A Review of War Costs in Iraq and Afghanistan

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Abstract

As of this writing, the wars in Iraq and Afghanistan are in their eighth and tenth years, having accrued nearly a trillion dollars in direct military costs. I review the history of cost forecasts for these ongoing engagements, highlighting the differences across them in scope and accuracy, assessing the methods and practice of cost forecasting, and exploring the implications of the war costs themselves. Besides the mostly unanticipated length and breadth of the military conflicts themselves, a related and equally important component of costs is the life cycle of costs associated with caring for veterans. The forecasts we have of such costs imply high levels of public spending per veteran and very high levels of costs associated with pain and suffering per veteran, as high as 10–25 percent of lifetime wealth. I also discuss the methods and motivations associated with war cost forecasts by comparing them with other types of aggregate forecasts, which are prone to similar types of errors. The history of war cost forecasts calls for a concerted effort to improve them by increasing their frequency and transparency.

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As of the summer of 2010, the wars in Iraq and Afghanistan were entering their eighth and tenth years respectively. The cumulative total in direct military costs associated with these conflicts exceeded $750 billion in the summer of 2009 (Belasco, 2009) and has likely reached $800 billion based on trends in monthly spending. Reductions in force strength are currently underway in Iraq, but troop levels have surged in Afghanistan and are likely to remain high at least through the summer of 2011. One notable study estimated that the total present value of all present and future costs associated with these wars might ultimately exceed three trillion dollars (Stiglitz and Bilmes, 2008), but other studies of costs have offered a wide range of estimates (Nordhaus, 2002; Wallsten and Kosec, 2005; Bilmes and Stiglitz, 2006; Bilmes, 2007; Sunshine, 2007; Goldberg, 2007; Tanielian and Jaycox, 2008; Davis, Murphy and Topel, 2009). I list these studies and a subset of their forecasts in Table 1. In this paper, I review the sources of differences across these forecasts and explore implications for the methods and practice of war cost forecasting. I also assess the relative magnitude of present and future war costs in Iraq and Afghanistan

Military actions are costly in many ways for a wide variety of groups, and accurate cost forecasts are important for informing policy. From an economic perspective, assessing the costs of warfare relative to its benefits should be a central component of the decision to engage in warfare. Still, some scholars argue that warfare is an inherently irrational outcome whose costs tend to exceed the benefits, even to those who win (Tuchman, 1984; Gartzke, 1999). But even if war cost forecasts do not appreciably affect policy making, they are still useful for assessing well-being.

Important characteristics of any cost forecast are the geographic and temporal domains over which costs are measured. A forecast of all direct U.S. military costs of actions in Iraq and Afghanistan would include only the funds required to deploy and maintain troops and equipment for the length of deployment. It would omitting many other overt budgetary costs such as those associated with compensation for U.S. veterans' disability and death. Another forecast domain might encompass all the incurred liabilities of the U.S. federal government,

regardless of what form they take, from the beginning of the military action through to the indefinite future. A third domain might cover costs borne by all U.S. individuals and institutions, over all periods of time. A fourth could add individuals and institutions in Iraq and Afghanistan or in other affected countries. Cost domains often differ dramatically across estimates, which restricts comparability. The largest extant cost estimate of $3 trillion (Stiglitz and Bilmes, 2008) covers one of the broadest domains. Rather than representing just one or two years' worth of costs, it is a sum of all future costs.[1] The estimate is also broad in the sense that the authors attempt to measure all of the costs associated with the wars in Iraq and Afghanistan that are borne by U.S. individuals, institutions, and governments, rather than just the direct military costs alone.

In the sections that follow, I discuss in greater detail this estimate and other extant cost forecasts, comparing and contrasting their domains and assumptions. Then I assess the relative size of these costs, comparing them with other government obligations, with our means to pay them, and with the population of veterans who bear the private costs. Finally, I provide a discussion of the methods and accuracy of cost forecasting, suggesting techniques to improve the quality and frequency of those estimates.

The Attribution, Timing, and Scope of War Costs

There are two important and largely separate dimensions of war costs: the life cycle, or temporal nature of costs; and the scope or breadth of costs across individuals affected by warfare. Extant forecasts often differ across both dimensions. Of the two, the life cycle of costs is less well understood and is an often understated element of future costs associated with warfare. Because the life cycle of costs can be relatively long, it can also become difficult to attribute costs to war when they occur far off in the future.

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[1]Future costs are expressed in terms of their present value, or the dollar amount that could be invested today at typical market rates so that after accumulating interest, it would equal the future amount. Measured this way, the present value of total costs is the dollar amount that the government would have to place in an investment account today in order to pay off all future costs.

Attributing Costs to War

Formally identifying costs as attributable to warfare requires specifying a counterfactual: had there been no wars in Iraq and Afghanistan, how much lower would costs have been? The answer is most clear in the case of deployment-related military spending, which would not have occurred without the deployment. It is somewhat less clear for military spending unrelated to deployment, since it may have occurred even without the conflict, though perhaps in a lesser amount.

In the case of a combat-related injury, it is clear that without a war, and thus without the injury, its cost probably would have been zero.[2] The system of VA disability compensation is designed to identify and measure the severity of combat-related injuries in order to reimburse the veteran for lost wages deriving from participation in war. But a large component of veterans' health benefits is the routine health care associated with aging. Had the veteran not served, regardless of whether the war occurred or not, these routine costs would have been borne by the public through Medicare, or by the veteran through private insurance.[3] Such routine health care costs should not be counted as part of war costs because they would have occurred in any event. In practice, however, it is difficult to decompose VA health spending into parts that are attributable to aging versus wartime service (Orszag, 2008b). Studies focusing on the costs of particular war-related conditions could inform such a decomposition, but they are rare and limited enough that broader surveys of war-related spending are often unable to strike a fine distinction between war-related and other

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[2]It is possible that some war-zone characteristics could actually improve some characteristics of the risk environment faced by soldiers, but it is unlikely the improvements would ever outweigh the heightened risk of combat-related injury and death in an active war zone. Buzzell and Preston (2007) find that among troops in Iraq between 2003 and 2006, death rates from non-combat violent deaths were more than 25 percent lower than those faced by U.S. civilians at similar ages and sex. Death rates from disease were almost two-third lower among troops in Iraq. But mortality risks from combat outweighed these beneficial effects, resulting in a total mortality rate for troops that was three times as high as for comparable civilians. Although it is conceivable that the net cost of warfare could actually be negative if combat-related injuries and deaths were somehow rare enough relative to any improvement in the risk environment, such a scenario is unlikely.

[3]If the comparison is between Medicare or the VA paying for care, there is probably little difference in the quantity and total cost of medical care. There could be a difference for any care utilized before the age of 65, which is probably less subsidized and therefore lower outside the VA.

treatments. As a result, aggregate estimates of the net costs of warfare may be biased upward if war results in unmeasured cost shifting, such as out of Medicare and into the system of VA health benefits.

The Life Cycle of Costs

The difficulty of attributing costs of future VA health benefits to warfare speaks to the long life cycle of war-related costs, far past the end of hostilities. While armed conflicts can last many years, their impacts will extend far beyond the period of the conflict because of the impacts on veterans, their families, and communities. Even if the wars in Iraq and Afghanistan were to end tomorrow, capping direct military costs immediately, cumulative war costs would continue to rise over time because there are several ways in which war costs are persistent or semi-permanent in modern societies. Put simply, the human burdens associated with warfare range from permanent to semi-permanent over the lifetimes of combatants, their families, and other people who are directly impacted. Combat-related wounds are only the clearest example of burdens that may be permanent during the remaining life of the afflicted individual. An array of research findings lead us to the conclusion that combat exposure and deployment have many other long-reaching and long-lasting effects on human outcomes (Institute of Medicine, 2010; MacLean, 2010).

As discussed in a recent report by the Institute of Medicine (2010), trends in publicly provided veterans' health and disability benefits can illustrate how such costs of war are long-lived. Aggregate payments of these benefits to veterans of a particular war typically follow an inverted U-shape over time, beginning low before rising and reaching a peak, then tapering off quickly. This is illustrated in Figure 1, which plots a hypothetical example decomposed into functional parts. In panel A, which depicts aggregate spending on a veteran cohort as a function of its age, the maximum utilization or payout rate for a cohort of veterans aged 25 at the end of hostilities reaches its maximum some 50 years later, when the cohort is 75. Costs reach a peak long after hostilities cease either by altering per capita need, or by

altering headcounts, or the number of veterans in a birth cohort that are actually receiving benefits. Both channels are important, and I discuss each below.

