Does Consumption Lag Behind Incomes?

J. Tinbergen


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DOES CONSUMPTION LAG BEHIND INCOMES?

RELATION BETWEEN INCOME AND CONSUMPTION

THE fact that consumption outlay of individuals as well as of groups of individuals depends on their income is well known. Although this statement will hardly be doubted, it may be tested statistically from family budget statistics, as has been done by various investigators. These statistics can show only that consumption outlay by different people, having different incomes at the same moment, depends on income. Consumption outlay by the same family in different years, showing varying income, will not necessarily depend on income in the same way that is shown by family budget statistics.

This latter relation plays a highly important rôle in the causation of business cycles, a fact perhaps most stressed by Mr. Keynes, who created the term "propensity to consume" and who used this notion in various deductions. The importance of the propensity to consume for the quantitative approximation of some business-cycle problems has led a number of authors to measurements of that coefficient.

How large the propensity to consume may be is not the only important question. Another question is "What lag exists between income changes and changes in consumption outlay?" The longer this lag, the more slowly will the economic system react to changes in income and the longer, other things being equal, will be the process of adjustment (e.g., a business cycle).

The answer to this question — put by Mrs. Gilboy in this Review — cannot be given by family budget data, as already stated. The only possible method of securing an answer is by use of time series. The use of time series, however, always implies the difficulty that a number of _ceteris paribus_ clauses are no longer fulfilled. Not only changes in income are the causes of any given changes in consumption outlay; other factors that also influence consumption outlay may have changed. A discussion of the most important of these other factors has been presented by Dr. Polak in this Review, where he applied the use of time series to consumption fluctuations in the United States during the period 1919-32. The same method that he employed was used in an investigation of United Kingdom data, 1870-1910, of which the present paper is a short account. Because of the nature of the statistical material available, one difference between the two studies lies in the choice of variables. This difference will be treated below (p. 5).

CONSUMPTION DATA, U. K., 1870-1910

The figures on which our calculations are based are of moderate quality only. The period and country under discussion, however, provide in so many respects a classical case for business-cycle research that experimenting with the material seemed worth while. Details of the calculation are shown in Table 1. Hoffmann’s index of industrial production seems to be the best index that can be constructed from the statistical material at hand. For the period that we are discussing, the index covers about two-thirds of total industrial production. For such important industries as cotton and wool spinning and for some smaller industries, data on consumption of raw materials have been used. For most of the other industries, net imports of raw materials only were available, which means that additions to raw-material stocks both by dealers and by industrial entrepreneurs have been included. We have tried to make a correction for this drawback (see p. 5 below).

1 Elizabeth W. Gilboy, "Income-Expenditure Relations," this Review, xxii (1940), pp. 115-21.


3 Walther Hoffmann, "Wachstum und Wachstumsformen der englischen Industriewirtschaft von 1700 bis zur Gegenwart," Probleme der Weltwirtschaft (Schriften des Instituts für Weltwirtschaft an der Universität Kiel, Nr. 63, Jena, 1940).
# Table I. — Calculation of Consumption and Production (Series 3, 6, 14, and 16 rounded off to ten units.)

