CHAPTER VI

# INCOME FORMATION

## VI 1. INCOME FROM ABROAD

Income from abroad consists chiefly in:

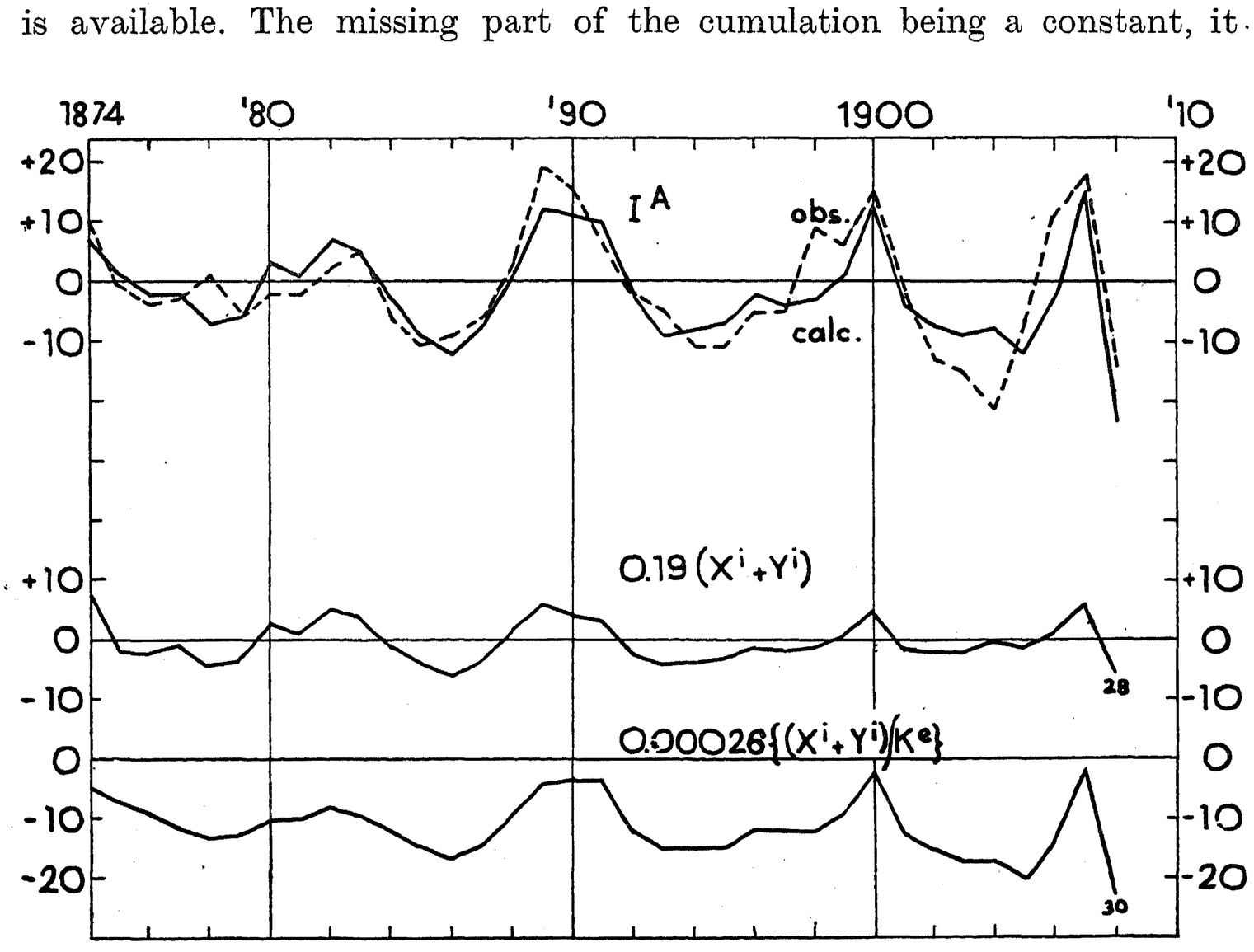
($a$) dividends and interest on capital invested abroad and

($b$) shipping and banking earnings.

