

Bank clearings as a measure of economic activity

It seems likely, on general grounds, that there is some relationship between the level of economic activity and the value of cheques passing through the bank clearing system. If the relationship proved stable and reliable, bank clearings would provide a valuable addition to our indicators of current economic trends, for their coverage is wide and they are available very promptly—within a few days of the end of each month. This article describes a recent statistical investigation into the relationship.

Cheques and 'final expenditure' The first question to decide is what measure of economic activity is most likely to be reflected in bank clearings. Since no breakdown by type of expenditure of the total value of cheques cleared is available, the best procedure appeared to be to compare, at least in the first instance, total bank clearings with the broadest measure of economic activity provided by the official statistics. This is "total final expenditure on goods and services at market prices" and represents the value of all final sales of goods and services produced in the United Kingdom or imported, whether for private consumption, public consumption, investment in fixed capital or stocks, or for export.

There would of course be no reason to expect the two series to correspond exactly for any particular period. The fact that many transactions are paid for by cash rather than by cheque would tend to result in a higher figure for total final expenditure than for bank clearings. On the other hand, the elimination of

double-counting in arriving at total final expenditure would have the opposite effect. A person buys a car from a dealer who in turn pays the manufacturer; the manufacturer pays the makers of car bodies and other components, pays wages and salaries to his workers and dividends to his shareholders; the makers of the components pay their employees and their suppliers of raw materials at home and abroad; and so on. Any or all of these transactions may give rise to a cheque and in total they obviously amount to considerably more than the value of the car itself, which is all that appears in total final expenditure—under "consumers' expenditure". In practice this second factor outweighs the first, so that the value of bank clearings is very much greater than that of total final expenditure.

Monthly totals of bank clearings are available for the town, general and provincial debit clearings of the London clearing banks, and also, since April 1960, for the credit clearing. The town clearing covers only cheques, drafts, bills of exchange, etc., which are both drawn on and paid into a small number of offices (under a hundred) in the City of London, and is dominated by financial transactions. Those relating to goods and services are the major element in the general clearing which covers all other cheques and bills passing through the London clearing house. In attempting to measure economic activity, therefore, it seems appropriate to ignore the town clearing and to concentrate on the total of general, provincial and credit clearings. In using this total, however, it needs to be borne in mind that it excludes various types of transactions: drawings of cash (for instance to pay wages)—except

where cheques are cashed at a branch of a different bank from that at which the account is kept; cheques paid into branches of the bank on which they are drawn; cheques and drafts payable at non-clearing banks or at government offices; and all purely local, as distinct from provincial, clearings. But these deficiencies are likely to be a more or less constant proportion of the total, so that they can reasonably be ignored. The total of cheques cleared (as just defined) has been rising a little faster than final expenditure and is now about 1.8 times the latter, as may be seen from the table on page 37.