A primary reason for growth in per capita need is that treatment costs per veteran in the system rise naturally with age; older individuals are more likely to suffer from multiple conditions that require intervention. For all individuals, the period immediately before death is the most costly (Lubitz and Riley, 1993; Miller, 2001). Therefore, over time, the veteran cohort will become more costly solely because it is aging within the system.[4] Rising costs of medical treatment over time will also contribute to increases in per capita costs. The annual growth in average health spending has exceeded the growth in average incomes by 2 to 3 percent in recent decades (Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2009). Such dynamics is depicted in panel B of Figure 1, which illustrates utilization by a typical member of a veteran cohort. That individual initiates claims at some age past the age at separation, becomes more costly over time for the reasons stated, and then dies at the age suggested by average remaining life expectancy of the cohort.

Another reason why costs tend to peak long after the end of hostilities is because headcounts, or utilization rates, within a veteran cohort rises over time. That dynamic reflects a variety of factors, but little is known about which are most salient. Some health impacts of military service may initially be latent, revealing themselves only much later through the natural course of aging, although that is not the case with most physical injuries nor with psychopathologies. It is also possible that injured veterans may not initially seek treatment that does not greatly impair their functioning, but seek treatment only when it does become burdensome. Some injured veterans may distrust the VA system and try to avoid it as long as possible. Other veterans may not at first fully understand their entitlements to benefits.

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[4]A challenge naturally arises in attributing such costs to warfare per se rather than to the natural course of aging. As I discuss in the next section, only the costs of treating diseases associated with wartime service should be included in a measure of the cost of warfare, but it is often difficult to measure those distinctly. Veterans in the VA medical system often receive care that would otherwise be covered by private insurance or Medicare, for example. I can only acknowledge this problem and surmise that the costs of treating service-connected diseases surely also increase with age.

Bottlenecks in the VA system could contribute to rising usage rates over time within cohorts, if those bottlenecks were persistent rather than relatively brief. Any of those factors could increase the number of veterans within a particular cohort who receive benefits.

Mortality in the veteran cohort, shown in panel C of Figure 1, is responsible for reductions in benefits after the peak. Like the rest of the population, veterans die off gradually rather than all at once, and it is only after the cumulative force of mortality has become great enough relative to the forces that are increasing need that aggregate claims will begin to fall.

Figure 1 suggests that a long-term perspective is vital to a complete assessment of the costs of armed conflict. In the short run, a variety of factors will keep the costs associated with service needs deceptively low, including the youth and vibrancy of the average veteran, the potential latency of service-related health conditions, bottlenecks in access to services, and the relatively inexpensive cost of care today versus care tomorrow. A thorough assessment of costs cannot ignore the vast increases in service needs that are sure to emerge as veteran cohorts age.

These patterns are evident in data on benefits, in both the number of veterans on disability and pension rolls and in total real spending, which is a function of the number of veterans and the compensated severity of their disability or need. Figures 2 and 3 depict data on disability headcounts and total spending reported by the Institute of Medicine (2010). Figure 2 shows the number of veterans by cohort who were drawing disability benefits or pensions since 1950, and Figure 3 depicts real total spending by cohort, or the product of the number of veterans and their cohort-specific average benefit in each year. Trajectories in both figures follow the basic inverted-U shape shown in the top Panel of Figure 1. The rate of decline through age is noticeably faster in the head counts shown in Figure 2 than in the total spending shown in Figure 3. This is because while the force of mortality accelerates, per capita usage is still rising for reasons I discussed earlier.

In both figures, the World War II cohort stands out as the largest both in terms of claims and spending, and also as the one for which there is the most historical data. For that cohort,

total real benefits and veterans on the disability payroll both appeared to peak around 1980, more than 30 years after the end of hostilities. The figures also show that the needs of the World War I cohort, which are currently the second highest on record, peaked around 1965, almost 50 years after the end of that war. Patterns among veterans of the Korean Conflicts are somewhat less clear, with the number of veterans peaking around 1978, or 25 years after the war, but with total real benefits remaining almost stable afterward rather than falling. The needs of Vietnam veterans are still rising in these data, which end in 2006, and the disability needs of Gulf War veterans, a group that technically includes OEF and OIF veterans in these data, similarly show rapid increases thus far.

The Scope and Definition of War Costs

Veterans' health and disability benefits comprise only the most overt long-term costs of war. They are indicators of latent sources, namely the physical and psychological impacts of military service on veterans. Government spending on disability benefits represents the publicly compensated part of the cost of the underlying affliction associated with those impacts, and the degree of compensation it represents is unclear.

It is useful to itemize war costs by payer in order to better understand their incidence; the uncompensated pain of war-related injuries would be a cost borne fully by injured veterans, for example. The total costs of war comprise public costs or budgetary costs, which like disability benefits are paid to veterans by taxpayers via governments; social economic costs, which are borne by individual veterans and their households; macroeconomic costs, which are spread over entire economies; and interest costs, namely the extra spending in the future required to put off the payment of costs that come due today. Public or budgetary costs, such as direct military spending and veterans' benefits, are the most overt. In this section I briefly describe each of the other types of cost which are more subtle.

Economists believe that the cost of traumas can be gauged by measuring the willingness

to pay money to avoid them. Although this notion is not universally accepted,[5] it has some parallels in law in addition to economic theory. Juries award financial penalties based on pain and suffering using the same underlying principle: money makes people better off, so it can compensate in at least some way for things that make them less well off, like injuries, health conditions, and even death. Compensation for victims of terrorism and environmental harms is also based in large part on that principle.

Part of the total compensation for an injury can be conceptualized as income replacement; if a debilitating injury reduces or removes altogether the ability to work and earn wages, one component of the cost of the injury is the present discounted value of foregone future earnings. But the important insight is that typically such lost income represents only a fraction of the total loss felt by an individual. Someone who loses a hand, for example, experiences not only a reduction in workplace productivity that lowers wages, but also a reduction in the quality of life that is altogether separate from and compounds the dollar value of the earnings loss. If that individual could have paid a lump sum to avoid the injury, its amount would equal the present value of lost earnings plus the cost of the reduction in quality of life. A full accounting of the costs of the debilitating event ought to measure both, and measuring the willingness to pay should do so in principle.

A standard terminology in economics is that social costs comprise all costs tied to an action or event, whether borne by public or private individuals, regardless of whether those entities were direct parties to the action or not. The public cost is the portion of the social cost paid by governments via borrowing or tax revenues that is frequently discussed. The Congressional Budget Office (CBO), for example, is charged with estimating the federal government's portion of public costs. While in theory the public costs could meet or even exceed social costs, studies have found that none of the veterans' compensation systems fully compensate the social costs associated with service-related injuries (Wallsten and Kosec,

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[5]Some view measuring the costs of injuries and other events in this way as potentially leading to socially unjust outcomes. The revealed willingness to pay may arguably depend on the ability to pay, or income, on the rationality of perceptions, on the availability of information, or on other factors that may not be distributed in a socially just fashion across individuals.

2005; Bilmes and Stiglitz, 2006). Veterans disability benefits, for example, are designed not to compensate any pain and suffering associated with the service-connected disability (Institute of Medicine, 2007; Stiglitz and Bilmes, 2008). As a result, the public costs of war-related compensation for service-related injuries and deaths, which are the most widely cited statistics, will understate the true social costs as they would be measured by aggregated willingness to pay across all those afflicted.

The difference between the public costs of treating and compensating injuries and fatalities and their larger social costs is a residual in cost estimation, and it has been termed the social economic cost (Stiglitz and Bilmes, 2008), in contrast with the budgetary cost that is publicly funded. The total cost of a service-related disability such as losing a limb is defined as the willingness to pay to avoid the injury minus all disability benefits associated with the injury that partially compensate for it.[6]

The concept of social economic cost as measured through willingness to pay is more complex than that of public costs, and due to the nature of the willingness to pay, estimates tend to vary widely. Markets only implicitly price injuries, such as when higher wages compensate workers who face higher injury risk, which is a standard source of identification in the literature on the willingness to pay to avoid injury and death (Viscusi and Aldy, 2003). Even to the extent that markets do this, it is not entirely clear whose well-being is priced. If individuals are altruistic and make decisions based on the well-being of their families and households, then the willingness to pay to avoid an injury should incorporate all adverse effects on families and households as well as on the individual. But the standard approach is to assume that willingness to pay does not incorporate these spillover costs, which should instead be measured separately. The social economic costs could then be defined to include costs borne by families and households, for example who lose a husband or father to death or illness, but because very little is known about these costs, current estimates never account

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[6]In calculating the social economic cost of an injury, the associated health care costs are not subtracted from the willingness to pay because the latter is typically calculated holding wealth or income fixed. The cost of health care that treats but does not reverse the condition would reduce income, so in theory it is not already factored into the willingness to pay and does not need to be netted out.

for them.

