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Armed with strong resolutions from the U.S. Congress and the U.N. Security Council, the United States is marching toward war with Iraq. The October 2002 Congressional Resolution authorizing the use of force describes U.S. policy, “to defend the national security of the United States against the continuing threat posed by Iraq and enforce all relevant United Nations Security Council resolutions regarding Iraq.”² In early November of 2002, the unanimous Security Council Resolution “warned Iraq that it will face serious consequences as a result of its continued violations of its obligations...”³

The major benefits of a war are reckoned to be disarming Iraq of its weapons of mass destruction and removing a leadership that is unrelentingly hostile to the United States. But what of the costs? Even asking such a question may be thought a sign of insufficient resolve at best and appeasement at worst. However, while cost estimates are often ignored when war is debated, most people recognize that the costs in dollars, and especially in blood, are acceptable only as long as they are low. If the casualty estimates mount to the thousands, if oil prices skyrocket, if a war pushes the economy into recession or requires a large tax increase, and if the United States becomes a pariah in the world because of callous attacks on civilian populations, then decision makers in the White House and the Congress might not post so expeditiously to battle.

¹ The author is grateful for helpful comments from Hill Huntington, Carl Kaysen, Joseph LaPalombara, Paul MacAvoy, Martin Malin, Doug Rae, Gustav Ranis, Bruce Russett, Herbert Scarf, Martin Shubik, Robert Silvers, John Weyant, John White, and anonymous readers from the Bush Administration. A non-technical version of this essay was published in The New York Review of Books, December 5, 2002 and is available at <http://www.nybooks.com/>.

² H.J.Res.114 (October 2002).

³ Resolution 1441 at Security Council meeting 4644, 8 November 2002.

Given the salience of cost, it is surprising that there have been no systematic public analyses of the economics of a military conflict in Iraq. This essay attempts to fill the gap. It is recognized that the estimates here are virtually certain to be wrong, for the fog of war extends far beyond the battlefield to include forecasts of political reactions and economic consequences.

However, as Keynes said, it is better to be vaguely right than precisely wrong.

While historians have documented the many miscalculations involved in war, little has been written on faulty economic forecasts, but a couple of examples will suffice. Lincoln's Secretary of the Treasury estimated that the direct cost of the war to the North would be \$240 million, which amounted to about 7 percent of annual GDP at that time. The actual cost to the North turned out to be \$3,200 million, or about 13 times the original estimated cost.⁴ The cost to the South was much greater, for most of its capital stock was destroyed and output per worker was depressed for nearly a century. The most prophetic economic analysis of war and peace of all time, Keynes's *Economic Consequences of the Peace*, did not foresee the great German inflation that was virtually at hand, nor did it contain any hints of the coming Great Depressions in Britain of the 1920s or of the world of the 1930s.

In recent times, the costs of the Vietnam War were grossly underestimated even as the buildup occurred. The original budget projection in early 1966 underestimated the cost for the subsequent fiscal year by \$10 billion, or about 1½ percent of GDP. In assuming that the war would end by June 1967, the Pentagon underestimated the total cost of the war by around 90 percent. The war in fact dragged on until 1973, and the total direct cost was in the range of \$110 billion to \$150 billion.⁵ The indirect costs were more difficult to gauge but comprised inflation and economic instability, civil unrest, and, some have argued, a growing disenchantment with authority and government in the United States.

⁴ See Table 2 below.

⁵ The economic story is thoughtfully laid out in Arthur Okun, *The Political Economy of Prosperity*, Brookings, Washington, D.C., 1970, Chapter 3.

Estimating the Costs of War

The Economic Background in Iraq

It is widely recognized that the United States is an economic and military superpower. The military status of Iraq has been carefully reviewed,⁶ and I will concentrate on the current economic situation, beginning with Iraq's major economic asset, oil.

Oil experts believe that Iraq has immense oil resources. Iraq has about 10 percent of the world's proven oil reserves and resources. A review in early 2002 by the U.S. Energy Information Agency stated:

Iraq contains 112 billion barrels of proven oil reserves, the second largest in the world (behind Saudi Arabia) along with roughly 220 billion barrels of probable and possible resources. Iraq's true resource potential may be far greater than this, however, as the country is relatively unexplored due to years of war and sanctions. Deep oil-bearing formations located mainly in the vast Western Desert region, for instance, could yield large additional oil resources, but have not been explored.⁷

Iraq's oil resources could satisfy current U.S. oil imports for almost a century.

Iraq's oil production in 2000 and 2001 averaged around 2.5 million barrels per day (mbpd). About 1 mbpd of this came from the northern Kirkuk field located largely in Kurdish Iraq, and the balance was produced largely in the southern, Shiite-majority Rumaila region.

What is the current state of Iraq's economy? The regime of Saddam Hussein has been as disastrous for the Iraqi economy as for other aspects of Iraqi society. Iraq's statistical system, like much of its economy, is in a sad state. None of the major international organizations has provided reliable data on Iraq's economy for the last decade, but a rough estimate of economic conditions can be obtained on the basis of informal estimates.

⁶ See particularly Anthony H. Cordesman, *Iraq's Military Capabilities in 2002: A Dynamic Net Assessment*, Center for Strategic and International Studies, Washington, September 2002.

⁷ <http://www.eia.doe.gov/emeu/cabs/iraq.html>

In recent decades, Iraq has been heavily dependent upon oil production. During those periods when oil production was not constrained by war or sanctions, it peaked at around 3 million barrels per day, or about 1 billion barrels per year. This constituted about half of Iraq's GDP during the late 1970s. GDP per capita peaked in 1979 at around \$9000 in 2002 prices.

The year 1979 also marked Saddam Hussein's rise to power. Since that time, Iraq has experienced one of the most catastrophic economic declines in modern history. It appears that per capita income was in the range of \$1000 - \$1200 in 2001. These figures suggest that in the 23 years since Saddam came to power, living standards in Iraq's economy have declined by around 90 percent.

The first phase of the economic decline came during the Iran-Iraq war (1980-88), and second during the first Persian Gulf War and under the subsequent UN sanctions. The Iran-Iraq war dealt a devastating blow to the Iraqi economy. The war destroyed a large part of Iraq's capital stock, reduced oil production and exports, and depleted much of its foreign assets and foreign exchange reserves. Kamran Mofid estimated that the total cost to Iraq was \$450 billion (in current dollars), which amounts to about eight years of Iraq's GDP at that time.⁸

The First Persian Gulf War (PGW-I) and the ensuing sanctions dealt two more blows to Iraq's economy. The war destroyed about \$230 billion of infrastructure.⁹ The UN sanctions in place since 1991 have been the most severe ever imposed. Under sanctions, oil production during the 1991-2002 period averaged 1.4 mbpd. Assuming that Iraq could have produced 3 mbpd during this period, the revenue shortfall since PGW-I was about \$150 billion. Although reliable statistics on Iraqi GDP are unavailable, it probably averaged \$25 billion in the 1990s. This suggests that the sanctions reduced Iraq's oil revenues by approximately six years' GDP, and the total cost to the Iraqi economy was probably even larger than that. Overall, the wars and sanctions during the Saddam regime probably cost Iraq in the order of two decades of GDP in lost output, capital, and financial resources. There are no parallels in modern history to economic devastation on that scale.

⁸ Kamran Mofid, *The Economic Consequences of the Gulf War*, Routledge, London, 1990.

⁹ Abbas Alnasrawi, *The Economy of Iraq*, Greenwood Press, Westport, CT., 1994.

Economic statistics are too abstract to capture the grim reality on the ground. A recent report captures the impact of economic decline on day-to-day life.

While the accuracy of statistics demonstrating the impact of United Nations sanctions on Iraq cannot be fully determined, there is no question that their impact has been severe. Infant mortality has doubled from the pre-sanctions era, with the Food and Agriculture Organization (FAO) reporting a fivefold increase in mortality among children under age five. Kwashiorkor and marasmus – symptoms of severe protein deficiency and usually seen only in famines – are increasingly common.... According to the World Health Organization (WHO), “The vast majority of the country’s population has been on a semi-starvation diet for years.” An FAO Mission to Iraq in the summer of 1997 found that 25 percent of young men and 16 percent of young women show signs of chronic energy deficiency, reflecting the reduced availability of food over the past seven years.... Before sanctions, 93 percent of urban and 70 percent of rural residents had access to potable water. Currently more than half of rural residents do not have access to clean water.¹⁰

The Costs of Wars Past

Before analyzing the current conflict, it will be useful to review the costs of past major wars. Table 1 shows the size of forces and total fatalities suffered by the United States in past wars.

¹⁰ Sheila Carapico, “The Impact of Sanctions in Iraq,” *Middle East Report*, Spring 1998, vol. 28, no. 206, no. 1 (slightly edited for brevity), available at <http://www.cam.ac.uk/societies/casi/info/themes.html#hum>.

Conflict	Population	Military Personnel		Fatalities	
	[millions]	[thousands]	[% of population]	[numbers]	[% of Population]
Revolutionary War	3.5	200	5.7%	4,435	0.127%
War of 1812	7.6	286	3.8%	2,260	0.030%
Mexican War	21.1	79	0.4%	1,733	0.008%
Civil War					
Union	26.2	2,803	10.7%	110,070	0.420%
Confederate	8.1	1,064	13.1%	74,524	0.920%
Combined	34.3	3,868	11.1%	184,594	0.538%
Spanish-American War	74.6	307	0.4%	385	0.001%
World War I	102.8	4,744	4.6%	53,513	0.052%
World War II	133.5	16,354	12.2%	292,131	0.219%
Korean War	151.7	5,764	3.8%	33,651	0.022%
Vietnam War	204.9	8,744	4.3%	47,369	0.023%
First Persian Gulf War	260.0	2,750	1.1%	148	0.000%

Table 1. American Casualties from Major American Wars

Source: Al Nofi, *Statistical Summary: America's Major Wars* at <http://www.cwc.lsu.edu/cwc/other/stats/warcost.htm>, based on *Principal Wars in which the US Participated: US Military Personnel Serving and Casualties*, Washington Headquarters Services, Directorate for Information Operations and Reports. US Department of Defense Records, Table 2-23. Casualties are limited to U.S. military forces.

Table 2 provides estimates of the direct military costs to the United States of major wars (again, statistics on losses to adversaries are not available). These costs omit veterans' benefits and health costs, which are appropriate budgetary items and have sometimes added substantially to costs but are difficult to reckon. They also omit interest costs, which are not appropriate economic costs as they reflect decisions about financing rather than costs. Major wars in the past cost more than one-half of a year's GDP. By contrast, the first Persian Gulf War cost only about 1 percent of GDP.

Conflict	Total Direct Costs of Wars (billions)	Total Direct Costs of Wars (billions)	Per capita cost	Cost
	[Current \$]	[2002 \$]	[2002 \$]	[% of annual GDP]
Revolutionary Wars (1775-1783)	0.1	2.2	447	63
War of 1812 (1812-1815)	0.09	1.1	120	13
Mexican War (1846-1848)	0.07	1.6	68	3
Civil War (1861-65)				
Union	3.2	38.1	1,357	84
Confederate	2.0	23.8	2,749	169
Combined	5.2	62.0	1,686	104
Spanish American War (1898)	0.4	9.6	110	3
World War I (1917-1918)	16.8	190.6	2,489	24
World War II (1941-1945)	285.4	2,896.3	20,388	130
Korea (1950-1953)	54.0	335.9	2,266	15
Vietnam (1964-1972)	111.0	494.3	2,204	12
First Gulf War (1990-1991)	61.0	76.1	306	1

Table 2. American Costs of Major Wars

Source: U.S. Commerce Department, *Historical Statistics of the United States*, Government Printing Office, 1975, vol. 2, series Y and AI Nofi, *Statistical Summary: America's Major Wars* at <http://www.cwc.lsu.edu/cwc/other/stats/warcost.htm>. Estimate in 2002 dollars are reflated using the GDP deflator. The costs include only costs to the U.S. federal budget and generally exclude postwar costs of veterans' pensions and health benefits.

Military Scenarios

An assessment of the costs of a war with Iraq is based on scenarios for the conduct of the war, the aftermath of hostilities, the impacts on oil markets, and the macroeconomic effects. It is impossible to project the detailed military strategies. However, we can describe the general contours of a “quick victory” and a “protracted conflict” and attempt to put price tags on each.

