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Civilian protection in counterinsurgency warfare

Sanghoon K. Lee

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Abstract This paper investigates how democracies protect the lives of enemy civilians in counterinsurgency warfare. A theoretical model is developed where the elected leaders' decisions are influenced by what is known as "endowment effect" or "memory effect" in cognitive psychology. It is shown that too many civilians are killed in equilibrium as the leaders choose to pass some of the long-term costs of civilian casualties to their successors. The bias becomes more pronounced when the leaders are subject to binding term limits. The existing law of war is interpreted and evaluated using the theoretical framework. The analysis shows that the law falls short of the optimal constraint as it regulates the relative rather than absolute size of civilian casualties.

Keywords Civilian casualties · Counterinsurgency · Endowment effect · Memory effect · Law of war

Introduction

The War on Terror has been brutal to the people of Afghanistan and Iraq. Estimates vary, but it is generally believed that more than 115,000 Iraqi and 15,000 Afghani civilians have died since the beginning of the war. Although the majority of deaths are attributed to insurgents and anti-government forces, U.S.-led international military forces are responsible for a significant number of the casualties.[1]

[1] The figure for Iraq is as of 2011 and is based on two widely cited estimates by Iraq Body Count (115,916, http://www.iraqbodycount.org/analysis/numbers/2011/ [accessed August 14, 2012]) and Brookings Institution (115,878, http://www.brookings.edu/~/media/Centers/saban/iraq%20index/index201207.pdf [accessed August 14, 2012]). Iraq Body Count provides a breakdown of the numbers, showing that 14,069 of 115,916

S. K. Lee (✉)
College of International Studies, Hallym University, 1 Hallymdaehak-gil, Chuncheon 200-702, South Korea
e-mail: slee@hallym.ac.kr

Research has shown that counterinsurgency warfare tends to kill more civilians than other types of war (Downes 2007; Valentino et al. 2004). What is not addressed well in the literature, however, is whether the casualties—say 130,000 deaths in Afghanistan and Iraq—are too high or too low. Desirable as it is, avoiding civilian casualties is not without cost. Air strikes, for example, have been a major cause of civilian deaths since the beginning of the current war. If ground troops had been used instead, civilian casualties might have been reduced significantly as force could have been employed more selectively against the insurgents. Ground operations, however, entail more military casualties and may use more material resources as well. But this means that there must be an "optimal" number of civilian deaths that balance the gains and losses from protecting civilian lives.

This article presents a theoretical analysis of how these trade-offs are made in liberal democracies. An infinite-horizon model is constructed where insurgents and the government interact over time. The key question is whether elected politicians pursue socially optimal policy to maximize the collective welfare of their constituents. The main finding is that the equilibrium policy has a political bias characterized by excessive civilian casualties and overspending of military resources. It is also shown that the problem is more pronounced when elected leaders are subject to term limits.

The intuition for the result comes from the observation that elected leaders care more about what happens during their terms rather than their successors' terms in office. It has been argued that killing civilians indiscriminately helps the recruitment of new insurgents and increases violence against international military forces.[2] Selectively targeting insurgents—and treating civilians more humanely in general—could, therefore, reduce the cost of counterinsurgency in the long run by weakening support for the insurgents. But elected leaders do not fully internalize these effects of protecting civilians because some of the benefits will not materialize until they leave office. This leads to an overly aggressive policy compared to the one that maximizes social welfare. The existence of a term limit makes the problem even worse: the leaders become more shortsighted in their last term.

In principle, the problem would be resolved if one could come up with a way to constrain the leaders' behavior. The analysis shows first that the optimal constraint has a simple structure: it sets a limit on the number of civilian casualties. It is then examined whether existing international law is consistent with the optimal constraint. It turns out that the law imposes a suboptimal constraint on the behavior of leaders. International law, therefore, fails to induce the social optimum even when it is observed to the fullest extent.

This article builds on the "political business cycle" literature and extends the analysis to counterinsurgency policy. Since the pioneering work by Nordhaus (1975), political bias in economic policy has been studied extensively. The literature has identified three potential sources of bias: voter myopia (Nordhaus 1975), asymmetric information between the

Footnote 1 continued
total deaths (12.1 %) were caused by US-led coalition forces. For Afghanistan, the United Nations Assistance Mission in Afghanistan (UNAMA) has been publishing civilian casualty data since 2007. During the period 2007–2009, 11,864 civilian deaths were reported, of which 2,890 (24 %) were attributed to the Afghan government and international military forces (UNAMA, *Annual Report on Protection of Civilians in Armed Conflict*, http://unama.unmissions.org/Default.aspx?tabid=12265&language=en-US [accessed August 14, 2012]). Heavy aerial bombing by coalition forces is believed to have caused thousands of civilian casualties in the earlier periods. The figure 15,000 in the text is based on 4,000 deaths for the period 2001–2006, which may be taken as a conservative estimate of total civilian casualties in Afghanistan.

[2] Kocher et al. (2011) show that aerial bombing during the Vietnam war was counterproductive indeed. For the war on terror, Condra et al. (2010) find strong evidence for the "revenge" effect but no evidence for the "recruitment" effect in Afghanistan. Neither effect was confirmed in Iraq data.

leader and the voters (Rogoff 1990), and partisan politics (Alesina 1987). In the context of counterterrorism, Bueno de Mesquita (2007) showed that asymmetric information between the government and the voters leads to a bias toward observable rather than non-observable measures. This article proposes yet another source of bias based on what is known as the "memory effect" (Elster and Loewenstein 1992) or the "endowment effect" (Tversky and Griffin 1991). This is, to the best of the author's knowledge, new in the literature.

Recent experiences in Iraq and Afghanistan spurred heated debates on the proper role of the executive branch during national emergencies. The advocates of executive power contend that the president should be given more discretion in order to act quickly and decisively against security threats (Goldsmith and Manning 2006; Yoo 2005). The advocates of civil liberties, on the other hand, argue that presidential power has been repeatedly abused and needs to be restrained more by Congress and the court (Cole 2003; Koh 2006). The latter view, often called the "civil libertarian" view in the literature, has been criticized on the grounds that there is no convincing explanation for alleged executive bias (Posner and Vermeule 2007). This article provides one such explanation and argues that restraints are necessary in order to correct the bias.

