation. Although w is correlated with observed compensation, it is an unobserved state variable whose distribution can only be recovered by estimating the model. Second, the reduced-form results document short-run effects on the flow value of social benefit provision, but they do not quantify the long-run welfare implications in terms of organizational social value. The model allows me to translate observed policy responses into welfare-relevant objects. Third, estimating the model enables counterfactual policy analysis.

Estimation Sample I estimate the model parameters using the Simulated Method of Moments (SMM), which chooses parameter values to minimize the distance between moments generated by the model and their empirical counterparts. It is therefore important to clarify the sample used to construct these moments. First, my initial sample includes all nonprofit hospital organizational groups with identified CEOs from 2013 to 2022, as described in Section 3.2. I exclude all observations in the treatment period and focus on the pre-policy sample. This restriction allows me to assign a zero tax rate, $\tau = 0$, to all organizations, without relying on realized compensation outcomes. In principle, I could instead assign τ to be either zero or 21% depending on treatment status in the treatment period. However, organizations may endogenously adjust CEO compensation in response to the excise tax, making such an assignment correlated with the unobserved state variable w and other parameters. Second, I use 2013 as the initialization year for all organizations to construct $w_{i,0}$, the initial CEO claim required to simulate the model. I calibrate $w_{i,0}$ by matching each organization's observed $Comp/NA_{i,t}$ in 2013 to the model-implied expected total compensation, $\gamma w_{i,0}$. Lastly, I truncate the remaining sample at the first CEO turnover, if any. This restriction is necessary because, over this relatively short sample period, the simulated moments would be sensitive to the bargaining assumptions used to reset w_0 following turnover.

[Table V here]

Internal Calibration Panel A of Table V summarizes the internally calibrated parameters. The moral hazard parameter λ is identified only conditional on the asset growth volatility σ. I therefore begin by calibrating the net earnings growth process using the pre-policy sample. In the data, I observe net earnings after costs of social benefit spending and excise taxation, but before depreciation. To recover the earnings process in the model, I define net earnings as revenues minus operating expenses plus direct social benefit spending, all normalized by net assets, and incorporate a calibrated annual depreciation rate of 15% on net assets. Because the estimation uses only the pre-policy period, no adjustment for excise taxation is required. However, this constructed earnings measure still omits the indirect costs of social benefit provision present in the model, which depend on the adjustment cost parameter θ estimated later.

To address this issue, I first calibrate an "unadjusted" earnings process from the data, obtaining $g^{\text{unadj}} = 0.110$ and $\sigma^{\text{unadj}} = 0.242$. In the estimation, conditional on a candidate θ, I then adjust these parameters prior to simulation as follows:

$$g = g^{unadj} + \theta/2 \times \overline{\left(\frac{CB}{NA}\right)^2},$$

and

$$\sigma = \left(\left(\sigma^{unadj}\right)^2 + \theta^2/4 \times \text{Var}\left(\left(\frac{CB}{NA}\right)^2\right) + \theta \times \text{Cov}\left(\frac{E}{NA}, \left(\frac{CB}{NA}\right)^2\right)\right)^{1/2},$$

where the mean and variance of $\left(CB/NA\right)^2$, as well as its covariance with the constructed earnings process E/NA, are computed using the pre-policy sample.

Next, I calibrate the CEO outside option $\underline{w}$. In the model, the expected flow compensation is γw, so I set $\gamma \underline{w}$ equal to the 1st percentile of observed compensation relative to net assets in the sample, which is 0.0006. Conditional on a candidate value of γ, I then set $\underline{w} = 0.0006/\gamma$ prior to simulation.

Taylor (2010) provides a structural estimate that total chief executive firing costs amount to 5.9% of firm assets in a dynamic compensation model. I therefore calibrate the liquidation value parameter to $l = 0.94$. Finally, I set the trustees' discount rate to $r = 0.04$, corresponding to a 4% annual real interest rate.

Identification The remaining parameters to be estimated are θ, γ, and λ. I begin with θ, which is identified by targeting the average level of social benefit provision relative to net assets, CB/NA, in the pre-policy sample. As shown by equation Equation (8), a higher θ

raises the marginal cost of social benefit provision, reducing its supply in the model.

Second, I target the mean and standard deviation of CEO compensation relative to net assets, $Comp/NA$, to identify γ and λ. The identification logic follows directly from the martingale representation of total compensation in equation Equation (2). In expectation, total compensation is proportional to γw, so a higher γ raises average compensation levels. In contrast, the volatility of total compensation identifies λ. Intuitively, a higher λ implies more severe moral hazard, requiring incentive provision through greater exposure of compensation to organizational performance. This increased risk exposure raises the volatility of the CEO's claim on organizational assets and, consequently, the volatility of total compensation.

I include two additional targeted moments to discipline the estimation and to help capture the dynamic mechanism emphasized in the model. First, I target the average growth rate of normalized CEO compensation in the data,

$$\Delta\left(\frac{Comp}{NA}\right)_{i,t} = \frac{Comp/NA_{i,t} - Comp/NA_{i,t-1}}{Comp/NA_{i,t-1}}.$$

This moment helps approximate the growth of the CEO's claim w over time, which is central to the dynamic income effects that account for the event-study results. Second, I target the average CEO turnover rate observed in the data. A higher θ increases the cost of social benefit provision, reducing social benefit supply overall. This effect is particularly pronounced when the CEO's claim w is low, since the model implies that social benefit provision is decreasing in w (Proposition 1). By reducing social benefit provision in this region, the growth rate of w slows, increasing the likelihood that w reaches the lower bound $\underline{w}$ and triggers CEO turnover.

Model Fit Table VI presents the moments targeted in the SMM estimation. The model matches the data moments closely. The average social benefit provision relative to net assets is 0.162 in the data and 0.160 in the model. The mean of CEO compensation relative to net assets is 0.0100 in the data and 0.0096 in the model. These magnitudes are consistent with the empirical observation that nonprofit hospitals allocate a substantial share of financial resources to social benefits, while CEO compensation represents a smaller fraction. Because the expected flow compensatioin ratio is γw in the model, the average CEO claim w is approximately 0.056 in both the data and the model, given an estimated γ of 0.180. Put it differently, on average, about 5.6% of the organization's net assets are effectively attributed to future compensation of the CEO.

The model generates an average CEO turnover rate of 0.165, compared to 0.155 in the data. The difference is marginally statistically insignificant. Consistent with this magnitude, the American College of Healthcare Executives reports an annual CEO turnover rate of approximately 16% in recent years.[7] This rate exceeds the roughly 10% annual turnover typically observed in publicly traded firms (e.g. Jenter and Kanaan, 2015), reflecting differences in governance structure and stakeholder environments.

Panel B of Table V reports the estimated parameters. The adjustment cost parameter θ is estimated to be 0.198, implying a modest indirect cost of social benefit provision. Given this estimate, the implied standard deviation of net earnings is 0.248. The private benefit parameter λ is estimated to be 0.318. In continuous-time dynamic agency models, the severity of moral hazard depends jointly on the magnitude of private benefits (λ) and the volatility of the performance signal (σ). Accordingly, the economically relevant measure is the product $\lambda\sigma$, which equals 0.079 in the estimated model. This magnitude is comparable to estimates in the literature. For example, Ward (2025) calibrates a private benefit parameter of 0.345 with asset volatility of 0.275 in a dynamic agency model of intangible capital investment, implying a similar order of magnitude.

[Table VI here]

[7]For details, see "Hospital CEO Turnover Rate Remains Steady," American College of Healthcare Executives, 2023.

5 Model Implications

In this section, I use the estimated model as a laboratory to analyze several key implications. In particular, I focus on the long-run effects of excise taxation on organizational social value and on the dynamic evolution of the CEO's financial claim. Let $F_t(w)$ denote the cross-sectional distribution of CEO claims across organizations at time t.

In the model, $F_t(w)$ evolves over time through three channels. First, stochastic earnings shocks generate idiosyncratic fluctuations in organizational financial assets, which in turn affect the CEO's claim w according to equation Equation (4). Second, when w reaches the upper bound $\bar{w}$, cash compensation is paid to the CEO, reflecting the claim back to $\bar{w}$. As a result, the distribution $F_t(w)$ accumulates mass at the payout boundary over time, affecting the frequency of cash payments. Third, when w reaches the lower bound $\underline{w}$, the CEO is replaced and the CEO's claim is reset to a new initial value w_0. To construct a stationary cross-sectional distribution, I assume that upon CEO turnover, the incoming CEO's initial claim w_0 is drawn from the prevailing cross-sectional distribution $F_{t-1}(w)$.

Let $\Gamma(\cdot)$ denote the transition operator governing the evolution of the cross-sectional distribution of CEO claims, so that

$$F_t(w) = \Gamma\big(F_{t-1}(w)\big)\,.$$

A stationary equilibrium is reached when $F(w) = \Gamma(F(w))$. Conditional on a given excise tax rate τ, I simulate 2,000 organizations. To initialize the simulation, I draw $w_{i,0}$ from the empirical distribution observed in 2013. The subsequent evolution of the cross-section is governed by the transition operator $\Gamma(\cdot)$, including the turnover rule described above. I iterate the transition process for 100 burn-in periods and simulate an additional 50 periods to ensure convergence, so that the resulting stationary distribution is not sensitive to the initial draw of $w_{i,0}$. The final 10 periods are used to compute the stationary distribution $F(w)$ and other objects of interest.

5.1 Costs of Excise Tax

Table VII reports the long-run implications of excise taxation for organizational social value. The first row shows that average social value declines from 0.9436 to 0.9417 when the excise tax rate increases from 0% to 21%. This change corresponds to a value loss of approximately 0.20% relative to the baseline, or 6% of the baseline standard deviation (0.030). The second row shows that the average CEO claim w increases significantly under excise taxation. A 0.0018 increase in the average CEO claim corresponds to a 2.8% increase relative to the baseline, or 7.1% of the baseline standard deviation (0.024). Figure VI(a) plots the distribution of w prior to cash payouts at the upper boundary. Following the introduction of excise taxation, the distribution shifts rightward, generating a higher average claim.

Consistent with this shift in w, Figure VI(b) shows that, in the baseline scenario without excise taxation, the distribution of social value v is concentrated near its upper range. Because the value function is concave in w, intermediate values of w correspond to the highest levels of organizational social value. The rightward shift and increased dispersion of w therefore translate into a lower average social value under excise taxation. Finally, consistent with the empirical results, the third and fourth rows show that CEO compensation increases while normalized social benefit provision decreases in response to excise taxation.