A related concept of costs that are external to the individual are the macroeconomic costs. These are associated with general equilibrium effects of large-scale events, of which open warfare involving nation states is a clear case. One example of a war-related macroeconomic cost could be a reduction in the aggregate supply of U.S. human capital if service were widely spread such as via a draft. Other macroeconomic effects could derive from a diversion of saving toward war industries rather than privately productive investment, which would reduce the private capital stock. A third example is that military action in the Middle East typically reduces oil production and raises the price of oil, which dampens global economic growth Stiglitz and Bilmes (2008). A more controversial macroeconomic effect of war is the fiscal stimulus associated with government spending, which could in principle be beneficial.[7]

A fourth category of costs whose inclusion is more debatable is that of interest costs, namely the extra spending in the future required to put off the payment of costs that come due today. The federal government has paid all of its current costs and run a budget surplus in only 12 of the 69 years since 1940; in others years it has borrowed funds and paid them back later. Borrowed costs are indeed higher in nominal or real dollars when paid back in the future. But unless government borrowing raises real interest rates, the present discounted value of costs, which takes real interest rates into account in determining the time value of money, remains unchanged by borrowing. As a result, some argue that interest costs do not belong in the calculation of total costs.[8]

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[7]Absent any behavioral response from private spenders, government purchases raise GDP one-for-one. Given a Keynesian marginal propensity to consume out of income, there would be an additional increase in private spending. But Stiglitz and Bilmes (2008) argue that modern economists believe war spending to be detrimental on net, in a clear rebuke of Keynesian thinking. Barro (2009) believes that of all types of government spending, military spending is the least likely type to crowd out private investment or consumption, but that even its net stimulative effect is less than one-for-one. In contrast, the 2009 fiscal stimulus plan was based on assumptions that the government spending multiplier was considerably greater than one.

[8]Gale and Orszag (2004) reveal that budget deficits typically reduce national saving and raise interest rates. Another reason why borrowing might matter is if it produces higher tax rates in the future, and thus larger distortions, disincentives, and dead-weight losses, which tend to rise at an increasing rate with tax rates.

Estimates of War Costs in Iraq and Afghanistan

Extant cost estimates of OEF and OIF are typically presented in aggregate dollars, either undiscounted nominal sums or in present discounted value. While relevant for fiscal planning, total dollars of costs do not reveal much about the severity of the implicit burden. The ratio of aggregate costs to the nation's income or gross domestic product (GDP), which indexes its ability to pay, is a better measure of net burden for the country. Similarly, the ratio of total costs to the size of the population that pays them, whether all taxpayers in the case of public costs or the much smaller subset of service members and families in the case of social economic costs, measures the net average burden on individuals. This section first compares and contrasts extant estimates of aggregate costs, focusing on the controversy over the costs of injury and death. Then I discuss the components of costs that are omitted from these studies. Finally I assess aggregate costs in relative terms in order to gauge the intensity of the associated burdens.

Aggregate Costs

The first widely publicized estimate of the cost of a war in Iraq was the $100 to $200 billion suggested by Lawrence Lindsey, President George W. Bush's chief economic adviser, in 2003 (Wallsten, 2006). As noted by Bilmes and Stiglitz (2006), the Bush Administration later labeled that an overestimate, citing figures in the range of $50 billion. By the end of 2005, the total cost of the military operations in Iraq alone had already exceeded $250 billion. By the middle of 2007, the CBO estimated that $602 billion had been spent only on military operations and other activities in Iraq and Afghanistan since September of 2001 Sunshine (2007).

As recounted by Nordhaus (2002), Wallsten and Kosec (2005), and Wallsten (2006), several government agencies and groups of economists predicted war costs prior to the invasion of Iraq. Most forecasts presented by economists acknowledged the great uncertainties involved

by specifying an array of scenarios with varying degrees of optimism about the outcome of the war. History has generally proven the pessimistic scenarios to be more accurate after 8 to 10 years of war and occupation. Instead of reporting and discussing all of the scenarios in this section, for now I have cherry-picked those scenarios that were most accurate ex post in order to focus attention on the other primary source of divergence across them: the extent to which they capture the life cycle of costs associated with injury. I return to the issue of forecast uncertainty in a later section.

Nordhaus (2002) estimated that the undiscounted sum of direct military and macroeconomic costs could range between $99 billion and $1.9 trillion depending on the quality of the war outcome. Other researchers differed on the likely scope of war costs and whether they would exceed the benefits of a successful war, such as the avoided costs of patrolling the no-fly zone in Iraq. Writing in 2003, Davis, Murphy and Topel (2009) argued it was possible that the benefits of war, the foregone no-fly costs and improved economic outcomes in Iraq, could exceed the costs. But they also presented a wide range of possible cost scenarios that included many high-cost outcomes, the largest registering $633 billion for U.S. military, humanitarian, and compensation costs combined.[9] At the top of Table 1, I list the larger of Nordhaus's two sets of estimates alongside scenario 6 as specified by Davis, Murphy and Topel, which most closely fits reality ex post. The two estimates are more similar than they at first appear because Davis, Murphy and Topel do not include estimates of macroeconomic costs or impacts on oil markets. Omitting those two components, Nordhaus's high estimate is $755 billion and Davis, Murphy and Topel estimate $633 billion in costs under their scenario 6.

But the similarity is misleading because Nordhaus did not account for the costs of death and disability, while Davis, Murphy and Topel followed the lead of Wallsten and Kosec (2005) in estimating the costs borne by veterans and the VA. In their middle scenario, shown in the next row of Table 1. Wallsten and Kosec expected military costs would reach $507

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[9]Their costliest scenario (7) included these costs plus discounted future costs associated with a return to maintaining the prewar status quo with no-fly zones.

billion, or 84 percent of the total present value of $603 billion, with the remaining $96 billion attributable to the costs of fatalities, injuries, and lost wages. This is roughly comparable to the $105 billion in U.S. fatalities and injuries forecast by Davis, Murphy and Topel because they used Wallsten and Kosec's results to inform their own analysis. There is controversy surrounding this cost component because it is dependent on estimates of the costs of treating new types of combat-related injuries, and on estimates of the economic harm associated with injuries and death.

Costs of Injury and Death

The unique contribution of Wallsten and Kosec (2005) was to estimate the lifetime costs associated with traumatic brain injury, which has been termed the signature injury of OEF and OIF. They report that the present value of treating TBI over a lifetime could range from $600,000 to $4.3 million, and their forecast assumes a value of about $2.2 million. The costs associated with the 2,824 veterans estimated to have been diagnosed with TBI before August 2005 reached $16 billion in present value in their study.

Although the number of troops ever diagnosed with TBI has surely risen over time, the Congressional Budget Office has argued that those costs are too high for several reasons. Goldberg (2007) states that Wallsten and Kosec (2005) overestimated both the numbers of diagnosed TBI's and their severity. He cites 1,950 TBI's diagnosed by December 2006, of which two thirds were mild. Goldberg (2007) and Orszag (2008b) also question the assumed cost per TBI, which in Wallsten and Kosec's work was based on the costs of severe head injuries suffered in automobile crashes, in which no protective gear is worn.

In two working papers, Bilmes and Stiglitz (2006) and Bilmes (2007) provided new sets of cost estimates, which are shown in the next rows of Table 1. Both studies forecast much larger costs associated with death and injury, between $400 and $500 billion. These were followed shortly thereafter by Stiglitz and Bilmes' book (2008), whose title literally put a present-value price tag on the wars in Iraq and Afghanistan. While Stiglitz and Bilmes

used Wallsten and Kosec's calculations in some cost areas, their overall figures came out considerably and sequentially larger, as shown toward the bottom of Table 1.

There are several possible reasons why the forecasts of Stiglitz and Bilmes were substantially higher. Military operations were still ongoing during this period; indeed they intensified during the troop surge conducted in Iraq during 2007, and this automatically raised both direct military costs and the costs associated with wounded veterans. In addition, Bilmes and Stiglitz also accounted for the macroeconomic costs of war, like Nordhaus did before them, and that raised costs by about one third. But most striking is the factor of 10 separating the estimates of Wallsten and Kosec from those of Stiglitz and Bilmes in one critical area: the combined public and social economic costs of injuries and deaths.

Wallsten and Kosec's original present value cost estimate of $96 billion is roughly consistent with similar estimates of total present value spending implied by official CBO estimates of only the public costs associated with injury and death. Because the CBO only produces 10-year forecasts, the only way to recover estimates of total present value is by using extrapolation.[10] My results suggest that the two CBO estimates of Sunshine (2007) and Goldberg (2007) differ slightly but imply a total present value of public spending on VA disability and medical care of around $60 billion, which is more than an order of magnitude below the $717 billion estimated by Stiglitz and Bilmes (2008).

This gap is huge. It must result from some combination of different assumptions about (1) the number of future veterans, which depends on current and future operations; (2) rates of illness and disability, the propensity of veterans to seek treatment, and the ability of the VA system to process them; (3) the costs of treatments or the amount of disability rating and benefits; and (4) growth in the cost of treatments.