Several authors have analyzed the law of war in a rational choice framework. Morrow (2001, 2002) interprets the law as a codification of equilibrium strategies in an underlying game of conflict. Posner (2003) views the law as a manifestation of states' self-interest and derives a number of hypotheses based on a game-theoretic analysis. On the empirical side, Valentino et al. (2006) examined whether international laws protect civilians in wars. They found no evidence that signatories to the Hague and Geneva conventions kill fewer civilians.

Model

A "pool" of insurgents consists of active and potential insurgents. Each period, only active insurgents engage in attacks. The government invests in counterinsurgency measures to reduce the damage from such attacks. The damage from attacks suffered by the government is given by

$$(x_t - q_t)D.$$

In the expression, x_t is the number of active insurgents and $q_t \in [0, x_t]$ is the amount of counterinsurgency "output" produced in period t. Counterinsurgency production is thus measured in terms of how much the government controls or "neutralizes" the insurgents' attacks. The damage is assumed to be proportional to the number—or "size"—of uncontrolled insurgents in the period.[3]

Counterinsurgency requires resources. Strengthening security measures, gathering intelligence, and conducting military operations are all costly activities. The resources used—capital, labor, raw material, and so on—are all part of this counterinsurgency cost. In addition to these material costs, implementing counterinsurgency measures also imposes a different kind of burden on the government. Bombing insurgents' camps, for instance,

[3] As the following analysis shows, this assumption simplifies the exposition greatly as it makes the solution independent of the state variable of the dynamic programming problem. The main result of the paper will still hold under a more general assumption that the damage is increasing and convex in the size of uncontrolled insurgents.

could result in civilian casualties. Also, by detaining suspects, the government cannot avoid the risk of locking up innocent people.

A novel approach of this paper is to take these "humanitarian values" as a factor of the counterinsurgency production process. More specifically, it is assumed that the input–output relation in counterinsurgency production is given by

$$q_t = \phi(m_t, h_t).$$

In the expression, m_t corresponds to the value of material inputs used and h_t measures the cost of humanitarian values sacrificed in counterinsurgency production.[4] The function $\phi(\cdot,\cdot)$ is strictly concave and increasing in both arguments. Also, the two inputs are assumed to be complementary to each other, that is $\frac{\partial^2 \phi}{\partial m \partial h} > 0$. It requires that an extra dollar's worth of material resources should contribute more to production when more humanitarian values could be sacrificed for counterinsurgency production.[5]

Each period, a fixed number (=n) of individuals enter the pool of potential insurgents. These are drawn randomly from a continuum of population.[6] In the following period, a fraction $f(h_t)$ of the potential insurgents become active, while the remaining $1 - f(h_t)$ becomes inactive and exits the pool. It is assumed that the function $f(\cdot)$ is strictly increasing and convex. Sacrificing humanitarian values thus mobilizes potential insurgents and the effect become larger at an increasing rate. Given this regeneration process, the number of active insurgents at time $t + 1$ becomes

$$x_{t+1} = nf(h_t).$$

Notice that x_{t+1}, which is a fraction of an integer, is not an integer in general. For simplicity, the following analysis disregards this integer constraint and treats x_{t+1} as the size of active insurgents.[7]

Using an analogy in epidemiology, one may think of a situation where a fixed number of people in the population get "infected" with the idea of insurgency. Among those infected (=potential insurgents), some will get sick (=become active), while others will recover without symptoms (=exit the pool).[8] An insurgent stays active for one period and then exits the pool. The idea is that active insurgents become unproductive after a period as they get captured or killed by the government or because they kill themselves in an operation (for example, suicide attacks). This is certainly not the most accurate description of reality because it rules out the possibility of recidivism over multiple periods. The assumption, however, simplifies the structure of the problem significantly and will be maintained throughout this paper.

[4] One can interpret m_t as the size (measured in monetary units) of an input mixture or a "composite" input used in counterinsurgency production.

[5] Input complementarity seems to be a reasonable assumption, but it is not essential for the main result of this paper. As will become clear in the following analysis, the government uses humanitarian values excessively in the equilibrium whether the inputs are complementary or not. The bias in the usage of material resources, however, becomes indeterminate once the complementarity assumption is dropped.

[6] This is interpreted as the insurgents' constituency. In general, it is a subset of the population of the insurgents' home country.

[7] One may interpret x_{t+1} as an approximate measure of the true number of active insurgents. For a large enough n, this approximation becomes quite accurate indeed.

[8] Extending the analogy from epidemiology, one may consider also whether or not people acquire "immunity" after they recover from the infection. But this does not change the result in any way given that the probability that a recovered person will get infected again is zero.

The country has a continuum of population, the size of which is normalized to one. At the start of a period, an election is held to select a decision maker or a leader. For simplicity, this paper abstracts away from the details of the actual voting process. It is assumed instead that an incumbent wins an election with a fixed probability $p \in [0, 1]$. Without term limits, this process may be taken as a rough approximation of the actual political process. The case with term limits will be discussed later.

Once elected, a leader decides how much material resource ($=m_t$) and humanitarian values ($=h_t$) to use for counterinsurgency purposes. The country's per-period payoff, which includes all costs and benefits associated with insurgency and counterinsurgency, is given by

$$-\{x_t - \phi(m_t, h_t)\}D - m_t - h_t.$$

The payoff of the leader is different from that of the rest of the population. More specifically, the leader's payoff is given by

$$\lambda[s - \{x_t - \phi(m_t, h_t)\}D - m_t - h_t].$$

Leaders enjoy "perks" when they are in office, the value of which equals $s > 0$ in the expression. A key assumption here is $\lambda > 1$. The idea is that leaders experience utility more intensely, while they are in office. This may be the case, for example, when leaders care about how they will remember their own presidency (or prime ministership) after they leave office. Voluntarily or involuntarily, former leaders are likely to recall their days as a leader more than other days in their lives. But this implies that the utility (or disutility) they receive as a leader should be given an additional weight in their lifetime utility computation. This is a consequence of the so-called "memory effect" or "endowment effect."[9] One may formalize this idea and derive the condition $\lambda > 1$ directly from the model primitives. The Appendix gives one such derivation based on differential memory effect.