<table>
<thead>
<tr>
<th>Description of Series and Symbols Source*</th>
<th>Unit</th>
<th>1866</th>
<th>1867</th>
<th>1868</th>
<th>1869</th>
<th>1870</th>
<th>1871</th>
<th>1872</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production of manuf. consumers' goods (Hoffmann).</td>
<td>W.A. 1</td>
<td>1907 = 426</td>
<td>225</td>
<td>220</td>
<td>215</td>
<td>210</td>
<td>230</td>
<td>270</td>
</tr>
<tr>
<td>2. Coal production.</td>
<td>S.A. 1</td>
<td>Min. 1907</td>
<td>46</td>
<td>47</td>
<td>46</td>
<td>48</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>3. Production of manuf. consumers' goods (our definition).</td>
<td>W.A. 2</td>
<td>See note</td>
<td>190</td>
<td>196</td>
<td>212</td>
<td>206</td>
<td>214</td>
<td>200</td>
</tr>
<tr>
<td>4. Production of agricultural products.</td>
<td>Cf. text</td>
<td>Min. 1907</td>
<td>170</td>
<td>706</td>
<td>702</td>
<td>733</td>
<td>784</td>
<td>830</td>
</tr>
<tr>
<td>5. Total production of consumers' goods (3 + 4).</td>
<td>Cf. text</td>
<td>100</td>
<td>100</td>
<td>110</td>
<td>110</td>
<td>120</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>6. Imports of consumers' goods (ready for retail trade).</td>
<td></td>
<td>102</td>
<td>108</td>
<td>118</td>
<td>118</td>
<td>120</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>7. Exports of consumers' goods (on wholesale basis).</td>
<td></td>
<td>96</td>
<td>98</td>
<td>104</td>
<td>104</td>
<td>106</td>
<td>106</td>
<td>126</td>
</tr>
<tr>
<td>8. Consumption of consumers' goods (5 + 6).</td>
<td></td>
<td>100</td>
<td>100</td>
<td>110</td>
<td>110</td>
<td>120</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>9. Retail price index.</td>
<td></td>
<td>100 = 100</td>
<td>118</td>
<td>119</td>
<td>117</td>
<td>113</td>
<td>113</td>
<td>119</td>
</tr>
<tr>
<td>10. Value of consumption of consumers' goods (8 X 10).</td>
<td></td>
<td>122</td>
<td>135</td>
<td>130</td>
<td>127</td>
<td>127</td>
<td>135</td>
<td>142</td>
</tr>
<tr>
<td>11. Consumption of services.</td>
<td></td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>12. Value of consumption of services (11 X 12 X 1000).</td>
<td></td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>13. Value of consumption (10 + 13).</td>
<td></td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>14. Total volume of consumption (8 + 11).</td>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>15. Total volume of production (8 + 11).</td>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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S.A.1 = Statistical Abstract of the United Kingdom.

† Brought on retail value basis by multiplication by the ratio 396, derived from 1907 figures.

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Note on calculation. Hoffmann's index of industrial production of consumers' goods excludes coal, which we consider as chiefly a consumers' good (following Cassel). Therefore coal production had to be included; both series have been converted to the base of 1907 pounds sterling (i.e., calculated at prices of 1907). For coal the 1907 value of production is 120 million £; this is indicated by Hoffmann to be 11.9 per cent of total production, which therefore was £506 million of this, 53 per cent, or £248 million, related to consumers' goods in the Hoffmann sense. The total of series 1 and 2 has as its base 1907, which is the retail value of consumers' goods production, according to Sir Alfred Flux (Census of Production 1907, General Report, pp. 25-33). The 1907 figures for series 3, 6, 7, and 11 have been taken from the same source. The series for consumption of services (11) is composed of the following items (weights for 1907 indicated in brackets, based on population and average number of rooms available per head of population (weight: 250); (ii) number of passengers carried by railways (25); (iii) domestic services, taken constantly at 80, since the number of people engaged in these services is almost constant; (iv) number of passengers carried by tramways (15); (v) letters delivered by postal service (30). For further particulars, see source references above and (for price indices, series 9 and 12) text.
DOES CONSUMPTION LAG BEHIND INCOMES?

To Hoffmann's index of industrial production of consumers' goods we first added coal production which Hoffmann considered a producers' good and then added production of agricultural products (Drescher's index), in order to secure total production of consumers' goods. Next, imports of such goods were added and exports deducted, to obtain consumption of consumers' goods. (Here again additions to stocks are included.) Finally, an index of consumption of services was added. Separate price indices for goods and services were applied to the indices of the consumption of consumers' goods and the consumption of services in order to obtain value figures. Since all volume indices were expressed in 1907 pounds sterling i.e., they were value indices at 1907 prices the price indices were taken with 1907 as a base.

The index of agricultural production as given by Drescher covers about 78 per cent of total agricultural production in 1925. The data for animal production are very rough, since they are based on figures for total live stock, of which a slowly changing percentage is assumed to be slaughtered each year.

The index of the imports of consumers' goods is based on goods ready for use and covers 69 per cent of these goods for 1907. This index, like the index of industrial production of consumers' goods, is based on retail value as given by Flux. The index for exports of consumers' goods covers 87 per cent of such exports in 1907. The index of consumption of services is explained in Table I.