[**Table VII here**]

[**Figure VI here**]

The main takeaway from this analysis is that excise taxation effectively exacerbates the underlying moral hazard problem. Because the CEO's claim and compensation grow faster, imposing an excise tax is equivalent to increasing the severity of the moral hazard problem, proxied by λ. An alternative interpretation is that excise taxation raises the cost of satisfying the incentive compatibility constraint, as the organization must transfer an additional fraction to the government. To demonstrate this equivalence, I simulate the model under different combinations of τ and λ, plotting the resulting average social value in Figure VII(a). This figure exhibits a clear monotonic relationship between τ, λ, and social value. For any given level of private benefit parameter λ, increasing the excise tax rate τ reduces social value. Conversely, for any given excise tax rate τ, increasing the private benefit parameter λ also reduces social value. As a result, the figure has a pattern of downward-sloping contour lines.

This monotonic relationship allows me to evaluate the costs of excise taxation in terms of an increase in the severity of moral hazard. For example, the estimated model implies that increasing the excise tax rate from 0% to 21%, holding λ fixed at its baseline estimate, reduces average social value to 0.9417. In Figure VII(a), to achieve the same reduction in social value through an increase in λ alone, holding τ fixed at zero, would require increasing λ from 0.318 to approximately 0.325, a 2.2% increase in the severity of moral hazard.

[**Figure VII here**]

Moreover, Figure VII(a) implies that an alternative policy that directly targets moral hazard, such as enhanced board oversight or greater transparency in executive compensation, would increase social value by reducing λ. For example, Babenko et al. (2026) document that the Nonprofit Revitalization Act of 2013 in New York reduced average CEO compensation by approximately 2%. In the model, this reduction can be interpreted as a reduction in the severity of moral hazard, as Figure VII(b) shows that average CEO compensation is increasing in λ. To achieve a 2% reduction in CEO compensation, holding τ fixed at zero, would require reducing λ from 0.318 to approximately 0.310, a 2.5% decrease in the severity of moral hazard. This reduction in λ would increase average social value from 0.9436 to approximately 0.946, a 0.25% increase relative to the baseline average social value, or 8% of the baseline standard deviation. Overall, this analysis shows that to improve organizational social value, it is more effective to directly target the underlying moral hazard problem.

5.2 Minimum Benefit Requirement

Despite the fact that the IRS requires nonprofit hospitals to report community benefit spending as a percentage of revenues in their annual Form 990 filings, there is no explicit minimum requirement for the level of community benefit provision. One frequently proposed policy solution is to introduce a minimum benefit requirement that mandates nonprofit hospitals allocate a fixed percentage of revenues to community benefits. For example, in Texas, one condition for tax exemption is that nonprofit hospitals must provide charity care equal to at least 5% of their net patient revenues.

In the model, a minimum benefit requirement can be implemented by imposing a lower bound on social benefit provision, h_{min}. Although the model does not include an explicit total revenue variable, revenues are proportional to net assets, so an asset-based minimum requirement is equivalent to a revenue-based requirement. Rather than hardcoding a lower bound, I equivalently introduce a penalty cost for social benefit provision below the required level. Specifically, I assume that organizations incur a penalty equal to the shortfall:

$$p(h) = \max\{h_{min} - h, 0\}.$$

[Figure VIII here]

In the absence of adjustment costs, or when they are negligible, the optimal policy features a floor at h_{min}. It is strictly better to allocate resources to social benefit provision rather than incur the penalty. More generally, incorporating the penalty term into the HJB Equation (7) modifies the optimal policy to

$$h(w) = \begin{cases} \dfrac{1}{\theta}\left(\dfrac{1}{v(w) - v'(w)w} - 1\right), & \text{if } h(w) \geq h_{min}, \\[2ex] \min\left\{\dfrac{1}{\theta\left(v(w) - v'(w)w\right)},\ h_{min}\right\}, & \text{otherwise,} \end{cases}$$

where the interior solution in the second case arises when θ is sufficiently large. Figure VIII plots the optimal social benefit provision policy and the trustees' value function under different minimum requirements h_{min}, holding the excise tax rate at zero. Figure VIII(a) shows that when θ is low, a minimum requirement binds in the high-w region by setting social benefit provision equal to h_{min}, where the unconstrained policy would otherwise prescribe a lower level of provision. In contrast, the requirement generates negligible changes in the low-w region.

This pattern is consistent with the model's prediction that social benefit provision is decreasing in w, implying that a minimum benefit requirement can reduce organizational social value. The policy forces the organization to allocate more resources to social benefits in the high-w region, which accelerates the growth of CEO claims on the remaining assets. This effect is reflected in the adjusted diffusion process of w in Equation (4):

$$\begin{aligned} dw_t = &\Big(w_t\left(\gamma - g + s(h_t) + p(h_t) + \tau\gamma w_t\right) + w_t\sigma^2\left(1-\tau\lambda\right)^2 - \lambda\sigma^2\left(1-\tau\lambda\right)\Big)\,dt \\ &- dc_t + \sigma\left(\lambda - w_t\left(1-\tau\lambda\right)\right)dB_t, \end{aligned}$$

where the minimum requirement increases the drift of w through either higher social benefit provision h_t or the penalty cost $p(h_t)$. In this region, however, the value function decreases in w, since trustees eventually begin paying out cash compensation once the CEO's claim becomes sufficiently large. As a result, Figure VIII(b) shows that social value strictly decreases in the minimum requirement h_{min}.

In the Online Appendix Figure B.3, I report the simulated long-run average social value and instantaneous social benefit provision under different minimum requirements using parameters estimated under the SMM. Consistent with the analysis above, increasing h_{min} from zero to 0.12 reduces average social value by 0.39% relative to the baseline mean, or 12.3% of the baseline standard deviation. Because the average revenue-to-asset ratio in the data is approximately 2.34, a minimum requirement of $h_{min} = 0.12$ corresponds to a revenue-based requirement of roughly 5%, comparable to the Texas policy. Although the average instantaneous social benefit provision increases mechanically, the increase is concentrated in the high-w region where the value function is decreasing in w. As a result, the long-run average social value declines under a minimum benefit requirement.

5.3 Warm Glow

Classic theory suggests that agents working in the nonprofit sector derive intrinsic utility from the social benefits they provide, which can mitigate agency problems by aligning managers' incentives with organizational missions. Weisbrod (1988) argues that this warm glow effect creates a sorting mechanism, attracting individuals who are more motivated by social impact than by financial rewards. In Besley and Ghatak (2005), the social preferences of nonprofit managers effectively substitute for the financial compensation required to elicit effort, thereby reducing the severity of moral hazard and improving organizational social value.

However, empirical evidence on managers' intrinsic motivation in the nonprofit sector is, at best, mixed (e.g., Ballou and Weisbrod, 2003; Brickley and Van Horn, 2002). This paper helps explain this puzzle by showing that, in a dynamic agency setting, the presence of warm-glow utility does not necessarily improve organizational social value. To demonstrate this, I extend the model by assuming that the CEO's flow utility follows

$$dC_t + (1 - e_t)\lambda g X_t \, dt + \eta H_t \, dt,$$

where $H_t = h_t X_t$ is the social benefit flow and $\eta > 0$ is the warm glow parameter. Economically, η captures the intrinsic value the CEO derives from fulfilling the organization's social mission. The model setup is otherwise identical to the baseline. I focus on the contract implementing $e_t = 1$ for all t. Under this contract, the CEO's continuation value simplifies to:

$$W_t = \mathbb{E}\left[\int_t^{\tau_L} e^{-\gamma(s-t)} \left(dC_s + \eta H_s \, ds\right) + e^{-\gamma(\tau_L - t)} \, \underline{w} \, X_{\tau_L}\right].$$

By the martingale representation theorem, the CEO's total incremental flow satisfies:

$$dC_t + dW_t + \eta H_t \, dt = \gamma W_t \, dt + \beta_t \, \sigma X_t \, dB_t. \tag{10}$$

Because the warm glow term $\eta H_t \, dt$ is contractually specified and independent of the CEO's effort choice e_t, the local incentive compatibility condition still compares the CEO's gain from effort against the private benefit from shirking. As a result, the incentive compatibility condition $\beta_t \geq \lambda$ is unchanged. For taxation, substituting Equation (10) with $\beta_t = \lambda$:

$$d\mathrm{T}_t = \max\{\tau\left(dC_t + dW_t\right), 0\} = \max\{\tau\left(\gamma W_t\, dt - \eta H_t\, dt + \lambda\sigma X_t\, dB_t\right), 0\}. \tag{11}$$

Note that in the above equation, I impose a non-negativity constraint on the excise tax payment. In reality, this constraint may be relaxed by allowing the organization to receive government subsidies when the organization provides a large amount of social benefits, which can be interpreted as negative taxation. However, the current excise tax policy does not include such a subsidy provision, so I maintain the non-negativity constraint for consistency with the actual policy.

The presence of warm-glow utility changes how the CEO's claim w evolves over time as

$$\begin{aligned} dw_t = & \Big(w_t\left(\gamma - g + s(h_t)\right) - \eta h_t + \max\{\tau w_t\left(\gamma w_t - \eta h_t\right), 0\} \\ & - \lambda\sigma^2(1-\tau\lambda) + w_t\sigma^2(1-\tau\lambda)^2\Big)dt \\ & - dc_t + \sigma\left(\lambda - w_t(1-\tau\lambda)\right) dB_t. \end{aligned} \tag{12}$$

Echoing Besley and Ghatak (2005), warm-glow utility reduces the expected growth rate of the CEO's claim through two channels. First, the warm-glow term ηH_t directly offsets the need for financial incentives to elicit effort. Second, in the presence of positive excise taxation, intrinsic utility from social benefit provision further reduces the amount of compensation subject to taxation.

However, the presence of warm-glow utility does not necessarily improve organizational social value due to termination risk. In the model, organizations with a low CEO claim w instead benefit from a faster-growing claim, as this reduces the likelihood of termination. Warm-glow utility slows down the accumulation of w. The following proposition formally characterizes the effect of warm glow on the optimal social benefit provision policy.