Analysis

This section characterizes the equilibrium and identifies a political bias in the government's counterinsurgency policy. The analysis starts with a benchmark case in which policy decisions are made by an imaginary "social planner" maximizing the country's collective welfare. This case is compared against the model in which policy decisions are made by elected leaders. The model is then extended to incorporate the effect of term limits.

Social optimum

The social planner maximizes the present discounted value of the citizens' collective payoff. Recall that the leader and the rest of the population have different payoffs. In computing the aggregate payoff, however, the leader's payoff is of negligible significance because the leader's measure in the population is zero. Per-period payoff for the planner

[9] Tversky and Griffin (1991) also discuss a "contrast effect," which works in the opposite direction. A meal at an outstanding restaurant, for example, will have a lasting positive effect (endowment) but will also make later meals at lower quality restaurants less enjoyable (contrast). Hence, an implicit assumption in this paper is that the contrast effect is not large enough to outweigh the endowment effect. For the empirical evidence of these effects, see Liberman et al. (2009) and the references therein.

thus equals the payoff of the ordinary citizens. Given that the size of the population is normalized to 1, the collective per-period payoff equals $-\{x_t - \phi(m_t, h_t)\}D - m_t - h_t$.

Each period, the planner makes a decision, taking into account that its choice affects the size of active insurgents in the next period. The problem involves an inter-temporal trade-off, which is represented by the following dynamic programming equation:

$$W(x_t) = \max_{m_t, h_t} -\{x_t - \phi(m_t, h_t)\}D - m_t - h_t + \delta W(nf(h_t)). \tag{1}$$

The state variable of the problem is x_t because the planner's payoff at any given time depends ultimately on the number of active terrorists. The value function for the planner $(= W(x_t))$ is found by maximizing the sum of the current-period payoff $(= -\{x_t - \phi(m_t, h_t)\}D - m_t - h_t)$ and the discounted continuation payoff $(= \delta W(nf(h_t)))$. This is a dynamic problem because the current choice of h_t determines the continuation payoff through its effect on the next period's state $(= nf(h_t))$. The problem is also stationary in the sense that it does not depend directly on the time variable, t. This implies that one can focus on a stationary solution of the form $(m_t, h_t) = (m^\circ, h^\circ)$. As will become clear, stationarity is a common feature across all the problems examined in this paper. For ease of exposition, the time subscript will thus be omitted whenever possible.[10]

The inter-temporal trade-off faced by the planner can be made clearer by examining the optimality conditions for the maximization problem. At an interior solution, the first-order conditions are given as follows:

$$\phi_m(m^\circ, h^\circ)D = 1 \tag{2}$$

$$\phi_h(m^\circ, h^\circ)D = 1 - \delta nf'(h^\circ)W'(nf(h^\circ)). \tag{3}$$

The first equation shows that the marginal benefit $(= \phi_m(m^\circ, h^\circ)D)$ of increasing material resources m must be equal to its marginal cost (=1). Given that changing m does not affect the size of future insurgents, both cost and benefit arise only in the current period. This is not the case in the second equation. Taking the derivative with respect to h, one confirms that the marginal benefit $(= \phi_h(m^\circ, h^\circ)D)$ is still contemporaneous, but the marginal cost includes the future cost $(= -\delta nf'(h^\circ)W'(nf(h^\circ)))$ as well as the current cost (=1) term.

What is rather unusual about these conditions is that the equations do not include the state variable x as an argument. This follows from two simplifying assumptions on counterinsurgency production and the insurgent regeneration process. Recall that the model assumes that (i) the current size of active insurgents does not affect counterinsurgency production $\phi(\cdot,\cdot)$ and (ii) all active insurgents exit in one period. Although not the most realistic, these assumptions simplify the analysis greatly by making the solution (m°, h°) independent of the state variable.

This independence property can be exploited to further simplify the condition (3).[11] Given that m° and h° are independent of x, one can *partially* differentiate the right-hand

[10] An implicit assumption in the model is that both insurgency and counterinsurgency activities continue indefinitely. A possible extension would be to allow for the possibility that insurgents are completely defeated by the government. The difficulty with such a model is that it leads to a non-stationary problem that is considerably more difficult to analyze. It would be interesting to see how this and other changes in the model dynamics affect the main result of this paper.

[11] This is a stronger restriction than is necessary for the planner's problem because, at an interior optimum, $W'(\cdot)$ is equal to its partial derivative by the "envelope theorem" argument. In the political equilibrium examined later, however, such an argument does not work and the independence result does become necessary.

side of (1) to obtain the expression for $W'(\cdot)$. A straightforward computation confirms that this leads to

$$W'(x) = -D.$$

Substituting this into (3) gives

$$\phi_h(m^\circ, h^\circ)D = 1 + \delta n f'(h^\circ)D. \tag{4}$$

The right-hand side of (4) now shows more clearly that the marginal cost with respect to h is the sum of the current marginal cost (=1) and the "deferred" cost of increasing the size of active insurgents in the future. The condition requires that, at the optimum, the marginal benefit should be equal to this total marginal cost occurring over two periods.

Equilibrium without term limits

Actual counterinsurgency policy decisions are made by politicians. Given that elected leaders and their constituencies have different incentives, the decisions made in the equilibrium will be different in general from those made by a social planner. The following analysis examines this issue more formally within the theoretical framework developed so far. Special attention will be given to the effect of term limits, since their existence changes the incentives of the leaders.

Term limits are rare in countries with a *parliamentary* system but more common among countries with a *presidential* system. Suppose that there are no term limits. An incumbent can be reelected multiple times and, in principle, may serve indefinitely as leader of the country. Given that incumbents win an election with a constant probability (=p), the problem is stationary, i.e., leaders solve the same problem whenever they are in power. Using its recursive structure, one can formulate the problem in the following dynamic programming equations:

$$V(x) = \max_{m,h} \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta[pV(nf(h)) + (1-p)v(nf(h))] \tag{5}$$

$$v(x) = -\{x - \phi(m^*, h^*)\}D - m^* - h^* + \delta v(nf(h^*)), \tag{6}$$

where

$$(m^*, h^*) = \arg\max \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta[pV(nf(h)) + (1-p)v(nf(h))].$$

The incumbent's problem is given by (5). $V(x)$ is the value function for the incumbent leader determined by (5), while $v(x)$ is the value function for an ordinary citizen given by Eq. (6). The incumbent leader maximizes the sum of the current payoff $(= \lambda[s - \{x - \phi(m,h)\}D - m - h])$ and the discounted continuation payoff $(= \delta[pV(nf(h)) + (1-p)v(nf(h))])$. In the next period, the incumbent wins the election with probability p and receives the value $V(nf(h))$. With probability $1 - p$, the incumbent loses and receives $v(nf(h))$. The continuation payoff is obtained by taking the expectation of these two values. The value function for an ordinary citizen is constructed in a similar fashion. Since policy decisions are made by the leaders only, Eq. (6) does not involve maximization and $v(x)$ is determined by the leader's choice (m^*, h^*). Given that the probability that an ordinary citizen becomes a leader is zero, the continuation payoff in this case becomes $v(nf(h^*))$ with certainty.

