In-Kind Transfers and the Law of Torts

Assaf Jacob, Alon Klement, and Yuval Procaccia

ABSTRACT

The state and charitable institutions provide in-kind services for distributive purposes. Such services generally benefit recipients but in particular instances may also cause them harm. We discuss the optimal tort regime that should apply when such harm occurs. We show that the optimal level of care applicable to such services is lower than if the same services are provided by ordinary injurers in the general market. We further demonstrate that the social optimum can be induced by a lenient gross-negligence standard, whereas the standard regimes of ordinary negligence and strict liability both lead to inefficient outcomes. These conclusions are robust to variations in the distribution of recipients' valuations of the service and to possible agency problems in the state or charity.

1. INTRODUCTION

In a free economy, the allocation of resources is determined largely through the mediation of markets and prices. Yet, even in a free economy, some entities operate outside the price system. One such entity is the state: the state may offer, for instance, medical services to the public without charging patients for the treatment. Charitable institutions serve as another important example: a charity may operate a soup kitchen without charging diners for the cost of their meals. The motivation underlying these activities is primarily distributive: payment is waived as a means to confer a benefit on a particular group of beneficiaries. Instead of

granting them a direct monetary transfer, the benefit is delivered through a service, provided in-kind.[1] In-kind services span a wide variety of activities (including health care, nutrition, housing, childcare, education, and training) and play an important role in governments' and charities' redistribution policies.[2]

Although the benevolent activities of charities and the state generally enhance the welfare of recipients, they may also cause them harm in particular instances. A medical treatment provided in a public hospital may go amiss. The food served in a soup kitchen may turn out to be spoiled. The question examined in this paper is whether providers of such services—that is, the state and charities—should be governed by the same tort regime as that applied to ordinary injurers. We argue that for the value of in-kind transfers to be maximized, their providers must be subject to a different regime, namely, one that is generally more lenient. For ease of reference, we refer to providers of such services as benefit providers (BPs).

The fact that BPs do not recoup the cost of production through price implies that their activities must be funded through some other, external means. The state's operations are funded by taxes, whereas charities rely on contributions. The scope of a BP's activity is therefore determined by the size of its allotted budget. It follows that if its budget is limited, as is often the case, the BP may not be able to provide the first-best combina-

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1. Several reasons may account for the decision to grant a benefit in-kind rather than through payment of money. One reason may be paternalistic. The provider may not trust the recipient to use the money wisely. Relatedly, she may have an independent preference that the recipient use it in a particular way (consider a parent willing to pay for college but not for the purchase of a motorcycle). Another reason may be that in-kind transfers produce positive externalities, and therefore their provision in the market is suboptimal. Finally, in-kind provision may help identify those belonging to a targeted group, through self-selection. Thus, for example, if one seeks to aid the destitute, it might not be straightforward to identify those in true financial need. But if only the destitute patronize soup kitchens, then the identification problem could be overcome by providing the benefit in that form. For a review of these alternative accounts of in-kind transfers, see Currie and Gahvari (2008).

2. Expenditure on publicly provided in-kind services in Organisation for Economic Co-operation and Development (OECD) countries averaged 16.8 percent of the gross domestic product (GDP) in 2013. A total of 24 countries recorded shares above 14 percent in 2013, including the United States (14.4 percent) and the United Kingdom (14.5 percent) (OECD 2015). Furthermore, overall expenditure on in-kind transfers in OECD countries has grown faster than cash transfers in recent years. Between 2000 and 2009, spending on in-kind benefits rose by 2.5 percentage points of the GDP, while cash transfers grew by merely 1.5 percentage points (see OECD 2013).

tion of quality and quantity in the service it delivers. This, we argue, affects the tort regime that should optimally apply.

To illustrate the policy-relevant distinction between BPs and market providers of similar services, consider the following two examples. In both examples, a precaution might be taken to reduce expected harm, and the question is whether taking the precaution would be socially desirable. Whereas in the first example harm is caused by a market provider—that is, one charging a price that covers the service's cost—in the second example it is caused by a budget-constrained BP, which provides the service for free.

Example 1: Market Provider. A private clinic offers dental services. When treating its patients, it must apply anesthesia using one of two types of injections, A or B. Injection A costs 1 and causes an expected harm of 10. Injection B costs 4 and reduces expected harm to 5. If no accident occurs, patients derive a value of 12 from the treatment. The clinic uses injection A, and Lisa, after suffering an injury, sues the clinic for failing to use injection B.

Pursuant to the conventional analysis of tort liability, the clinic should indeed be deemed negligent: by investing 3 more in injection B, it could reduce expected harm by 5. The imposition of liability would optimally induce the clinic to make the desirable choice. Now suppose that the service is provided for free by a BP acting within a limited budget.

Example 2: In-Kind Transfer. A public clinic provides free dental services to patients with limited means. It may use either injection A or B, as in example 1. If no accident occurs, patients derive a value of 12 from the treatment. The clinic operates under a fixed budget of 1,000, which is insufficient to serve all those who seek treatment. The clinic uses the A-type injections, and Lisa, after suffering an injury, sues the clinic for failing to use injection B.

Despite the similarity between examples 1 and 2, the clinic in the latter case should not be deemed negligent. Although in both cases injection B would reduce the expected harm by more than the difference in cost, the clinic in the second example should use injection A. If injection A is used, the budget allows for treatment of 1,000 patients, who derive an aggregate expected value of 2,000 (=12,000 − 10,000). If injection B is used, only 250 patients can be treated, which would result in an aggregate expected value of 1,750 (=3,000 − 1,250). Thus, social welfare is greater if the public clinic uses injection A. Although in both cases an

additional cost of 3 would reduce expected harm by 5, this cost should be borne in the first case but not in the second.

The general point demonstrated by these examples is that when a product or a service is provided without charge, and its provision is subject to a binding budget, the optimal investment in care is lower than if it were priced in the market. The binding budget creates a trade-off between the level of care and the level of activity: when channeling a budget dollar to care, fewer resources remain available for production. Therefore, the real cost of care is given not by its nominal dollar value but by the alternative value that the same amount would create if channeled to production. In terms of example 2, the cost of moving from injection A to injection B is not the nominal cost of 3 but rather the value lost by three patients who would no longer be treated ($3 \times (12 - 10) = 6$). As long as the BP's activity is efficient, the alternative cost will exceed the nominal cost. This, in turn, will make care more expensive for BPs than for ordinary injurers and will imply a lower level of care at the optimum.

The conclusion that BPs should exercise a lower level of care than ordinary injurers is also supported by an additional, separate reason. As BPs provide a service free of charge, it is likely to be demanded by any individual who ascribes to it a positive value. This implies that some of the resulting demand will be inefficient; that is, it will include recipients who value the service by less than the sum of ensuing losses and the cost of providing the product. Against this backdrop, reducing the BP's level of care also serves a favorable sorting function: when the level of care falls, the value of the service declines for all recipients. Accordingly, recipients with the lowest valuations exit the market and thereby raise the average valuation for those who remain. Hence, lowering the level of care is a means to screen out some of the inefficient demand; it not only allows for more demand to be filled but also favorably affects the composition of demand.

Two policy implications follow from these observations. First, tort law should incentivize different precautionary behavior when a service is provided as an in-kind transfer and when it is provided in the market. If the social value of in-kind transfers is to be maximized, BPs must be induced to invest less in care than ordinary injurers. Second, the tort regime applied to in-kind transfers should be one in which liability is not imposed in equilibrium. When a marginal budget dollar is channeled to liability, the value conferred to the recipient is exactly $1. In contrast, if the dollar remains in the budget and is channeled to either production or

care, its social worth exceeds $1. Thus, other things being equal, greater welfare is attained if liability is not imposed in equilibrium.

