

# Economic Costs and Consequences of War

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- I. Microeconomic Analysis
- II. Macroeconomic Implications of War
- III. The Transfer Problem and War
- IV. Toward Measuring the Cost of War

## GLOSSARY

**External Costs** The costs borne by noncombatant nations in a war.

**Externality** When the action of a nation (individual) affects the consumption or production opportunities available to another.

**Internal Costs** The cost borne by combatant or participating nations in a war.

**Terms-of-Trade** The price of commodities that are imported relative to the price of those that are exported by a country.

**Value of Life** The present discounted value of a person's expected future earnings plus an

amount to compensate for the suffering of the victim's family, community, and other nonpecuniary costs.

*IN ANALYZING* the costs of war, it is convenient to classify or partition costs in two ways. First, a distinction should be made between whether the costs and consequences are internal or external, that is, whether they are borne directly by the participants or by the wider international community, respectively. This distinction is similar to the one made in economics between private and social costs. If the decisions to go to war are based on the calculus of whether the private benefits outweigh the private cost of going to war, then many wars could be prevented if the parties involved internalized the higher social cost imposed by their actions. Once this distinction is emphasized, the importance of developing institutions which provide the proper incentives or mechanisms to account for these external effects becomes evident.

Another useful classification is between the direct and indirect effects or consequences arising from war. Direct effects will involve those immediately arising during and after the war and generally are restricted to the economic effects from casualties, displacement of populations, and destruction of infrastructure and other types of physical capital. The indirect effects are much more subtle and will persist into the future as, for example, famine, disease, and changes in the political and civil society that can occur as a consequence of the event. Since institutions are important to economic activity these events have profound effects on the economy. Finally, we may also make a distinction between a static and dynamic analysis of the consequences of war. Table 1 presents an example of the

categorization scheme followed in Section I of the article.

## **I. MICROECONOMIC ANALYSIS**

War leads to the destruction of resources: capital (factories, housing stock, weapons, etc.), human capital (reduction in the population as a result of casualties, disease, displacement and starvation), and other resources such as the possible loss of land or territory. Historically, if victory is achieved the potential private benefits to the countries involved are the confiscation of resources such as territory (land), slaves (labor), and other resources. Yet, not only does war reduce aggregate resources but the final distribution is generally different. Both the reduction in resources and their redistribution between the participants will lead to changes in the valuation or prices of commodities and factors of production. In effect, there is a wealth effect and a substitution effect from war.

For example, if the nation does not lose territory but suffers a great number of casualties, then labor becomes scarce relative to land. This would lead to the price of land declining and the cost of labor rising in the postwar period. If the economy was closed after the war, the decline in population would also lead to a decline in the demand for many commodities and, therefore, their prices. A new level of prices and returns to factors of production will result. In the event of a victory, the winner may gain sufficient resources, for example, oil, to now have influence over prices. This may lead the victor to decrease production so as to increase price to a more profitable level.

Figure 1 illustrates a possible scenario for Country A. We label its production possibility frontier by AA. It shows all the feasible combinations of commodities X and Y that the country can produce given its endowment and the state of technology available to produce these goods. The country is initially producing the equilibrium amounts given by point E, the point of tangency of the slope of the production possibility curve (which measures the relative cost to society of producing these goods) to the price of commodities X relative to Y given by the slope of the line, p. The amount produced of each commodity is denoted by  $(X', Y')$ , whereas the amount consumed by  $(x', y')$ . The level of utility or welfare of a representative citizen of Country A consuming this amount is given by  $U_0$ . After a war, if the country suffers casualties and loses resources the new production possibility curve is given by BB, that is, the set of feasible choices is reduced. As is shown, if we assume that world prices are unaltered by the conflict (the war is between two small nations), the level of output of both goods as well as the country's comparative advantage has changed. Prior to the war, this country imported commodity Y by an amount  $(y' - Y')$  and exported  $(X' - x')$ , yet after the war it now exports Y and imports X. In addition, the representative individual of Country A has been made worse off by the amount  $U_0 - U_1$ .

Note that in this case, only the warring countries are assumed to be affected. Yet generally, wars will have an impact on the international community at large. As such, the social cost of war is greater than the private cost since the war leads to what may be termed a negative externality on the world community. Other possible costs may ensue because the terms of trade may change as a result of war. By the very nature of altering the amount and the distribution of resources available in the world, wars will affect prices. The effect of these price changes will be felt by both the participants (internal cost) and the rest of the world (external). As prices change, so will the income of different groups, both domestically in the

participating nations and those in the noncombatant nations.