The political equilibrium without term limits is characterized by the leader's optimality conditions. Assume that the solution (m^*, h^*) is in the interior. Then, the first-order condition for maximization is given by

$$\lambda\phi_m(m^*, h^*)D = \lambda \tag{7}$$

$$\lambda\phi_h(m^*, h^*)D = \lambda - \delta nf'(h^*)[pV'(nf(h^*)) + (1-p)v'(nf(h^*))]. \tag{8}$$

Equation (7) shows that the marginal benefit and the marginal cost with respect to the material resources should be equal at the optimum. The difference with (2) is that both marginal benefit and marginal cost are now multiplied by the same factor, λ. This follows from the fact that leaders bear the cost of counterinsurgency more intensively than ordinary citizens do. But the increases in the marginal benefit and marginal cost exactly offset each other, so that (2) and (7) become identical—dividing both sides of (7) by λ gives (2). This is not the case with (3) and (8). In (8), the marginal benefit $(= \lambda\phi_h(m^*, h^*)D)$ and the current marginal cost (=λ) are again scaled up by the same factor, λ. The deferred marginal cost, however, now takes two different values depending on whether the incumbent gets reelected in the next period or not.

Once again, (8) can be simplified further by using the fact that, in an interior equilibrium, the leader's choice (m^*, h^*) must be independent of the state variable x. This means that the derivatives $V'(x)$ and $v'(x)$ can be computed by partially differentiating (5) and (6). It is straightforward to confirm that $V'(x) = -\lambda D$ and $v'(x) = -D$. Substituting these into (8) gives the following condition:

$$\phi_h(m^*, h^*)D = 1 + \delta nf'(h^*)\left[p + \frac{1-p}{\lambda}\right]D. \tag{9}$$

This is a rescaled version of (8) where both sides of the equation are divided by the factor λ. The difference with (4) is that, for a given h, the deferred marginal cost is smaller than the one under the social optimum $\left(\delta nf'(h)\left[p + \frac{1-p}{\lambda}\right]D \le \delta nf'(h)D\right)$. This is because an incumbent leader, who may not get reelected in the next period, does not place as much weight on the deferred cost as the social planner would do.

Examining (9) reveals also that one can interpret the planner's problem as a special case of the incumbent's problem. This is confirmed by substituting $\lambda = 1$ into (9). The deferred marginal cost in (9) is then reduced to the one in (4). This should not be surprising because, when $\lambda = 1$, the planner's problem and the incumbent's problem become essentially the same. Compared to the planner's problem, the incumbent's objective function will still include an additional benefits or "perks" term (=λs). Adding a constant, however, merely increases the equilibrium payoff by a fixed amount but does not change the optimality conditions. The solution to the incumbent's problem will be exactly the same, therefore, as the one under the social optimum. What this shows is that the planner's problem is "nested" in the incumbent's problem.

It turns out that the leader's problem without term limits nests not only the planner's problem but also the incumbent's problem with term limits. With term limits, incumbent leaders in their last term will behave just as they would if the probability of reelection was zero and there were no term limits. This "nesting" feature makes the comparison of the three cases a rather simple exercise because one needs to look at the model without term limits and examine the effect of changes in the parameters λ and p. The following proposition summarizes this comparative statics result.

Proposition 1 *In the equilibrium without term limits, leaders use more material resources and humanitarian values for counterinsurgency when they assign more weight to the payoff during their tenure or when the probability of reelection is smaller.*

Proof In the Appendix.

As the leaders bear an increasingly larger cost compared to the rest of the population (λ increases), they choose to sacrifice humanitarian values more in the equilibrium (h increases). This is consistent with the fact that, in the leader's optimality condition, the deferred marginal cost is "discounted" by a factor $p + \frac{1-p}{\lambda}\,(<1)$ from its true social cost. An increase in λ will lower this discount factor, leading the leaders to use humanitarian values excessively without fully internalizing the deferred costs. An increase in p, on the other hand, has the opposite effect of raising the discount factor. As the chance of reelection looms larger, a leader will have more incentive to internalize the deferred cost and hence makes less use of humanitarian values. Given that the two inputs are complementary, humanitarian values and material resources should change in the same direction, i.e., they both should rise in equilibrium. The following proposition summarizes the main finding of this paper.

Proposition 2 *In the equilibrium without term limits, leaders use both material resources and humanitarian values excessively compared to the social optimum.*

This follows immediately from the fact that the planner's problem is equivalent to the leader's problem when $\lambda = 1$. The leader will thus use more resources than the social planner would do.

Equilibrium with term limits

The existence of term limits changes the leader's incentives. In their last term, for instance, leaders do not have much incentive to internalize the deferred cost of counterinsurgency. It seems natural thus to expect that term limits will exacerbate the leader's tendency to overuse resources. This intuition turns out to be correct, and it is confirmed formally in the following analysis.

Suppose now that an elected leader can serve for a maximum of two consecutive terms. A two-term limit is a simple and yet also common form of term limit. Although the result derived below assumes this particular kind of term limit, a more general conclusion can be drawn from this analysis, as will be discussed later.

