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Volume Author/Editor: Simon Kuznets

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Chapter Author: Simon Kuznets

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# PART II

# National Product, 1939-1943

The discussion in this Part follows closely the text of *Occasional Paper 17*, 'National Product, War and Prewar' (National Bureau of Economic Research, Feb. 1944). Changes have been made to take account of the more recent estimates of the Department of Commerce, and to bring the series through the last two quarters of 1943.

For a critical review of the *Occasional Paper* and a discussion of the methods used see *Review of Economic Statistics*, Vol. XXVI, No. 3, August 1944, pp. 109-35.

TABLE

APPENDIX TABLE

## 1 National Product in Current Prices

As defined in Part I, national product in wartime is the sum of finished output: (a) flow of goods to ultimate consumers; (b) additions to the stock of nonwar capital; (c) flow of goods to war uses; (d) additions to the stock of war capital. Components (a) and (b) constitute nonwar output, the nonwar sector; components (c) and (d), war output, the war sector. National product is net or gross as components (b) and (d) are measured net or gross of the current consumption of durable capital.

The estimates in Table II 1 are merely approximations to national product so defined because the data are not sufficiently detailed to measure accurately final product categories. The following comments serve to indicate the respects in which the estimates fail to give what is wanted.

The value of goods flowing to, or retained from their production by households and individuals (line 1) excludes subsistence and related expenditures by the government for the armed forces. Theoretically, it should include them, since it should measure all goods flowing to consumers qua consumers. There is no more reason to exclude the value of subsistence for the armed services from the flow of consumer goods (as a measure of a distinct category of final products) because it is covered in war output than to exclude expenditures on consumer goods by workers in munitions plants. The subsistence item under war output, together with pay, is the value of services rendered by the military forces; and there is no duplication if the goods are treated also as part of the flow of goods to ultimate consumers.

This item is not easy to measure. It should include only the part of the allowance for food, clothing, shelter, etc. that is a minimum needed by the armed forces as peacetime consumers; not the part that represents special needs arising from the particular demands of military activity. Yet to say what part of total expenditures on food, clothing, shelter, transportation, etc. for the armed forces is equivalent to a peacetime consumption minimum and what part is due to special military needs is difficult. It may be argued that since the value of the services of the armed forces is determined arbitrarily, a simpler method would be to equate it to money payments alone, thereby allowing in war output for the flow of consumer goods to members of the armed forces qua ultimate consumers. But this would seriously undervalue the services of the armed

forces, calling for a subsequent correction, and mis-classify under war output a portion of the flow of goods to consumers. It was deemed preferable to characterize the omission as a qualification upon our estimates of the flow of consumer goods. Could this item be included, both the flow of goods to consumers and national product in a year like 1942 would be $2 to $3 billion larger than the totals in Table II 1.[1]

TABLE II 1

National Product, Wartime Concept, Current Prices
1939-1943
(billions of dollars)

| | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| 1 Flow of goods to consumers | 64.8 | 68.8 | 77.7 | 85.1 | 94.1 |
| 2 Nonwar capital formation | | | | | |
| a) Gross | 13.2 | 16.7 | 20.9 | 8.8 | 2.7 |
| b) Net | 6.0 | 9.3 | 13.0 | 0.1 | —6.5 |
| 3 War output | | | | | |
| a) Gross | 1.4 | 2.8 | 12.8 | 50.3 | 81.3 |
| b) Net | 1.4 | 2.8 | 12.5 | 49.5 | 79.5 |
| 4 National product | | | | | |
| a) Gross (1 + 2a + 3a) | 79.4 | 88.3 | 111.4 | 144.2 | 178.1 |
| b) Net (1 + 2b + 3b) | 72.2 | 80.9 | 103.2 | 134.7 | 167.1 |

For derivation see Appendix II and Appendix Table II 11. Since these estimates use the recent work of the Department of Commerce, the coverage of the components is not the same as that in National Bureau estimates. The two chief differences are (a) flow of goods to consumers excludes imputed rent on owner-occupied houses; (b) net private capital formation, the major part of total nonwar capital formation, is the residual left after subtracting depreciation and depletion as recorded in business accounts, i.e., unadjusted to current reproduction value. Also, viewed as sums of income payments and undistributed savings of enterprises, the totals implicitly disregard government savings, i.e., set them at zero.

The value of services to individuals by governments in peacetime is assumed, somewhat arbitrarily, to be equal to direct personal taxes paid by individuals. There is no reason to modify the assumption in wartime: at least prewar direct tax payments may be interpreted as compensation for services by governments to individuals, and only the increase in direct taxes attributed to the additional

[1] If we assume minimum subsistence to be $500 per member of the armed forces, and 4 million in the armed forces in 1942, the item amounts to $2 billion. It would tend to rise rapidly from 1941 to 1943, accentuating the rise shown in Table II 1.

services rendered in war. For this reason, prewar direct taxes are added to round out consumers' expenditures to total outlay.[2]

Before we can estimate nonwar capital formation (line 2) we have to differentiate war from nonwar capital goods. Some part of the addition to privately financed equipment and construction was, during the years covered in Table II 1, specifically designed for the production of war implements or their components; and a substantial proportion of both private and public nonwar capital formation, while not directly associated with munitions production, was due to the expansion of activity associated with the war. In a sense, all capital formation in a period of intensive preparation for or participation in a major war is for military purposes, stimulated in the short run by war needs.

Yet the classification cannot be based upon purposes—for they are intangible. It should rather take into account the extent to which equipment and construction are either of such physical character as to be suitable only for war production in the narrowest sense or of such extraordinary size as can be warranted by war demands alone and in no way be justified by reasonable estimates of peacetime needs. As this cannot be done with the present data, the best practicable criterion is the source of financing. Additions to capital equipment that are specifically for transient war needs and are so unwarranted by peacetime prospects as to require government financing could be defined as capital formation for war purposes. Private financing or government financing outside the war budget was considered evidence that the capital formation involved could be defined as nonwar in the longer run.

War output in line 3 differs from the usual estimate of war expenditures in excluding payments that do not represent a draft upon real resources (property purchase, prepayments, and the like); and in line 3b, in excluding also depreciation on government-financed war construction and equipment. Neither adjustment can be statistically precise.

[2] It may be argued that a more reasonable method would be to allow for an increase in direct taxes associated with the rising cost per unit of governmental services. This correction, however, would be for a relatively small part of the total, and would call for a subsequent adjustment of the totals in current prices by a price index for governmental services. In calculating totals in 1939 prices, direct taxes were held constant at the 1939 price level, the assumption being that the real volume of services to consumers did not change.

Another disadvantage of the estimates in line 3 is that part of war output is measured before it reaches the units that dispose of it for purposes of the armed conflict. Even in the series for munitions, products accepted by the military agencies and ready for combat or training use are combined with products subject to further modification. While there is no duplication, war output is not as truly a finished products total as the flow of consumer goods.[3]

The above qualifications stem from a single cause: the available information is on categories of outlay by source, a not unambiguous guide to the categories of final products. Yet the disparities between what we wish and can measure are not sufficient to preclude analysis.

Table II 1 reveals marked changes in national product and in its composition: a striking increase in the total in current prices from 1939 to 1943; a spectacular climb of war output to high proportions of national product; an increase in nonwar capital formation until 1941, then a drastic contraction; an impressive increase in consumers' expenditures, retarded after 1941.

However, there is little purpose in analyzing here the estimates in current prices. Our interest is in real output and the relative proportions of its components measured in real terms; and for this purpose Table II 1 may be quite misleading. Even in peacetime, values in current prices tend to disguise movements in real output and contain some elements of noncomparability in the price structure and in the price fluctuations of national product components. But in peacetime these elements of noncomparability and heterogeneity are few because price changes and shifts are usually not violent. In wartime, however, prices tend to fluctuate violently and bases of valuation for the war and nonwar sectors of the economy are inherently noncomparable. Estimates in current prices are then merely a first step toward estimates of national product and its components in real terms. The next step is obviously to measure price changes and differentials.

## 2 Price Changes and Differentials: The Problem

The national product totals given above are sums of final products, each valued at changing price levels and on bases possibly differ-

[3] On the other hand, additions to inventories held by the government on war account and not yet paid for are omitted. To this extent, the total understates the increase in war output, at least when it is expanding.

ent from one component to another. To make these totals internally consistent and unaffected by temporal changes in prices we need indexes designed to adjust values in current prices for both price changes and differentials.

We assume first that the valuation base current in recent prewar years for nonwar goods is appropriate for estimating national product in real terms comparable as between war- and peacetime. The alternative would be to accept the valuation base for the war sector in wartime and try to modify the base for the nonwar sectors; in other words, to value each component of national product just as war goods are valued. Obviously it would be difficult to translate all components of national product to the unusual and rapidly shifting valuation base that determines the pricing of war goods. Even if it were not, national product totals covering *both* peace- and wartime would be more comparable and internally consistent if based on peacetime valuations, for not only are they more persistent in the longer run but also constitute a more familiar set of values for appraising changes in wartime.[4]

If this position is conceded, the task in the nonwar sector is solely to find reliable measures of changes in prices over time. Formidable difficulties arise even here. Price indexes do not reflect fully qualitative deterioration in commodities and services; the 'pricing up' that takes the form of adding superficial and unwanted elements to the good, largely in order to raise it into higher price brackets without violating price regulations; the reduction in discounts or in services formerly granted in connection with durable commodities; pricing on black markets; and the general effects of a narrowing freedom of choice on the part of would-be civilian purchasers. As indicated in Section 3, only a few halting steps can be taken toward overcoming these difficulties. Still for the nonwar sector we can construct indexes of final product prices that, when applied to totals in current prices, yield approximate estimates of the relevant components of national product at prewar market prices.

The war sector presents more serious difficulties. To begin with, prices of final products (various items of munitions and of war construction) are not freely accessible; nor are they in existence during the full period spanning both prewar and war years, for many

[4] With the conclusion of the war, new nonwar bases may be used, preferably of a postwar year relatively free from the disturbing effects of war.

of the items were not produced until this country got well into the war. Even when items produced in 1939-40 and 1942-43 are superficially similar, e.g., war planes, certain types of guns, and merchant ships, the qualitative change is such that the resemblance is more in name than in substance. It is impossible to construct directly a price index of war products that would span both prewar and war years.

Even were it possible, price and valuation bases for the war and nonwar sectors would still not be comparable; or, following the preference just indicated, it would still be necessary to adjust prices of war products to a valuation base comparable with that which determines prices of peacetime goods on the free markets of the economy. Commodities and services for use in the armed conflict are purchased under conditions radically different from those that govern transactions in peace type products on the market. Hence, even if we expressed war output as totals in constant prices of munitions, war construction, and nonmunitions, the valuation of at least the first two components would be quite different from that of peacetime goods; and we would be adding into national product physical quantities multiplied by a heterogeneous set of weights.

It may be argued that the rather lavish use of monetary incentives and of laws and regulations, which condition the prices of war products in wartime, represents a shift in consumer preferences on a par with changes in more normal times; or that it is a mere quantitative expansion of the area of governmental purchasing and government-destined production, which in peacetime also is characterized by valuation practices substantially different from those in private markets. To the first argument one may reply that if there are such violent and drastic shifts in consumer preference, estimates of national product cease to have any meaning unless based on a relatively fixed set of values that consciously ignore such shifts. A reply to the second argument is that while government-bound production and products of the private business system are not valued on comparable bases in peacetime, the former is so small in years of peace that the distortion in the national product totals is negligible; but that the matter cannot be dismissed so lightly when the government-controlled sector becomes as large as it does during a major war.[5] At any rate, it seemed better to

[5] If after this war the scope of government-controlled activity extends and continues

wrestle with the problem than ignore it or reduce it to a question of temporal changes only in final product prices in the war sector.

We attempt therefore to value war output not at actual 1939 prices (if such could be found), but at prices it would have fetched in 1939 had it been produced under conditions comparable to peacetime, i.e., when producers could attain the efficiency of resource input characteristic of comparable peacetime industries grown to maturity without the haste and waste of wartime. The concept may seem unrealistic; but it is only so far as any application of peacetime criteria to wartime is unrealistic. And if we are to have national product totals continuous and comparable as between prewar and war years, and some basis for evaluating war output in its longer range postwar aspect, we cannot avoid introducing arbitrarily a common base.

In this attempt we must begin with evaluation at the resource input level. At the final products level there is no comparability between peacetime goods and war implements. The choice between butter and machine guns is not made in the way consumers' demand determines the choice between bread and cake; nor is the government in the position of a producer who chooses among capital goods according to his knowledge or anticipation of consumers' demand. But resources common to both butter and machine guns can be identified; and some can be specifically tagged as having been used to produce the former in peacetime and the latter in wartime. It is thus at the resource input level that the first step can be taken to reduce elements of heterogeneity (at a point of time) and of noncomparability (over time) in wartime national product in current prices.

The element of *heterogeneity* is this: identical or comparable resources utilized at a given time for different ends (e.g., civilian and war goods) are not compensated at the same monetary rates, but the differences in compensation do not correspond to differences in the efficiency of use. The elements of *noncomparability* (over time) are two: (i) identical or comparable resources in identical or comparable uses at two different points of time are not com-

to be conditioned by rules quite different from those of the private market place, the problem will remain formidable and will require careful reconsideration of the somewhat arbitrary compromises made in estimating national product for this country before this war.

pensated at the same monetary rates; (ii) identical or comparable resources shifting over time to different uses (e.g., from peace to war production) are not compensated at the same monetary rates, but the differences in compensation do not correspond to differences in efficiency of use.

Therefore measuring war (and hence total) output in real terms raises two distinct questions: What changes occur over time in the monetary compensation of identical or comparable resources? Does a change from peace to war production mean that identical or comparable units of productive resources are used more or less efficiently? The separation of the two elements of noncomparability is artificial in that the resources that shift to new uses undergo changes both in monetary compensation per efficiency unit and in efficiency. But it is easier to measure them separately, and as the first is obviously much more susceptible of definition and measurement, it is treated first.

The successive steps are: (i) To measure changes over time in final product prices for consumer goods, nonwar capital formation, and certain components of war output (nonmunitions) (Sec. 3a). (ii) To measure changes in prices of resources entering the major part of war output (munitions and war construction) (Sec. 3a). (iii) To assume changes in the efficiency of resource input in the nonwar sectors and nonmunitions, then convert the indexes under (i) to indexes of the compensation of resources, with which we can translate national product and its components to resource input at 1939 prices (Sec. 3b). (iv) To assume changes in and the relative levels of the efficiency of resource input in munitions and war construction, then convert the indexes under (ii) to indexes of the final product prices of munitions and war construction, i.e., prices on a base identical with peacetime prices of products of comparable industries. Once the price differentials between peace and war goods have been eliminated, national product and its components can be translated to a consistent level of final output in 1939 prices (Sec. 3c).

## 3 Price Changes and Differentials: Procedures and Assumptions

### a *Price indexes for products and resources*

The degree to which price and other data can be made to reflect quality and quantity changes in the nonwar sector, and differences in the productivity of resources between the nonwar and war sectors, determines the degree of our success in measuring national product and its components in real terms. The procedures are described in detail in Appendix II, but the estimates cannot be understood without some introduction here.

To test the adequacy of the price indexes used by the Department of Commerce to translate consumers' outlay into constant prices, we compared movements in 'deflated' totals with changes in output destined for civilian use. This test, applied to food products and apparel (clothing and shoes), seemed to warrant a substantial correction for the understatement of the price indexes (for this particular purpose). In all other commodity groups and for some sectors of the service group, the price data customarily used, which are commonly acknowledged to reflect inadequately the types of price change briefly indicated in the opening paragraphs of Section 2, could not be adjusted. Consequently, even our overall price indexes for the flow of goods to consumers may understate the price rise; if so, the price adjusted totals overstate the increase or understate the decline in the 'real' value of the flow of goods to consumers.[6]

Since the Department of Commerce price indexes for nonwar capital formation represent the most practicably complete utilization of available data on the prices of final products, they were used. Here too restrictions and smaller supply have led to quality de-

[6] An adjustment made in *Occasional Paper 17* to re-weight the various price indexes for services has now been carried through by the Department of Commerce, and we have used their recent price indexes for this category.