Of these, the first element is relatively trivial and depends on war developments and

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[10]I adopt the same basic forecasting techniques, time horizon (40 years), and nominal discount rate (4.5 percent) used by Stiglitz and Bilmes (2008). The average age of OEF/OIF veterans is about 29 (Institute of Medicine, 2010). Sex-specific cohort life tables forecast by the Social Security Administration Bell and Miller (2005) suggest that their remaining life expectancy should be closer to 55 years, but I use 40 years in order to maintain consistency.

policy. The second is important but also more uncertain, and we are gaining new knowledge about it continually. The incidence and degree of TBI affliction and its permanence are unknowns, as are the ability of the VA to identify it and the propensity of veterans to ask VA to do so. Compared to annual data on OEF and OIF veterans treated by VA prior to 2009 presented by Goldberg (2007), Bilmes (2007) assumed aggregate usage that was about 25 percent higher. A recent cost estimate provided by RAND (Tanielian and Jaycox, 2008) and shown near the bottom of Table 1 examines the cost of mental health trauma deriving from PTSD, TBI, depression, and other related conditions. That estimate, \$10.2 billion in public and social economic costs over 2 years or \$5.1 over 1 year, is difficult to compare to the other long-run cost estimates; but it is 5 to 10 times as large as the single-year cost estimates of public disability and VA medical care cited by Sunshine (2007) and Goldberg (2007). The difference could be due to prevalence estimates, assumptions about per capita costs, assumptions about the life cycle of the diseases, or all of these.[11]

For long-term forecasts, the third and fourth assumptions play very critical roles. Stiglitz and Bilmes assume that the average cost per OEF and OIF veteran in 2006 is roughly twice as large as what the CBO assumes.[12] Part of this is because in their "realistic-moderate" forecast, Stiglitz and Bilmes use the average cost across all VA patients, not the average across only OEF and OIF veterans in the VA. As CBO has pointed out (Orszag, 2008b), veterans from earlier conflicts are older and thus more expensive because of the routine costs of treating diseases associating with aging. Assuming OEF/OIF veterans cost the same as Vietnam and older veterans will surely overstate current costs, but it may not overstate

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[11]The RAND study collected a telephone sample of about 2,000 OEF and OIF veterans, Seal et al. (2009) examined VA medical records of almost 300,000 veterans. Both studies found a high incidence of mental health ailments. The RAND study, based on self-report, found that 30.7 percent has at least one out of three conditions (TBI, depression, or PTSD). Seal et al. estimate that 36.9 percent had been diagnosed with at least one of a slightly broader set of conditions (including PTSD, depressive disorders, alcohol use disorders, and drug use disorders). The prevalence of PTSD was 13.8 percent in the RAND study and 21.8 percent in the VA data.

[12]Both Stiglitz and Bilmes (2008) and CBO (Goldberg, 2007) use spending per capita in 2006 as their benchmark. The former assume spending per OEF/OIF veteran will start at \$5,765, the average VA treatment cost across all veterans; the latter assumes it is \$2,610, the actual VA health spending in 2006 per OEF/OIF veteran. In their "best case" estimates, Stiglitz and Bilmes assume the number is \$3,500, which they chose "after consulting with physicians in the VA treating new veterans."

future costs. Average OEF/OIF costs could increase quickly as knowledge about health conditions and treatments arrives.

Most importantly, Stiglitz and Bilmes assume that the real average cost of treatments rises 3 percent each year, doubling about every 23 years. CBO forecasts are less clear regarding this assumption, but the 10-year estimates under the high option presented by Goldberg (2007) show an average annual growth rate in total real VA health spending on OEF and OIF veterans of 2.2 percent. Because there will be rapid growth in the population of OEF and OIF veterans, the assumed growth rate in real average costs must be much lower.[13] To be sure, a 3 percent annual rate of growth in real average medical costs is considerably faster growth than assumed for Medicare by Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds (2009). The Trustees report that excess growth in health care costs has averaged 2 or 3 percent in recent decades. But based in part on recommendations from technical review panels, they currently forecast the differential to decline to 1.4 percentage points by 2033, to 0.8 by 2053, and 0.2 by 2083. Compared to the assumptions of the Medicare Trustees, Stiglitz and Bilmes' 3 percent excess growth assumption raises their present value of VA health costs by almost a factor of 2 over a window of 40 years.

Growth in average medical costs and growth in the patient population have the same effect on an actuarial forecast of total costs, and it appears that both are important for the differences in forecasts that are being seen. Assuming that CBO's estimates of medical cost growth are similar to those of the Medicare Trustees, then the factor of 10 separating Stiglitz and Bilmes's estimate from the CBO's estimate of VA medical and disability costs may be roughly parceled into (i) a factor of 2 separating the initial average health costs, (ii) another factor of 2 deriving from faster growth in average costs, and (iii) a residual factor of 2.5 that must be subsumed in different estimates of the population of OEF/OIF veterans

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[13]Bilmes (2007) estimated the OEF and OIF VA population would be growing at an average annual rate of 11 percent over that period, which is actually below the comparable rate of 32 percent observed between 2005 and 2008 according to the CBO (Goldberg, 2007).

and their propensity to seek and receive care, as well as any other factors. The assumptions underlying long-term forecasts are important for the bottom line, and it behooves researchers and government agencies to make their assumptions as transparent as possible.

Omitted Costs of Education and Adjustment

The estimates shown in Table 1 focus on costs associated with deployment and post-deployment health and disability, which are arguably the most important. But there are at least two other types of costs that are less frequently discussed. Education and retraining programs for veterans and their families are costly to the government and to taxpayers, but they are beneficial to recipients and thus may not be commonly perceived as costs at all. At the opposite extreme, there are very real social, psychological, and economic costs borne and felt acutely by families and communities who are adjusting to accelerated deployments, reduced dwell times, and reentry following military service. But these costs are much less overt or clearly understood, and currently we can say very little about them.

Educational benefits, most notably the G.I. Bill, are a war-related cost to the government but also a beneficial investment in the human capital of veterans. Researchers view the midcentury G.I. Bill as having vastly expanded the educational attainment of birth cohorts with high rates of military service in World War II and Korea (Bound, 2002; Stanley, 2003). The Post-9/11 Veterans Educational Assistance Act of 2008 expanded the G.I. Bill to cover OEF and OIF veterans; that program went into effect in August of 2009. In 2008, the CBO estimated that the bill would cost \$51.8 billion over 10 years (Orszag, 2008a). That is about four times as large as the CBO's "high option" 10-year forecast of VA medical and disability spending (Goldberg, 2007).

According to statistics reported by the U.S. Department of Education (2009), the real average costs of education have been rising by more than 2 percent per year during the past decade. In other words, the growth in those average costs is roughly as fast as for average medical costs. Working to reduce educational costs is the relatively short life-cycle of usage

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per veteran; reentry students typically finish within several years. This is not the case with VA health care, which is typically provided throughout the entire life of the veteran. Educational benefits may also improve force retention and should improve individual well-being by raising earnings and improving health (Grossman, 2006). But educational benefits are also a potentially explosive source of cost growth because of wide eligibility and rapidly increasing costs of tuition. The volatility of payments for veterans' education subsidies is depicted in Figure 4, which plots federal spending on several types of veterans' payments as shares of GDP since 1940 and forecast to 2014. The G.I. Bill produced a massive surge in spending that reached nearly 2.5 percent of GDP in 1950, five times its share after 1952.

The second component of costs that is less frequently discussed derives from the burdens placed on families and communities by accelerated and lengthened overseas deployment, reduced dwell times between deployments, and reentry adjustments for returning veterans and their families. As reported by the Institute of Medicine (2010), very little is known yet about the conditions fostered by recent changes in military life brought on by wartime commitments. The challenges faced by veterans and their families of adapting to social and economic conditions are also in a state of flux, owing both to long-term trends like the increase in female labor force participation and the rise in divorce rates, and to short-term trends like the massive disruptions brought about by the recession of 2008.

Costs in this category could derive from juvenile delinquency associated with the absence of parental guidance, the trauma of divorce, domestic violence, and other family trauma. Disruptions in communities that lose workers called up to National Guard or reserve units are sure to be costly as well. However, little is known about the incidence of these events and their connections with wartime service, and even less is known about their costs. Their omission is not indicative of any judgment about their relative importance, but the state of knowledge is so poor as to preclude even a guess about how large or small the costs might be. More research is vitally needed in these areas.

Relative Costs

The aggregate costs of wars in Iraq and Afghanistan remain unclear because the conflicts are ongoing, the life cycle of costs is very long, and there is much uncertainty about current let alone future costs. But even though our current knowledge may be imprecise, it is useful to assess the magnitudes of costs relative to the ability to bear them.