The combination of these two observations underlie the conclusion that providers of in-kind transfers ought to be governed by a negligence regime in which the standard of care is more lenient than the standard applied to market transactions. The reduced standard would incentivize less investment in care, and as the standard would be met in equilibrium, liability would ultimately not be imposed. We refer to such a regime as one of gross negligence.[3]

A gross-negligence regime would generally be superior to both strict liability and ordinary negligence (in which the standard for ordinary injurers is applied). It would outperform strict liability because it would induce a more efficient level of care and would not result in the imposition of liability in equilibrium. It would outperform ordinary negligence because under ordinary negligence the BP would effectively be forced to choose between meeting the ordinary standard, in which case investment in care would be excessive, and failing to meet the standard, in which case it would bear inefficient liability.

It follows that even if the BP's sole objective is to maximize welfare, then applying either ordinary negligence or strict liability will result in an inefficient outcome. Hence, to the extent that government and charities seek to advance the social good, moving to gross negligence from either of those regimes will result in increased social welfare. Moreover, we show that even if BPs seek to advance a different agenda, perhaps because of agency problems, the superiority of gross negligence over its alternatives remains intact. Namely, if BPs seek to invest less in care than the desirable level, we show that the liability imposed under gross negligence will realign their private interest with that of the social planner. And if, alternatively, they seek to invest more in care than the social optimum, gross negligence will remain (weakly) superior, as it will free BPs from

3. Indeed, some benefit providers (BPs) are subject to the gross-negligence standard, but not all (see n. 10 and accompanying text). The concept of gross negligence is also used in other domains of tort law and applied to address different problems. It has been applied to law enforcement and government officials engaged in the discharge of their governmental function (*Jones v. Sherrill,* 827 F.2d 1102, 1106 [1987]). It has also been applied to Good Samaritans offering immediate assistance to individuals in need (see, for example, Utah Code Ann., sec. 78B-4-501) and to drivers taking passengers at no charge (J. Heher in *Oliver v. Kantor,* 122 N.J.L. 528 [Sup. Ct. 1939]). Some courts require gross negligence as a condition for awarding exemplary damages (*Burk Royalty Co. v. Walls,* 616 S.W.2d 911, 920 [Tex. 1981]). The rationale underlying the use of the standard varies among the applications.

inefficient liability, and in a range of cases it will also induce them take a more efficient level of care. Hence, the conditions under which gross negligence outperforms the alternative regimes are quite general.

The notion that entities such as the state and charities should be held to lower standards is not foreign to tort law doctrine. In fact, historically, both have enjoyed full immunity from liability. Today, although most immunities have been abolished, some exceptions remain (for an overview, see Section 2).

Existing accounts of immunity are mostly founded on the observation that the positive externalities conferred by the state and charities create a divergence between private and social interests. Thus, for example, if the state or a charity faces liability when causing harm, it might inefficiently restrict its operations to low-risk activities or even cease certain operations altogether (Tremper 1991; Jeffries 1998, pp. 74–78; Gillette and Stephan 2000; Horwitz and Mead 2009). In the case of the state, the threat of liability might also distort the execution of discretion (Epstein 1978).

In light of this concern, partial or full immunity may result in improved incentives (De Geest 2012). For example, when a firefighter uses high-pressure water to put out a fire, he must balance the benefit of rapidly extinguishing the fire with the cost of water damage. As he takes more care to avoid water damage, his effectiveness in extinguishing the fire is reduced. If exposed to liability for water damage (but not for fire damage), he would tend toward too much care against water damage. Thus, tort immunity toward water damage can be viewed as a means to counter the tendency for excessive precautions when the cost of those precautions is externalized (see also Spitzer 1977; Mashaw 1978; Schuck 1983; Jeffries 1998; Cooter and Porat 2006).

This misalignment of private and social interests might also be corrected either by holding the injurer strictly liable for costs and unfulfilled benefits or by holding him to a negligence standard that takes account of both. Thus, if the firefighter is held strictly liable not only for water damage but also for fire losses, he would internalize the full consequences of his action and behave optimally. Alternatively, if under a negligence standard fire damage is viewed as a component in the cost of avoiding water damage, then the standard would prescribe optimal behavior, and thus the firefighter would again be induced to act efficiently.

The present analysis differs from existing accounts in that the core problem examined here is not a problem of misaligned interests or pos-

itive externalities. Accordingly, the optimal policy differs from that suggested in existing accounts. We show that when the firefighter operates under a limited budget, holding him strictly liable for all losses would never be optimal. Moreover, if he is subject to a negligence regime, the above standard would always be too high. The main point stressed in this paper is that the free provision of services lowers the socially optimal level of care itself.[4] Thus, to allow a BP to maximize the value of its enterprise, it must be subject to a lower standard of care.[5]

The paper proceeds as follows. Section 2 discusses governmental and charitable immunities and their relation to the present argument. Section 3 develops our model. We show that when the BP seeks to maximize social welfare, alternative regimes of ordinary negligence and strict liability produce inferior results, as they prevent the BP from fulfilling its social purpose. We then show that gross negligence dominates the alternative regimes even when the BP is assumed to be afflicted by agency problems

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4. In this respect the argument also departs from the literature on judgment-proof injurers. There is a sense in which a budget constraint might be viewed as a form of insolvency, as in both cases the means available to the agent may not be sufficient to finance the activity while internalizing the harm. However, the problems are fundamentally distinct. The case of judgment proofness essentially concerns misaligned incentives: Bearing only part of the harm, the injurer may be inefficiently induced to take a lower level of precaution (see, for example, Dari-Mattiacci and De Geest 2005; Summers 1983; Shavell 1986). Conversely, in the case of a limited budget, lower levels of precaution are a feature of the social optimum. Accordingly, the two problems call for distinct solutions: while the judgment-proofness problem can be countered by reinforcing the incentive to take care (for example, by imposing punitive damages when the probability of suit is less than certain), the budget-constraint problem calls for the adoption of a lenient standard of care.

5. The interrelationship of activity levels and the standard of care has been analyzed in the literature in different contexts. Gilo and Guttel (2009) consider the possibility that under a negligence regime an injurer will choose an inefficiently low activity level so as to prevent a precautionary measure from becoming cost justified. Accordingly, the suggested solution is to raise the standard of care so that strategic restriction of activity will not free the injurer from liability. In a similar vein, Gilo, Guttel, and Yuval (2013) discuss victims' choice of activity levels in a setting in which many victims are simultaneously injured by the same action and suffer from a collective-action problem. When victims raise their activity levels, the injurer may be required to take greater care. This, in turn, affects victims' levels of activity in opposing directions: on the one hand, victims may tend to act excessively, as they externalize the injurer's cost of care, but on the other hand, they may overly restrict their activity, because a single victim's activity confers a positive externality on other victims. Hence, the ultimate level of activity will depend on the relative magnitude of the two effects. In contrast, the point made here is that activity and care function as substitutes under a limited budget. If the budget cannot accommodate the first-best levels of activity and care, then the second-best solution is to equate their values at the margin. To allow implementation of that solution, the standard of care must be lowered.

such that its interests no longer converge with the social optimum. Section 4 concludes.