The difference between the good and bad cases is unlikely to revolve around the victor, for there is little doubt among military specialists that the United States will prevail if it enters with overwhelming force and perseveres through all obstacles. Rather, the difference lies in the duration of the conflict, the total damage to Iraq, civilian casualties, the potential for unconventional warfare, and the spread of the conflict outside Iraq.

Several studies have outlined the likely force requirements for a full-scale invasion of Iraq. A study prepared by the Democratic staff of the House Budget Committee¹¹ and studies by private specialists such as Anthony H. Cordesman, Michael E. O’Hanlon, and Kenneth M. Pollack¹² lay out a plausible starting point for the analysis. Most experts believe that the war would begin with an intensive bombing of Iraqi targets, focusing on command and control sites, leadership headquarters, Scud missiles, CBRN [chemical, biological, radiological, and nuclear] weapons sites, communications infrastructure, and elite Republican guard troops.¹³

These studies estimate that the U. S. will need to deploy between 150,000 and 350,000 personnel to achieve overwhelming force – this being approximately half of the troop strength deployed in the First Persian Gulf War. To some extent, the conduct of the war will be limited by decisions on

¹¹ *Assessing the Cost of Military Action Against Iraq: Using Desert Shield/Desert Storm as a Basis for Estimates*, An Analysis by the House Budget Committee, Democratic Staff, September 23, 2002.

¹² Anthony H. Cordesman, *Iraq’s Military Capabilities in 2002: A Dynamic Net Assessment*, Center for Strategic and International Studies, Washington, September 2002; Michael E. O’Hanlon, “Three Months to Baghdad,” *The Washington Times*, August 30, 2002; and Kenneth J. Pollack, *The Gathering Storm: The Case For Invading Iraq*, Random House, New York, 2002, Chapter 11.

¹³ In addition, there have been several newspaper reports on American battle strategies purportedly coming from administration sources, but these “leaks” are as likely to be designed to mislead and to inform.

use of territory by Turkey, Jordan, and Saudi Arabia. Specialists provide a wide array of scenarios ranging from heavy reliance on Special Forces to intensive air war to ground invasion, but it seems most likely that if the U.S. decides to overthrow the current regime it will deploy sufficient forces to ensure that the job is swiftly accomplished. All scenarios end up with some form of capitulation by Iraq, occupation of Baghdad, and destruction or capture of Saddam and Iraq's top leadership.

The "quick victory" scenario would involve some combination of strategy and luck in which Saddam Hussein and his top leadership were captured or killed, the Iraqi ground forces surrendered quickly, and the presence of U.S. forces prevented civil disorder from breaking out in the south or Kurdish regions. This is the outcome analyzed in the Democratic staff report, which envisions between 30 and 60 days of air war, invasion, and ground combat, followed by 2½ months of post-victory presence by troops in the theatre. It is hard to see how anything short of preemptive capitulation by the Saddam regime could be less costly than this scenario. U.S. casualties under the quick victory strategy might be similar to those in PGW-I of around 150 fatalities.

When the smoke has cleared, military analysts will spend many years sifting through the results of the battles. From an economic point of view, the tactical details are unpredictable, but they are also inessential for the economic analysis.

Prolonged Conflict and Nasty Outcomes

The quick victory scenario would resemble the first Persian Gulf War, the Kosovo War, and the Afghanistan war. The outcome might instead be a prolonged conflict if the dice of war roll unfavorably. Often, as in the case of September 11, problems arise simply because people thought they could not or would not happen. Sometimes, things go wrong because there are no good ways to prevent them. However, the opportunity for miscalculation is unlimited. Anthony Cordesman concludes his review of the battlefield prospects by emphasizing the intrinsic uncertainty:

Anyone who looks seriously at this list of independent variables will quickly see that it is impossible to predict when and how the United States will use decisive force, the Iraqi response to a U.S.-led coalition, the nature of a U.S.-led coalition,

how long Iraq can endure, and what strategy Iraq will actually pursue if it does use its CBRN weapons.¹⁴

Analysts point to a wide variety of potential complications and costs that need to be contemplated. These include the effects of prolonged conflict and an Iraqi urban defense strategy; the cost of buying support from allies; war with Israel; contagion of terrorist acts around the world; the use of weapons of mass destruction; impact on oil markets; subsequent terrorist acts inside or outside the United States; macroeconomic shocks; spillover to other policies; occupation and peacekeeping costs; reconstruction costs; humanitarian assistance; and costs of nation building. This section outlines some potential adverse military scenarios, and the subsequent sections attempts to put a price tag on them where they involve economic impacts.

Urban defense strategy

A first possibility, viewed as a serious risk by military analysts, involves an urban defense strategy on the part of the Iraqis. PGW-I was a turkey shoot in part because the turkeys were in the open desert. Cordesman described the implications of an urban strategy as follows:¹⁵

While much would depend on the loyalty of the population and the army, dispersing and sheltering in towns and cities would make it much harder to use air and missile power effectively. Iraqi fixed facilities would remain highly vulnerable, but Desert Fox, Kosovo, and Afghanistan have all shown that air targeting and weaponry have not reached the point where it is possible to destroy massive amounts of major ground weapons without high collateral damage and civilian casualties. Similarly, forcing the US and its allies to fight urban warfare on a city-by-city basis means close combat of a kind where many of the technical advantages of US troops have far less effectiveness. It also would mean giving the war a far more negative public profile in the eyes of the rest of the world.

The dangers of an urban redoubt strategy were stated forcefully by retired General Joseph Hoar, former Commander in Chief of the U.S. Central Command, before the Senate in September 2002:¹⁶

¹⁴ Anthony H. Cordesman, *Iraq's Military Capabilities in 2002: A Dynamic Net Assessment*, Center for Strategic and International Studies, Washington, September 2002, p. 81.

¹⁵ Ibid, pp. 7f.

¹⁶ <http://www.fednet.net/archive/> and cited at <http://www.smh.com.au/text/articles/2002/09/27/1032734328055.htm>.

The nightmare scenario is that six Iraqi Republican Guard divisions and six heavy divisions reinforced with several thousand anti-aircraft artillery pieces defend the city of Baghdad. The result would be high casualties on both sides as well as in the civilian community. U.S. forces would certainly prevail, but at what cost and what cost as the rest of the world watches while we bomb and have artillery rounds exploded in densely populated Iraqi neighborhoods.... All our advantages of command and control, technology, mobility, all of those things are in part given up and you are working with corporals and sergeants and young men fighting street to street. It will look like the first 15 minutes of *Saving Private Ryan*.

The peril of urban warfare for the United States is that Iraqi forces have better cover, while U.S. precision weapons are not smart enough to separate out troops from civilians or tanks from trucks. O'Hanlon notes that "even after eight years of further modernization after Desert Storm, NATO airpower was of quite limited effectiveness against small groups of Serb forces operating within forests, towns, and civilian populations in the Kosovo war."¹⁷

An urban defense strategy might produce much higher casualties on both sides. O'Hanlon estimates the casualties in an Iraqi war as follows:¹⁸

Based on available methodologies, the likely numbers of U.S. military personnel killed in a future war to overthrow Saddam Hussein could plausibly range anywhere from roughly 100, in the event of little fighting, to 5,000, in the event of intense if relatively short urban combat, with total numbers of wounded about three to four times as great either way.

An effective urban-defense strategy by Iraq would prolong the combat, increase casualties, and broaden the destruction of Iraq's urban areas and infrastructure. Collateral damage and civilian deaths would probably be much greater, and the nightly news (or at least the news in the Arab world) would produce many grisly pictures. Intensive urban fighting would provoke massive movements of refugees fleeing combat zones and seeking the protection of American forces. A long and bloody urban conflict would induce hundreds of thousands of protesters, or more, on the streets of America, Europe, and the Muslim world.

¹⁷ Michael E. O'Hanlon, "Counting Casualties: How many people would die in an Iraqi War?"
Slate, September 25, 2002.

¹⁸ Id.

Iraqi Use of Chemical and Biological Weapons

A major risk is that Iraq might successfully use biological or chemical weapons. The most likely targets would be U.S. troops, Saudi Arabia, or Israel. Cordesman provides a useful summary of the prospects:

In spite of some defector claims, it seems doubtful that Saddam has even one nuclear weapon. The same, however, is probably not true of biological and chemical weapons and a radiological weapon is possible. Iraq may also have enough components to assemble as many as 25 Scuds, has shorter range missiles, can modify drones and combat aircraft to act as "cruise missiles," and has significant capability to smuggle weapons of mass destruction out of Iraq and deliver them covertly. There is considerable evidence that he may have the capability to make dry, storable biological weapons in aerosol form.¹⁹

Unless U.S. forces are caught by surprise, they have protective gear and training against biological and chemical weapons. However, U.S. troops have not experienced germs or gas under combat conditions in modern times, so the effectiveness of training and equipment are not established. The major threat, however, is the casualties and panic that would occur if these weapons were launched on civilian populations in large cities.

Iraqi preemption and wider conflict in the region

Another set of worrisome outcomes would occur if the war spills outside of Iraq. For example, Iraq might preempt the preemptors by attacking the population centers of Kuwait or Saudi Arabia, or attempting to destroy the oil facilities of other Gulf states. (I discuss the oil issues below.)

Alternatively, the conflict might stoke widespread resentment against the U.S., boiling over into political protests, mob action, adverse policies, or even regime changes outside Iraq. The parade of concerns includes attacks by Russia or China on dissident groups or regions, turmoil in the Indian subcontinent, a takeover of Pakistan by fundamentalists, military conflict between Israel and its neighbors, or terrorist actions by Al Qaeda. The range of outcomes here is so broad as to defy any serious attempt to quantify the likelihood or impacts.

¹⁹ Anthony H. Cordesman, "Iraq's Military Capabilities: Fighting A Wounded, But Dangerous, Poisonous Snake," Center for Strategic and International Studies, December 3, 2001, p. 8.

One particularly dangerous scenario would involve a damaging Iraqi attack on Israel, perhaps with chemical or biological weapons. Israel would probably strike back with great ferocity, leading to a further poisoning of relations between the Israel and the Arab world as well as of U.S.-Arab relations. A most frightening scenario is described by Cordesman: "If Iraq should succeed in delivering extremely lethal biological agents against an Israeli city, Israel would probably massively retaliate with nuclear ground bursts against every Iraqi city not already occupied by U.S.-led coalition forces."²⁰

These three nasty outcomes – urban warfare, unconventional warfare, and wider escalation – are obvious to both sides. The U.S. has undoubtedly analyzed these scenarios and has plans to prevent, preempt, deter, or overcome them.²¹ Successfully avoiding a wider war is probably the key to a rapid and relatively bloodless victory.

The Military Costs of a War

What is known about the cost of a war in Iraq? Two conceptual points need to be made before starting the analysis. First, we are attempting to estimate the total costs to the nation, not just the budgetary costs. That is, we are asking how much of our national output will be sacrificed by the war and its consequences – in effect, the loss of butter because of the resort to guns.

Second, these calculations should count only the incremental costs of the war. The 82nd Airborne Division has to be paid whether it is in Iraq or North Carolina. Only additional costs such as the cost of transport, the combat pay, and the replacement cost of the munitions should be counted in the cost of the war. The implication of this conceptual point is that the cost of a short war is likely to be surprisingly small because most of the costs have already paid for in the current defense budget.

Lindsey's Estimates

²⁰ Anthony H. Cordesman, *Iraq's Military Capabilities in 2002: A Dynamic Net Assessment*, Center for Strategic and International Studies, Washington, September 2002, p. 45.

²¹ A report on a new U.S. approach to urban warfare is given in Eric Schmitt and Thom Shanker, "Threats and Responses: Military Tactics; U.S. Refines Plans For War In Cities," *The New York Times*, October 22, 2002, p. A-1.

