# Economic Growth in Western Europe
## 1870-1957 (*)

In the post-war years there has undoubtedly been very great economic progress in Western Europe. Output and productivity have risen very fast, investment has been high, employment has been at very high levels, and although we shall not be analysing them in this article, trade has risen faster and growth has proceeded with much less interference from periodic waves of recession than was the case historically. The purpose of this study is to try to put the post-war experience into historical perspective in order to provide some criteria for measuring post-war performance, and also to find out whether the nature of economic growth in the Western economies has been transformed, or whether the achievements of the past decade are due to special, and perhaps temporary, circumstances connected with recovery from war and the great depression of the 1920s.

The study arose from attempts by the author to make long-term forecasts of economic growth for European countries, in which many unanswered questions arise. What has been the "normal" rate of growth of output and productivity in Europe, excluding times of war and major recession? What degree of recovery or abnormality has there been in post-war rates of growth? What is the normal capital-output ratio, or the ratio of investment to output? For the U.S., the answers to these questions are much easier, not only because there are more statistics, but because the experience of growth has been interrupted only once in this century — by the Great Depression. In Europe, the statistical information for any one country is not as good as in the U.S.

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for the past 50 years, but by collecting the best available data for several European countries, analogies can be found which are useful for analysing the past or forecasting the future of any one of them. Such a study should also be useful in throwing up any inconsistencies or errors in the original data, for an estimate of output or productivity which may be plausible for one country might be questioned when compared with divergent developments in a neighbouring country with similar resource endowments, factor costs, social institutions, rates of investment and political structure.

### Output

In this article, we have chosen GNP as our measure of output because it is a more embracing concept than the other main measure available — industrial production — and thus reflects better the output of the whole community. Industrial production would give too optimistic a picture of growth in societies which have been steadily increasing their degree of industrialisation. It is also necessary in the analysis of economic growth to examine other significant variables which are only available on an aggregative basis — such as the labour force, the rate of investment, or the capital stock. Furthermore, there is now some agreement in Europe as to how to define Gross National Product, thanks to the efforts of the OEEC, and there are reasonable historical estimates available for Denmark, Germany, Italy, Netherlands, Norway, Sweden and the U.K. which we have adjusted to make as comparable in concept as possible (1).

(1) Colin Clark, in his third edition of *Conditions of Economic Progress*, presents estimates for several other European countries as well. However, Clark was interested in bolder and more global comparisons than we are. Some of his time series are simply a collection of unrelated estimates for different years for which there is no link, but for which he has been able to find some indicator of the purchasing power of the currency. We have not accepted any estimate which is not based on a continuous series, or linked any series for which there is no satisfactory overlap. It is difficult to judge the validity of some of Clark's figures in some cases where sources are not given. Professor Kuznets', *Economic Development and Cultural Change*, Vo. V, No. 1, October 1956, has estimates for France, Ireland and Switzerland as well as the countries covered here, but the figures for the latter two countries are derived from Clark, and for France partially from Clark. His other GNP sources are mostly the same as ours. It is a pity that our sample does not include France for which the lack of production censuses, an aversion to taxation and chronic inflation, seem to have so far impeded any reasonable estimates in constant prices.

Unfortunately, the sources of data for estimates of GNP vary considerably from country to country, and methods of correction for price changes have varied too. The choice of different periods as a weighting base can also affect significantly the quantitative developments. However, there is little that can be done by the lone investigator to unscramble the weighting systems to make them reasonably uniform (2), because many of the price indices which are published as having the weights of a certain year, have, in fact, simply been rebased on that year. So that references to "prices of 1913, 1929" etc. often do not really represent the price relationships of those years at all. For the future, we can hope for better things as there are some hopes that deflation procedures may be standardised just as the definitions of product have been (3).

Our output figures start from 1870 and run to 1957, a period of 87 years, which we have divided into two equal periods by taking 1913 as our base year. 1870 is a good year to start because it follows the unification of Germany and Italy, and the American civil war, and was the beginning of a long period during which the production and trade of the major industrial powers was not interrupted by war. The (unweighted) average growth for this period was 2.5 per cent a year, with Denmark, Germany, Sweden, well above average at 3.1 per cent, and Italy lagging well behind at 1.4 per cent. 1913 is a good turning point because it was the beginning of a period of war, major economic disturbance, and important changes in demographic structure. Over the period 1913-1929 as a whole, output grew more slowly than before the war — although expansion was generally fast in the late 1920s. During the depression period of 1929-38, the rate of growth was, surprisingly, higher than from 1913 to 1929 in all countries except Italy and the Netherlands.

1938 is a reasonable benchmark to take in measuring achievements since pre-world war II, because it was generally the peak pre-war year (4). From 1938 to 1957, the rate of GNP increase has averaged 2.6 per cent in our seven countries, *i.e.* considerably

(2) As has been done for industrial production for OEEC countries, cf. *Industrial Statistics 1900-1957*, OEEC, Paris, 1958.

(3) Cf. Richard Stone, *Quantity and Price Indexes in National Accounts*, OEEC, Paris, 1956.

(4) 1937 was fractionally higher in Denmark, Italy and the Netherlands.



Table 1

RATES OF GROWTH OF GNP (1)

| | Denmark | Germany | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870–1913 | 3.1 | 3.1 (2) | 1.4 | 2.2 (3) | 2.6 (3) | 3.1 | 2.3 |
| 1913–1957 | 2.2 | 2.0 | 2.0 | 2.5 | 2.8 | 2.4 | 1.6 |
| 1913–1929 | 2.1 | 0.5 | 1.8 | 3.3 | 2.8 | 1.6 | 1.3 |
| 1929–1938 | 2.2 | 2.5 | 1.6 | 0.1 | 3.0 | 2.0 | 2.2 |
| 1938–1957 | 2.3 | 2.9 | 2.3 | 3.1 | 2.8 | 3.3 | 1.6 |
| 1924–1929 | 2.7 | 3.5 (4) | 2.6 | 4.2 | 4.2 | 4.3 | 2.9 |
| 1951–1957 | 2.7 | 7.5 | 5.4 | 5.2 | 3.6 | 3.8 | 2.5 |

(1) This table and the following tables in the text are derived from the tables in the statistical annex.

(2) 1871-1913.

(3) 1900-1913.

(4) 1925-1929.

Figures adjusted to exclude the effect of changes in national boundaries. Cf. Table I of annex and notes.

better than in the previous period of war and recovery from 1913-1929. If we compare post-war experience since 1951, we find that the average rate of growth has been 4.4 per cent, which compares well with the similar period of prosperity from 1924 to 1929 when growth averaged 3.5 per cent.

Thus, we can conclude that the recovery from wartime losses was very good considering the length of the war and the extent of post-war dislocation. It also seems that the post-war rate of growth has been very satisfying in historical perspective, but, in the light of experience in the 1920s, it does not seem to be without parallel. As one must suspect that there were large elements of recovery in the period from 1951, it would be difficult to claim that the last row in Table 1 is any measure of a new long-run trend. It is necessary to analyse the reasons for increased output in more detail in order to appreciate the nature of the gains which have been made. We shall try in the following sections to see how output has been influenced by changes in the labour supply and its productivity, and then by investment and its productivity.

## Labour Supply

(a) *Population.*

From 1913 to 1938, the rate of population growth fell in most of our countries because of falling birthrates. Since 1938, birthrates have risen again and the rate of population growth has increased. In Germany the sharp rise has been due almost entirely to immigration.

POPULATION GROWTH — TABLE 2

| | Denmark | Germany | Italy | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 - 1913 | 1.1 | 1.1 (1) | 0.7 | 1.4 (2) | 0.7 (2) | 0.7 | 0.9 |
| 1913 - 1938 | 0.9 | 0.5 | 0.6 | 1.4 | 0.7 | 0.5 | 0.4 |
| 1938 - 1957 | 0.9 | 1.4 | 0.7 | 1.3 | 0.9 | 0.8 | 0.4 |

(1) 1871-1913.
(2) 1900-1913.

TABLE 3

POPULATION OF WORKING AGE AS A PERCENTAGE OF POPULATION

| | Denmark | Germany | Italy | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 60.8 | 61.2 (1) | 61.7 | 59.0 (2) | 56.5 (2) | 60.5 | 58.9 (1) |
| 1913 | 60.2 | 63.1 | 60.3 | 60.1 | 57.9 | 60.6 | 64.1 |
| 1938 | 67.0 | 68.1 | 62.5 | 64.8 | 64.3 | 69.3 | 69.4 |
| 1957 | 63.3 | 69.1 | 66.6 | 61.4 | 63.1 | 65.1 | 65.2 |

(1) 1871.
(2) 1900.

As far as production is concerned, the movement in the population of working age, *i.e.* aged 15-64, is of more importance than movements in total population, for it is the principal determinant of the labour supply (5). From 1870 to 1913, there was little change in the age structure of the population, except in the U.K. where the

(5) In nearly all our countries, well over 95 per cent of the labour force is aged between 15 and 64.



proportion of working age rose substantially. From 1913 to 1938, there were substantial increases in the relative size of the working age population in all countries, due to the fall in birth rates and the rise in life expectation. Since 1938, this tendency has been generally reversed, except in Germany and Italy, because birth rates have risen again, and the increase in life expectation has had its chief impact on those who have already passed working age.

(b) *Labour Force.*

There are no official estimates of the labour force for European countries for the years before the war, and, indeed, even for the post-war period estimates are often lacking. The main pre-war source of information of the working population is the population census, and in several countries difficulties arise because the definition of economic activity changed from one census to another.

In the United States, where more work has been done on the measurement of the labour force than in any European country, it has been observed that the labour force has been a remarkably stable proportion of the total population of working age, although this long-term stability concealed some compensating variations for different groups of the population — a fall in the activity of juveniles and old people compensated by a rise in female activity. A recent American study has suggested that stability of activity rates may be a fairly general international phenomenon (6).

Insofar as the census material is a reliable guide, it does seem that the labour force has been a reasonably stable proportion of the working population in the last forty years or so in Europe, although there has been a slight tendency to a decline because of increased school attendance by young people, and, in some cases, reduced activity of females. Since 1950, however, thit decline has been checked, and in Germany and the U.K. substantially reversed, because the buoyant level of demand has attracted more women into the labour force.

In the case of Italy, however, the long-term decline in the activity rate has been very substantial due to the decline in the

(6) CLARENCE D. LONG, *The Labor Force under Changing Income and Employment*, NBER, 1958. Professor Long finds a fair degree of stability for Australia, Canada, Great Britain, New Zealand, as well as for the U.S.

activity of juveniles and women. There were also erratic movements in activity rates from 1913 to 1929 in Denmark and Sweden, probably due to changes in census definitions. Several observers have commented on the difficulty of measurement created by changing census definitions of the occupied population, and some of them have attempted to correct for this.

TABLE 4

LABOUR FORCE AS A PERCENTAGE OF POPULATION OF WORKING AGE (1)

| | Denmark | Germany | Italy | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1913 | 73.2 | 74.7 | 79.0 | 64.9 | 67.7 | 68.9 | 70.0 |
| 1929 | 68.4 | 73.4 | 73.1 | 63.5 | 65.5 | 71.7 | 68.6 |
| 1938 | 74.7 | 74.3 | 69.8 | 63.3 | 64.9 | 68.0 | 68.9 |
| 1950 | 74.5 | 68.9 | 64.1 | 61.2 | 64.2 | 66.5 | 69.4 |
| 1957 | 74.4 | 72.4 | 63.9 | 62.6 | 64.8 | 66.5 | 72.0 |

(1) *i.e.* total labour force of all ages as a ratio of population aged 15-64. The above figures are for our benchmark years and are generally interpolations between census years with the exception of 1950. The ratios for census years are cited in our statistical annex.

In order to avoid some of these difficulties, Colin Clark has excluded all women engaged in agriculture and fishing from his estimates of the labour force (7). This is probably an improvement if one wants to compare activity rates between countries as he does, for there are big discrepancies between countries in the census treatment of family workers in agriculture. However, this adjustment will not necessarily improve the estimates of the movement of the labour force over time for any one country. It totally excludes a portion of the labour force which does make some contribution to output but which is likely to be declining in relative importance over time, and hence the residual labour force figure will have an upward bias over time. There are also other problems apart from agricultural women which detract from the value of

(7) *Conditions of Economic Progress*, Third Edition, p. 496.



census data for long-term or inter-country comparison, *e.g.* the vagaries in the measurement of juvenile employment. In some countries, the occupied population by definition now excludes juveniles under 15, and this is rather a good practice as children are rather ineffective members of the labour force and are often in part-time jobs in any case. However, the age limit for census purposes has varied over time, and from country to country.

In most nineteenth century censuses and in all the Italian censuses, children aged 10 and over were included as members of the labour force. There is no doubt that these children did have some impact on output, but if they are included in the labour force it is desirable to give some lesser weight to their contribution than to that of adults. Rather than embark on this exercise which would lead logically to manifold adjustment coefficients for different kinds of part-time labour, it would be preferable to ignore the contribution of those aged less than 15. An even simpler hypothesis in doubtful cases is to assume that the activity rate has been stable and that the labour force has moved parallel with the population of working age (8). We have made this assumption for the period before 1913 when the variations between successive censuses were probably greater than they have been since (9), and it may for some purposes be preferable to make the same assumption for Italy throughout.