The incomes under ($a$) chiefly depend on two factors, viz. the total amount of capital invested abroad $\int\overline{\overline{K}}^e$ and the business situation of the countries to which the capital has been exported. These countries mainly producing raw materials, and England being one of the most important buyers of these raw materials, it has been assumed that the total value of raw materials imported $\overline{\overline{X}}^i + \overline{\overline{Y}}^i$ is a fair measure of this business situation. An explanation may therefore be based upon $(\overline{\overline{X}}^i + \overline{\overline{Y}}^i)$. $\int \overline{\overline{K}}^e$ as a first factor. Here $\int \overline{\overline{K}}^e$ should be taken from the beginning of any capital exports onwards; our figures, however, only start with 1870 and thus only

$$(\overline{\overline{X}}^i + \overline{\overline{Y}}^i) \int_{1870} \overline{\overline{K}}^e$$

is available. The missing part of the cumulation being a constant, it




VI 1. "Explanation" of income from abroad.

means that we should add $\bar{\bar{X}}^i + \bar{\bar{Y}}^i$ as a second explanatory series. (*b*) Shipping earnings depend, to a large degree, on transports of wheat, wood, coal, petroleum and nitrates and their fluctuations may, therefore, also be fairly well represented by the fluctuations of $\bar{\bar{X}}^i + \bar{\bar{Y}}^i$.

Many refinements would of course have been possible. The importance of such refinements for our chief purpose is, however, limited, and therefore this rough approximation has been used.

The explanation obtained with these two explanatory series runs [1]):

$$I^A = 0.00026 \ \{(\bar{\bar{X}}^i + \bar{\bar{Y}}^i) \cdot \int \bar{\bar{K}}^e\} + 0.19 \ (X^i + Y^i)$$

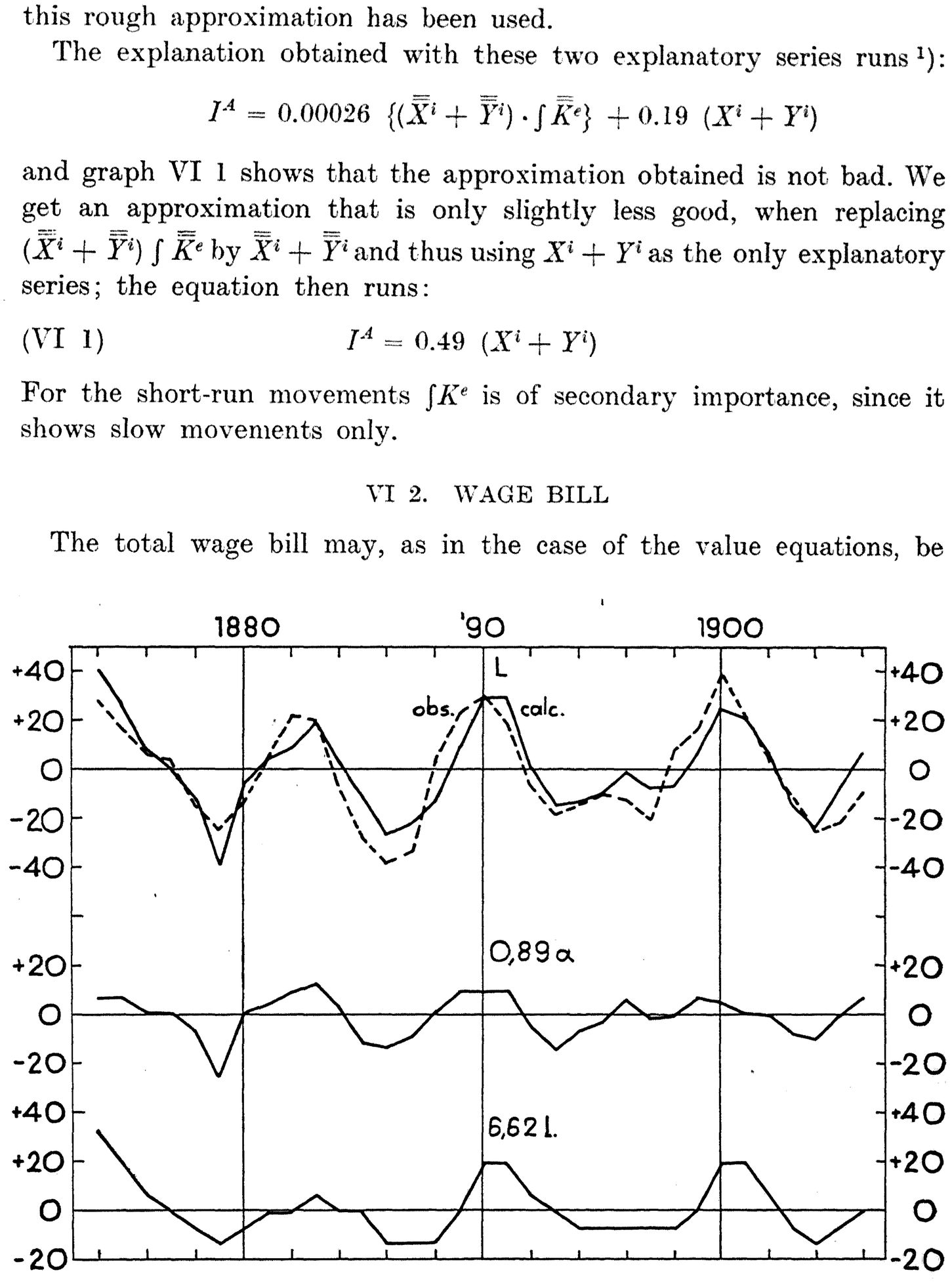
and graph VI 1 shows that the approximation obtained is not bad. We get an approximation that is only slightly less good, when replacing $(\bar{\bar{X}}^i + \bar{\bar{Y}}^i) \int \bar{\bar{K}}^e$ by $\bar{\bar{X}}^i + \bar{\bar{Y}}^i$ and thus using $X^i + Y^i$ as the only explanatory series; the equation then runs:

(VI 1) $$I^A = 0.49 \ (X^i + Y^i)$$

For the short-run movements $\int K^e$ is of secondary importance, since it shows slow movements only.

## VI 2. WAGE BILL

The total wage bill may, as in the case of the value equations, be




VI 2. "Explanation" of labour income.

[1]) Here again { } means: deviations from 9-year moving averages.

found by multiplying the wage rate by the figure of employment. Transformed into a linear formula, we get:

(VI 2) $$L = 0.89a + 6.62\ l$$

## VI 3. NON-LABOUR INCOME

(i) *Theoretical.*

At first an effort was made, just to fit $Z$ with an *a priori* expression, viz. total net value of production plus income from abroad minus wages:

(VI 30) $$U + V - X'_A - Y'_A + I_A - L$$

Provisionally, depreciation allowances have been assumed to show a trend development only. There appeared, however, to be a systematic difference, for which several reasons may exist:

($a$) Differences between income calculated for tax purposes and actual income calculation;

($b$) Differences between actual income calculated and the static income concept;

($c$) Deficiencies in the statistical material for the other series, especially that for $U$, and

($d$) Inadequacy of our hypothesis on depreciation allowances.

($a$) This topic has been dealt with extensively by Lord STAMP in his British Income and Property [1]). Apart from the facts (already roughly accounted for by our calculation of $Z$) of the moving average, the timing and the incomes below the exemption limit, this author deals with a number of other possible discrepancies of which he writes, however (page 176):

> "Upon a careful examination the greater part of the supposed difference (between assessed and real profits), for statistical use, will be found to disappear ....."

But there remains the fact, mentioned already in section I 2, that there is an unknown difference in timing between our $Z$ and true incomes ($Z$ preceding, by half a year at most, those true incomes) because of the adjustments, in the case of new firms and of losses, upon the three year moving average.

($b$) The static income concept does not take account of profits or apparent profits from the rise in value of commodity stocks already present at the beginning of the year, whereas in reality these are often included in profit calculations. This means that an expression representing such profits has to be added to the static terms of VI 30 [2]). Since such rises in

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[1]) London, 1916, p. 170 and following pages.