In terms of solving the model, a two-term limit makes the structure of the problem a little more complicated. This is because one needs to set up two separate value functions for each term, given that an incumbent leader solves two different problems in the first and second terms. Let $V_1(x)$ ($V_2(x)$) be the leader's value function in the first (second) term in office. Also, let $v_1(x)$ ($v_2(x)$) be the value function of an ordinary citizen under a first-term (second-term) leader. The equilibrium is then represented by the following system of dynamic programming equations:

$$V_1(x) = \max_{m,h} \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta[pV_2(nf(h)) + (1-p)v_1(nf(h))] \quad (10)$$

$$v_1(x) = -\{x - \phi(\tilde{m}_1, \tilde{h}_1)\}D - \tilde{m}_1 - \tilde{h}_1 + \delta\left[pv_2\left(nf\left(\tilde{h}_1\right)\right) + (1-p)v_1\left(nf\left(\tilde{h}_1\right)\right)\right] \quad (11)$$

$$V_2(x) = \max_{m,h} \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta v_1(nf(h)) \quad (12)$$

$$v_2(x) = -\{x - \phi(\tilde{m}_2, \tilde{h}_2)\}D - m - h + \delta v_1(nf(\tilde{h}_2)), \tag{13}$$

where

$$(\tilde{m}_1, \tilde{h}_1) = \arg\max \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta[pV_2(nf(h)) + (1-p)v_1(nf(h))]$$

$$(\tilde{m}_2, \tilde{h}_2) = \arg\max \lambda[s - \{x - \phi(m,h)\}D - m - h] + \delta v_1(nf(h)).$$

The leader's problem in the first term is given by (10). Compared to its counterpart (5) without term limits, it has the same current payoff but a different continuation value. The continuation value is again given by the expected value function in the next period. With probability p, an incumbent gets reelected and receives the leader's second-term value $V_2(nf(h))$. With probability $1 - p$, on the other hand, the incumbent loses the election and receives the value for an ordinary citizen under a first-term leader ($= v_1(nf(h))$). The value function $v_1(x)$ is given in (11), which is again different from its counterpart (6) in its continuation value. With probability p, an ordinary citizen will be under a second-term leader in the next period, the payoff of which equals $v_2(nf(\tilde{h}_1))$. With probability $1 - p$, there will be a new first-term leader, and an ordinary citizen will get the payoff $v_1(nf(\tilde{h}_1))$. The value functions under a second-term leader are determined similarly and shown in (12) and (13). In this case, the leader's value function ($=V_2(x)$) and an ordinary citizen's value function ($=v_2(x)$) share the same continuation value. This is because, in the next period, everyone in the country will become an ordinary citizen under a new first-term leader.

Assuming that the solutions are in the interior, one can characterize the equilibrium by the first-order conditions of the leader's problem. This leads to the following four conditions, which correspond to (7) and (8) in the equilibrium without term limits:

$$\lambda\phi_m(\tilde{m}_1, \tilde{h}_1)D = \lambda \tag{14}$$

$$\lambda\phi_h(\tilde{m}_1, \tilde{h}_1)D = \lambda - \delta nf'(\tilde{h}_1)[pV_2'(nf(\tilde{h}_1)) + (1-p)v_1'(nf(\tilde{h}_1))] \tag{15}$$

$$\lambda\phi_m(\tilde{m}_2, \tilde{h}_2)D = \lambda \tag{16}$$

$$\lambda\phi_h(\tilde{m}_2, \tilde{h}_2)D = \lambda - \delta nf'(\tilde{h}_2)v_1'(nf(\tilde{h}_2)). \tag{17}$$

As was the case before, these conditions are independent of the state variable, x. The derivatives of the value functions can be found, therefore, by partially differentiating (10) and (12). This gives $V_j(x) = -\lambda D$ and $v_j(x) = -D$ for $j = 1, 2$. By substituting these into (15) and (17), one obtains

$$\phi_h(\tilde{m}_1, \tilde{h}_1)D = 1 + \delta nf'(\tilde{h}_1)\left[p + \frac{1-p}{\lambda}\right]D \tag{18}$$

$$\phi_h(\tilde{m}_2, \tilde{h}_2)D = 1 + \delta nf'(\tilde{h}_2)\frac{D}{\lambda}. \tag{19}$$

A quick examination of the conditions confirms that (14) and (18), which determine the leader's first-term choice, are identical to (7) and (9). This implies that, in their first term, leaders will choose the same policy with or without term limits. It should not be surprising that a term limit has a limited effect on the leader's first-term choice. The fact that it has no effect at all, however, is due to the model's simplifying assumptions on state transition. As has been shown already, the leader's choice becomes independent of the state variable under these assumptions. This reduces the leader's problem into a sequence of two-period problems. In this case, a term limit, the consequence of which occurs in two periods, does not affect the leader's choice in the first term.

The conditions (16) and (19), on the other hand, are not equivalent to (7) and (9). The difference lies in the deferred cost in (19) $\left(= 1 + \delta n f'(\cdot)\frac{D}{\lambda}\right)$, which is not the same form as the one in (9) $\left(= 1 + \delta n f'(\cdot)\left[p + \frac{1-p}{\lambda}\right]D\right)$. Examining the two expressions reveals, however, that (19) becomes equivalent to (9) if evaluated at $p = 0$. This is an intuitive result. If the probability of reelection is zero, the current term is the last term for an incumbent leader even if there are no formal term limits in place. The leader's problem without term limits thus nests the one with term limits.

Once the underlying relationship between the two problems has been established, comparing the two corresponding equilibria becomes rather straightforward. Recall that, without term limits, leaders pursue a more aggressive counterinsurgency policy as the probability of reelection decreases. Leaders' second-term problem, however, is equivalent to their problem without term limits but the probability of reelection is at its minimum. This implies that leaders will use more resources in their second term than they would in the equilibrium without term limits. The following proposition summarizes this finding.

Proposition 3 *In the first term of the equilibrium with term limits, leaders use the same amount of material resources and humanitarian values as they would with no term limits. In the second term, leaders use more material resources and humanitarian values than they would with no term limits.*

Before closing this section, it is worth noting that the result can be extended to a more general n-term limit without much difficulty. As the previous analysis shows, what drives the result is the fact that leaders have a different incentive in their last term. As long as the simple state transition is maintained, the leader's problem will have a two-period structure as well under an n-term limit. This implies that the leader's last-period problem will be equivalent to the second-period problem under a two-term limit. The first $n - 1$ terms, on the other hand, will be equivalent to the first-period problem under a two-term limit. Then, it is not difficult to expect that leaders will use more resources in their last term but the same amount of resources in their first $n - 1$ terms.