(c) *Unemployment.*

Figures on unemployment are not very comparable over time as methods of registering unemployment have changed considerably. Nevertheless, we have tried to introduce some degree of comparability into the figures by correcting them for their degree of coverage, and certain broad conclusions emerge quite clearly.

(8) Most observers who have attempted to make corrections of census figures tend to produce figures which show much greater stability in activity rates than does the census, cf. LONG, *op. cit.*, and Bjerke's figures for the Danish labour force, "The National Product of Denmark 1870-1952", *Income and Wealth*, Series V, p. 151.

(9) Cf. JOSTOCK's comments on the German census of 1882, which undercounted family workers, "The Long-Term Growth of National Income in Germany", *Income and Wealth*, Series V, p. 101.

The post-war period has been one of very high employment in the Netherlands, Norway, Sweden and the United Kingdom, with unemployment at about 1 to 2 per cent of the labour force, and there has been a steady move in the same direction in Germany. In Denmark, unemployment has hovered around 5 per cent of the labour force, and in Italy unemployment has varied around 9 per cent.

This makes, perhaps, the most striking contrast with the years from 1920 to 1938 when unemployment was allowed to reach levels which would now be unthinkable in many countries. Even in the 1920s unemployment was considerably above the pre-1913 average and in the 1930s the unemployment rate averaged about 10 per cent or more.

It is interesting to see that post-war experience is not really so different from that before 1913. In the case of the United Kingdom, the 1900-1913 unemployment average was 3.3 per cent of the labour force as compared with 1.5 per cent from 1950-57. One of the reasons why the post-war experience is usually considered unique is that it has generally been so much better than the famous 3 per cent put forward by Lord Beveridge as a goal of policy. Beveridge's target was not based on historical analogy, but in terms of historical experience it was not too ambitious.

### (d) *Changes in Annual Working Time per Head.*

In the period since 1870, there have been such considerable changes in working hours that we felt it necessary to make some adjustment for this even though the data available are very inadequate. In general, working hours are recorded only for manufacturing industry, and we have taken these figures to indicate movements in working hours for the economy as a whole. This is probably a reasonable assumption over long periods, but working hours in manufacturing are more sensitive to changes in the conjuncture than are working hours generally, so that our figure for 1938 is probably rather too low, compared to our other benchmark years 1870, 1913, 1929 and 1957, in which the level of activity was higher.

From 1870 to 1913, working hours fell generally from about 66 hours a week to about 54 hours, and by 1929 the working week had fallen to about 47 hours. There was some further fall in most cases between 1929 and 1938, with little net change since then. From 1913 onwards, there has also been a steady increase in the number of days taken for holidays and, since the war, increased leisure in the form of holidays has probably been more popular than shorter hours.



## Total Labour Input

It is now possible to assess the movement in labour input in the different periods under review. In all countries, except Denmark, the pace of growth dropped sharply in the period 1913 to 1938, mainly because of increased unemployment, the fall in working hours and activity rates. In some countries there was even an absolute fall in labour input. From 1938 to 1957 the increase in labour input was very high compared with either the inter-war or pre-1913 period — thanks to decreased unemployment, the rise or stability of activity rates, and stable or rising working hours. In most countries the biggest increase in labour input took place from 1938 to 1951, but in Germany the biggest increase has taken place since then.

TABLE 5

THE ANNUAL RATE OF INCREASE IN TOTAL LABOUR INPUT (1)

| | Denmark | Germany | Italy | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 – 1913 | 0.6 | 0.8 (2) | 0.2 | 1.0 (3) | 0.4 (3) | 0.2 | 0.6 |
| 1913 – 1938 | 0.6 | 0.4 | – 0.9 | 0.5 | – 0.3 | 0.1 | – 0.3 |
| 1938 – 1957 | 0.6 | 1.0 | 0.9 | 1.7 | 1.2 | 0.4 | 0.7 |
| 1938 – 1951 | 0.7 | 0.3 | 0.9 | 1.9 | 1.7 | 0.6 | 0.7 |
| 1951 – 1957 | 0.2 | 2.5 | 0.9 | 1.3 | 0.1 | 0.1 | 0.6 |

(1) *i.e.* labour force adjusted for unemployment and changes in annual working hours per head.

(2) 1871-1913.

(3) 1900-1913.

TABLE 6

RATES OF GROWTH OF GNP PER MAN HOUR (a)
*(Compound Rates)*

| | Denmark | Germany | Italy (1) | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870–1913 | 2.5 | 2.3 (2) | 1.2 | 1.2 (3) | 2.2 (3) | 2.8 | 1.7 |
| 1913–1957 | 1.6 | 1.3 | 2.1 | 1.5 | 2.5 | 2.2 | 1.5 |
| 1913–1929 | 2.2 | 0.9 | 2.4 | 2.6 | 3.0 | 1.4 | 2.0 |
| 1929–1938 | 0.5 | 0.8 | 3.0 | 0.0 | 3.4 | 2.1 | 1.9 |
| 1913–1938 | 1.6 | 0.9 | 2.6 | 1.6 | 3.1 | 1.6 | 1.9 |
| 1938–1951 | 1.4 | 0.6 | 0.1 | 0.2 | 0.7 | 2.6 | 0.4 |
| 1951–1957 | 2.4 | 4.8 | 4.4 | 3.8 | 3.5 | 3.7 | 1.9 |
| 1938–1957 | 1.7 | 1.9 | 1.4 | 1.3 | 1.6 | 2.9 | 0.9 |

(a) *i.e.* GNP divided by labour force, adjusted for changes in unemployment and annual working time per head.

TABLE 7

ALTERNATE ESTIMATES OF RATES OF GROWTH OF GNP PER MAN HOUR (b)
*(Compound Rates)*

| | Denmark | Germany | Italy (1) | Nether-lands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870–1913 | 2.5 | 2.3 (2) | 1.2 | 1.2 (3) | 2.2 (3) | 2.8 | 1.7 |
| 1913–1957 | 1.7 | 1.2 | 1.6 | 1.4 | 2.4 | 2.1 | 1.6 |
| 1913–1929 | 1.8 | 0.8 | 1.9 | 2.4 | 2.8 | 1.6 | 1.9 |
| 1929–1938 | 1.5 | 0.9 | 2.5 | 0.0 | 3.3 | 1.5 | 1.9 |
| 1913–1938 | 1.7 | 0.8 | 2.1 | 1.5 | 3.0 | 1.6 | 1.9 |
| 1938–1951 | 1.4 | 0.1 | – 0.6 | – 0.1 | 0.6 | 2.4 | 0.5 |
| 1951–1957 | 2.4 | 5.5 | 4.4 | 4.2 | 3.6 | 3.6 | 2.5 |
| 1938–1957 | 1.7 | 1.8 | 0.9 | 1.2 | 1.6 | 2.8 | 1.1 |

(b) *i.e.* GNP divided by population of working age, adjusted for changes in unemployment and annual working time per head.

(1) In the case of Italy, it is assumed that the rate of unemployment has been constant throughout.

(2) 1871-1913.

(3) 1900-1913.



## Productivity

We have derived estimates of productivity by dividing our estimates of output by our figures for total labour input. It should be noted that our productivity figures in Table 6 will suffer from all the imperfections mentioned above, and we have, in fact, given an alternative set of figures in Table 7 which shows productivity growth on the assumption that the activity rate has been stable over time. Most of the following conclusions hold good in terms of both tables, although the argument is stated in terms of Table 6 which is generally preferable.

In the period 1870-1913, the average rate of productivity growth for our seven countries was 2 per cent per annum. Progress was well above average in Sweden and Denmark, and relatively slow in Italy, the Netherlands and the U.K.

In the period 1913-1929, the average growth of productivity in our seven countries was slightly higher at 2.1 per cent than before the first World War. This is a rather surprising result as this period includes four years of war. However, the rate of growth was considerably reduced in Germany and the two countries with the highest rates of growth in the period were the Netherlands and Norway which, as neutrals, had probably received more stimulus than damage from the war. On the other hand, the rate of growth was also higher in both Italy and the U.K.

In the 1930s the average rate of productivity growth for our seven countries was reduced to 1.7. The average is heavily affected by the absolute fall in productivity in the Netherlands. In the U.K. and Germany, the rate of progress was virtually unchanged from that in the 1913-38 period, and in Italy and Norway there was even an acceleration in the rate of growth.

Over the whole period 1913-1938, which included the World War and the Great Depression, productivity growth averaged 1.9 per cent per annum, *i.e.* it was not substantially different from the period 1870-1913. The biggest retardation was in Germany, and there was also slower growth in Denmark and Sweden, but in Italy, the Netherlands and Norway, growth was accelerated considerably, and there was also a slightly faster pace in the U.K. It is usually considered that this period was one of stagnation, but the

stagnation was expressed in unemployment, a slower growth of output and stagnating trade, and did not have nearly such a big effect on productivity. The level of investment in the 1920s and 1930s was higher than before 1913 in most cases (except Denmark where productivity grew slower), and not so much investment was needed for capital "widening" as it had been before 1913. It is also likely that the rapid reduction in working hours after the first world war reduced physical strain to an extent which was reflected in productivity. Between 1870 and 1913, working hours generally were reduced from 66 to about 54 per week, and by 1929 to about 47 per week, and it may even be that the latter reduction, plus the increase in holidays, made a bigger qualitative difference than the first.

In the period from 1938 to 1957, the rate of productivity growth for our seven countries averaged 1.7 per cent per annum. This is not a particularly impressive record. In no country is it significantly better than the pre-1913 experience, and in most cases it is less than was accomplished from 1913-1929 when there were similar problems of war and reconstruction. Only in Germany and Sweden was growth accelerated in the 1938-1957 period, but one might have expected this to happen in the Netherlands and also in Denmark, as some compensation for their slow rate of progress in the 1930s.

However, it is perhaps too much to expect that net growth of productivity from 1938-1957 should be higher than from 1913 to 1929. The second world war affected more of our countries than did the first, and the success in the employment field itself has limited the success in terms of productivity, as we shall explain below.

If we take the post-war period alone, we do, of course, get impressive rates of growth which average 3.5 per cent for our seven countries. However, it is not surprising to find high rates of growth in such a period. There is strong reason to suspect that there was still a substantial element of recovery in productivity growth after 1951, in view of the very slow growth from 1938 to 1951, and the retarded growth of productivity in the 1930s. This is particularly true of Germany, Italy and the Netherlands, and in two of the other countries — Denmark and the U.K. — the growth of productivity since 1951 has not, in any case, been particularly high by historical standards.



However, there are some reasons to believe that Europe may also be on a better long-term productivity trend than in the past, and it would be a mistake to reject this hypothesis simply on the grounds that net progress from 1938 to 1957 has been unimpressive, or that the gains since 1951 have contained special elements of recovery. It seems worthwhile, therefore, to analyse the factors affecting productivity growth in the past few years before arriving at any final judgment. We shall examine the following factors in turn:

(i) the nature of the recovery elements which have influenced economic development in the past few years to see if they have a once-for-all character;

(ii) the rate of investment;

(iii) the capital output ratio.

(i) *Recovery Elements.*

We have picked a period beginning in 1951 in order to exclude the immediate post-war elements of recovery (10). In the years just after the war, increases in inventories greatly stimulated the flow of production, and repairs to damaged plant and equipment had a large impact on effective capacity and labour productivity. The emergence from autarchy and bilateralism in trade had similar effects in removing bottlenecks, providing bigger markets and economies of scale. Productivity benefited from the adoption of technical advances which had been made in other countries during the war. Work became more efficient as people recovered from the distortions in economic attitudes and incentives induced by wartime experience of production for an occupying power, service in the army, or black marketing. These were the main factors influencing productivity in the period in which the pre-war levels were being regained and perhaps even for some time afterwards. They had probably exhausted most of their impact by 1948 in Denmark and Sweden, and probably in Norway and the United Kingdom as well. In Germany, Italy and the Netherlands, however, the period of recovery was preceded by a period of severe dislocation which,

(10) By 1951 all our countries had regained their pre-war productivity level in terms of Table 6, but this was not true of Italy or the Netherlands in terms of Table 7.

in Germany, was aggravated by the arbitrary division of the economy and the stagnation preceding the currency reform. So that for these three countries, this initial period was probably not over until 1950 or 1951, and even so these elements of recovery from the war probably persisted for a number of years in some branches of industry.

During the initial recovery period, the shortage of capital equipment was a factor which hindered the growth of labour productivity, particularly as all of our countries, except Germany, were making much fuller use of their labour supply than they had in pre-war years, so that the amount of capital per head was generally reduced, and the quality of the capital stock was lowered because so much replacement had been delayed (11). It therefore proved a much bigger problem to raise capital per head to pre-war levels, and to make good arrears of replacement after the second world war than after the first, because labour input was substantially increased instead of being substantially reduced. Since 1951 the quality of capital equipment has probably increased more rapidly than one would expect in future, because an abnormal backlog of old equipment has been scrapped.