2. GOVERNMENTAL AND CHARITABLE IMMUNITIES

Under the traditional common law, both the state and charitable organizations were exempt from tort liability. Sovereign immunity was originally premised on the precept that "the king can do no wrong." It appeared natural to the kings and jurists of the feudal Middle Ages that the sovereign—the maker of the law—could not himself be bound by its coercive powers. Although the justifying principle is now obsolete, the immunity still survives with respect to some functions of government. At the federal level and in most states, discretionary functions of government remain immune (Epstein 1999, pp. 619–24).[6] At the local government level, activities are immune if designated as governmental as opposed to proprietary (see Dobbs 2000, pp. 718–20; *Bailey v. Mayor of New York,* 3 Hill 531, 539 [N.Y. Sup. Ct. 1842]). Today, however, the justification for immunity rests on different grounds. It is thought that although the government is capable of wrongdoing, the judicial branch should not interfere with the powers granted by Congress to the executive. Moreover, the government should not be burdened by litigation over numerous daily decisions, and the threat of liability should not be allowed to bias the judgment of government officials. Immunity does not extend, however, to activities in which the government acts in its private capacity. When supplying services that are of a character similar to those offered by private providers, it is as exposed to liability as market producers when causing harm (Dobbs 2000, pp. 696–701, 716–18; Restatement [Second] of Torts, sec. 895B, comment D, sec. 895C, comment g; see also Krent 1992).

The distinction between the different capacities of government has proven difficult to apply. Thus, to take one recurring example, the question arose as to whether a public swimming pool operated by a municipal entity should be accountable for injuries sustained by swimmers. Is the activity proprietary because swimming pools are often, even typically, operated by private providers? Or is it governmental because any investment in maintenance and safety involves a budgetary decision that impli-

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6. With regard to claims against the federal government, see Federal Torts Claim Act (28 U.S.C. sec. 2674). For a discussion at the state level, see Dobbs (2000, pp. 715–18) and Restatement (Second) of Torts, sec. 895B.

cates governmental discretion? While some jurisdictions apply full immunity in these cases, others treat the municipality as they would any other injurer.[7]

We suggest that the question of capacity is of limited import to resolving the issue. For even if a governmental service could alternatively be supplied by a private entity, the decision to supply it by the government involves a choice concerning the deployment of limited public resources. It is this characteristic of public provision that warrants an application of a lenient standard. Thus, whether the capacity is viewed as governmental or proprietary, a lower standard ought to apply.

Charities, like governments, have also historically enjoyed immunity under the common law. The stated rationale was that imposition of liability would wrongly divert the charity's funds from their intended purpose (Dobbs 2000, pp. 760–65; Epstein 1999, pp. 617–19). From an ex ante perspective, it addressed a concern that the threat of liability would dissuade donors from committing funds to charities (Dobbs 2000; Epstein 1999; Restatement [Second] of Torts, sec. 895E, comment c[5]). Furthermore, it was thought that recipients of charity services should be assumed by implication to accept them as is while waiving the right to sue in case of injury (Epstein 1999, p. 618; *Southern Methodist Hosp. & Sanitarium of Tucson v. Wilson,* 46 P.2d 118 [Ariz. 1935]).

The charitable immunity was repudiated in England 2 decades after its inception but remained in force longer in the United States. However, with increased dissatisfaction in the United States as well, the immunity was gradually eroded by various exceptions and limitations, until it was eventually abolished (Epstein 1999, p. 617; Restatement [Second] of Torts, sec. 895E; Dobbs 2000, p. 763).[8] The charity's good intentions were eventually viewed as insufficient reason to shield it from liability when it negligently inflicted harm. Furthermore, the courts reasoned that the dilemma concerning charities could be resolved by requiring them to purchase liability insurance. If charities are insured and immunity is lifted, it has been argued, then both policy objectives could be attained at

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7. Cases that found the operation of a public pool to be a governmental activity, and therefore immune from liability, include *Zacharias v. Minnesota Dep't of Natural Res.,* 506 N.W.2d 313 (Minn. Ct. App. 1993); *Baltimore v. State,* 173 Md. 267 (1937); *Austin v. Baltimore,* 286 Md. 51 (1979); *Nissen v. Redelack,* 246 Minn. 83 (1955). Cases that categorized the public pool activity as proprietary include *Weeks v. Newark,* 62 N.J. Super. 166 (App. Div. 1960); *Hack v. Salem,* 174 Ohio St. 383 (1963).

8. In some states, however, liability caps are still applied.

once: on the one hand, victims would not be denied compensation, and on the other, the charity's budget would not be depleted.[9]

This latter argument, however, overstates the role of insurance in settling the issue. If the charity is to acquire liability insurance, it must pay a premium of at least the expected harm. Thus, in the long run, the budget would not be any less burdened by the purchase of insurance than if the charity faced ordinary liability. But as we demonstrate here, the real policy question is whether it is socially desirable to have the charity face the same precautionary demands as ordinary injurers, given the constraints on its budget. With or without insurance, the constrained budget implies that it is socially optimal for charities to exercise a lower level of care compared with ordinary injurers. Hence, requiring the acquisition of insurance without changing the standard cannot facilitate the desirable outcome.

One example of a law seeking to encourage charitable activity by applying a lenient standard of care is the Bill Emerson Good Samaritan Food Donation Act (42 U.S.C. sec. 1791).[10] The act absolves donors of food from tort liability for various injuries caused to recipients. This immunity does not apply, however, to injuries caused by gross negligence or intentional misconduct.[11] As the analysis demonstrates, setting the standard to gross negligence facilitates optimal allocation of the donor-funded budget between production and care. Hence, the act's policy is in line with the conclusions reached here.

3. THE MODEL

We consider a BP offering a service that may inflict harm on its recipients. The BP provides the service for free, funding it with a budget B. The cost of acquiring funds for the budget is $b(B) = B + \beta(B)$, where $\beta(B) \geq 0$ is

9. According to Restatement (Second) of Torts (sec. 895E, comment c), "[A]ll of the supposed reasons for the immunity fail when the charity can insure against liability," and "in any case the interest of the public in proper care and treatment, and the compensation of harm done, may well outweigh in social importance the encouragement of donations."

10. Congress intended the act to "relieve concerns over liability . . . that deter companies and individuals from donating as freely as they would like" (142 Cong. Rec. H7479 [daily ed., July 12, 1996] [statement of Rep. McKeon]).

11. Gross negligence is defined as a "voluntary and conscious conduct (including a failure to act) by a person who, at the time of the conduct, knew that the conduct was likely to be harmful to the health or well-being of another person" (see 42 U.S.C. sec. 1791[b][7]).

increasing and convex. If the BP is the government, then $\beta(B)$ may be naturally interpreted as the deadweight loss arising from the taxes required to fund it. If it is a charity, then $\beta(B)$ is the cost of acquiring the funds. As $b(B) \geq B$, the BP's operation is efficient only if the value of the service to recipients exceeds $b(B)$.

The BP's per-unit cost of providing the service is given by $k(c) = k_0 + c$, where k_0 is the fixed cost of producing a single unit and $c \geq 0$ is the per-unit cost of care. Each unit causes the recipient an expected loss of $l(c)$, which is uniform among all recipients. We assume that $l'(c) < 0$ and $l''(c) > 0$. The BP's liability is determined by the legal regime, which in any state of the world prescribes either liability for the entire loss or no liability at all. Thus, in any state, liability is given by $\lambda l(c)$, where $\lambda \in \{0, 1\}$. For any budget B, the BP's utility depends on the cost of production, the level of care, liability, and recipients' valuations and losses, as explained below.