The only public estimate of the cost of the war by the Bush Administration came in an interview by Larry Lindsey, the economist-in-residence in the West Wing. As reported by *The Wall Street Journal*, Lindsey estimated the “upper bound” cost of \$100 billion to \$200 billion. He dismissed the cost as small, stating that these numbers would be only 1 to 2 percent of U.S. GDP. The *Journal* report continued:

Mr. Lindsey said that Mr. Hussein's ouster could actually ease the oil problem by increasing supplies. Iraqi production has been constrained somewhat because of its limited investment and political factors. “When there is a regime change in Iraq, you could add three million to five million barrels of production to world supply” each day, Mr. Lindsey estimated. “The successful prosecution of the war would be good for the economy.”²²

The lead editorial in the *Journal* joined Lindsey’s upbeat assessment, opining, “the best way to keep oil prices in check is a short, successful war on Iraq that begins sooner rather than later.”²³

The next day, the White House spokesman, Scott McClellan distanced the White House from Lindsey’s interview.²⁴ OMB Director Mitch Daniels stated that Lindsey’s estimates were “very, very high.” An authoritative administration source said to the author that he knew of no basis for Lindsey’s comments. Indeed, the one factual element in Lindsey’s comments – the statement that a regime change in Iraq could add 3 to 5 million barrels per day (mbpd) to oil production – is far off base. The oil situation is discussed below, but the general conclusion is that Iraq’s production in 2001 was close to its sustainable level.

It is certain that the Pentagon has made internal forecasts of the military cost of the war. The Council of Economic Advisers has reportedly sent a classified study of the economic impacts of a war in Iraq to the President. None of these has been made public, nor are they likely to be released for a decade. In short, aside from Lindsey’s assessment, the Administration has remained silent on the economic impacts of the war.

²² *WSJ*, September 15, 2002.

²³ *WSJ*, September 15, 2002 (“Saddam’s Oil”).

²⁴ White House Daily Briefing, September 16, 2002.

Estimates by the Democratic Staff of the House Budget Committee

There were two published studies of the prospective cost of a war with Iraq prepared by government budget analysts through the mid-November 2002. One was undertaken by the Democratic Staff of the House Budget Committee (the House study)²⁵ and the second was by the Congressional Budget Office (the CBO study).²⁶

This House study was a “top down” analysis. It assumed that the costs of the second Persian Gulf War could be projected based on the costs of the 1990-91 conflict. The study priced two scenarios for the war. The most relevant one is “New War A,” which involves 250,000 troops (the other scenario plans for only half that number). As Table 3 shows, New War A is estimated to cost between \$48 billion and \$60 billion.²⁷ This figure is slightly less than the earlier war, which cost about \$80 billion in today’s dollars.

²⁵ *Assessing the Cost of Military Action Against Iraq: Using Desert Shield/Desert Storm as Basis for Estimates*, An Analysis by the House Budget Committee, Democratic Staff, September 23, 2002 (hereafter, “House study”).

²⁶ Congressional Budget Office, “Estimated Costs of a Potential Conflict with Iraq,” September 2002, available at <http://www.cbo.gov/> (“CBO study”).

²⁷ The House study also includes interest costs in the estimates. These costs are inappropriate, however, for they depend upon the financing of the war.

<u>Cost Category</u>	<u>Persian Gulf</u>	<u>New War A</u>
Airlift/Sealift (Buildup)	10.6	6.6
Personnel & Personnel Support	21.5	11.3 - 13.4
Operating Support & Fuel	32.2	14.6 - 24.1
Investment	10.1	10.1
All Other	<u>5.6</u>	<u>5.6</u>
<i>Subtotal, Cost of Defeating Iraq</i>	79.9	48.3 - 59.8

Table 3. Comparing the Costs of the First Persian Gulf War to Estimates of the New War Scenario “A” (in billions of 2002 dollars)

Source: House Study, p. 2.

Most of the cost involves fuel and extra costs for the buildup. The costs labeled “investment” are somewhat vague but appear to include the replacement cost of weapons, ammunition, weapon systems, and other equipment. The total costs of the Second Persian Gulf War (PGW-II) are estimated to be smaller than those for PGW-I because the size of the force is estimated to be about half as large.

The advantage of relying upon the costs of Desert Shield/Desert Storm is that these represent the actual costs of operating in the same theater of operations against the same enemy. Therefore, as long as the war unfolds in roughly the same manner, the estimates are likely to be relatively accurate.

Estimates by the Congressional Budget Committee

The CBO study used a different methodology from the House study. It examined two options – a “heavy ground” option involving 370,000 military personnel in the Persian Gulf and a “heavy air” option relying primarily on air power with 250,000 military personnel. The CBO methodology was a “bottom up” approach, which priced out the components and added them up, rather than the “top down” approach of the House study, which priced the war based on the numbers from the earlier conflict.

Table 4 shows the CBO’s building blocks used to estimate the costs of the “heavy ground” war. Two parts, deployment and redeployment, are fixed in nature and total about \$20 billion. The other component of wartime cost is combat, estimated to cost \$9 billion per month for the first month and \$8 billion for subsequent months. (The heavy air scenario costs slightly less.)

Cost Element	Deployment (Three months)	First Month of Combat ^d	Subsequent Months of Combat ^e (Per month)	Redeployment (Three months)	Occupation (Per month)
Personnel and Personnel Support ^a	4.3	1.4	1.4	4.3	n.a.
Operations Support ^b	5.4	7.1	5.4	1.5	n.a.
Transportation ^c	<u>2.8</u>	<u>0.7</u>	<u>0.7</u>	<u>1.5</u>	n.a.
Total	12.5	9.2	7.5	7.3	1.4 to 3.8 ^f

Table 4. Costs of Different Components of a War in Iraq for Heavy Ground Force Option (in billions of 2002 dollars)

Source: Congressional Budget Office Study, Table 3.

We can compare the two studies by plugging the assumptions for duration in the House report into the CBO costs for the different components. The “New War A” assumption in Table 3 assumed 30 days of combat plus 2½ months of post-combat presence in the region. For a conflict of that duration, the CBO formula yields \$44 billion as compared to the House study estimate of \$48 billion to \$60 billion.

The two studies come to a slightly different conclusion, which is not surprising given that they use completely different methodologies. A reasonable ballpark estimate based on these two studies is that the cost of a short and successful war would be around \$50 billion. This compares with the cost of \$80 billion for PGW-I in 2002 dollars.

Neither report estimates the costs of a protracted war. These costs would depend upon the length of the conflict, the extent to which it spread to other countries, and the need for the United States to devote more resources to the conduct of the war. Pollack considers a six-month ground invasion to

be the outer limit of the length of the conflict.²⁸ One might rather consider, as a reasonable upper bound, the case where Iraq pursued an urban defense strategy and where some of the neighboring countries refused basing and overflight rights to the U.S. In this situation, the conflict, including buildup and mopping up operations, might drag on for a year, and the U.S. might need to devote 50 percent more resources than in the “heavy ground” option analyzed by the CBO. In that case, the cost would rise from \$50 billion to around \$140 billion. While much larger, these military costs would still be only around 1½ percent of GDP – on the scale of the Mexican or Spanish-American wars rather than the more costly Vietnam or Korean wars.

Costs of Postwar Occupation and Reconstruction

The two Congressional studies are valuable contributions to public awareness of the costs of the coming war. They are incomplete, however, because they explicitly exclude a number of potential costs, generally non-military in nature, most of which are highly uncertain. The reports exclude, with the exception of a brief mention in the CBO study, estimates of the total costs of occupation, peacekeeping, democratization, nation building, and humanitarian assistance. They assume that there will be no use of weapons of mass destruction or subsequent terrorist activities. Furthermore, they exclude the costs of persuading other nations to support the U.S and exclude impacts upon oil supplies, macroeconomic activity, and the federal budget.

This point was put more dramatically by James Fallows, who recently asked a number of experts, “What will the U.S. do when it gets to Baghdad?”²⁹ He found a long list of worries. The U.S. might easily face a humanitarian crisis, with tens of thousands of wounded and hundreds of thousands of refugees without adequate shelter or food. Someone will have to do the policing to keep yesterday’s victims from becoming tomorrow’s tyrants. The U.S. might face the cleanup of any biological or chemical weapons attacks; anthrax, for example, can remain potent for many years. Moreover, the Iraqi population might view the Americans as occupation troops rather than as liberators – in essence, they might see themselves as Palestinians on the Tigris.

²⁸ Kenneth J. Pollack, *The Gathering Storm: The Case For Invading Iraq*, Random House, New York, 2002, Chapter 11.

²⁹ James Fallows, “A ‘Liberated’ Iraq Could End Up Like Weimar Germany,” September 24, 2002, Guardian/UK.

Occupation and peacekeeping

General Wesley Clark, who oversaw implementation of the Bosnia peace accord and commanded NATO forces in Kosovo, recommended that, after a war in Iraq, the United States should plan for humanitarian assistance, police and judicial capabilities, emergency medical and reconstruction assistance, and preparations for a transitional governing body.³⁰

It seems highly likely that there will need to be a substantial occupation and peacekeeping force in Iraq for a lengthy period after the war. There is no evidence that the American people are prepared for the potential scale of the operation. Gordon and O'Hanlon provide the following estimates:³¹

[T]o avoid the risk of prolonged conflict among various Kurdish, Shi'a, and Sunni groups, which could draw Iraq's neighbors into a regional conflict, the United States would need to lead a major international effort to help form a stable national government. Such an effort could require a multi-year military presence by tens of thousands of U.S. military forces, implying annual military costs of at least \$10 billion. (In Bosnia, one-eighth the size of Iraq and with one-sixth the population, NATO deemed it necessary to deploy over 50,000 peacekeeping troops, at a cost of some \$10 billion per year; six years later nearly 20,000 troops remain).

Pollack's estimated that the force size required for security in Iraq might initially be as high as 250,000 to 300,000, but that after five years the forces could be reduced to 100,000.³²

The CBO estimates are considerably higher than Gordon and O'Hanlon's:

The costs associated with an occupation force for Iraq remain highly uncertain, varying from about \$1 billion to \$4 billion a month, depending on the assumptions used about force size and operations. Some military experts suggest

³⁰ Statement Of General Wesley K. Clark, U.S. Army (Retired), Before The House Armed Services Committee United States House Of Representatives, September 26, 2002 at <http://www.house.gov/hasc/openingstatementsandpressreleases/107thcongress/02-09-26clark.html>.

³¹ Philip H. Gordon and Michael E. O'Hanlon, "Should the War on Terrorism Target Iraq? Implementing a Bush Doctrine on Deterrence," Brookings, Policy Brief #93, January 2002.

³² Kenneth J. Pollack, *The Gathering Storm: The Case For Invading Iraq*, Random House, New York, 2002, p. 398.

that a force of up to 75,000 peacekeepers might be needed; another plan discussed by the U.S. Central Command calls for up to 200,000 troops. For its estimate, CBO used an average cost for a U.S. Army peacekeeper consistent with experiences in Bosnia and Kosovo, and assumed that U.S. force levels would range between 75,000 and 200,000 troops. It also assumed that replacement occupation personnel and equipment would be periodically rotated to the theater in a manner similar to that used in recent peacekeeping activities. However, current Army forces would be unable to support those rotations for a prolonged 200,000-person occupation.³³

The CBO numbers are between \$17 billion to \$46 billion per year, or approximately \$250,000 per peacekeeper per year. This figure is at the low end of the estimated cost of U.S. peacekeepers in Kosovo; it might actually underestimate the cost if the post-combat environment in Iraq is hostile and its dangers resemble the West Bank more than the Balkans.

The duration of the occupation-peacekeeping effort is unpredictable. The occupation of Japan lasted seven years, while the U.S. has stationed more than 30,000 troops in South Korea for a half-century. It is difficult to see how a successful occupation of Iraq could be less than five years and might easily extend for two decades. While there are no public estimates of the total, a minimum cost would be \$75 billion and an upper bound of \$500 billion over the next decade is consistent with peacekeeping operations in the Balkans and the size and scope of the task in Iraq.³⁴

Reconstruction costs and nation building

The democratization of Iraq is one of the most politically appealing aspects of the Bush administration's current policy. The stated U.S. policy is to "promote the emergence of a democratic government." President Bush committed the United States to nation building in his October 7, 2002 address:

Freed from the weight of oppression, Iraq's people will be able to share in the progress and prosperity of our time. If military action is necessary, the United States and our allies will help the Iraqi people rebuild their economy, and create the institutions of liberty in a unified Iraq at peace with its neighbors.³⁵

³³ CBO Report, p. 4.