A third type of recovery or backlog was due to the elimination of uneconomic habits acquired in the inter-war period as a result of prolonged unemployment. The high levels of demand and activity in the post-war period have not only had the measurable effects on working hours, unemployment and activity rates which we have noted above, but they have also had a salutary effect on productivity. They have tended to draw people from unremunerative but safe occupations as the prospect of unemployment receded. Full employment has made restrictive union practices less necessary, and producers have been less prone to make cartel and market-sharing arrangements. Producers have been able to plan ahead better and arrange production lines more economically. Although the net effect of full employment and high levels of activity has probably been positive, it obviously has not been entirely favourable to productivity growth. The reduction in the margin of unemployment has brought the least efficient members of the labour force into activity and has increased the recruitment difficulties of the most rapidly expanding firms.

(11) We are speaking here of the capital stock in the sense of the plant and equipment in physical use. If we think instead in terms of the accounting concept of a capital stock after allowance for depreciation, then we would not count the obsolete equipment at all, but simply say that capital per head had been further reduced.



It may be argued that the existence of a large productivity differential between Europe and the U.S. represents another element of backlog which has been exploited by Europe as a source of rapid productivity growth. This backlog has, of course, existed for several decades, so that it could hardly be considered to provide any special reason for a post-war rate of growth faster than that in the inter-war period, although there has been more awareness of it in the post-war period. There is no doubt about the fact that an inferior starting position can be exploited so as to speed the process of growth, particularly if such a position is due to ignorance of the best technical practices, poor management, a badly educated labour force, and badly organised and uncompetitive markets. However, only a small part of the difference between European and American productivity is due to such reasons. A major reason for higher American productivity is that the American capital stock is bigger, and the faster growth of American productivity in the past has been largely due to a higher rate of American investment, although growth was also aided to some extent by better natural resources. The best way to emulate American productivity is therefore to raise the rate of investment.

It seems clear then that there have been special elements of recovery in the past few years which one would expect to stimulate productivity growth. Some of these have had a once-for-all character which would lead us to expect the future growth to be smaller. However, some of the faster growth has been due to higher capital formation, and, to this extent, it is reasonable to suppose that the faster rates of productivity growth can be expected to continue. It is therefore worth looking in more detail at what has been happening to capital formation and to the capital output ratio.

(ii) *The Rate of Investment.*

From the evidence available, it is clear that most European countries have been investing more in the post-war period than has been the case in any recorded period of equal length. The post-war rate of investment has been particularly high in Germany, the Netherlands and Norway, but even in the United Kingdom, where

it has been low, the rate has also been higher than the long-term rate (12). Furthermore, the rate of investment has been higher in most European countries than in the United States, where the rate has, in fact, been below the long-term average (13).

RATES OF INVESTMENT — TABLE 8

| | Denmark (1) | Germany | Italy | Netherlands | Norway | Sweden | United Kingdom (2) |
|---|---|---|---|---|---|---|---|
| 1870–1913 | 13.6 | — | 11.2 | — | 12.7 (3) | 8.1 | 9.2 |
| 1920–1929 | 10.6 | — | 16.7 | — | 14.7 | 11.7 | — |
| 1920–1938 | 12.0 | 13.6 (4) | 16.3 | — | 15.1 | 13.3 | 10.2 (5) |
| 1948–1957 | 17.1 | 23.4 (6) | 201 | 23.8 | 29.7 | 20.2 | 14.6 |

(1) Excluding inventories.
(2) The figures for the U.K. would be 12.8, 10.5 and 15.3 if foreign investment were included.
(3) 1900-1913.
(4) 1925-34 and 1936.
(5) 1924-1938.
(6) 1950-1957.

The impact of investment on the growth of GNP will depend upon the purposes for which investment is used. Not all investment goes directly to productive purposes. A good deal of post-war investment has gone into housing, a smaller amount into public works, and a good deal of "productive" investment has been designed as much to improve amenities or working conditions as to raise capacity. In Europe as a whole, about a quarter of investment goes to manufacturing and about a quarter to housing with

(12) The accompanying table shows the proportion of GNP devoted to domestic gross investment including inventories. This proportion is given in terms of current prices. In most countries for which estimates are available in constant prices, it appears that the price of investment goods has risen more than GNP so that our ratios for earlier years would be higher if measured in terms of present day prices. However, this would not change our general conclusions.

(13) The post-war U.S. rate from 1948-57 has been 17.8 per cent in terms comparable with our table. This is lower than the long-term average for the U.S. given by KUZNETS, *Capital Formation and Economic Growth*, N.B.E.R. 1955, p. 62, *i.e.* 21.8 per cent for 1869-1908, and 20.8 per cent for 1909-1948. Kuznets' concept of capital formation is slightly different from that of the OEEC, which we have used, but the difference is not such as to make our conclusion invalid.



a slightly higher proportion going to manufacturing in the U.K. and Germany (14). Unfortunately, there are very few historical data on the proportionate distribution of investment with which to compare the present distribution. It seems that a smaller proportion of post-war British investment has gone to housing than was the case historically (15), but there is no evidence that post-war investment in Europe has been strongly biased in a "productive" direction as it has been for instance in the USSR.

The impact of investment on productivity will depend upon whether it is destined to replace existing capital, to increase capital per head, or to provide capital for additional workers. The impact of replacement investment on capacity and productivity will be smaller than that of net additions to the capital stock. However, the impact of replacement investment will always be positive, for new equipment is always more efficient than that which is replaced and usually incorporates new technique as well. The older the equipment which is replaced, the bigger will be the contribution to capacity and productivity of the new investment. During the war and in the early post-war years, the normal life of capital was prolonged, so that there was a backlog of abnormally obsolete capital to be replaced in the late 1950s, and hence replacement investment brought bigger productivity gains than one would normally expect.

It is not possible to estimate what proportion of capital formation has been destined for replacement in the post-war period, but for the period 1948-1957 as a whole it has probably been no higher

(14) PROPORTIONATE DISTRIBUTION OF GROSS FIXED INVESTMENT

| | Germany | United Kingdom | OEEC Countries | U.S. | USSR |
|---|---|---|---|---|---|
| Manufacturing | 28 | 26 | 23 | 25 | 40 |
| Housing | 22 | 21 | 24 | 25 | 10–15 |
| Other | 50 | 53 | 53 | 50 | 45–50 |

U.K. figures from U.K. National Income bluebook refer to 1948-57, German figures from *Vierteljahrshefte zur Wirtschaftsforschung*, Berlin, refer to 1956-57; for OEEC countries from OEEC 8th Annual Report, Vol. II, *Europe in 1960*, p. 61, and refer to 1955. For the U.S. and Russia, the figures are historical averages quoted by NORMAN M. KAPLAN, "Capital Formation & Allocation", in *Soviet Economic Growth*, edited by A. Bergson.

(15) Cf. E. H. PHELPS BROWN and S. J. HANDFIELD JONES, "The Climacteric of the 1890s", in *Oxford Economic Papers*, October 1952, who show a gross investment in housing of £1,941 million from 1871-1912 total capital formation including inventories of £6,275 million in constant prices.

than it was in the long run for pre-war years. The amount of investment needed for replacement backlogs was, of course, higher than the long-run norm, but the rate of investment was raised so that there was a compensating tendency for the share of replacement to fall. One would certainly expect that, in future, replacement will be a smaller part of total investment than it was in pre-war years, if the higher rate of investment continues. The additions to the capital stock each year will be bigger relative to the amount of old capital which is scrapped, unless there is a considerable reduction in the life of capital assets (16).

It is impossible to distinguish quantitatively between increases in the capital stock which are designed to provide for the increase in the labour supply, and those destined to increase capital per head, and there is no reason to expect that the distinction will be clear in practice. In cases where the increase in labour supply takes the form of increased working hours, the existing capital stock should be quite adequate, and can simply be used more hours per day. Where the increase in labour supply is due to an increase in employment, it is always possible to put more people into a factory or office, even if the new people do need extra lathes or typewriters. This is undoubtedly what happened during the war and early post-war years, and it did have adverse effects on productivity in many cases. In the later post-war period extra factory and office space has been built for these additional workers. This addition to the capital stock has been a " widening " of capital in the sense of providing for extra workers, but as they were hired before the " widening " took place, the investment also " deepened " the capital stock by restoring previous levels of capital per head. This investment has therefore contributed to productivity growth during the past few years. In future, a smaller proportion of investment will be needed for " widening " of capital as the rate of growth of labour input will be considerably below the 1938-57 rates in most countries.

In spite of the backlog of replacement and the need to " widen " the capital stock, there seems little doubt that the increase in the

(16) Professor Domar gives a detailed explanation of the relation of replacement requirements to total capital formation for different rates of growth of capital and different lengths of life of assets; cf. *Essays in the Theory of Economic Growth*, O.U.P., 1957.



rate of capital formation in most countries has been high enough to raise capital per worker well above pre-war levels, and in certain countries, such as Germany, Norway and Sweden, the rate of increase of capital per worker in recent years has probably been quicker than ever before. In future, the proportion of new investment required for replacement and for " widening " of capital will be smaller than in recent years, so that we might expect the rate of productivity growth to be even higher in future than it has been since 1951 — if similarly high rates of investment are maintained (17). The advantages of these higher rates of investment may, however, be diminished if the capital output ratio rises. It is necessary, therefore, to see whether this is likely before we can conclude that Europe has entered on a new productivity trend. It is also helpful to restate some of the previous argument in terms of the post-war development of the capital output ratio.

### (iii) *Capital Output Ratio.*

We may first ask how we would expect the capital output ratio to have behaved in the post-war period in the absence of any changes in the rate of innovation. We would expect that capital equipment would be used intensively in wartime and in the early post-war years when demand was very high, resources available for new investment were low and more labour was employed. In such a situation, the productivity of capital would be increased at the expense of the productivity of labour. However, we would expect that as conditions became more normal and labour input grew more slowly, the use of capacity would become less intense and that there would be a return to higher average capital output ratios.

In Germany, one might have expected a somewhat different situation. Activity remained at low levels in the early post-war years, in 1950 labour input was about the same as in 1938, and effective capacity was much greater, in spite of war damage. One

(17) The disappearance of some of the recovery elements mentioned above which were not connected with new capital formation will, of course, be an offsetting factor, and the replacement and widening investment will also have less of an impact on productivity than in the past few years.

might have expected the German capital stock to be partly idle and the capital output ratio to be above pre-war. The big increase in German labour input occurred after 1950 when it increased by a fifth (whereas the big increase had happened earlier in other countries) so that one would expect German capital equipment to have become more intensively used rather than less intensively.

Unfortunately, the evidence available on the average capital output ratio is rather limited. Estimates of the capital output ratio for post-war years are available for only three European countries, Germany (18), Norway (19), and the United Kingdom (20). For Norway, the evidence is somewhat similar to what we expected, with the capital output ratio (total fixed real capital divided by net real domestic product) falling in the early post-war years and rising steadily from 1950 onwards, although it was still less than the pre-war average in 1955.

For the United Kingdom, Redfern's figures for the total fixed capital stock show some fall (21) in the capital output ratio from 1938 to 1947, with little change up to 1953. There has probably been an increase since then as the incremental capital output ratio has been large in recent years. For manufacturing alone the evidence is that the 1948 British capital output ratio was already at the 1937-38 level, but that it rose thereafter until by 1956 it was at the higher 1929 level. However, the capital output ratio for the economy as a whole may have increased less than in manufacturing because of government restrictions on non-industrial investment.

For German manufacturing, Krengel's figures show that the average capital output ratio was very high in the early post-war

(18) R. Krengel, *Anlagevermögen, Produktion und Beschäftigung der Industrie im Gebiet der Bundesrepublik von 1924 bis 1956*, Deutsches Institut für Wirtschaftsforschung 1958.

(19) *Real Capital in Norway, 1900-1956*, O. Aukrust and J. Bjerke, paper given at the Pietersberg Conference of the International Association for Research in Income and Wealth, August 1957.

(20) P. Redfern, "Net Investment in Fixed Assets in the United Kingdom 1938-1953", *Journal of the Royal Statistical Society*, 1955, and Tibor Barna, "Investment in Industry - Has Britain Lagged?", *The Banker*, April 1957. Barna has carried Redfern's estimates farther for manufacturing and has adjusted them to include wartime government capital formation at its full value which Redfern does not include at all.

(21) The fall in the U.K. was about 10 per cent from 1938 to 1947. In Norway the fall was about twice as large.



years, and was steadily reduced until about 1953 when it reached something like the pre-war norm. It has since levelled out.