Similarly, wars will divert trade both directly via disruption of commercial trading routes during the conflict and through the alteration of prices. When trade is reduced or diverted, then social welfare declines not only for the participants but also for the many nations that must pay higher prices for the products that have been made scarcer, or whose transportation costs have risen. Those countries exporting the products whose prices have risen may be better off depending on the income and substitution effects created by the war, since the total amount exported may fall during wartime.

There are other internal indirect effects from war such as famine. This results from the disruption of the distribution channels or from a reduction in the income of certain groups. There may also be external indirect effects that we can envision resulting from war. For example, the price of food may increase for the noncombatant nations to a level where starvation and disease in their countries may ensue. If a warring country is a large producer of agricultural products such as wheat and rice, then disruption in their supply of these products raises world prices. The adverse effect is created when the cost of a subsistence diet rises for the poor in parts of the world.

War leads not only to a direct reduction in physical and human capital as it is destroyed, but the uncertainty created by enduring rivalries and the future possibilities of conflict will lead to a reduction in investments in both human and physical capital. This decrease in capital formation will reduce the level of output and economic growth of the participants from the level that would exist if peace prevailed. Conversely, if enduring rivalries induce investments in the military sector, including in weapons and the training of

soldiers for war, this imposes a social cost on society since these resources could instead have been used to increase current and future production.

The development of much more destructive weapons seems to have resulted in an increase in the divergence between the private and social cost of war than has been the case historically. When weapons were more primitive, casualties were generally confined to those directly involved in combat. As technology improved, so did the likelihood of casualty to the general population. The recent development of nuclear, biological, and other more destructive weapons has led to the cost of war now spilling over to the larger international community. The extreme example is the case of nuclear war, where the possibility exists for the annihilation of a large fraction of the world's population from nuclear fallout. In the modern era, the realization of this dramatic external effect from war has led many in the international community to demand the elimination of these weapons possessing the potential for inflicting large external costs. Therefore, the weapons or technology employed in war will not only lead to the cost of war varying for the participants, but will also change the size of the divergence between the private and social costs.

Finally, there must be a realization that the economic consequences of war will likely imply changes in the political, social, and civic institutions of the warring countries. Since economic policy is not derived in a vacuum, but is instead formed within political institutions, there are costs and possibly benefits that may thus arise. For example, if war leads to an authoritarian regime coming into power then the general citizenry loses influence in the process of policymaking. This leads to the adoption of economic policies that differ from those that would be adopted under a democratic regime. In addition, the mobilization of resources by governments during war may lead to a reduction in civil liberties, which in

many cases persists into the postwar period. The cost of these events, although implicit, must also be factored into account for the total cost of war. There has been a failure to realize that freedom of speech and association, for example, not only are rights that provide direct benefits to those endowed with them, but that they also serve to facilitate trade and therefore, make the economic system more efficient. In summary, since war generally leads to the redistribution of economic and political power there arises the possibility that governments will adopt economic and social policies that impose a higher cost on society than had the event not occurred.

## **II. MACROECONOMIC IMPLICATIONS OF WAR**

It appears that the earliest concern by economists about the effects of war had to do with the financing of military expenditures. In England, the systematic study of inflation and debt financing during the Napoleonic Wars by Ricardo, Malthus, J. S. Mill, and other British economists led to treatises on monetary and fiscal policy that are the foundation of our knowledge in these areas today. For example, it was as a writer on monetary policy in the discussion of war inflation that David Ricardo first made his reputation.

Wars are generally accompanied by increases in government spending, unless the government reduces spending on nonmilitary goods. Therefore, governments can finance this increase by a combination of either taxing the current generation, that is, by raising taxes, borrowing (levying taxes on future generations to repay the debt), or printing money. The initial concern by economists was on the impact that financing war would have on increases in the general price level or inflation. Like any government expenditure financed by printing money, inflation is the product. If war requires greater amounts of spending at the same time

that a country's access to the capital markets or its ability to tax is restricted, then higher rates of inflation would be associated with it.

In fact, the early empirical work in macroeconomics examines the effects of monetary policy on inflation or hyperinflation during and after war periods. Lerner documents that the worst inflation in American history since the Revolution plagued the South during the Civil War. He finds that for 31 consecutive months from October 1861 to March 1864 the Confederate commodity price index rose at the average rate of 10% per month. When the Civil War had ended, the index was 92 times its prewar base. Similarly, Cagan documented the bouts of hyperinflation following World War I in Austria, Germany, and other European countries.