No great accuracy is claimed for the correction made in the price indexes for food and clothing. Indeed it may well overstate the price rise in these two categories. But if so, the overstatement may serve to offset the downward bias in the price indexes for the other commodity and service groups. And the price measures wanted here—indexes of changes in costs of commodities and services to all consumers, reflecting shifts in their residence and employment status as well as the full complex of changes in the quality of goods—are quite different from such measures as the BLS cost of living index, which reflects changes only in the prices paid by a settled group of wage earners and low-salaried employees.

terioration, reduction of discounts and services customary in more normal times, and a narrowing of the would-be buyer's choice. There is, therefore, ground for assuming that the indexes understate the price rise, and that, consequently, the totals adjusted for price changes overstate values in constant prices.

Under war output 'nonmunitions' and 'munitions and war construction' were estimated separately. The former comprise military pay and subsistence allowances; salaries of civilians in war agencies; subsistence outlays as well as travel for the armed forces; agricultural exports to allies; and similar miscellaneous items. The price indexes for the commodity items were based on Bureau of Labor Statistics wholesale price data; for the pay items, on known changes in rates of pay. Though rather crude, they contain no perceptible biases.

'Munitions and war construction' are dominated by items of specific use in the armed conflict and subject to the rapid qualitative changes associated with active warfare—planes, guns, ammunition, naval ships, merchant ships, war construction units (barracks, depots, airfields, etc., government-financed war plants and war housing). The price indexes, based on the compensation of resources rather than on the prices of final products, were built up from separate indexes for the three resource categories: labor costs; gross profits, allocable between returns to capital and enterprise; and corporate income and excess profits taxes. The weights assigned to these three resource cost indexes (the price adjustment was made separately for the three subtotals, each representing the relevant cost category) were based on the division of the gross value product in the five 'war' industries (metal mining, oil and gas mining, metals fabrication, chemicals and petroleum refining in manufacturing, and contract construction) that accounted for the bulk of munitions output and war construction in 1942 and 1943.

The price measure for the labor factor is an index of hourly earnings in 44 war manufacturing industries weighted by current year man hours. The total current cost of the capital and enterprise factor was calculated by multiplying the total value of munitions and war construction by the changing ratio of the combined total of corporate net income after taxes, depreciation, entrepreneurial income, interest, and net rents and royalties to the gross value product of the five 'war' industries. The corresponding price meas-

ure was obtained by dividing an index (1939=100) of the total value of these items in the five 'war' industries by an index of the consumption of raw materials of mineral origin. The latter, prepared by G. H. Moore, was taken to measure changes in the physical volume of capital and enterprise input. Finally, it was assumed that the corporate taxes (income and excess profits) paid in 1939 were the monetary equivalent of the government's contribution to business activity, and that, after 1939, such services increased with real output, i.e., with deflated labor, capital, and enterprise costs. Accordingly, the deflated totals of labor, capital, and enterprise costs were multiplied by the ratio of 1939 taxes in the five 'war' industries to the 1939 total of such costs; the result measures governmental services (at 1939 prices) rendered in connection with these activities.

Of course the assumptions adopted to construct price indexes for the various categories of resources embodied in munitions and war construction can easily be challenged. Attempts to attach quantities to processes whose substantive scope is exceedingly difficult to ascertain, the indexes are submitted here in the realization that fuller data may make better estimates possible in the future. But crude as the indexes are as measures of changes in compensation per resource unit entering munitions and war construction, the implicit assumptions are, on the whole, in the direction of under- rather than overstating the rise in resource prices. For both labor and the human part of capital and enterprise the procedure assumes that the groups involved are comparable through the years with respect to skill and training. But this means that the price indexes neglect the dilution of skill and experience in labor and managerial groups.[7] Furthermore, for both labor and nonlabor factors, the procedure assumes that in each industry covered, compensation of factors engaged in war production has increased since 1939 at the same rate as compensation of factors engaged in the same industry in all work. That is, the indexes neglect the possibly greater increase by 1942 or 1943 in the pay to factors engaged in war production proper

[7] There is an offsetting factor in the undervaluation of the services of the armed forces and war agency personnel included under nonmunitions. The relative magnitudes cannot be gauged; but there is some doubt that the underpayment of the armed forces and war agency personnel relative to their potential earnings is equal to or greater than the overpayment of labor or management in war production relative to their skills and training by prewar standards.

than in the compensation of factors still engaged in the same industries in peace type work.

True, there are offsets that might reduce the downward bias of the price indexes. The index of earnings per man hour covers wage earners in selected industries that by 1942 may have been engaged chiefly in war work. It is quite possible that price per unit of input of other labor entering war outlay (salaries in war industries, payments to employees in transportation or other fields serving the war but not covered in our index) may have risen less from 1939 to 1942 than earnings per man hour in the 44 manufacturing industries. Similarly, compensation of nonlabor factors, entering war output but not covered in our indexes, may have risen less than is indicated. However, a rough balancing of these considerations, which can be nothing but a guess, would suggest that the offsets would not fully cancel the downward bias of the price indexes. Consequently, like the price indexes for other components of national product, and perhaps to an even greater degree, the indexes of compensation of productive factors entering war output may understate the price rise between 1939 and 1943.

Prices of goods to consumers rose more in 1942 and 1943 according to the index in Table II 2, line 1, than according to the customary cost of living index (line 5). As indicated in Appendix II, Section 1, some of the difference may be due to an improperly full imputation of our adjustments in food and clothing to the price indexes. Perhaps some should be attributed to a bias in the current price totals. But the greater proportion is due to the emphasis in

TABLE II 2

Final Product and Resource Price Indexes
National Product Components, 1939-1943
1939 = 100

| *Price Indexes for* | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| 1 Flow of goods to consumers (excl. gov. services) | 100 | 101 | 107 | 122 | 134 |
| 2 Nonwar construction & equipment, gross | 100 | 101 | 107 | 116 | 123 |
| 3 War output, gross | 100 | 112 | 128 | 144 | 160 |
| 4 Wholesale prices, BLS | 100 | 102 | 113 | 128 | 134 |
| 5 Cost of living, BLS | 100 | 101 | 106 | 117 | 124 |

The indexes in lines 1-3 are implicit: totals in current prices divided by the corresponding totals in 1939 prices. For a detailed description of the procedures and the quarterly and annual totals see Appendix II.

the BLS index on measuring price changes of a relatively constant bundle of goods going to a settled body of wage earning and low-salaried families. The indexes appropriate for the 'deflation' of consumers' outlay should reflect also the effects of migration; quality deterioration, even though not compensable by larger money outlay; and changes in the cost of living of consumer groups other than those covered by the BLS index.

The rise in prices of resources entering war output was relatively sharp (line 3). Since the index covers also prices (at the final product level) of nonmunitions, which rose less, the rate of compensation of resources associated with munitions and war construction proper rose even more than is indicated in line 3.

Table II 2 brings us to an intermediate stage in the analysis. The indexes in lines 1 and 2 (and part of that in line 3) are for prices of final products; those dominating the entries in line 3, for prices of resources. Were we to apply these indexes in adjusting the relevant components of national product, one part of the latter would represent a sum of final products at their 1939 prices; the other, a sum of productive resources at their 1939 prices. The two parts can legitimately be added only by one of two further steps: (1) estimate changes in the efficiency of resources in the area outside munitions and war construction, then convert the final product price indexes into measures of changes in the compensation of resources at their 1939 efficiency level; in which case the national product totals, when adjusted for price changes, become consistent measures of the 'real' value of resource input at a constant efficiency level; or (2) estimate changes after 1939 in the efficiency of resources put into munitions and war construction; then convert the totals for munitions and war construction into measures of final output, comparable with the other components of national product.

b *Conversion to resource prices*

The few scattered data on the efficiency of resources in the nonwar sector (chiefly in some manufacturing and mining industries and utilities on a per man hour base) suggest that the rise since 1939 has been moderate, at an annual rate of not more than 2 or 3 per cent; that it virtually ceased by 1942; and that in recent quarters, as the scale of operations in many civilian industries shrank and

dilution of labor and other resources took place, efficiency per resource unit may have declined slightly.

On the basis of such meager evidence, a quarterly efficiency index was constructed and applied uniformly to the price indexes (at final product prices) for three of the chief components of national product (flow of consumer goods, excluding direct taxes; nonwar construction and equipment; the nonmunitions part of war output). The price indexes for final products were thereby converted into price indexes for resources in terms of their efficiency in 1939.[8]

Even if this single efficiency index is accurate, its application to such different groups of final products as are represented by consumers' outlay, nonwar construction and equipment, and nonmunitions is arbitrary. Efficiency of resources put into construction and equipment may have risen less or more than efficiency of resources in the production, transportation, and distribution of consumer goods; and it may well be asked how productivity of resources in such a heterogeneous category as 'nonmunitions' can be gauged. But it seemed preferable to make the assumption, on whatever little ground could be found, then show how the customary measures have to be modified, if only to stress the questions that must be answered in any consistent estimate of national output or input in real terms.

Comparison of the indexes in Tables II 2 and 3 reveals relatively minor differences, largely because the scanty data indicate merely minor changes in the efficiency of resources embodied in the flow of goods to consumers and other components aside from munitions and war construction.

Since changes in the prices of all components are measured on the same base in Table II 3, price indexes implicit in national product can be derived (lines 4 and 5).[9] These are indexes of resource

[8] See Appendix Tables II 2, 3, and 6. Actually, totals 'deflated' by final product price indexes were adjusted.

The efficiency index for the nonwar sector (see App. Table II 2, col. 3) shows only a minor decline from the latter part of 1941 to 1942; and no change from 1942 to 1943. It is quite possible that the index is biased in failing to reflect a decline in efficiency of resource use in nonwar industries in the latter part of 1942 and in 1943. Unfortunately there is no evidence upon which to estimate such a decline. If the index is indeed faulty in this respect, resource input (at 1939 prices) in the nonwar sector would be understated in 1942 and 1943.

[9] This is true with the exception of governmental services to individuals (direct taxes), which are included at the same absolute level in both the current price and

TABLE II 3

Resource Price Indexes
National Product and Its Components, 1939-1943
1939 = 100

| *Price Indexes for Resources Embodied in* | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| 1 Flow of goods to consumers (excl. gov. services) | 100 | 104 | 112 | 128 | 140 |
| 2 Nonwar construction & equipment, gross | 100 | 104 | 112 | 122 | 129 |
| 3 War output, gross | 100 | 112 | 129 | 147 | 162 |
| 4 Gross national product | 100 | 104 | 114 | 133 | 149 |
| 5 Net national product | 100 | 104 | 114 | 136 | 153 |

All indexes are implicit: totals in current prices divided by the corresponding totals in 1939 resource prices.

prices, that is, strictly speaking, the totals to which they apply are of national resource input, not of final output.[10]

The notable features of these indexes are their rise to relatively high levels by 1943 and the acceleration of the rise after 1941. In the two years 1939-41 they rise only 14 per cent; in the following two years over 30 per cent, partly because of a fairly steep rise from 1941 to 1943 in resource prices of war output, partly because of the large increase in the weight of war output in national product.

c *Conversion to final product prices*

The main question here concerns the relative efficiency of resources used in munitions and war construction. The sole evidence is scattered information on changes in labor efficiency in some munitions industries (planes, merchant ships), which indicates a marked rise. There are no data that would serve even to suggest the relative efficiency of resources in munitions and war construction compared with that in similar (i.e., five 'war') industries in 1939—except again fragmentary data on loss of labor time paid for due to labor 'hoarding', difficulties of attaining a smooth flow of materials and components, and troubles arising from rapid modifications in technical specifications due to fluid conditions of active warfare.

Consequently, assumptions had to be made again. The estimates

adjusted totals. The item, however, is relatively small, and of slight effect on the implicit price indexes.

[10] Not the full total of all resource input, since resources devoted to unproductive activities (e.g., robbery or forbidden drug peddling) are presumably excluded. The total embraces only resource input in uses not explicitly recognized by society as deleterious.

arrived at by resort to them, of illustrative value, lead us to conclusions that are no more than tentative and inferential. The three assumptions in the calculation differed in the relative efficiency assigned to resource input for the first half of 1943. Assumption *a* set the level of efficiency in munitions and war construction at 80; for the other components of national product, at 105. This meant that whatever the efficiency ratio of resources in the five 'war' industries to resources in all 'other' industries was in 1939, the corresponding ratio in the first half of 1943 was lower by the proportion: $(105 - 80) \div 105$. Assumption *b* set the relative efficiency level in munitions and war construction in the first half of 1943 at the efficiency *ratio* for the five 'war' industries in 1939. Assumption *c* set it higher than the corresponding ratio for the five 'war' industries in 1939, by the proportion: $(130 - 105) \div 105$.[11]

In addition to assuming different *levels* of relative efficiency in munitions and war construction in the first half of 1943, we assume that they *moved* similarly between 1939 and the recent quarters, namely: (i) that efficiency increased two-thirds from 1939 to the first half of 1943, then another tenth in the second half of that year; (ii) that the increase was fairly steady through 1941; (iii) that in the last quarter of 1941, and especially in the first and second quarters of 1942, the upward trend was damped by the precipitous expansion of munitions and war construction; (iv) that efficiency rose rapidly after the second quarter of 1942 as plants were completed, mass production of munitions began to hit its stride, and the pains of rapid growth subsided; (v) that in the second half

[11] The assumptions indicate nothing concerning the efficiency of resources in munitions and war construction, on the one hand, and in all other production, on the other. They relate directly to the ratio between two ratios: (i) the ratio in 1939 between efficiency in the five 'war' industries and in the other sectors of national product; (ii) the ratio between efficiency in munitions and war construction in 1943 and efficiency in the other sectors of national product.

Assumption *a* states that the ratio of (ii) to (i) is 0.76 (i.e., $(80 \div 105) : 1$); assumption *b*, that it is 1.0 (i.e., $(105 \div 105) : 1$); assumption *c*, that it is 1.24 (i.e., $(130 \div 105) : 1$).

However, the assumptions imply a relation between the efficiency of resources in munitions and war construction in 1943 and in the five 'war' industries in 1939: under assumption *a*, the former is at a level of 0.8 of the latter; under assumption *b*, of 1.05; under assumption *c*, of 1.3.

The reference throughout is to the first half of 1943, the most recent period covered in the original calculations.

of 1943 the rate of increase began to decline, reflecting the beginning of cutbacks in some of the older programs.[12]

Upon these assumptions, we convert the indexes of resource prices for munitions and war construction into indexes of final product prices, the prices being on the bases at which comparable products were valued in a prewar year like 1939 (Table II 4, line 3). Since these indexes are consistent with those for the flow of consumer goods and nonwar capital formation, indexes of price changes in national product also can be calculated (Table II 4, lines 4 and 5)

Of course, the price indexes for war output are not in terms of 1939 as 100: they would yield 100 for 1939 only if the efficiency of resource use in war production were assumed to stand in the same relation to efficiency in the other sectors of production as characterized the five 'war' industries at their 1939 productivity level. In other words, the base of the indexes is not the actual prices of war products in 1939, but what those prices would have been if the efficiency of resource use in munitions and war construction had been the same as in the five 'war' industries in 1939. The amount by which the entries in lines 3a, b, and c exceed 100 in 1939 measures the extent to which the relative efficiency of resources in war production was assumed to fall short of that in comparable industries in 1939.

If we wish to measure temporal price changes alone, i.e., not correct for any differences in the way prices measure real output in the war sector as compared with the nonwar, lines 3a, b, and c can be converted to relatives of 1939 and the results averaged (line 6). This price index rises moderately to 1942, then declines in 1943.

[12] The assumed movement in the relative efficiency of resource use, as distinct from the level assumed for the first half of 1943, is based for the years since 1941 upon a rough check with the expansion in munitions output weighted by constant prices. The three assumptions concerning the relative efficiency level in the first half of 1943 are illustrative; and the preference, in subsequent discussion, for assumption *a* is based largely upon scattered evidence of lavish (by peacetime standards) use of manpower and materials in war production.

There is no inconsistency in assuming a rapid *rise* in the relative efficiency of resource use in munitions and war construction and a low *level* compared with the efficiency in the five 'war' industries in 1939. A rapid rise could hardly be expected from levels of efficiency in 1939 that would be close to those in comparable industries which have enjoyed a long history of rising volumes and cumulative improvements in technology of operation. Yet this in itself is no proof that levels of relative efficiency of resource use in munitions and war construction by 1943 were necessarily lower than those of comparable industries in 1939.