On the demand side, each recipient i captures a benefit v_i, drawn from a distribution $f(v_i)$ (continuous and positive) on $[0, V]$, with a corresponding cumulative distribution function denoted $F(v_i)$. We assume that $V = l(0)$, so for $c > 0$ there are always recipients whose value from the service is higher than their expected loss. Each recipient's value v_i is privately known to her, whereas the BP knows only the distribution $f(v_i)$. Since a recipient would seek the service if her valuation exceeds uncompensated losses, total demand for the service equals $1 - F[(1 - \lambda)l(c)]$.

The BP's budget is said to be binding if it is not sufficiently large to satisfy the entire demand. In particular, for each λ and c, the budget B is binding if the budget amount is (weakly) lower than the costs of production, care, and liability required to fully satisfy demand. We denote the budget required to exactly meet demand $\bar{B}(\lambda, c)$. Then

$$\bar{B}(\lambda, c) = \{1 - F[(1 - \lambda)l(c)]\}[k(c) + \lambda l(c)]. \tag{1}$$

Clearly, $\bar{B}(0, c)$ is increasing in c. Define by $c(B)$ the level of care for which the budget exactly satisfies demand, given that no liability is imposed ($\lambda = 0$). Then

$$\bar{B}[0, c(B)] = (1 - F\{l[c(B)]\})k[c(B)] = B. \tag{2}$$

Thus, when $\lambda = 0$, the budget is binding for all levels of care exceeding $c(B)$ but is not binding for lower levels of care.

The definition of social welfare depends on whether the budget is

binding. In particular, if the budget is binding, $B \leq \bar{B}(\lambda, c)$, then social welfare is given by

$$W(\lambda, c, B) = \frac{B}{\bar{B}(\lambda, c)} \int\limits_{(1-\lambda)l(c)}^{V} [v - (1 - \lambda)l(c)]f(v)dv - b(B). \tag{3}$$

The integrand $\int_{(1-\lambda)l(c)}^{V}[v - (1 - \lambda)l(c)]f(v)dv$ equals the net value that the service confers on recipients. The term before the integrand, $B/\bar{B}(\lambda, c) \leq 1$, is the fraction of a unit provided to each recipient. Alternatively, if the service is not divisible, then it may be interpreted as each recipient's probability of obtaining the service.

If the budget is not binding, $B \geq \bar{B}(\lambda, c)$, then the entire demand can be satisfied, and remaining funds are not utilized. Therefore, social welfare is given by

$$W(\lambda, c, B) = \int\limits_{(1-\lambda)l(c)}^{V} [v - (1 - \lambda)l(c)]f(v)dv - b(B). \tag{4}$$

We assume that there exist some values of λ, c, and B for which social welfare is positive:

$$W(\lambda, c, B) > 0. \tag{5}$$

The timing of the model is as follows: At time 0 the BP acquires funds for the budget. At time 1, the BP chooses its levels of production and care, yet its choice may diverge from the social optimum because of agency problems. At time 2, recipients decide whether to demand the service, and the BP provides it. We assume that each recipient's value and losses are accrued instantaneously at the time of consumption. If liability is imposed, then it is also borne immediately.

To allow for divergence between the socially optimal levels of care and production, and those chosen by the potentially biased BP, we model the BP's utility, given budget B, as follows. When the budget B is binding, the BP's utility, denoted $U(\lambda, c)$, is

$$U(\lambda, c) = \frac{B}{\bar{B}(\lambda, c)} \int\limits_{(1-\lambda)l(c)}^{V} [\alpha v - (1 - \lambda)l(c)]f(v)dv, \tag{6}$$

and when the budget is not binding, its utility is

$$U(\lambda, c) = \int\limits_{(1-\lambda)l(c)}^{V} [\alpha v - (1 - \lambda)l(c)]f(v)dv. \tag{7}$$

Notice that when $\alpha = 1$, the BP's utility converges with social welfare,

given B. When $\alpha > 1$, the BP is biased toward production: the value it assigns to production relative to the avoidance of losses is greater than that of the social planner's. Conversely, when $\alpha < 1$, the BP is biased in the opposite direction, toward the avoidance of losses. Note that the BP's bias refers to net losses, that is, to losses that remain after compensation (if liability is imposed), rather than the infliction of harm per se.[12]

To simplify our discussion below, we denote by $\bar{v}(\lambda, c)$ the average valuation captured by recipients per unit, conditional on the level of care and on liability:

$$\bar{v}(\lambda, c) = \frac{\int_{(1-\lambda)l(c)}^{V} vf(v)dv}{1 - F[(1 - \lambda)l(c)]}. \tag{8}$$

Notice that $\bar{v}(\lambda, c)$ is decreasing in c.[13] This is because changes in the levels of care affect not only the utility captured by each recipient but also the overall level of demand. As the level of care falls, recipients' utility falls as well, and hence recipients with the lowest valuations exit the market. Their exit, in turn, raises the average valuations of those who remain.

Since under full liability all recipients with positive valuations demand the service regardless of the chosen level of care, $\bar{v}(1, c)$ is constant. Denote that level $\bar{v}$. Since under no liability some low-valuation recipients do not demand the service, the average valuation under no liability is always higher than under full liability, $\bar{v}(0, c) > \bar{v}$ for all c. Finally, to simplify the analysis we assume that $\bar{v}(0, c) - l(c)$ is concave.[14]

We begin by deriving the optimal level of care for ordinary market injurers. We then characterize the social optimum for in-kind transfers and examine the relative performance of alternative liability regimes, given alternative assumptions regarding the BP's objective function.

3.1. Competitive Market Provision

Suppose first that the service is offered by a private producer whose chosen level of care is observed by recipients. In a perfectly competitive mar-

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12. For further discussion of the BP's objective function and its ramifications, see Section 2. As we demonstrate below, this construction of the objective function implies that the BP's bias α does not affect its level of care under strict liability.

13. That is, $\partial\bar{v}(\lambda, c)/\partial c = l'(c)f[l(c)][\bar{v}(\lambda, c) - l(c)]/\{1 - F[l(c)]\} < 0$.

14. This property simplifies the identification of a unique maximum for the social welfare functions. It holds when v_i is distributed uniformly, as $\bar{v}(0, c) - l(c) = [V - l(c)]/2$. Numerical simulations show that it also holds for other familiar distributions like normal and exponential distributions.

ket, transactions are then undertaken if and only if they yield a positive net value. Hence, social welfare is given by

$$W(c) = \int_{k(c)+l(c)}^{V} [v - l(c) - k(c)]f(v)dv. \tag{9}$$

Maximizing social welfare over c, we obtain the familiar condition for the optimal level of care:

$$l'(c^*) = -k'(c^*) = -1, \tag{10}$$

where c^* denotes the level of care satisfying equation (10).

3.2. In-Kind Transfers

Now consider the case in which the service is offered as an in-kind transfer by a BP. The budget is assumed to have no uses other than to finance production, care, and possibly liability payments. We initially examine the budget and the levels of care and liability that would be chosen by a social planner. We then turn to examine the social implications of alternative liability regimes.

3.2.1. Characterizing the Social Optimum.   The social optimum consists of two major elements. The first is the optimal size of the budget, and the second is the optimal allocation of the budget among its potential uses: production, care, and liability for harm.