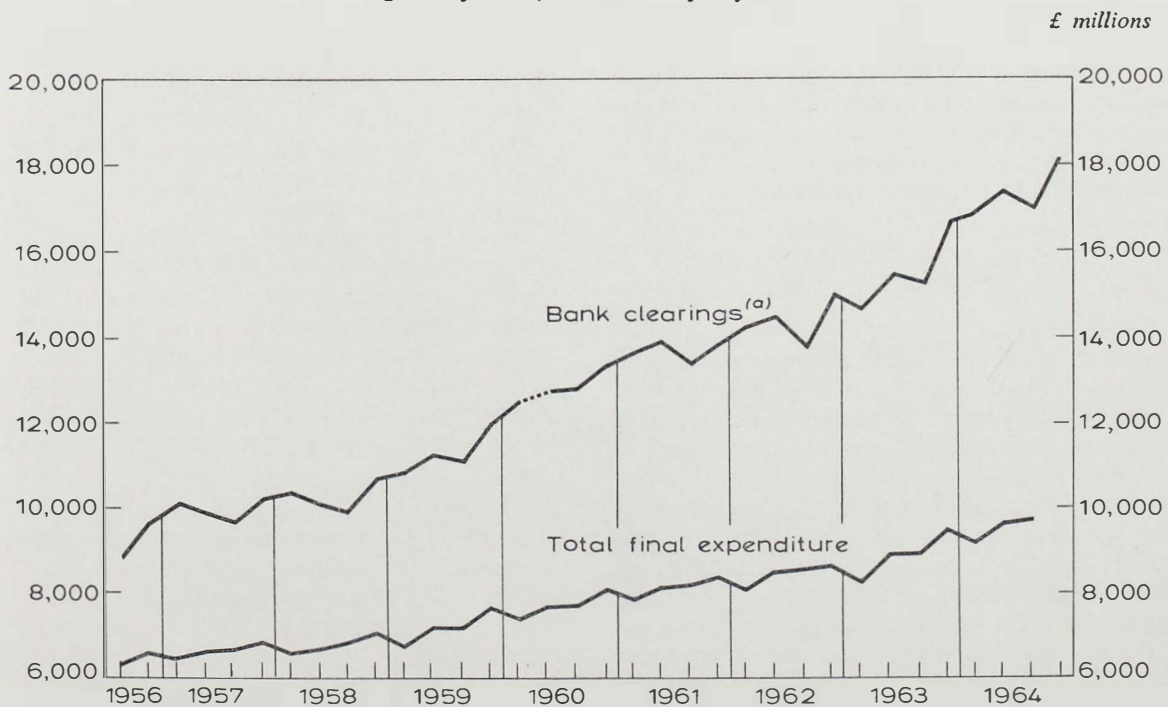
Seasonal patterns

The first step in studying a possible relationship is to see if either of the two series shows a seasonal pattern, because this will tend to mask the

underlying trend. Chart I shows quarterly series of total final expenditure (at current prices) and bank clearings as defined above. If allowance is made for the upward trend, expenditure shows a trough in the first quarter and a peak in the fourth, whereas clearings have a trough in the third quarter.

Before seasonally adjusting the monthly totals of clearings they were converted into daily averages, based on the number of 'normal' clearing days in each month. (Saturdays have not been normal clearing days since July 1956, except sometimes at the end of June and December) The Committee of London Clearing Bankers have kindly made available some daily figures for the years 1960-62, which show a regular increase in value on the first three working days of the month, each day being equivalent to about one and a half normal days' clearings. They also show the

Chart I
Quarterly totals, not seasonally adjusted



(a) General and provincial debit clearings and, from April 1960, the credit clearing.

effect of public holidays. The decline in the value of clearings owing to the Christmas holiday is made good before the end of the month, but there is a net reduction equivalent to one and a half days' work at Easter, and to one day's work at Whitsun and at the August bank holiday. The daily figures reveal a regular weekly pattern, with Tuesday the busiest day (it includes cheques paid into but not forwarded by branches on Saturday), but this pattern is not important enough to require special adjustment. The "number of normal working days" is therefore defined as the number of clearing days in the month (Mondays to Fridays except sometimes in June and December), plus one and a half days, less adjustments for public holidays. When a Saturday clearing occurs in the last two days of June or December, one day is added to this month and subtracted from the following month.

The monthly series of daily averages was then seasonally adjusted on a computer. Finally, for comparison with expenditure, the adjusted daily averages were converted into total clearings during a standard quarter (by multiplying them by the average number of normal clearing days in a month and combining the months into quarters). The Central Statistical Office have provided a seasonally-adjusted series of total final expenditure at current market prices; this is a component of the published series "gross domestic product at factor cost". Chart II shows the two seasonally-adjusted series over the same period of time as Chart I.

Correlations Chart III shows the two seasonally-adjusted series plotted against each other. This strongly suggests a linear relationship, in other words that total final expenditure consists of a constant part and a part proportional to clearings. But the relationship seems to have changed around April 1960 (when the credit clearing was introduced), so separate lines have been drawn for the periods before and after this. The shift is to be expected because of the increased coverage of the series: for example, standing orders, which now pass through the credit clearing, were formerly settled by a bulk payment through the town

clearing, and so excluded from the series. By standard statistical methods straight lines were fitted to the data for these two periods, as shown in Chart III.