Differences among the various price indexes in Table II 4 are as might be expected. If we allow for the lower efficiency of resource use in war production than in the comparable prewar industries, and thus for a higher price level in it, the very increase in the proportion of war output in national product causes an upward movement in the price indexes for national product as a whole. For example, under assumption *a* the over-all price index rises more than 50 per cent from 1939 to 1943 (lines 4a and 5a). The failure to allow for

TABLE II 4

Final Product Price Indexes

Three Assumptions concerning the Relative Efficiency of Resource Use in Munitions and War Construction, 1939-1943

| *Price Indexes for* | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| 1 Flow of goods to consumers (excl. gov. services) | 100 | 101 | 107 | 122 | 134 |
| 2 Nonwar construction & equipment, gross | 100 | 101 | 107 | 116 | 123 |
| 3 War output, gross | | | | | |
| a) Assumption *a* | 165 | 175 | 187 | 189 | 182 |
| b) Assumption *b* | 138 | 144 | 156 | 158 | 148 |
| c) Assumption *c* | 119 | 123 | 133 | 133 | 126 |
| 4 National income | | | | | |
| a) Assumption *a* | 101 | 103 | 113 | 142 | 156 |
| b) Assumption *b* | 101 | 102 | 111 | 134 | 143 |
| c) Assumption *c* | 100 | 102 | 110 | 127 | 131 |
| 5 Gross national product | | | | | |
| a) Assumption *a* | 101 | 103 | 112 | 139 | 152 |
| b) Assumption *b* | 101 | 102 | 111 | 132 | 140 |
| c) Assumption *c* | 100 | 102 | 109 | 125 | 130 |
| 6 War output, disregarding level of relative efficiency in war production | 100 | 104 | 113 | 114 | 108 |
| 7 National income (based on lines 1, 2, 6) | 100 | 101 | 108 | 120 | 121 |
| 8 Gross national product (based on lines 1, 2, 6) | 100 | 101 | 108 | 119 | 121 |
| 9 Gross national product, Dept. of Commerce adjustment & concept | 100 | 101 | 106 | 115 | 120 |

LINE

1 & 2 Table II 2.

3a, b, c See Appendix II.

4 & 5 Totals in current prices divided by the corresponding totals in 1939 prices (App. Tables II 11-14).

6 Arithmetic mean of relatives of lines 3a, b, and c (1939 $\doteq$ 100).

7 & 8 Totals in current prices (App. Table II 11) divided by the price adjusted totals (adjusted by lines 1, 2, and 6).

9 *Survey of Current Business,* April 1944, p. 6, Table 1. The concept includes in gross national product *all* government outlays.

the lower efficiency of resources in war output yields an over-all price index that rises only 19 or 20 per cent from 1939 to 1942, and in 1943 rises 1-2 per cent further (lines 7 and 8).

In its adjustment for price changes the Department of Commerce assumes that final prices of munitions do not change over time, and that they are comparable with prices in the nonwar sectors (line 9). This is tantamount to saying that a war output price index is affected solely by changes in the prices and relative weight of nonmunitions, and, in the Department's calculations, also by the changes in the construction costs indexes used to 'deflate' war construction. The resulting price index is similar to an index that measures only temporal changes in the prices of war output and does not allow for the lower level of relative efficiency of resource use. Line 9 differs from line 8 only in that it is somewhat lower in 1941, 1942, and 1943, and rises slightly more from 1942 to 1943.

## 4 National Product in Constant Prices

### a *The several variants*

With the alternative price indexes discussed in Section 3, national product and its components at constant price levels in several variants are computed (Table II 5). The meaning of each variant must be understood before the differences in its movement over time, in its distribution among its main components, and in the increases and declines in it and its components can be analyzed.

The variants in lines 1 are sums of resources valued at their 1939 prices. Line I 1, for example, is the sum of productive resources, weighted at their 1939 prices, i.e., at their 1939 efficiency as represented by the prices they fetched in that year, embodied in the flow of goods to consumers. A similar statement, with modifications in the description of the categories of final products into which the resources entered, can be made for lines II 1, III 1, IV 1, and V 1.

The four variants in lines 2 differ in the degree to which they allow, in the transition from the resource to the final product level of measuring munitions and war construction, for differences in the relative efficiency of resource use. Variants *a, b,* and *c* assume that resource use in munitions and war construction is at an efficiency level, relative to the rest of the economy, different from that characterizing similar types of industrial output (i.e., largely the metal

working, chemical, and construction industries) in 1939. Variant *d* disregards such differences in efficiency level betwen munitions and war construction and its prewar civilian counterpart in 1939, and adjusts the value in current prices only for temporal changes in the final product prices of war goods.

The 2a lines are, then, the sums of final products weighted by their 1939 prices, on the assumption that in converting resource input in munitions and war construction into final products, the efficiency of use, relative to the rest of the economy, was in 1939 at 0.48 of the relative efficiency level of comparable peacetime industries (metal mining and manufacturing, chemicals and construc-

TABLE II 5

National Product and Resource Input, Wartime Concept, 1939-1943
1939 Final Product and Resource Prices
(billions of dollars)

| | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| I Flow of goods to consumers | | | | | |
| 1 Resource input | 64.8 | 66.4 | 69.5 | 66.6 | 67.1 |
| 2 Final product | 64.8 | 68.0 | 72.7 | 69.8 | 70.3 |
| II Nonwar capital formation, gross | | | | | |
| 1 Resource input | 13.2 | 16.1 | 18.7 | 7.2 | 2.1 |
| 2 Final product | 13.2 | 16.5 | 19.6 | 7.6 | 2.2 |
| III War output, gross | | | | | |
| 1 Resource input | 1.4 | 2.5 | 9.9 | 34.3 | 50.2 |
| 2 Final product | | | | | |
| a) Assumption *a* | 0.8 | 1.6 | 6.9 | 26.5 | 44.6 |
| b) Assumption *b* | 1.0 | 1.9 | 8.2 | 31.9 | 54.8 |
| c) Assumption *c* | 1.1 | 2.3 | 9.6 | 37.8 | 64.8 |
| d) Disregarding level of relative efficiency in war production | 1.4 | 2.7 | 11.3 | 44.1 | 75.3 |
| IV Net national product | | | | | |
| 1 Resource input | 72.2 | 77.6 | 90.2 | 99.1 | 109.3 |
| 2 Final product | | | | | |
| a) Using III 2a, net | 71.6 | 78.7 | 91.3 | 94.9 | 107.0 |
| b) Using III 2b, net | 71.8 | 79.0 | 92.6 | 100.3 | 117.2 |
| c) Using III 2c, net | 71.9 | 79.4 | 94.0 | 106.2 | 127.2 |
| d) Using III 2d, net | 72.2 | 79.8 | 95.7 | 112.5 | 137.7 |
| V Gross national product | | | | | |
| 1 Resource input | 79.4 | 85.0 | 98.1 | 108.1 | 119.4 |
| 2 Final product | | | | | |
| a) Using III 2a | 78.8 | 86.1 | 99.2 | 103.9 | 117.1 |
| b) Using III 2b | 79.0 | 86.4 | 100.5 | 109.3 | 127.3 |
| c) Using III 2c | 79.1 | 86.8 | 101.9 | 115.2 | 137.3 |
| d) Using III 2d | 79.4 | 87.2 | 103.6 | 121.5 | 147.8 |

All entries from Appendix II tables.

tion) and rose to 0.88 by the last quarter of 1943. The same statement could be repeated for lines 2b and c, with changes in the ratios to 0.63 and 1.18, and 0.78 and 1.46 respectively.[13]

The 2d lines are quite different: also the sums of final products weighted by their 1939 prices, they do not allow, in the conversion of resource input in munitions and war construction into final products, for any difference in *level* of efficiency, between these industries and comparable peacetime industries, relative to the rest of the economy. They do reflect, however, the large upward *movement* in the efficiency of resource use in munitions and war construction.

The distinction between the estimates at resource and at final product levels is clear; and which is chosen depends primarily on the uses to which they are to be put. Similarly, the choice between the final product totals that do (a, b, c) and do not (d) allow for differences in levels of relative efficiency between war and peacetime production of comparable character is also clear; for any purposes in which national product, in real terms, for prewar and war years is to be compared and in which the proportion of war and other output is to be established in final product terms, variants of the *a-c* type alone are suitable.

But the choice among the three variants based on different assumptions concerning the relative efficiency of resources in munitions and war production is not easy; for it is determined by differences in the validity of assumptions concerning a phenomenon extremely difficult to observe at all accurately—not by theoretical criteria. As already indicated, preference for one of these three variants (or any of this type using different levels of relative efficiency of war production) cannot be grounded upon much tangible evidence and is largely a matter of judgment.

As far as national product and its distribution by final product categories are concerned, the choice among variants *a, b,* and *c* (and perhaps any others of similar character that may reasonably be devised) is of quantitative importance for 1942 and 1943 alone. Before 1942 war output, no matter how measured, was too small a proportion of national product for differences in its price adjustment to have much effect. Even in 1942 the spread among national product totals in the three variants is only somewhat over 10 per

[13] Under the assumptions concerning both relative levels and movement discussed in Section 3c.

cent. Not until 1943 do the quantitative effects of the choice among the three variants become decisive.

We definitely prefer variant *a,* with its assumption that resource use in war production in the first half of 1943 was still below comparable prewar industries in relative efficiency. The efficiency we are concerned with is that in munitions and war construction in 1943 as compared with similar peacetime industries of 1939, not as compared with it in munitions and war construction in 1942, 1941, or 1939, or that of resources in 'other' industries in 1943 or any earlier year. The judgment is solely that the efficiency of resources in munitions and war construction in the first half of 1943 was some 20 per cent lower than that of resource use in comparable prewar industries in 1939. In other words, utilization of labor (measured, e.g., by idle hours out of the total paid for or by diversion to less essential jobs to fill gaps); of materials (measured, e.g., by rates of consumption compared with those at more mature stages of technology); of machinery (measured at input rates per unit, not at time rates, compared again with the practices of the older and gradually developing industries of peacetime) was, in the first half of 1943, still below the prewar par.

This statement should not be interpreted as an adverse verdict upon this country's enterprise or as depreciation of its enormous accomplishment after it entered the war. On the contrary, to be able to assume that relative efficiency in war production was no more than one-fifth less than that of comparable peacetime industries is a matter for congratulation when we think of the pressure to turn out munitions in huge quantities, the rapidly changing demands of warfare, and the drains upon manpower and management by calls into the military services. But just as it would be unfair to minimize the gigantic productive task met, so would it be misleading to ignore the patent fact that resources were not used as economically as they might have been had the more efficient methods feasible with slower growth under more normal competitive conditions been possible. Regardless of the validity of the specific figure used in assumption *a* (which should perhaps be somewhat larger or smaller), we believe that assigning to war production a *lower* level of relative efficiency in the first half of 1943 than existed in similar industries before the war is decidedly more justifiable than putting it on the same or a higher level.

b *Increase, 1939-1943*

We discuss only the two estimates that seem preferable: resource input or national product at final product prices under assumption *a*.

National product, both gross and net, is roughly 50 per cent greater in 1943 than in 1939 (Table II 6, col. 6). Of this increase, somewhat more than half occurred before this country entered the war (col. 1 and 5). The percentage increase in national product during the two years of participation is somewhat less than that during the two years of neutrality.

The increases in the Department of Commerce totals and in such

TABLE II 6

National Product and Resource Input, Wartime Concept
Percentage Increase, Selected Periods
1939 Prices, Several Variants

| | *1939-1941* (1) | *1941-1942* (2) | *1939-1942* (3) | *1942-1943* (4) | *1941-1943* (5) | *1939-1943* (6) |
|---|---|---|---|---|---|---|
| I Net national product | | | | | | |
| 1 Resource input | 24.9 | 9.9 | 37.3 | 10.3 | 21.2 | 51.4 |
| 2 Final product | | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 27.5 | 3.9 | 32.5 | 12.8 | 17.2 | 49.4 |
| d) Disregarding level of relative efficiency in war production | 32.5 | 17.6 | 55.8 | 22.4 | 43.9 | 90.7 |
| II Gross national product | | | | | | |
| 1 Resource input | 23.6 | 10.2 | 36.1 | 10.5 | 21.7 | 50.4 |
| 2 Final product | | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 25.9 | 4.7 | 31.9 | 12.7 | 18.0 | 48.6 |
| d) Disregarding level of relative efficiency in war production | 30.5 | 17.3 | 53.0 | 21.6 | 42.7 | 86.1 |
| III Other measures | | | | | | |
| 1 Dept. of Commerce G.N.P., 1939 prices | | | | | | |
| a) Dept. of Commerce concept | 26.7 | 18.1 | 49.7 | 17.1 | 38.3 | 75.3 |
| b) Adj. to our concept | 31.7 | 20.1 | 58.2 | 18.3 | 42.1 | 87.2 |
| 2 FRB industrial production index | 48.6 | 22.8 | 82.6 | 20.1 | 47.5 | 119.3 |
| *Net national product | | | | | | |
| b) Assumption *b* | 29.0 | 8.3 | 39.7 | 16.8 | 26.6 | 63.2 |
| c) Assumption *c* | 30.7 | 13.0 | 47.7 | 19.8 | 35.3 | 76.9 |
| Gross national product | | | | | | |
| b) Assumption *b* | 27.2 | 8.8 | 38.4 | 16.5 | 26.7 | 61.1 |
| c) Assumption *c* | 28.8 | 13.1 | 45.6 | 19.2 | 34.7 | 73.6 |

Entries under I and II based on Table II 5. Entries under III based on Department of Commerce figures and the Federal Reserve Board index (revised as of Oct. 1943).

widely used measures of industrial output as the Federal Reserve Board index are larger. Gross national product, based upon the Department of Commerce concept and price adjustment, rises 75 per cent; and the percentage rise from 1941 to 1943 is much greater than from 1939 to 1941. Readjusted to our concept (to exclude prewar business taxes), it rises 87 per cent from 1939 to 1943; and again the percentage rise after 1941 is much greater than during the preceding two years. The Federal Reserve Board index, which would naturally rise more since it is more heavily weighted by industrial commodity production, rises 119 per cent from 1939 to 1943; the percentage rise from 1941 to 1943 is about the same as from 1939 to 1941. The difference between our estimates and those of the Department of Commerce is due largely to a different treatment of the value of war output; that between our estimates and the Federal Reserve Board index is due partly to a difference in coverage and partly to a different treatment of the productivity of factors in the war industries.[14]

The rates of increase in our national product totals at resource or at final product prices are in themselves not unusual. In the two decades for which annual estimates are available, 1919-38, there are increases of relatively the same size. From 1921 to 1923 net national product in 1929 prices rose 25 per cent and gross national product (wartime concept) 22 per cent; from 1935 to 1937, 24 and 22 per cent. These increases compare with a 25-27 per cent increase from 1939 to 1941; and with an increase of either 17 or 22 per cent from 1941 to 1943. From 1933 to 1937 net national product in constant prices increased 49 per cent and gross national product 43 per cent, which compares with roughly 50 per cent from 1939 to 1943. From 1933 to 1936 the former increased 38 per cent, the latter 33 per cent, compared with 33 and 32 per cent from 1939 to 1942.[15]

[14] The FRB index is based, for recent years, upon man hour input in many war industries, weighted by productivity levels extrapolated from 1939. No allowance is made for possibly lower efficiency levels in the war industries relatively to those of comparable industries in 1939.

[15] All figures for national income and for gross national product 1919-38 are from estimates recently revised for *National Product since 1869*. The comparison should properly be confined to the variant at final product prices, since the national income figures have been adjusted for price changes with the help of final product price indexes. But during relatively short periods in the more 'normal' peace years, the

These numerical comparisons disregard the phase of the business cycle the initial years represent. Each period selected from the two decades 1919-38 begins with a year of deep depression, either 1921 or 1933, with the sole exception of 1935-37, and even by 1935 cyclical expansion had fallen short of the preceding cyclical peak in total output (as measured by national income in constant prices). Under such conditions national product in real terms may easily rise by substantial percentages within a fairly short period. In contrast, 1939 was not a year of depression: the level of activity, again as measured by national income or gross national product in constant prices, was much higher than in the preceding peak year in the business cycle, 1937. This consideration, together with the probable continuation of the rise that began in 1938 through 1944, and the bias of the comparison against the present period because of the more careful adjustment for price differentials and changes that tend to overvalue product in *any* expansion, leads to the conclusion that the present period of sustained and marked rise in the real value of national product, which has already lasted six years, is an achievement unique in our economy in recent decades.