Thus, the evidence, though rather scanty, seems to bear out our general hypothesis (22). It is worth noting that several studies have also shown a decline in the ratio of capital to output in the post-war period in the United States. This is true for the estimates of the capital output ratio for the economy as a whole as measured by Goldsmith (23) and Fellner (24), for the private sector of the economy as measured by Terborgh (25), and for manufacturing as measured by Wooden and Wasson (26). All these studies show that the United States capital output ratio had been substantially reduced during the war and that it has remained below the pre-war level even though it has been increasing steadily since 1945. These studies show that the reduction in the ratio is due to the fall in the ratio of structures to output, the ratio of equipment to output being about the same as pre-war (27).

(22) The estimates cited are based on the perpetual inventory method of calculating the capital stock after allowing for depreciation. For our purpose, it would be better to measure the capital stock gross of depreciation and net only of actual replacement. This would, however, be impossible to measure. Both Krengel and Redfern do, however, give alternative figures showing the capital stock net of calculated replacement — and these figures also bear out our argument. Krengel does make some attempt to take account of variations in the rate of replacement, by assuming that the life of equipment assets has steadily shortened in the period he covers.

(23) Raymond W. Goldsmith, "The Growth of Reproducible Wealth of the USA from 1805 to 1950", *Income & Wealth*, Series II, International Association for Research in Income and Wealth, 1952, pp. 299-300, and *A Study of Savings in the United States*, Princeton, 1956.

(24) William Fellner, "Long-Term Tendencies in Private Capital Formation", *Long-Range Economic Projection*, Conference on Research in Income and Wealth, N.B.E.R., 1954.

(25) George Terborgh, various numbers of the *Capital Goods Review*, Machinery and Allied Products Institute, Washington, particularly No. 22, which shows the capital output ratio in 1955 to be about three-quarters of that in 1929.

(26) D. G. Wooden and R. C. Wasson, "Manufacturing Investment since 1929", *Survey of Current Business*, November 1956. This article shows a similar change in the capital output ratio from 1929 to 1955 as the source in the footnote above.

(27) There has been a much greater increase in labour input in the U.S. than in Europe since pre-war, and perhaps a bigger increase in the cost of factory construction relative to the cost of machinery. There has probably been an even greater incentive to economise on capital in buildings than in Europe, and greater possibilities of doing so because the United States normal pre-war range of spare capacity was probably greater than in Europe and the average age of capital lower. The average age of American capital is certainly lower in the statistical estimates of Wooden and Wasson and Terborgh, who use the average lives of the Bureau of Internal Revenue, *Bulletin F*, which are shorter than those used for the U.K. and Norway (but not shorter than those for recent years used by Krengel for Germany). Some American writers have attributed the reduction in the construc-

It is likely that the experience of most European countries has been somewhat similar to that of Norway and the U.K., *i.e.* with some lowering of the capital output ratio in the early post-war years, and a subsequent rise in the ratio.

In a period in which the average capital output ratio is below the long run trend, it does not follow that the incremental capital output ratio will also be below its long-run trend. The relation between the average and incremental ratio will depend on the direction in which the average ratio is moving. When the average ratio is falling, as it has been in Germany, then the incremental ratio will be lower than the average. When the average ratio is rising, the incremental ratio will, of course, be higher than the average. Thus, even though the average ratio may be below its long-run norm, the incremental ratio may well be above its long-run norm, if the average ratio is rising rapidly. In such circumstances, growth will be fairly expensive in terms of capital formation.

In Table 9 we show the gross incremental capital output ratios (28) for the period 1949-1957, broken down by non-residential

tion output ratio to changes in the structure of industry — *e.g.* chemical plants which require no buildings, or to geographical shifts of industry to California and the South where structures are less necessary for weather protection.

(28) We have estimated the incremental capital output ratio by cumulating gross capital formation (including inventories) in constant prices for the eight years 1949-56 inclusive, and we divided this by the increment in GNP in constant prices in the eight years between 1949 and 1957, thus allowing a lag of one year for the investment to take effect. These incremental ratios have certain disadvantages, but they are at least something which we can measure for all our countries. Our estimates exaggerate the ratio of capital to output because they make no allowance for replacement or depreciation. However, we do, at least, include depreciation in our denominator — GNP — as well as in our numerator, and we could not make estimates of net capital formation without information on the initial size of the capital stock or its age structure. Comparison of our results between countries and over time is affected by the fact that the share of replacement in total investment will vary. When the share of replacement is high, this will raise the gross capital output ratio. However, capital stock estimates which allow for replacement do so on the basis of hypothetical rather than actual replacement so that they are equally defective as measures of change in the physical stock of equipment in use. The same is true of estimates of the capital stock after allowing for depreciation. Normally, when the rate of investment rises considerably, as it has in the post-war period, one would expect depreciation or replacement to decline as a share of the total gross investment, and the increase in gross capital formation in such a period would understate the increase in the capital stock compared with the increase that would be shown by estimates net of depreciation or replacement. However, we assume that the normal tendency for the share of replacement to fall as the rate of investment increases has been offset in the past few years by a backlog of replacement requirements.



GROSS INCREMENTAL CAPITAL OUTPUT RATIOS TABLE 9

| | 1 Increase in G.N.P. 1949-57 | 2 Cumulative Gross Capital Formation 1949-56 | 3 Cumulative Gross Non-Residential Construction 1949-56 | 4 Cumulative Gross Machinery and Equipment Investment 1949-56 | 5 Cumulative Stock Formation 1949-56 | Capital Output Ratios | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2/1 | 3/1 | 4/1 | 5/1 |
| Denmark . . | 6,070 | 39,930 | 9,455 | 21,530 | 3,020 | 6.6 | 1.6 | 3.6 | 0.5 |
| Germany (1) . | 80,450 | 235,359 | 49,200 | 111,375 | 25,584 | 2.9 | 0.6 | 1.4 | 0.3 |
| Italy . . . . | 5,383 | 18,383 | 2,332 | 11,535 | 763 | 3.4 | 0.4 | 2.1 | 0.1 |
| Netherlands . | 9,300 | 46,270 | 13,330 | 20,770 | 4,000 | 5.0 | 1.4 | 2.2 | 0.4 |
| Norway . . . | 6,282 | 50,664 | 12,947 | 26,145 | 3,040 | 8.1 | 2.0 | 4.2 | 0.5 |
| Sweden . . . | 11,138 | 63,403 | 22,960 | 22,120 | 3,060 | 5.7 | 2.1 | 2.0 | 0.3 |
| United Kingdom | 3,670 | 19,809 | 4,969 | 9,625 | 1,105 | 5.4 | 1.4 | 2.6 | 0.3 |

*Source*: OEEC: *General Bulletin of Statistics*, January, 1959. Absolute figures in million units of national currency in 1954 prices (for Italy: billion units).

(1) Column 1 refers to 1950-57, columns 2, 3, 4 and 5 to 1950-56. Figure for column 3 is my estimate.

construction, machinery and equipment, and inventories. It can be seen that there is considerable variation in the ratios. The overall ratios are reasonably similar in the United Kingdom, the Netherlands and Sweden, rather higher in Denmark, very high in Norway, and particularly low in Germany and Italy. In the case of Italy the ratio for machinery and equipment is not particularly low, but the overall ratio is brought down by the low figure for construction.

For a few countries we can compare the post-war ratio with the long-term experience. We can do this for Denmark, Italy, Norway and the United Kingdom. It can be seen that the incremental capital output ratio has been higher in the post-war period

in Norway, Denmark and the United Kingdom than it has been historically, and that it has been much lower in Italy.

TABLE 10

INCREMENTAL GROSS CAPITAL OUTPUT RATIOS

| | Denmark (1) | Italy | Norway | United Kingdom |
|---|---|---|---|---|
| 1870–1913 | 5.2 | 6.9 | 5.2 (2) | 4.3 (3) |
| 1920–1938 | 6.0 | 7.3 | 5.2 | 3.8 (4) |
| 1949–1957 | 6.1 | 3.4 | 8.1 | 5.4 |

(1) Figures exclude inventories.

(2) 1900-1913.

(3) Domestic capital formation, the ratio would be 6 if foreign investment were included. In the other periods net foreign investment was negligible.

(4) 1924-1938.

The above evidence on incremental capital output ratios seems consistent with our hypothesis that the average capital output ratio has been rising in most countries, except Germany where it has been falling. It also seems that it has been falling in Italy, probably for rather different reasons from those operating in Germany. In Italy the incremental capital output ratio was extremely high from 1870 to 1938, probably because of large expenditures on public buildings. In the post-war period the Italian capital output ratio has been low, largely because of the small amount of resources devoted to construction, so that earlier over-investment has made recent growth cheaper. The low stock output ratio for Italy may be due to the declining relative importance of agriculture in the economy, for the average stock output ratio is usually much higher in the agricultural than in the non-agricultural sector.

In the case of Norway the incremental capital output ratio has been so large that it might be taken as evidence of a move towards a much higher average capital output ratio than pre-war rather than as simply a return to a previous level. It might well be considered that the rise in the Norwegian capital output ratio has occurred because the investment rate of about 30 per cent is high enough to cause diminishing returns. However, Norwegian post-war investment in long-lived assets, such as hydro-electric stations and shipping has been substantial, and in future there will probably be less need for investment in these capital-intensive sectors.



Thus, there is no reason to think that the behaviour of the capital output ratio in the past few years has been particularly favourable to economic growth, except in Germany and Italy. One can expect the average capital output ratio to return to a more stable level in future so that the capital costs of economic growth will be generally somewhat lower than in the past few years, but higher in Germany, and in the longer run in Italy as well.

## Conclusions

Our conclusions therefore are as follows:

(i) European countries increased labour input faster than ever before from 1938 to 1957 by eliminating unemployment and by checking and, in some cases, reversing the long-term trend towards lower activity rates and shorter working hours. These gains are largely of a once-for-all character, and in most countries, except Italy, there will be a reversion to slower growth rates.

(ii) This increase in labour input had some temporary adverse effects on productivity in the early post-war years.

(iii) Productivity growth in the past few years has been faster than the long-run trend, partly because of some once-for-all elements of recovery, but also because of higher investment.

(iv) The rate of investment in the past few years has been much higher than the long-run average in all European countries, but the full impact of higher investment on productivity has not been felt because of backlogs of replacement and capital " widening ".

(v) The average capital output ratio has been low in the post-war period in most countries, but as it has been rising, the incremental ratio has been as high or higher than the long-run average. In Germany and Italy, where special conditions have prevailed, the incremental ratio has been much lower than the long-run trend.

(vi) For the future, the rate of growth of European output will be faster than the long-run trend before 1913 if present levels of

investment continue. In quantitative terms, the norm will probably be an economy with an investment rate of about 20 per cent, and output growing at 3.5-4.0 per cent a year, to which productivity will contribute about 3 per cent. Some countries may be able to do better than this by higher investment rates or efficient exploitation of backlogs. If countries do worse than this, there will probably be reason to suspect them of bad economic policies.