[2]) Sometimes this is done in the form of calculating as production costs the costs of raw materials at the moment of buying. This means that a lag in raw

value are proportional to the rate of increase $\dot{r}^i$ in raw material prices, this variable may also be added.

(*c*) As was already stated (cf. section III 1), HOFFMAN's production index includes, for several commodities, additions to stocks of raw materials. Such additions are treated by us as if they contributed to the total value of production $U$ the full value added from the raw material stage up to the finished stage. If only part of these stages are really passed through, $U$ must be diminished by the value of the non-included processes. The annual fluctuations in this correction will be parallel to the fluctuations in (positive or negative) additions to stocks. These were assumed to be parallel to $u_t - u_{t-1}$; hence this variable may also be included in the explanation.

(*d*) Finally, although depreciation allowances, as a rule, do not show pronounced cyclical fluctuations, they may nevertheless show some. A correction for this item may therefore be added. Several factors influence its fluctuations, e.g.

(1) the number of investment good units in existence, which is the cumulation of the annual additions (i.e. of net investment); the movements of this cumulation are, however, very stable;

(2) the price level of investment goods, averaged over some ten years; the fluctuations of such averages are, however, very small too;

(3) serious fluctuations in earning capacity may be accounted for by writings-off, which would be proportional to the rate of decrease in profits $Z$;

(4) the level of profits itself may determine whether higher or lower depreciation rates will be applied.

Since the ultimate use made of our elementary equations is to substitute for all variables occurring in them their expressions in $Z$, $Z_{-1}$, etc. (cf. chapters VII, etc.), the best procedure to be followed in this case of uncertainty seemed to introduce as supplementary variables $Z$ and $Z_{-1}$, using, thereby, the procedure introduced by HAAVELMO [1]).

(ii) *Statistical.*

Since it is the object of the equation under discussion to represent the cause of income fluctuations, this variable should be the variable to be explained. But since it is represented by an unknown combination of $Z$ and $Z_{-1}$ as long as we do not know the lag between $Z$ and true incomes, it is impossible to determine the corresponding first regression

material prices over the period for which the stocks would be sufficient, is applied. Calling raw material consumption $\bar{\bar{x}}$ and the period for which stocks would be sufficient, $T$, raw material costs are calculated to be $0.01\ \bar{\bar{x}}\bar{\bar{r}}^i_{-T}$, whereas they are calculated to be $0.01\ \bar{\bar{x}}\bar{\bar{r}}^i$ in the static income concept. So the addition is $0.01\ \bar{\bar{x}}(\bar{\bar{r}}^i_{-T} - \bar{\bar{r}}^i)$, or approximately equal to $0.01\ T\bar{x}\dot{r}^i$; since $T\bar{x}$ represents the stock, the correction is equal to the increase in value, during the year, of this stock.

[1]) TRYGVE HAAVELMO: The Method of Supplementary Confluent Relations, Illustrated by a Study of Stock Prices, Econometrica 6 (1938), p. 203.

equation. So we have first calculated the second regression equation, i.e. the one where

(VI 301) $$U + V - X^i - Y^i + I^A - L$$

is explained by:

$$(a)\ Z; \quad (b)\ Z_{-1}; \quad (c)\ \dot{r}^i; \quad (d)\ u - u_{-1}$$

For latter calculations it is convenient to replace $U$ and $V$ by their expressions $U' + U^e - U^i$ and $V' + V^e + \dot{w}^I$ resp. and using equation (II 1) (balance of payments) which transforms (VI 301) into