A war with a price tag like $3 trillion sounds more catastrophic than simply unaffordable. Compared with the inflation-adjusted direct military costs of past wars, which are shown in Table 2, $3 trillion is certainly large, surpassed only by the massive direct military expenditures incurred during World War II, which amounted to almost $3.5 trillion in 2008 prices. But according to Table 1, direct military expenditures in Iraq and Afghanistan are likely to be more like $1 to $1.5 trillion, or perhaps half the level of World War II spending but also at least twice the real direct cost of the Vietnam war. The rest of the $3 trillion, if that figure is correct, may or may not be historically unprecedented; without comparable estimates of past public and social costs associated with injuries and deaths and of macroeconomic costs, it is impossible to tell. I assess historical costs of injury and death in a companion study (Edwards, 2010), while Glick and Taylor (2010) estimates the cost of lost trade in several wars in the last century. Both studies find these components tend to be large for historical conflicts.

Other costs of roughly the same magnitude as the $3 trillion price tag are commonplace in recent political discourse and in economics and budgeting. The unfunded shortfall in Social Security is currently $5.3 trillion in present value over 75 years (Board of Trustees, 2009), while Medicare's unfunded shortfall is more than twice as large at $13.4 trillion (Boards of Trustees, 2009). Measured relative to these unfunded obligations, which are a combined $18.7 trillion, $3 trillion seems relatively small, only about a sixth as much.

The deficit was $1.6 trillion in fiscal year 2009, and the national debt held by the public rose to $7.9 trillion, or about 56 percent of the nation's $14.1 trillion GDP (Office of Management and Budget, 2009) and is projected to rise. As a percentage of annual GDP, $3

trillion represents an addition of about 20 percentage points to the debt-to-GDP ratio. But as a present value of the sum of GDP over 40 years, the total war cost is only 0.4 percent.[14] Like the actuarial balance measures of Social Security and Medicare, this number roughly represents the required increase in the tax rate that would close the fiscal gap over this period. By comparison, the needs of Social Security and Medicare loom much larger: 0.7 percentage point over 75 years for the former and 1.7 percentage points for the latter. Compared to the implicit debt of the entitlement programs, war costs do not seem so large. But this is an unbalanced and unfair comparison. The benefits associated with Social Security and Medicare seem larger and clearer than those that may derive from warfare, although this may be open to debate.

Viewed relative to population, war costs again sound relatively high. If costs were apportioned across 300 million U.S. residents, they would produce individual costs of $10,000 per person. This is large in an absolute sense, although it is not large relative to lifetime income, current wealth, or other kinds of household debt per capita.

But not all war-related costs are spread equally across all taxpayers or citizens. On the contrary, many costs are concentrated among a very few. Of the costs itemized in Table 6-1, the $415 billion in social economic costs forecast by Stiglitz and Bilmes (2008) will be borne entirely by the 1.8 million veterans they estimate will have been discharged by 2017. As described above, the social economic cost can be conceptualized as the uncompensated pain and suffering and other costs associated with illness and death. It does not include the uncompensated costs of warfare borne by veterans' families and communities, such as may stem from divorce and other family disharmony. If they could be measured, those costs would raise the bottom line.

On a per capita basis, the $415 billion in social economic costs borne by 1.8 million OEF and OIF veterans is over $230,000 per veteran. This is large. By comparison, the present value of family gross income may approach $2.5 million for these veterans, implying that

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[14]I assume the real interest rate is 1.5 percent while the growth rate of real GDP is 2.9 percent. This produces a total present value of GDP over 40 years of about $750 trillion.

uncompensated war costs could represent about 10 percent of remaining lifetime wealth.[15] If the social economic costs are borne only by the 40 percent of OEF/OIF veterans who Stiglitz and Bilmes assume will claim any benefits, the per capita cost would rise by a factor of 2.5 to $575,000 per veteran, or 25 percent of lifetime wealth.

If these estimates are correct, a challenge for policy would be to spread the burden of these costs associated with pain and suffering from war wounds more widely and equitably. Costs may be large in aggregate, but they are not unbearably large for the nation as a whole. Needless to say, this insight may offer little assurance to veterans. In this time of increased fiscal pressures owing to the Great Recession and the aging of the Baby Boom generation, it may be very difficult to shift the burden any more toward taxpayers than it already is.

The Methods and Practice of Cost Forecasts

Ex Post Assessment of Iraq War Costs

As I have shown, one of the difficulties with comparing war cost forecasts is that they often differ greatly in terms of their scope. Forecasts of veterans' health benefits also tend to disagree. It is more straightforward to compare forecasts of direct military spending, which has a much shorter life span although it is still subject to much uncertainty associated with the conduct of the war.

Figure 5 plots an array of forecasts of total direct military costs associated with Operation Iraqi freedom alongside the unfolding reality of total cumulative costs as reported by Belasco (2009) for each fiscal year since 2003. The sets of horizontal lines depict projections of the ultimate total present value of costs in 2003 dollars provided by Nordhaus (2002), Davis, Murphy and Topel (2009), Wallsten and Kosec (2005), and Stiglitz and Bilmes (2008), start-

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[15]Real median family income of veterans is probably about $50,000 in 2009, a figure consistent with data from the 2001 National Survey of Veterans for a similar age group inflated to 2009 levels. Real incomes are likely to increase 1.5 percent per year over 55 remaining years of life from an average age of 28, with a replacement rate of 50 percent after age 67. As before, I assume the nominal interest rate is 4.5 percent and the real interest rate is 1.5 percent.

ing from the year in which they were originally made. Each set of forecasts includes at least two scenarios; the middle two include eight and three. The dark line rising monotonically upward is the actual cumulative present value of direct military costs as of the current year, also expressed in 2003 dollars.

The graphic reveals that only the forecasts of Nordhaus (2002) have bracketed reality. Those of Stiglitz and Bilmes (2008) are higher but may ultimately be proven right, given the continuing upward trend in the actual total. Some forecasts do a good job of expressing the uncertainty, others apparently less so; Wallsten and Kosec (2005) forecasts a particularly narrow band. Part of this may have been due to the increasing revelation that the war would not be short; later forecasts are generally higher in addition to reflecting less perceived uncertainty.

The forecasting record revealed by Figure 5 does not seem particularly poor. While it is now clear that the range of scenarios considered by Davis, Murphy and Topel (2009) and Wallsten and Kosec (2005) were not wide enough, only in the case of the latter does the implied uncertainty band seem unrealistically narrow. This figure does not speak to the quality of official government forecasts, which seems to have been generally lower (Nordhaus, 2002). But it does suggest that academic efforts provided war cost forecasts of reasonable quality, at least in the case of direct military spending.

Cost Forecasts through History

Nordhaus (2002) observes that governments seem to be historically prone to underestimating the costs of war. Some political scientists and historians have argued that warfare itself is the result of miscalculations or irrationality (Tuchman, 1984; Gartzke, 1999), so it may not be surprising that ex ante cost estimates are usually wrong. Nordhaus argues there may political gains to forecasting low costs associated with war; consensus to go to war may be more easily achieved if the perceived costs are low.

But many other kinds of government forecasts are also prone to error. In particular,

revenue forecasts have been shown to be of relatively poor quality, overly influenced by short-run developments like business cycles (Auerbach, 1999). Long-term projections of population and transfer programs like Social Security and Medicare rely heavily on mortality forecasts, which in the past have been consistently too pessimistic (Lee and Miller, 2001). In the case of the former, private revenue forecasts do no better than government forecasts, suggesting the problem is not rooted in politics or inefficiency as much as lack of knowledge. The latter seems to be the result of over-reliance on expert opinion about what the future ought to hold, contrasted with the insight that past trends often continue. There is much debate currently about the accuracy of long-term forecasts of Medicare and Social Security, with engagement by academics on either side of the debate about mortality projections, and with the Actuaries and Trustees themselves actively involved in discussions.

Lessons from both types of forecasting are salient here. Forecasting is an inexact science, and expert opinion might be unduly influenced by short-term developments. But while past trends are often informative, a complete approach should examine them alongside expert opinion. In the present context, the trend toward reduced fatality rates in warfare and thus greater prevalence of injury and need is a very good example of a long-term trend that must be taken into account in forecasts. Likewise, the trend toward better dissemination of knowledge about veterans' programs, for example via the Internet, must affect assumptions about manifested service needs in future periods. These emerging trends imply that it is imperative to produce and publicize transparent forecasts as frequently as possible, and to engage and encourage criticism about the assumptions.