Proposition 4. *The optimal social benefit provision policy is*

$$h^{\eta}(w) = \max\left\{\frac{1}{\theta}\left(\frac{1-\eta v'(w)}{v(w)-wv'(w)}+\eta\tau-1\right),0\right\}. \tag{13}$$

Define $h^0(w)$ as the baseline optimal policy without warm glow. There exist two cutoffs $\tilde{w}_1, \tilde{w}_2 \in [\underline{w}, \bar{w}]$ such that (i) $h^{\eta\prime}(w) < 0$ if and only if $w > \tilde{w}_1$, and (ii) $h^{\eta}(w) > h^0(w)$ if and only if $w \geq \tilde{w}_2$.

[**Figure IX here**]

Figure IX(a) plots the optimal social benefit provision policy under different warm glow parameters. Compared to the baseline policy, the policy under warm glow utility is lower in the low-w region and higher in the high-w region. This pattern arises because, when w is low, the organization benefits from a faster-growing claim, so the optimal policy reduces social benefit provision to accelerate the growth of w and reduce termination risk. In contrast, when w is high, the organization benefits from a slower-growing claim to avoid cash payouts, so the optimal policy increases social benefit provision, essentially compensating the CEO with intrinsic utility to reduce the need for financial incentives. The difference between the two policies is more pronounced when η is higher. The policy under warm-glow utility is no longer necessarily decreasing in w for all values of η. As η increases, the policy function will first become less steeply decreasing in w, and then hump-shaped, and eventually increasing in w for sufficiently high η.

How does warm glow utility affect organizational social value? Figure IX(b) plots the trustees' value function under different warm glow parameters. In general, the value functions cross the baseline value from below at intermediate values of w. When w is low, the value function under warm glow utility is lower than the baseline, due to reduced social benefit provision and increased termination risk. The relationship flips in the high-w region given severe agency frictions. In this region, Besley and Ghatak (2005)'s argument applies as intrinsic value reduces the chance of cash payouts.

Overall, the presence of warm-glow utility does not necessarily improve organizational social value. As a result, whether managerial intrinsic motivation leads to higher or lower average social value becomes a quantitative question that depends on the steady-state cross-sectional distribution of CEO claims across organizations. If the distribution is concentrated in the low-w region, the costs of reduced social benefit provision and increased termination risk dominate. Conversely, if the distribution is concentrated in the high-w region, the benefit of reduced cash payouts dominates. To illustrate this, I simulate the model under different warm-glow parameters and plot the resulting average social value in the Online Appendix Figure B.4 using the structurally estimated parameters. The figure shows that average social value under warm-glow utility is lower than in the baseline when η is low (e.g., $\eta = 0.05$), but exceeds the baseline when η is sufficiently high (e.g., $\eta = 0.10$).

Furthermore, the presence of warm-glow utility appears to mitigate the value costs of excise taxation. Although excise taxation still reduces social value under warm-glow utility, the reduction is smaller than in the baseline, especially when the warm-glow parameter is high. This effect arises because intrinsic utility reduces financial claims and thus the tax base. This tax-saving channel encourages organizations to allocate more resources to social benefit provision, which in turn reduces the growth rate of CEO claims and mitigates agency frictions in the high-w region. In fact, excise taxation increases average flow social benefit provision under warm-glow utility in the simulation.

6 Conclusion

This paper studies whether taxing executive compensation helps tax-exempt organizations fulfill their social missions. Congress introduced a 21% excise tax on excessive executive pay in 2017 to discourage the diversion of resources away from social benefit provision. I show that the equilibrium effects of this policy run in the opposite direction.

In the nonprofit sector, the non-distribution constraint is intended to ensure that managers do not profit at the expense of social missions. Yet the absence of shareholders weakens conventional governance mechanisms that would otherwise discipline moral hazard. When managerial effort is essential for generating earnings, incentive provision necessarily requires performance-based contracts that resemble residual claims. In this setting, the CEO's continuation claim on organizational assets becomes the key state variable governing social benefit provision. Excise taxation erodes financial assets and increases the effective growth and volatility of this claim, amplifying agency distortions rather than mitigating them. Consistent with the model, nonprofit hospitals more exposed to the excise tax increase CEO compensation and reduce charity care and community benefit spending following the reform.

Structural estimation implies that raising the tax rate is equivalent to increasing the severity of the moral hazard friction. These findings highlight a fundamental governance dilemma in nonprofit organizations. In practice, when executive effort drives cash flows, residual-claim-like incentives reemerge through compensation contracts. Policies that distort these incentives without directly reducing agency frictions can reduce organizational social value.

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Table I: Summary Statistics of the Empirical Sample

This summarizes the key variables in the empirical sample of nonprofit hospital organizational groups from 2013 to 2022. The final sample contains 11,856 organization-year observations. *Total Compensation* is the total CEO compensation aggregated across all related EINs under the same organization. Real variables are deflated to 2017 dollars using the CPI. *Net Assets* is defined as total assets minus total liabilities. *Treated* is one if the organization belongs to the treatment group and year is 2018 or later, and zero otherwise. The treatment group consists of organizations that had at least three facilities before 2017. *Covered* is one if the organization has a covered executive and year is 2018 or later, and zero otherwise. A covered executive is one who has total compensation exceeding $1 million in any year after 2017. *Comp/NA* is the ratio of total CEO compensation to net assets. *FA/NA* is the ratio of financial assistance spending to net assets. *CB/NA* is the ratio of total community benefit spending, including both financial assistance and other community benefits, to net assets. *Comp/Rev*, *CB/Rev*, and *FA/Rev* are defined analogously using total revenues as the denominator. *Rev/NA* is the ratio of total revenues to net assets. *Size* is the total number of hospital facilities that belong to each organization.

Variable	**N**	**Mean**	**Std**	**p10**	**Median**	**p90**
Total Compensation (nominal, million)	11,856	1.050	1.383	0.233	0.683	2.080
Total Compensation (real, million)	11,856	0.991	1.277	0.223	0.649	1.987
Net Assets (real, million)	11,856	476.013	1,257.333	11.580	135.248	1,073.629
Treated	11,856	0.095	0.294	0.000	0.000	0.000
Covered	11,856	0.195	0.396	0.000	0.000	1.000
Comp/NA	11,835	0.010	0.015	0.001	0.005	0.024
FA/NA	11,835	0.117	0.142	0.013	0.070	0.274
CB/NA	11,835	0.179	0.198	0.032	0.113	0.395
Comp/Rev	11,856	0.004	0.004	0.001	0.003	0.010
CB/Rev	11,856	0.083	0.049	0.029	0.074	0.147
FA/Rev	11,856	0.053	0.036	0.012	0.047	0.102
Rev/NA	11,856	2.339	2.361	0.745	1.579	4.521
Size	11,856	2.294	3.510	1.000	1.000	5.000

Table II: Impacts of Excise Tax: Event Study Estimates

This table shows the results of the event-study analysis estimating the impact of excise taxation on CEO compensation and social benefit provision. *Treated* is one if the organization belongs to the treatment group and year is 2018 or later, and zero otherwise. The treatment group consists of organizations that had at least three facilities before 2017. *Covered* is one if the organization has a covered executive and year is 2018 or later, and zero otherwise. A covered executive is one who has total compensation exceeding $1 million in any year after 2017. *Comp/NA* is the ratio of total CEO compensation to net assets. *FA/NA* is the ratio of financial assistance spending to net assets. *CB/NA* is the ratio of total community benefit spending, including both financial assistance and other community benefits, to net assets. *Comp/Rev*, *CB/Rev*, and *FA/Rev* are defined analogously using total revenues as the denominator. Control variables include lagged values of the logarithm of net assets, logarithm of organization size, Rev/NA, and $(Rev - Exp)/NA$. All specifications include organization and year fixed effects. Standard errors are clustered at the organization level. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Covered*	(2) *Comp/NA*	(3) *CB/NA*	(4) *FA/NA*	(5) *Comp/Rev*	(6) *CB/Rev*	(7) *FA/Rev*
$Treated$	0.4748***	0.0008*	-0.0147**	-0.0092**	0.0003***	-0.0065***	-0.0027**
	(17.424)	(1.957)	(-2.316)	(-1.996)	(2.965)	(-3.576)	(-1.993)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11,721	11,703	11,703	11,703	11,721	11,721	11,721
Adj. R^2	0.64	0.72	0.66	0.64	0.87	0.68	0.65

Table III: Charity Care Policy Generosity and Hospital Behavior

This table reports the results of regressions of hospital compensation and social benefit provision on free-care and discounted-care FPG threshold groups. Columns (1)–(3) use free-care FPG thresholds and Columns (4)–(6) use discounted-care FPG thresholds. *Log(FPG Pct)* is the log of the FPG percentage threshold. *FPG Tier* is an ordinal variable indicating the FPG threshold bin. *Generous Policy* is an indicator equal to one if the FPG threshold exceeds 150% for free care or 350% for discounted care. *Treated* is defined as in Table II. Control variables and fixed effects are the same as in Table II. Standard errors are clustered at the organization level. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
		Free Care			*Discounted Care*	
	Log(FPG Pct)	*FPG Tier*	*Generous Policy*	*Log(FPG Pct)*	*FPG Tier*	*Generous Policy*
Treated	-0.0099	0.0121	-0.0081	-0.0425*	-0.1277**	-0.0479**
	(-0.584)	(0.383)	(-0.610)	(-1.769)	(-2.188)	(-2.136)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,507	10,005	10,005	10,586	10,171	10,171
Adj. R^2	0.67	0.76	0.81	0.35	0.77	0.75

Table IV: Impacts of Excise Tax: Contract Features

This table reports the results of regressions of CEO contract features on the treatment indicator. *Bonus Frac.* is the ratio of bonus compensation to total compensation. *DC Frac.* is the ratio of non-current (deferred) compensation to total compensation. *Retire Bene.* is one if the organization provides a supplemental nonqualified retirement plan to the CEO, and zero otherwise. *Treated* is defined as in Table II. Control variables and fixed effects are the same as in Table II. Standard errors are clustered at the organization level. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Bonus Frac.*	(2) *DC Frac.*	(3) *Retire Bene.*
Treated	0.0144**	-0.0283***	-0.0425**
	(2.136)	(-3.484)	(-2.304)
Controls	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	10,485	11,721	11,721
Adj. R^2	0.65	0.41	0.81

Table V: Model Parameters

This table presents the parameter values of the model, along with the descriptions. Panel (a) summarizes the parameters that are calibrated internally, while Panel (b) summarizes the parameters that are estimated using the SMM.