However, other factors must be taken into account. First, even though 1939 was a year of more than full recovery from the cyclical depression of 1938, the levels of national product in constant prices do not compare favorably with 1929; and as indicated more fully in Part III, there are many evidences that more resources could have been put to use. A substantial part of the subsequent rise was facilitated by this slack, which greatly exceeded that in the 1920's. Second, even disregarding the whole question of the ultimate net

difference in movement between resource input and final product levels would not be sizable.

It may be argued that the comparison is improper, since in any cyclical expansion the proportion of national product accounted for by the less efficient 'new' industries (similar to munitions and war construction) may increase; and a procedure like that used here to put final products on a comparable valuation basis would tend to accelerate the rise of the price indexes, thereby retarding the rise in the price adjusted totals. No such price adjustment was applied to the estimates for 1919-38.

The validity of this argument depends upon the correctness of the assumption that there is a substantial rise during cyclical expansions in the proportion of national product accounted for by the less efficient 'new' industries (beyond the rising secular trend in their share). It is to be doubted that such an increase even approximates the degree to which the share of war output increased in 1942 and 1943, at least for areas in peacetime economy so 'new' and so far below comparable industries in relative efficiency as were munitions and war construction.

contribution of war output to future social welfare, between 1939 and 1944, as in any cyclical expansion, resources shifted from the nonmarket to the market area; such a shift, as always, meant a reduction in the flow from the nonmarket area of goods of a type rarely taken account of in measuring national product. Yet the reduction in the supply of these nonmarket goods (largely services of housewives and other members of the family) must have been much greater during this recent period than during the prewar cyclical expansions; and the offsets to the rise in the volume of goods turned out by the market sector must have been all the greater. Perhaps as our data improve, further research will succeed in measuring the nonmarket sectors of the economy (in addition to such few items as are now covered, e.g., products retained by farmers and imputed rent); and thus lead to a more comprehensive measure of the total flow of final product. This more comprehensive measure would undoubtedly show a smaller relative rise from 1939 to 1943 than the present estimates.[16]

c *Share of war output*

The changing ratio of war output to national product is of particular interest in wartime as an indicator of the proportion of resources or final products devoted to war. As a measure of the full impact of the war upon the national economy, it has serious limitations: it disregards the effect of the war upon the capital structure of the country, while its meaning in terms of effects upon the welfare of the inhabitants is obviously contingent upon the level of national product per capita, the rate at which civilian supply per capita declines, and the distribution of consumer goods. However, it is a rough approximation to what is wanted; and in view of its

[16] The analysis of the estimates we present could, perhaps, have been made more pointed had we attempted to measure the rise in national product in relation to the underlying long term trend instead of from a given year. However, the establishment of such a trend is beset with difficulties; and its values at the end of the long period to which the trend line would have to be fitted would be subject to especially wide margins of error.

Another refinement of the estimates in Table II 6 (and in Tables II 7 and 8) is to base them on quarterly rather than annual totals. These quarterly estimates, presented in Appendix II, can be used in calculations that span the full period and distinguish between the quarters before and after Pearl Harbor. Since they are approximate and their margin of error wider, it did not seem necessary to go beyond the annual totals.

wide current usage, its movement is established on the basis of our estimates.

The share of war output increased rapidly from 1939 to the first half of 1943—from 1 or 2 per cent to a percentage ranging from 38 to 45; also, as would be expected, most sharply from 1941 to 1942 (Table II 7). The Department of Commerce estimates are similar. Only when we apply its method of price adjustment to our concept does the share in 1942 and 1943 greatly exceed that measured here at the resource level. The difference is not more, partly because our adjustment corrects the prices of both consumer goods and war output for upward biases.

The difference between the share of war output for 1942 in final product prices (variant *a*) and the Department's is greater. Indeed, the outstanding feature of Table II 7 is the difference for all years

TABLE II 7

War Output as a Percentage of National Product, Wartime Concept, 1939-1943

1939 Prices, Several Variants

| | *1939* | *1940* | *1941* | *1942* | *1943* |
|---|---|---|---|---|---|
| I Net national product | | | | | |
| 1 Resource input | 1.9 | 3.2 | 10.6 | 33.8 | 44.5 |
| 2 Final product | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 1.1 | 2.0 | 7.2 | 27.1 | 40.2 |
| d) Disregarding level of relative efficiency in war production | 1.9 | 3.4 | 11.5 | 38.5 | 53.5 |
| II Gross national product | | | | | |
| 1 Resource input | 1.8 | 2.9 | 10.1 | 31.7 | 42.0 |
| 2 Final product | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 1.0 | 1.9 | 7.0 | 25.5 | 38.1 |
| d) Disregarding level of relative efficiency in war production | 1.8 | 3.1 | 10.9 | 36.3 | 50.9 |
| III Other measures | | | | | |
| 1 Dept. of Commerce G.N.P., 1939 prices | | | | | |
| a) Dept. of Commerce concept | 1.6 | 2.8 | 10.9 | 34.8 | 46.7 |
| b) Adj. to our concept | 1.8 | 3.1 | 11.7 | 36.7 | 48.8 |
| *Net national product | | | | | |
| b) Assumption *b* | 1.4 | 2.4 | 8.5 | 31.0 | 45.4 |
| c) Assumption *c* | 1.5 | 2.9 | 9.9 | 34.8 | 49.7 |
| Gross national product | | | | | |
| b) Assumption *b* | 1.3 | 2.2 | 8.2 | 29.2 | 43.0 |
| c) Assumption *c* | 1.4 | 2.6 | 9.4 | 32.8 | 47.2 |

See source notes to Table II 6.

between the shares at the resource and final product levels (lines 1 and 2a). In terms of resource input, war output accounts for a larger share of the national total than when it is adjusted for the relative efficiency of resource use and expressed in terms of final product. This difference is natural since we assume that, owing to a lower efficiency of resource use in war production, the quantity of final war products turned out was less than that resulting in peacetime from the same input of resources in comparable industries. The difference had narrowed materially by 1943, and if efficiency continues to improve, may vanish, or perhaps even change sign.

d *Source of increase in war output*

The output of commodities and services for the armed conflict can be augmented by shifting resources from civilian to war production, by increasing the total resources put into active use, and by both methods. Comparison of the increase in war output with the changes in the nonwar components of national product and in national product itself in current prices indicates the financial sources of war output, but not the resource or final product balance. To show how misleading totals in current prices can be as measures of resources or final products in periods of rapid differential price shifts, they, together with the totals and components in constant resource or product prices are given in Table II 8.

From 1939 to 1941 the several variants of national product and its components in constant prices are roughly similar (Table II 8, Part A). There is a substantial increase in national product and in each of its three chief components—war output, flow of consumer goods, and nonwar capital formation (private gross capital formation plus nonwar government outlay in the Department of Commerce total). The increase in war output is a fraction of the total increase in national product—in all variants less than a half, and ranging in general from one-fourth to somewhat over two-fifths. Even the totals in current prices are fairly similar, largely because prices rose little.

The picture from 1941 to 1943 is quite different (Table II 8, Part B). In general, war output climbs precipitously—in every variant appreciably more than national product. The other components decline markedly, particularly nonwar capital formation (and, in the Department of Commerce concept, nonwar expenditures

## TABLE II 8

National Product and Its Components, Wartime Concept, Changes, 1939-1941 and 1941-1943, 1939 Prices, Several Variants

(billions of dollars)

| | PART A 1939 TO 1941 | | | | PART B 1941 TO 1943 | | | |
|---|---|---|---|---|---|---|---|---|
| | War output (1) | Flow of goods to consumers (2) | Other components (3) | National product (4) | War output (5) | Flow of goods to consumers (6) | Other components (7) | National product (8) |
| I Net national product | | | | | | | | |
| 1 Resource input | 8.2 | 4.7 | 5.1 | 18.0 | 39.0 | —2.4 | —17.5 | 19.1 |
| 2 Final product | | | | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 5.8 | 7.9 | 6.0 | 19.7 | 36.4 | —2.4 | —18.3 | 15.7 |
| d) Disregarding level of relative efficiency in war production | 9.6 | 7.9 | 6.0 | 23.5 | 62.7 | —2.4 | —18.3 | 42.0 |
| II Gross national product | | | | | | | | |
| 1 Resource input | 8.5 | 4.7 | 5.5 | 18.7 | 40.3 | —2.4 | —16.6 | 21.3 |
| 2 Final product | | | | | | | | |
| a) Regarding relative efficiency in war production, assumption *a** | 6.1 | 7.9 | 6.4 | 20.4 | 37.7 | —2.4 | —17.4 | 17.9 |
| d) Disregarding level of relative efficiency in war production | 9.9 | 7.9 | 6.4 | 24.2 | 64.0 | —2.4 | —17.4 | 44.2 |
| III Other measures | | | | | | | | |
| 1 Dept. of Commerce G.N.P. in 1939 prices | | | | | | | | |
| a) Dept. of Commerce concept | 10.8 | 8.0 | 4.9 | 23.7 | 60.3 | 1.1 | —18.4 | 43.0 |
| b) Adj. to our concept | 10.8 | 8.0 | 6.4 | 25.2 | 60.3 | 1.1 | —17.4 | 44.0 |
| IV National product, current prices | | | | | | | | |
| 1 Net | 11.1 | 12.9 | 7.0 | 31.0 | 67.0 | 16.4 | —19.5 | 63.9 |
| 2 Gross | 11.4 | 12.9 | 7.7 | 32.0 | 68.5 | 16.4 | —18.2 | 66.7 |
| *Net national product | | | | | | | | |
| b) Assumption *b* | 6.9 | 7.9 | 6.0 | 20.8 | 45.3 | —2.4 | —18.3 | 24.6 |
| c) Assumption *c* | 8.2 | 7.9 | 6.0 | 22.1 | 53.9 | —2.4 | —18.3 | 33.2 |
| Gross national product | | | | | | | | |
| b) Assumption *b* | 7.2 | 7.9 | 6.4 | 21.5 | 46.6 | —2.4 | —17.4 | 26.8 |
| c) Assumption *c* | 8.5 | 7.9 | 6.4 | 22.8 | 55.2 | —2.4 | —17.4 | 35.4 |

See notes to Tables II 5, 6, and 7. Entries under IV from Table II 1.

of government, although the decline in it is minor). But the several variants differ in the degree to which the increase in war output in each is associated with the increase in national product or with the declines in the nonwar components. Estimates based on our concept, at both resource and final product levels (variant *a*), indicate that one-half (or somewhat less) is due to the increase in national product, the other half to the decline in nonwar capital formation and the very minor drop in the flow of consumer goods.

In the Department of Commerce estimates, whether based upon its own concept or adjusted to our concept, the increase in national product amounts to over 70 per cent of the increase in war output. The decline in the other components, i.e., chiefly in private gross capital formation, amounts to less than one-third of the increase in war output; the rest is accounted for by a minor rise in the flow of consumer goods.[17]

The picture is even more strikingly different when we assume that the increase in war output is associated with the increase in national product in current prices. In this case, well over 90 per cent of the increase in war output is accounted for by the increase in national product, and only 3 to 5 per cent by the net reduction in the nonwar components combined. Obviously the impression that the tremendous increase in war output has been attained to such a preponderant extent by an increase in national product and to such a minor extent by drafts upon nonwar output—an impression that can all too easily be formed on the basis of current prices—is far from the truth, if the analysis of national product in real terms, as suggested by the upper part of Table II 8, is at all valid.

## 5 Summary

a) Changes in prices over time and differentials in pricing bases between the nonwar and war sectors are large during a major war. Consequently, estimates of national product and its components in current prices are misleading as indexes of movements in it and in the shares of its components in 'real' terms, i.e., as physical vol-

[17] In this calculation the full increase in national product is counted as a source of the increase in war output. The results would be practically the same were we to subtract the increase in the flow of consumer goods from the increase in national product, and treat the remainder alone as a source of augmented war output.

umes weighted by prices constant over time and consistent as to base.

b) In translating totals in current into totals in constant prices, both changes in prices over time and the differences in pricing bases between war and nonwar output must be taken into account. Only thus can a continued series of comparable estimates, spanning both prewar and war years, be made.

c) Such an adjustment is attempted here on two levels. First, indexes, based on 1939, of resource prices were computed for 1939 to 1943. Their application to totals in current prices yielded estimates of *resource input,* total and for the main components of final product; resources being weighted at 1939 prices, i.e., at their 1939 relative efficiency levels. Second, with the help of assumptions concerning the relative efficiency of resource use in munitions and war construction, all indexes were converted into measures of changes in the prices of final products. Their application to totals in current prices yielded estimates of *final product,* total and for the main components, weighted by their 1939 prices (war goods priced on a base comparable with that of peace type products).

d) National product adjusted for changes in the prices of resources (i.e., input of resources at their 1939 efficiency and price levels) increased about 50 per cent from 1939 to 1943. In terms of final product and on the most plausible assumption concerning the relative efficiency of resource use in munitions and war construction, it increased somewhat less. Both increases are appreciably less than those in the Department of Commerce gross national product totals in 1939 prices. Estimates based on the Department's concept and price adjustments increase 75 per cent; those based on our concept but using the Department's price adjustments, 87 per cent.

e) An increase in either gross or net national product, in constant prices, of about 50 per cent during four years can be matched in peacetime (e.g., from 1933 to 1937). The recent increase is unusual in that it came not after a deep cyclical trough but after 1939, which cannot be described as a year of depression, for its levels of over-all output were above those of the immediately preceding cyclical peak (1937).

f) Both the resource input and the preferred final product estimates increase from 1941 to 1943 somewhat less than from 1939 to 1941. In contrast, the Department of Commerce estimates of

gross national product in constant prices increase from 1941 to 1943 almost one and a half times more than from 1939 to 1941.

g) In both total resource input and final product, the share of the war sector rises precipitously—from 1 or 2 per cent in 1939 to about 40 in 1943; the share of the nonwar sectors declines correspondingly in 1943. Our ratios of war output to national product at the final output level are lower (38) than those based on Department of Commerce gross national product totals in 1939 prices (47). In terms of resource input, the share of the war sector in our estimates (42 per cent) differs less from that in the Department of Commerce's.

h) From 1939 to 1941 the increase in the volume of resources devoted to war production or in the final products represented by it was merely a fraction (roughly one-third to four-tenths) of the increase in total resource input or final output. Resource input or final output represented by the flow of consumer goods and nonwar capital formation also increased substantially. Totals in current prices and the Department of Commerce gross national product in constant prices all show these relations.

i) From 1941 to 1943, in contrast, the increase in the volume of resources devoted to war production or in the final products represented by it was much greater than in total resource input or final output. Our estimates of the national totals of either resource input or final product rose one-half (or somewhat less) as much as war output; the compensating changes are a marked decline in nonwar capital formation and a minor drop in the flow of consumer goods. Hence at least one-half of the increase in war output was associated with drafts upon nonwar capital formation and (to a minor extent) upon the flow of consumer goods.

j) The Department of Commerce totals in constant prices show a different picture. From 1941 to 1943 the rise in national product in constant prices accounts for over seven-tenths of the increase in war output; i.e., less than three-tenths of the increase is accounted for by a decrease in the nonwar sectors, largely nonwar capital formation. In other words, our estimates, which tend to 'deflate' war output to terms comparable with nonwar, indicate for 1941-43 a greater dependence of the increase in the war sector upon contraction in the nonwar sectors, and relatively less upon the increase in national product.

# Appendix II

## Calculation of Quarterly Estimates in 1939 Prices

### 1 Flow of Goods to Consumers

a *Final products*

The basic data are those of the Department of Commerce on consumers' outlay. To the annual estimates of consumers' outlay in 1939 prices the prewar total of direct taxes, $3.1 billion, is added.

The Department of Commerce adjustment for price changes consists largely in reweighting the BLS prices of consumers' commodities and services. We attempted to improve the adjustment by comparing the 'deflated' totals for food and clothing prepared by the Department of Commerce with measures of the physical volume of commodity flow.[18]

For about 75 food items, representing more than 95 per cent by value of all foods purchased by civilians, the Food Distribution Administration has estimated the amount flowing into civilian channels, i.e., after allowance for military takings and net exports. These items were weighted by consumers' expenditures in 1941. Since no data are available for 1939 we could not check for an upward bias in consumers' expenditures from 1939 to 1941. The weighted FDA estimates were therefore linked to the estimate of deflated expenditures for 1941, giving estimates of expenditures in constant prices 4 and 6 per cent lower than those of the Department of Commerce for 1942 and 1943, respectively.