   As we demonstrate next, the optimal budget is lower than the level allowing full satisfaction of demand while investing c^* in care. This implies, in turn, that under an optimal budget, the BP will necessarily face a trade-off among its alternative uses. In light of this trade-off, we show that the optimal level of care for BPs is lower than c^* and that BPs should bear no liability in equilibrium. These results are stated in proposition 1.

   Proposition 1.   It is socially optimal for the BP
   a) to exert a level of care $c = \max[c^{**}, c(B)] < c^*$, where c^{**} is the level of care maximizing social welfare in equation (3),
   b) to acquire funds for a budget that is lower than $\bar{B}(0, c^*)$, and
   c) to bear no liability.

   Proof.   See the Appendix.

   Intuitively, the optimal budget does not allow for full satisfaction of demand at a level of care c^* because otherwise the budget-acquiring decision would be inefficient. Namely, while acquiring the marginal dollar

costs more than \$1 ($b'(B) \geq 1$), at c^* it yields merely \$1 in benefit (recall that $l'(c^*) = -1$). Hence, if the budget did allow for full satisfaction of demand at c^*, it would be inefficiently large.

Since, given their budgets, BPs cannot invest in both production and care as ordinary injurers do, they face an inevitable trade-off between them. Channeling funds to production implies that less remains for care, and having greater levels of care implies that more demand must remain unmet. When the budget is binding, the optimal allocation is achieved when the marginal budget dollar yields the same value when channeled to either production or care. That value, in turn, exceeds \$1 and is realized by the level of care c^{**}. If the budget is not binding at c^{**}—namely, it allows for full satisfaction of demand without being exhausted—then remaining funds should be channeled exclusively to care. The optimal level of care then rises and is given by $c(B)$. Hence, a general representation of the BP's optimal care, encompassing both situations, is given by $\max[c^{**}, c(B)] < c^*$.

The optimality of reducing the level of care below c^* also stems from an additional, subtler reason. Namely, when a good is provided free of charge, a problem of excessive demand emerges whereby recipients seek the service even when they value it by less than its cost of production. In view of that, lowering the level of care also functions as a sorting mechanism that counters the problem: as the level of care falls and expected harm rises, recipients with the lowest valuations exit the market. As they do so, the average value captured by those who continue to be served rises, and the scope of inefficient demand falls. Hence, a lower level of care is desirable not only because it allows for more demand to be met; it is also efficient because it favorably affects the composition of demand by inducing low-valuation recipients to exit.

Similar reasoning explains why the imposition of liability is inefficient for BPs. First, liability uses budget resources that would otherwise be channeled to production or to care. While \$1 in liability confers a value of \$1 to the person receiving it, its value in either production or care exceeds \$1 (recall that $l'(c^{**}) \leq -1$ and $l'[c(B)] \leq -1$). Hence, imposition of liability prevents the BP from utilizing its full value-creating potential. Second, compensation for losses produces an adverse sorting effect by incentivizing the entry of low-valuation recipients. If all potential harm is effectively insured, any recipient with a positive valuation is induced to enter. Supplying the service to such recipients comes at the expense of high-valuation recipients who are unable to obtain the service. Thus, while the threat of liability may be required to discipline behavior when

the BP suffers from agency problems (more on this below), it is a threat that in equilibrium is best kept unfulfilled.

The proof of proposition 1 also discloses an additional result, namely, that for any budget under which demand is not fully satisfied, $B \leq \bar{B}(0, c^{**})$, the optimal level of care is constant and equal to c^{**}. The reason is that for any such budget, the allocation problem facing the BP—whether to invest in production or in care—is replicated with each additional unit the BP produces. As long as demand is not satisfied, all units confer the same average benefit to recipients and inflict the same level of harm. Thus, for all units, the trade-off between production and care reemerges in identical form. It follows, therefore, that the optimal level of care remains constant as well. This property ceases to hold only once the entire demand is satisfied, $B > \bar{B}(0, c^{**})$, and the optimal level of care equals $c(B)$.

This result carries a practical implication: if a court can verify that the entire demand cannot be satisfied at the optimum (as perhaps in the case of a soup kitchen that cannot serve the entire population in need), then it need not probe into the magnitude of the BP's budget to identify the optimal level of care. Regardless of size, all such BPs should be induced to meet the same standard.

A final point worth mentioning concerns the distributive effect of a lower level of care. The goals that governments and charities seek to accomplish through in-kind transfers are fundamentally distributive. A principal purpose is to aid the poor, who are unable to purchase the same service in the market (see note 1). But if BPs are required to invest less in precautions and bear no liability, as the analysis here suggests, then the implication is that the poor will be more exposed to harm than the wealthy. Thus, such disparate treatment by the legal system may seem to conflict with the goal of redistribution.

We suggest, however, that the normative implications of the analysis fully realize the distributive goals of in-kind transfers and are consistent with them. The lower standard of $\max[c^{**}, c(B)]$ is not merely efficient in the broad social sense but is also optimal from the standpoint of recipients. Recall that the lower standard optimally balances the value that recipients obtain from care and the value they obtain from production. Requiring BPs to increase investment in care would therefore only cause recipients' welfare to fall, as the loss from reduced production would by definition outweigh the benefit from increased care. Thus, ex ante, when all recipients face equal probability of obtaining access to the service,

they have a common interest that the standard be set at the optimal level applicable to in-kind transfers rather than to market transactions.

3.2.2. The Optimal Liability Regime.

We next consider what liability regime would be optimal. We compare the following four regimes: ordinary negligence, in which the standard is set at c^*, the level of care applicable to ordinary injurers; gross negligence, in which the standard of care is set at $\max[c^{**}, c(B)]$, the socially optimal level for BPs when providing in-kind services; strict liability, in which liability extends to all losses regardless of the chosen level of care; and no liability, in which no liability is imposed regardless of the chosen level of care.

As previously mentioned, we consider two presumptions regarding the BPs' objective function. The first is that BPs seek to maximize the welfare of recipients. The second is that they suffer from agency problems, which cause them to sometimes diverge from their stated objectives.

The presumption that BPs seek to promote social welfare seems tenable in a broad array of contexts. Charities are altruistic institutions, formed with the purpose of promoting the welfare of beneficiaries. The state, too, is entrusted with the task of benefiting the public. Hence, at least to a considerable degree, it can be assumed that BPs in fact pursue their intended purpose.

However, in some contexts, agency problems may steer BPs toward different agendas. The individuals running them often have personal stakes in the policies of the institutions they control. For instance, an administrator may seek to minimize liability so as to avoid personal damage to her reputation, or she may seek to produce more than is efficient—engage in empire building—to maximize the visibility and apparent importance of the enterprise she controls.[15] Thus, although the promotion of social welfare may be the stated mission of BPs, that mission may not always be implemented in full.

Hence, in what follows we examine both settings. Recall that the BP's utility function contains a parameter $\alpha \geq 0$ that determines the relation between the BP's objective and that of the social planner's (see equations [6] and [7]). When $\alpha = 1$, the BP's objective is aligned with the social optimum. When $\alpha > 1$, it is biased toward production, and when $\alpha < 1$ it is biased toward the avoidance of (net) losses.

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15. For a discussion of what charities maximize, see Tremper (1991) and Young (1983). For a discussion of sovereign immunity in light of possible motivational theories of government, see Spitzer (1977) and Gillette and Stephan (2000).