Panel A. Calibrated Parameters		
g^{unadj}	Unadjusted earnings growth rate	0.110
σ^{unadj}	Unadjusted earnings standard deviation	0.242
$\gamma\underline{w}$	Expected lowest flow compensation	0.0006
l	Liquidation value parameter	0.94
r	Trustee discount rate	0.04
Panel B. Parameters Estimated via SMM		
θ	Indirect cost parameter	0.198
λ	Private benefit parameter	0.318
γ	CEO discount rate	0.180

Table VI: Moment Conditions

This table presents the moments targeted in the SMM estimation, along with their empirical and model-implied average values. The first column describes the moment, while the second and third columns report the empirical and model-implied values, respectively. The last two columns report the difference between the empirical and model-implied moments, along with the t-statistic of this difference, computed using the standard error of the empirical moment.

Moments	*Data*	*Model*	*Diff.*	*t-stat*
Mean Benefits to Assets Ratio	0.1615	0.1601	-0.0013	-0.3388
Mean Compensation to Assets Ratio	0.0100	0.0096	-0.0004	-1.0573
Standard Deviation of Compensation to Assets Ratio	0.0141	0.0136	-0.0005	-0.6328
Mean Turnover Rate	0.1550	0.1653	0.0102	1.6390
Mean Growth Rate of Compensation to Assets	0.0571	0.0619	0.0048	0.8942

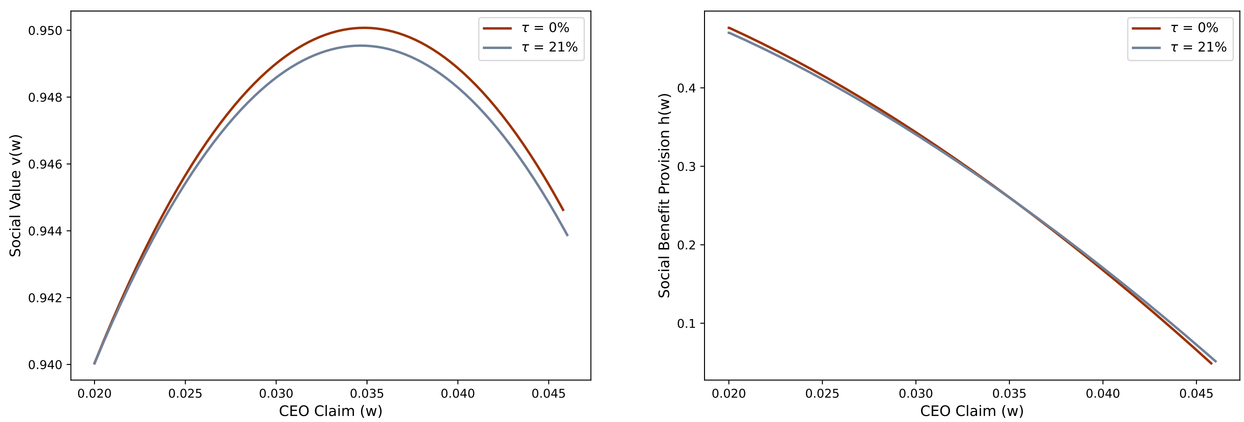
Table VII: Long-run Impacts of Excise Tax

This table presents the average values of key variables in the long-run stationary distribution under different excise tax rates $\tau = 0$ and $\tau = 21\%$. The first two columns report the average values under each tax rate. The next three columns report the difference between the two scenarios, along with the t-statistic and p-value of this difference.

	Mean				
	$\tau = 0$	$\tau = 21\%$	*Diff.*	*t-stat*	*p-value*
Social Value (v)	0.9436	0.9417	0.0019	4.801	0.000
CEO Claim (w)	0.0586	0.0603	-0.0017	-6.090	0.000
CEO Comp ($dc + dw$)	0.0140	0.0144	-0.0004	-4.049	0.000
Social Benefit Provision (h)	0.0956	0.0931	0.0026	1.735	0.083

Figure I: Value Function and Optimal Social Benefit Provision Policy

This figure plots the trustees' value function and the optimal social benefit provision policy under two excise tax rates, $\tau = 0$ and $\tau = 0.21$. Panel (a) plots the trustees' value function $v(w)$ against the CEO's claim w. Panel (b) plots the optimal social benefit provision policy $h(w)$ against w. Functions under different tax rates are plotted with different colors, indicated in the legend. The internally calibrated parameters used are reported in Panel A of Table V. The other parameters are set as follows: $\lambda = 0.20$, $\theta = 0.20$ and $\gamma = 0.15$.

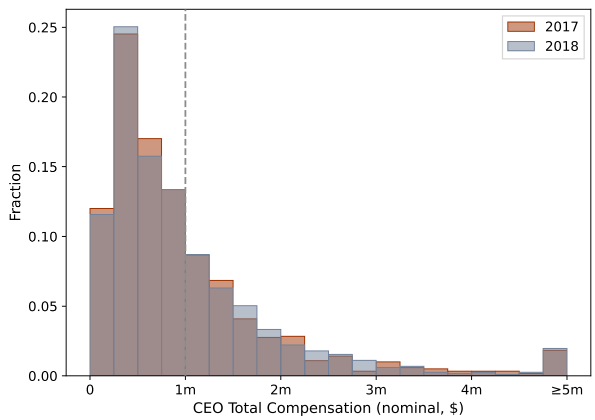


(a) Social Value Function

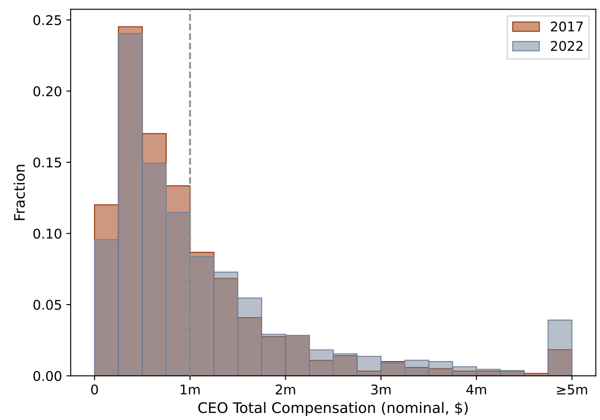
(b) Optimal Social Benefit Provision Policy

Figure II: Histogram of CEO Compensation

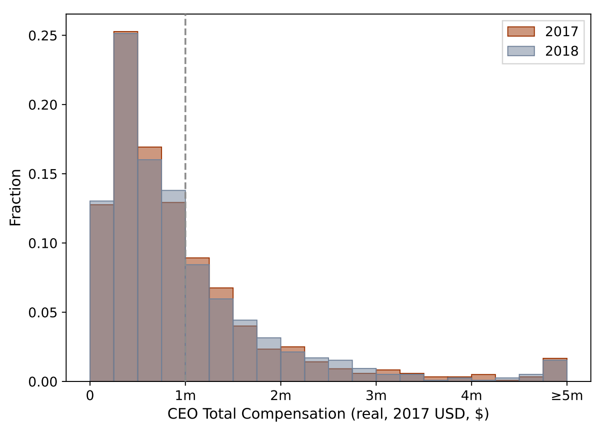
This figure plots histograms of CEO compensation in 2017, 2018, and 2022, in both nominal and real terms. Different years are plotted with different colors, indicated in the legend. All panels use the 2017 compensation as the benchmark, with different comparison years and deflation adjustments, as indicated in the titles. Real variables are deflated to 2017 dollars using the CPI. The vertical dashed line indicates the \$1 million threshold for excise taxation under Section 4960.



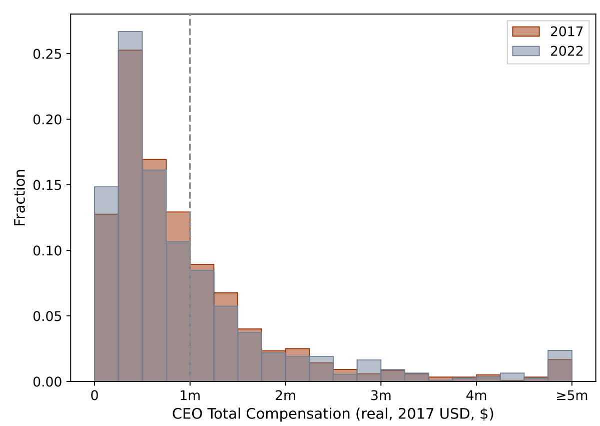
(a) CEO Compensation in 2018 vs. 2017



(b) CEO Compensation in 2022 vs. 2017



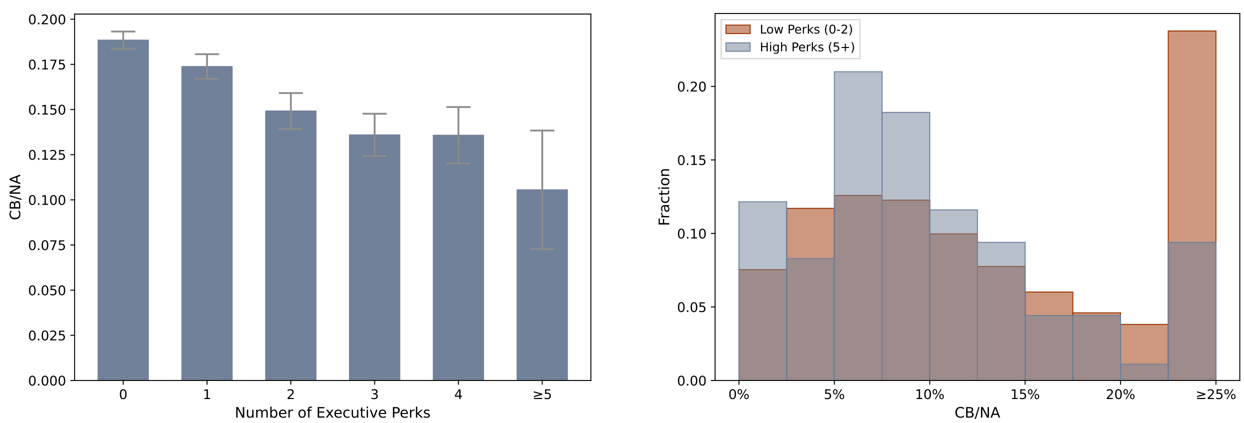
(c) CEO Compensation in 2018 vs. 2017 (in 2017 dollars)



(d) CEO Compensation in 2022 vs. 2017 (in 2017 dollars)

Figure III: Nonprofit Executive Perks and Social Benefit Provision

This figure examines the relationship between executive perks and social benefit provision. Panel (a) plots average social benefit provision, measured by the ratio of total community benefit spending to net assets, for panel observations grouped by perk count. 95% confidence intervals of the mean are indicated. The x-axis indicates the number of executive perks provided, with 5 or more perks grouped together due to smaller sample sizes. Panel (b) plots the distribution of social benefit provision for low-perk (0–2) and high-perk (5 or more) organizations.