It is unlikely that inventory changes can account for any considerable part of these differences. The FDA consumption estimates allow for inventory changes at the early stages of the distribution process, and the rather sketchy data on retail inventories do not indicate much liquidation in either 1942 or 1943. Nor could a higher degree of fabrication account for an accelerated upward movement in consumers' expenditures. Military and lend-lease takings, heavily weighted with highly processed items, are sufficient to explain the slightly greater employment in the processing industries in 1942 and 1943.

The price adjusted totals for clothing could be checked with the help of the Federal Reserve Board index of the output of clothing and shoes for civilians; raw materials allocated to civilian output;

[18] For the basis of the Department's price adjustment, see 'Price Deflators for Consumer Commodities and Capital Equipment, 1929-42', by Henry Shavell, *Survey of Current Business*, May 1943, pp. 13-21; also Part II, note 6.

military takings; and man hours of employment in apparel industries. The consensus of these data indicates an overstatement of expenditures, when adjusted by current price indexes for clothing and shoes, of roughly 15 per cent in 1942 and 26 per cent in 1943, even after adjustment for discrepancies that might be attributed to a reduction in inventories.[19]

Both adjustments reflect probably not only a rise in prices but also quality uptrading of a kind that occurs when incomes rise; and the disparity between the Department of Commerce 'deflated' totals and the physical volume we used may be due also to a possible overvaluation of retail sales in the Department's estimates of the flow of civilian foods and clothing in current prices. For these reasons it cannot be claimed that for these two specific categories the implicit price indexes constructed above measure the price rise more accurately than the indexes used by the Department of Commerce in calculating the 'deflated' totals.

But even if the adjustments overstate the rise in the prices of food and clothing, we thought it best to include them fully. For no other commodity and service group is account taken of the failure of currently available price indexes to reflect completely quality deterioration, forced uptrading, and shifts of consumers to higher priced localities. Any overadjustment for food and clothing would probably be more than offset by the failure to adjust the 'deflated' totals in all other categories of consumer goods (App. Table II 1).

From the annual indexes of final product prices of consumer goods we estimated consumers' outlay in 1939 prices annually. To get the total flow of goods to individuals and households we added $3.1 billion per year to allow for the value of direct governmental services to individuals. The quarterly totals for 1939-41 are Department of Commerce estimates. Those for 1942 and 1943 are interpolations within our annual totals in 1939 prices (App. Table II 1) on the basis of the quarterly totals in 1939 prices as estimated by the Department of Commerce (App. Table II 2, col. 1 and 2).

b *Resource input*

For reasons discussed in the text, we need estimates of the flow of consumer goods not only in 1939 final product prices but also in

[19] Because of the confidential classification of the underlying data, the detailed calculations cannot be shown here.

terms of resource input at 1939 prices of resources. The simplest way to get this series is to construct an index of the efficiency of resource use in the production and distribution of consumer goods; then apply an adjustment based upon this efficiency index directly to the value of consumer goods in 1939 final product prices.

Except for scattered data on changes in physical output per man hour for a few manufacturing and mining industries and utilities (published chiefly by the Bureau of Labor Statistics, Productivity and Technological Development Division), there is no information on changes in the efficiency of resources used in the production of consumer goods or in other nonwar categories. The few data suggest that the annual gain in productivity since 1939 has been moderate, not more than 2 or 3 per cent; that it virtually ceased by 1942; and that in recent quarters, as the scale of operations in many

APPENDIX TABLE II 1

Flow of Goods to Consumers, 1939 Prices
Revised Estimates Compared with Department of Commerce Estimates
(dollar figures in billions; base year for indexes, 1939)

| | *1942* | *1943* |
|---|---|---|
| A COMMODITIES | | |
| I Department of Commerce | | |
| 1 Total, current prices | 54.4 | 61.7 |
| 2 Total, 1939 prices | 43.4 | 45.4 |
| 3 Implicit price index (1 ÷ 2)100 | 125.3 | 135.9 |
| II Our Estimates | | |
| 4 Total, 1939 prices | 41.2 | 41.8 |
| 5 Implicit price index (1 ÷ 4)100 | 132.0 | 147.6 |
| B SERVICES | | |
| 1 Total, current prices | 27.6 | 29.2 |
| 2 Total, 1939 prices | 25.4 | 25.4 |
| 3 Implicit price index | 108.7 | 115.0 |
| C TOTAL (excl. direct government services to individuals) | | |
| I Department of Commerce | | |
| 1 Total, current prices | 82.0 | 91.0 |
| 2 Total, 1939 prices | 68.8 | 70.8 |
| 3 Implicit price index | 119.2 | 128.5 |
| II Our Estimates | | |
| 4 Total, 1939 prices | 66.6 | 67.2 |
| 5 Implicit price index | 123.1 | 135.4 |

Department of Commerce estimates in current and 1939 prices from *Survey of Current Business*, April 1944, p. 8, Table 3, and p. 13, Table 10. Because of rounding, details will not necessarily check.

## APPENDIX TABLE II 2

Flow of Goods to Consumers, Current and 1939 Prices, Quarterly, 1939-1943
(dollar figures in billions, seasonally adjusted annual rates)

| YEAR & QUARTER | TOTAL Current prices | TOTAL 1939 final product prices | EFFICIENCY INDEX | ADJ. IN (2) | RESOURCE INPUT 1939 prices |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| *1939* | 64.8 | 64.8 | 100.0 | 0.0 | 64.8 |
| I | 63.5 | 63.7 | 99.1 | 0.6 | 64.3 |
| II | 64.1 | 64.5 | 99.7 | 0.2 | 64.7 |
| III | 65.1 | 64.8 | 100.3 | —0.2 | 64.6 |
| IV | 66.3 | 65.9 | 100.9 | —0.6 | 65.3 |
| *1940* | 68.8 | 68.0 | 102.5 | —1.6 | 66.4 |
| I | 67.7 | 67.1 | 101.5 | —0.9 | 66.2 |
| II | 68.1 | 67.4 | 102.2 | —1.4 | 66.0 |
| III | 69.0 | 68.2 | 102.8 | —1.8 | 66.4 |
| IV | 70.3 | 69.3 | 103.4 | —2.2 | 67.1 |
| *1941* | 77.7 | 72.7 | 104.8 | —3.2 | 69.5 |
| I | 74.1 | 72.2 | 104.0 | —2.7 | 69.5 |
| II | 76.8 | 73.0 | 104.6 | —3.1 | 69.9 |
| III | 80.4 | 74.3 | 105.1 | —3.5 | 70.8 |
| IV | 79.5 | 71.4 | 105.5 | —3.6 | 67.8 |
| *1942* | 85.1 | 69.8 | 105.1 | —3.2 | 66.6 |
| I | 83.4 | 71.1 | 105.3 | —3.4 | 67.7 |
| II | 82.6 | 68.3 | 105.1 | —3.2 | 65.1 |
| III | 85.9 | 69.7 | 105.0 | —3.2 | 66.5 |
| IV | 88.5 | 70.1 | 105.0 | —3.2 | 66.9 |
| *1943* | 94.1 | 70.3 | 105.0 | —3.2 | 67.1 |
| I | 93.4 | 70.6 | 105.0 | —3.2 | 67.4 |
| II | 92.5 | 69.1 | 105.0 | —3.1 | 66.0 |
| III | 94.2 | 70.6 | 105.0 | —3.2 | 67.4 |
| IV | 96.1 | 71.2 | 105.0 | —3.2 | 68.0 |

COLUMN

1 Sum of consumer goods and services (*Survey of Current Business*, April 1944, p. 12, Table 7, line 14, and p. 13, Table 10, line 16) and an allowance for direct personal taxes of $3.1 billion per year—an average of direct personal taxes for 1936-38 (*ibid.*, May 1942, p. 12, Table 4, line 10).

2 Sum of estimates for (a) nondurable commodities; (b) durable commodities; (c) services, excluding direct government services to individuals; (d) direct government services. (a) for 1939-41 is from the Department of Commerce; for 1942 and 1943 annual totals of the Department of Commerce, modified by the adjustments for food and clothing categories as described in the text and interpolated by quarters on the basis of Department of Commerce quarterly estimates in 1939 prices. (b) and (c) are from the Department of Commerce. (d) is assumed to be $3.1 billion per year throughout the period.

3 Assumed, see text.

4 100(col. 2, excl. direct government services, divided by col. 3) — (col. 2, excl. direct government services).

5 Col. 2 *plus* adjustments in col. 4.

Because of rounding, details will not necessarily check.

civilian industries shrank and dilution of labor and other resources took place, efficiency per resource unit may have diminished.

The efficiency index in Appendix Table II 2, column 3, an unwarrantedly precise quantitative summary, is intended to be illustrative rather than substantive. It rises mildly to 1942, then remains stable through most of 1942 and all 1943. The adjustment it necessitates is calculated for the flow of goods to consumers, excluding direct governmental services (col. 4). The application of this adjustment to the total flow of goods to consumers in 1939 final product prices (col. 2) yields an estimate of the resource input equivalent of this flow in 1939 resource prices (col. 5). Because the changes during the period in the efficiency index are so minor, resource input and final product output move in substantially the same way, except for the somewhat more moderate rise from 1939 to 1943 in the former.

## 2 Nonwar Capital Formation

The quarterly and annual totals of nonwar gross capital formation in current prices (App. Table II 3, col. 1) are the sum of corresponding totals of private gross capital formation as estimated by the Department of Commerce, and public nonwar construction—the sum of appropriate categories of public construction in the detailed estimates of the Department. The totals net of depreciation and depletion (col. 2) are the difference between column 1 and the estimated consumption of nonwar durable capital. The latter is in turn the sum of depreciation and depletion on private durable capital, as estimated by the Department of Commerce, and of an allowance for the depreciation on public construction, set roughly at $1 billion per year throughout the period.

For an adjustment of nonwar capital formation to 1939 final product prices (col. 3 and 4) we rely again on Department of Commerce estimates. The main component of column 3, private gross capital formation, in 1939 final product prices, is a Department estimate. In this price adjustment the Department uses indexes of construction costs, prices of capital equipment goods, prices of commodities (in connection with inventory changes), and so on. The methods are briefly described in the *Survey of Current Business,* March 1943 (notes to Table 1, pp. 19-20). For the other component of column 3, public nonwar construction, the values

in current prices are adjusted for price changes by the Department of Commerce index for its construction component of private gross capital formation.

To pass from nonwar gross capital formation in 1939 final product prices to net, we subtract from the former depreciation and depletion valued at 1939 prices. To obtain this subtrahend, depreciation and depletion in current prices was adjusted for price changes by an index compiled from Department of Commerce data on the construction and durable equipment components of private gross capital formation. Since current price changes are presumably damped in the total values of capital goods subject to depreciation

APPENDIX TABLE II 3

Nonwar Capital Formation, Current and 1939 Prices
Quarterly, 1939-1943
(billions of dollars, seasonally adjusted annual rates)

| YEAR & QUARTER | TOTALS: CURRENT PRICES Gross | CURRENT PRICES Net | TOTALS: 1939 FINAL PRODUCT PRICES Gross | 1939 FINAL PRODUCT PRICES Net | ADJ. FOR TRANSITION TO RESOURCE PRICES | RESOURCE INPUT 1939 RESOURCE PRICES Gross | 1939 RESOURCE PRICES Net |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *1939* | 13.2 | 6.0 | 13.2 | 6.0 | 0.0 | 13.2 | 6.0 |
| I | 12.7 | 5.5 | 12.6 | 5.4 | 0.1 | 12.7 | 5.5 |
| II | 11.6 | 4.4 | 11.6 | 4.4 | 0.0 | 11.6 | 4.4 |
| III | 12.5 | 5.3 | 12.5 | 5.3 | 0.0 | 12.5 | 5.3 |
| IV | 16.1 | 8.8 | 16.1 | 8.8 | —0.1 | 16.0 | 8.7 |
| *1940* | 16.7 | 9.3 | 16.5 | 9.1 | —0.4 | 16.1 | 8.7 |
| I | 16.6 | 9.3 | 16.4 | 9.1 | —0.2 | 16.2 | 8.9 |
| II | 14.8 | 7.4 | 14.7 | 7.3 | —0.3 | 14.4 | 7.0 |
| III | 16.5 | 9.1 | 16.4 | 9.0 | —0.4 | 16.0 | 8.6 |
| IV | 18.8 | 11.3 | 18.5 | 11.1 | —0.6 | 17.9 | 10.5 |
| *1941* | 20.9 | 13.0 | 19.6 | 12.0 | —0.9 | 18.7 | 11.1 |
| I | 19.3 | 11.7 | 18.6 | 11.1 | —0.7 | 17.9 | 10.4 |
| II | 20.8 | 13.0 | 19.8 | 12.2 | —0.9 | 18.9 | 11.3 |
| III | 21.4 | 13.4 | 19.9 | 12.2 | —1.0 | 18.9 | 11.2 |
| IV | 22.2 | 14.0 | 20.0 | 12.2 | —1.0 | 19.0 | 11.2 |
| *1942* | 8.8 | 0.1 | 7.6 | —0.6 | —0.4 | 7.2 | —1.0 |
| I | 14.7 | 6.2 | 12.8 | 4.8 | —0.6 | 12.2 | 4.2 |
| II | 11.8 | 3.1 | 10.1 | 1.9 | —0.5 | 9.6 | 1.4 |
| III | 5.5 | —3.4 | 4.8 | —3.5 | —0.2 | 4.6 | —3.7 |
| IV | 3.1 | —5.9 | 2.7 | —5.7 | —0.1 | 2.6 | —5.8 |
| *1943* | 2.7 | —6.5 | 2.2 | —6.3 | —0.1 | 2.1 | —6.4 |
| I | 2.7 | —6.3 | 2.2 | —6.3 | —0.1 | 2.1 | —6.4 |
| II | 1.9 | —7.1 | 1.6 | —6.9 | —0.1 | 1.5 | —7.0 |
| III | 3.4 | —5.6 | 2.6 | —5.9 | —0.1 | 2.5 | —6.0 |
| IV | 3.0 | —6.0 | 2.2 | —6.3 | —0.1 | 2.1 | —6.4 |

*Notes to Appendix Table II 3*

COLUMN

1 Sum of private gross capital formation (*Survey of Current Business,* April 1944, p. 12, Table 7, line 8, and p. 13, Table 10, line 8) and public nonwar construction, defined as public excluding residential, military and naval, and nonresidential industrial (for 1939-42: *ibid.,* May 1943, p. 10, Table 7; for 1943, by addition of monthly entries: *ibid.,* April 1944, p. S-4).

2 Col. 1 minus depreciation on both private capital (*ibid.,* April 1944, p. 14, Table 13, line 3, with minor changes to allow for a more gradual quarterly movement) and public nonwar construction (roughly estimated to be $1 billion per year throughout the period).

3 Sum of private gross capital formation in 1939 prices (Department of Commerce) and public nonwar construction (estimates in current prices, from col. 1, adjusted for price changes by the Department of Commerce index for its construction component of private gross capital formation).

4 Col. 3 minus depreciation and depletion, adjusted to 1939 prices by a price index derived from the Department of Commerce quarterly data for the construction and durable equipment components of private gross capital formation (in current and 1939 prices). One-half of the rise in the current prices of construction and equipment was allowed in the index used to adjust the depreciation and depletion allowance for price changes.

5 Based on the assumed efficiency index in App. Table II 2, col. 3. The adjustment is equal to 100(col. 3 ÷ efficiency index) — col. 3.

6 Col. 3 *plus* adjustments in col. 5.

7 Col. 4 *plus* adjustments in col. 5.

Because of rounding, details will not necessarily check.

and depletion, only one-half of the rise in the current prices of construction and equipment was included in the index. This procedure is crude. But in view of the difficulties of a proper translation of depreciation to a reproduction value base, the small annual change, and the smallness of the item relative to total national product, it did not seem worth while to attempt more laborious calculations.

Nonwar capital formation in 1939 final product prices is adjusted to resource input levels by the same efficiency index as consumer goods in Appendix Table II 2. Lack of specific data is the reason for this rather arbitrary procedure. The adjustment (App. Table II 3, col. 5) is then applied to gross capital formation in 1939 final product prices (col. 3) to yield column 6. Net nonwar capital formation in 1939 resource prices (col. 7) is the difference between gross (col. 6) and the depreciation and depletion in 1939 prices used to pass from column 3 to 4.

## 3 War Output

### a *Resource input*

For reasons indicated in the text, the first approach to the adjustment of war output for price changes must be through the prices of resources. Consequently, we must reverse the order of discussion followed in the preceding two sections, and begin with resource rather than final product prices.