The index of retail prices is a combination of Colin Clark's index (for the trend movement) and Wood's index of retail prices (for the shorter fluctuations). Our index is the product of Wood's index and a smoothly moving cofactor; the cofactor is equal to the ratio between Clark's figures and Wood's figures for the middle of the periods for which Clark's figures are given (averages for cycles); between these mid-periods, the cofactor has been linearly interpolated.

The index of service prices has been taken from Clark and linearly interpolated on the assumption that service prices move smoothly. For railway, tram, domestic, and postal services this assumption does not seem to be unreasonable; for rents, it is less certain; it is, however, also applied by Professor Bowley.

INCOME DATA

Two kinds of incomes may be distinguished: wages and non-workers' income. For total wages in this study we have used Professor Bowley's estimate; and in order to estimate the fluctuations in other incomes, assessed incomes according to the income tax data, as corrected by Professor Bowley and Lord Stamp, have been taken as raw material. This material has, however, been adjusted somewhat further. (See Table 2.)

One reason for making adjustments was that Professor Bowley and Lord Stamp do not agree as to the timing of the series. Professor Bowley

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considers that the figure for the year of assessment 1908–09 corresponds to incomes earned in 1907; 11 Lord Stamp indicates the year ending June, 1907 as the corresponding income period. To begin with, we have followed Lord Stamp and have taken the two-year average of Professor Bowley’s figures for 1907 and 1908 to represent the 1907 income.

This series has been multiplied by 1.5, since for three reasons its fluctuations are, without doubt, too small: First, assessed incomes are for most types of incomes, a three-year moving average. Secondly, we have already taken two-year moving average. On the assumpto
that the fluctuations are eight-year period sine curves, it is easily computed that the original fluctuations have been reduced by about one-sixth. Thirdly, some incomes are below the exemption limit. An estimate of these low incomes has been made by several authors, for various years. On the average they amount to about one-quarter of assessed incomes. In summa, multiplication by \( \frac{4}{3} \times \frac{2}{3} \), or 1.5, is therefore needed. This factor is correct only for the fluctuations of the series around its trend; it need not be correct for the trend values themselves. Because of the arguments used, these values should be multiplied by only 1.25. For other reasons a multiplication by 1.5 for the trend values also seems appropriate; but these reasons need not occupy us now since we are interested in the deviations only.

One component of income fluctuations is not included in income tax figures, viz., the short fluctuations in agricultural incomes. Farmers are taxed in proportion to rents, and rents change slowly because of the long duration of the contracts. In the long run, rents will follow agricultural profits more or less, but certainly not in the short run. We have, therefore, added the deviations from three-year moving averages of the value of farm production. This value was estimated in the following way: An index for the volume of farm production calculated by Drescher was multiplied by an index of prices for home farm products calculated by Rousseaux. The value of the product for 1907 was estimated by use of the figures mentioned by Flux in the General Report on the 1907 Census. Although this method is a rough one — Drescher's index is unsatisfactory as far as the production of meat is concerned, in particular — the estimate of agricultural income thus secured seemed better than no estimate whatsoever.

The final figures obtained are tabulated in line 9 of Table 2. We have tried to test these figures with independent figures from other sources. Limitations of space prevent us from giving all the details of this test; briefly, however, we have attempted to reconstruct non-labor income from data on production, prices, international trade, and wages. The comparison does not prove to be very satisfactory unless it is assumed that (1) Professor Bowley's timing is correct; (2) raw material cost is calculated at lagged prices (prices at moment of purchase instead of prices at moment of delivery of production); and (3) the fluctuations in actual incomes are about three times as large as those given in Table 2. From all series calculated the trends have been eliminated by using deviations from nine-year moving averages.

### RELATIONS BETWEEN INCOMES AND CONSUMPTION TESTED

In accordance with general economic theory, we have assumed that consumption outlay, \( U' \), depends, first of all, on total wages, \( L \), non-labor income, \( Z \), and cost of living, \( p \). Since our figures for consumption also include additions to stocks, one or two factors explaining these additions have been included. From another investigation that we made on this subject, we felt justified in including the following factors:

1. the rate of increase in the volume of consumption: \( u' - u'_{-1} \)
2. the interest rate, \( m' \).

Our previous investigations led us to believe, however, that the influence of \( m' \) would be very small.