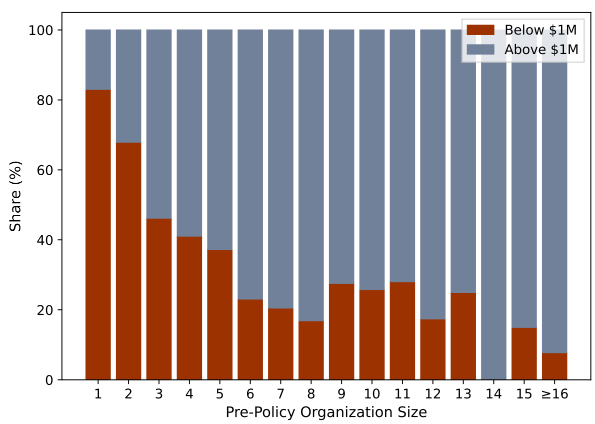


(a) Average Social Benefit Provision by Perk Count

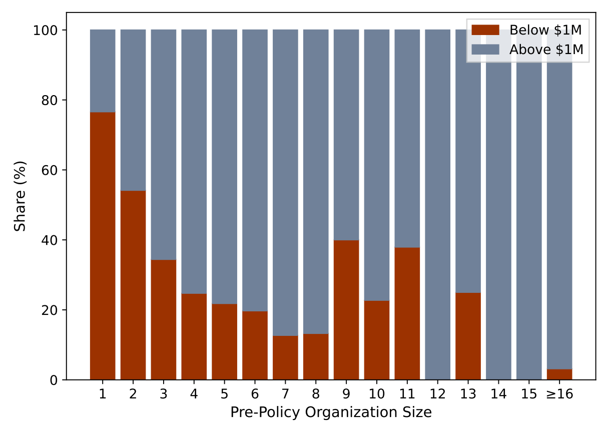
(b) Distribution of Social Benefit Provision across Perk Groups

Figure IV: Organization Size and CEO Compensation

This figure illustrates the relationship between pre-policy organization size, measured by the maximum number of facilities in the pre-treatment period, and CEO compensation levels. In both panels, the x-axis indicates the pre-policy organization size, with 16 or more facilities grouped together due to smaller sample sizes. The y-axis indicates the share of organization-year observations with CEO compensation below or above $1 million, as indicated in the legend. Panel (a) plots this relationship for the pre-policy period of 2013–2017, while panel (b) plots it for the post-policy period of 2018–2022.



(a) 2013–2017



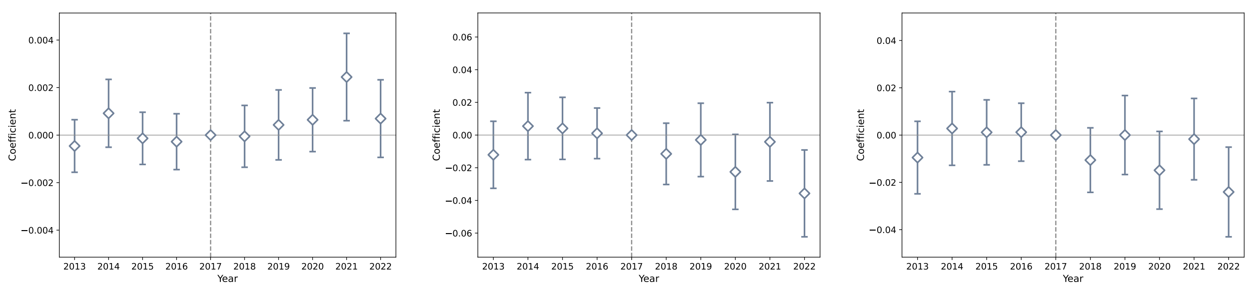
(b) 2018–2022

Figure V: Coefficient Dynamics of the Event Study

This figure plots the coefficient dynamics of the event-study specification, estimating the following equation:

$$Y_{i,t} = \sum_{k \neq 2017,\, k \in [2013,2022]} \beta_k Treated_{i,t}^{k} + \delta Controls_{i,t} + \alpha_i + \mu_t + \varepsilon_{i,t},$$

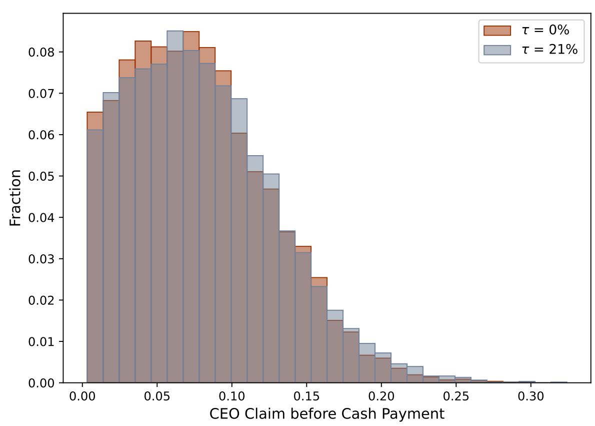
where $Treated_{i,t}^{k}$ is an indicator equal to one if organization i belongs to the treatment group and year t is equal to calendar year k, and zero otherwise. The omitted category is 2017, which serves as the reference year. All other specification details remain unchanged from Equation (9). The x-axis indicates calendar years, and the y-axis indicates the estimated coefficients β_k for each year, with 95% confidence intervals indicated by vertical bars. The vertical dashed line indicates the policy implementation year of 2018.



(a) *Comp/NA* (b) *CB/NA* (c) *FA/NA*

Figure VI: Long-run Distribution of CEO Claims and Social Value under Excise Tax

This figure presents the distribution of CEO claims and social value v in the long-run stationary distribution under different excise tax rates $\tau = 0$ and $\tau = 21\%$. Panel (a) plots the distribution of CEO claims w prior to cash payouts at the upper boundary, while panel (b) plots the distribution of social value v. In both panels, the x-axis indicates the variable of interest, while the y-axis indicates the fraction.

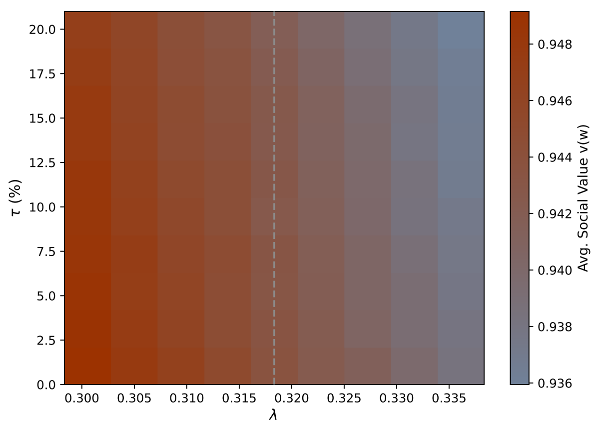


(a) *CEO Claim w*

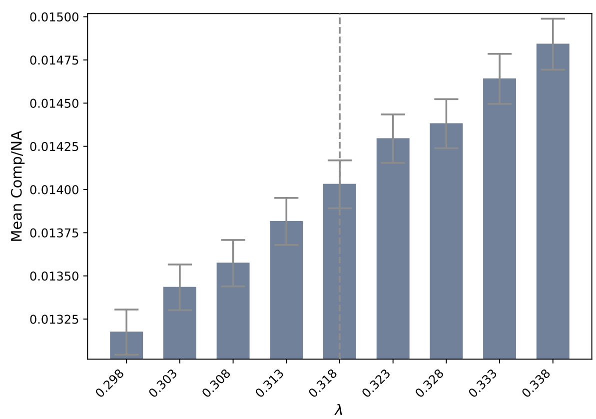
(b) *Social Value v*

Figure VII: Equivalence between Excise Tax and Moral Hazard Severity

This figure illustrates the equivalence between excise taxation and the severity of moral hazard in terms of their effects on organizational social value. Panel (a) plots the average social value v under different combinations of excise tax rate τ and private benefit parameter λ in a heatmap format, with warmer (red) colors indicating higher social value. Panel (b) plots the average CEO compensation under different values of λ, holding τ fixed at zero. 95% confidence intervals are indicated. In both panels, the vertical dashed line indicates the baseline estimate of λ from the SMM estimation.



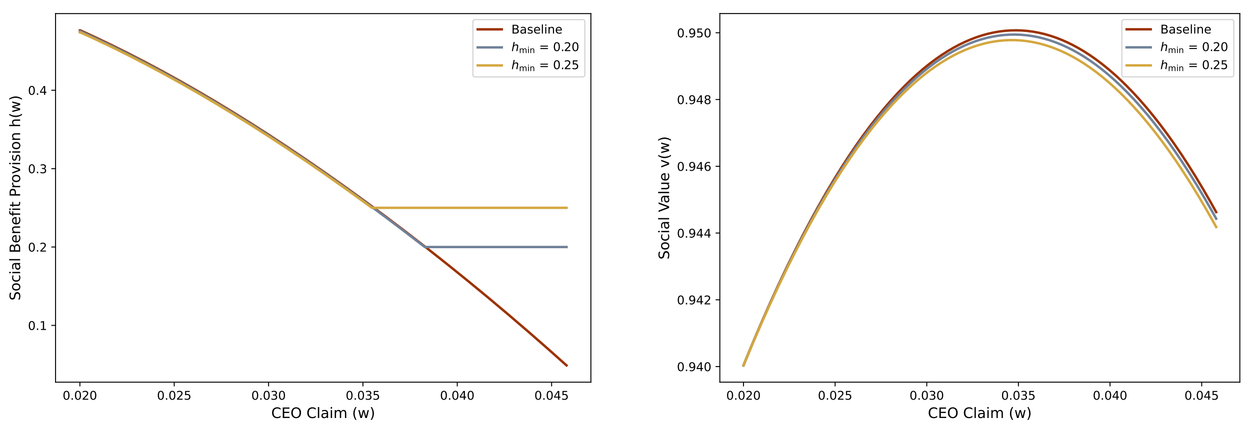
(a) *Average Social Value v under τ and λ*



(b) *Average CEO Compensation under λ*

Figure VIII: Value Function and Optimal Social Benefit Provision Policy under Minimum Benefit Requirement

This figure plots the optimal social benefit provision policy and the trustees' value function under different minimum benefit requirements, $h_{min} = 0.20$ and $h_{min} = 0.25$. Panel (a) plots the optimal social benefit provision policy $h(w)$ against the CEO's claim w. Panel (b) plots the trustees' value function $v(w)$ against w. Functions under different minimum benefit requirements are plotted with different colors, indicated in the legend. The internally calibrated parameters used are reported in Panel A of Table V. The other parameters are set as follows: $\lambda = 0.20$, $\theta = 0.20$ and $\gamma = 0.15$.

