THE INFLUENCE OF ECONOMIC DEVELOPMENT ON THE USE OF CHEQUES

A STATISTICAL STUDY FOR GREECE*

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1. *Introduction.*

The development of the cheque system affects the structure of money supply and, to the extent that there are other conditions present, allows the monetary authorities to employ more refined and effective methods of credit control. Where as in developed countries the use of cheques is widespreea, in economically beackward countries payments are effected mainly through transfars of actual cash, either banknotes or coins.

In Greece, the economic conditions which prevailed immediately after the second world war were not favourable for the rapid expansion of cheque payments. During that period the relatively limited volume of transactions was financed to a large extent through gold sovereigns owning to lack of confidence in the currency resulting from continuous inflation. After 1949 conditions in the Greek economy improved rapidly, both from the point of view of the monetary situation and from the point of view of development. Thus, the average annual rate of increase of the cost of living index, which amounted to 9.5% in the period 1950–1955, fell to 2.2% in the period 1955–1960 and to 1.7% from 1960 to 1965. On the other hand, the average annual rate of increase of gross national income at 1958 prices for the period 1950–1965 amounted to 6.2% while per capita income at 1958 prices rose from $ 235 in 1950 to $ 509 in 1965.

Given the economic progress which has taken place in Greece in the last fifteen or twenty years, an attempt is being made in the present paper to draw out certain quantitative indications regarding the development of the cheque system during that period. This attempt may prove useful not only for the design of appropriate policies aimed at stimu-

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lating cheque habits in Greece but also in providing some general idea on the behaviour of this category of payments during the process of economic development.

2. Selection of an indicator of cheque payments.

Debits or credits to sight deposit accounts would be appropriate magnitudes for following the evolution of payments by cheque. Such data, however, covering all banks and special credit institutions, are not available in Greece for an adequate number of years in the post-war period. Instead the volume of bank clearings has been selected; for in Greece, as in most other countries [1], these data extend relatively far into the past.

Cheques which are cashed in a bank other than the one on which they are drawn are finally collected for settlement in Clearing Houses. The procedure of clearing refers, on the one hand, to the exchange of cheques between banks and, on the other, to the settlement of balances. The total value of cheques presented for clearing, which should be equal to the sums cleared plus those settled through the Central Bank, is the magnitude taken in this study as being indicative of cheque payments in Greece.

TABLE 1

Cheques presented for clearing in Greece for selected years

Year	Value of cheques		Number of cheques		Average value of cheques		Percentage change in the cost of living index
	In million drachmae	Percentage change	In Thousand	Percentage change	In drachmae	Percentage change	
1950	7,675	—	492	—	15,600	—	—
1955	20,213	163.4	976	98.3	20,720	32.8	56.8
1960	35,881	77.5	1,138	16.7	31,520	52.1	11.7
1965	70,424	96.3	1,408	23.7	50,030	58.7	8.5

Source: Bank of Greece, «Monthly Statistical Bulletin».

As can be seen in Table 1, during the period under study the total value of cheques presented for clearing increased continuously with varying, of course, annual rates. The corresponding number of cheques

1. See G. Garvy, «Debits and Clearing Statistics and their Use», Board of Governors of the Federal Reserve System, Washington, 1959, pp. 6–24.

presented for clearing showed a substantially smaller increase and even decreased in a number of years. The increase which has thus taken place in the average value of cheques was only in part due to the rise in the level of prices which in any case was rather limited particularly after 1955. Given that the sums for which cheques are drawn also provide indications concerning the spread of cheque habits, it has been considered preferable to use the total value of cheques cleared rather that their number.

In Greece, clearing is effected at three Houses, one each in Athens, Piraeus and Salonica. The greatest part of clarings is done in Athens, a small part in Piraeus and a very small part in Salonica (see Table 2). During 1950–1955 an increase took place in business transacted in the Salonica House, not enough, however, to affect significantly the relative proportion of cheques presented in Salonica. This

TABLE 2

Percentage shares of the three Clearing Houses of Greece in the total value of clearing for selected years

	Clearing House of:		
Year	Athens	Piraeus	Salonica
1950	77.7	19.5	2.8
1955	74.8	18.4	6.8
1960	76.4	17.9	5.7
1965	80.0	13.4	6.6

Source: Bank of Greece, «Monthly Statistical Bulletin».

unbalanced geographical distribution of clearings presumably reflects the high degree of concentration of economic activity in the Athens - Piraeus region [2]. It is likely that financial activity shows an even greater degree of concentration. Nevertheless, taking into account the volume of transactions, the difference between the Clearing Houses should be mainly attributed to the high degree of concentration of industry and trade in the Athens - Piraeus area.