*Paris* ANGUS MADDISON



# STATISTICAL ANNEX

GROSS NATIONAL PRODUCT (1913=100) TABLE I

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 26.7 | 27.4(1) | 54.8 | | | 27.3 | 37.4 |
| 1880 | 33.3 | 44.6(2) | 60.2 | | | 35.8 | 44.9 |
| 1890 | 44.1 | 67.1(3) | 62.6 | | | 43.2 | 68.0 |
| 1900 | 63.5 | 77.7 | 70.4 | 75.0 | 71.6 | 62.7 | 83.3 |
| 1901 | 67.0 | 79.5 | 76.8 | 73.4 | 73.5 | | 83.2 |
| 1902 | 65.7 | 81.3 | 73.6 | 78.1 | 74.5 | | 84.4 |
| 1903 | 67.7 | 83.0 | 80.0 | 79.7 | 74.1 | | 82.5 |
| 1904 | 70.4 | 84.5 | 79.1 | 79.7 | 73.8 | | 83.0 |
| 1905 | 71.0 | 86.3 | 83.3 | 81.3 | 74.6 | | 86.4 |
| 1906 | 76.0 | 88.0 | 83.5 | 84.4 | 76.7 | | 90.3 |
| 1907 | 81.0 | 89.9 | 88.6 | 85.9 | 79.6 | | 92.0 |
| 1908 | 79.1 | 91.6 | 89.7 | 85.9 | 82.0 | | 89.3 |
| 1909 | 82.0 | 93.4 | 92.3 | 89.1 | 83.9 | | 90.6 |
| 1910 | 83.6 | 95.1 | 87.5 | 89.1 | 88.5 | 88.9 | 93.4 |
| 1911 | 88.0 | 96.6 | 96.7 | 92.2 | 90.3 | | 95.4 |
| 1912 | 96.6 | 98.4 | 96.2 | 98.4 | 94.4 | | 97.9 |
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 123.9 | | 106.6 | 117.2 | 123.2 | | |
| 1921 | 109.3 | | 108.9 | 123.4 | 110.5 | | |
| 1922 | 115.0 | | 113.4 | 128.1 | 123.2 | | |
| 1923 | 121.0 | | 116.6 | 132.8 | 126.8 | 100.7 | |
| 1924 | 122.8 | | 117.2 | 137.5 | 126.2 | 104.4 | 106.6 |
| 1925 | 122.2 | 94.0 | 122.1 | 143.8 | 131.7 | 104.6 | 108.5 |
| 1926 | 126.3 | 97.0 | 122.9 | 151.6 | 133.1 | 112.8 | 109.5 |
| 1927 | 132.2 | 105.0 | 122.1 | 156.3 | 138.6 | 117.7 | 118.8 |
| 1928 | 135.4 | 109.0 | 130.4 | 164.1 | 135.8 | 119.2 | 120.8 |
| 1929 | 140.0 | 108.0 | 132.9 | 168.8 | 155.1 | 128.7 | 122.8 |
| 1930 | 154.6 | 104.0 | 125.7 | 168.8 | 166.9 | 131.1 | 122.2 |
| 1931 | 159.1 | 92.0 | 127.4 | 157.8 | 153.5 | 123.0 | 122.5 |
| 1932 | 149.6 | 82.0 | 132.7 | 153.1 | 162.9 | 112.7 | 123.4 |
| 1933 | 152.8 | 86.0 | 132.0 | 150.0 | 166.9 | 116.0 | 130.8 |
| 1934 | 159.7 | 95.0 | 131.0 | 148.4 | 171.3 | 128.4 | 135.4 |
| 1935 | 158.8 | 102.6 | 144.1 | 151.6 | 180.5 | 132.6 | 140.7 |
| 1936 | 168.6 | 112.5 | 145.3 | 159.4 | 190.6 | 140.0 | 146.0 |
| 1937 | 170,8 | 122.4 | 154.2 | 171.9 | 197.8 | 154.0 | 146.5 |
| 1938 | 170.0 | 135.2 | 153.8 | 170.3 | 202.7 | 154.5 | 149.5 |
| 1948 | 197.0 | | 143.3 | 195.3 | 248.1 | 205.7 | 158.6 |
| 1949 | 204.7 | | 151.2 | 210.6 | 252.4 | 218.5 | 164.1 |
| 1950 | 220.9 | 136.2 | 162.1 | 217.9 | 265.7 | 232.3 | 170.2 |
| 1951 | 222.5 | 152.2 | 174.6 | 223.1 | 276.5 | 229.4 | 174.4 |
| 1952 | 223.8 | 162.6 | 179.5 | 227.8 | 292.1 | 235.1 | 172.8 |
| 1953 | 237.5 | 175.2 | 193.3 | 247.5 | 298.2 | 243.4 | 180.4 |
| 1954 | 243.5 | 187.5 | 203.0 | 267.3 | 312.8 | 258.5 | 189.0 |
| 1955 | 242.3 | 209.6 | 216.7 | 283.4 | 318.8 | 268.0 | 195.2 |
| 1956 | 247.1 | 223.0 | 225.8 | 295.1 | 332.0 | 276.6 | 199.2 |
| 1957 | 260.6 | 234.2 | 238.9 | 302.1 | 341.5 | 286.7 | 202.6 |

(1) 1871. (2) 1882. (3) 1891.

TABLE II

POPULATION (1913=100)

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 63.3 | 61.2 (1) | 74.2 | | | 74.1 | 68.5 |
| 1880 | 69.8 | 68.3 (2) | 79.2 | | | 81.3 | 75.9 |
| 1890 | 76.9 | 74.3 (3) | 84.6 | | | 85.1 | 82.0 |
| 1900 | 85.8 | 83.7 | 90.3 | 83.4 | 91.1 | 91.0 | 90.2 |
| 1901 | 86.9 | 85.0 | 90.9 | 84.7 | 92.2 | 91.7 | 91.0 |
| 1902 | 87.9 | 86.3 | 91.5 | 86.1 | 93.0 | 92.3 | 91.8 |
| 1903 | 88.9 | 87.5 | 92.1 | 87.4 | 93.5 | 92.7 | 92.6 |
| 1904 | 89.9 | 88,8 | 92.8 | 88.8 | 93.9 | 93.2 | 93.5 |
| 1905 | 90.9 | 90.0 | 93.5 | 90.1 | 94.4 | 93.9 | 94.3 |
| 1906 | 91.9 | 91.4 | 94.1 | 91.4 | 94.8 | 94.6 | 95.1 |
| 1907 | 93.0 | 92.6 | 94.9 | 92.6 | 95.2 | 95.3 | 96.0 |
| 1908 | 94.2 | 93.9 | 95.9 | 93.9 | 95.9 | 96.1 | 96.8 |
| 1909 | 95.4 | 95.1 | 96.9 | 94.8 | 96.7 | 97.0 | 97.6 |
| 1910 | 96.6 | 96.4 | 98.0 | 95.7 | 97.2 | 97.8 | 98.5 |
| 1911 | 97.8 | 97.6 | 99.0 | 97.1 | 98.1 | 98.6 | 99.3 |
| 1912 | 98.9 | 98.7 | 95.5 | 98.4 | 99.0 | 99.3 | 99.7 |
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 108.1 | 100.9 | 100.9 | 111.0 | 107.7 | 104.5 | |
| 1921 | 109.5 | 102.0 | 101.4 | 112.6 | 109.0 | 105.5 | |
| 1922 | 107.4 | 102.6 | 102.1 | 114.5 | 110.1 | 106.2 | |
| 1923 | 111.9 | 103.2 | 103.1 | 116.4 | 110.9 | 106.7 | |
| 1924 | 113.0 | 103.9 | 104.0 | 118.2 | 111.5 | 107.1 | 105.2 |
| 1925 | 114.2 | 104.7 | 105.1 | 119.9 | 112.2 | 107.5 | 105.4 |
| 1926 | 115.1 | 105.4 | 106.2 | 121.6 | 112.9 | 107.9 | 105.9 |
| 1927 | 115.8 | 106.1 | 107.0 | 123.3 | 113.4 | 108.2 | 106.2 |
| 1928 | 116.6 | 106.7 | 107.9 | 125,0 | 113.8 | 108.5 | 106.7 |
| 1929 | 117.3 | 107.3 | 108.6 | 126.6 | 114.2 | 108.7 | 106.9 |
| 1930 | 118.1 | 107.8 | 109.5 | 128.3 | 114.7 | 109.1 | 107.3 |
| 1931 | 119.0 | 108.4 | 110.3 | 130.2 | 115.4 | 109.4 | 107.8 |
| 1932 | 120.1 | 108.9 | 111.0 | 132.2 | 116.1 | 109.9 | 108.4 |
| 1933 | 121.1 | 109.4 | 111.7 | 134.1 | 116.8 | 110.3 | 108.9 |
| 1934 | 122.2 | 110.0 | 112.4 | 135.8 | 117.4 | 110.7 | 109.2 |
| 1935 | 123.2 | 110.8 | 113.2 | 137.3 | 118.1 | 111.0 | 109.7 |
| 1936 | 124.1 | 111.6 | 113.9 | 138.6 | 118.6 | 111.4 | 110.2 |
| 1937 | 125.0 | 112.4 | 114.7 | 139.9 | 119.3 | 111.7 | 110.7 |
| 1938 | 125.9 | 113.4 | 115.6 | 141.3 | 120.0 | 112.0 | 111.2 |
| 1948 | 139.6 | 132.0 | 124.3 | 159.4 | 130.8 | 122.4 | 116.7 |
| 1949 | 141.0 | 134.5 | 125.4 | 161.9 | 132.1 | 123.8 | 117.3 |
| 1950 | 142.4 | 136.6 | 126,4 | 164.6 | 134.0 | 124.8 | 117.8 |
| 1951 | 143.5 | 138.1 | 127.3 | 167.0 | 134.8 | 125.8 | 118.4 |
| 1952 | 144.5 | 139.0 | 128.2 | 168.9 | 136.0 | 126.7 | 118.8 |
| 1953 | 145.7 | 140.4 | 129.2 | 170.7 | 137.3 | 127.6 | 119.1 |
| 1954 | 146.8 | 142.0 | 130.3 | 172.7 | 138.6 | 128.4 | 119.5 |
| 1955 | 147.9 | 143.3 | 131.5 | 174.8 | 140.0 | 129.1 | 119.9 |
| 1956 | 148.9 | 145.0 | 132.5 | 177.2 | 141.5 | 130.1 | 120.4 |
| 1957 | 150.0 | 147.1 | 133.2 | 179.3 | 142.9 | 131.0 | 120.9 |

(1) 1871. (2) 1882. (3) 1891.



TABLE III

POPULATION OF WORKING AGE (1913=100)

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 63.9 | 59.4 (1) | 76.0 | | | 74.0 | 62.6 |
| 1880 | 69.7 | 64.8 (2) | 82.0 | | | 82.6 | 69.3 |
| 1890 | 74.4 | 70.4 (3) | 86.1 | | | 82.9 | 76.4 |
| 1900 | 84.5 | 80.0 | 89.7 | 82.0 | 89.0 | 88.9 | 87.5 |
| 1901 | 85.8 | 81.4 | 90.0 | 83.3 | 90.2 | 89.7 | 88.8 |
| 1902 | 86.8 | 82.7 | 90.6 | 84.7 | 90.9 | 90.4 | 89.7 |
| 1903 | 87.9 | 83.9 | 91.2 | 86.0 | 91.5 | 90.9 | 90.6 |
| 1904 | 88.9 | 85.3 | 91.8 | 87.4 | 92.0 | 91.5 | 91.7 |
| 1905 | 89.9 | 86.5 | 92.5 | 88.7 | 92.5 | 92.3 | 92.6 |
| 1906 | 91.0 | 87.9 | 93.1 | 90.0 | 93.0 | 93.0 | 93.7 |
| 1907 | 92.1 | 89.1 | 93.8 | 91.3 | 93.4 | 93.8 | 94.6 |
| 1908 | 93.3 | 90.5 | 94.8 | 92.6 | 94.1 | 94.7 | 95.5 |
| 1909 | 94.6 | 91.7 | 95.7 | 93.5 | 95.0 | 95.7 | 96.5 |
| 1910 | 95.8 | 93.1 | 96.8 | 94.7 | 95.5 | 96.6 | 97.5 |
| 1911 | 97.1 | 95.4 | 97.8 | 96.4 | 97.0 | 97.8 | 98.5 |
| 1912 | 98.5 | 97.6 | 98.9 | 98.1 | 98.4 | 98.9 | 99.3 |
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 110.9 | 105.7 | 103.5 | 113.7 | 112.1 | 107.5 | |
| 1921 | 112.8 | 107.5 | 104.4 | 115.7 | 114.0 | 109.1 | |
| 1922 | 111.2 | 108.8 | 105.1 | 118.0 | 115.7 | 110.5 | |
| 1923 | 116.6 | 110.2 | 106.1 | 120.2 | 117.1 | 111.7 | |
| 1924 | 118.4 | 111.6 | 107.0 | 122.4 | 118.3 | 112.7 | 109.7 |
| 1925 | 120.4 | 113.2 | 108.1 | 124.5 | 119.7 | 113.8 | 110.3 |
| 1926 | 122.0 | 114.1 | 109.2 | 126.6 | 121.0 | 114.9 | 111.1 |
| 1927 | 123.4 | 115.1 | 110.0 | 128.7 | 122.1 | 115.9 | 111.8 |
| 1928 | 125.0 | 115.9 | 111.0 | 130.8 | 123.1 | 116.8 | 112.6 |
| 1929 | 126.4 | 116.8 | 111.7 | 132.8 | 124.2 | 117.7 | 113.2 |
| 1930 | 128.0 | 117.5 | 112.6 | 135.0 | 125.3 | 118.8 | 114.0 |
| 1931 | 129.7 | 118.3 | 113.4 | 137.4 | 126.4 | 119.9 | 114.8 |
| 1932 | 131.6 | 119.1 | 114.1 | 139.9 | 127.4 | 121.2 | 115.7 |
| 1933 | 133.5 | 119.8 | 114.8 | 142.4 | 128.5 | 122.4 | 116.5 |
| 1934 | 135.4 | 120.1 | 115.5 | 144.7 | 129.4 | 123.6 | 117.1 |
| 1935 | 137.3 | 120,6 | 116.3 | 146.7 | 130.4 | 124.7 | 117.9 |
| 1936 | 138.3 | 121.2 | 117.0 | 148.5 | 131.3 | 126.0 | 118.7 |
| 1937 | 139.3 | 121.7 | 118.4 | 150.4 | 132.3 | 127.1 | 119.5 |
| 1938 | 140.2 | 122.4 | 119.8 | 152.4 | 133.4 | 128.2 | 120.3 |
| 1948 | 148.3 | 139.7 | 134.5 | 168.3 | 148.5 | 135.5 | 122.5 |
| 1949 | 148.7 | 142.7 | 136.3 | 170.4 | 150.3 | 136.3 | 122.7 |
| 1950 | 149.1 | 145.3 | 137.5 | 172.7 | 152.8 | 136.6 | 122.7 |
| 1951 | 149.7 | 147.3 | 138.4 | 174.5 | 153.1 | 137.0 | 122.9 |
| 1952 | 150.3 | 148.7 | 139.7 | 175.5 | 153.6 | 137.6 | 123.0 |
| 1953 | 150.9 | 150.8 | 141.1 | 176.6 | 154.1 | 137.9 | 123.0 |
| 1954 | 151.8 | 153.2 | 142.5 | 178.1 | 154.7 | 138.4 | 123.0 |
| 1955 | 152.5 | 155.9 | 143.8 | 179.9 | 155.6 | 139.1 | 123.2 |
| 1956 | 153.0 | 158.7 | 146.3 | 181.7 | 155.6 | 139.8 | 123.2 |
| 1957 | 153.9 | 161.0 | 147.3 | 183.6 | 155.8 | 140.7 | 123.4 |

(1) 1871. (2) 1882. (3) 1891.