As I have discussed, there is much disagreement across forecasts concerning the costs of treating and compensating injured veterans. But one commonality is that most forecasts specified best and worst-case scenarios in an attempt to address the large uncertainties surrounding the outcomes of armed conflict. It seems especially true in the case of academic forecasts that the rough confidence intervals implied by these scenarios were more or less wide enough to capture the worst case scenario as it eventually unfolded. This raises questions

about how the U.S. government arrives at military decisions, the degree of risk aversion in its objective function, and whether policy advice concerning uncertain outcomes should take a different form. These are all deserving topics for further inquiry.

Current Forecasting Needs

The public and Congress receive forecasts of veterans' programs very infrequently under the current system. The most consistently produced sets of official projections are released by the CBO, whose researchers sift through the VA's reports to OMB in order to specify many of their key assumptions. As of this writing, CBO has not publicly updated its forecasts in two and a half years. It appears that CBO does not have the personnel or funding to produce forecasts more frequently, and it is already charged by Congress with assessing a far wider array of government programs than just those for veterans support. But with CBO forecasts available only sporadically, it becomes very difficult for outside observers to assess their quality or the quality of private forecasts, or most importantly to gain a clear, up-to-date picture of veterans' service needs.

It appears that the VA does not have the personnel, the funding, or the mandate from Congress to produce broad forecasts of service needs. The VA Actuary generates an annual actuarial forecast of limited scope for the disability payment system that appears in the VA's Performance and Accountability Report. But there are no long-term forecasts of health care utilization for the VA population. Given that both aggregate health and disability benefits are roughly $40 billion per year, at best a tenth of Social Security or Medicare but still large, that is unfortunate.

To be sure, the only other long-term forecasts of federal government spending programs are produced by the Social Security Administration and the Centers for Medicare & Medicaid Services. Those two agencies dwarf the VA in terms of service population and budget size. From this perspective, it is not surprising that Congress has neither asked for nor funded long-term forecasts from the VA. But another comparison is also apt: most states employ

actuaries to produce long-term forecasts of future spending on pensions and health care utilization owed to retired public employees in police, fire, and sometimes other agencies including education. Those programs are orders of magnitude smaller than the VA system, but long-term actuarial forecasts are produced on an annual basis.[16]

Besides the differences in size, another salient difference between Social Security, Medicare, and VA benefits has to do with the categorization of current and future obligation as either mandatory or discretionary spending within the budget process. Social Security, most of Medicare, and VA disability benefits are mandatory spending categories, meaning that unless Congress were to rewrite the basic laws governing those programs, it must fund the spending each year. Veterans' health benefits are a discretionary part of the budget. The issue that arises is not that discretionary programs are underfunded; on the contrary, Congress has consistently funded the Veterans Health Administration (VHA), including through emergency spending.[17] Rather, the fact that VHA spending is discretionary has meant that Congress can and does follow a wait-and-see approach to VHA funding rather than a more proactive stance as with Social Security and Medicare, both of which have trust funds. Because Congress currently operates this way, it has neither asked nor funded the VHA to produce long-term forecasts.

Given that the VA knows its service population the best, the VA would have a comparative advantage at producing the best long-term forecasts, were it sufficiently funded and staffed to do so. If the VA Actuary were expanded with sufficient funding and institutional support, it would likely be able to produce the long-term forecasts of disability and health care needs on a timely basis that are so desperately needed. Recategorizing VHA benefits

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[16]It is also true that states' means of financing current and future benefits are generally more constrained than those of the federal government, for example due to balanced budget amendments. This may help explain why states frequently produce long-term forecasts of their retirement and pension systems.

[17]The fact that emergency VA funding has been required so frequently bears two implications. First, forecasts of VA funding needs may be relatively poor precisely because VHA spending is discretionary; Congress could simply alter funding to meet unanticipated developments, an alternative that is not feasible in the case of mandatory spending. Second, even when forecasts are highly uncertain, good forecasts should not be biased. That VA forecasts appear to be systematically biased downward suggests that the system of forecasting is requires upgrading.

as mandatory spending would help this initiative.

Conclusion

The costs of the wars in Iraq and Afghanistan are large. The present value of war costs is in the trillions rather than millions or billions of dollars. A large portion is attributable to direct military operations, which are funded by general tax revenue and thus represent a burden shared by many current and future U.S. taxpayers. The same is true of macroeconomic costs and the costs of publicly funded veterans' benefits. The nation's ability to pay those costs, while not infinite, appears to be sufficient. The greater challenge in the case of those costs is knowing their size and timing with greater precision.

The costs to veterans and their families are very large. Unlike the need covered by publicly funded benefits, the social economic costs, comprising the uncompensated harms associated with the physical and psychological wounds of warfare, are borne solely by veterans and their families. While these costs appear to be small in an absolute sense, they are very large when apportioned out to each veteran who must bear them. Unreimbursed social economic costs of $415 billion spread over a pool of veterans that may reach 1.8 million works out to a average lifetime burden of more than $230,000 per veteran.[18] This is a cost approaching 10 percent of lifetime wealth, 25 percent if apportioned to injured veterans alone. If social economic costs were an order of magnitude smaller at more like $25 billion, the average lifetime cost borne by each veteran would be more like $14,000. While perhaps small in a lifetime sense, this number is still large as a lump sum.

The public costs will surely rise with time. While the direct operational costs of war are necessarily limited except in the case of indefinite occupation, a possibility that now seems remote, the life cycle of costs borne by and associated with veterans themselves is very long because their remaining life spans are typically quite long. This is one of the downsides of

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[18]Removing the social economic costs of death, which are obviously not borne by living veterans, changes the average burden to just over $200,000 per veteran. But it would be misleading to omit altogether the costs of death, which to some extent must be felt by survivors.

the otherwise very positive development that service members now face much greater odds of survival from war wounds. Historically, the peak need has lagged the end of hostilities by 30 years or more, meaning the maximum effect on annual budgets and on support systems might not be felt until 2040.

Cost forecasts and planning need to be improved. The record of academic projections suggests they provide useful insights; applying current techniques with greater frequency and transparency is thus likely to yield useful results. That said, there are a number of unresolved questions surrounding war cost forecasts, such as how future veterans' costs are likely to unfold, and how the government utilizes war costs forecasts and their uncertainty in making decisions. In a separate paper, I explore the history of veterans' costs in greater detail, revealing that they have tended to be large relative to direct military costs owing to their life cycle (Edwards, 2010). Given that war costs are large, they will rise over time, and that a subset will be acutely felt by veterans and their families, it is important to produce cost forecasts of high quality, transparency, and frequency, and to assess the methods by which governments make decisions based on such forecasts.

The public system of forecasting the needs of veterans and the costs of meeting them appears to be underfunded and insufficient. To be sure, long-term cost estimates are highly uncertain and potentially the subject of controversy. Perhaps as a result, the domain has been more than partially ceded to academics. But in the cases of Social Security and Medicare, also the subject of much interest and debate in scholarly circles, the Trustees and Actuaries of both systems are fully engaged in that debate, fully informed regarding the controversial issues, and they have and share strong opinions about the components of long-range forecasts. Expanding the funding and mandate of the VA Actuary would be one way to improve the quality of war costs forecasts. Recategorizing VHA spending as mandatory spending similar to Medicare could help in such an effort.