³⁴ The low and high numbers assume, respectively, peacekeeper costs of \$200,000 to \$250,000 per peacekeeper per year, with the numbers from 75,000 to 200,000, and for a period of 5 to 10 years.

³⁵ <http://www.whitehouse.gov/news/releases/2002/10/20021007-8.html>

This goal has been widely praised by columnists and political leaders, as exemplified by Thomas Friedman's appraisal:

So I am for invading Iraq only if we think that doing so can bring about regime change and democratization. Because what the Arab world desperately needs is a model that works – a progressive Arab regime that by its sheer existence would create pressure and inspiration for gradual democratization and modernization around the region.³⁶

When some semblance of order has been imposed, the U.S. and its coalition partners must turn to reconstruction and nation building. What are the goals for Iraq, and how would these goals be accomplished? Would the regime change be followed by turning over the reins of power to local representatives as occurred with the Loya Jirga as in Afghanistan? Would the U.S. install an occupation regime like those in Germany or Japan after World War II, imposing a western-style constitution, a free press, free elections, and all the other infrastructure of western democracy? Would the U.S. introduce a new Marshall Plan for democracies of the Middle East?

Planning for postwar Iraq within the Bush Administration is in its infancy. Newspaper reports on one day in mid-October suggested that the Bush administration was coalescing around a plan modeled after the postwar occupation of Japan. However, the very next day, administration sources indicated that the Japanese model had too much of the taint of "occupation" and that the U.S. would be friends rather than enemies. About the same time, Secretary of State Powell candidly described the state of U.S. planning: "And we are obviously doing contingency planning, and there are lots of different models from history that one could look at: Japan, Germany, but I wouldn't say that anything has been settled upon..."³⁷ Therefore, the answer clearly is that as of mid-October, the U.S. does not know what it will do when it gets to Baghdad.

Scholars who have studied the problems of nation building caution that the process is difficult, costly, and fraught with dilemmas. Recent examples of U.S. nation building, including Haiti, Bosnia, and Afghanistan,

³⁶ Thomas Friedman, *The New York Times*, September 18, 2002.

³⁷ Interview by Robert Siegel of NPR's "All Things Considered" with Secretary Colin L. Powell, Washington, D.C., October 11, 2002, available at <http://www.state.gov/secretary/rm/2002/14344.htm>

indicate that the United States has not discovered any formulas for quick success. A recent review of efforts concludes:

Like Afghanistan, Iraq is a country torn by profound ideological, religious and ethnic conflicts. Before democratization can even begin, the United States would have to assemble a power-sharing agreement among ethnic Kurds, Shiites, and Sunni Muslims. Because no obvious leader is waiting in the wings and the exiled Iraqi opposition is chronically divided, Washington would have to provide the political and, most importantly, military and security infrastructure necessary for holding a new government together. In short, the United States would have to become engaged in nation building on a scale that would dwarf any other such effort since the reconstruction of Germany and Japan after World War II. And it would have to stay engaged not just years, but decades, given the depth of change required to make Iraq into a democracy.³⁸

The length of the nation-building effort is highly uncertain, but it is hard to see how a serious attempt to turn Iraq into a modern democratic society could be accomplished in less than a decade. This effort is orders of magnitude more than the United States has undertaken in the region in the past; the U.S. spent about \$250 million on democracy programs in the Middle East in the last decade.

Reconstruction needs will depend upon the extent of destruction during a war as well as the current situation of the Iraqi economy. There are several different approaches to estimating this number. A 1991 report to the United Nations on restoring Iraq's infrastructure back to its prewar condition estimated a cost of \$22 billion in 1991 prices.³⁹ Converting this into 2002 prices and accounting for further deterioration in Iraq's economy and for a short war suggests that \$30 billion in reconstruction costs would be a reasonable estimate. An alternative approach is to look at the capital-output ratio for oil-rich developing countries like Iraq. This number is usually in the range of 1 to 2. If Iraq is to attain a per capita GDP equal to Egypt or Iran, and if one-half of the capital stock requires rebuilding, this would imply rebuilding needs of about \$1200 per capita, or a total of \$30 billion. Estimates by the World Bank have found that rebuilding in Lebanon, East Timor, and

³⁸ Marina Ottaway, Thomas Carothers, Amy Hawthorne, and Daniel Brumberg, "Democratic Mirage in the Middle East," Policy Brief no. 20, Carnegie Endowment for International Peace, October 2002.

³⁹ *Report to the Secretary-General dated 15 July 1991 on humanitarian needs in Iraq prepared by a mission led by the Executive Delegate of the Secretary-General for humanitarian assistance in Iraq, S/22799*, 17 July 1991. Excerpts are available at <http://www.cam.ac.uk/societies/casi/info/undocs/s22799.html>.

Bosnia would require approximately \$1000 per person, which implies a total of around \$25 billion.⁴⁰ I take an estimate of \$30 billion in 2002 dollars as the best guess for the minimal rebuilding needs in postwar Iraq (including the oil sector).

A more ambitious plan would be a “Marshall Plan for Iraq.”⁴¹ To refresh our memories, recall that the Marshall Plan cost the United States \$13.3 billion over a four-year period, this being about 4½ percent of the GDP of that period, or about \$450 billion as a share of today’s GDP. At today’s income levels, the assistance comprised about \$2000 per person, or \$500 per person per year, in the recipient countries, which is about two times the size of the minimal figure cited above.

The parallel is optimistic, even simplistic, for the Marshall plan was introduced after the countries of Western Europe had undertaken a substantial part of their reconstruction efforts, and European countries had most of the infrastructure of democracy and civil society in place before the war. Moreover, the threat of an Islamic republic, or even a fundamentalist regime, in Iraq will worry nation builders looking to other countries, like Iran or Algeria. To recognize that the nation building in Iraq begins with much less social capital and civic infrastructure, we might conservatively expect that the effort would be six rather than four years of effort at the expenditure rate of the Marshall Plan, for a total of \$75 billion.

The numbers for both reconstruction and nation building, therefore, are substantial, from a minimum \$30 billion for reconstruction to as much as \$105 billion.

⁴⁰ World Bank, “Afghanistan: World Bank Approach Paper,” November 2001, available at [inweb18.worldbank.org/SAR/sa.nsf/Attachments/ az/\\$File/afgApproach.pdf](http://inweb18.worldbank.org/SAR/sa.nsf/Attachments/az/$File/afgApproach.pdf).

⁴¹ Roger D. Carstens, “A Marshal plan for Iraq,” *The Washington Times*, August 5, 2002. (“The solution is to provide U.S. leadership in the implementation of a Marshall plan for Iraq. An Iraq that is stable, strong and pro-American is in our interests. Both America and the people of Iraq deserve it.”)

Humanitarian assistance

Humanitarian assistance will be necessary to feed, house, clothe, and care for the refugees, wounded, and ill in Iraq, and possibly in neighboring countries. Estimates of the costs of humanitarian assistance are uncertain because they involve knowing the population at risk, the level of need after the war, and the duration of the assistance.

One benchmark for estimating the cost of humanitarian assistance is the experience in Bosnia and Herzegovina (including Republika Srpska) during the 1990s. Humanitarian assistance in the country was \$5 - 6 billion during the war and \$7 - 8 billion in the post-war period, for a total of \$12 - 14 billion over a period of approximately a decade. On a per capita basis, this amounted to approximately \$500 per person per year.⁴²

Only the roughest of estimates are available for the cost of humanitarian assistance. A plausible estimate would be that 1 to 5 million residents of Iraq (out of a total population of around 24 million) would require assistance in the post-war environment. If the time required for assistance was between two and four years, then the total cost of humanitarian assistance would be \$1 billion to \$10 billion.

Who Will Pay for the War?

Who will pay for all these efforts? Iraq has one major advantage compared to recently damaged countries like Afghanistan, Serbia, Bosnia, or Kosovo because it has major oil resources that might be tapped. If Iraq could rebuild its production back to 3 million barrels per day, this would yield around \$25 billion per year at prevailing oil prices.

However, claims on these resources will be numerous. To begin with, these revenues amount to only \$1000 per capita in today's Iraq, and much of these funds will be required for domestic fuel use and imports of food, medicines, and other necessities of daily life. Some revenues would be needed to finance the rebuilding and upgrading of Iraq's economic infrastructure. Additionally, Iraq has close to \$100 billion of foreign debts and Kuwaiti reparation claims. As of early 2002, there were \$78 billion of

⁴² Žarko Papić, "Normal Social Policy and International Humanitarian Assistance in the Conflict Context," IBHI, Sarajevo, October 2000, available at www.stakes.fi/gaspp/seminar/papapic.pdf.

business claims against Iraq, but only \$3.6 billion had been paid by Iraq.⁴³ The claims against Iraq after the 1991 war totaled over \$300 billion. Given all these claims, to divert funds from vital necessities to pay the expenses of the U. S. occupation forces would be economic and political folly.

Will other countries step up to pay the bills, as they did after the First Persian Gulf War? Probably not. If the war is undertaken without U.N. sanction or broad international support, the U.S. could be forced to pay the lion's share of the costs. Indeed, the United States may actually need to increase assistance or provide debt relief to countries to persuade them to join a coalition. The House study suggests that the U.S. might need to forgive up to \$4 billion in Turkish loans to gain Turkey's participation in the effort. This would not be a direct economic cost but would qualify as a "negative allied contribution" to the cost of the war.

Can these costs be covered by the United Nations? Current U.N. peacekeeping efforts of \$2.6 billion per year are a pittance by comparison to the needs in post-war Iraq. In addition, payments for U.N. peacekeeping missions are in arrears, and little of the half-billion dollar commitment for the reconstruction of Afghanistan has been paid.

Will the U.S. actually undertake the massive effort required to rebuild and democratize Iraq? In virtually every country where the U.S. intervened militarily over the last four decades, it has displayed a "hit and run" philosophy where bombing runs have seldom been followed by construction crews. The latest war in Afghanistan is a signal example. In the year ending September 2002, the U.S. spent \$13 billion on the war effort. By contrast, the total Pentagon effort has committed only \$10 million to civil works and humanitarian aid.

The disproportion between military destruction and civilian construction in Afghanistan and elsewhere does not augur well for an ambitious rebuilding effort in Iraq. Is it plausible that such an enormous civilian effort will be appropriated when the U.S. today spends only \$15 billion annually on foreign aid for the entire world? The prospect of an ambitious nation-building plan that is left half-built is the most realistic prospect.

⁴³ "Iraq Presses Firms to Forgo Billions in War Reparations," *Wall Street Journal*, June 21, 2002.

Broader Economic Impacts: Oil Markets and the Overall Economy

The economic ripples of a war with Iraq are likely to spread beyond the direct budgetary costs, with the prospect of raising the cost of imported petroleum, slowing productivity growth, and possibly triggering a recession. These broader economic impacts will depend largely on the war's effects on oil prices and the psychological reactions that might occur if a war is protracted or has unfavorable side effects of the kind discussed above.

Concerns about oil markets in the context of war in the Middle East are not idle. Every recession in the last three decades has been associated directly or indirectly with turmoil in oil market, terrorism, or war. Both of the oil-price shocks of the 1970s led to sharp recessions, while the First Persian Gulf War induced a sharp spike in oil prices that contributed to the 1990 recession. Talk of war over the last half year has produced a "war premium" in oil prices amounting to perhaps \$5 a barrel.

In weighing potential costs of a war, it is useful to analyze first the impacts of war that operate directly through oil and energy markets and second the effects on the broader economy. The oil-market effect operates by raising the costs of imported oil as well as by lowering productivity growth. The broader economic impact, which is associated with the business cycle, comes through the impact on the economy of defense spending as well as psychological effects operating through private investment and consumption. I discuss each of these two mechanisms in turn.

Oil Markets

Background on oil markets

War in the Persian Gulf would affect the economy if oil prices rise sharply due to production declines arising either from physical damage or if oil producers restrict production after the war.

When pressed on the reasons for the first Persian Gulf War, Secretary of State James Baker stated the reason was "jobs, jobs, jobs." When later asked what this meant, Baker stated, "[T]he fact of the matter is it would have boiled down to jobs if Saddam Hussein had been able to control the flow of oil from the Persian Gulf or to, by controlling his own oil and

Kuwaiti's oil, act in a way to influence prices."⁴⁴ So, perhaps Baker was really saying that the reason for the war was "oil, oil, oil."