Discussion

Given that politicians tend to pursue an overly aggressive counterinsurgency policy, what can be done to correct this bias? This is a rather complex problem and this paper does not aim to offer a complete solution. The theoretical framework developed so far, however, suggests an interesting perspective on how such a solution should be structured.

Optimal constraint

Consider the case without term limits. Previous analysis showed that a leader uses too much material resources and humanitarian values compared to the social optimum. A question then arises whether it is theoretically possible to move the equilibrium (m^*, h^*) toward the social optimum (m°, h°). Conceptually, this can be done by imposing a constraint on the leader's choice. The leader's problem is then transformed from an unconstrained into a constrained optimization problem.

To explore how such a scheme works, it is helpful to visualize the leader's choice in the equilibrium. The problem is that the objective function in (5) contains two unknown functions, $V(\cdot)$ and $v(\cdot)$. Given that $V'(x) = -\lambda D$ and $v'(x) = -D$, however, the two value functions are linear, so that they can be determined up to a constant. This implies that

$$V(x) = -\lambda Dx + C$$

$$v(x) = -Dx + c,$$

where C and c are constants to be determined. Substituting these into (5) gives

$$\max_{m,h} \bar{V}(m,h) \equiv \lambda[s - \{x - \phi(m,h)\} - m - h] - \delta nf(h)\{p\lambda + (1-p)\}D + \bar{C}, \qquad (20)$$

where

$$\bar{C} = \delta\{pC + (1-p)c\}.$$

A quick examination of the expression reveals that the problem is now transformed into a simpler two-period problem.

With a workable objective function on hand, one can depict the leader's problem on the (m, h) plane. Figure 1 shows three "iso-value" curves of $\bar{V}(m,h)$ and the equilibrium policy choice (m^*, h^*). Iso-value curves are defined as the collection of points (m, h) corresponding to the same value of the function $\bar{V}(m,h)$:

$$\bar{V}(m,h) = k(\text{constant}).$$

Collectively, the curves represent the map of the objective function, in which the peak corresponds to the unconstrained maximum (m^*, h^*).

The leader's choice will change when different constraints are introduced into the model. In the current framework, the constraints are in general of the form

$$\Gamma(m,h) \leq 0.$$

The question now is whether one can induce the leader to pick the social optimum (m^*, h^*) by choosing an appropriate constraint. It turns out that there is such a constraint and, perhaps surprisingly, it has a very simple form.

This is easily confirmed by examining the shape of the iso-value curves. By totally differentiating the right-hand side of (20), one can obtain the slope of the iso-value curves. It is straightforward to verify that the slope is given by

$$\frac{dh}{dm} = -\frac{\phi_m(m,h)D - 1}{\phi_h(m,h)D - 1 - \delta nf'(\cdot)\left[p + \frac{1-p}{\lambda}\right]D}.$$

One thing worth noting from this expression is that the slope takes a value of zero at the social optimum. This is because, evaluated at (m°, h°), the numerator of the right-hand side is zero by (2), but the denominator is negative by (3). Graphically, this implies that the iso-value curve passing through the social optimum is flat at the point, as shown in Fig. 1.

The graphical representation of the equilibrium suggests a natural candidate for the optimal constraint. Consider $h \leq h^\circ$. The constraint is shown as the shaded area in Fig. 1. Given that the iso-value curve is flat at the social optimum, the curve must be tangent to the boundary of the constraint $h = h^\circ$ at (m°, h°). Under the constraint, therefore, this implies that the objective function $\bar{V}(m,h)$ will indeed be maximized at the social optimum. The intuition behind this result is rather simple. Recall that the equilibrium optimality condition with respect to material resources is the same as the one in the social optimum. The

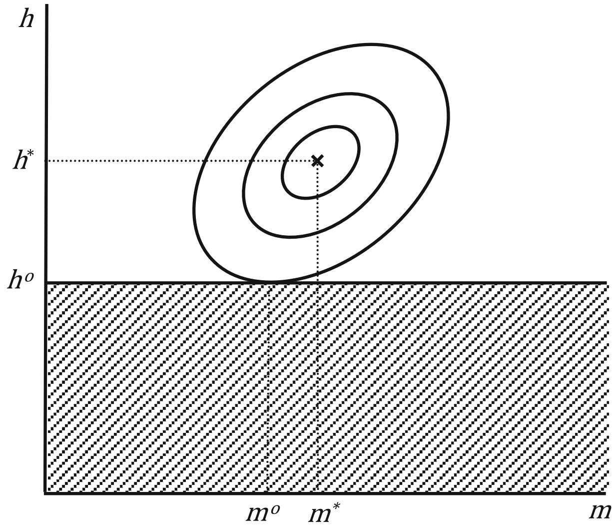

Fig. 1 The equilibrium with and without the optimal constraint. The optimal constraint is shown as the *shaded* area. The unconstrained equilibrium (m^*, h^*) arises at the peak of the iso-value map. The iso-value *curve* is tangent to the boundary of the constraint at the social optimum (m°, h°) showing that the equilibrium with the optimal constraint coincides with the social optimum

political bias arises only because leaders have a wrong incentive in their choice of humanitarian values. Once the distorted incentive is corrected by the constraint, leaders will use the right amount of material resources as well as humanitarian values. All one needs to do, therefore, is to address the problem at the source.

The law of war

Civilians are supposed to be protected during armed conflict by the law of war. Known as the "targeting law," it requires that: (i) civilians should not be made the target of attack (principle of *distinction*) and (ii) even military objectives may not be attacked if an attack is expected to cause excessive civilian casualties or damage compared to the anticipated military advantage (principle of *proportionality*) (Greenwood 2003). Setting aside the issue of its enforceability, one may ask whether the existing law provides a useful guideline for controlling the political bias. A close examination of the law reveals that it fails to provide a proper constraint to induce the optimal protection of civilians.