There are two more recent issues in macroeconomics that have led economists to focus research on the consequences of war. The first deals with the tax-smoothing literature that suggests that optimal income taxation requires a smooth tax path and, therefore, unexpected events such as wars are optimally financed by debt. In other words, wars should be financed by fiscal deficits. Although in this literature war plays no special role outside of being assumed to be an unexpected event that governments must deal with, the second literature is more specific to the consequences of war or defense spending in general. This latter work assumes that individuals have a derived demand for national security to protect their well-being, and that of their descendants. Therefore, both temporary increases in defense spending (wars), as well as permanent increases during times of peace will be financed by debt. The key to deriving this result is that bequests, although operative, cannot be fully realized because there exists the possibility that international conflict may break out.

If so, then a portion of these bequests may never reach one's heirs since they may be confiscated by an adversary or destroyed during the conflict.

As a consequence of war, a component of government expenditures, defense spending, is perceived by individuals as a form of protecting against these attacks or increasing the likelihood that bequests are realized. Therefore, increases in public debt to finance defense expenditures (which help to ensure that a portion of bequests are received by future generations) will not be fully offset by increases in savings. Consequently, we should expect to observe a positive correlation between increases in the size of the public debt and defense spending in countries where such a concern exists.

Another important implication from this model is that since defense spending lowers the amount bequeathed to future generations it lowers national savings. In particular, using time series data for 11 OECD countries, Seiglie (1998) finds robust results that both aggregate savings as well as the saving rate are reduced by defense spending. Since economic growth is largely determined by the accumulation of both physical and human capital partly financed by inter vivos transfers, then defense spending can affect economic growth.

### **III. THE TRANSFER PROBLEM AND WAR**

Victory in war may lead to not only confiscation of the loser's resources (e.g., territory) as a prize, but a more subtle form of compensation: reparation payments for war damages. For example, France was forced to pay Prussia indemnities after the 1870–1871 war and Germany was made to pay France reparations after World War I. Economic research on the general question of the effects of transferring resources between countries on the terms of

trade of the paying or receiving country was stimulated after WWI by debates between Keynes and Ohlin. After WWII, the beginning of the Marshall Plan led to a reexamination of this issue by Samuelson.

The transfer problem refers to the need for real resources to accompany the international transfer of financial resources between two countries or groups of countries in order for the latter to take place. Under standard assumptions, the problem is that for country A that loses a war to make reparations to country B the victor, country A must reduce its expenditures by the same amount as the recipient increases theirs. Otherwise, the transfer would lead to one or the other country's terms-of-trade changing (the price of imports relative to exports) and the transfer would be undereffected or overeffected. Restating the problem differently, when the loser gives the winner \$100, the loser's balance of trade will improve as they will reduce their expenditures on imports and the recipient of the transfer will purchase more of the loser's exports. If the improvement in the balance of trade via income changes does not lead to the loser making \$100 of transfer in real resources (or commodities) then the terms-of-trade will change to complete the adjustment. For example, if the balance of trade only improved by \$90, then the transfer is undereffected and the price of this country's exports relative to its imports would fall. As the price of exports relative to imports falls for the defeated country, this will further encourage their exports and discourage imports until the full transfer is completed. It should be noted that much of the discussion on foreign aid and other transfers in the area of international political economy fails to account for this effect. Therefore, financial transfers that may appear as war reparations (or foreign aid) may lead to dramatic changes in the terms of trade of the recipient country, with varying consequences.

#### IV. TOWARD MEASURING THE COST OF WAR

Adam Smith was one of the first economists to recognize the costs as well as the potential benefits of the military when used for national defense. In his book, the *Wealth of Nations* he states that “the first duty of the sovereign, that of protecting the society from violence and invasion (by others), can be performed only by means of military force. But the expense both of preparing this military force in times of peace, and of employing it in time of war, is very different in the different states of society (and in) different periods.” He recognized that the cost of war, including death, destruction, and other casualties, will vary depending on time and place. In other words, the opportunity cost of the resources employed or destroyed varies depending on the economic conditions of the particular actors.

Jean-Baptiste Say went even farther by noting that the loss of human life is a loss of wealth. This wealth is composed of the total expenditure used up in previous years in maintenance and education. He wrote: “War cost more than its expense; it costs what it prevents from being earned.” This is one of the earliest recognition that human beings are embodied with human capital, and therefore a part of the value of a human life is the foregone earnings or the loss to society resulting from the inability of individuals to produce, that is, the reduction in output experienced by society.

In the simple example shown in Figure 1, the cost of war was simply  $U_0 - U_1$ , since there was no time dimension nor externalities. Yet operationally, measuring the cost of war requires as a first step calculating the present discounted value of the loss in productivity of the dead and wounded. For those who are killed, the base measure is the discounted value of their lifetime earnings. For those who are wounded, we calculate the differential between

their potential lifetime earnings prior to the conflict and that after the war. Since casualties during war tend to be young, both as a result of soldiers being young and children being the most vulnerable to some of the spillovers of war such as starvation and disease, these costs based on normal life expectancy would tend to be high. Algebraically, the base amount of the cost of a casualty at time  $t = 0$  is

$$C = \sum_{t=1}^T \frac{y_t^* - \hat{y}_t}{(1+r_t)^t},$$

where  $y_t^*$  is the individual's annual expected income,  $\hat{y}_t$  is the actual income received which is equal to zero if the person is killed,  $r$  is the discount rate or cost of capital and  $T$  is the expected age of retirement.