The current administration has said little about jobs or oil, although the interview with Larry Lindsey suggests that thoughts about improved oil security and control of Iraq's oil resources after the war may be hidden in the classified analyses. Whatever the role of oil supplies in the Bush administration's calculus, many foreign nations suspect that getting control of Iraqi oil supplies for American companies and American SUVs is high on the American priority list.

Some background information will be useful for this discussion. World oil consumption in 2000 and 2001 averaged around 68 million barrels per day (mbpd). OPEC was responsible for approximately 29 mbpd, or 42 percent, of the total. The Arab states plus Iran contributed 22 mbpd, or 32 percent, of world production. Excess capacity in OPEC countries in 2001 was around 4 mbpd, which was dangerously low by historical standards (there is little or no excess capacity outside OPEC). In earlier periods, when excess capacity dipped to or below 4 mbpd – as occurred in 1973-74, 1978-79, and 1991 – oil prices rose sharply.

A particularly worrisome outcome would be a wholesale destruction of oil facilities in Iraq, and possibly in Kuwait, Iran, and Saudi Arabia. In the first Persian Gulf War, Iraq destroyed much of Kuwait's petroleum infrastructure as it withdrew. The damage included most of Kuwait's oil wells in addition to refineries and export facilities. The sabotage was apparently well planned, and not just a last minute act of revenge, and shut down Kuwaiti oil production for approximately a year.⁴⁵ Kuwait's production was 0.2 mbpd in 1991, 1.1 mbpd in 1992, and only reached 1.9 mbpd – close to prewar levels – by 1993.

Cordesman suggests the possibility of a reprise: "Saddam Hussein might well see burning Iraq's oil fields and CBRN [chemical, biological,

⁴⁴ Frontline/BBC, "Oral History," January 1996, available at <http://www.pbs.org/wgbh/pages/frontline/gulf/oral/baker/5.html>.

⁴⁵ U.S. Central Intelligence Agency, "Damage Assessment - Kuwait Oil," April 2002, available at http://www.fas.org/irp/gulf/cia/960702/70076_01.htm.

radiological, or nuclear] attacks on major Gulf oil fields as both a defense and form of revenge.”⁴⁶

Unless the Iraqi leadership is caught completely off-guard, destruction of Iraq’s oil production facilities in a new war is probably within the capabilities of Iraqi forces. There is no military logic behind this step, but such an act of revenge cannot be ruled out. This would reduce world oil capacity by about 3 mbpd. Sabotage of Kuwait’s northern oil fields is not impossible, particularly as a preemptive measure, but sabotage of other countries’ oil fields would require a military operation that Iraq was unable to accomplish in PGW-I and is even less capable of undertaking today. Contamination of major areas by biological or chemical means would pose much greater problems for oil markets, but the risks of that contingency are impossible to assess.

A final possibility is a concerted reduction in oil production. This might occur through a boycott against the U.S. and other Western countries, such as the one that followed the 1973 Arab-Israeli war, or if control of a substantial part of OPEC’s oil resources fell under the control of anti-Western elements. This possibility is worrisome because of the high degree of dependence of industrial countries, particularly the United States, on imported oil.

Potential impacts of a third oil-price shock

Among the dizzying array of possible unfavorable outcomes in oil markets, I analyze first an unfavorable case and then a favorable case. For the unfavorable case, I analyze an oil-market shock similar in magnitude to the oil-price shocks of 1973-74 and 1978-79. In each of these periods, restrictions in production led to sharp increases in the price of oil imports. From 1972 to 1974, prices of imported oil rose by a factor of four, while from 1978 to 1980 prices rose by a factor of slightly under three.

The unfavorable case assumes a decline in world oil production of 7 million barrels per day, partially offset by a drawdown of 2½ million barrels per day from strategic oil reserves. Many combinations of events – arising from wartime destruction, terrorism, or political reaction of governments in the region – could lead to such an outcome. Specific examples would be

⁴⁶ Anthony H. Cordesman, *Iraq’s Military Capabilities in 2002: A Dynamic Net Assessment*, Center for Strategic and International Studies, Washington, September 2002, p. 81.

destruction of most of Iraq's oil-production capacity along with one-quarter of the productive capacity of other Gulf states. Another possible cause would be an OPEC boycott that cut oil production by 25 percent. The boycott route is economically plausible in oil markets because producer profits go up rather than down with lower production.

We should avoid the common fallacy of thinking that the U.S. or any country can insulate its economy from an oil shock because it imports oil from "safe" sources. As long as oil prices are determined in the world market, oil is a fungible commodity, and a price shock anywhere affects importers everywhere.

A recent study by George Perry analyzed the short-run impacts of disruptions of world oil supplies. He analyzed a bad case, a worse case, and a worst case. His "worse" case is the same as the unfavorable case analyzed here. The results of Perry's three scenarios for the first year are shown in Table 5. Focusing on the worse case, Perry projects a tripling of oil prices to around \$75 per barrel, with gasoline rising to almost \$3 per gallon. The cost of imported oil is projected to rise about \$200 billion per year, and the projected decline in real GDP is almost 3 percent. Perry's projection is not entirely appropriate for the present purpose because it extends for only a single year and because it includes business-cycle elements in the costs along with productivity losses.

	Baseline	Bad Case	Worse Case	Worst Case
World production shock (mbpd)	0	-3.5	-7	-10
Less: supply from reserves (mbpd)	0	2.5	2.5	2.5
Net supply change (mbpd)	0	-1	-4.5	-7.5
Crude oil price (\$/barrel)	25	32	75	161
Gasoline price (\$/gallon)	1.60	1.76	2.78	4.84
Change in real GDP				
Percent	0.0%	0.6%	2.7%	4.6%
Billions (2002 \$)	0	62	282	478

Table 5. Impact of Oil Supply Disruption on the U.S. Economy

Source: George L. Perry, "The War on Terrorism, the World Oil Market and the US Economy," Brookings Institution, Analysis Paper #7, October 24, 2001, available at <http://www.brook.edu/views/papers/perry/20011024.htm>. For a description of the scenarios, see text.

To estimate the total impact of an oil-price shock similar to that of Perry's worse case, I follow his methodology by assuming that oil prices rise by a factor of three in 2003. Based on historical data, I further assume that the real oil price regresses back to the pre-shock level at a rate of 20 percent per year. I then track the impact on real national income⁴⁷ over the next decade assuming full employment and using a neoclassical economic model of oil markets described in the appendix.⁴⁸ (The Keynesian or business-cycle effects are provided in the next section.)

⁴⁷ "Real national income" is a measure of income that measures sustainable consumption. It first adjusts GDP by subtracting depreciation to get net domestic product; it then adjusts net domestic product by subtracting the decline in living standards that would be caused by higher prices of imported oil. In technical language, it includes a correction for changes in the terms of trade.

⁴⁸ The estimates provided here are described in the appendix, which sketches a model of the oil sector that can be used to estimate the impact on the U.S. economy of changes in oil prices. The model is a full-employment, putty-clay model in which the price elasticity of demand for oil is relatively low in the short run because the capital stock is inflexible, but the elasticity becomes larger over time as the capital stock is replaced.

The impact of the “worse” oil shock is a reduction in real national income of \$175 billion in the first year and \$778 billion over the entire decade (the full results are shown in Table A-1 in the appendix). One-seventh of the decadal cost comes in higher cost of imported oil, while the balance comes in lower domestic production. For the first-year cost, \$148 billion comes from the higher cost of imported oil and \$27 billion in lower domestic output. The first-year numbers are considerably lower than Perry’s estimates because they assume full employment, whereas Perry’s GDP loss primarily arises from business-cycle impacts, which are analyzed in the next section.

Our summary estimate is that an oil-price shock of the kind seen in the 1970s and assumed in Perry’s “worse” case would have extremely adverse impacts totaling \$778 billion over the decade following the war. The impact would be smaller if the price shock were smaller or more short-lived than assumed, and it would be larger if macroeconomic, economic, or political frictions were added to the irreducible minimum for the full-employment economy modeled here.

A “happy” outcome in oil markets

Some strategists may be betting that a successful war in Iraq will liberate Iraqi oil as well as the Iraqi people. A quick victory in Iraq followed by relative stability in the region could lead to increases in oil-production capacity in Iraq, Iran, and other countries, putting downward pressure on oil prices in the years ahead. Some observers have pointed to the possibility of \$10 per barrel oil and gasoline below \$1 per gallon.

Such a scenario is not physically impossible. A rapid development of Iraqi oil resources could flood the market with oil, drive down oil prices, and give a boost to industrial economies. But there are several obstacles down that path: the physical and financial requirements for oil-field expansion, OPEC quotas, resistance to Iraqi oil growth from OPEC and other oil producers, and reluctance of oil-importing countries to become even more dependent on Persian Gulf oil.⁴⁹

We can sketch out a reasonable “happy” scenario as follows. After two decades of war and sanctions, Iraq’s oil infrastructure is poorly maintained and plagued by technical difficulties. From a peak of around 3.5 mbpd in

⁴⁹ A full treatment of the issues is contained in Adam Sieminski et al., *Oil Market Outlook: OPEC’s Balancing Act*, Deutsche Bank, September 5, 2002; J.J. Traynor et al., *Baghdad Bazaar: Big Oil in Iraq*, October 21, 2002; and Philip Verleger, “Oil Markets After Saddam,” undated from Fall 2002.

1979, Iraq's current capacity declined to between 2.8 and 3.0 mbpd in 2002. Oil production in 2000 and 2001 was close to capacity at 2.5 mbpd. Experts believe that, if restructuring operations can operate effectively, Iraq's production capacity can be raised to between 3 and 4 mbpd within two years.

Iraq has enormous oil resources relative to its current production, as noted above. Iraq has negotiated \$40 billion of contracts with Russia, China, and France to develop approximately 5 mbpd of new capacity.⁵⁰ While threatening the United States with the oil weapon, these contracts were in the nature of "oil carrots." They were negotiated on extremely favorable terms and were probably devoted more with an eye to gaining Security Council vetoes or foot-dragging than to adding capacity. The jockeying for contracts in postwar Iraq is likely to be time-consuming, particularly if the U.S. tries to ensure "equity" for its own companies. Unless the U.S. decides to treat Iraq as a fifty-first state - Texas on the Tigris - developing new oil fields is likely to be a contentious and lengthy process.

The most important limitation on Iraqi oil expansion revolves around its OPEC membership and quota. Iraq has been a card-carrying member since the founding of OPEC. Since the First Persian Gulf War, Iraq's oil production has in principle (but not of late in practice) been controlled by the United Nations. In the postwar era, a first decision Iraq's decision makers will face is whether to remain in OPEC.

A decision to quit OPEC would have major political and economic ramifications. The economic beneficiaries would be the oil-importing countries, primarily the United States, which could enjoy economic growth with low oil prices for many years to come. If the decision to quit were dictated from Washington, it would be the economic equivalent of the recent national security doctrine that trumpets the United States' hegemony over the world.⁵¹ But the political implications are also far-reaching. Forcing Iraq out of OPEC, and encouraging a major production increase by Iraq, would be an economic declaration of war on OPEC. It would lower incomes in all the major Middle East countries, deal a blow to the Russian economy, and could destabilize the region from Algiers to Novosibirsk. From the U.S. point of view, it would be a myopic policy leading to even greater dependency upon Persian Gulf oil supplies and inviting decades more of political, economic,

⁵⁰ See J. J. Traynor et al., *Baghdad Bazaar: Big Oil in Iraq*, October 21, 2002 and U.S. Energy Information Agency, <http://www.eia.doe.gov/emeu/cabs/iraq.html>.

⁵¹ *The National Security Strategy of the United States of America*, September 17, 2002, available at <http://www.whitehouse.gov/nsc/nss.html>.

and military struggles in that region. The conjunction of circumstances that would lead to a free fall in oil prices in a world without OPEC constraints might qualify as a “best economic case” but it is sufficiently remote that I have not included it in the “happy” outcome for oil markets.