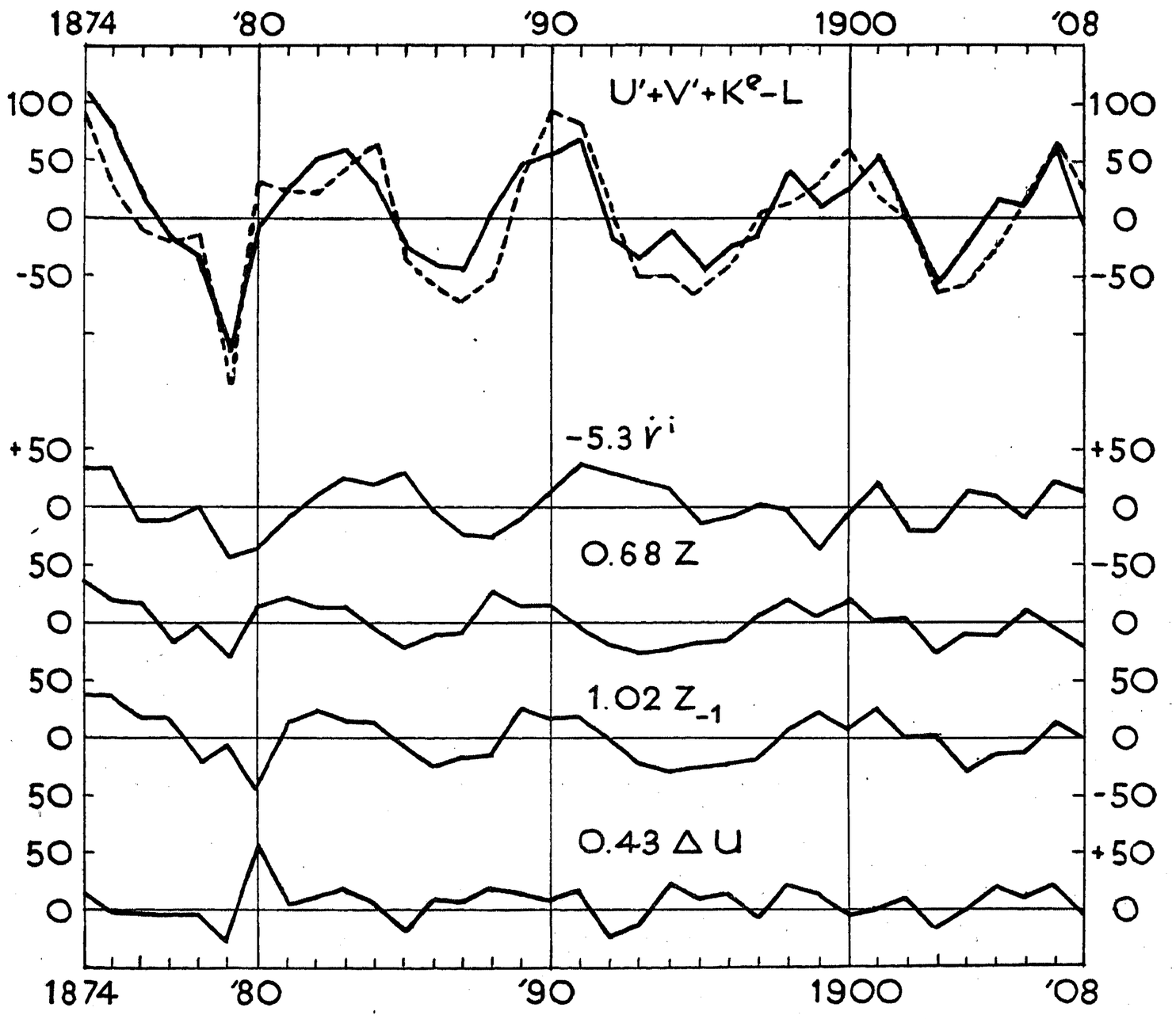
$$U' + V' + K^e - L + A\dot{u} + \dot{w}^I$$

Here again the fluctuations in $A\dot{u}$ and $\dot{w}^I$ are so small that they may be neglected; hence the expression

$$U' + V' + K^e - L$$

should be explained by $Z$, $Z_{-1}$, $\dot{r}^i$ and $u - u_{-1}$.
The result is:

(VI 3) $$U' + V' + K^e - L = 0.68Z + 1.02Z_{-1} - 5.3\dot{r}^i + 0.43\Delta u$$




VI 3. "Explanation" of non-labour income.

represented graphically in chart VI 3. The correlation is not bad; the average lag in the $Z$-terms is 7 months which is not too bad either after the remarks made in table IF.