The main treaty regulating the matter of civilian protection in armed conflict is the First Additional Protocol to the Geneva Conventions ("Protocol I"). Protocol I mandates that an attacking party should "do everything feasible" to verify that the targets are neither civilians nor civilian objects and "take all feasible precautions" to avoid civilian casualties and damage.[12] Taken at face value, these clauses can be prohibitively costly to comply with, making them impossible to follow. In practice, therefore, they are interpreted as standards requiring "reasonable care" on the part of the affected parties, rather than as strict rules (Waxman 2008). Exactly what constitutes reasonable care should be determined by weighing the value of civilian lives and property against the cost of protecting them. This inherent trade-off associated with civilian protection is recognized more explicitly in the principle of proportionality. Protocol I specifies that collateral

[12] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), art.57, 8 June 1977, 1125 U.N.T.S. 17512.

damage should not be "excessive in relation to the concrete and direct military advantage anticipated."[13]

The significance of these restrictions becomes clearer when they are cast in the current theoretical framework. The "reasonable care" standard, for instance, can be thought of as a constraint regulating how humanitarian values should be substituted for material resources.

Recall that the marginal rate of substitution in production, which is the slope of the production indifference curve, measures the substitutability of one input in terms of the other. What the reasonable care standard does is to put a limit on the substitution between humanitarian values and material resources. The constraint thus imposes an upper bound on the marginal rate of substitution, i.e.,

$$MRS(m,h) = \frac{\phi_m(m,h)}{\phi_h(m,h)} \leq b. \tag{21}$$

The principle of proportionality, on the other hand, requires that humanitarian values should not be overused compared to their objective—reducing the size of active insurgents. What it regulates is thus the minimum "productivity" with respect to an input (=humanitarian values). The corresponding constraint can be written then as

$$\frac{\phi(m,h)}{h} \geq b. \tag{22}$$

The two constraints not only are different in form but also share a common feature that makes them quite similar in effect. This is because the two measures—the marginal rate of substitution and the productivity—are closely related to the amount of material resources used in production. Given the complementarity between the two inputs, increasing the usage of material resources, for example, will lower the marginal rate of substitution: it decreases the numerator (=marginal product of material resources), while increasing the denominator (=marginal product of humanitarian values). Increasing material resources, on the other hand, raises productivity with respect to humanitarian values. By increasing material resources, therefore, one may relax both constraints at the same time without changing the usage of humanitarian values.

The two constraints (21) and (22) can be reduced to simpler "ratio" conditions when the production function $\phi(m, h)$ is homogeneous of degree one. The production function is homothetic in this case so that the marginal rate of substitution depends only on the ratio h/m. Also, given that the production function is concave, the production indifference curve is convex, which means that the marginal rate of substitution is increasing in h/m. But this implies that (21) is reduced to

$$\frac{h}{m} \leq b^{RC}. \tag{23}$$

The constraint (22), on the other hand, can be rewritten as

$$\phi(m/h, 1) \geq b$$

given that the production function is homogeneous of degree one. Since the production function is increasing in both of its arguments, this implies that m/h should be bounded below (or, equivalently, h/m is bounded above). This leads to the simplified expression for (22)

[13] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), art.51, 8 June 1977, 1125 U.N.T.S. 17512.

$$\frac{h}{m} \leq b^{PP}. \quad (24)$$

The effects of implementing the law of war can be examined now in the familiar constrained optimization framework. The leader's problem in this case is to solve the reduced problem (20) with two constraints (23) and (24). Notice that the two inequality constraints are convex cones in the $m{-}h$ plane. This means that only one of the two will bind in equilibrium. It is straightforward to confirm that (23) (24) will bind if $b^{RC} \leq b^{PP}$ ($b^{PP} < b^{RC}$), as it becomes the stricter of the two constraints.

The leader's choice under the inequality constraint is depicted in Fig. 2. The figure shows the constrained optimum (m^r, h^r) as well as the social optimum (m^o, h°) and the political equilibrium (m^*, h^*). The shaded area corresponds to the binding constraint, which is drawn to pass through the social optimum. It is clear from the figure that the given constraint does not induce the social optimum: the leader will still overuse material resources as well as humanitarian values. Given that the iso-value curve is flat at the social optimum, it is also evident that a ratio constraint, no matter what the slope is, cannot implement the first best.

The intuition for this result is rather simple. The root cause of the problem is the leader's tendency to overuse humanitarian values. The optimal constraint deals with this problem at the source by placing an "absolute" limit on the usage of humanitarian values. But the law of war, as it exists now, imposes a "relative" constraint regulating the ratio of inputs. When the substitution rate or the productivity is set at the socially optimal level, which is the case shown in Fig. 2, the leader will still choose to use humanitarian values excessively. For this purpose, however, a leader has to use more material resources as well in order to keep the ratio within the bounds.

It is worth noting that this problem is recognized by practitioners already. The International Committee of the Red Cross notes that

> [t]he idea has also been put forward that even if they are very high, civilian losses and damages may be justified if the military advantage at stake is of great importance…the Protocol does not provide any justification for attacks which cause extensive civilian losses and damages. Incidental losses and damages should never be extensive (Sandoz et al. 1987, p. 626).

The analysis so far suggests that civilian losses and damages are likely to become "extensive" indeed. It seems questionable though whether all the signatories to Protocol I will share this interpretation of the law by the International Committee of the Red Cross.

Concluding remarks

The key lesson from this theoretical exercise is that the myopic interest of politicians needs to be checked. Existing international law seems inadequate in this regard. It seems that the law has to be reworked so as to correct the incentive for excessive civilian killing.

Then, in principle, the court may assume a more proactive role in the implementation of counterinsurgency policy. Historically, the court has played a rather passive role in national security matters by exercising "judicial deference" (Posner 2006). In a recent decision,[14] however, the U.S. Supreme Court ruled that alleged terrorists are entitled to due

[14] *Hamdan v. Rumsfeld* (548 U.S. 557 [2006]).

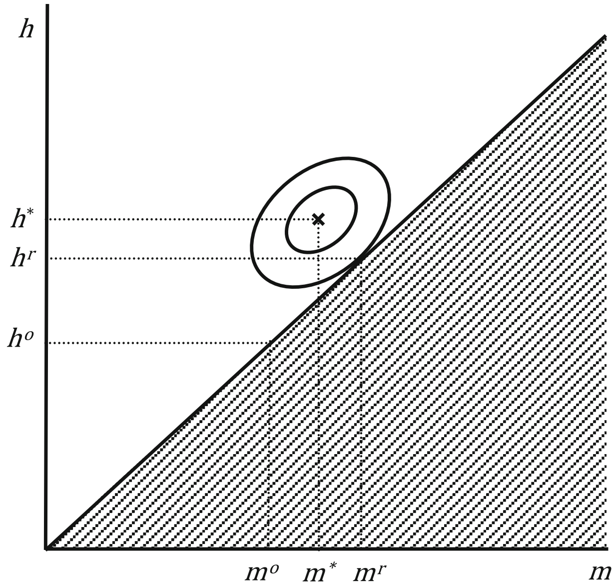

Fig. 2 The equilibrium under the law of war. The constraint imposed by the law of war is shown as the *shaded* area. The equilibrium under the law of war (m^r, h^r) arises where the iso-value *curve* is tangent to the boundary of the constraint. Given the positive slope of the boundary, the law of war fails to implement the social optimum ($m°$, $h°$)

process rights under the Geneva Conventions of 1949. Protocol I, although widely accepted as customary international law, has not been ratified by the United States. It seems unlikely that the court will address politically sensitive issues such as civilian deaths any time soon.