TABLE IV

LABOUR FORCE (1) (1913=100)

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 103.0 | 106.1 | 102.4 | 113.0 | 110.8 | 116.1 | 104.8 |
| 1921 | 103.6 | 108.0 | 103.1 | 114.8 | 112.5 | 117.3 | 105.5 |
| 1922 | 102.4 | 109.4 | 103.0 | 116.9 | 113.9 | 118.4 | 106.1 |
| 1923 | 107.6 | 110.8 | 103.1 | 118.9 | 115.0 | 119.2 | 106.8 |
| 1924 | 109.5 | 112.3 | 103.2 | 120.8 | 115.9 | 119.7 | 107.5 |
| 1925 | 111.6 | 114.0 | 103.4 | 122.7 | 117.0 | 120.4 | 108.1 |
| 1926 | 113.3 | 114.2 | 103.6 | 124.6 | 118.0 | 121.1 | 108.9 |
| 1927 | 114.8 | 114.5 | 103.5 | 126.4 | 118.8 | 121.6 | 109.6 |
| 1928 | 116.6 | 114.6 | 103.6 | 128.3 | 119.5 | 122.1 | 110.4 |
| 1929 | 118.1 | 114.8 | 103.4 | 130.0 | 120.3 | 122.5 | 111.0 |
| 1930 | 119.9 | 114.8 | 103.4 | 132.0 | 121.0 | 123.1 | 111.8 |
| 1931 | 122.8 | 114.9 | 103.2 | 134.3 | 122.0 | 123.5 | 112.6 |
| 1932 | 126.0 | 114.9 | 103.5 | 136.7 | 122.8 | 124.1 | 113.6 |
| 1933 | 129.3 | 114.9 | 103.8 | 139.1 | 123.8 | 124.6 | 114.4 |
| 1934 | 132.5 | 116.0 | 104.2 | 141.3 | 124.5 | 125.0 | 115.1 |
| 1935 | 135.8 | 117.4 | 104.6 | 143.3 | 125.4 | 125.3 | 115.9 |
| 1936 | 138.3 | 118.8 | 104.9 | 145.0 | 126.1 | 125.9 | 116.8 |
| 1937 | 140.8 | 120.2 | 105.4 | 146.8 | 127.0 | 126.2 | 117.7 |
| 1938 | 143.1 | 121.8 | 105.9 | 148.7 | 127.9 | 126.5 | 118.5 |
| 1948 | 151.6 | 130.9 | 110.7 | 162.1 | 141.1 | 131.1 | |
| 1949 | 151.6 | 132.7 | 111.4 | 162.4 | 142.7 | 131.7 | 119.6 |
| 1950 | 151.7 | 134.1 | 111.5 | 162.9 | 144.9 | 132.3 | 120.6 |
| 1951 | 152.3 | 136.9 | 111.4 | 165.0 | 146.1 | 132.7 | 122.0 |
| 1952 | 152.9 | 138.8 | 111.7 | 167.0 | 145.3 | 133.1 | 122.3 |
| 1953 | 153.4 | 141.6 | 112.0 | 169.3 | 145.6 | 133.5 | 122.7 |
| 1954 | 154.0 | 145.8 | 112.3 | 170.9 | 146.2 | 133.9 | 124.2 |
| 1955 | 154.6 | 148.9 | 116.0 | 172.8 | 147.4 | 134.3 | 125.6 |
| 1956 | 155.1 | 153.1 | 116.7 | 175.0 | 148.4 | 135.0 | 126,5 |
| 1957 | 156.0 | 156.2 | 119.1 | 177.1 | 149.2 | 135.9 | 126.9 |

(1) For the years before 1913 labour force is assumed to move in the same way as population of working age.



TABLE V

UNEMPLOYMENT AS A PERCENTAGE OF THE LABOUR FORCE

| | Denmark | Germany (F.R.) | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|
| 1900 | | | | | | 1.9 |
| 1901 | | | | | | 2.4 |
| 1902 | | | | | | 3.0 |
| 1903 | 6.6 | 2.3 | | | | 3.5 |
| 1904 | 6.1 | 1.8 | | 2.0 | | 4.4 |
| 1905 | 6.6 | 1.5 | | 2.2 | | 3.7 |
| 1906 | 3.1 | 1.3 | | 1.6 | | 2.7 |
| 1907 | 3.6 | 1.4 | | 1.3 | | 2.7 |
| 1908 | 5.6 | 2.2 | | 1.9 | | 5.8 |
| 1909 | 6.6 | 2.1 | | 2.5 | | 5.7 |
| 1910 | 5.5 | 1.7 | | 1.5 | | 3.5 |
| 1911 | 4.9 | 1.5 | 1.4 | 1.0 | 2.7 | 2.2 |
| 1912 | 3.9 | 1.6 | 2.2 | 0.7 | 2.6 | 2.4 |
| 1913 | 3.8 | 2.1 | 2.8 | 0.9 | 2.2 | 1.6 |
| 1920 | 3.1 | 1.9 | 3.2 | 1.2 | 2.6 | 2.4 |
| 1921 | 10.1 | 1.4 | 5.0 | 8.9 | 13.0 | 12.6 |
| 1922 | 9.9 | 0.7 | 6.1 | 8.6 | 11.2 | 10.6 |
| 1923 | 6.5 | 5.0 | 6.2 | 5.4 | 6.1 | 8.7 |
| 1924 | 5.5 | 6.4 | 4.9 | 4.3 | 4.9 | 7.6 |
| 1925 | 7.5 | 3.3 | 4.5 | 6.7 | 5.4 | 8.4 |
| 1926 | 10.6 | 8.8 | 4.0 | 12.2 | 6.0 | 9.3 |
| 1927 | 11.5 | 4.6 | 4.1 | 12.8 | 5.9 | 7.2 |
| 1928 | 9.5 | 4.6 | 3.1 | 9.7 | 5.2 | 8.0 |
| 1929 | 7.9 | 6.5 | 3.3 | 7.8 | 5.0 | 7.7 |
| 1930 | 7.0 | 10.7 | 4.3 | 8.4 | 5.8 | 11.9 |
| 1931 | 9.1 | 16.3 | 8.2 | 11.2 | 8.2 | 15.8 |
| 1932 | 16.2 | 21.1 | 14.0 | 15.5 | 11.0 | 16.4 |
| 1933 | 14.7 | 18.4 | 14.9 | 16.8 | 11.4 | 14.7 |
| 1934 | 11.3 | 10.4 | 15.6 | 15.5 | 8.8 | 12.4 |
| 1935 | 10.1 | 8.1 | 17.5 | 12.8 | 7.4 | 11.5 |
| 1936 | 9.9 | 5.8 | 18.1 | 9.5 | 6.2 | 9.7 |
| 1937 | 11.2 | 3.2 | 14.9 | 10.1 | 5.3 | 8.0 |
| 1938 | 11.0 | 1.5 | 13.8 | 11.1 | 5.3 | 9.5 |
| 1950 | 4.4 | 7.6 | 1.6 | 0.6 | 1.1 | 1.5 |
| 1951 | 5.0 | 6.7 | 1.8 | 0.8 | 0.9 | 1.2 |
| 1952 | 6.4 | 6.3 | 2.8 | 0.9 | 1.1 | 2.0 |
| 1953 | 4.7 | 5.6 | 2.1 | 1.1 | 1.4 | 1.7 |
| 1954 | 4.1 | 5.2 | 1.5 | 0.9 | 1.3 | 1.4 |
| 1955 | 5.0 | 3.8 | 1.0 | 0.9 | 1.2 | 1.1 |
| 1956 | 5.7 | 3.0 | 0.7 | 1.0 | 1.1 | 1.2 |
| 1957 | 5.2 | 2.5 | 1.0 | 1.0 | 1.3 | 1.5 |

TABLE VI

ANNUAL HOURS WORKED PER HEAD (1913=100)

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 122.7 | 122.7 | 122.7 | | | 122.7 | 122.7 |
| 1900 | | | | 106.8 | 106.8 | | |
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1929 | 87.5 | 85.2 | 87.9 | 86.9 | 86.5 | 87.0 | 86.5 |
| 1938 | 86.6 | 89.2 | 76.0 | 86.1 | 81.4 | 84.1 | 85.2 |
| 1950 | 83.7 | 88.0 | 80.3 | 88.2 | 80.0 | 81.9 | 83.5 |
| 1951 | 83.5 | 86.8 | 81.3 | 87.5 | 79.7 | 81.6 | 83.4 |
| 1952 | 83.5 | 86.9 | 81.2 | 87.7 | 79.1 | 81.3 | 83.5 |
| 1953 | 83.3 | 87.5 | 81.5 | 88.0 | 80.4 | 81.8 | 83.8 |
| 1954 | 83.2 | 88.8 | 81.6 | 88.0 | 78.9 | 81.1 | 84.6 |
| 1955 | 83.0 | 89.1 | 81.5 | 88.3 | 79.2 | 81.1 | 84.6 |
| 1956 | 82.9 | 87.5 | 80.4 | 88.1 | 79.0 | 80.8 | 83.9 |
| 1957 | 82.8 | 84.7 | 80.5 | 87.4 | 78.4 | 80.5 | 83.4 |

TABLE VII

G.N.P. PER MAN HOUR (1913=100)

| | Denmark | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|
| 1870 | 34.1 | 37.6 | 58.7 | | | 30.1 | 48.7 |
| 1900 | | | | 85.6 | 75.3 | | |
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1929 | 141.4 | 115.6 | 146.2 | 150.2 | 160.2 | 124.3 | 137.1 |
| 1938 | 148.2 | 123.7 | 191.1 | 149.9 | 217.0 | 150.0 | 161.8 |
| 1950 | 175.0 | 122.3 | 181.1 | 149.9 | 228.7 | 212.1 | 169.7 |
| 1951 | 177.1 | 134.3 | 192.7 | 152.9 | 237.3 | 208.9 | 171.5 |
| 1952 | 180.2 | 140.9 | 197.9 | 155.5 | 254.2 | 214.9 | 170.8 |
| 1953 | 187.6 | 146.7 | 211.7 | 165.0 | 255.3 | 221.1 | 176.5 |
| 1954 | 190.7 | 149.5 | 221.6 | 175.4 | 271.1 | 235.9 | 180.5 |
| 1955 | 191.2 | 160.7 | 229.3 | 182.4 | 273.2 | 243.4 | 183.6 |
| 1956 | 196.1 | 168.0 | 240.7 | 187.4 | 283.3 | 250.8 | 189.0 |
| 1957 | 204.7 | 177.7 | 249.1 | 191.7 | 292.4 | 259.7 | 192.2 |