Statistical results The line fitted for the period from the second quarter of 1960 to mid-1964 is:

$$y_t = 2,120 + 0.4373x_t \quad (1)$$

where t is the serial number of a typical quarter (counting from the second quarter of 1960 in this case), y_t represents total final expenditure in £ millions in this quarter and x_t total clearings in £ millions in the same quarter. No simple equation of this kind can be expected to fit the data exactly. The goodness of fit is measured by the average size of the errors, that is, the differences between the actual values of y_t and those calculated from the equation. It can be pictured as the average distance of the points in Chart III above or below the fitted line. Provided the errors are random, the smaller the average distance the more reliable is the equation for trying to predict the future. The average distance, as measured by the 'standard error' (1) of the equation, is 61 in this case (less than 1% of total final expenditure) and the correlation coefficient is 0.995. (0 represents no correlation and 1 perfect correlation)

The line fitted for the period preceding the introduction of the credit clearing is:

$$y_t = 2,349 + 0.4304x_t \quad (2)$$

which has a standard error of 53 and a correlation coefficient of 0.990. Although the slope of the line is very close to that of equation (1), the constant term is not and it can be shown that the difference between the equations is statistically significant, *i.e.*, the difference in coverage of clearings makes it impossible to fit a single equation satisfactorily over the whole period.

It is necessary to guard against the possibility that these high correlations arise from the uninterrupted upward trend of both final expenditure and clearings during the last eight years. This could be tested by removing the time trend from y_t and x_t separately, and then correlating their deviations from trend. It is simpler and more satisfactory to introduce a time trend into the equation connecting y_t and x_t , which then

(1) The square root of the mean of the squares of the errors.

Chart II^(a)
Quarterly totals, seasonally adjusted

£ millions

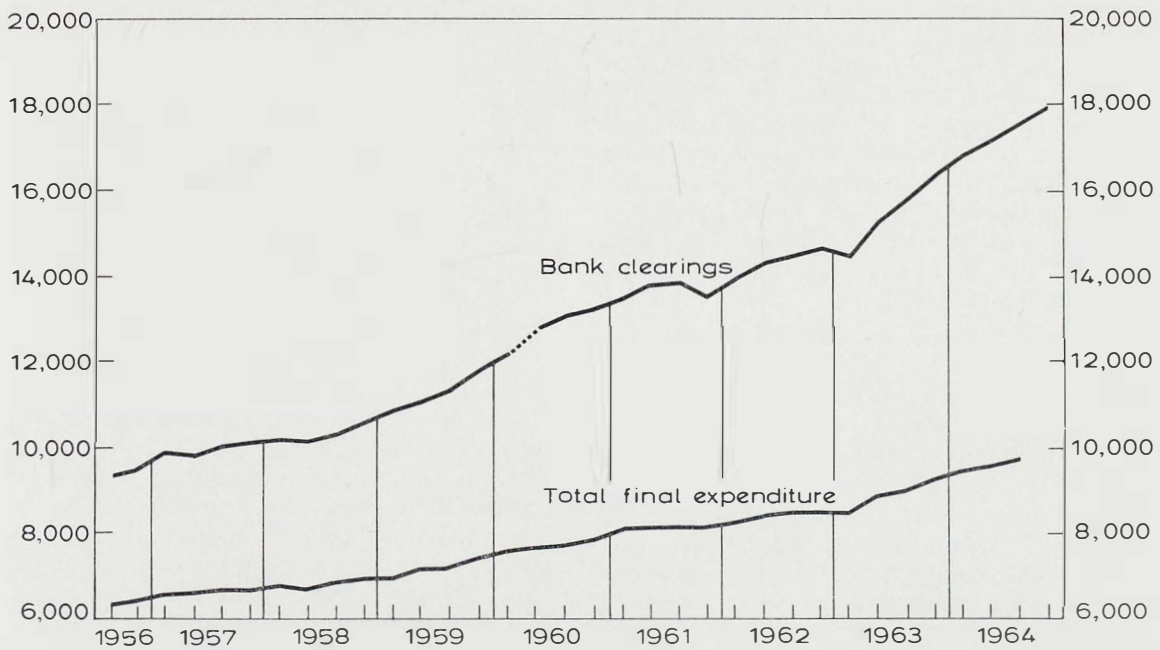
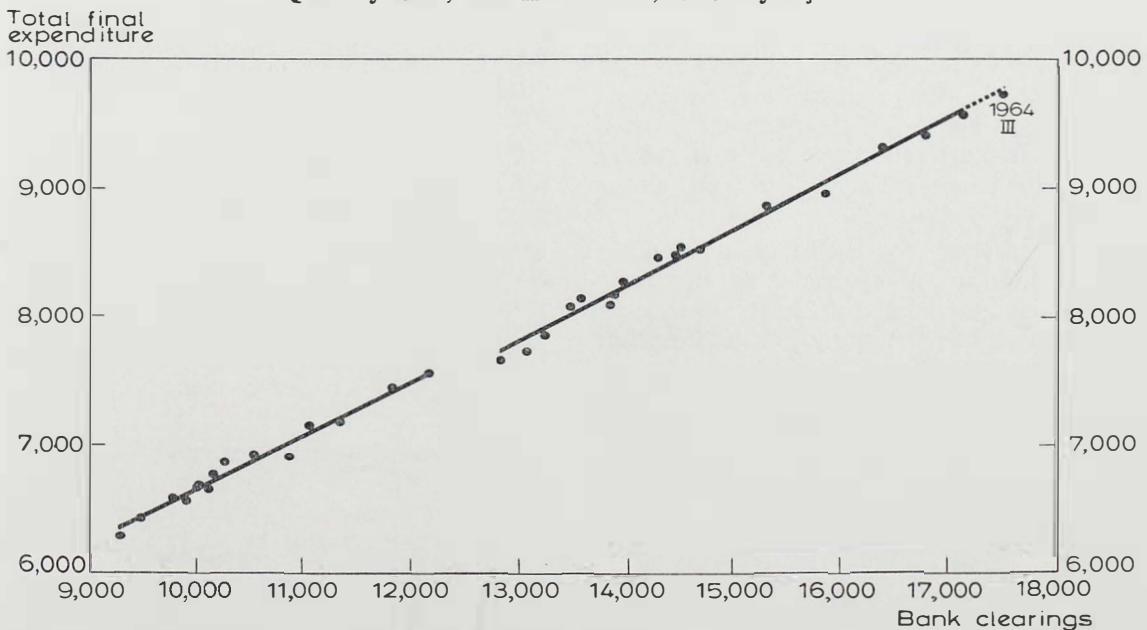