2. It should be noted that figures of clearings may slightly overestimate the degree of concentration. The reason for this should be sought in the fact that a number of small banks operate only in the Athens–Piraeus area exerting thus an upward influence on the volume of clearings effected through the Houses of thsi region.

3. The formulation of the models used.

As mentioned above, cheques which are cashed at the bank on which they have been drawn do not come to the Clearing Houses. Thus the changes in Clearing House business can be considered as representative of the changes in the volume of cheques issued provided that both the number of the banks participating in clearing arrangements and their share in cheques issued remain unchanged from year to year. To consider the value of cheques presented at Clearing Houses as being determined by a magnitude representing the total volume of transactions, a statistical measure embodying the influences exerted by these factors must be introduced into the relevant function as an additional explanatory variable.

The measure employed in this connection is an index of concentration of sight deposits at participating banks. Sight deposits were assumed to be in direct relation to cheques drawn. This index is based on the formula proposed by Gini - Hirschman [3]. If D represents outstanding balances of sight deposits at the end of a given year at bank i (i = 1,2, ..., n) and D the total of sight deposits in all n banks on the same date, the index of concentration C will be :

$$C = 100\sqrt{\sum_{i=1}^{n}\left(\frac{D_i}{D}\right)^2}$$

It can be easily seen that this index is affected both by the number of banks participating in clearings and by the distribution of sight deposits among them. Specifically, the index becomes greater as the number of banks declines and the distribution of deposits becomes more uneven. It should be added in this connection that, because the clearings taking place in any one year are likely to be influenced by the value of the concentration index at the end of the previous and the current years, it has been considered advisable to use as an independent variable in the function the semi-total of these two values.

In order to explain the behaviour of the value of cheques presented for clearing (X) in the period under review an attempt has been made to select a relatively reliable indicator of the total value of transactions in the economy, since direct estimates of this magnitude are not available in Greece. For this purpose the basic aggregates provided by the

3. See A. Hirschman, «National Power and the Structure of Foreign Trades», Berkeley and Los Angeles : University of California Press, 1945, pp. 157–162.

National Accounts were used, i.e. gross national produts (Y) and gross expenditure of the economy (E). Since cheques in Greece are mainly used in industry and trade, clearings have been also related to the gross product of these sectors (Yp).

It should be stressed here that changes in the above magnitudes could be considered as representative of the development of transactions in the economy only if real transactions per unit of product or expenditure remained unchanged and financial transactions moved in parallel with national accounts magnitudes. It is, of course, highly arguable that these conditions did actually hold in the period under review. For want of a better approach, however, these conditions were assumed to hold at least in the first stage of the analysis so as to be able to draw useful quantitative information for further elaboration.

On the basis of the above discussion of the factors which may affect the value of cheque clearings in Greece, the following functions were formed in which ustands for the error term :

$$(1) \qquad X = f\ (Y,\ u)$$

$$(2) \qquad X = f\ \left(\frac{Y,\ C(t) + C(t-1),\ u}{2}\right)$$

$$(3) \qquad X = f\ (E,\ u)$$

$$(4) \qquad X = f\ \left(\frac{(E,\ C(t) + C(t-1),\ u}{2}\right)$$

$$(5) \qquad X = f\ (Yp,\ u)$$

$$(6) \qquad X = f\ \left(\frac{Yp,\ C(t) + C(t-1),\ u}{2}\right)$$

It is, of course, evident that the validity of the above functions rests on the assumption that the legal rules which relate to the issue, transfer and payment of cheques as well as the legal consequences of breaking these rules remained unchanged in the period examined. In Greece, during the period studied this condition holds absolutely since there has not been any significant change in the relevant legislation between 1949 and 1965.

4. *The statistical results.*

The above formulated functions of the value of cheques presented for clearing were estimated by the method of ordinary least squares on the basis of the statistical data presented in Table 3. The results obtained for the period 1949–1965 are shown in Table 4.