For the timing of the explanatory series, we assumed that wages are spent without much delay. For the case of non-workers, the possibility of a lag between incomes earned and consumption outlay had to be recognized. A lag may occur for various reasons: First, these incomes can often be disposed of only at a time period later than that of earning. Secondly, even if they are disposed of at the moment of earning (shopkeepers, e.g.) their exact magnitude is determined later (after the closing of

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12 Cf. Stamp, *British Incomes and Property* (London, 1916), p. 427, where a number of estimates have been reproduced.
13 Another question remains, viz., whether there are not other reasons for assuming that the income fluctuations as reported by assessments are too weak. Cf. below.
16 A number of these details are treated in my forthcoming book, *Business Cycles in the United Kingdom, 1879–1914*.
the books), and, therefore, that magnitude can influence outlay only at a later moment. Thirdly, the effect of the knowledge that one’s income has risen or fallen on one’s consumption outlay may also take place only after some time — the duration of the psychological reaction. The less the pressure of income forces one to react immediately to changes, the longer that reaction may take. Finally, income payments (e.g., dividends) as well as some types of consumption outlay (travel expenses, Christmas presents) show seasonal fluctuations.

Since the lag cannot be fixed beforehand, a test of the relation with a fixed a priori value of that lag did not seem adequate; we, therefore, based our test on a not a priori restricted statistical estimate of lag. This estimate may be obtained most easily by the inclusion of two different values of Z — e.g., for t and t - 1. If the lag is between 0 and 1, the coefficients for \( Z_t \) and \( Z_{t-1} \) will both be positive; if it is more than 1, the coefficient for \( Z_{t-1} \) will be positive and that for \( Z_t \) negative. It is appropriate then to try \( Z_{t-1} \) and \( Z_{t-2} \); if both coefficients are positive, the lag lies between 1 and 2; and so on. Graphical trials may shorten this process of adaptation; in the present case, it proved to be appropriate to include \( Z_{t-1} \) and \( Z_{t-2} \).

In the case of \( p_t \), an influence without delay could reasonably be expected, since the amount to be paid depends on the level of actual prices in a direct way. But a lagged influence could also be imagined to exist: decisions based on earlier prices may contribute to the actual behavior of the consumer. For that reason \( p_{t-1} \) was also included in some of the calculations.

In summary: attempts have been made to explain the fluctuations in consumption outlay by a linear combination of the fluctuations in total wages \( (L_t) \), non-labor income with lags of 1 and 2 years \( (Z_{t-1} \) and \( Z_{t-2} \)), price level \( p_t \), and rate of increase in quantity of consumption \( (u_t - u_{t-1}) \); and in additional attempts the price level with a lag of 1 year \( (p_{t-1}) \) and the interest rate \( (m') \) have been added.

Unfortunately, the correlation between \( L \) and \( Z_{t-1} \) appears to be high, which makes accurate determination of the coefficients for both these variables impossible. One coefficient has to be determined on a priori grounds. We have chosen that for \( L \), at 0.8; various investigations point to about that value for the marginal propensity to consume for workers’ families.\(^{18}\)

The two factors \( p_{t-1} \) and \( m' \) appeared to have only very subordinate influence; therefore, they were not included in the final equation. With the remaining variables, the best result obtained was

\[
U'_t = 0.80 L + 0.50 Z_{t-1} + 0.42 Z_{t-2} + 1.17 p + 0.45 (u_t - u_{t-1}).
\]

(See Chart 2.)

**SIGNIFICANCE OF RESULTS**

The significance of the free coefficients (i.e., all except that for \( L \)) was tested in various ways. One way was the rather elementary method of trying alternatives, as follows:

1. The regression coefficient for \( L \) was varied and values of 0.9 and 0.7 were tried.
2. As has been mentioned already, \( m' \), the rate of interest, and \( p_{t-1} \), cost of living one year before, were included as additional variables.