With this lag we may now calculate the first regression equation if we take as variable to be explained:

$$Z_{-0.6} = 0.4\,Z + 0.6\,Z_{-1}$$

At the same time we have combined *a priori* the variables $U' + \ldots\ldots$ and $u - u_{-1}$ in a somewhat more accurate way by taking the deviations from 9-year moving averages of the product

$$\overline{\overline{u}}' - 0.45\ (\overline{\overline{u}} - \overline{\overline{u}}_{-1})\ \overline{\overline{p}},$$

where the corrections for changes in stocks are applied to the physical figures for consumption. The difference from

$$U' - 0.45\ (u - u_{-1})$$

is, however, only slight and we shall treat them as equivalent. The result now obtained is, when written — for an easy comparison — with a coefficient 1 before the term $U'$ .....:

$$\text{(VI 3)} \qquad 3.0\,Z_{-0.6} = U' - 0.45\,(u - u_{-1}) + V' + K^e - L + 4.5\,\dot{r}^i$$

Some alternative calculations were made by using the old series $U'$ and $u - u_{-1}$ separately and also by the introduction of a half-year lag in $Z$, but the differences in the coefficients of equation (VI 3) were not great [1]).

*The high coefficient for Z is striking. It can only be understood if the fluctuations in income below the exemption limit and the fluctuations in income evaded are considerably larger than those in assessed incomes.* Only a small part of the divergency can be explained by fluctuations in depreciation allowances.

If the coefficient is correct, the figures found for the marginal propensity to consume and to invest (equations III 1 and III 4) should be divided by 3, giving a figure of 0.31 for the propensity to consume (for non-workers) and one of 0.22 for investment at home.

These are extreme figures, since part of the $Z$-term may represent, as already pointed out at (i), depreciation allowances, etc.

For the United States [2]) it was found that the latter fluctuations are about 10 % of those in profits.

Another possible explanation of the high coefficient found is that the fluctuations in consumption outlay are smaller than those indicated by

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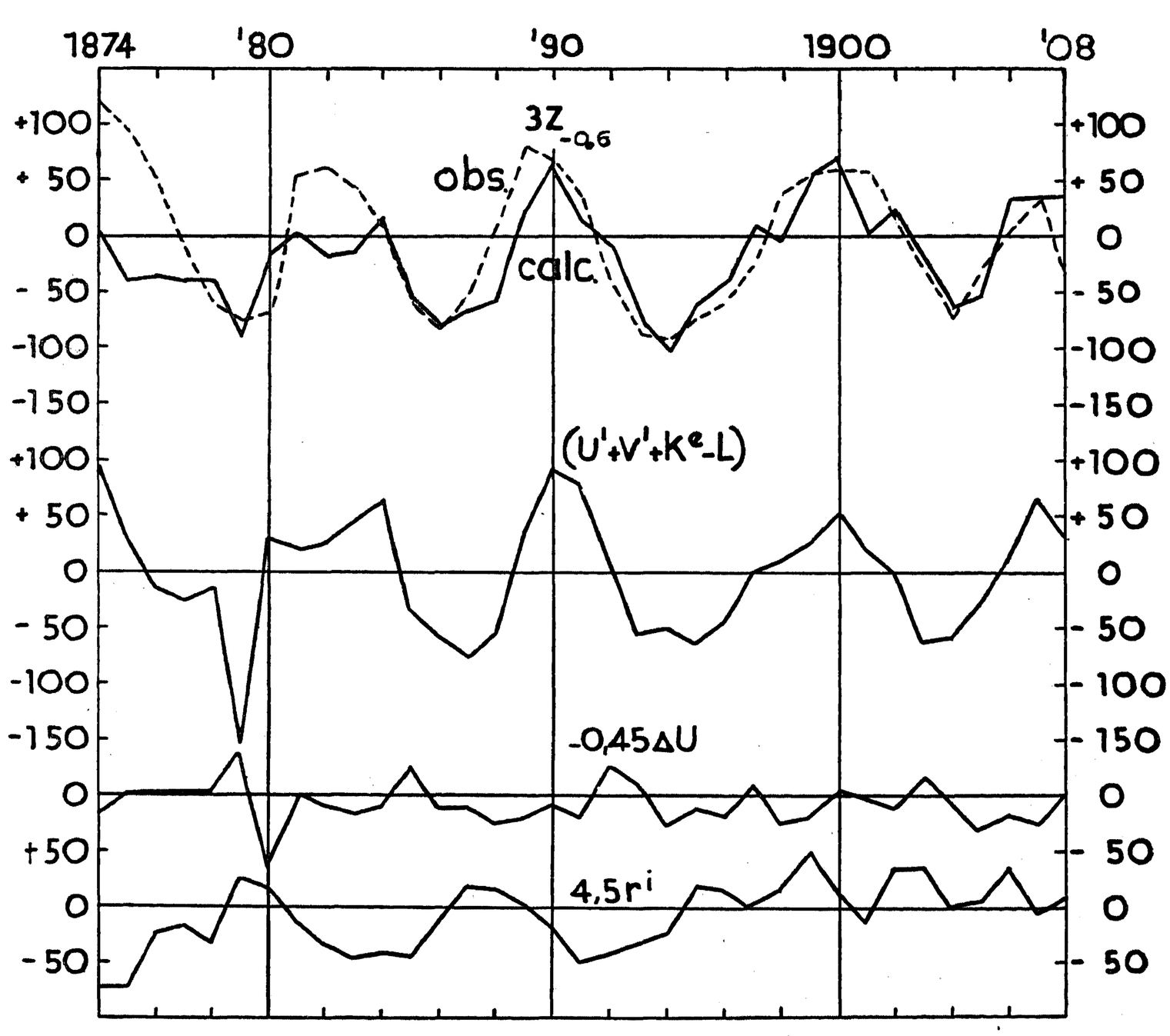
[1]) Also, the use of the income figures as given by STAMP, without the corrections made in table IF, leads to about the same figures.