It is observed that each of the three magnitudes used as indicators of total transactions in the economy explains a considerable part of total variance in the dependent variable. In addition, the regression coeffcients estimated are definitely significant at the 5 per cent level. Certainly, the upward trend that dominates both the independent and the dependent variable in these equations (No 1, 3, 5) contributes considerably to the high coefficients of determination found. It is a fact, however, that year-to-yaer changes in clearings and in each of the three series used are closely related. Consequently, clearings tend to reflect rather adequately the underlying changes in general business

TABLE 3

Statistical data used to estimate te parameters of various models explaining the behaviour of clearings, 1949 – 1965 (In million drachmae)

Year	Value of cheques presented for clearing X (t)	Gross national product at current prices Y (t)	Gross expenditure of the economy at current prices E (t)	Gross domestic product of manufacturing industry and trade at current prices Yp (t)	Concentration index of sight deposits $\frac{C(t) + C(t-1)}{2}$
1949	5.0	27.6	30.8	6.1.	46.4
1950	7.7	33.3	37.0	8.2	45.6
1951	10.5	39.3	43.7	9.2	47.6
1952	12.5	41.2	44.3	9.2	48.4
1953	14.4	54.1	56.7	12.5	53.7
1954	17.3	62.7	66.1	15.3	59.0
1955	20.2	72.2	75.0	17.5	58.0
1956	23.1	84.1	88.3	20.4	57.2
1957	29.0	90.4	94.9	21.9	58.8
1958	31.6	94.2	99.8	23.3	60.7
1959	33.3	97.8	102.5	24.0	61.4
1960	35.9	105.4	110.8	26.0	60.9
1961	38.4	119.7	125.8	28.2	60.2
1962	44.5	127.4	134.7	30.2	59.7
1963	49.9	141.0	148.8	33.4	58.4
1964	60.9	157.7	169.3	37.1	57.5
1965	70.4	176.3	102.9	41.9	56.1

Sources: Bank of Greece, «Monthly Statistical Bulletin», Ministry of Coordination, «National Accounts Statistics for Greece, 1948–1965», No 16, Athens, 1967.

conditions [4]. This observation is particularly important for short-term analyses in Creece, where the number of comprehensive and reliable indications of business activity is very small.

The explanatory ability of the equations is further impoved when the concentration index of sight deposits is introduced as an additional independent variable. Its regression coefficient has in all cases a negative sign, which is in accord with a priori expectations. From the functions tested the one that includes total expenditure fits the data better. The two independent variables used explain the 99.5 % of total variance in the dependent variable and their regression coefficients are definitely significant at the 5 percent level. Also, the partial correlation coefficient between X and E is 0.996 and between X and $\frac{C(t)+C(t-1)}{2}$ is -0.665.

In order to compare the rates of change in cheques and total expenditure in the economy during the period examined use was made of the coefficient of elasticity. Thr average value of partial elasticity of X with respect to E is 1.34, whose difference from unity is statistically significant at the 5 per cent level. This elasticity shows that in the period examined an increase of total expenditure by 1 % was accompanied by an increase in cheques as represented by the value of clearings by 1.34 %.

TABLE 4

Regression equations estimated from statistical data of Table 3

	Coefficients of:					
Equation No.	Y	E	YP	$\frac{C(t)+C(t)}{2}$	Constant	R^2
(1)	.4198	—	—	—	-7.9581	.985
	(.0136)					
(2)	.4526	—	—	-.4036	11.6405	.992
	(.0135)			(.1111)		
(3)	—	.3935	—	—	-7.8352	.961
		(.0988)				
(4)	—	.4170	—	-.3363	8.7172	.995
		(.0105)		(.1006)		
(5)	—	—	1.7536	—	-7.9073	.979
			(.0661)			
(6)	—	—	1.9401	-.5555	18.9342	.993
			(.0562)	(.1101)		

4. A similar analysis for the United States see in G. Garvy, op. cit., pp. 67-71.

It must be noted, however, that in a developing country total payments in the process of production and distribution as well as financial transactions, in which cheques are widely used, are likely to increase at a faster rate than total expenditure on finished goods and services. Consequently the value of elasticity should, perhaps, be even higher than 1.34 in order to justify firmly the hypothesis that the use of cheques has been definitely extended in Greece in the postwar period.