Chart III^(a)
Quarterly totals, 1956 III—1964 III, seasonally adjusted



^(a) Bank clearings comprise general and provincial debit clearings and, from April 1960, the credit clearing: the lines in Chart III correspond to the periods before and after the change in coverage.

becomes, using data for the same period as equation (1):

$$y_t = 3,252 + 0.3436x_t + 25.59t \quad (3)$$

The standard error of the new equation is 48 and the errors are satisfactorily random. If the correlation between y_t and x_t is due to both having a steady upward trend, their "partial" correlation, *i.e.*, after eliminating the effect of their common correlation with time, would be low; in fact it is satisfactorily high (0.948). Equation (3) may be more reliable than the simpler equation (1) if, for instance, the relationship is gradually changing as a result of the spread of the banking habit.

There is next the question of whether the relationship might be improved if a different, narrower, measure of activity were chosen. "Total final expenditure" covers, as well as sales to final buyers, changes in stocks of goods and work in progress throughout the economy (eliminating any increase in value due simply to stock appreciation). It is *prima facie* likely that stockbuilding does not bear the same relationship to cheques cleared as other forms of expenditure. It might therefore be supposed that the omission of stock changes—a very volatile item—from final expenditure would produce a closer relationship with clearings. Accordingly this was tried. The equation analogous to equation (3) was found to be:

$$u_t = 4,896 + 0.2005x_t + 65.60t \quad (4)$$

where u_t represents total final expenditure excluding stockbuilding. The standard error of this equation is 49, about the same as that of equation (3), but it is not satisfactory because the prediction errors seem to be influenced by the stockbuilding cycle and are no longer random.

A second possibility is that the relationship might be improved by excluding imports—again on the ground that their ratio to cheques cleared might be significantly different from that of other transactions. Accordingly "gross domestic product at market prices", which is total final expenditure less imports of goods and services, was plotted against bank clearings. The appropriate equation was found to be:

$$z_t = 3,592 + 0.2149x_t + 38.42t \quad (5)$$

where z_t stands for G.D.P. at market prices.⁽¹⁾

The standard error of the equation is 66, much larger than that of equation (3), and the partial correlation is lower.

Advance indicator

Thus the best relationship to concentrate on is, after all, that with total final expenditure. The table opposite compares the latest official estimates of final expenditure during the last four and a half years with those calculated from clearings, using equation (3), which gives the best fit to the data during this period. The largest of the errors is 94 and thirteen out of eighteen are less than 48, the standard error.