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Table 1: War Cost Forecasts

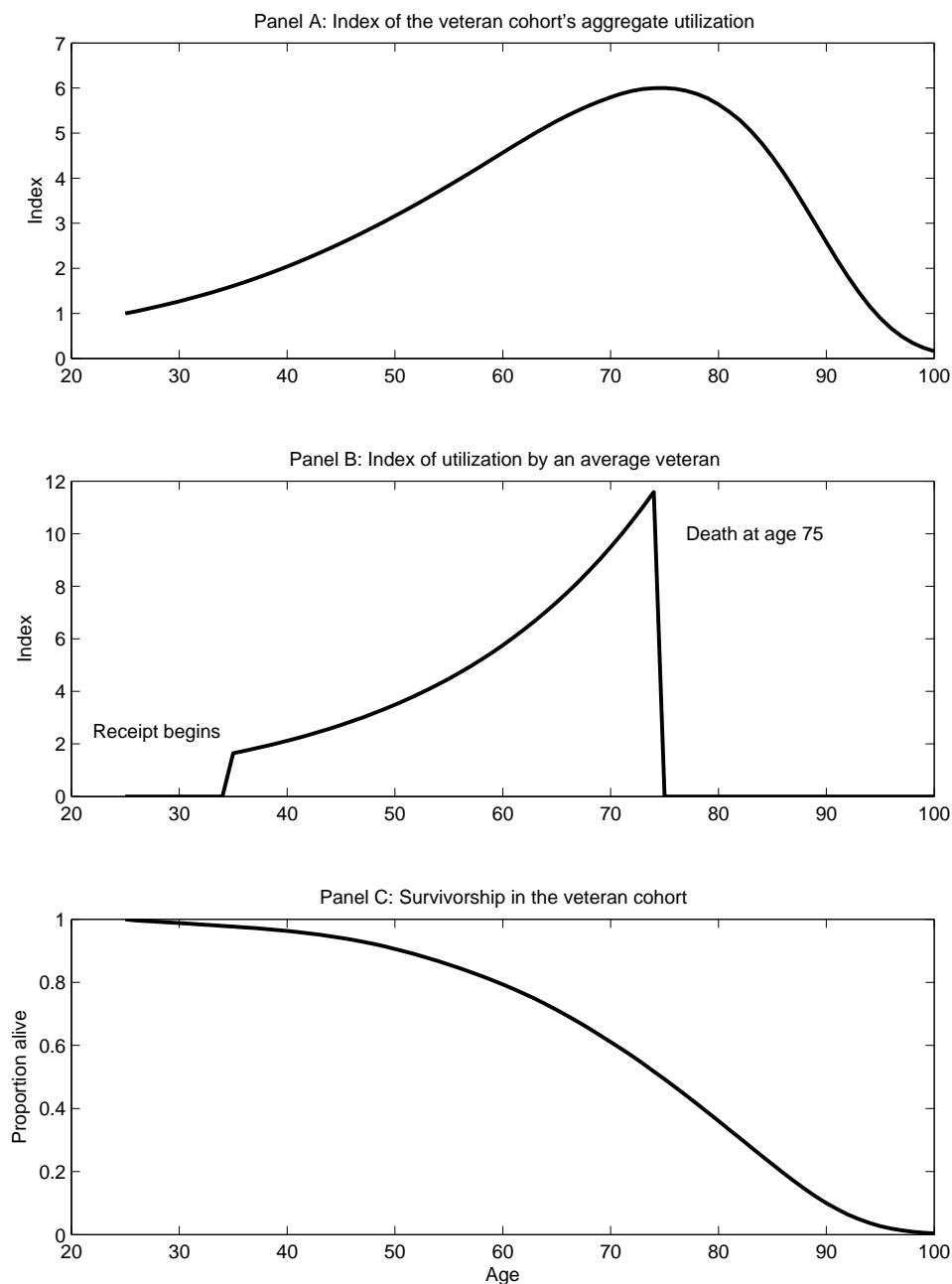| Source	Year of forecast	Conflict	Scope of costs	Costs in one year (billions)	Present value over 40 years (billions)
Nordhaus (2002) high case	2002	OIF	Direct military spending		140
			Occupation and peacekeeping		500
			Reconstruction		105
			Humanitarian assistance		10
			Impact on oil markets		778
			Macroeconomic impact		391
			Total		1,924
Davis, Murphy, and Topel (2009) Scenario 6: Longer war, ten-year occupation, major insurgency, 2 percent real discount rate	2003	OIF	Initial military operations		63
			Occupation		410
			U.S. fatalities and injuries		105
			Reconstruction aid and Humanitarian assistance		56
Wallsten and Kosec (2005) middle scenario	2005	OIF	Military operations to date		212
			Future military operations		295
			Public costs of VA disability and medical care and social economic costs of injuries and deaths		96
			Total		603
Bilmes and Stiglitz (2006) moderate scenario	2006	OIF	Military operations to date		251
			Future military operations and defense		419
			Public costs of VA disability and medical care		214
			Social economic		305
			Macroeconomic		1,050
			Total		2,239
			Interest costs		386
Bilmes (2007) moderate scenario	2007	OEF/OIF	Public costs of VA disability and medical care	3.7	425
Sunshine (2007) high option (scenario 2) with 12-month surge	2007	OEF/OIF	Military operations to date	170	601
			Future military operations and defense	170	727*
			Public costs of VA disability and medical care	0.7	69*
Stiglitz and Bilmes (2008) realistic-moderate scenario	2007	OEF/OIF	Military operations to date		646
			Future military operations and defense		1,317
			Public costs of VA disability and medical care		717
			Social economic costs of injuries and deaths		415
			Macroeconomic		1,900
			Total budgetary & social		3,095
			Budgetary, social, and macroeconomic w/o interest		4,995
			Interest costs		816
Tanielian and Jaycox (2008)	2007	OEF/OIF	Public and social economic costs of mental health only	5.1	
Goldberg (2007) high option with 12-month surge	2008	OEF/OIF	Public costs of VA disability and medical care	0.9	57*

Notes: Asterisks denotes authors calculations based on extrapolation assuming a constant growth rate model to 2048 of the original CBO forecast to 2017, with a nominal discount rate of 4.5 percent.

Table 2: Direct Military Costs Associated with Major U.S. Wars

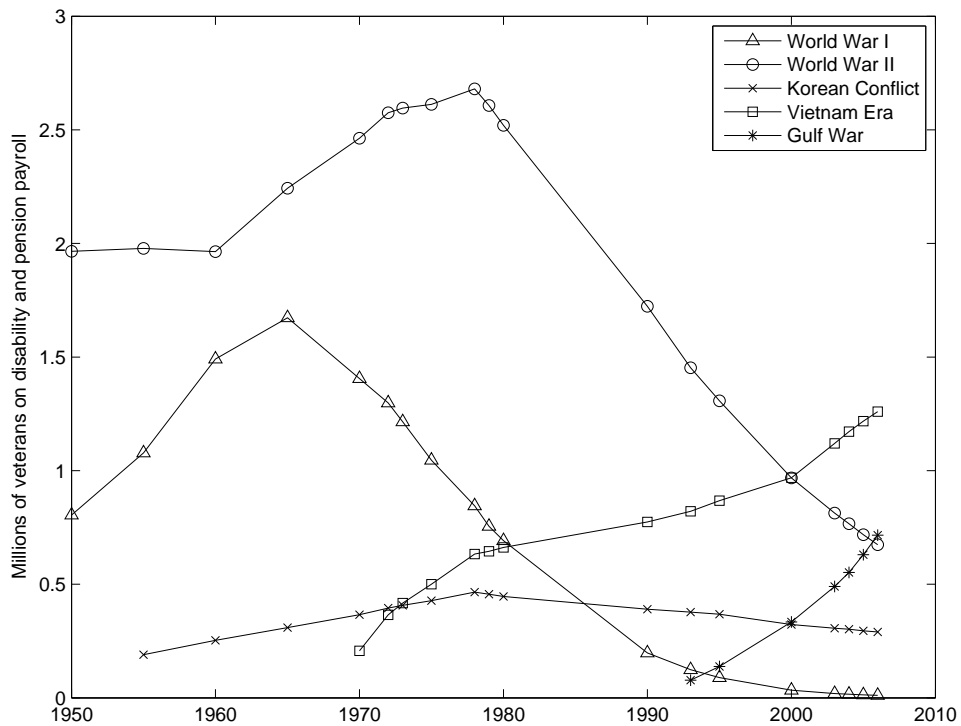| Conflict | Total direct cost in billions of: | | Per capita cost in 2008 dollars | Total cost as % of GDP |
	Current dollars	2008 dollars		
Revolutionary Wars (1775-1783)	0.1	2.6	525.2	63
War of 1812 (1812-1815)	0.09	1.3	141.0	13
Mexican War (1846-1848)	0.07	1.9	79.9	3
Civil War (1861-1865)				
Union	3.2	44.8	1,594.5	84
Confederate	2.0	28.0	3,230.1	169
Combined	5.2	72.9	1,981.1	104
Spanish American War (1898)	0.4	11.3	129.3	3
World War I (1917-1918)	16.8	224.0	2,924.6	24
World War II (1941-1945)	285.4	3,403.2	23,956.3	130
Korea (1950-1953)	54.0	394.7	2,662.6	15
Vietnam (1964-1972)	111.0	580.8	2,589.7	12
First Gulf War (1990-1991)	61.0	89.4	359.6	1

Notes: The source is Nordhaus (2002), who cites U.S. Commerce Department, Historical Statistics of the United States, Government Printing Office, 1975, vol. 2, series Y and Al Nofi, Statistical Summary: Americas Major Wars at http://www.cwc.lsu.edu/cwc/other/stats/warcost.htm. Real costs are inflated to 2008 levels using the GDP implicit price deflator