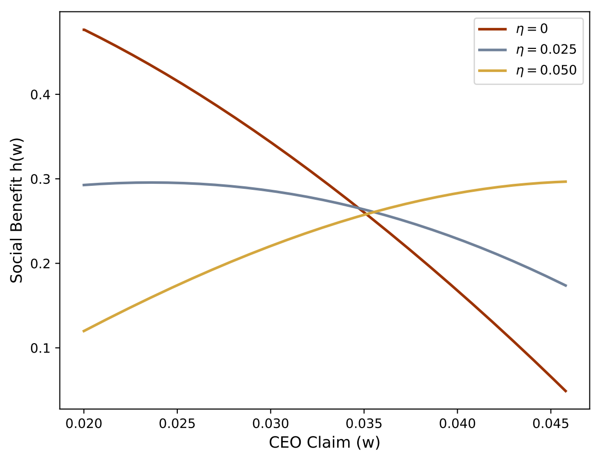


(a) Optimal Social Benefit Provision Policy

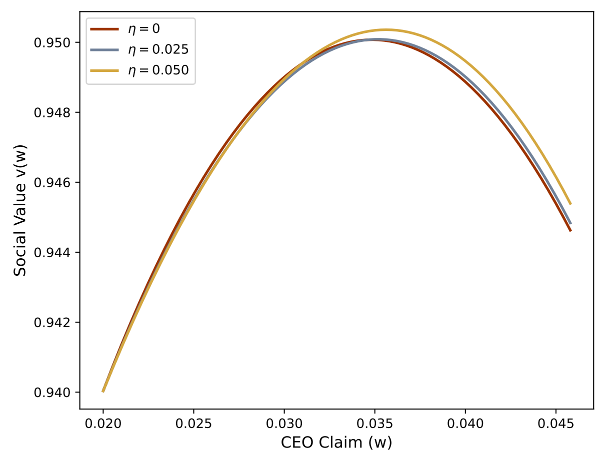
(b) Social Value Function

Figure IX: Value Function and Optimal Social Benefit Provision Policy under Different Warm Glow Parameters

This figure plots the optimal social benefit provision policy and the trustees' value function under different warm glow parameters $\eta = 0$ (baseline), $\eta = 0.025$, and $\eta = 0.050$. Panel (a) plots the optimal social benefit provision policy $h(w)$ against the CEO's claim w. Panel (b) plots the trustees' value function $v(w)$ against w. Functions under different warm glow parameters are plotted with different colors, indicated in the legend. The internally calibrated parameters used are reported in Panel A of Table V. The other parameters are set as follows: $\lambda = 0.20$, $\theta = 0.20$ and $\gamma = 0.15$.



(a) Optimal Social Benefit Provision Policy



(b) Social Value Function

Online Appendix for

"Taxing Executive Compensation for Social Missions"

A Online Appendix: Proofs

Lemma A.1. *Given $\gamma > g$, the value function $v(w)$ is strictly concave on $(\underline{w}, \bar{w})$. That is, $v''(w) < 0$ for all $w \in (\underline{w}, \bar{w})$.*

Proof. I first define the following notation for convenience

$$a(w) = v(w) - wv'(w), \tag{A.1}$$

and obtain by differentiation

$$v'(w) = \frac{v(w) - a(w)}{w}, \qquad v''(w) = -\frac{a'(w)}{w}. \tag{A.2}$$

Define

$$\mu(w) = g - s\left(h(w)\right) - \tau\gamma w, \qquad z(w) = \lambda - w\left(1 - \tau\lambda\right).$$

Substituting Equation (A.2) into Equation (7) and rearranging yields

$$\left(r - \gamma\right) v(w) = h(w) - a(w)\left(\gamma - \mu(w)\right) - \tfrac{1}{2}\sigma^2 z(w)^2 \frac{a'(w)}{w}.$$

Solving for $a'(w)$ gives

$$a'(w) = \frac{2w}{\sigma^2 z(w)^2}\Big(h(w) + a(w)\left(\gamma - \mu(w)\right) + v(w)\left(\gamma - r\right)\Big).$$

Substituting $\mu(w) = g - s\left(h(w)\right) - \tau\gamma w$, the above equation becomes

$$a'(w) = \frac{2w}{\sigma^2 z(w)^2}\bigg(h(w) + a(w)\Big(\gamma - g + s\left(h(w)\right) + \tau\gamma w\Big) + v(w)\left(\gamma - r\right)\bigg).$$

With $\gamma > g$ and $\gamma > r$, the above equation is strictly positive. From Equation (A.2), I have $v''(w) = -a'(w)/w < 0$. □

Proof of Proposition 1

Proof. From the first order condition, $h(w) = \frac{1}{\theta}\left(a(w)^{-1} - 1\right)$, I obtain by differentiation

$$h'(w) = -\frac{1}{\theta}\frac{a'(w)}{a(w)^2}.$$

Since $a'(w) > 0$ by Lemma A.1, I have $h'(w) < 0$ for all $w \in (\underline{w}, \bar{w})$. $\square$

Proof of Proposition 2

Proof. Rewrite Equation (7) in the form $A(w,\tau)v(w) = h(w) + B(w,\tau)v'(w) + C(w,\tau)v''(w)$, where:

$$\begin{aligned}
A(w,\tau) &= r - \Big(g - s\left(h(w)\right) - \tau\gamma w\Big), \\
B(w,\tau) &= w\Big(\gamma - g + s\left(h(w)\right) + \tau\gamma w\Big), \\
C(w,\tau) &= \frac{1}{2}\sigma^2\left(\lambda - w\left(1 - \tau\lambda\right)\right)^2.
\end{aligned}$$

By the envelope theorem, the partial derivatives of $A(w,\tau)$, $B(w,\tau)$, and $C(w,\tau)$ with respect to τ are

$$\begin{aligned}
\partial_\tau A(w,\tau) &= \gamma w, \\
\partial_\tau B(w,\tau) &= w^2\gamma, \\
\partial_\tau C(w,\tau) &= \sigma^2\left(\lambda - w\left(1 - \tau\lambda\right)\right)\cdot w\lambda.
\end{aligned}$$

Define $q(w,\tau) := \partial_\tau v(w,\tau)$. Differentiating Equation (7) with respect to τ and applying the envelope theorem generates the following ODE for $q(w,\tau)$:

$$A(w,\tau)q - B(w,\tau)q' - C(w,\tau)q'' = F(w,\tau), \tag{A.3}$$

where

$$F(w,\tau) := -\gamma w v(w) + \gamma w^2 v'(w) + \sigma^2 \left(\lambda - w\left(1 - \tau\lambda\right)\right) \cdot w\lambda v''(w). \tag{A.4}$$

To establish that $q(w,\tau) < 0$, I first verify that $F(w,\tau) < 0$ for all $w \in (\underline{w}, \bar{w})$. Rewriting $F(w,\tau)$ using the definition $a(w) = v(w) - wv'(w)$ from Lemma A.1:

$$F(w,\tau) = -\gamma w a(w) + \sigma^2 \left(\lambda - w\left(1 - \tau\lambda\right)\right) \cdot w\lambda v''(w).$$

The first term is negative given $a(w) > 0$. Note that $v''(w) < 0$ by Lemma A.1, and I have $\lambda > \bar{w}$ following He (2009). Therefore, the second term is also negative, and I conclude:

$$F(w,\tau) < 0 \quad \text{for all } w \in (\underline{w}, \bar{w}). \tag{A.5}$$

Next, I identify the boundary conditions for q. Given $v(\underline{w}, \tau) = l$ as a constant independent of τ, I have:

$$q(\underline{w}, \tau) = \partial_\tau v(\underline{w}, \tau) = 0. \tag{A.6}$$

For the upper boundary condition, I differentiate $v'(\bar{w}, \tau) = -1$ with respect to τ. Since $\bar{w}$ is endogenous as a function of τ, the chain rule gives:

$$\partial_\tau \left(v'(\bar{w}, \tau)\right) = v''(\bar{w}, \tau)\, \bar{w}_\tau(\tau) + v'_\tau(\bar{w}, \tau) = 0$$

Under the super-contact condition $v''(\bar{w}, \tau) = 0$, the first term vanishes, yielding:

$$q'(\bar{w}, \tau) = 0. \tag{A.7}$$

Now, I observe that $q(w,\tau)$ satisfies the ODE Equation (A.3) with boundary conditions Equation (A.6) and Equation (A.7), with $F(w,\tau) < 0$ by Equation (A.5). Moreover, $B(w,\tau) = w\left(\gamma - g + s\left(h(w)\right) + \tau\gamma w\right) > 0$ and $C(w,\tau) > 0$ for all $w \in (\underline{w}, \bar{w})$. So I can rewrite Equation (A.3) as $Bq_w + Cq_{ww} - Aq = -F$ and consider the reflected diffusion on $[\underline{w}, \bar{w}]$,

$$dW_t = B(W_t, \tau)\, dt + \sqrt{2C(W_t, \tau)}\, dB_t + dL_t,$$

where L_t is the regulator that increases only when $W_t = \bar{w}$, and let $\tau_{\underline{w}} := \inf\{t \geq 0 : W_t = \underline{w}\}$. Applying Itô's formula to $e^{-\int_0^t A(W_s,\tau)\,ds} q(W_t, \tau)$ generates the Feynman-Kac representation:

$$q(w, \tau) = \mathbb{E}_w \left[\int_0^{\tau_{\underline{w}}} \exp\Big(- \int_0^t A(W_s, \tau)\, ds \Big)\, F(W_t, \tau)\, dt \right],$$

where the terminal term and regulator term vanish since $q(\underline{w}, \tau) = 0$ and $q'(\bar{w}, \tau) = 0$. Therefore, I conclude that $q(w, \tau) < 0$ for all $w \in (\underline{w}, \bar{w})$. □

Proof of Proposition 3

Proof. Recall from the first-order condition that:

$$h(w, \tau) = \frac{1}{\theta} \left(a(w, \tau)^{-1} - 1 \right), \quad \text{where } a(w, \tau) = v(w, \tau) - wv'(w, \tau).$$

Differentiating with respect to τ:

$$\partial_\tau h(w, \tau) = -\frac{1}{\theta} \frac{\partial_\tau a(w, \tau)}{a(w, \tau)^2}.$$

Since $a(w, \tau) > 0$, the sign of $\partial_\tau h(w, \tau)$ is opposite to the sign of $\partial_\tau a(w, \tau)$, which follows:

$$\partial_\tau a(w, \tau) = q(w, \tau) - wq'(w, \tau),$$

where $q(w, \tau) = \partial_\tau v(w, \tau)$, as defined in the proof of Proposition 2.