TABLE VIII

SHARE OF GROSS DOMESTIC INVESTMENT IN G.N.P. AT CURRENT PRICES

*(percentage of G.N.P.)*

| | Denmark (1) | Germany (F.R.) | Italy | Netherlands | Norway | Sweden | United Kingdom | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Domestic | Foreign |
| 1870–79 | 13.5 | | 8.6 | | | 5.5 | 10.1 | 2.9 |
| 1880–89 | 11.7 | | 11.7 | | | 6.5 | 8.9 | 3.9 |
| 1890–99 | 14.1 | | 7.5 | | | 8.2 | 8.8 | 2.8 |
| 1900 | 15.4 | | 13.3 | | 12.3 | 11.2 | 12.9 | 1.7 |
| 1901 | 14.2 | | 16.1 | | 11.8 | 10.5 | 10.6 | 1.0 |
| 1902 | 15.6 | | 11.8 | | 11.5 | 10.6 | 11.4 | 0.8 |
| 1903 | 15.4 | | 12.7 | | 10.7 | 11.1 | 9.7 | 1.2 |
| 1904 | 15.1 | | 12.7 | | 11.6 | 12.1 | 10.6 | 1.2 |
| 1905 | 14.4 | | 12.4 | | 11.0 | 10.9 | 10.9 | 3.4 |
| 1906 | 16.9 | | 13.2 | | 12.2 | 10.8 | 10.8 | 4.9 |
| 1907 | 16.8 | | 20.3 | | 13.4 | 12.7 | 8.9 | 6.5 |
| 1908 | 15.0 | | 16.9 | | 13.3 | 11.3 | 3.7 | 6.0 |
| 1909 | 14.0 | | 19.9 | | 12.3 | 10.4 | 6.7 | 5.3 |
| 1910 | 13.4 | | 14.3 | | 13.0 | 11.2 | 7.0 | 6.6 |
| 1911 | 13.5 | | 17.5 | | 14.9 | 10.9 | 7.0 | 8.0 |
| 1912 | 13.8 | | 17.1 | | 15.4 | 10.4 | 8.0 | 8.1 |
| 1913 | 14.1 | | 17.6 | | 14.8 | 11.4 | 8.1 | 8.5 |
| 1920 | 9.1 | | 14.2 | | 23.4 | 13.6 | | |
| 1921 | 10.4 | | 9.7 | | 16.9 | 11.1 | | |
| 1922 | 10.7 | | 13.4 | | 14.1 | 9.2 | | |
| 1923 | 10.9 | | 17.1 | | 14.0 | 11.4 | | |
| 1924 | 11.4 | | 19.2 | | 13.1 | 11.8 | 9.2 | 1.7 |
| 1925 | 10.9 | 19.8 | 20.7 | | 13.4 | 11.4 | 9.5 | 1.1 |
| 1926 | 10.5 | 12.7 | 18,2 | | 12.4 | 11.8 | 8.8 | −0.3 |
| 1927 | 10.2 | 22.6 | 15.0 | | 11.7 | 11.6 | 12.0 | 1.9 |
| 1928 | 10.4 | 19.9 | 20.3 | | 13.6 | 12.4 | 9.5 | 2.8 |
| 1929 | 11.8 | 13,9 | 19.0 | | 14.1 | 12.7 | 9.7 | 2.3 |
| 1930 | 14.9 | 8.5 | 14.9 | | 17.3 | 13.4 | 7.8 | 0.7 |
| 1931 | 14.7 | 2.0 | 14.0 | | 13.7 | 14.3 | 7.0 | −2.7 |
| 1932 | 11.7 | 4.6 | 14.3 | | 12.2 | 12.1 | 8.0 | −1.3 |
| 1933 | 13.0 | 10.9 | 13.5 | | 12.2 | 11.0 | 10.3 | — |
| 1934 | 14.1 | 15.6 | 14.3 | | 13.9 | 13.8 | 10.7 | −0.2 |
| 1935 | 14.1 | | 19.2 | | 15.8 | 16.2 | 11.9 | 0.7 |
| 1936 | 13.5 | 18.7 | 16.6 | | 16.5 | 16.5 | 13.3 | −0.4 |
| 1937 | 13.7 | | 19.6 | | 18.9 | 18.7 | 13.8 | −1.1 |
| 1938 | 12.0 | | 17.3 | 11.2 | 18.9 | 18.9 | 11.3 | −1.1 |
| 1948 | 14.6 | | 18.2 | 25.9 | 30.7 | 18.8 | 13.1 | 0.4 |
| 1949 | 16.4 | | 18.3 | 21.9 | 31.9 | 17.5 | 12.7 | 0.9 |
| 1950 | 16.7 | 22.8 | 19.0 | 26.3 | 28.1 | 17.8 | 11.2 | 2.4 |
| 1951 | 17.4 | 24.6 | 20.7 | 24.3 | 28.3 | 21.2 | 16.8 | −2.5 |
| 1952 | 18.2 | 22.8 | 19.6 | 17.2 | 29.0 | 21.4 | 13.5 | 1.1 |
| 1953 | 18.2 | 21.4 | 19.5 | 20.0 | 29.2 | 19.0 | 14.6 | 0.7 |
| 1954 | 18.7 | 22.0 | 20.0 | 24.8 | 30.6 | 20.8 | 14.4 | 1.3 |
| 1955 | 17.1 | 25.7 | 21.6 | 23.3 | 30.2 | 22.0 | 16.2 | −0.2 |
| 1956 | 16.8 | 24.2 | 21.5 | 26.2 | 29.8 | 21.2 | 16.2 | 1.5 |
| 1957 | 17.0 | 24.0 | 22.1 | 27.7 | 29.2 | 22.0 | 17.3 | 1.4 |

(1) Excluding inventories.

GROSS NATIONAL PRODUCT

In fact, the figures do not always refer to G.N.P. but sometimes to Gross Domestic Product or to National Income. We have adjusted the series to make them as comparable as possible to the O.E.E.C. standardised system (1).

*Denmark*

Gross Domestic Product at factor cost: 1870-1938 figures from Kjeld Bjerke, "The National Product of Denmark 1870-1952", *Income and Wealth, Series V*. The link between Bjerke's figures for 1913 and 1920 has been made so as to eliminate the effect of the inclusion of North Schleswig, *i.e.* it was adjusted by the population ratio. 1938-57 figures from O.E.E.C. *General Statistical Bulletins*, July 1958 and January 1959.

*Germany*

Net National Product at factor cost for the years 1871-1938, from 1938 onwards gross national product at factor cost. The figures have been adjusted to eliminate the effect of changes in national territory, but the basic data for 1871, 1882 and 1891-1913 refer to pre-world-war I territory, linked to data for 1913, 1925-35 for post-world-war I territory (excluding Saar) linked to data for 1935-38 including the Saar linked to data from 1938 onwards for the Federal Republic, excluding Berlin.

Figures for 1871 and 1882 from Paul Jostock, "The Long-Term Growth of National Income in Germany", *Income and Wealth, Series V*, p. 102. Figures for 1891-1938 from Ferdinand Grünig "Die Anfänge der Volkswirtschaftlichen Gesamtrechnung in Deutschland", *Beiträge zur empirischen Konjunkturforschung*, p. 73, Duncker & Humblot, Berlin 1951. Figures for 1938 onwards from O.E.E.C. *General Statistical Bulletins*, July 1958 and January 1959.

*Italy*

Gross National Product at market prices.

1870-1956 figures from *Annali di Statistica*, Serie VIII, Vol. 9, Rome 1957, Istituto Centrale di Statistica. The original estimates have been increased to include those government goods and services which are treated in the Italian study as intermediate, in order to conform with the O.E.E.C. standardised system. The figures are adjusted to refer to the present Italian boundaries. 1957 figures from O.E.E.C. *Op. cit.*

(1) *A Standardised System of National Accounts*, O.E.E.C., Paris, January 1959.



*Netherlands*

1900-1948 Net National Product at factor cost. 1948-1957 G.N.P. at market prices.

Figures for 1900-1938 from *Het Nationale Inkomen van Nederland 1921-39*, Centraal Bureau Voor de Statistiek (Utrecht 1948), and *Jaarcijfers voor Nederland 1947-1950*, Utrecht 1951, p. 215, for link 1938-1948. Figures for 1948 onwards from O.E.E.C. *Op. cit.* refer to G.N.P. at market prices, figures for national product at factor cost not being available.

*Norway*

Gross National Product at market prices.

Figures for 1900-1938 from *National Accounts, 1900-29*, No. XI, 143, Central Bureau of Statistics, Oslo 1953. The original estimates have been adjusted to eliminate repair and maintenance expenditures. The adjustment was a 30 per cent reduction of the original figures for gross investment. Figures for 1938 onwards from O.E.E.C., *Op. cit.*

*Sweden*

Gross Domestic Product at market prices.

Figures for 1870, 1880, 1890, 1900, 1910, 1923, 1929 and 1939 at constant prices are given in *Sveriges National Produkt 1861-1951*, p. 43, Konjunkturinstitutet, Stockholm 1956. The Swedish figures include repair and maintenance, and we have eliminated this by reducing the constant price figures by the ratio of repair and maintenance to gross domestic product in current prices. Table 1, *Op. cit.* shows G.D.P. and gross capital formation in current prices, and repair and maintenance is assumed to be 30 per cent of the original figures for gross investment. For the years between these benchmarks, we used the movements shown by Svennilson's series for Swedish national income cited in *Growth and Stagnation in the European Economy*, E.C.E., Geneva, 1954, p. 233, which are also from the Konjunkturinstitutet. 1938-1957 figures from O.E.E.C. *Op. cit.*

*U.K.*

Gross National Product at market prices.

Figures for 1870-1938, James B. Jefferys and Dorothy Walters. "National Income and Expenditure of the U.K., 1870-1952", *Income & Wealth, Series V*. The link between 1913 and 1924 was made after an upward adjustment of 7·3 per cent to allow for exclusion of Southern Ireland after 1920. Investment

was deflated by the capital goods price index of Table XVI, *Op. cit.* pp. 39 and 40, and the rest of G.N.P. by the Consumer Goods and Services price index *Op. cit.* pp. 39 and 40. Figures for 1938-1957 from O.E.E.C. *Op. cit.*

### Population

Mid-year estimates.

*Denmark*

K. Bjerke *Op. cit.* 1870-1951. Corrected to exclude the effect of the incorporation of North Schleswig in 1920 which added 5.8 per cent to population. 1952-1957 figures from O.E.E.C. *General Statistical Bulletins.*

*Germany*

1870-1913 *Statistisches Jahrbuch für die Bundesrepublik Deutschland,* 1956, p. 30. 1913-1938 Svennilson *Op. cit.*, p. 236. 1938-57 figures from O.E.E.C. *Op. cit.*

*Italy*

1870-1956 *Annali di Statistica, Op. cit.* Table 37, pp. 251-252. Figures refer to resident population in present boundaries. 1957 figures O.E.E.C. *Op. cit.*

*Netherlands*

1900-1938 Svennilson *Op. cit.* p. 236. 1938-1957 O.E.E.C. *Op. cit.*

*Norway*

1900-1938 Svennilson *Op. cit.* p. 236. 1938-1957 O.E.E.C. *Op. cit.*

*Sweden*

1870, *Le Vieillissement des Populations et ses Conséquences Economiques et Sociales*, U.N. 1956. 1880-1938 Svennilson, *Op. cit.* p. 236. 1938-57 O.E.E.C. *Op. cit.*

*U.K.*

*82nd Statistical Abstract for the U.K. 1938*, pp. 4 and 5, gives decennial (April) figures for the census years and for mid-years for 1913 and 1924-1937. Our index for 1870-1913 is based on interpolation of the census figures adjusted to a mid-year basis. The link between 1913 and 1924 is made after excluding the effect of the loss of Southern Ireland. 1938-1957 derived from the *1958 Annual Abstract of Statistics.*



### Population of Working Age (*i.e.* aged 15-64)

Mid-year estimates.

For all countries, except the U.K., the basic source was *Le Vieillissement des Populations et ses Conséquences Economiques et Sociales*, United Nations, New York, 1956, which gives percentages of the population aged 15-64 for Census years. For inter-censal years, these percentages were interpolated. The percentages were then applied to our figures for total population. The publication cited does not give figures for the U.K. but only for Great Britain. We therefore derived the percentages for the U.K. for census years as given in the *82nd Statistical Abstract*, and the *1958 Annual Abstract*, interpolated the inter-censal percentages, and applied these to our population figures. For years later than the last census, *i.e.* from 1950, for most countries the ratios of the population aged 15-64 to total population were derived from the O.E.E.C. *Op. cit.*, and applied to our population figures.

### Labour Force

Labour force activity rates (ratio of occupied population of all ages to population aged 15-64) derived from the census were applied to our estimates of the population of working age. For non-census years the activity rates were interpolated and applied to the figures for population of working age. For most countries O.E.E.C. estimates of the labour force are available from 1950 onwards, and these have been linked to the last available census figures. In some cases, however, the O.E.E.C. labour force activity rates do not coincide with the activity rates shown by the census, and we have therefore taken the O.E.E.C. figures only as an indication of *movements* in the activity rates since 1950 in most cases, and not as an indication of the activity rate itself. The activity rates derived from the censuses are given below after the year to which they refer.

*Denmark*

Activity rates derived from *International Statistical Yearbook, 1927*, League of Nations, for 1911 74.7%, 1921 67.3%, from I.L.O. *Yearbook 1938* for 1930 68.6%, from I.L.O. *Yearbook 1945-46* for 1940 76.3%, from I.L.O. *Yearbook 1957* for 1950 74.5%. Movement from 1950 to 1955 from O.E.E.C. *8th Annual Report*, Vol. II, p. 18, extrapolated to 1957.

These figures differ substantially from the adjusted estimates given by Bjerke *Op. cit.*, p. 151, which imply much higher but steadier activity rates, 1911 82.6%, 1921 81.1%, 1930 81.4%, 1940 80.9%, 1950 77.2%.

*Germany*

Activity rates derived from *Statistisches Handbuch von Deutschland 1928-1944*, p. 31 1949, München, 1907 74.5%, 1925 75.2%, 1933 71.7%, 1939 74.8%, from *Statistisches Jahrbuch für Bundesrepublik Deutschland, 1956*, p. 111, for 1950 68.9%. From 1950 onwards, the estimates of the O.E.E.C. *General Statistical Bulletins* were linked to the census figures. The adjusted rates derivable from Long *Op. cit.* are steadier, 1907 71.9%, 1925 72.3%, 1933 71.2%, 1939 72.7%.