The general scheme of estimating war output in 1939 prices is indicated in Appendix Table II 4; some of the underlying data are presented in Appendix Table II 5. Because data on the components of war output are confidential, no figures are shown in Appendix Table II 4.

### Appendix Table II 4

Schematic Presentation of the Measurement of War Output in 1939 Prices
1939, 1940, First Half of 1941; then by Quarters
Mixed Final Product and Resource Prices

1 Total war output, current dollars

2 Nonmunitions (given directly)

3 Munitions & war construction (line 1 — line 2)

4 Total costs, munitions & war construction
  a) Labor (line 3 x line 5 of App. Table II 5)
  b) Capital & enterprise (line 3 x line 6 of App. Table II 5)
  c) Taxes (line 3 x line 7 of App. Table II 5)

5 Price index for labor costs (see text)

6 Price index for capital & enterprise (App. Table II 5, line 10 after seasonal correction)

7 Resource input, 1939 prices
  a) Labor (line 4a ÷ line 5)
  b) Capital & enterprise (line 4b ÷ line 6)
  c) Taxes (1939 ratio of line 3 of App. Table II 5 to sum of lines 1 & 2 of App. Table II 5 multiplied by sum of lines 7a & b)
  d) Total (lines 7a + b + c)

8 Price index for nonmunitions (see text)

9 Nonmunitions, 1939 prices (line 2 ÷ line 8)

10 War output, 1939 prices (lines 7d + 9)

*Implicit Price Indexes*

11 Taxes (line 4c ÷ line 7c)

12 Munitions & war construction (line 3 ÷ line 7d)

13 Total war output (line 1 ÷ line 10)

An approximate division of war output into nonmunitions, munitions, and war construction has recently been published in *Budget Message of the President;* Washington, 1944 (see table on p. vi). The apportionment used in the calculations here is from the monthly estimates of the War Production Board.

The adjustment of war output for price changes is carried through separately for two components: (aa) nonmunitions; (bb) munitions and war construction. The former, adjusted by final product prices, and the latter by resource price indexes, together yield (cc) a mixed price index of war output (App. Table II 4). Only by further adjustment of the nonmunitions sector (as well as by allowance for depreciation on war construction) do we get (dd) gross and net war output, in 1939 resource prices.

aa Nonmunitions

These comprise military pay; civilian pay (war agencies); subsistence; travel; agricultural exports; other nonmunitions. Apart from pay items, the group is made up largely of consumer type goods, though subject to considerable modification to satisfy military requirements. Indeed, many of the items are purchased off the shelf rather than contracted for. As their close correspondence with civilian type products seems to warrant the application of wholesale price indexes, appropriate ones were chosen from the BLS wholesale price series. Both military and civilian pay were corrected for recent increases in rates of pay.

The index of final product prices for the nonmunitions segment of total war output rises to about 110 by the last quarter of 1941; averages somewhat over 125 in 1942; and rises further to about 145 in 1943.

bb Munitions and war construction

The conversion to 1939 resource prices was effected by the separate deflation of the main components of munitions output in current prices: labor costs and gross profits, the latter in turn divided between returns to capital and enterprise and corporate income and excess profits taxes. The weights assigned these three components of munitions output are determined by the division of gross output in the five industrial groups (oil, gas and metal mining, chemicals and petroleum refining, metal fabrication, and contract construction) that accounted for the bulk of munitions output and war construction in 1942 and 1943 (see App. Table II 5).

i) *The price index for the labor factor* was based on changes in hourly earnings in war manufacturing industries. A weighted index was constructed by dividing aggregate weekly wages actually paid by aggregate weekly wages, assuming 1939 hourly earnings through-

## Appendix Table II 5

Distribution of Costs, Five 'War' Industries

(dollar figures in millions; base year for index, 1939)

| | 1939 | 1940 | 1941 | | | 1942 | | | | 1943 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st Half | III | IV | I | II | III | IV | I | II | III | IV |
| 1 Labor costs (wages & salaries) | 8,244 | 10,092 | 6,901 | 4,157 | 4,545 | 4,931 | 5,829 | 6,902 | 7,529 | 7,765 | 8,259 | 8,403 | 8,536 |
| 2 Capital & enterprise | 3,407 | 4,369 | 2,597 | 1,522 | 1,735 | 1,394 | 1,490 | 1,676 | 1,916 | 1,719 | 1,789 | 1,853 | 1,934 |
| 3 Taxes | 391 | 1,103 | 1,575 | 983 | 1,146 | 1,339 | 1,455 | 1,450 | 1,565 | 1,742 | 1,840 | 1,888 | 2,037 |
| 4 Total (1 + 2 + 3) | 12,042 | 15,564 | 11,073 | 6,662 | 7,426 | 7,664 | 8,774 | 10,028 | 11,010 | 11,226 | 11,888 | 12,144 | 12,507 |
| 5 Ratio of (1) to (4) | .685 | .648 | .623 | .624 | .612 | .643 | .664 | .688 | .684 | .692 | .695 | .692 | .682 |
| 6 Ratio of (2) to (4) | .283 | .281 | .235 | .228 | .234 | .182 | .170 | .167 | .174 | .153 | .150 | .153 | .155 |
| 7 Ratio of (3) to (4) | .032 | .071 | .142 | .148 | .154 | .175 | .166 | .145 | .142 | .155 | .155 | .155 | .163 |
| 8 Index of (2) | 100 | 128 | 152 | 179 | 204 | 164 | 175 | 197 | 225 | 202 | 210 | 218 | 227 |
| 9 Index of minerals consumption | 100 | 116 | 128 | 137 | 140 | 141 | 139 | 142 | 148 | 151 | 153 | 156 | 158 |
| 10 Price index for (2) (8 ÷ 9)100 | 100 | 110 | 119 | 131 | 146 | 116 | 126 | 139 | 152 | 134 | 137 | 140 | 143 |

The 5 'war' industries comprise metal mining, oil and gas mining, chemical and petroleum refining, metal fabrication, and contract construction.

Data on wages and salaries (labor costs) are from the Department of Commerce (the annual totals through 1942 published in the *Survey of Current Business,* March 1943, Table 16, p. 23). Taxes and net corporate income (before dividends) from *ibid.,* Sept. 1943 (Table 6, p. 7) and earlier issues.

Elements in the capital and enterprise total other than net corporate profits (interest, depreciation and depletion, incomes of individual entrepreneurs) are from the Department of Commerce, and are based on Internal Revenue Bureau totals and the corporate sample or (for individual entrepreneurs) on the annual totals and monthly payments.

The index of minerals consumption is based on annual totals (1939-42) estimated by G. H. Moore, interpolated by quarters and extrapolated through 1943 by the materials component of the Federal Reserve Board index of industrial production. Moore's unrevised index, used here, differs from that published in *Occasional Paper 18,* March 1944, p. 17, Table 4, by one point in 1941, a difference too slight to warrant recalculation.

out the period (the number of employees multiplied by the average work week, in hours; the product, i.e., weekly man hours, then multiplied by average hourly earnings in 1939) in a group of 44 war industries (BLS employment and earnings series). This gave, in effect, an index of hourly earnings in these 44 industries combined, weighted by current man hours.[20]

The 44 metal, chemical, and rubber industries covered (BLS designations and arranged in ascending order of the percentage increase in average hourly earnings from 1939 to 1942) follow:

1 Communications equipment
2 Rubber tires & inner tubes
3 Blast furnaces, steel works & rolling mills
4 Tractors
5 Stoves, oil burners & heating equipment
6 Plumbers' supplies
7 Wirework
8 Automobiles
9 Textile machinery
10 Machine-tool accessories
11 Washing machines, wringers & dryers, domestic
12 Lighting equipment
13 Chemicals
14 Sewing machines, domestic & industrial
15 Explosives & safety fuses
16 Fabricated structural & ornamental metal work
17 Typewriters
18 Cash registers, adding & calculating machines
19 Machinery & machine-shop products
20 Machine tools
21 Bolts, nuts, washers, rivets
22 Silverware & plated ware
23 Smelting & refining, nonferrous metals
24 Electrical equipment
25 Hardware
26 Rubber goods, other
27 Agricultural machinery, excl. tractors
28 Stamped & enameled ware & galvanizing
29 Aircraft & parts, excl. aircraft engines
30 Steam & hot-water heating apparatus & steam fittings
31 Cutlery & edge tools
32 Clocks & watches
33 Tools, excl. edge tools, machine tools, files & saws
34 Aluminum
35 Car building, electric & steam railroad
36 Radios & phonographs
37 Forgings, iron & steel
38 Alloying & rolling & drawing
39 Ammunition, small arms
40 Shipbuilding
41 Engines & turbines
42 Pumps and pumping equipment
43 Locomotives
44 Aircraft engines

ii) The current *cost of the capital plus enterprise factor* is the sum of corporate net income after taxes, depreciation, entrepreneurial income, interest, and net rents and royalties. To construct a price

[20] Weighting had almost no effect. The weighted and the unweighted indexes almost kept pace during 1939-42; the high wage industries had a slight tendency to expand less rapidly than the relatively low wage industries.

The weighted index was used through the second quarter of 1943. For the remaining two quarters of that year it was extrapolated by the unweighted index for the 44 industries.

index for this component, changing total cost had to be divided by the changing number of units of capital and enterprise. Since it is difficult to find an index of changes in the input of capital and enterprise analogous to man hours of employment, we used the index of the consumption of raw materials of mineral origin prepared at the National Bureau by G. H. Moore.[21] It may reflect with a fair degree of accuracy the utilization of durable capital in war industries—by and large, the biggest metal consumers in both war and peace; but it is quite unrelated to the enterprise or risk element of gross capital or to such elements of management as are not included in labor income. The net increase in the unit return to capital and enterprise, only slightly greater than in the unit return to labor, is not believed to be excessively large and may conceal a sizable downward bias.

iii) *Corporate income and excess profits taxes* have increased enormously since 1939, especially in the industries that have been largely converted to war production. But the increase reflects the needs of the government for more revenue in wartime rather than additional services performed for corporate enterprises. It can of course be argued that under wartime controls of production and distribution the government has assumed most of the risk and many

[21] See *Occasional Paper 18*. It is a weighted index comprising 9 metals and 10 nonmetals:

| METALS | | NONMETALS |
|---|---|---|
| *Ferrous* | | *Fuels* |
| Steel ingots & castings | | Anthracite coal |
| | | Bituminous coal |
| *Nonferrous* | | Crude petroleum |
| Aluminum, Copper, Zinc, Lead | primary & secondary | Natural gas |
| | | *Other nonmetals* |
| Tin consumption | | Portland cement shipments |
| Magnesium | | Gypsum |
| Antimony consumption | | Graphite |
| Mercury consumption | | Sand & gravel |
| | | Crushed limestone |
| | | Sulphur |

Experiments with an index of somewhat different composition more closely related to the 5 'war' industries (excluding coal and including rubber, ethyl alcohol, lumber) yielded a similar index. Recalculation did not, therefore, seem warranted.

A seasonal correction had to be introduced into the price index since it reflects the seasonal influences of such elements in the capital and enterprise totals as dividends and interest (see App. Table II 5, line 10).

of the management functions of corporations, particularly of those manufacturing military equipment. But to the extent that this is true, the increase in the real contribution of capital and enterprise is certainly overstated in our estimates; and any allowance for an increase in the real value of services measured by taxes would be offset by a reduction in the real value of the services of capital and enterprise. We have assumed that in 1939 corporate taxes were the monetary equivalent of the federal government's contribution to business activity; and that thereafter such services kept pace with real output, i.e., with deflated labor and capital costs. As a result of applying this assumption, corporate taxes have an implicit price index of about 700 in 1942 and 800 in 1943; and contribute materially to the rise in the implicit price index for total war outlay in those years.

cc The mixed price index

The combination of the final product price index for nonmunitions and of the resource price indexes for munitions and war construction yielded an annual mixed price index of war output for 1939-41 and quarterly indexes beginning with the third quarter of 1941 (App. Table II 6, col. 3). Detailed quarterly calculations did not seem warranted for the period before the third quarter of 1941, partly because prices had changed so little since 1939, but mainly because the war output totals were so small. From 1939 to the third quarter of 1941 quarterly price indexes were, therefore, constructed by graphic interpolation of the annual figures (App. Table II 6, col. 4).

dd War output, in terms of resource input, at current and 1939 prices

To make the results obtained so far usable in calculating gross and net war output at the resource input level, two further steps are necessary: to estimate (*i*) nonmunitions at resource rather than final product prices, (ii) depreciation on war construction, so that all totals for war output can be adjusted to a net basis.

i) First we translate the nonmunitions component of gross war output (col. 3, identical with col. 6 of App. Table II 6) to resource input at 1939 resource prices. Again we have recourse to the efficiency index used for consumer goods, though the procedure is probably even more arbitrary here. Nevertheless, for the part of

nonmunitions output for which an efficiency index can have a meaning (food, and similar civilian type products, as distinct, e.g., from

APPENDIX TABLE II 6

Derivation of Quarterly Gross War Output and Price Index
Mixed Final Products and Resource Prices
1939 to 1941, Second Quarter
(dollar figures in billions)

| YEAR & QUARTER | GROSS WAR OUTPUT Current prices | GROSS WAR OUTPUT 1939 prices | IMPLICIT PRICE INDEX (1939 = 100) Annual & quarterly | Interpolated values | Final series | GROSS WAR OUTPUT 1939 prices |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *1939* | 1.4 | 1.4 | 100 | | 100 | 1.4 |
| I | .3 | | | | | .3 |
| II | .3 | | | | | .3 |
| III | .4 | | | | | .4 |
| IV | .4 | | | | | .4 |
| *1940* | 2.8 | 2.5 | 112 | | 112 | 2.5 |
| I | .4 | | | 103 | 103 | .4 |
| II | .5 | | | 108 | 108 | .5 |
| III | .6 | | | 110 | 110 | .5 |
| IV | 1.2 | | | 115 | 115 | 1.0 |
| *1941* | 12.8 | 10.0 | 128 | | 128 | 10.0 |
| I | 1.9 | | | 120 | 120 | 1.6 |
| II | 2.5 | | | 124 | 124 | 2.0 |
| III | 3.5 | 2.7 | 128 | | 128 | 2.7 |
| IV | 4.9 | 3.7 | 132 | | 132 | 3.7 |
| *1942* | 50.3 | 34.8 | 144 | | 144 | 34.8 |
| I | 7.2 | 5.4 | 133 | | 133 | 5.4 |
| II | 10.8 | 7.7 | 140 | | 140 | 7.7 |
| III | 14.8 | 10.1 | 147 | | 147 | 10.1 |
| IV | 17.6 | 11.6 | 152 | | 152 | 11.6 |
| *1943* | 81.3 | 50.9 | 160 | | 160 | 50.9 |
| I | 18.9 | 12.2 | 154 | | 154 | 12.2 |
| II | 20.7 | 13.1 | 159 | | 159 | 13.1 |
| III | 20.6 | 12.8 | 161 | | 161 | 12.8 |
| IV | 21.0 | 12.8 | 164 | | 164 | 12.8 |

COLUMN

1 *Survey of Current Business*, April 1944, p. 13, Table 10, line 4.

2 By application to col. 1 of annual and quarterly price indexes in App. Table II 4.

3 (Col. 1 ÷ col. 2)100.

4 Interpolated graphically on the basis of annual figures. There was no need to interpolate quarterly for 1939 since the indicated quarterly indexes were not sufficiently above or below 100 to affect the values in current prices in the first decimal place.

5 Combination of col. 3 and 4.

6 Col. 2 when given; for all other periods (col. 1 ÷ col 5)100.

Because of rounding, details will not necessarily check.

the services of the armed forces), the efficiency index in Appendix Table II 2 is perhaps the most reasonable approximation that can be made. Its application yields the adjustment in column 5 of Appendix Table II 7; which, in turn permits us to compute gross war output, in terms of resource input at 1939 prices (col. 6).

ii) Depreciation on war construction in current prices is calculated by applying a ratio, based upon an assumed 10-year life and a straight line apportionment, to the cumulated quarterly volume of war construction (cumulated beginning with the first quarter of 1939). Subtraction from column 1 of Appendix Table II 7 yields net war output in current prices (col. 2).

We adjusted the quarterly totals of depreciation on war construction for price changes by the index of construction costs and prices of durable equipment used by the Department of Commerce for the construction and equipment components of private gross capital formation. It undoubtedly understates the level of current costs of war construction relative to 1939, but may approximate fairly well the changing valuation level in the cumulated total of war construction subject to depreciation. In any event, in view of the crude assumptions that have to be made concerning the scope of this category and the life period underlying the depreciation rate, more laborious and specific procedures for price adjustment did not seem warranted.