The meaning of the equation and of the standard error may be illustrated in another way. It is necessary to qualify any statistical prediction by a margin expressed as plus or minus a certain amount. This amount is calculated on the basis of past experience of the size of the errors and gives, for any required degree of probability, the band within which the realised value is expected to lie. The wider the band, the higher becomes this probability but the less useful the prediction. The official figure for total final expenditure in the third quarter of 1964 would have been predicted as having about nineteen chances out of twenty of lying in the band $9,731 \pm 96$ ⁽²⁾ and having about two chances in three of lying in the narrower band $9,731 \pm 48$ ⁽³⁾ that is, between 9,683 and 9,779; the official estimate is 9,714.

Perhaps more usefully, the calculated figure for the third quarter would have suggested a probable rise of between 1.0% and 2.0% over the official estimate for the second quarter. The actual rise was 1.3%. For the fourth quarter the calculation indicates that the figure for total final expenditure is likely (*i.e.*, has about two chances out of three) to rise by between 1.3% and 2.3%—rather faster than in the third quarter.

Although advance indications of any sharp changes in the rate of growth are valuable, some comments and qualifications must be made. First, it must be emphasised that a

(1) Differs from the definition in *National Income and Expenditure 1964* by the inclusion of taxes on expenditure relating to imported goods. Estimates of these taxes are not available quarterly.

(2) Twice the standard error.

(3) The standard error.

				Bank clearings ^(a)	Total final expenditure		£ millions
					Calculated from clearings ^(b)	Official estimates ^(c)	Prediction error ^(d)
				Seasonally adjusted, at current prices			
1960	2nd quarter	...	...	12,825	7,684	7,678	- 6
	3rd "	...	...	13,090	7,801	7,734	-67
	4th "	...	...	13,217	7,870	7,850	-20
1961	1st quarter	...	...	13,480	7,986	8,080	94
	2nd "	...	...	13,812	8,125	8,093	-32
	3rd "	...	...	13,871	8,171	8,165	- 6
	4th "	...	...	13,595	8,102	8,139	37
1962	1st quarter	...	...	13,977	8,259	8,258	- 1
	2nd "	...	...	14,296	8,394	8,451	57
	3rd "	...	...	14,495	8,488	8,530	42
	4th "	...	...	14,621	8,557	8,514	-43
1963	1st quarter	...	...	14,440	8,520	8,468	-52
	2nd "	...	...	15,270	8,831	8,862	31
	3rd "	...	...	15,817	9,045	8,986	-59
	4th "	...	...	16,386	9,266	9,306	40
1964	1st quarter	...	...	16,791	9,430	9,407	-23
	2nd "	...	...	17,164	9,584	9,591	7
	3rd "	...	...	17,519	9,731	9,714	-17
	4th "	...	...	17,908	9,891		

(a) General and provincial debit clearings and, from April 1960, the credit clearing.

(b) Using equation (3) opposite.

(c) Consistent with total final expenditure published in *Economic Trends* for January 1965.

(d) The official estimate minus the calculated figure: a minus sign means that the official estimate is lower than predicted.

correlation over time between economic aggregates of this nature, however close, must always be treated with caution: partly because (as in this case) the period for which homogeneous data are available may be rather short; partly because the relationship may be gradually changing, for example, as public habits change; and partly because there are other explanatory variables which have been ignored (for instance, the clearings series may contain, despite the omission of the town clearing, substantial transactions of a purely financial nature).

Secondly, the standard error in the calculation is a not negligible percentage of final expenditure. But the official estimates on which it is based are not firm: they are subject to a process of continuous revision and improvement, which often changes figures for several years back. The percentage changes between quarters are less affected by these revisions than the absolute magnitudes; even so, the range of variation in the estimates of the percentage change between two quarters has often been as large as the standard error.

For these reasons, it would be wrong to stress the use of bank clearings as a solitary method of predicting the official quarterly figures. Moreover the prediction of the total is of limited value because much of the interest lies in the host of different component items which it comprises.

The more appropriate use for the series is as one among many partial and imperfect indicators of the way in which activity is moving. Even for this purpose, it must be remembered that clearings can only reflect economic activity

measured in current prices: to draw conclusions about movements in real terms involves the question of choosing and forecasting an appropriate price index, which lies outside the scope of this article. On the other hand, bank clearings have the great advantage of being available monthly and very promptly. Altogether, the statistical investigation gives some ground for believing that bank clearings, if used with an understanding of their limitations, can provide some help in assessing the latest developments in the economy.