*Italy*

Activity rates derived from *Annuario Statistico Italiano*, 1955, p. 377, for 1901 82.0%, 1911 79.7%, 1921 78.0%, 1931 71.9%, 1936 70.8%, 1951 63.6%. Movement from 1950 to 1955 from O.E.E.C. *8th Annual Report*, Vol. II, p. 18, 1956 and 1957 O.E.E.C. *General Statistical Bulletins*.

*Netherlands*

Activity rates derived from *International Statistical Yearbook 1927*, League of Nations, for 1909 65.2%, and 1920 64.5%, from *Statistical Yearbook of the Netherlands 1953-54*, for 1930 63.4%, and 1947 63.2%, for 1950 onwards the figures in O.E.E.C. *Op. cit.* were linked to the census figures.

*Norway*

Activity rates derived from *Statistisk Arbok 1957*, p. 20, for 1900 69.1%, 1920, 66.9%, 1930 65.4%, 1950 64.2%. From 1950 onwards the movements shown in the O.E.E.C. *General Statistical Bulletins* were used, although the 1950 figure in this latter source shows an activity rate of 67.1% for 1950 compared with the lower census figure of 64.2%.

*Sweden*

Activity rates derived from *International Statistical Yearbook, 1927*, League of Nations, for 1910 66.5%, 1920 74.4%, from I.L.O. *Yearbook 1938* for 1930 71.4%, from *Statistisk Arsbok 1957*, p. 29, for 1940, 67.1%, and 1950 66.5%. Movement from 1950 to 1955 O.E.E.C. *8th Annual Report*, Vol. II, p. 18, extrapolated to 1957.

*U.K.*

Activity rates derived from *82nd Statistical Abstract for the U.K.*, p. XV, for 1881 72.8%, 1891 73.1%, 1901 70.3%, 1911 70.3%, 1921 68.5%, 1931 68.6%, from the *Statistical Abstract for 1958* for 1951 69.4%. Movements



from 1949 to 1957 derived from annual estimates for the labour force, *Op. cit.* pp. 106-7, although these figures show a slightly higher proportion of the population in the labour force in 1951 than does the census.

### Unemployment as a Percentage of the Labour Force

The estimates have been derived from the Yearbooks of the I.L.O. for 1937, 1938, 1945/46, 1957 and 1958. The I.L.O. figures generally only cover a part of the labour force, and are presented both in absolute figures and as a percentage of the sample from which they are drawn. We have therefore subjected the I.L.O. figures to two adjustments: (a) the percentage rate of unemployment has been scaled down in those cases where the sample is drawn from a group, *i.e.* trade unionists, whose propensity to unemployment is likely to be higher than average for all employed persons. In all cases, the estimates were multiplied by .7 to effect this adjustment, for this was the ratio between the rate of unemployment as shown in unemployment insurance statistics and the rate shown by trade union unemployment statistics for Germany — where the two different sets of figures are available and can be compared for a fairly long run of years; for the U.K. where a similar comparison is possible there does not seem to be much difference between the rate shown by trade union and insurance statistics but we have assumed that the U.K. situation was less typical than the German; (b) the figures were then subjected to a second adjustment to allow for the fact that a certain proportion of the labour force is unlikely to be subject to unemployment at all, *i.e.* employers, independent proprietors and family workers. The unemployment rates are therefore scaled down by the ratio of the number of wage and salary earners to the total labour force as given in the census (figures are given in I.L.O. Yearbooks). In the case of the post-war figures for Germany and the U.K., the sample covered by the unemployment data is greater than the number of wage and salary earners, so that the unemployment figure is adjusted by the ratio of the sample to the total labour force.

A valuable source of information for trade union unemployment statistics is to be found in "International Comparison of Unemployment Rates", by W. Galenson and A. Zellner, published in *The Measurement and Behaviour of Unemployment*, N.B.E.R., 1957, which also contains a useful analysis of the value of these statistics. For the years before 1927, we used this source for all countries. For the following years, the I.L.O. figures are available, and in the country source notes below, the figures in brackets refer to the type of I.L.O. statistics which we have used. For Italy we have not thought it worthwhile to estimate unemployment as the pre-war figures are of more dubious value than those for other countries.

*Denmark*

1903-1957 Trade Union Statistics (III) multiplied by .7 for adjustment (a), and by .73 for adjustment (b); total adjustment factor .511.

*Germany*

1903-1926 Trade Union Statistics multiplied by .7 for adjustment (a), and by .7 for adjustment (b); total adjustment factor .49. 1927-1938 unemployment insurance statistics (V), adjustment (b) .7, 1948 onwards unemployment insurance statistics (V) adjustment (b) modified, *i.e.* ratio of sample to total .744.

*Netherlands*

1911-1938 Trade Union Statistics (II) of percentage of days lost per month by unemployment, multiplied by .7 for adjustment (a) and by .79 for adjustment (b); total adjustment factor .553. 1948 onwards unemployment insurance statistics (VB) adjustment (b) .79.

*Norway*

1904-1938 Trade union statistics (III) multiplied by .7 for adjustment (a) and by .72 for adjustment (b); total adjustment factor .504. 1948 onwards unemployment insurance statistics (VB) adjustment (b) .72.

*Sweden*

1911-1955 Trade union statistics (IV) multiplied by .7 for adjustment (a) and by .7 for adjustment (b); total adjustment factor .49. 1956 onwards unemployment insurance statistics (V) adjustment (b) .70.

*United Kingdom*

1900-1913 Trade union statistics multiplied by .74 for adjustment (b); 1920-38 Unemployment insurance statistics adjustment (b) .74. 1948 onwards unemployment insurance statistics (VB), adjustment (b) modified, *i.e.* ratio of sample to total .933.

## Annual Hours Worked Per Head

Figures on annual hours worked per head are the product of separate estimates of changes in weekly working hours, and of holidays.

*Weekly Working Hours*

For early years the available figures on working hours are mostly based on guesses by writers on social conditions, or on small samples made by



such writers. A number of these writers are cited by Colin Clark in *Conditions of Economic Progress*, e.g. on p. 135 he cites a figure of 66 hours per week for Germany in 1885 from Jeans *England's Supremacy*, on p. 159 a figure of 76 hours per week for Italy in 1885 from the same source, on p. 146 a figure of 55 hours per week for the U.K. in 1886 from Giffen, who thought hours had been 66 hours per week fifty years earlier. Because of the uncertainty surrounding these figures, we have assumed that the movement in working hours from 1870 to 1913 was the same in all our countries. This is probably a reasonable assumption, for in the period for which our information is better, *i.e.* from 1929 to 1957, the long-run movements in our countries have been rather similar. For 1870 we have assumed that working hours were 66 per week, and for 1913, 53.8 per week. The latter figure is derived from the extensive *Hours & Earnings Inquiry* (published 1909-1913) carried out by the Board of Trade in the U.K. The figure refers to weekly hours in manufacturing (exclusive of mealtimes and overtime) in September 1906. For the Netherlands and Norway, the figure for 1900 is simply an interpolation of the 1870-1913 movement.

*Denmark*

1913 onwards Bjerke. *Op. cit.*, page 128.

*Germany*

1929 (including building) and 1938 (excluding building) figures from I.L.O. Yearbook 1945-46. 1950 onwards *Wirtschaft und Statistik, Wochenbericht*, includes building and mining.

*Italy*

1929 and 1938 I.L.O. Yearbook 1945-46, p. 86, mid-point of range cited. Excludes building. 1950 onwards I.L.O. Yearbook 1958, figures for daily hours multiplied by 5.5.

*Netherlands*

For 1929 no figures were available so the average hours for countries with data were used. 1938 and 1950 onwards I.L.O. Yearbook 1958. However, the post-war figures are for adult males and they have been reduced in the ratio of adult male to total working hours which prevailed in 1938.

*Norway*

1929 as for Netherlands. 1938 and 1955 from I.L.O. Yearbook 1958, movement from 1955-57 as for U.K.

*Sweden*

Average of Denmark and Norway.

*U.K.*

1913 figure as cited above. 1929 is an average of the figure for 1924 (October) and 1935 (October) from Board of Trade inquiries. 1938 I.L.O. *Yearbook*. 1950 onwards October figures for manufacturing from *Ministry of Labour Gazette*, September 1958.

*Holidays*

There is very little historical information available on holidays except for the U.K. In 1906 the average number of holidays in British manufacturing was 11.2 days, including public holidays (cf. Board of Trade inquiry cited above); in 1948 it was about 15 days and in 1957 about 18 days. For recent years, *Etudes et Conjoncture*, I.N.S.E.E., Paris, 8th August 1957, page 863, provides a guide to the situation in most European countries which was as follows for 1957: Denmark 28 days (annual vacation 18, public holidays 10), Germany 22 days (12 plus 10), Italy 28 days (12 plus 16), Netherlands 18 days (12 plus 6), Norway 28 days (18 plus 10), Sweden 29 days (18 plus 11), U.K. 18 days (12 plus 6). It has been assumed that in 1913 workers had one week's vacation plus the same number of public holidays as in 1957. This fits in well with what we know of the U.K. It was assumed that a quarter of the increase in annual vacations was obtained from 1913 to 1929, another quarter from 1929 to 1938, no change from 1938 to 1950, and another half of the increase from 1950 to 1957.

## G.N.P. per Man Hour

This table is derived from our other tables. G.N.P. is divided by total labour input. Total labour input is employment (labour force adjusted for unemployment) multiplied by the index of annual hours worked per head. In the case of Italy, no adjustment was made for unemployment — because of lack of comparable data over time. For the years 1870-1913 we have assumed that unemployment was stable at the 1913 level; unemployment figures were not available for the nineteenth century for any country except the U.K. In fact, 1913 was a year of low unemployment by pre-1913 standards, and 1870 unemployment was probably higher in most cases, but it is unlikely to have been different enough to affect our productivity estimates significantly (in the U.K. 1870 unemployment was 2.7 per cent compared with a 1913 figure of 1.6 per cent). Table 6 in the text is derived from the Table VII. Table 7 in the text is derived in the same way as Table 6 except that we used the



index of population of working age instead of labour force — which is equivalent to assuming that the labour force activity rate has been constant over time. It was felt useful to present this alternative estimate as the changes in the labour force shown by successive censuses are dubious in some cases, *i.e.* Italy where the census records a rapid fall in the labour force over time which may, in turn, tend to overstate the productivity increase as shown by Table 6 of the text. In Denmark the activity rate for 1929 is probably too low and the rise in productivity from 1913 to 1929 is probably overstated in terms of Table 6 of the text. In Sweden the activity rate for 1929 is probably too high and the rise of productivity from 1913 to 1929 is probably understated in terms of Table 6 of the text.

## Share of Gross Investment in G.N.P. at Current Prices

*Denmark*

1870-1938. Bjerke *Op. cit.* Gross domestic investment excluding inventories as a percentage of Gross Domestic Product at factor cost. Bjerke does not specify whether his estimates include inventories, but Kuznets states that they do not, when he cites Bjerke's article in *Capital Formation and Economic Growth*, N.B.E.R. 1955, p. 64. 1938 onwards from O.E.E.C. *General Statistical Bulletins*, January 1959. Gross Domestic Capital Formation excluding inventories at market prices as percentage of Gross Domestic Product at market prices.

*Germany*

1925-1934 figures from Grünig, *Op cit.* Gross capital formation including inventories as a percentage of G.N.P. at factor cost. 1936 and 1948 onwards. Gross Capital Formation at market prices including inventories as percentage of G.N.P. at market prices from O.E.E.C. *General Statistical Bulletins*, January 1959.

*Italy*

Gross capital formation including inventories as a percentage of G.N.P. at market prices. 1870-1938. *Annali di Statistica Op. cit.* 1938 onwards O.E.E.C. *Op. cit.*

*Netherlands*

Gross Domestic Capital Formation as a percentage of G.N.P. at current market prices. 1938 *Statistics of National Product and Expenditure, 1938, and 1947 to 1955*, O.E.E.C., Paris, 1957. 1948-1957, O.E.E.C. *Op. cit.*

*Norway*

1900-1938. Cf. note above for G.N.P. Gross capital formation including inventories and excluding repair and maintenance, as a percentage of G.N.P. at market prices. 1958 onwards O.E.E.C. *Op. cit.*

*Sweden*

1870-1938. Cf. note above for G.N.P. Gross capital formation excluding repair and maintenance and including inventories as percentage of Gross Domestic Product at market prices. 1938 onwards. Gross capital formation including inventories as percentage of Gross Domestic Product at market prices O.E.E.C. *Op. cit.*

*U.K*

1870-1938. Jefferys and Walters, *Op. cit.* Gross capital formation including inventories as a percentage of G.N.P. at factor cost. 1938 onwards. Gross Capital Formation including inventories as a percentage of G.N.P. at market prices O.E.E.C. *Op cit.* In the case of the U.K. we have also shown foreign investment as this was quite significant before 1913. Figures for 1870-1937 from Jefferys and Walters, *Op. cit.*, pp. 36 and 37; 1938 onwards from O.E.E.C. *Op. cit.*

Angus Maddison