Net war output in 1939 mixed resource and product prices is the difference between column 3 of Appendix Table II 7 and the quarterly estimates of depreciation on war construction in 1939 prices; in 1939 resource prices it is the difference between column 6 and the latter.

b *In final product prices*

To convert war output to 1939 final product prices, three assumptions were made concerning the relative efficiency of resources in munitions and war construction (see Sec. 3c). Appendix Table II 8 shows a sample calculation based on assumption *a*. The quarterly index in column 1 is by graphic interpolation to annual totals, which allows for a two-thirds rise of the index from 1939 to the first half of 1943, some retardation in the rise from the third quarter of 1941 to the second quarter of 1942; then a more rapid rise, which loses momentum in the second half of 1943.

## APPENDIX TABLE II 7

### War Output, Resource Input at Current and 1939 Prices
### (billions of dollars, seasonally adjusted annual rates)

| YEAR & QUARTER | TOTALS: CURRENT PRICES Gross | CURRENT PRICES Net | 1939 MIXED PRICES Gross | 1939 MIXED PRICES Net | ADJ. OF NONMUNITIONS TO 1939 RESOURCE PRICES | RESOURCE INPUT 1939 RESOURCE PRICES Gross | Net |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *1939* | 1.4 | 1.4 | 1.4 | 1.4 | | 1.4 | 1.4 |
| I | 1.2 | 1.2 | 1.2 | 1.2 | | 1.2 | 1.2 |
| II | 1.3 | 1.3 | 1.3 | 1.3 | No | 1.3 | 1.3 |
| III | 1.4 | 1.4 | 1.4 | 1.4 | | 1.4 | 1.4 |
| IV | 1.5 | 1.5 | 1.5 | 1.5 | adj. | 1.5 | 1.5 |
| *1940* | 2.8 | 2.8 | 2.5 | 2.5 | through | 2.5 | 2.5 |
| I | 1.7 | 1.7 | 1.7 | 1.7 | | 1.7 | 1.7 |
| II | 2.0 | 2.0 | 1.9 | 1.9 | 1940 | 1.9 | 1.9 |
| III | 2.6 | 2.5 | 2.4 | 2.3 | | 2.4 | 2.3 |
| IV | 4.8 | 4.7 | 4.2 | 4.1 | | 4.2 | 4.1 |
| *1941* | 12.8 | 12.5 | 10.0 | 9.7 | —0.1 | 9.9 | 9.6 |
| I | 7.7 | 7.5 | 6.4 | 6.2 | —0.1 | 6.3 | 6.1 |
| II | 10.0 | 9.7 | 8.1 | 7.8 | —0.1 | 8.0 | 7.7 |
| III | 13.9 | 13.6 | 10.9 | 10.6 | —0.2 | 10.7 | 10.4 |
| IV | 19.7 | 19.3 | 14.9 | 14.5 | —0.2 | 14.7 | 14.3 |
| *1942* | 50.3 | 49.5 | 34.8 | 34.0 | —0.5 | 34.3 | 33.5 |
| I | 28.7 | 28.1 | 21.6 | 21.1 | —0.3 | 21.3 | 20.8 |
| II | 43.2 | 42.5 | 30.9 | 30.3 | —0.4 | 30.5 | 29.9 |
| III | 59.1 | 58.2 | 40.2 | 39.4 | —0.6 | 39.6 | 38.8 |
| IV | 70.3 | 69.1 | 46.3 | 45.2 | —0.7 | 45.6 | 44.5 |
| *1943* | 81.3 | 79.5 | 50.9 | 49.3 | —0.7 | 50.2 | 48.6 |
| I | 75.6 | 74.1 | 49.1 | 47.8 | —0.7 | 48.4 | 47.1 |
| II | 82.9 | 81.2 | 52.1 | 50.6 | —0.7 | 51.4 | 49.9 |
| III | 82.6 | 80.7 | 51.3 | 49.6 | —0.7 | 50.6 | 48.9 |
| IV | 84.0 | 82.0 | 51.2 | 49.4 | —0.7 | 50.5 | 48.7 |

COLUMN

1 *Survey of Current Business,* April 1944, p. 12, Table 7, line 4, and p. 13, Table 10, line 4.

2 Col. 1 minus depreciation on war construction, calculated by applying a 10 per cent charge, a fairly crude approximation, to the total of government-financed war construction—the sum of the public construction items listed in Appendix Table II 3, note to col. 1, as excluded because they represent war construction—cumulated quarterly. Only one-half of the given quarter's construction is included in the cumulated total for that quarter. The quarterly depreciation series is then one-tenth of the quarterly war construction total.

3 From col. 1, by applying the price index in col. 5 of App. Table II 6.

4 Col. 3 minus depreciation on war construction (for values in current prices see note to col. 2) adjusted for price changes by the index of construction costs and prices of durable equipment (obtained by dividing the Department of Commerce quarterly totals for the construction and equipment components of gross capital formation in current prices by those in 1939 prices).

The weights of the indexes in columns 1 and 2, based on the approximate proportions of the two components of war output (in 1939 prices in App. Table II 7), are held constant, since otherwise the proportion of nonmunitions in total war output could be calculated. But in general, variations in the proportions are relatively minor in quarterly totals in recent years.

The implicit prices in column 7 are final product prices reflecting the assumed relative efficiency of resources in munitions and war construction. Appendix Table II 9 presents the more important steps in the calculations based upon assumptions *b* and *c*. In accordance with the decision to vary the three assumptions only with respect to the level of relative efficiency set for the first half of 1943, and to make them the same with respect to the relative movement of the efficiency level from 1939 to 1943, the quarterly interpolation of the efficiency indexes, as well as the movement of the annual totals, was established along lines similar to those adopted in the calculations based upon assumption *a*.

Under the three assumptions, the implicit final product prices for munitions and war construction (and hence for war output) could not be relatives of actual prices in terms of 1939 as 100 unless we disregarded differences in the level of efficiency of resource use in war production relative to that in similar industries in peacetime. What are the *temporal* changes in final product prices of war output, if the level of relative efficiency is disregarded, and what would the totals of war output and national product be if adjusted for such price changes over time alone?

Appendix Table II 10 provides the key price index, calculated from averages of the annual price indexes in war output implicit under the three assumptions in terms of 1939 as 100. This annual index is interpolated quarterly, largely again on the basis of the

*Notes to Appendix Table II 7 concluded:*

COLUMN

5 Based on the assumed efficiency index (see App. Table II 2, col. 3) applied to the nonmunitions part of war output in 1939 prices. To prevent disclosure of the amounts, the nonmunitions component was here calculated as 0.3 of the total war output in col. 3. Thus the entries in col. 5 are equal to 100 [(col. 3 x 0.3) ÷ efficiency index] — (col. 3 x 0.3).

6 Col. 3 *plus* adjustments in col. 5.

7 Col. 4 *plus* adjustments in col. 5.

Because of rounding, details will not necessarily check.

implicit quarterly price indexes under the three assumptions of Appendix Tables II 8 and 9, smoothed to eliminate erratic fluctuations. Column 5 in Appendix Table II 10 is a matter of straight-

APPENDIX TABLE II 8

Sample Calculation of Gross War Output, 1939 Final Product Prices
Quarterly, 1939-1943
Assumption *a*
(dollar figures in billions, seasonally adjusted annual rates)

| YEAR & QUARTER | RELATIVE EFFICIENCY OF RESOURCES: Munitions & war construction | Non-munitions | Combined | GROSS WAR OUTPUT: 1939 resource prices | 1939 final product prices [(3)x(4)]÷100 | Current prices | IMPLICIT PRICE INDEX [(6)÷(5)]100 |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *1939* | 48 | 100 | 61 | 1.4 | 0.8 | 1.35 | 165 |
| I | 48 | 99 | 61 | 1.2 | 0.7 | | |
| II | 48 | 100 | 61 | 1.3 | 0.8 | | |
| III | 48 | 100 | 61 | 1.4 | 0.9 | | |
| IV | 49 | 101 | 62 | 1.5 | 0.9 | | |
| *1940* | 51 | 102 | 64 | 2.5 | 1.6 | 2.8 | 175 |
| I | 50 | 101 | 63 | 1.7 | 1.1 | | |
| II | 51 | 102 | 64 | 1.9 | 1.2 | | |
| III | 51 | 103 | 64 | 2.4 | 1.5 | | |
| IV | 52 | 103 | 65 | 4.2 | 2.7 | | |
| *1941* | 56 | 105 | 68.5 | 9.9 | 6.9 | 12.8 | 187 |
| I | 54 | 104 | 66.5 | 6.3 | 4.2 | | |
| II | 55 | 105 | 67.5 | 8.0 | 5.4 | | |
| III | 57 | 105 | 69 | 10.7 | 7.4 | | |
| IV | 59 | 106 | 71 | 14.7 | 10.4 | | |
| *1942* | 67 | 105 | 76.5 | 34.3 | 26.5 | 50.3 | 189 |
| I | 61 | 105 | 72 | 21.3 | 15.3 | | |
| II | 64 | 105 | 74 | 30.5 | 22.6 | | |
| III | 69 | 105 | 78 | 39.6 | 30.9 | | |
| IV | 74 | 105 | 82 | 45.6 | 37.4 | | |
| *1943* | 83 | 105 | 89 | 50.2 | 44.6 | 81.3 | 182 |
| I | 78 | 105 | 85 | 48.4 | 41.1 | | |
| II | 82 | 105 | 88 | 51.4 | 45.2 | | |
| III | 85 | 105 | 90 | 50.6 | 45.5 | | |
| IV | 88 | 105 | 92 | 50.5 | 46.5 | | |

COLUMN

1 & 2 Assumed, see text. Annual entries are averages of quarterly.

3 (Col. 1 x 0.75) + (col. 2 x 0.25). Annual entries are averages of quarterly.

4 App. Table II 7, col. 6.

5 Annual entries are averages of quarterly.

6 App. Table II 7, col. 1.

7 Underlying calculation in col. 5 carried to two decimal places.

Because of rounding, details will not necessarily check.

forward calculation from column 4 and estimates of gross war output in current prices (App. Table II 7, col. 1).

## 4 Summary Tables

Now that we have discussed the measurement of the three major components of national product (wartime concept)—flow of goods

### Appendix Table II 9

Gross War Output, 1939 Final Product Prices, Quarterly, 1939-1943
Assumptions *b* and *c*
(dollar figures in billions, seasonally adjusted annual rates)

| Year & quarter | Assumption *b* | | | Assumption *c* | | |
|---|---|---|---|---|---|---|
| | Relative efficiency of resources in war production (1) | Gross war output, 1939 final product prices (2) | Price index implicit in (2) (3) | Relative efficiency of resources in war production (4) | Gross war output, 1939 final product prices (5) | Price index implicit in (5) (6) |
| *1939* | 72 | 1.0 | 138 | 84 | 1.1 | 119 |
| I | 72 | 0.9 | | 83 | 1.0 | |
| II | 72 | 0.9 | | 83.5 | 1.1 | |
| III | 72 | 1.0 | | 83.5 | 1.2 | |
| IV | 73 | 1.1 | | 84.5 | 1.3 | |
| *1940* | 76 | 1.9 | 144 | 89 | 2.3 | 123 |
| I | 74 | 1.3 | | 86 | 1.5 | |
| II | 75 | 1.4 | | 88 | 1.7 | |
| III | 76 | 1.8 | | 89.5 | 2.2 | |
| IV | 77.5 | 3.3 | | 91 | 3.8 | |
| *1941* | 82 | 8.2 | 156 | 96 | 9.6 | 133 |
| I | 79 | 5.0 | | 93 | 5.9 | |
| II | 81 | 6.5 | | 95 | 7.6 | |
| III | 82.5 | 8.8 | | 97.5 | 10.4 | |
| IV | 85 | 12.5 | | 100 | 14.7 | |
| *1942* | 92 | 31.9 | 158 | 109 | 37.8 | 133 |
| I | 87 | 18.5 | | 103 | 21.9 | |
| II | 89 | 27.1 | | 106 | 32.3 | |
| III | 94 | 37.2 | | 111 | 44.0 | |
| IV | 98 | 44.7 | | 116 | 52.9 | |
| *1943* | 109 | 54.8 | 148 | 129 | 64.8 | 126 |
| I | 103 | 49.8 | | 121.5 | 58.8 | |
| II | 107 | 55.0 | | 127 | 65.3 | |
| III | 111 | 56.2 | | 131 | 66.3 | |
| IV | 115 | 58.1 | | 136 | 68.7 | |

See notes to Appendix Table II 8.

Col. 1 and 4 correspond to col. 3 of Appendix Table II 8; col. 2 and 5 to col. 5 of Appendix Table II 8; col. 3 and 6 to col. 7 of Appendix Table II 8.

to consumers, nonwar capital formation, and war output—and presented the estimates for each, we are in a position to assemble summary tables covering both these components and the national product totals (App. Tables II 11-14). The entries in these four summary tables are either transcribed from the appendix tables

APPENDIX TABLE II 10

Gross War Output, Adjusted by an Implicit Final Product Price Index for Munitions and War Construction

| YEAR & QUARTER | IMPLICIT ANNUAL PRICE INDEX, 1939=100 UNDER ASSUMPTION *a* | *b* | *c* | AV. IMPLICIT INDEX | GROSS WAR OUTPUT ($ billions, 1939 product prices) |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| *1939* | 100 | 100 | 100 | 100 | 1.4 |
| I | | | | 100 | 1.2 |
| II | | | | 100 | 1.3 |
| III | | | | 100 | 1.4 |
| IV | | | | 100 | 1.5 |
| *1940* | 106 | 104 | 103 | 104 | 2.7 |
| I | | | | 100 | 1.7 |
| II | | | | 103 | 1.9 |
| III | | | | 105 | 2.5 |
| IV | | | | 109 | 4.4 |
| *1941* | 113 | 116 | 112 | 113 | 11.3 |
| I | | | | 111 | 6.9 |
| II | | | | 113 | 8.8 |
| III | | | | 114 | 12.2 |
| IV | | | | 115 | 17.1 |
| *1942* | 115 | 114 | 112 | 114 | 44.1 |
| I | | | | 115 | 25.0 |
| II | | | | 115 | 37.6 |
| III | | | | 113 | 52.3 |
| IV | | | | 112 | 62.8 |
| *1943* | 110 | 107 | 106 | 108 | 75.3 |
| I | | | | 110 | 68.7 |
| II | | | | 108 | 76.8 |
| III | | | | 107 | 77.2 |
| IV | | | | 106 | 79.2 |

COLUMN

1 App. Table II 8, col. 7.

2 App. Table II 9, col. 3.

3 *Ibid.*, col. 6.