We begin by assuming that $\alpha = 1$. Our main point in this section is that when BPs seek to do what is socially best, the applicable tort regime should not stand in their way. We show, however, that tort law's dominant liability regime, ordinary negligence, and its counterpart, strict liability, prevent BPs from maximizing welfare. Hence, the conclusion of this section is that neither of these regimes yields the socially desirable outcome. To avert interference, welfare-maximizing BPs ought to be governed by either a gross-negligence regime or a no-liability regime.

We then proceed to consider the case in which BPs are afflicted by agency problems, with either $\alpha > 1$ or $\alpha < 1$. We find that in these cases as well, gross negligence dominates both ordinary negligence and no liability and also dominates strict liability (albeit, in the latter case, with a minor qualification). Hence, our overall conclusion is that, regardless of whether BPs seek to maximize welfare or pursue an inefficient private agenda, gross negligence emerges as the preferable regime.[16]

We focus on the interesting case in which the BP does not attain a budget allowing it to meet the entire demand under the ordinary negligence standard $(B \leq \bar{B}(c^*))$. Recall that, as established in proposition 1, acquiring funds for such a budget would never be optimal when the BP acts efficiently. Acquiring funds for such a budget would be even less appealing for the social planner if, because of agency problems, the BP's operation is less valuable.

Benefit Providers Seek to Maximize Social Welfare. We begin by assuming that the BP's incentives are aligned with the social optimum ($\alpha = 1$). Proposition 2 lays out the main result applicable to this case.

Proposition 2. When BPs seek to maximize social welfare ($\alpha = 1$),

  a) under either strict liability or ordinary negligence, BPs are prevented from maximizing the social value of in-kind transfers, and

  b) a regime of gross negligence, under which the standard is defined by $c = \max[c^{**}, c(B)]$, facilitates the optimal result.

Proof. The proof follows directly from proposition 1. As for proposition 2*a,* under strict liability the BP bears inefficient liability and takes the excessive level of care c^* (see the proof of proposition 1*c* in the Ap-

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16. Note that while the analysis assumes that the level of care taken by the BP is observable to recipients, our results do not fundamentally depend on it. Namely, if care is not observable (but verifiable), then the implication is that variations in care do not affect demand, and hence $\bar{v}'(0, c) = 0$ holds for all c. That is, therefore, merely a special case of the general setting considered above.

pendix). Under ordinary negligence, the BP must either satisfy the standard at c^* or bear liability, in which case the optimal level of care is again c^*. Hence, the BP chooses c^*. Proposition 2*b* follows directly from the characterization of the social optimum, as established in proposition 1. Q.E.D.

Benefit Providers May Be Biased toward Production or Care.   We now turn to examining to what extent the superiority of gross negligence survives the possibility of agency problems in BPs (either $\alpha > 1$ or $\alpha < 1$). Our conclusion is that, with a minor qualification, gross negligence is superior to ordinary negligence, strict liability, and no liability regardless of the nature of the agenda advanced by the BP's administrators. In particular, the move from the most dominant regime at present, ordinary negligence, to the proposed regime of gross negligence is unequivocally desirable.

Under full liability, substituting $\lambda = 1$ in equation (6) and using the definition of $\bar{v}(\lambda, c)$ from equation (8) yields

$$U(1, c) = B \frac{\alpha \bar{v}}{k(c) + l(c)}. \tag{11}$$

Differentiating equation (11) with respect to c, we verify that the level of care maximizing the BP's utility under full liability is c^*, which is independent of the value of α. Further note that since $B < B(0, c^*)$, the budget is always binding at c^* under full liability, and therefore the BP's choice is indeed derived by the first-order condition of equation (11).

This result implies that full liability corrects both of the BP's biases. Intuitively, the reason is that if the BP is biased toward production ($\alpha > 1$) and the level of care is initially set at c^*, then diverting additional funds to production at the expense of care would ultimately not result in increased production. While shifting \$1 from care to production would initially increase the budget allotted to production by \$1, it would also increase liability expenses by more than \$1 (as $l'(c^*) = -1$). Therefore, such a shift would ultimately leave the BP with less money with which to produce rather than more. Hence, to serve the BP's own preference for production, the level of care must not fall below c^*.

If, alternatively, the BP is biased toward avoidance of net losses ($\alpha < 1$), then liability again renders this bias moot. Since, given liability, all losses are compensated in full, recipients incur no net losses irrespective of the chosen level of care. Hence, despite the bias, the level of care will be cho-

sen solely on the basis of its effect on the level of production, which is maximized at c^*.

Turning to the case of no liability, substituting $\lambda = 0$ in equation (6), and differentiating with respect to c, we obtain the following first-order condition:

$$l'(\tilde{c}) = -\frac{\alpha \bar{v}(0,\ \tilde{c}) - l(\tilde{c})}{k(\tilde{c})} + \alpha \bar{v}'(0,\ \tilde{c}), \tag{12}$$

where $\tilde{c}$ denotes the level of care satisfying equation (12). Hence, the BP chooses $\tilde{c}$ if the budget is binding at $\tilde{c}$, and otherwise it chooses $c(B)$, by the same argument given in the proof of proposition 1a. Hence, when the budget is binding, the BP's bias may drive it away from the social optimum, but if the BP's preference for production or for the avoidance of losses has been satisfied and additional funds remain, the BP simply raises its level of care to $c(B)$, and its choice converges with the social optimum. The BP therefore selects its level of care according to $\max[\tilde{c},\ c(B)]$.

Notice that when no liability is imposed, the BP's chosen level of care decreases in α as long as the budget is binding. Comparing equation (12) to the choice of the social planner (see expression [A2] in the Appendix), the BP's choice is aligned with the socially optimal choice if $\alpha = 1$ but is inadequate if $\alpha > 1$ and excessive if $\alpha < 1$. We can now state the main results pertaining to the comparison of liability regimes for biased BPs:

Proposition 3.
a) When the BP is biased toward production, $\alpha > 1$, a gross-negligence regime, under which the standard of care is set at $\max[c^{**},\ c(B)]$, is weakly superior to ordinary negligence, strict liability, and no liability regimes.

b) When the BP is biased toward avoiding losses, $\alpha < 1$, gross negligence is weakly superior to ordinary negligence and yields the same outcome as no liability. Its relation to strict liability is ambiguous.

Proof. See the Appendix.

Proposition 3 establishes the superiority of gross negligence when the BP is biased toward production or care. Intuitively, when the BP is biased toward production ($\alpha > 1$), gross negligence fully aligns its incentive with the social optimum while imposing no liability in equilibrium. In particular, the BP does not invest less than the prescribed standard, $\max[c^{**},\ c(B)]$, because otherwise it would face liability. Also recall that, given lia-

bility, it seeks to invest more than $\max[c^{**}, c(B)]$, as its preferred level of care is then c^* (see equation [11] and the accompanying text).[17]

The same cannot be said of any of the alternative regimes. Under ordinary negligence the BP must choose between meeting the ordinary standard c^* and facing liability. As its preferred level of care given liability is c^*, it indeed chooses c^*. Strict liability also leads to investment of c^* (see equation [11] and the accompanying text), and it exposes the BP to liability. Finally, a regime of no liability leads to inadequate care because of the BP's bias (see equation [12]). Hence, gross negligence dominates all alternative regimes.

When the BP is biased in the opposite direction, $\alpha < 1$, it may want to invest too much in care ($\max[\tilde{c}, c(B)] \geq \max[c^{**}, c(B)]$). Hence, under gross negligence and under no liability, it invests excessively and bears no liability. Under ordinary negligence, the chosen level of care is either the same or higher: if $\tilde{c} > c^*$, the result is the same, but if $\tilde{c} < c^*$, then under ordinary negligence the BP raises its level of care from $\tilde{c}$ to c^*, which further aggravates the inefficiency stemming from excessive care.