It is important to emphasize that in calculating the economic costs of war, we do not just simply total the number of dead and wounded. Each individual has a value to society based on his or her ability to contribute to the production and therefore, wealth of a country. The cost of a casualty of a young person with the same amount of human capital as that of an older one will have a higher value to society, since, for example, his or her death at a younger age results in society foregoing more expected years of production. The amount of the loss or the economic cost is positively related to the life expectancy in the society. This is consistent with Smith's observation that the costs of war varies across time and space since so will economic conditions.

To this base amount, we must then add the value of the foregone consumption of intangibles and the value placed by society on "life itself." In order to arrive at a monetary

value for this loss from war requires the use of implicit measures of individuals' valuation for these "goods." We must equally account for the loss of earnings to others as a consequence of war or conflict. For example, there are currently many countries where the presence of relatively low intensity conflict has eliminated certain industries such as tourism. To measure this cost, we calculate the earnings prior to and during the war and the differential is an approximation of the damage to specific industries resulting from the conflict.

Similarly, the adoption of weapons with the potential to impose externalities requires that we factor in these costs. As an example, exposure to chemicals during a conflict reduces the health and life expectancy of those exposed and this amount has to be accounted for in the calculus. Similarly, the environmental damage caused by war has to be factored in. This may include the cost to the environment of oil spills or burning oil wells. As a first approximation, we can estimate the reduction in the income of the affected parties. For example, oil spills resulting from a war may lead to a reduction in the catch of fish. We can then impute some monetary value for this loss. In a similar way, we can calculate the loss generated from increases in infant mortality. This may be done by estimating the loss in production (earnings) for those who do not survive. In addition, we must add the cost of providing health care for those who are casualties of the war.

Other costs of war (or more generally, the maintenance of a military) include the following: (1) the salaries and allowance of military personnel evaluated at their opportunity cost; (2) maintenance of paramilitary forces; (3) payments made to civilians employed in the military sector; (4) operations and maintenance; (5) procurement of weapons; (6) research and development (R&D); (7) construction expenditures related to the military sector; (8)

pensions to retired military personnel; (9) military aid to foreign countries; (10) civil defense; and (11) military aspect of atomic energy and space.

All of these components of military spending could be attributed indirectly as a cost of war, even if these expenditures are made during peacetime. The reason is that the existence of war creates the necessity for nations to maintain standing armies and keep stocks of armaments ready for deployment, that is, to divert resources from alternative uses. Therefore, in calculating the cost of war we should include the loss in production of the factors employed in the war effort. For example, we should value the time of soldiers while engaged in war, not by the amount that they are paid by their government, but by the foregone earnings in their prewar employment. In calculating costs, even if soldiers are conscripted their time in the military should be valued at their market wages and not at what they are paid by the government. This is a fundamental issue in the debate on the costs and benefits of the draft versus a volunteer army.

All of the other expenditures listed above should be evaluated at their opportunity cost. For example, we must account for the cost of weapons, expenditures on R & D, and the replacement of capital destroyed during war by the amount required to replace them at market prices. It is important to emphasize that when governments borrow to finance these expenditures (or finance them from tax revenues or seigniorage), care should be taken when determining the appropriate rate of interest used to discount any flow of services. The rate used should be one that reflects the social opportunity cost of capital. As Harberger demonstrates, with distortions such as taxes in the economy the social rate of return will generally deviate from the private rate. But one thing is clear, the rate used should not necessarily be the rate paid by the government to finance expenditures since this rate will

generally underestimate the true social cost of capital. Using this lower rate will result in the actual net cost of many different military activities to be understated, leading to the adoption of military projects that have a net social loss to society. For example, if no distortions exist and the government borrows to finance a new weapon system or to fund pension systems, the rate used to evaluate these costs is the marginal productivity of capital in the private sector that without any risk premium and well-functioning capital markets will equal the market rate of interest. More generally, insofar as military expenditures raise claims on factors of production, they should be included in the cost of war.

### **Also See the Following Articles**

ECONOMIC CAUSES OF WAR AND PEACE • ECONOMICS OF WAR AND PEACE,  
OVERVIEW • MILITARY-INDUSTRIAL COMPLEX, CONTEMPORARY  
SIGNIFICANCE

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