If Iraq stays in OPEC, then it will attempt to negotiate a high quota. Experts believe that Iraq is unlikely to get a major increase from its prior quota of 2.8 mbpd, and a quota equal to that of Iran (currently 3.2 mbpd) would seem a plausible one for Iraq.⁵² Even with a small amount of cheating, an outer limit of 3½ mbpd would seem the outer limit of Iraq’s new production level if it remains in OPEC. Assuming that this was accompanied by no change in the quotas, cheating, or excess capacity of other countries, the net effect would be an increase in OPEC oil production of about 2/3 million barrels per day.

What would be the beneficial impact of such an increase in Iraqi oil production? Assuming a trend (no war) oil-price path of \$25 barrel in 2002, which rises gradually thereafter, the model described in the appendix estimates that an oil price of \$0.92 per barrel below trend over the postwar decade would balance supply and demand in the happy case. Figure 1 shows the projected oil prices in the trend case along with the paths for the adverse and happy cases. For the happy case, lower prices have no net effect on the cost of imported oil and raise productivity by \$40 billion over the decade. The total effect would be an increase in U.S. real national income of \$40 billion over the postwar decade at full employment.

⁵² See Adam Sieminski et al., *Oil Market Outlook: OPEC’s Balancing Act*, Deutsche Bank, September 5, 2002.

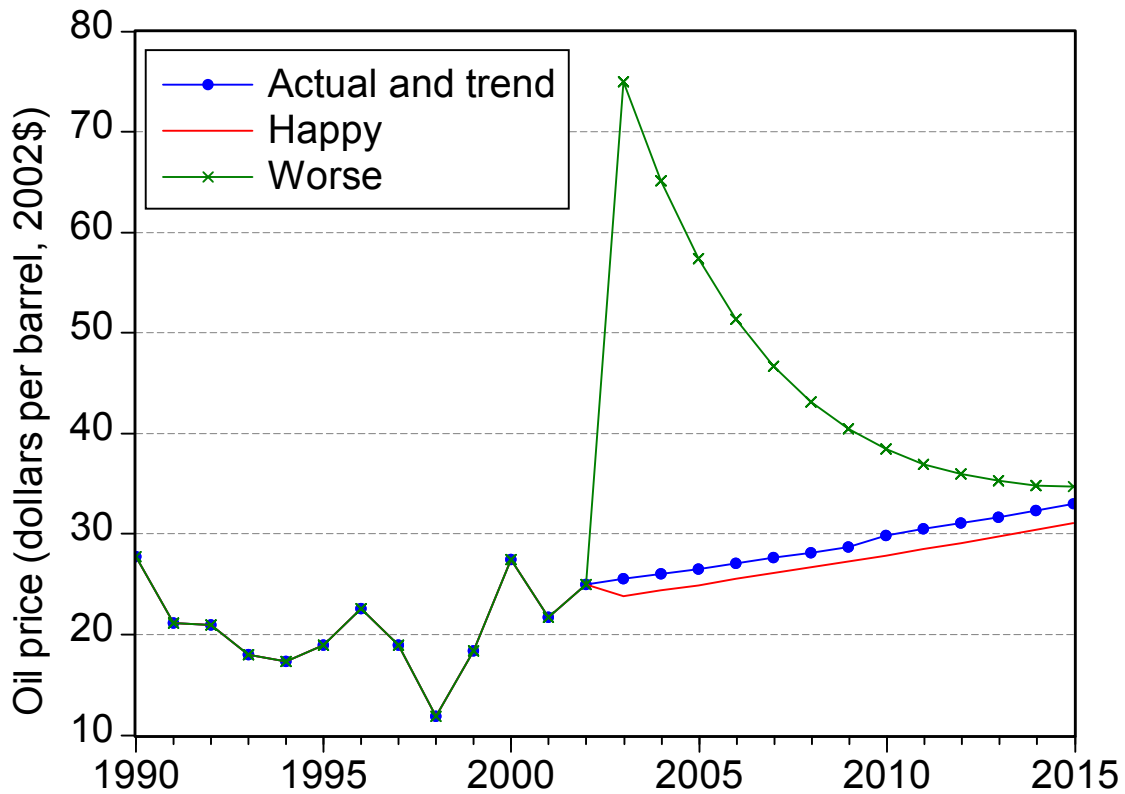


Figure 1. Oil Prices in the Trend, Worse, and Happy Scenarios

Source: See text and appendix.

Impacts on Aggregate Spending and the Business Cycle

Historically, economic expansions were the constant companions of war. As can be seen in Table 6, the iron law of wartime booms was caused by the large wartime increases in military expenditures. In World War II, for example, defense outlays rose by almost 10 percent of total GDP before Pearl Harbor, and this spending boosted the economy out of the doldrums of the Great Depression. Similar but smaller military buildups accompanied economic expansions in the Korean and Vietnam Wars.

Economic Stimulus from Defense Spending			
<i>War</i>	<i>Period</i>	<i>Increase in Defense Spending as Percent of GDP</i>	<i>Real GDP growth over buildup period (percent)</i>
World War II			
Before Pearl Harbor	1939-41	9.7%	26.7%
All years	1939-44	41.4%	69.1%
Korean War	1950:3 to 1951:3	8.0%	10.5%
Vietnam War	1965:3 to 1967:1	1.9%	9.7%
Persian Gulf War I	1990:3 to 1991:1	0.3%	-1.3%

Table 6. **Size of Defense Buildup and Economic Expansion in Past Conflicts**

Source: Department of Commerce, National Income and Product Accounts, available at www.bea.gov.

The iron law of wartime booms ended with the First Persian Gulf War. One of the reasons why the iron law was repealed is that defense spending during the First Persian Gulf War increased by only 0.3 percent of GDP. Because the public sector provided little expansionary impetus, the course of macroeconomic activity was determined by the private sector, which in turn was driven in the short run by psychological reactions to the war.

The major psychological factors that affect the economy in the short run are those driving stock prices, exchange rates, and consumer sentiment. Sharp drops in consumer sentiment and stock prices tend to depress investment and consumer spending, particularly on consumer durables. Sharp declines in the exchange rate of the dollar tend to raise inflation and are sometimes associated with declines in asset prices.

Figure 2 shows the dramatic psychoeconomic reaction to the Iraqi invasion of Kuwait in August 1990. The figure shows indexes of consumer sentiment, stock prices, the exchange rate of the dollar, and industrial production; each variable has been normalized to equal 1 in July 1990, the month before the invasion. Consumer sentiment and the stock market both took a nosedive after the initial Iraqi invasion. They then recovered sharply with the quick U.S. victory in February 1991. Industrial production reacted gradually to the resulting decrease in demand. The recession was sharp, but,

notwithstanding the general euphoria after the 100-hour war (seen in the upturn in consumer sentiment), the recovery was slow. The total shortfall of GDP relative to its potential from the beginning of the war until the end of 1991 was around \$490 billion (in 2002 prices).

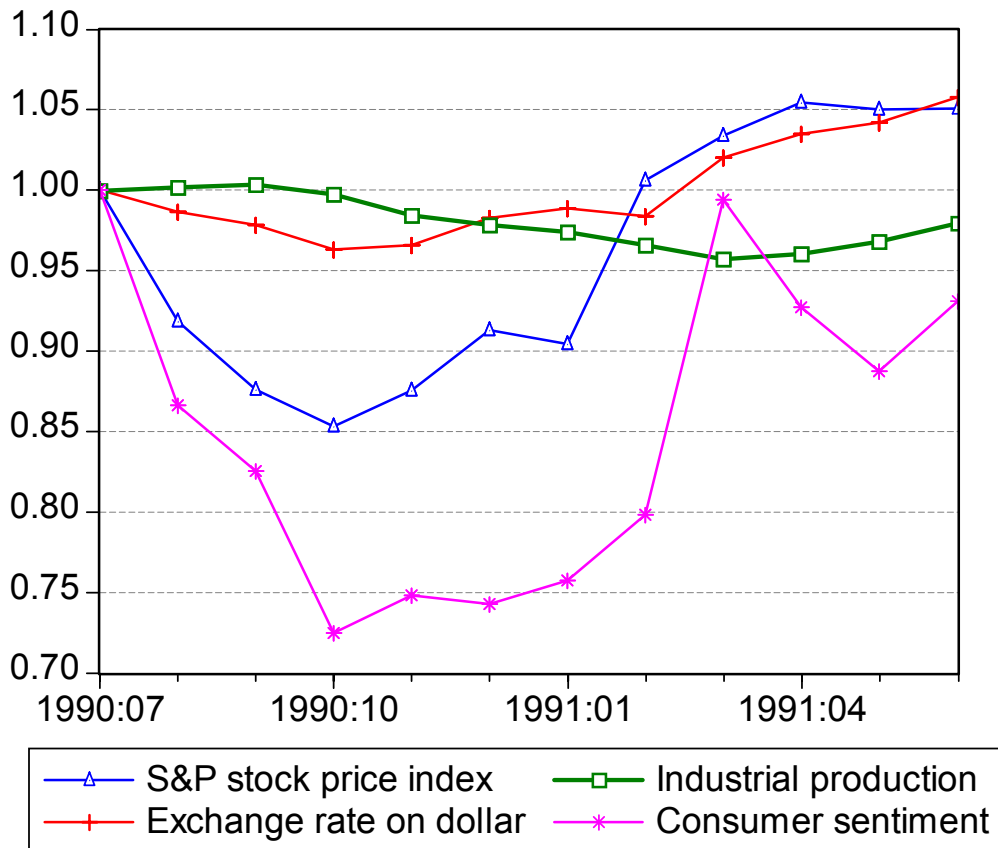


Figure 2. Major Factors Determining Short Run Economic Behavior After the Beginning of the first Persian Gulf War

Source: Data from the U.S. Department of Commerce, Federal Reserve Board, Standard and Poor’s Corporation, and the University of Michigan. Each series is normalized by setting its value equal to 1.00 in July 1990.

What is likely to be the overall economic impact of a war in Iraq? The increase in defense spending over the last year (2001:3 through 2002:3) was small, only 0.3 percent of GDP. Since early 2002, markets have discounted the prospect of a war – or at least of a short war. Stock prices have fallen 25 percent, the dollar has depreciated, oil prices have risen sharply, and indexes of consumer sentiment are at their lowest level for almost a decade. Fears of war are hard to separate from the bursting of the dot-com bubble, a weak economy, corporate scandals, and poor profits, but most of the adverse

psychological reaction to a short war has probably already occurred. Assuming that oil prices are stable and victory is swift, a repetition of the 1990-91 recession is unlikely and the macroeconomic impact is likely to be nil to favorable.

If the war goes badly, the macroeconomic outcome might turn sour. The dangers of tipping into recession are real, particularly given that the U.S. economy was growing very slowly in fall of 2002. If there is some combination of heavy casualties, protracted urban warfare, gory pictures on the nightly news, massive foreign denunciations of American policy, rumors or reality of chemical or biological weapons, or major terrorist actions at home or abroad, the economic reactions might resemble the sharp economic declines following the Iraqi invasion in August 1990 war or the attacks of September 11.

The most likely cause of a business-cycle downturn is an oil-price shock of the kind discussed above. Oil-price shocks have been associated with at least three of the last five recessions. The appendix develops a simple approach to estimating the business-cycle impact of an oil-price shock and compares it with alternative estimates. A sharp oil-price increase is likely to be followed by a spurt of inflation, a fall in consumer and business spending, and tight money as the Federal Reserve contains the inflation. Assuming that the cyclical impact lasts only two years, and that monetary and fiscal policy close the gap between the no-shock and the oil-shock output after that time, the net cyclical impact of the adverse price reaction is estimated to be \$391 billion. This equals a gross cyclical impact of \$492 billion less the \$101 billion already included in the full-employment calculation above. The gross cyclical impact is consistent with Perry's estimate, being approximately 1½ years of Perry's estimate of the GDP impact of the same oil-price scenario. This number is close to the output lost from the recession triggered by the First Persian Gulf War, which amounted to \$490 billion over a two-year period.

The impact of the happy oil price scenario is likely to be small because most of the macroeconomic impacts will come well into the future and are likely to be anticipated. Using the same methodology as is employed for the oil-shock case, the impact is estimated to be \$17 billion in net cyclical gain in the first two years.