Finally, the comparison with strict liability is inconclusive. Under strict liability, the BP chooses c^* and bears liability. If $\tilde{c}$ is sufficiently greater than c^*, then a point may be reached where the reduction in care induced by strict liability would be sufficiently beneficial to outweigh the social cost of liability. In that case, strict liability is preferable to gross negligence. In all other cases—that is, when $\tilde{c} < c^*$ or is insufficiently greater than c^*— gross negligence remains superior. In the Appendix we provide two examples demonstrating both possibilities.

We should emphasize that the setting in which gross negligence is outperformed by strict liability is one we consider quite implausible. Note that the possibility arises only in cases in which the BP's agency bias leads it to invest so excessively in care that strict liability becomes appealing as a disciplining device, assisting in reining in some of the excessive investment. If the main social concern posed by BPs relates to a tendency toward insufficient care, or even toward excessive care that does not rise beyond an arduous threshold, then the superiority of gross negligence over strict liability will remain intact.[18]

17. It obviously does not invest more in care than the prescribed standard, since its preference, driven by its bias, is to invest less.

18. The plausibility of strict liability outperforming gross negligence is further diminished by a consideration beyond the scope of the model. Note that the BP can serve its bias toward the avoidance of losses, not only by taking excessive care but also by compensating injured recipients voluntarily. If voluntary compensation is possible, then, un-

Hence, the principal result remains quite general: gross negligence outperforms its alternatives under a variety of assumptions. It holds whether the BP seeks to maximize social welfare or is driven by bias; it holds if the bias presses in the direction of inadequate care and generally when it presses in the direction of excessive care. In all of those settings, the limited budget and the need to curb inefficient demand underlie the gross-negligence regime's relative advantage.

4. CONCLUSION

In an optimal tort system, in-kind transfers and market transactions should not be subject to the same legal standards. A binding budget alters the economic cost of care and therefore alters its socially desirable level. Whereas for ordinary injurers $1 invested in care costs $1, for budget-constrained BPs its cost is given by its alternative value if channeled to production. As that value exceeds $1, diverting it from production to care costs more than $1.

Two conclusions follow from these observations: first, that the optimal standard of care for BPs should be set at a lower level than for ordinary injurers; second, that BPs should not be made to bear liability in equilibrium. As $1 of a budget yields more than its worth when used for production, it is better spent for production than as a liability transfer.

In the history of tort law, the approach toward charities and the state has moved ambivalently between two extremes. Whereas in the past they were entirely exempt from liability, today they are largely required to meet the same burden as market providers. The present analysis suggests that a midway approach may well dominate both of those extremes. The threat of liability may be required to deter BP administrators from behavior that is undesirably negligent. However, the standard of care should require less of BPs, and liability should apply only if the lenient standard is violated. Applying the same standard to in-kind transfers is likely to undermine the welfare of recipients—and thereby defeat the transfer's very purpose.

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der gross negligence, the BP will wish to set the level of care at c^* and reduce further losses only through monetary compensation. Since the cost of care beyond c^* exceeds the reduction in expected harm, pursuing this option will allow the BP to increase production for any level of uncompensated losses. This implies that when voluntary compensation is possible, the level of care will not exceed c^*, and gross negligence will retain its unqualified (weak) superiority to strict liability.

APPENDIX: PROOFS

Proof of Proposition 1*a*

Suppose that no liability is imposed ($\lambda = 0$), and initially consider all levels of care $c \geq c(B)$. Welfare is given by equation (3). Using the definition of $\bar{v}(0, c)$ (see equation [8]), we can rewrite social welfare as

$$W(0, c, B) = \frac{B}{k(c)}[\bar{v}(0, c) - l(c)] - b(B). \tag{A1}$$

Differentiating equation (A1) with respect to c, we obtain the first-order condition for its maximum:[19]

$$l'(c^{**}) = -\frac{\bar{v}(0, c^{**}) - l(c^{**})}{k(c^{**})} + \bar{v}'(0, c^{**}) < -1, \tag{A2}$$

where c^{**} denotes the level of care satisfying expression (A2). The inequality follows from assumption (5) (which implies that at the optimum, $\bar{v}(0, c^{**}) - l(c^{**}) > k(c^{**})$) and from the fact that $\bar{v}'(0, c) < 0$.[20] Hence, $c^{**} < c^*$.

It follows that when $c^{**} > c(B)$, c^{**} is the optimal level of care, and it is lower than the optimal level applicable to ordinary injurers, c^*. If, alternatively, $c^{**} < c(B)$, then the BP can fulfill the entire demand at c^{**} without exhausting the budget. In that case, as welfare decreases for all levels of care $c \geq c(B)$, the maximum is obtained as a corner solution, at $c = c(B)$.

Consider next all levels of care $c \leq c(B)$. The budget is not binding, and therefore social welfare is given by equation (4). Substituting for $\lambda = 0$ in equation (4), and differentiating with respect to c, we obtain

$$\frac{\partial W(0, c, B)}{\partial c} = -l'(c)\{1 - F[l(c)]\} > 0. \tag{A3}$$

Hence, after the entire demand is met, it is optimal to invest all remaining funds in care. The optimal level of care is thus $c = c(B)$. It follows from the foregoing that the optimal level of care under no liability equals $\max[c^{**}, c(B)]$.

Proof of Proposition 1*b*

We now show that it is never optimal for the BP to acquire funds for a budget $B \geq \bar{B}(0, c^*)$. As established in proposition 1*a*, for any budget $B \geq \bar{B}(0, c^{**})$, the

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19. The assumption that $\bar{v}(0, c) - l(c)$ is concave guarantees that this is the unique global maximum.

20. Expression (A2) can also be rewritten as $l'(c^{**}) = -\{[\bar{v}(0, c^{**}) - l(c^{**})]/k(c^{**})\} \times (\{1 - F[l(c^{**})]\} /\{1 - F[l(c^{**})] - f[l(c^{**})][\bar{v}(0, c^{**}) - l(c^{**})]\})$, which, again, implies that $l'(c^{**}) < -1$.

optimal level of care is $c(B)$. Thus, differentiating social welfare in equation (4) with respect to B, we obtain

$$\frac{\partial W(0, c, B)}{\partial B} = -l'(c)\frac{1 - F[l(c)]}{1 - F[l(c)] - f[l(c)]l'(c)k(c)} - b'(B). \tag{A4}$$

Since $l'(c^*) = -1$ and $b'(B) > 1$, $\partial W(0, c, B)/\partial B < 0$ for all $B \geq \bar{B}(0, c^*)$. Hence, under no liability the optimal budget is lower than $\bar{B}(0, c^*)$, and the optimal level of care is lower than c^*.

Proof of Proposition 1c

It remains to be shown that no liability dominates full liability. Under full liability all recipients with positive valuations demand the service, and the average valuation is fixed at $\bar{v}$. It is easily verified that the optimal level of care is then c^*, since it minimizes the total costs of care and liability. Note that under full liability, acquiring funds for a budget exceeding $\bar{B}(1, c^*)$ can never be optimal, as beyond that level the cost of care exceeds its value, and therefore social welfare declines (see equation [4]). We assume that $\bar{v} - l(c^*) - k(c^*) > 0$; otherwise, it would have been inefficient to acquire funds for any budget under full liability.