4 Average of col. 1-3 in terms of 1939 as 100 interpolated graphically on the basis of quarterly figures for col. 1-3.

5 100(col. 1 of App. Table II 7 ÷ col. 4).

already presented and discussed, or are the sum of the estimates for the components. The one minor point that calls for comment is the calculation of *net* war output in final product prices (App. Table II 14, col. 3-6): as the difference between the entries in the corresponding columns for gross (App. Table II 13, col. 3-6) and depreciation on war construction, as already calculated in Appendix Table II 7 (war output in resource prices). We could recalculate this depreciation item in terms of final output represented by war construction, by basing it on a share of war output, as shown in App. Table II 13. But it is not clear that the results would

APPENDIX TABLE II 11

National Product and Its Components, Wartime Concept
Quarterly, 1939-1943, Current Prices
(billions of dollars, seasonally adjusted annual rates)

| YEAR & QUARTER | FLOW OF GOODS TO CONSUMERS | NONWAR CAPITAL FORMATION | | WAR OUTPUT | | NATIONAL PRODUCT | |
|---|---|---|---|---|---|---|---|
| | | Gross | Net | Gross | Net | Gross (1+2+4) | Net (1+3+5) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *1939* | 64.8 | 13.2 | 6.0 | 1.4 | 1.4 | 79.4 | 72.2 |
| I | 63.5 | 12.7 | 5.5 | 1.2 | 1.2 | 77.4 | 70.2 |
| II | 64.1 | 11.6 | 4.4 | 1.3 | 1.3 | 77.0 | 69.8 |
| III | 65.1 | 12.5 | 5.3 | 1.4 | 1.4 | 79.0 | 71.8 |
| IV | 66.3 | 16.1 | 8.8 | 1.5 | 1.5 | 83.9 | 76.6 |
| *1940* | 68.8 | 16.7 | 9.3 | 2.8 | 2.8 | 88.3 | 80.9 |
| I | 67.7 | 16.6 | 9.3 | 1.7 | 1.7 | 86.0 | 78.7 |
| II | 68.1 | 14.8 | 7.4 | 2.0 | 2.0 | 84.9 | 77.5 |
| III | 69.0 | 16.5 | 9.1 | 2.6 | 2.5 | 88.1 | 80.6 |
| IV | 70.3 | 18.8 | 11.3 | 4.8 | 4.7 | 93.9 | 86.3 |
| *1941* | 77.7 | 20.9 | 13.0 | 12.8 | 12.5 | 111.4 | 103.2 |
| I | 74.1 | 19.3 | 11.7 | 7.7 | 7.5 | 101.1 | 93.3 |
| II | 76.8 | 20.8 | 13.0 | 10.0 | 9.7 | 107.6 | 99.5 |
| III | 80.4 | 21.4 | 13.4 | 13.9 | 13.6 | 115.7 | 107.4 |
| IV | 79.5 | 22.2 | 14.0 | 19.7 | 19.3 | 121.4 | 112.8 |
| *1942* | 85.1 | 8.8 | 0.1 | 50.3 | 49.5 | 144.2 | 134.7 |
| I | 83.4 | 14.7 | 6.2 | 28.7 | 28.1 | 126.8 | 117.7 |
| II | 82.6 | 11.8 | 3.1 | 43.2 | 42.5 | 137.6 | 128.2 |
| III | 85.9 | 5.5 | —3.4 | 59.1 | 58.2 | 150.5 | 140.7 |
| IV | 88.5 | 3.1 | —5.9 | 70.3 | 69.1 | 161.9 | 151.7 |
| *1943* | 94.1 | 2.7 | —6.5 | 81.3 | 79.5 | 178.1 | 167.1 |
| I | 93.4 | 2.7 | —6.3 | 75.6 | 74.1 | 171.7 | 161.2 |
| II | 92.5 | 1.9 | —7.1 | 82.9 | 81.2 | 177.3 | 166.6 |
| III | 94.2 | 3.4 | —5.6 | 82.6 | 80.7 | 180.2 | 169.3 |
| IV | 96.1 | 3.0 | —6.0 | 84.0 | 82.0 | 183.1 | 172.1 |

Column 1: App. Table II 2, col. 1; 2: App. Table II 3, col. 1; 3: *ibid.*, col. 2; 4: App. Table II 7, col. 1; 5: *ibid.*, col. 2.

be better approximations than the estimates in Appendix Table II 7; and in view of the smallness of the item and the necessarily arbitrary character of the underlying assumption concerning length of life, the refinement in consistency did not seem to warrant the additional calculations.

APPENDIX TABLE II 12

National Product and Its Components in Terms of Resource Input
Wartime Concept, Quarterly, 1939-1943, 1939 Resource Prices
(billions of dollars, seasonally adjusted annual rates)

| YEAR & QUARTER | FLOW OF GOODS TO CONSUMERS | NONWAR CAPITAL FORMATION | | WAR OUTPUT | | TOTAL RESOURCE INPUT | |
|---|---|---|---|---|---|---|---|
| | | Gross | Net | Gross | Net | Gross (1+2+4) | Net (1+3+5) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *1939* | 64.8 | 13.2 | 6.0 | 1.4 | 1.4 | 79.4 | 72.2 |
| I | 64.3 | 12.7 | 5.5 | 1.2 | 1.2 | 78.2 | 71.0 |
| II | 64.7 | 11.6 | 4.4 | 1.3 | 1.3 | 77.6 | 70.4 |
| III | 64.6 | 12.5 | 5.3 | 1.4 | 1.4 | 78.5 | 71.3 |
| IV | 65.3 | 16.0 | 8.7 | 1.5 | 1.5 | 82.8 | 75.5 |
| *1940* | 66.4 | 16.1 | 8.7 | 2.5 | 2.5 | 85.0 | 77.6 |
| I | 66.2 | 16.2 | 8.9 | 1.7 | 1.7 | 84.1 | 76.8 |
| II | 66.0 | 14.4 | 7.0 | 1.9 | 1.9 | 82.3 | 74.9 |
| III | 66.4 | 16.0 | 8.6 | 2.4 | 2.3 | 84.8 | 77.3 |
| IV | 67.1 | 17.9 | 10.5 | 4.2 | 4.1 | 89.2 | 81.7 |
| *1941* | 69.5 | 18.7 | 11.1 | 9.9 | 9.6 | 98.1 | 90.2 |
| I | 69.5 | 17.9 | 10.4 | 6.3 | 6.1 | 93.7 | 86.0 |
| II | 69.9 | 18.9 | 11.3 | 8.0 | 7.7 | 96.8 | 88.9 |
| III | 70.8 | 18.9 | 11.2 | 10.7 | 10.4 | 100.4 | 92.4 |
| IV | 67.8 | 19.0 | 11.2 | 14.7 | 14.3 | 101.5 | 93.3 |
| *1942* | 66.6 | 7.2 | —1.0 | 34.3 | 33.5 | 108.1 | 99.1 |
| I | 67.7 | 12.2 | 4.2 | 21.3 | 20.8 | 101.2 | 92.7 |
| II | 65.1 | 9.6 | 1.4 | 30.5 | 29.9 | 105.2 | 96.4 |
| III | 66.5 | 4.6 | —3.7 | 39.6 | 38.8 | 110.7 | 101.6 |
| IV | 66.9 | 2.6 | —5.8 | 45.6 | 44.5 | 115.1 | 105.6 |
| *1943* | 67.1 | 2.1 | —6.4 | 50.2 | 48.6 | 119.4 | 109.3 |
| I | 67.4 | 2.1 | —6.4 | 48.4 | 47.1 | 117.9 | 108.1 |
| II | 66.0 | 1.5 | —7.0 | 51.4 | 49.9 | 118.9 | 108.9 |
| III | 67.4 | 2.5 | —6.0 | 50.6 | 48.9 | 120.5 | 110.3 |
| IV | 68.0 | 2.1 | —6.4 | 50.5 | 48.7 | 120.6 | 110.3 |

Column 1: App. Table II 2, col. 5; 2: App. Table II 3, col. 6; 3: *ibid.*, col. 7; 4: App. Table II 7, col. 6; 5: *ibid.*, col. 7.

## APPENDIX TABLE II 13

### Gross National Product and Its Components, Wartime Concept
### Quarterly, 1939-1943, 1939 Final Product Prices
### (billions of dollars, seasonally adjusted annual rates)

| YEAR & QUARTER | FLOW OF GOODS TO CONSUMERS | GROSS NONWAR CAPITAL FORMATION | GROSS WAR OUTPUT: Under assumption *a* | *b* | *c* | GROSS WAR OUTPUT: *Disregarding* level of relative efficiency | GROSS NATIONAL PRODUCT: Under assumption *a* (1+2+3) | *b* (1+2+4) | *c* (1+2+5) | GROSS NATIONAL PRODUCT: *Disregarding* level of relative efficiency (1+2+6) |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *1939* | 64.8 | 13.2 | 0.8 | 1.0 | 1.1 | 1.4 | 78.8 | 79.0 | 79.1 | 79.4 |
| I | 63.7 | 12.6 | 0.7 | 0.9 | 1.0 | 1.2 | 77.0 | 77.2 | 77.3 | 77.5 |
| II | 64.5 | 11.6 | 0.8 | 0.9 | 1.1 | 1.3 | 76.9 | 77.0 | 77.2 | 77.4 |
| III | 64.8 | 12.5 | 0.9 | 1.0 | 1.2 | 1.4 | 78.2 | 78.3 | 78.5 | 78.7 |
| IV | 65.9 | 16.1 | 0.9 | 1.1 | 1.3 | 1.5 | 82.9 | 83.1 | 83.3 | 83.5 |
| *1940* | 68.0 | 16.5 | 1.6 | 1.9 | 2.3 | 2.7 | 86.1 | 86.4 | 86.8 | 87.2 |
| I | 67.1 | 16.4 | 1.1 | 1.3 | 1.5 | 1.7 | 84.6 | 84.8 | 85.0 | 85.2 |
| II | 67.4 | 14.7 | 1.2 | 1.4 | 1.7 | 1.9 | 83.3 | 83.5 | 83.8 | 84.0 |
| III | 68.2 | 16.4 | 1.5 | 1.8 | 2.2 | 2.5 | 86.1 | 86.4 | 86.8 | 87.1 |
| IV | 69.3 | 18.5 | 2.7 | 3.3 | 3.8 | 4.4 | 90.5 | 91.1 | 91.6 | 92.2 |
| *1941* | 72.7 | 19.6 | 6.9 | 8.2 | 9.6 | 11.3 | 99.2 | 100.5 | 101.9 | 103.6 |
| I | 72.2 | 18.6 | 4.2 | 5.0 | 5.9 | 6.9 | 95.0 | 95.8 | 96.7 | 97.7 |
| II | 73.0 | 19.8 | 5.4 | 6.5 | 7.6 | 8.8 | 98.2 | 99.3 | 100.4 | 101.6 |
| III | 74.3 | 19.9 | 7.4 | 8.8 | 10.4 | 12.2 | 101.6 | 103.0 | 104.6 | 106.4 |
| IV | 71.4 | 20.0 | 10.4 | 12.5 | 14.7 | 17.1 | 101.8 | 103.9 | 106.1 | 108.5 |
| *1942* | 69.8 | 7.6 | 26.5 | 31.9 | 37.8 | 44.1 | 103.9 | 109.3 | 115.2 | 121.5 |
| I | 71.1 | 12.8 | 15.3 | 18.5 | 21.9 | 25.0 | 99.2 | 102.4 | 105.8 | 108.9 |
| II | 68.3 | 10.1 | 22.6 | 27.1 | 32.3 | 37.6 | 101.0 | 105.5 | 110.7 | 116.0 |
| III | 69.7 | 4.8 | 30.9 | 37.2 | 44.0 | 52.3 | 105.4 | 111.7 | 118.5 | 126.8 |
| IV | 70.1 | 2.7 | 37.4 | 44.7 | 52.9 | 62.8 | 110.2 | 117.5 | 125.7 | 135.6 |
| *1943* | 70.3 | 2.2 | 44.6 | 54.8 | 64.8 | 75.3 | 117.1 | 127.3 | 137.3 | 147.8 |
| I | 70.6 | 2.2 | 41.1 | 49.8 | 58.8 | 68.7 | 113.9 | 122.6 | 131.6 | 141.5 |
| II | 69.1 | 1.6 | 45.2 | 55.0 | 65.3 | 76.8 | 115.9 | 125.7 | 136.0 | 147.5 |
| III | 70.6 | 2.6 | 45.5 | 56.2 | 66.3 | 77.2 | 118.7 | 129.4 | 139.5 | 150.4 |
| IV | 71.2 | 2.2 | 46.5 | 58.1 | 68.7 | 79.2 | 119.9 | 131.5 | 142.1 | 152.6 |

COLUMN

1 App. Table II 2, col. 2.

2 App. Table II 3, col. 3.

3 App. Table II 8, col. 5.

COLUMN

4 App. Table II 9, col. 2.

5 *Ibid.*, col. 5.

6 App. Table II 10, col. 5.

## Appendix Table II 14

### Net National Product and Its Components, Wartime Concept
### Quarterly, 1939-1943, 1939 Final Product Prices
### (billions of dollars, seasonally adjusted annual rates)

| Year & Quarter | Flow of Goods to Consumers | Net Nonwar Capital Formation | Net War Output: Under assumption *a* | Net War Output: Under assumption *b* | Net War Output: Under assumption *c* | Net War Output: *Disregarding* level of relative efficiency | Net National Product: Under assumption *a* (1+2+3) | Net National Product: Under assumption *b* (1+2+4) | Net National Product: Under assumption *c* (1+2+5) | Net National Product: *Disregarding* level of relative efficiency (1+2+6) |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *1939* | 64.8 | 6.0 | 0.8 | 1.0 | 1.1 | 1.4 | 71.6 | 71.8 | 71.9 | 72.2 |
| I | 63.7 | 5.4 | 0.7 | 0.9 | 1.0 | 1.2 | 69.8 | 70.0 | 70.1 | 70.3 |
| II | 64.5 | 4.4 | 0.8 | 0.9 | 1.1 | 1.3 | 69.7 | 69.8 | 70.0 | 70.2 |
| III | 64.8 | 5.3 | 0.9 | 1.0 | 1.2 | 1.4 | 71.0 | 71.1 | 71.3 | 71.5 |
| IV | 65.9 | 8.8 | 0.9 | 1.1 | 1.3 | 1.5 | 75.6 | 75.8 | 76.0 | 76.2 |
| *1940* | 68.0 | 9.1 | 1.6 | 1.9 | 2.3 | 2.7 | 78.7 | 79.0 | 79.4 | 79.8 |
| I | 67.1 | 9.1 | 1.1 | 1.3 | 1.5 | 1.7 | 77.3 | 77.5 | 77.7 | 77.9 |
| II | 67.4 | 7.3 | 1.2 | 1.4 | 1.7 | 1.9 | 75.9 | 76.1 | 76.4 | 76.6 |
| III | 68.2 | 9.0 | 1.4 | 1.7 | 2.1 | 2.4 | 78.6 | 78.9 | 79.3 | 79.6 |
| IV | 69.3 | 11.1 | 2.6 | 3.2 | 3.7 | 4.3 | 83.0 | 83.6 | 84.1 | 84.7 |
| *1941* | 72.7 | 12.0 | 6.6 | 7.9 | 9.3 | 11.0 | 91.3 | 92.6 | 94.0 | 95.7 |
| I | 72.2 | 11.1 | 4.0 | 4.8 | 5.7 | 6.7 | 87.3 | 88.1 | 89.0 | 90.0 |
| II | 73.0 | 12.2 | 5.1 | 6.2 | 7.3 | 8.5 | 90.3 | 91.4 | 92.5 | 93.7 |
| III | 74.3 | 12.2 | 7.1 | 8.5 | 10.1 | 11.9 | 93.6 | 95.0 | 96.6 | 98.4 |
| IV | 71.4 | 12.2 | 10.0 | 12.1 | 14.3 | 16.7 | 93.6 | 95.7 | 97.9 | 100.3 |
| *1942* | 69.8 | —0.6 | 25.7 | 31.1 | 37.0 | 43.3 | 94.9 | 100.3 | 106.2 | 112.5 |
| I | 71.1 | 4.8 | 14.8 | 18.0 | 21.4 | 24.5 | 90.7 | 93.9 | 97.3 | 100.4 |
| II | 68.3 | 1.9 | 22.0 | 26.5 | 31.7 | 37.0 | 92.2 | 96.7 | 101.9 | 107.2 |
| III | 69.7 | —3.5 | 30.1 | 36.4 | 43.2 | 51.5 | 96.3 | 102.6 | 109.4 | 117.7 |
| IV | 70.1 | —5.7 | 36.3 | 43.6 | 51.8 | 61.7 | 100.7 | 108.0 | 116.2 | 126.1 |
| *1943* | 70.3 | —6.3 | 43.0 | 53.2 | 63.2 | 73.7 | 107.0 | 117.2 | 127.2 | 137.7 |
| I | 70.6 | —6.3 | 39.8 | 48.5 | 57.5 | 67.4 | 104.1 | 112.8 | 121.8 | 131.7 |
| II | 69.1 | —6.9 | 43.7 | 53.5 | 63.8 | 75.3 | 105.9 | 115.7 | 126.0 | 137.5 |
| III | 70.6 | —5.9 | 43.8 | 54.5 | 64.6 | 75.5 | 108.5 | 119.2 | 129.3 | 140.2 |
| IV | 71.2 | —6.3 | 44.7 | 56.3 | 66.9 | 77.4 | 109.6 | 121.2 | 131.8 | 142.3 |

COLUMN

1 App. Table II 2, col. 2.

2 App. Table II 3, col. 4.

3 App. Table II 13, col. 3 minus the difference between col. 4 and 5 of App. Table II 12.

COLUMN

4 App. Table II 13, col. 4 minus the difference between col. 4 and 5 of App. Table II 12.

5 App. Table II 13, col. 5 minus the difference between col. 4 and 5 of App. Table II 12.

6 App. Table II 13, col. 6 minus the difference between col. 4 and 5 of App. Table II 12.