5. The relation between clearings and sight deposits.

Cheques, being written orders to transfer money, are issued in a volume which is related to the stock of this money, i.e. to sight deposits. In the preceding analysis the outstanding total of deposits was not included among the explanatory factors of the behaviour of clearings, since it was assumed that the volume of transactions as reflected in the total expenditure or income determines concurrently both the level of sight, deposits and the volume of cheques issued. An investigation, howerer of the relation between these last two variables is essential in order to present a more clear picture of the subject.

The regression of clearings on the semi-total of outstanding sight deposits (S) at the end of the previous and current years has yielded the following equation.

$$X(t) = 2.4846 + \underset{(.2423)}{7.6172}\left(\frac{S(t)+S(t-1)}{2}\right)$$

$$R^2 = .985$$

This equation shows that an adequately systematic relation exists between variables X and $\frac{S(t)+S(t-1)}{2}$. It should be noted that, although the factors embodied in the concentration index employed above were not taken into account in this equation, the level of sight deposits alone explains 98.5 % of the variance in clearings. The value of the average elasticity of clearings with respect to sight deposits (.92) shows that in the period examined an increase of 1 % in sight deposits was accompanied by an increase in clearings of .92 %. The difference of this elasticity from unity is statistically significant at the 5 per cent level. Consequently, it can be said that in the period 1949–1965 the use of cheques compared with the increase in sight deposits has shown a smaller rate of expansion.

Another useful way of examining the relation between clearings and sight deposits would be to calculate their ratio on an annual basis [5]. As shown in Table 5, this ratio declined substantially at the beginning of the period examined but failed to show any clear trend throughout the rest of the period. It should be noted that during the same period the income velocity of circulation (calculated as the ratio of gross national product at current prices to total money supply) showed a downward trend. This difference in the development of the two measures should be sought in two directions: First, in the basic conceptual differences of the two measures and the peculiarities in calculating them. Second, and more important, in the fact that in Greece during the period examined the demand for currency was determined not only by the needs of increased transactions but also by a continuously increasing propensity to hold assets, a direct result of the gradual restoration of

TABLE 5

Ratio of clearings to sight deposits and income velocity of circulation in Greece for selected years

Year	Ratio oj clearings to sight deposits (a)	Rati of GNP at currentprices to money supply (a)
1950	12.8	13.3
1955	7.8	10.5
1960	7.8	7.4
1965	8.3	5.8

(a) Semi-total of the figures refering to the end of the previous and the current year.

monetary stability. Thus, the total money sypply—the greater part of which is made up of currency—increased much more rapidly than sight deposits which were mainly used for transactions and not for asset-holding.

5. This ratio has been considered by many writers as an indicative measure of the transactions velocity of circulation (see R. T. Selden, «Monetary Velocity in the United States», in Studies in the Quantity Theory of Money, Edited by M. Friedman, The University of Chicago Press, pp. 218–219). This use, however, of the ratio is rather limited in Greece where sight deposits constitute a small fraction of total money supply.

Conclusion

In the postwar period the rate of development of the Greek economy was ratherhigh. As a result of the improvement of banking techniques and of transaction methods in general it could be expected that the use of cheques would expand at a rate far more rapid than that of total transactions. From the above quantitative analysis, however, no indications have appeared which warrant this assumption for the period 1949–1965. This conclusion is strengthened by the observation that during the same period the rate of increase of clearings was slightly smaller than that of sight deposits.

The unsatisfactory rate of expansion of thė cheque system in Greece calls for measures which should alter the conditions on which the estimated relationship rest. One way whereby the use of cheques could be stimulated would be the payment of civil servants' salaries by cheque. It is true that such an effort was made in the past with no worthwhile results. Nevertheless, this measure should be introduced again and, possibly, be extended to other categories of payment. As it is know, changes in transaction habits cannot take place in a short period of time.

Of greated importance for the development of the cheque system would be the overhauling of existing legislation in conjunction with orgañizational improvements at the banks in order to facilitate transactions in cheques. It is evident moreover that the effective solution of this problem would contribute greatly to the improvement and modernization of the monetary system, especially as far as monetary control techniques are concerned.