To compare full liability with no liability, suppose, initially, that $B \leq \bar{B}(0, c^*)$. Then the following set of inequalities demonstrate the superiority of no liability:

$$
\begin{aligned}
W(1, c^*, B) &= \frac{B}{k(c^*) + l(c^*)}\int_0^V vf(v)dv - b(B) \\
&< \frac{B}{k(c^*) + l(c^*)}\left\{\int_{l(c^*)}^V [v - l(c^*)]f(v)dv + l(c^*) + \int_0^{l(c^*)} [k(c^*)]f(v)dv\right\} - b(B) \\
&< \frac{B}{k(c^*) + l(c^*)}\left\{[\bar{v}(0, c^*) - l(c^*)]\frac{k(c^*) + l(c^*)}{k(c^*)}\right\} - b(B) \\
&= \frac{B}{k(c)}[\bar{v}(0, c^*) - l(c^*)] - b(B) = W(0, c^*, B) \leq W\{0, \max[c^*, c(B)], B\}.
\end{aligned}
\tag{A5}
$$

The first term represents welfare when full liability is borne, the care level is set at c^*, and all recipients with positive valuations are served. To arrive at the second term, suppose that production is restricted to recipients whose valuations exceed $l(c^*)$, and liability for those recipients is removed.[21] Inequality (A6) follows since the BP no longer serves the inefficient demand by recipients with valuations lower than $l(c^*)$:

$$\int_0^{l(c^*)} vf(v)dv < \int_0^{l(c^*)} [k(c^*) + l(c^*)]f(v)dv. \tag{A6}$$

To arrive at the third term, suppose that the funds released are now channeled

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21. The funds released are represented by $l(c^*) + \int_0^{l(c^*)}[k(c^*)]f(v)dv = \{1 - F[l(c^*)]\}l(c^*) + \int_0^{l(c^*)}[k(c^*) + l(c^*)]f(v)dv$.

to production for recipients whose valuation exceeds $l(c^*)$. The inequality holds since when using these resources to produce the service, the net value to recipients is higher than the costs of production and care $\bar{v}(0, c^*) - l(c^*) > k(c^*)$. Finally, the last inequality follows from the optimality of $\max[c^{**}, c(B)]$ under no liability.

When $\bar{B}(0, c^*) < B \le \bar{B}(1, c^*)$, a similar argument applies:

$$
\begin{aligned}
W(1, c^*, B) &= \frac{B}{k(c^*) + l(c^*)} \int_0^V vf(v)dv - b(B) \\
&< \frac{B}{k(c^*) + l(c^*)} \left\{ \int_{l(c^*)}^V [v - l(c^*)]f(v)dv + l(c^*) + \int_0^{l(c^*)} [k(c^*)]f(v)dv \right\} - b(B) \\
&< W(0, c^*, B) + B - \bar{B}(0, c^*) \\
&\le W\{0, \max[c^{**}, c(B)], B\}.
\end{aligned}
\tag{A7}
$$

Q.E.D.

Proof of Proposition 3*a*

Suppose first that the BP is biased toward production ($\alpha > 1$). Then its preferred level of care when liability is not imposed is $\max[\tilde{c}, c(B)]$, where $\tilde{c} < c^{**}$. If, however, liability is imposed, the BP's preferred level of care rises to c^*.

It follows that, under a gross-negligence regime, the BP takes exactly the level of care prescribed by the standard, $\max[c^{**}, c(B)]$. If $B > \bar{B}(c^{**})$, then the BP selects $c(B)$, which corresponds to the social optimum. If $B \le \bar{B}(c^{**})$, then the BP chooses c^{**} for the following reasoning: It does not invest less than c^{**}, for then liability would be imposed, in which case its utility is increasing in care up to $c^* > c^{**}$. It would not choose more than c^{**}, because under no liability its utility is decreasing for all $c > \tilde{c}$ (following equation [12]). Hence, under gross negligence the BP satisfies the required standard. No liability is imposed, and the social optimum is realized.

By contrast, the behavior induced by the alternative regimes is suboptimal. Namely, by the same argument as above, under ordinary negligence the BP selects c^*, which is socially excessive. Under strict liability it also chooses c^* and in addition bears liability (which is itself inefficient by proposition 1). Finally, under no liability the BP chooses $\max[\tilde{c}, c(B)]$, which is an inadequate level of care when $B \le \bar{B}(c^{**})$.

Proof of Proposition 3*b*

Now suppose alternatively that the BP is biased toward avoiding losses ($\alpha < 1$). The BP's preferred level of care when liability is not imposed is $\max[\tilde{c}, c(B)]$, where $\tilde{c} > c^{**}$. Its preferred level of care when liability is imposed is again c^*. Hence, under gross negligence the BP invests $\max[\tilde{c}, c(B)]$ and bears no liability. When $B \le \bar{B}(c^{**})$, the BP's level of care is thus excessive. Clearly, the outcome under no liability is the same.

Next consider the comparison to ordinary negligence. If the budget is binding under $\tilde{c}$ and $c^{**} < \tilde{c} < c^*$, then under ordinary negligence the BP selects c^* using the same reasoning as above. As social welfare falls monotonically above c^{**}, welfare is higher under $\tilde{c}$ than under c^*. If, alternatively, $c^{**} < c^* < \tilde{c}$, then $\tilde{c}$ is selected under both gross negligence and ordinary negligence.

Finally, under strict liability the BP chooses c^*. If the budget is binding under $\tilde{c}$ and $c^{**} < \tilde{c} < c^*$, then the result is superior under gross negligence, because welfare falls monotonically above c^{**}. If $c^* < \tilde{c}$ the result is ambiguous. We next provide two examples demonstrating that under those conditions, welfare may be higher under either regime.

Example 1: Superiority of Strict Liability When $\alpha < 1$ and $c^* < \tilde{c}$. By equation (12), under gross negligence, as α tends to 0, $l(\tilde{c})$ must also approach 0, and therefore $k(\tilde{c})$ tends to ∞. Social welfare is then given by

$$W(0, \tilde{c}, B) = B\frac{\overline{v}(0, \tilde{c}) - l(\tilde{c})}{k(\tilde{c})} - b(B) \xrightarrow[\alpha \searrow 0]{} - b(B).$$

Conversely, under strict liability, social welfare is given by

$$W(1, c^*, B) = B\frac{\overline{v}}{k(c^*) + l(c^*)} - b(B) > W(0, \tilde{c}, B),$$

where the inequality follows since $B\{\overline{v}/[k(c^*) + l(c^*)]\} > 0$. Hence, for sufficiently low α, strict liability produces higher social welfare than does gross negligence.

Example 2: Superiority of Gross Negligence When $\alpha < 1$ and $c^* < \tilde{c}$. By equation (12), under gross negligence, when α tends to 1, $\tilde{c}$ approaches $c^{**} < c^*$. In addition, as established above, when α tends to 0, $\tilde{c}$ tends to ∞. Since $\tilde{c}$ is a continuous function of α, there must exist some value of α, $0 < \alpha < 1$, such that $\tilde{c} = c^*$. For that value of α, gross negligence induces a welfare level of $W(0, c^*, B)$. By proposition 1, $W(0, c^*, B) > W(1, c^*, B)$. Therefore, there are values of α slightly lower than that value for which $\tilde{c} > c^*$ and for which gross negligence yields greater welfare than strict liability. Q.E.D.

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