This paper shows that liberal democracies are prone to excessive civilian killing. But this does not necessarily mean that autocracies tend to kill fewer civilians than democracies. Respect for basic human rights, for example, may constrain leaders in democracies from killing enemy civilians.[15] The relation between regime type and civilian casualties seems ambiguous, which is consistent with the existing empirical studies.[16]

In order to keep the analysis tractable, this paper abstracts away from institutional aspects of democracy as well as the reality of the actual political process. The agents in the model are also assumed to be homogeneous in their preference. Incorporating such details into the set up will enrich the model and strengthen the analysis. It would be interesting to see how these extensions change the main results of this paper.

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Appendix

Derivation of Payoffs from a Utility Function with Memory Effects

Define a state variable $\sigma_t \in \{0, 1\}$ such that $\sigma_t = 1$ if a person is a leader in period t and $\sigma_t = 0$ otherwise. Also, let u_t be the utility experienced in period t. The lifetime utility is given by

[15] See, for example, Rummel (1995) for the evidence.

[16] See Downes (2007), Valentino et al. (2004), (2006).

$$U(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots) = u_0 + \delta[\rho(\sigma_0)u_0 + u_1] + \delta^2\left[\{\rho(\sigma_0)\}^2 u_0 + \rho(\sigma_1)u_1 + u_2\right] + \ldots.$$

Due to the memory effect, the utility "experienced" in the current period has a lasting effect, as it will be "recalled" in future periods. Memory decays at a constant rate, with a decay factor $\rho(\sigma_t) < 1$. Assume $\rho(0) \leq \rho(1)$; that is, memories acquired as a leader have a stronger impact than ones acquired as an ordinary citizen. Also, assume $\delta\rho(1) < 1$ so that the infinite sum is well defined. The lifetime utility is then reduced to

$$U(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots) = \frac{1}{1-\delta\rho(\sigma_0)}u_0 + \frac{1}{1-\delta\rho(\sigma_1)}\delta u_1 + \frac{1}{1-\delta\rho(\sigma_2)}\delta^2 u_2 + \ldots.$$

Let $K \equiv \frac{1}{1-\delta\rho(0)}$ and $\lambda(\sigma_t) \equiv \frac{1-\delta\rho(0)}{1-\delta\rho(\sigma_t)}$. It is straight forward to confirm that $1 = \lambda(0) \leq \lambda(1)$. Define $\tilde{U}(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots)$ such that

$$\tilde{U}(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots) \equiv \lambda(\sigma_0)u_0 + \delta\lambda(\sigma_1)u_1 + \delta^2\lambda(\sigma_2)u_2 + \ldots.$$

Notice that $\tilde{U}(\cdot;\cdot)$ is the utility specification used in the paper with $\lambda(\sigma_1) \equiv \lambda$. But one can easily confirm that

$$U(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots) = K\tilde{U}(u_0, u_1, \ldots; \sigma_0, \sigma_1, \ldots).$$

This shows that the two utility functions $U(\cdot;\cdot)$ and $\tilde{U}(\cdot;\cdot)$ represent the same preference.

Proof of Proposition 1

Totally differentiating the first-order conditions with respect to m^*,h^*, λ, and p gives

$$\phi_{mm}dm^* + \phi_{mh}dh^* = 0$$

$$\phi_{mh}dm^* + \phi_{hh}dh^* - \delta nf'' \left[p + \frac{1-p}{\lambda}\right]dh^* = -\delta nf' \frac{1-p}{\lambda^2}d\lambda + \delta nf' \frac{\lambda - 1}{\lambda}dp.$$

Since $\phi_{\mathrm{mm}} < 0$ by assumption, the first equation implies that dm^* and dh^* should have the same (opposite) sign if $\phi_{mh} > 0(\phi_{mh} < 0)$. To show $\frac{\partial h^*}{\partial \lambda} > 0$, set $dp = 0$ and substitute $dm^* = -\frac{\phi_{mh}}{\phi_{mm}}dh^*$ into the second equation. Then, after rearranging the terms, one obtains

$$\frac{\partial h^*}{\partial \lambda} = \frac{-\phi_{mm}\delta nf' \frac{1-p}{\lambda^2}}{-(\phi_{mh})^2 + \phi_{mm}\phi_{hh} - \phi_{mm}\delta nf''\left(p + \frac{1-p}{\lambda}\right)}.$$

The numerator of the right-hand side is positive because $\phi_{mm} < 0$ and $f' > 0$. The denominator is also positive because the concavity of $\phi(\cdot,\cdot)$ implies $-(\phi_{mh})^2 + \phi_{mm}\phi_{hh} > 0$ and $f'' > 0$ by assumption. This leads to $\frac{\partial h^*}{\partial \lambda} > 0$. Similarly, to see that $\frac{\partial h^*}{\partial p} < 0$, set $d\lambda = 0$ and substitute $dm^* = -\frac{\phi_{\mathrm{mh}}}{\phi_{mm}}dh^*$ into the second equation. After rearranging the terms, this gives

$$\frac{\partial h^*}{\partial p} = \frac{\phi_{mm}\delta nf' \frac{\lambda-1}{\lambda}}{-(\phi_{mh})^2 + \phi_{mm}\phi_{hh} - \phi_{mm}\delta nf''\left(p + \frac{1-p}{\lambda}\right)}.$$

Given that the numerator is positive and $\lambda > 1$, $\frac{\partial h^*}{\partial p} < 0$ as claimed. □.

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