\(^{18}\) For the United States, cf. my *Business Cycles in the United States, 1910-1929* (Geneva, 1939), pp. 36-37, where the figures 0.83 and 0.95 are mentioned. For Holland, cf. J. Tinbergen and A. L. G. M. Rombouts, “Statistische meting van Keynes’ begrippen ‘propensity to consume’ en ‘propensity to save’ voor Nederland,” *De Nederlandse Conjunctuur*, XI (1940), p. 21, where a figure of 0.8 is found. It would seem that English workers are more like Dutch than like American workers, in that they will save more in good times and dissave in bad times.
DOES CONSUMPTION LAG BEHIND INCOMES?

All calculations show the same order of magnitude for the coefficients (Table 3). Those for \( p \) and \( u-u-1 \) are particularly stable. Those for \( Z-1 \) and \( Z-2 \) are less stable, but always positive. This means that the lag of the \( Z \)-term is always between one and two years or, taking account of what has been said about the timing of \( Z \), that the lag in the influence of non-labor income on consumption is between one-half and one and one-half years.

### Table 3. — Some Results of Alternative Calculations (1874–1910)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( L^p )</td>
<td>( Z-4 )</td>
</tr>
<tr>
<td>1</td>
<td>0.8</td>
<td>0.50</td>
</tr>
<tr>
<td>2</td>
<td>0.9</td>
<td>0.44</td>
</tr>
<tr>
<td>3</td>
<td>0.7</td>
<td>0.56</td>
</tr>
<tr>
<td>4</td>
<td>0.8</td>
<td>0.46†</td>
</tr>
<tr>
<td>5</td>
<td>0.8</td>
<td>0.48†</td>
</tr>
</tbody>
</table>

* This coefficient has been given \( a \) \( p \)\( r \)\( i \)\( o \)\( r \)\( i \)\( t \)\( o \)\( r \).
† In these cases, the coefficients for \( Z-1 \) and \( Z-2 \) have, for convenience, been chosen equal.

A second elementary test of the significance of the regression coefficients consisted in the splitting up of the period into two subperiods, and the establishment of a regression equation for each subperiod. The results are given in Table 4. Again, not much variation is evident in the order of magnitude of the coefficients.

### Table 4. — Results for Two Subperiods

<table>
<thead>
<tr>
<th>No.</th>
<th>Period</th>
<th>( L^p )</th>
<th>( Z-4 )</th>
<th>( Z-2 )</th>
<th>( p )</th>
<th>( u-u-1 )</th>
<th>( p-1 )</th>
<th>( m^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1874–1910</td>
<td>0.8</td>
<td>0.50</td>
<td>0.42</td>
<td>11.7</td>
<td>0.45</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>6</td>
<td>1874–1895</td>
<td>0.8</td>
<td>0.35</td>
<td>0.68</td>
<td>9.0</td>
<td>0.55</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>7</td>
<td>1896–1910</td>
<td>0.8</td>
<td>0.42</td>
<td>0.73</td>
<td>8.4</td>
<td>0.55</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>2</td>
<td>1874–1910</td>
<td>0.9</td>
<td>0.44</td>
<td>0.41</td>
<td>11.4</td>
<td>0.44</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>8</td>
<td>1874–1895</td>
<td>0.9</td>
<td>0.44</td>
<td>0.30</td>
<td>12.6</td>
<td>0.42</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>9</td>
<td>1896–1910</td>
<td>0.9</td>
<td>0.49</td>
<td>0.29</td>
<td>12.0</td>
<td>0.43</td>
<td>..</td>
<td>1.63</td>
</tr>
</tbody>
</table>

* The coefficient for \( L \) has been chosen \( a \) \( p \)\( r \)\( i \)\( o \)\( r \)\( i \)\( t \)\( o \)\( r \)\( i \)\( t \)\( o \).

A third test was made along the lines of R. A. Fisher's methods. The assumptions made by Fisher are (i) that there are no error components in the explanatory variables, but only in the variable to be explained, (ii) that the error component in the latter is a sample from a normal universe, and (iii) that that sample is a random one. We think assumption (i) is approximately fulfilled, since the errors of measurement are far less important than the errors made by the use of an incomplete theory. As to assumption (ii), the distribution of the residuals was compared with a binomial distribution for \( n=10 \), and the \( \chi^2 \)-test applied. The probability of the deviations found appeared to be \( P=0.80 \), which is quite satisfactory. Assumption (iii) was tested by the determination of the serial correlation of the residuals; this appears to be \( -0.05 \pm 0.17 \), which is also satisfactory. The assumptions upon which Fisher's method is based are, therefore, fulfilled. Calculation of the standard deviations of the regression coefficients yields:

Explanatory variable \( Z-3 \) \( Z-2 \) \( p \) \( u-u-1 \)
Regression coefficient \( 0.50 \) \( 0.42 \) \( 11.7 \) \( 0.45 \)
Standard deviation of regression coefficient \( 0.13 \) \( 0.15 \) \( 1.83 \) \( 0.07 \)

These results are in accordance with the results already mentioned: the coefficients for \( p \) and \( u-u-1 \) are very stable, those for \( Z-1 \) and \( Z-2 \) less stable, but it is very improbable that they are not both positive. Of course, we should not forget that the coefficient for \( L \) has been assumed as given beforehand. We do not think, however, that this invalidates this conclusion very much. A glance at Table 3 shows
that a change of 0.1 in the regression coefficient for \( L \) has not a very great influence on the other regression coefficients.

A fourth test, finally, was made by the construction of a bunch map. Here again the coefficient for \( L \) was taken at its \textit{a priori} value 0.8. The spread in the bunches is not ideal; but again the coefficients for \( p \) and \( u-u_{-1} \) are, according to this test, the most stable ones, whereas those for \( Z_{-1} \) and \( Z_{-2} \) are, practically speaking, positive. Only one of the beams shows a slope slightly below zero (cf. Chart 3, which gives only the 12345-set).

**CONCLUSIONS**

The chief conclusion to be drawn from our results concerns the theme of this paper, viz., the lag between income and consumption outlay. Since the regression coefficients for both the \( Z_{-1} \)-term and the \( Z_{-2} \)-term are positive, the average lag must be between one-half and one and one-half years, with the most probable value at about one year. Thus our results suggest an average lag of one year between non-labor incomes and consumption outlay. This lag is of great importance for the explanation of the business cycle.\(^{10} \) We have tried to find confirmation of this result in the behavior of consumption figures for separate commodities and we have succeeded. Consumption of sugar as well as of coffee, tea, spirits, and cotton manufactures all show the same feature.

A second conclusion may be drawn from our equation, viz., from the regression coefficient for \( p \). In principle this coefficient would enable us to calculate some sort of average elasticity of demand for consumers' goods. Given the average values of consumption outlay (1500) and of the price level (99), we find that the elasticity of outlay with respect to prices is 0.78. It follows that the elasticity of quantity de-

\(^{10} \) Cf. \textit{Business Cycles in the United Kingdom, 1870–1914}, where this thesis will be considered in detail.

manded with respect to prices is \( 0.78 - 1 = -0.22 \). This is a low figure, contrary to what is often assumed. In order to test this result too, we have calculated the elasticity of demand of some individual commodities. The results were:

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>0.06</td>
</tr>
<tr>
<td>Coffee</td>
<td>0.08</td>
</tr>
<tr>
<td>Tea</td>
<td>0.00</td>
</tr>
<tr>
<td>Spirits</td>
<td>0.16</td>
</tr>
<tr>
<td>Cotton manufactures</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Although this small sample cannot prove very much, it is not in contradiction to the general result; four out of five elasticities are very low indeed.

Even a third conclusion may be drawn, but with still more caution. It concerns the marginal propensity to consume for non-workers. If our income figures were exact, the sum total of the two regression coefficients — 0.50 and 0.42, or 0.92 — would indicate that marginal propensity. Since, however, our test of the income figures (cf. above, p. 5) suggests that our series underestimates by about three times the intensity of the income fluctuations, the marginal propensity should accordingly be taken at one-third of the above value, or 0.31, which might seem too low. One fact must not be forgotten when judging this figure: Incomes include undistributed profits, of which nothing is consumed but all saved. And the English consumer probably is conservative. Nevertheless, the figure is low; and the question remains whether it may be due partly to the low quality of our statistics. Only fresh material could help us answer this question.

Summarizing our results very briefly, we are led to believe that for the United Kingdom, 1870–1914, consumption outlay of non-workers lags about one year behind the corresponding incomes; and the elasticity of demand as a whole and the marginal propensity to consume seem to be very low figures.

J. Tinbergen
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J. Tinbergen
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