Summary of Economic Costs

We can now collect the different components of the cost of a war with Iraq. It should be emphasized that these estimates vary in terms of precision and empirical support. Indeed, aside from the estimates of the direct military costs, all of the numbers should be regarded as informed conjecture. The costs are limited to the United States and exclude other countries.

Moreover, these costs do not attempt to estimate the benefits of resorting to arms. Since reducing future dangers from of the current Iraqi regime are one of the major objectives of the war, we cannot truly balance the costs and benefits of war without considering the benefits of the disarmament of Iraq. The point was clearly put by Secretary Powell when he asked, "But do we want Saddam Hussein to have nuclear, chemical and biological weapons that he can use, as he has used these kinds of weapons in the past against his neighbors, against his own people, or perhaps against us someday? This is the time to stop him."⁵³ We do not (and cannot) measure the extent to which military action today may reduce the threat of Iraqi weapons of mass destruction in the future. At the same time, we do not and cannot estimate the increase or decrease in risk of terrorist acts that are triggered or prevented by a war, or that are triggered or prevented when the U.S. attention is focused on Iraq.

Table 7 shows a summary compilation of the different elements that we have been able to quantify. Recall that these costs include only the costs to the United States over the decade following the beginning of a war. The favorable case indicates that the economic costs over the 2003-2012 period are \$99 billion dollars.⁵⁴ This outcome assumes that the military, diplomatic, and nation-building campaigns are successful.

⁵³ Interview on the Oprah Winfrey Show, October 22, 2002, available at <http://www.state.gov/secretary/rm/2002/14563.htm>.

⁵⁴ The spurious precision of the estimates should be ignored. Numbers are retained to the nearest billion dollars to maintain numerical consistency. Any single number, and therefore the total, is likely to be accurate only within a range of plus or minus fifty percent.

Source of Cost	Costs of War (billions of 2002 \$)		Notes
	Low (short and favorable)	High (protracted and unfavorable)	
Direct military spending	\$50	\$140	[1]
Follow-on costs			
<i>Occupation and peacekeeping</i>	75	500	[2]
<i>Reconstruction and nation-building</i>	30	105	[3]
<i>Humanitarian assistance</i>	1	10	
<i>Impact on oil markets</i>	-40	778	[4]
<i>Macroeconomic impact</i>	-17	391	[5]
Total	\$99	\$1,924	

Table 7. Estimates of Decadal Cost to the United States of A Potential War in Iraq (in billions of 2002 dollars)

These costs are the total for the decade following the conflict (e.g., 2003-2012). Negative numbers are benefits.

Notes:

[1] Protracted conflict assumes that the monthly cost is 50 percent greater than the CBO estimate and that the conflict lasts 8 months longer.

[2] The low and high numbers assume, respectively, peacekeeper costs of \$200,000 to \$250,000 per peacekeeper per year, with the numbers from 75,000 to 200,000, and for periods of 5 to 10 years.

[3] This includes, at the low end, reconstruction costs of \$30 billion and minimal nation-building costs. At the high end, it adds a “Marshall Plan for Iraq” as described in the text.

[4] These estimates refer to a full-employment economy. The high estimate is based on Perry’s “worse” or middle case, which assumes a production decline of 7 mbpd offset by withdrawals from reserves of 2½ mbpd. The “happy” case assumes that OPEC increases production by 2/3 mbpd in the five years after the end of hostilities and that production stays at the higher level. The sign is negative to indicate a benefit or negative cost.

[5] The macroeconomic impact excludes the full-employment impacts in [4] and includes only the first two years of a cyclical impact.

The high case is a collage of potential unfavorable outcomes rather than a single scenario. It shows the array of costs that might be incurred if the war drags on, occupation is lengthy, nation building is costly, the war destroys a large part of Iraq's oil infrastructure, there is lingering military and political resistance in the Islamic world to U.S. occupation, and there are major adverse psychological reactions to the conflict. The outer limit of costs would be around \$1.9 trillion, most of which come outside of the direct military costs.

Be warned that this discussion vastly oversimplifies the analysis by constructing only two cases, whereas reality presents a dizzying array of outcomes. Returning to the metaphor of war as a giant roll of the dice, we might say that the U.S. could end up paying the low costs of around \$100 billion if the dice come up favorably. If some dice come up unfavorably, the costs would lie between the low and the high cases. However, if the U.S. has a string of bad luck or misjudgments during or after the war, the outcome could reach the \$1.9 trillion of the high case.

Even the high case is not the limit of fortune's frowns. This number excludes any costs to other countries and consequent further impact on the U.S., omits the most extreme outcomes (such as chemical or biological warfare), and excludes Perry's "worst" case in oil markets. Moreover, the quantified costs ignore any tangible or intangible fallout that comes from worldwide reaction (except that of a potential boycott by oil producers) against perceived American disregard for the lives and property of others.

One feature not shown in Table 7 is the extent to which other countries share the costs. In the first Persian Gulf War, the U.S. diplomatic efforts reduced the military expenditures for the war essentially to zero. It seems highly unlikely that the U.S. can transfer most of the military costs to other countries in the present circumstance, and help from U.S. allies is even more unlikely if the U.S. undertakes a unilateral war without broad international support. Indeed, the longer, more expensive, bloodier, more unilateral, and more destructive is the war, the larger the fraction of the very large costs the U.S. will be forced to bear.

Why Do Nations Underestimate the Costs of War?

The historical record is littered with failed forecasts about the economic, political, and military outcomes of wars. Why do forecasts often fall so far astray?

To begin with, the outbreak of war is itself evidence of some kind of faulty bargaining process, major miscalculation, or impaired collective decision-making on a grand scale. Wars destroy in a few days or months the physical and human capital that has been accumulated over decades or centuries. With hindsight, would the ministers of George III have risked the empire for the principle of levying a tax on tea? Would the southerners have seceded and provoked a civil war if they had known the devastation that would follow? Would the Germans have provoked World Wars I and II? Would Japan have bombed Pearl Harbor? Would the United States have sent half a million men in Vietnam? Economics teaches that trade is a positive-sum game that helps all who participate. By contrast, war is the ultimate negative-sum game in which the spoils of the victors are much less than the losses of the vanquished.

Additionally, wars are disproportionately undertaken by nations who overestimate their chances of victory or underestimate the size of the undertaking. They are often started or provoked by those – like Saddam Hussein – who miscalculate badly and often. Perhaps, as in imperial Austria, war is chosen by those who cannot count, refuse to count, count badly, or belittle costs. Sometimes, as with Lyndon Johnson, leaders pursue war because they are foolishly sucked into a psychology where honor and credibility are valued above the lives of combatants and the livelihoods of citizens – and both credibility and the economy end up as casualties.

Often, nations underestimate combat's costs because they are unable to listen or are provided systematically biased information. Some leaders either cannot hear bad news or kill the messenger who delivers it. Philip II of Spain was of the first variety, as Barbara Tuchman recounts in her masterful history of catastrophically bad decisions:

Wooden-headedness, the source of self-deception, is a factor that plays a remarkably large role in government. It consists in assessing a situation in terms of preconceived fixed notions while ignoring or rejecting any contrary signs. It is acting according to wish while not allowing oneself to be deflected by the facts. It is epitomized in a historian's statement about Philip II of Spain, the surpassing

wooden-head of all sovereigns: "No experience of the failure of his policy could shake his belief in its essential excellence."⁵⁵

There are many examples of the dangers of sealing off a leader from information in such a way that produces poor decisions. Saddam Hussein has an unbroken record of catastrophic miscalculations since his rise to power in 1979. His reign has comprised eight years of disastrous war with Iran, one year of war with the United States, eleven years of draconian sanctions, and only three years free of costly disputes or hostilities. Time and again, Saddam ignored intelligence, his advisers, even CNN, and relied upon his own bizarre theories. An example from Kenneth Pollack is instructive:

What is most disconcerting about Saddam's decision to attack Kuwait [in 1990] is that he apparently had concluded that there was a high probability that the United States would oppose an invasion of Kuwait militarily *and he believed that he could defeat the expected American response....* Although all indications are that the Iraqi elite feared that the U.S.-led coalition would obliterate the Iraqi armed forces, Saddam convinced himself otherwise.... According to General Samarra'i, Saddam was dismissive of American military capabilities: "... He would say that, 'We will fire mud and water to the screen of these radars that are leading these cruise missiles.'" ⁵⁶

Might historians look back and conclude that the United States also showed signs of wooden-headedness in its determination to overthrow Saddam in Iraq? In contrast to the clear danger from terrorist activities, there is no imminent threat from Iraq. A war in Iraq threatens to claim the scarce resources and attention of the United States for many years. A stagnant economy, fiscal deficits, a persistent crisis of corporate governance, growing health-care problems, and trouble spots in the rest of the world – all these would take a back seat if the U.S. gets bogged down in issues of war and peace in Iraq.

A further reason for underestimating the costs of war, particularly salient for democracies like the United States, is the advantage of understating costs for gaining political consensus. If wars are thought to be short, cheap, and bloodless, then it is easier to persuade the populace and the Congress to defer to the President. If the American people are led to believe that a war with Iraq will be like the First Persian Gulf War, or like the

⁵⁵ Barbara Tuchman, *The March of Folly: From Troy to Vietnam*, Knopf, New York, 1984, p. 7.

⁵⁶ Kenneth J. Pollack, *The Gathering Storm: The Case For Invading Iraq*, Random House, New York, 2002, pp. 261, 262 (emphasis in the original).

Afghanistan conflict, then they may believe that war will not disrupt life or comforts and the world will be rid of a terrible tyrant. Moreover, if optimistic forecasts prove wrong, it is much easier to raise the extra billions of dollars once troops are in the field and bullets are flying than before the battle is engaged. Politics does not end at the water's edge, but it is surely silenced when the first shot is fired.

All the dangers that lead to ignoring or underestimating the costs of war can be reduced by a thoughtful public discussion. Yet neither the Bush administration nor the Congress – neither the proponents nor the critics of war – has presented a serious estimate of the costs of a war in Iraq. Neither citizens nor policy makers are able to make informed judgments about the realistic costs and benefits of a potential conflict when none is given.

Particularly worrisome are the casual promises of post-war democratization, reconstruction, and nation building in Iraq. The cost of war may be turn out to be low, but the cost of a successful peace looks very steep. If American taxpayers decline to pay the bills for ensuring the long-term health of Iraq, America would leave behind mountains of rubble and mobs of angry people. As the world learned from the Carthaginian peace that settled World War I, the cost of a botched peace may be even higher than the price of a bloody war.

Technical Appendix: The Economic Consequences of a War with Iraq

The most durable economic impacts of a war in Iraq are likely to be the effects on oil markets. Economic models of the oil market are extremely complex because they combine hard geological realities with game-theoretic indeterminacies of oligopolistic behavior, and these difficulties are overlaid with domestic politics and geopolitical strategies in all major countries. The inherent complexities become even greater given uncertainties about post-war oil-market destruction and production scenarios, changes in decisionmakers in the Gulf region, and the potential instability of the OPEC cartel. Finally, from a pure economic point of view, there are technical difficulties in modeling the response of oil demand to price shocks.

The impact of oil prices on economic activity has been well established since the oil-price shocks of the 1970s. Economists do not always agree, however, on the exact mechanism by which oil prices affect the economy. The two major routes are the real-income effect and the business-cycle impact. The real-income effect measures the impact of changing oil prices at full employment on expenditures for imported oil and on productivity as businesses substitute other inputs for high-priced oil. The business cycle effect occurs when higher oil prices trigger lower spending and higher unemployment, either directly through the impact on real incomes and consumption or indirectly through monetary tightening, higher interest rates, and lower investment. These two mechanisms are discussed in turn.

Full employment impacts on real incomes

To tackle the impact on real incomes in a full-employment economy, I have drawn upon recent general-equilibrium economic models of oil demand along with the scenarios laid out by oil-market specialists. This appendix lays out the results of the oil modeling exercise. The model assumes that output is a single homogeneous good. The major component of the model is a production function in which output is produced by other factors and oil inputs, where oil is supplied both by endogenous imports and exogenous domestic production. Aggregate output is produced by a putty-clay technology in oil and other exogenous inputs and is characterized by Cobb-Douglas substitutability *ex ante* and fixed proportions between output and oil inputs *ex post*. The model is a full-employment model that calculates the

terms of trade effects along with the effects of substitution of other inputs for oil. The investment-output ratio is assumed to be invariant over time.