I first show the existence of threshold $\underline{w}^*(\tau)$. From Equation (A.6), I have $q(\underline{w}, \tau) = 0$. Moreover, since $q(w, \tau) < 0$ for all $w > \underline{w}$ (by Proposition 2), I have $q'(\underline{w}^+, \tau) < 0$. Therefore:

$$\partial_\tau a(\underline{w}, \tau) = q(\underline{w}, \tau) - \underline{w}\, q'(\underline{w}^+, \tau) = 0 - \underline{w}\, q'(\underline{w}^+, \tau) > 0.$$

By continuity, there exists $\underline{w}^*(\tau) > \underline{w}$ such that $\partial_\tau a(w,\tau) > 0$ for all $w \in (\underline{w}, \underline{w}^*(\tau))$, implying $\partial_\tau h(w,\tau) < 0$ in this region.

Next, I show the existence of threshold $\bar{w}^*(\tau)$. From the boundary condition $q'(\bar{w},\tau) = 0$ in Equation (A.7), I have:

$$\partial_\tau a(\bar{w},\tau) = q(\bar{w},\tau) - \bar{w}\, q'(\bar{w},\tau) = q(\bar{w},\tau) < 0.$$

By continuity, there exists $\bar{w}^*(\tau) < \bar{w}$ such that $\partial_\tau a(w,\tau) < 0$ for all $w \in (\bar{w}^*(\tau), \bar{w})$, implying $\partial_\tau h(w,\tau) > 0$ in this region.

$\square$

Proof of Proposition 4

Proof. The HJB equation under warm glow is:

$$\begin{aligned} rv(w) = \max_h \Big\{ & h + v(w)\left(g - s(h) - \tau\gamma w + \tau\eta h\right) \\ & + v'(w)\Big(w\left(\gamma - g + s(h) + \tau\gamma w\right) - (1+\tau w)\eta h\Big) \\ & + \tfrac{1}{2} v''(w)\,\sigma^2 \left[\lambda - w(1-\tau\lambda)\right]^2 \Big\}. \end{aligned} \tag{A.8}$$

Differentiating Equation (A.8) with respect to h and setting to zero generates the optimal social benefit provision policy under warm-glow utility in Equation (13).

Differentiating Equation (13) with respect to w gives:

$$\frac{dh^\eta}{dw} = \frac{1}{\theta}\frac{d}{dw}\left(\frac{1-\eta v'(w)}{v(w) - wv'(w)}\right).$$

By the quotient rule:

$$\frac{dh^\eta}{dw} = \frac{v''(w)\left(w - \eta v(w)\right)}{\theta\,\left(v(w) - wv'(w)\right)^2}. \tag{A.9}$$

Since $v''(w) < 0$ (concavity), $\theta > 0$, and $\big(v(w) - wv'(w)\big)^2 > 0$:

$$\frac{dh^\eta}{dw} < 0 \iff \eta < \frac{w}{v(w)}.$$

Note that:

$$\frac{d}{dw}\left(\frac{w}{v(w)}\right) = \frac{v(w) - wv'(w)}{v(w)^2} > 0.$$

Therefore, if there exists $\tilde{w}_1 \in [\underline{w}, \bar{w}]$ such that $\eta = \tilde{w}_1/v(\tilde{w}_1)$, then $h^\eta(w)$ is decreasing in w if and only if $w > \tilde{w}_1$. If instead $\eta < \underline{w}/v(\underline{w})$, then $h^\eta(w)$ is decreasing in w for all $w \in [\underline{w}, \bar{w}]$ and I can set $\tilde{w}_1 = \underline{w}$ without loss of generality. If instead $\eta > \bar{w}/v(\bar{w})$, then $h^\eta(w)$ is increasing in w for all $w \in [\underline{w}, \bar{w}]$ and I can set $\tilde{w}_1 = \bar{w}$ without loss of generality.

Next, I compare $h^\eta(w)$ with the baseline policy $h^0(w)$. The difference is given by:

$$h^\eta(w) - h^0(w) = \frac{\eta}{\theta} \cdot \frac{\tau v(w) - (1 + \tau w)\, v'(w)}{v(w) - wv'(w)}.$$

Therefore, $h^\eta(w) > h^0(w)$ if and only if $\tau v(w) - (1 + \tau w)\, v'(w) > 0$. Differentiating the above expression with respect to w gives:

$$\frac{d}{dw}\big(\tau v(w) - (1 + \tau w)\, v'(w)\big) = -(1 + \tau w)\, v''(w) > 0.$$

Note that at the boundary $w = \bar{w}$, the boundary condition $v'(\bar{w}) = -1$ implies $\tau v(\bar{w}) - (1 + \tau \bar{w})\, v'(\bar{w}) > 0$. Therefore, if there exists $\tilde{w}_2 \in [\underline{w}, \bar{w}]$ such that $\tau v(\tilde{w}_2) - (1 + \tau \tilde{w}_2)\, v'(\tilde{w}_2) = 0$, then $h^\eta(w) > h^0(w)$ if and only if $w > \tilde{w}_2$. If instead $\tau v(\underline{w}) - (1 + \tau \underline{w})\, v'(\underline{w}) > 0$, then $h^\eta(w) > h^0(w)$ for all $w \in [\underline{w}, \bar{w}]$ and I can set $\tilde{w}_2 = \underline{w}$ without loss of generality. $\square$

B Online Appendix: Figures

Figure B.1: 2017 CEO Compensation by 5th-Percentile Group

This figure plots box plots of 2017 CEO compensation by vigintile group (5th-percentile bins). The dashed horizontal line indicates the $1 million excise tax threshold. Organizations in groups 14–20 are assigned to the treatment group.

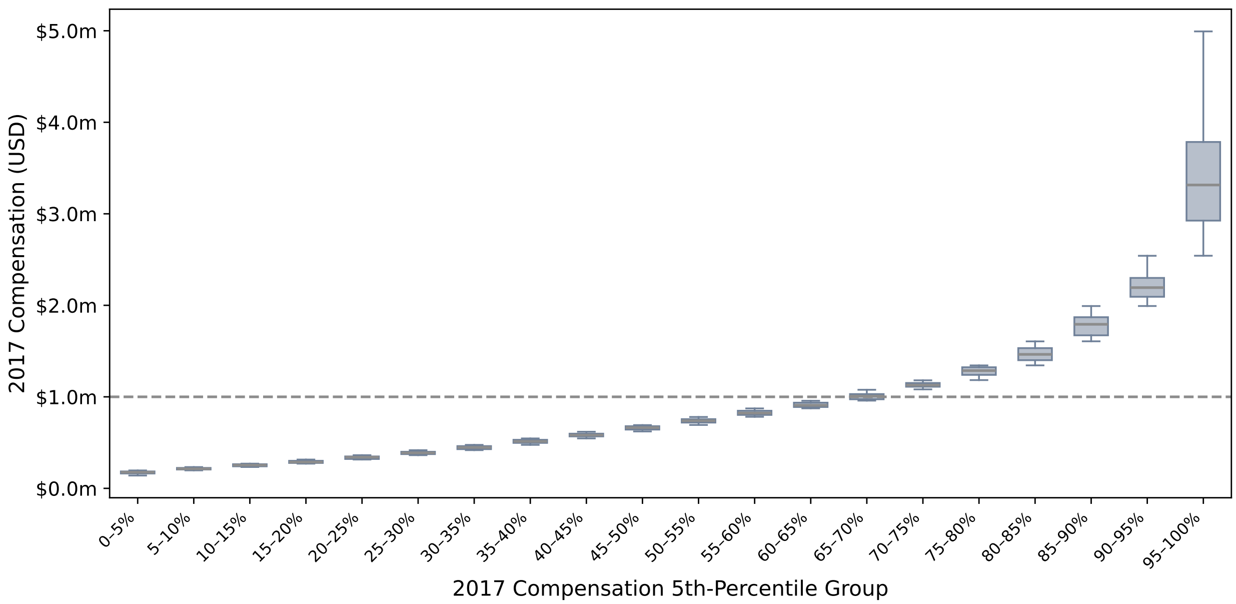
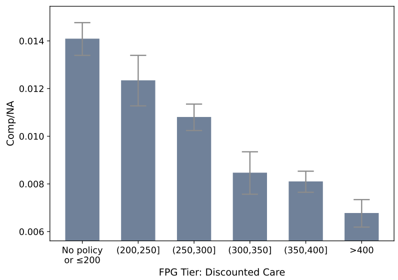
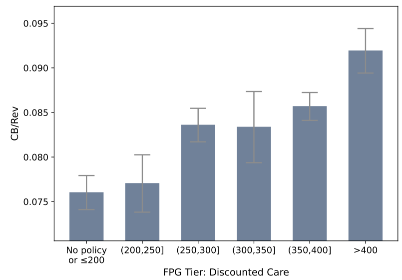


Figure B.2: Hospital Behavior by Charity Care Policy Generosity

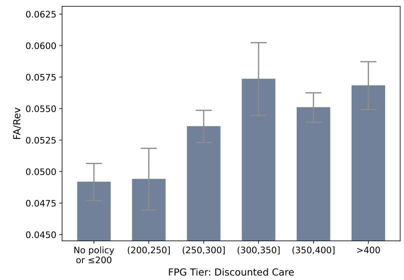
This figure plots mean *Comp/NA*, *CB/Rev*, and *FA/Rev* by FPG threshold tier, with 95% confidence intervals. The top row groups hospitals by discounted-care FPG tier (6 bins); the bottom row groups by free-care FPG tier (4 bins).