[2]) Business Cycles in the United States, 1919—1932, section 5.9.

our series $U'$. This might be caused by too important fluctuations either in $u'$ or in $p$; it is conceivable that the elements in $u'$ and $p$ for which figures are available are the more fluctuating elements. Although we have no direct indications as to the occurrence of such errors in our series, we shall later on pay some attention to their implications (cf. chapter VIII).

The coefficient for $\dot{r}^i$ would point to a value for 0.01 $T\overline{x}$ of 4.5. Since the total value of consumption is, on an average, some 1500 for the period, this would mean that stocks in all the stages of production taken together would amount to 30 % of the annual consumption of finished goods. This figure found for stocks does not compare badly with Mr KEYNES' assertion [1]) that stocks might normally amount to 40 or 50 % of the national income, and with COLIN CLARK's figures for 1929—1934, being 41 to 32 % of gross income. Assuming that the average number of stages is 6 and the increase in value during the production process 75 % of the final value, stocks in each stage would amount, on an average, to 8 % of consumption or about 1 month. Since in their total consumption




VI 3'. "Explanation" of non-labour income.

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[1]) Quoted by A. J. BROWN, in the Oxford Economic Papers Nr 3, Febr. 1940, p. 12.

services — of which no stocking is possible — amount to about $\frac{1}{4}$, the figure for goods may be 1/3 higher, i.e. 11 %. If the number of stages is lower than assumed, the figure will be correspondingly higher. Anyhow the figure does not seem to be irrealistic. Since there might exist a tendency among sellers to follow raw material prices more rapidly in times of price falls than in times of rises in prices, an alternative calculation has been tried, where in addition to the variables already included, $\dot{r}^{i2}$ was included. This new variable appeared to be of no influence whatever.

The correlation, as shown by graph VI 3, although not splendid, is not bad either [1]).

The result that so large a part of profit fluctuations should be ascribed to the term with $\dot{r}^{i}$, i.e. to the fact that costs are calculated at the date of buying instead of at the date of selling, means a partial confirmation of the theory of SCHMIDT [2]) and others who consider this method of calculation as one of the major causes of cycles.

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[1]) It is only a long time after this book was finished that the estimates on national income by Mr PREST were published (Cf. Preface, footnote 2).

[2]) F. SCHMIDT: Ein Rechenfehler als Konjunkturursache. Vierteljahrshefte zur Konjunkturforschung, Erg.-Heft 4, Berlin 1926.