The parameters central to the model's performance are the following: the initial level and the growth rate of total factor productivity, the elasticity and the rate of growth of the elasticity of output with respect to oil inputs, and the depreciation rate. Note that the depreciation rate is key because it determines the speed with which oil demand responds to changes in oil prices. It is assumed that capital is never scrapped, which is realistic when oil inputs are a very small share (around 3 percent) of costs. More precisely, the equations of the model are the following:

$$(1) \quad Q(t,t) = A(t) E(t, t)^{b(t)}$$

$$(2) \quad Q(t) = Q(t,t) + (1-d) Q(t-1)$$

$$(3) \quad E(t) = DP(t) + OI(t)$$

$$(4) \quad E(t) = E(t, t) + (1-d) E(t-1)$$

where $Q(t,t)$ is the output produced in year t from vintage t , $A(t)$ is total factor productivity in year t , $E(t, t)$ is oil inputs used in year t in vintage t , $b(t)$ is the time-varying ex ante elasticity of output with respect to oil inputs in year t , $Q(t)$ is total output, $E(t)$ is total oil inputs, d is the depreciation rate of capital, $DP(t)$ is domestic production of oil, and $OI(t)$ is imports of oil. It is assumed that $A(t)$ and $b(t)$ have constant proportional rates of change over time. The major other variable is $P(t)$, which is the real price of oil, assumed to be set in world markets. The model assumes that, for a given vintage, output, energy inputs, and other inputs decline exponentially at rate d after the initial year.

By manipulating these four equations, we obtain the following two equations for estimation:

$$(5) \quad E(t) = (1-d) E(t-1) + [P(t)/(b(t) A(t))]^{1/(b(t)-1)}$$

$$(6) \quad Q(t) = (1-d) Q(t-1) + A(t) [P(t)/(b(t) A(t))]^{b(t)/(b(t)-1)}$$

The model's five parameters are determined by weighted least squares for the sample period 1970-2002 using annual data; data for 2002 are preliminary through the first nine months of the year. The important depreciation rate variable (d) has an estimated value of 12.2 percent per year

with a standard error of 5.3 percent per year. These results are consistent with recent studies of the oil market.⁵⁷ Figure A-1 shows the value of oil imports (in 2002 prices) for the estimated model along with the actual numbers over the 1970-2002 period. Figure A-2 shows the actual and calculated volume of oil imports. The model captures the broad trends but cannot resolve the short-run turning points precisely. The results presented below are, however, quite robust to changes in structure or timing.

Using the model, we estimate the impact of both Perry's "worse" case as well as the "happy" case of an increase in oil production. To estimate the impacts of alternative outcomes, the trend case assumes that real oil prices grow at 2 percent per year after 2002. The "worse" or price-shock case starts with an initial price of \$75 per barrel in 2003. Based on the behavior of oil prices in the 1970-2000 period, oil prices in the worse case are assumed to regress back to the trend path at a rate of 20 percent per year of the difference between the trend and worse prices in the prior year.

The "happy" outcome is somewhat more complex to model. It assumes that the net increase in OPEC production (due to an increase in productive capacity in Iraq less any reduction in production in Saudi Arabia and other supplier countries) totals 2/3 million barrels per day, which is attained five years after the beginning of a war. It further assumes that world oil demand is four times as large as U.S. demand and has equal elasticities. The model then solves for the price trajectory that balances supply and demand over the 2003-2012 period.

The key results of the model are shown in Table A-1. The first column shows the terms of trade impacts – that is, the impacts of the shocks on the *real cost of oil imports. The second column shows the impact on real net domestic product (which is the appropriate welfare measure of output). The final column shows real national income, which is real output corrected for the terms of trade effect. The third column equals the sum of the first two.

⁵⁷ See James D. Hamilton, "What is an Oil Shock?" NBER Working Papers 7755, National Bureau of Economic Research, 2000. The results are similar to the putty-clay model developed in Andrew Atkeson and Patrick J. Kehoe, "Models of Energy Use: Putty-Clay Versus Clay-Clay," *American Economic Review*, September 1999, pp. 1028-043.

	Value of Oil Imports	Real Potential Output	Real National Income
Case	Costs, billions, 2002 prices		
Oil Price Shock			
First year impact	148	-27	-175
Impact of years 2 - 9	-34	-637	-603
Total impact	114	-665	-778
Production Increase			
First year impact	-3	1	5
Impact of years 2 - 9	3	38	35
Total impact	0	40	40

Table A-1. **Cost Estimates of Adverse and Happy Outcomes in Oil Markets**

Note: These estimates are for the full-employment model described in text.

The cost in the adverse case totals slightly under \$800 billion for the decade. About one-seventh of this is higher expenditures on imported oil, while the balance comes from a decline in real output. The increase in oil expenditures comes in the early years, before the economy has a chance to adapt to the higher prices. Most of the production decline, by contrast, comes in later periods as the economy substitutes other inputs for higher-cost oil. Note that these results exclude any business cycle impacts, which are considered next, and additionally they assume perfect competition, no economic frictions, and no political sand in the gears of market reactions.

Business cycle impacts

Sharp oil price increases have been associated with most of the recessions of the last three decades. There have been numerous studies of the impact of oil prices on output in the short run. We can use a simple one-equation model to capture the fundamental dynamics. An instrumental-variables estimate over the period 1962 to 2002 relating real GDP to real oil prices, lagged real GDP, and a trend produces the following:

$$(7) \log[Q(t)] = \text{constant} - 0.011 \log[P(t)] - 0.023 \log[P(t-1)] + 0.22 \log[Q(t-1)]$$

$$(0.013) \qquad (0.014) \qquad (0.214)$$

+ trend + autoregressive error correction

$$\text{SEE} = 0.0172 \qquad R^2 = 0.998$$

The variable definitions are the same as in the previous section. In this equation, I have used twice-lagged real oil prices as the instrument for lagged real GDP. The numbers in parentheses underneath the coefficients are the standard errors of the coefficients, SEE is the standard error of estimate of the equation, and R^2 is the fraction of the variance of the dependent variable explained by the equation.

We can use this equation to project the impact of the oil-price shock on output. The equation predicts for the worse price case a decline in real GDP reaching a maximum of 3.5 percent of GDP, which is much larger than maximum decline of 0.5 percent predicted by the full-employment model in the last section. The reason why output reacts so much to oil price increases – almost 10 times more than would be predicted by standard neoclassical growth models – has been observed in earlier research and remains controversial. One possible reason for the large discrepancy is that oil price increases tend to fuel inflationary pressures and thereby trigger anti-inflationary monetary policies. Inflationary impulses also tend to redistribute income from labor to property incomes and thereby lower consumption expenditures.

We can use equation (7) to estimate the impact of the “worse” oil-price shock on the business cycle. For this purpose, I assume that the business-cycle impacts last only two years, and that monetary and fiscal policies close the gap between the trend and worse output paths after that time. I also subtract the full-employment impact on output estimated in the first section to prevent double counting.

Under these assumptions, the net cyclical impact of the worse price increase is \$391 billion. This net number represents \$492 billion of gross loss in output less \$101 billion of loss in potential output which was counted in the numbers in Table A-1. The gross loss estimate is consistent with Perry’s estimate, being approximately 1½ years of Perry’s estimate of the GDP impact of the worse oil price scenario. Additionally, this estimate is close to the loss in output from the recession triggered by the First Persian Gulf War,

which reduced output over the 1990:3 to 1992:2 period by \$490 billion relative to the pre-war trend.

The impact of the happy oil price scenario is likely to be very small. Most of the macroeconomic impacts will come well into the future and are likely to be anticipated. Using the same methodology as is employed for the oil-shock case, the impact is estimated to be \$17 billion in net cyclical gain in the first two years.

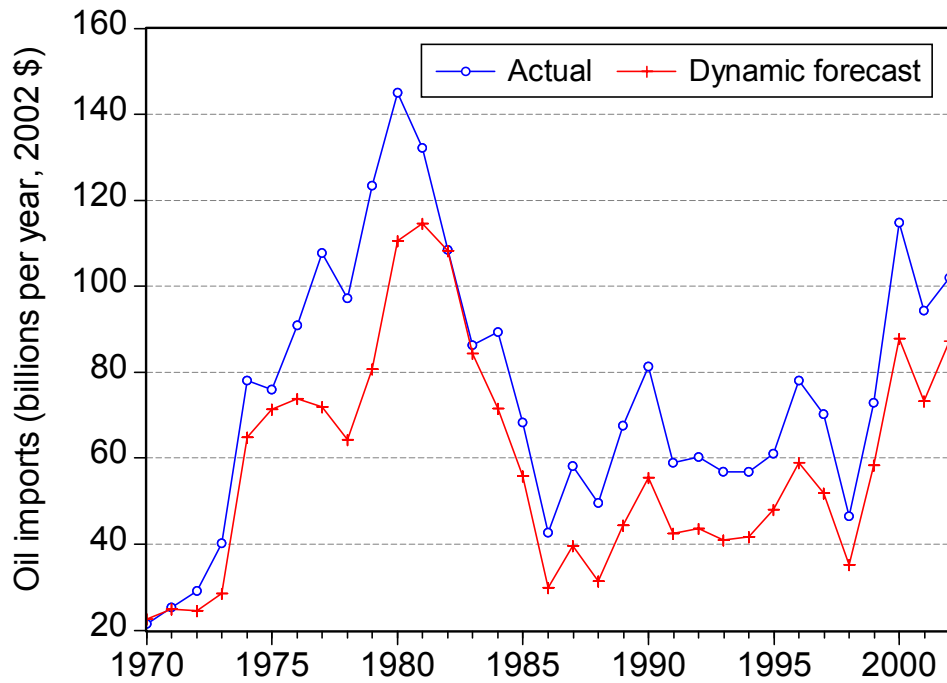


Figure A-1. Estimated and Actual Value of Oil Imports, 1970-2002 (billions in constant prices)

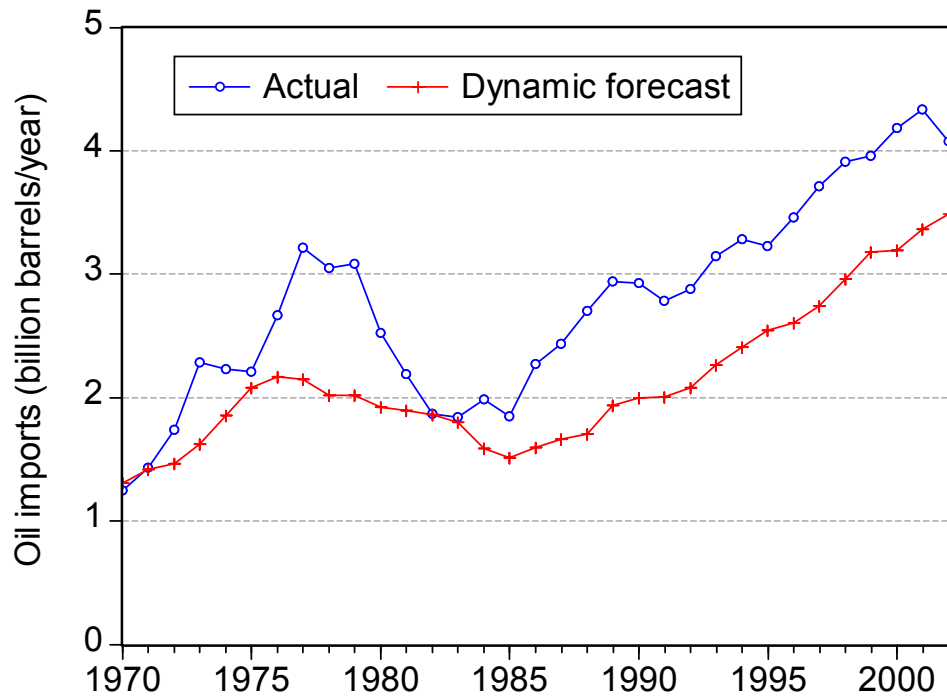


Figure A-2. Actual and Projected Volume of Imports, 1970-2002 (billions of barrels)