Figure 1: The life cycle of publicly provided veterans' benefits

Panel A: Index of the veteran cohort's aggregate utilization

Panel B: Index of utilization by an average veteran

Death at age 75

Receipt begins
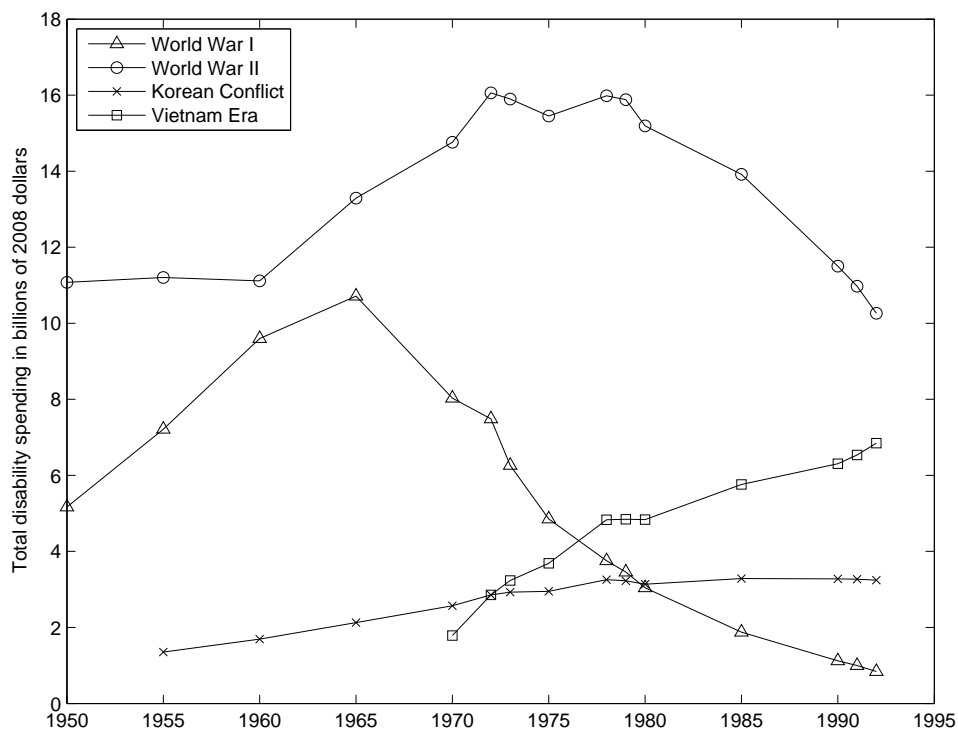
Panel C: Survivorship in the veteran cohort

Age

Sources: Survivorship data for the 1920 U.S. male birth cohort are taken from Bell and Miller (2005) and authors' calculations. Data in panels A and B are illustrative and reflect assumptions and survivorship, not any other real statistics.

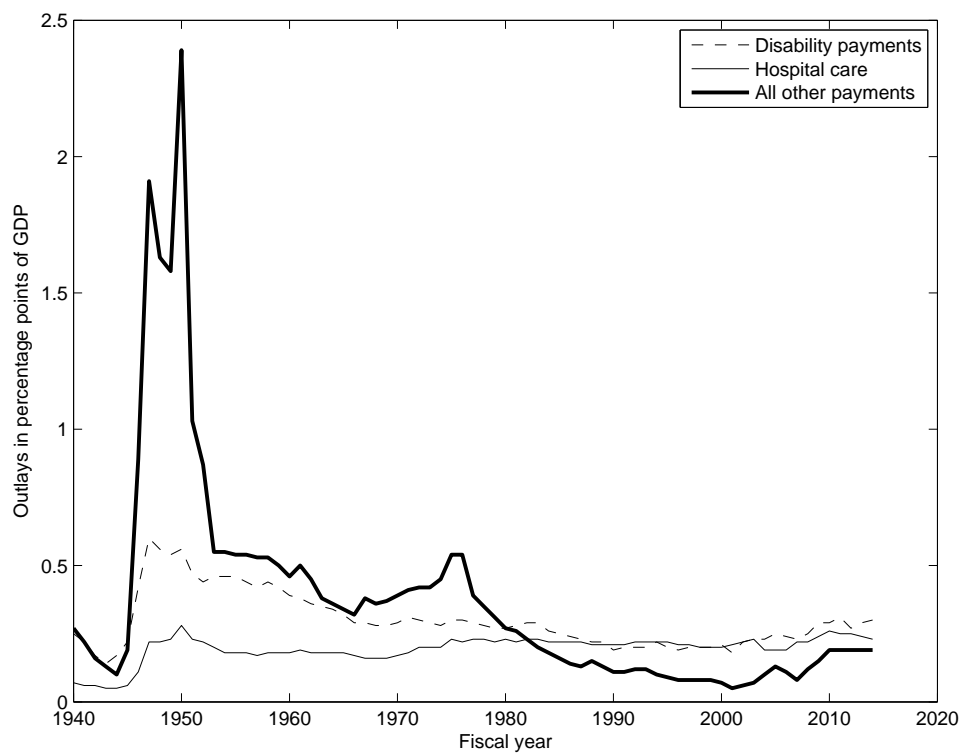Figure 2: Veterans on disability and pension payrolls by period of service

Notes: The underlying data are counts of both living veterans receiving disability pensions and deceased veterans whose dependents are receiving survivors' benefits. The source is the Institute of Medicine (2010), which drew the data from the U.S. Census Bureaus *Statistical Abstracts of the United States* from various years, which in turn cite *Annual Reports of the Secretary of Veterans Affairs* and VAs Annual *Performance and Accountability Reports.*

Figure 3: Total spending on disability compensation and pensions by period of service
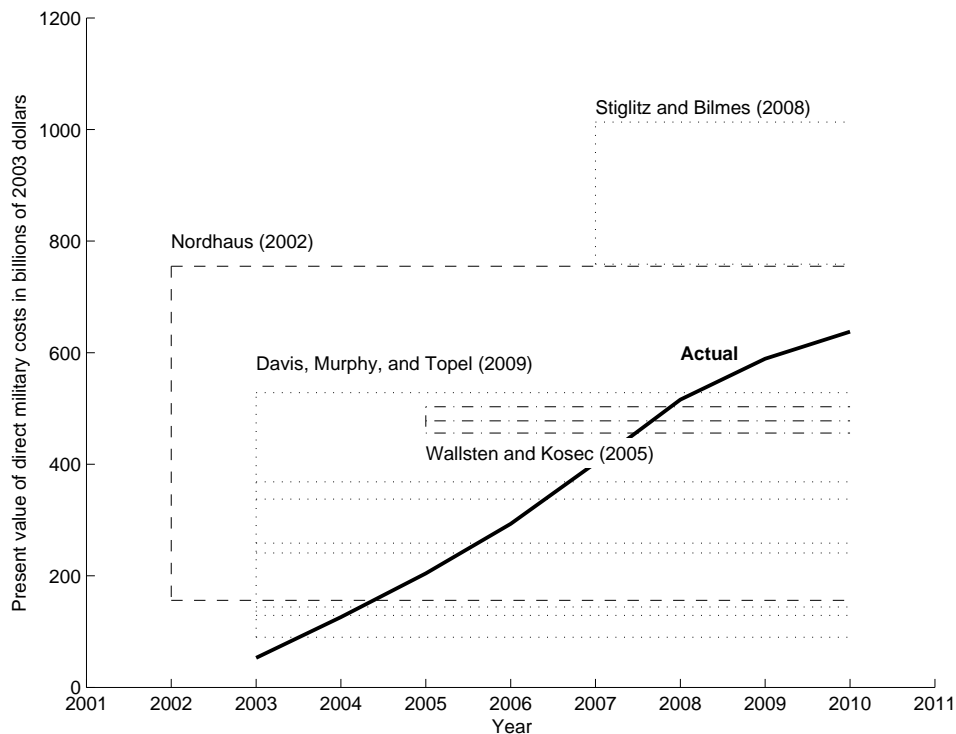

Notes: For sources, see notes to Table 2. The data are real dollars of disability compensation and pensions for veterans by period of service, where the nominal amounts are deflated by the CPI. These are totals for the veteran cohort, constructed as the product of the number of veterans receiving benefits and the reported average spending per veteran.

Figure 4: Spending on veterans' benefits by category as shares of GDP

Sources: Budget of the U.S. Government, Fiscal Year 2010. The category labeled "All other payments" includes educational benefits, non-service connected pensions, insurance and burial benefits, and any other payments not otherwise itemized.

Figure 5: Forecasts and realization of total direct military costs in Iraq

Sources: Nordhaus (2002), Davis, Murphy and Topel (2009), Wallsten and Kosec (2005), Stiglitz and Bilmes (2008), and Belasco (2009). The data are forecasts (dashed lines) or the realization (thick black line) of the total present value of direct military costs associated with Operation Iraqi Freedom. All data are in 2003 dollars. Direct military costs consist of those associated with deployment, combat, occupation, reconstruction, and humanitarian assistance. Forecasts of the total present value of costs are plotted as straight lines extending forward from the year they were first released. The actual cumulative present value of direct military costs is constructed from nominal annual flows reported by Belasco (2009) translated into present values in 2003 dollars using the market yield on 10-year U.S. Treasury securities as reported in the Federal Reserve's H.15 release. The actual data are not a forecast; they are the running cumulative spending totals, in 2003 present-value dollars, as of the date shown.