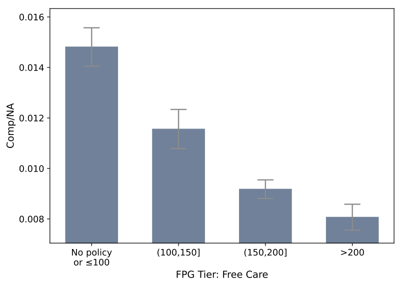
(a) *Comp/NA*, Discounted Care



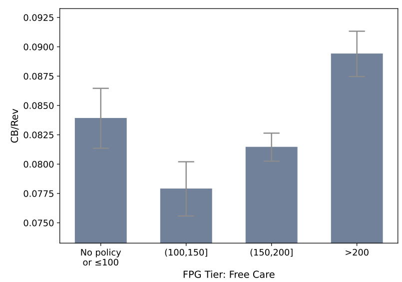
(b) *CB/Rev*, Discounted Care



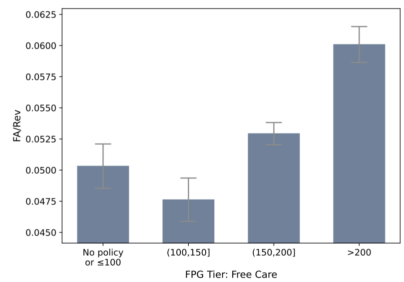
(c) *FA/Rev*, Discounted Care



(d) *Comp/NA*, Free Care



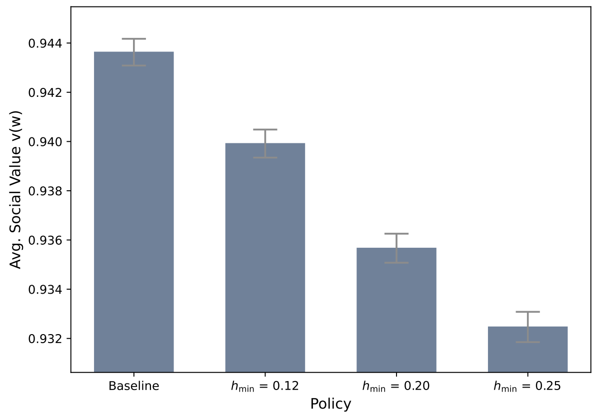
(e) *CB/Rev*, Free Care



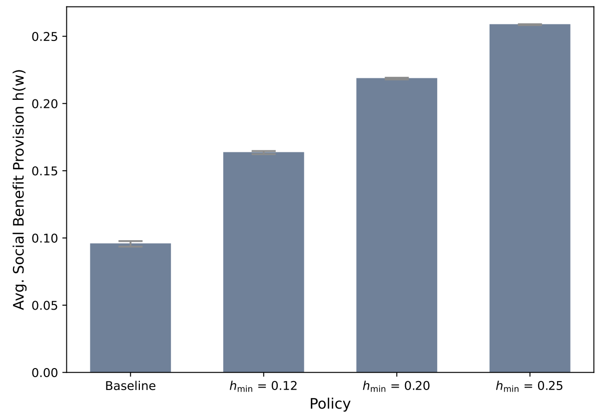
(f) *FA/Rev*, Free Care

Figure B.3: Long-run Costs of Minimum Benefit Requirement

This figure plots the average social value v and instantaneous social benefit provision h in the long-run stationary distribution under different minimum benefit requirements, $h_{min} = 0.00$ (baseline), $h_{min} = 0.12$, $h_{min} = 0.20$, and $h_{min} = 0.25$. Panel (a) plots the average social value v under different minimum requirements, while panel (b) plots the average instantaneous social benefit provision h under different minimum requirements. In both panels, the x-axis indicates the minimum requirement h_{min}, while the y-axis indicates the mean values of the variable of interest. 95% confidence intervals are indicated.



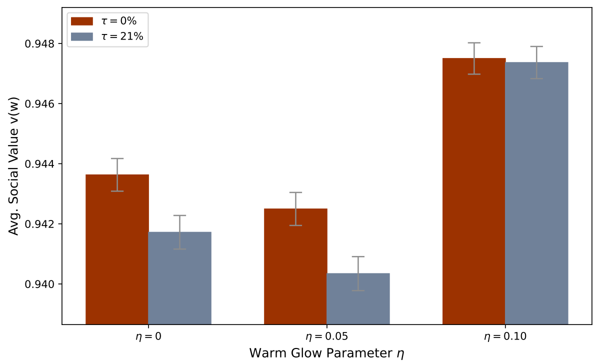
(a) *Average Social Value v under h_{min}*



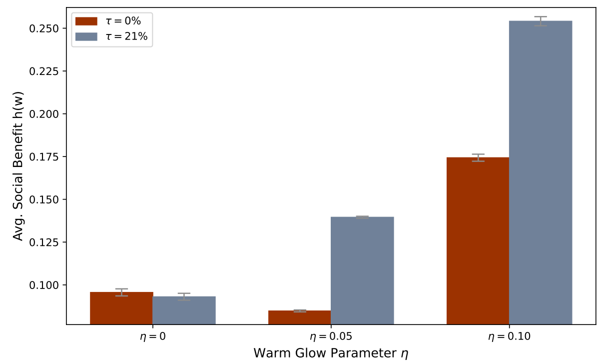
(b) *Average Instantaneous Social Benefit Provision h under h_{min}*

Figure B.4: Long-run Costs of Warm Glow Parameter

This figure plots the average social value v and instantaneous social benefit provision h in the long-run stationary distribution under different warm glow parameters, $\eta = 0.00$ (baseline), $\eta = 0.05$, and $\eta = 0.10$. Panel (a) plots the average social value v under different warm glow parameters, while panel (b) plots the average instantaneous social benefit provision h under different warm glow parameters. Average values with or without excise taxes are indicated respectively. In both panels, the x-axis indicates the warm glow parameter η, while the y-axis indicates the mean values of the variable of interest. 95% confidence intervals are indicated.



(a) *Average Social Value v under η*



(b) *Average Instantaneous Social Benefit Provision h under η*

C Online Appendix: Tables

Table C.1: Impacts of Excise Tax: 2SLS Estimates

This table shows the results of the two-stage least squares (2SLS) analysis estimating the impact of excise taxation on CEO compensation and social benefit provision. $\widehat{Covered}$ is the predicted value of *Covered* from the first stage regression, where the instrument is *Treated*. The first-stage F-statistic is 303.055. The other details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
$\widehat{Covered}$	0.0016**	-0.0310**	-0.0195**	0.0006***	-0.0136***	-0.0056*
	(1.988)	(-2.279)	(-1.968)	(3.019)	(-3.444)	(-1.960)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,703	11,703	11,703	11,721	11,721	11,721

Table C.2: Robustness of Event Study Estimates: Drop 2-Facility Organizations

This table shows the robustness of Table II by dropping organizations with two facilities before 2017 from the sample. The details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
Treated	0.0008**	-0.0147**	-0.0092**	0.0003***	-0.0065***	-0.0027**
	(1.967)	(-2.315)	(-1.997)	(2.972)	(-3.577)	(-1.994)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,598	11,598	11,598	11,614	11,614	11,614
Adj. R^2	0.72	0.66	0.64	0.87	0.68	0.65

Table C.3: Robustness of Event Study Estimates: Drop 2- or 3-Facility Organizations

This table shows the robustness of Table II by dropping organizations with two or three facilities before 2017 from the sample. The details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
Treated	0.0009**	-0.0173***	-0.0098**	0.0003***	-0.0071***	-0.0019
	(2.397)	(-2.643)	(-2.000)	(3.090)	(-3.435)	(-1.238)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,551	11,551	11,551	11,566	11,566	11,566
Adj. R^2	0.72	0.66	0.64	0.87	0.68	0.65

Table C.4: Robustness of Event Study Estimates: Excluding Medicaid Expansion States

This table shows the robustness of Table II by excluding states that expanded Medicaid between 2018 and 2022 (ME, VA, ID, NE, UT, OK, MO). The details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
Treated	0.0010**	-0.0138**	-0.0107**	0.0002***	-0.0068***	-0.0034**
	(2.369)	(-2.023)	(-2.171)	(2.613)	(-3.461)	(-2.367)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	10,496	10,496	10,496	10,513	10,513	10,513
Adj. R^2	0.73	0.67	0.65	0.87	0.68	0.65

Table C.5: Robustness of Event Study Estimates: Interaction with Medicaid Expansion

This table shows the robustness of Table II by interacting the treatment indicator with an indicator for states that expanded Medicaid between 2018 and 2022. *MedExp* equals one for ME, VA, ID, NE, UT, OK, and MO. The details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
$Treated$	0.0009**	-0.0148**	-0.0103**	0.0003***	-0.0063***	-0.0027*
	(2.284)	(-2.213)	(-2.119)	(3.025)	(-3.276)	(-1.930)
$MedExp$	0.0017	-0.0142	-0.0095	0.0004	-0.0035	-0.0006
	(0.472)	(-0.330)	(-0.310)	(0.772)	(-0.623)	(-0.118)
$Treated \times Expansion$	-0.0013	0.0021	0.0095	-0.0001	-0.0009	0.0005
	(-1.183)	(0.130)	(0.771)	(-0.654)	(-0.261)	(0.159)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,703	11,703	11,703	11,721	11,721	11,721
Adj. R^2	0.72	0.66	0.64	0.87	0.68	0.65

Table C.6: Robustness of Event Study Estimates: Alternative Treatment Definition via 2017 Compensation

This table shows the robustness of Table II using an alternative treatment definition based on 2017 CEO compensation. Organizations in the top 35% of the 2017 compensation distribution (groups 14–20 in Figure B.1) are assigned to the treatment group. The details are the same as in Table II. t-statistics are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) *Comp/NA*	(2) *CB/NA*	(3) *FA/NA*	(4) *Comp/Rev*	(5) *CB/Rev*	(6) *FA/Rev*
Treated	0.0008**	-0.0091*	-0.0048	0.0002***	-0.0029*	-0.0015
	(2.437)	(-1.695)	(-1.226)	(2.974)	(-1.726)	(-1.204)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Org. FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,703	11,703	11,703	11,721	11,721	11,721
Adj. R^2	0.72	0.66	0.64	0.87	0.68	0.65