# THE IMPACT OF CREDIT CONTROLS ON CONSUMER DURABLE EXPENDITURES AND FIXED INVESTMENT IN THE IRISH ECONOMY

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The purpose of this paper is to examine the relationship between credit guidelines and real expenditures in the Irish economy. Between 1978 and 1984, the Central Bank issued a number of quantitative and sectoral credit guidelines designed to regulate private sector credit in the system. The ultimate objective of the quantitative guidelines was to achieve an external reserves target (see Murray, 1979), whereas the sectoral guidelines, by restricting personal lending, was to ensure that a significant proportion of the total available credit is reserved for "productive" purposes.

Directives on Licensed Banks lending have been issued by the Central Bank since 1965. However, with one exception (the personal lending guidelines in 1974), the guidelines were unenforced, and in a large number of cases, unspecific, directives. In contrast, the current controls are enforced by special deposit and market base deduction measures which penalise banks for breaches of the guidelines. As a consequence, a greater degree of compliance by the banks is to be expected. The earlier quantitative guideline was replaced by reserve requirements as an instrument of policy in 1972 and no sectorial guidelines were issued between 1975 and 1978.

This paper is organised into two sections. First, the growth rates in bank lending in relation to both types of guidelines is analysed to determine if the controls acted as a constraint. This discussion then provides the basis for a number of empirical tests conducted in section 2. The assumption underlying these tests is that credit is necessary to finance consumer durable expenditures and fixed investment in the economy. If there is imperfect substitution to unregulated forms of credit or alternative sources of funds, then guideline induced credit rationing will reduce real expenditures in the economy. The paper does not consider the implications for inventories or working capital or indeed other forms of rationing such as dynamic or equilibrium credit rationing.

The principal conclusion is that personal loans, but not "productive" loans, were rationed over the period and that this in turn resulted in lower consumer durable expenditures.

## Quantitative and Sectoral Credit Guidelines

The growth rates in the Associated Banks total and personal credit in relation to each of the quantitative and sectoral credit guidelines, issued between 1978 and 1984, are given in Table 1.[1] With regard to the

Table 1: *Bank Lending Subject to the Guidelines.*
*Cumulative % change from the introduction of guideline.*

| Guide-line | Period | Associated Banks Total Private Sector Credit (1) | Quanti-tative Guideline (2) | Associated Banks Personal Lending (3) | Non-Associated Banks Personal Lending (4) | Total Personal Lending (5) | Sectoral Guideline (6) |
|---|---|---|---|---|---|---|---|
| 1 | Sept '78 March '79 | 14.7 | 10 | – 3.0 | | | 5 |
| 2 | 1979 Q1 | 11.9 | | 8.4 | | | |
|  | Q2 | 14.6 | | 0.4 | | | |
|  | Q3 | 18.6 | | – 0.6 | | | |
|  | Q4 | 17.5 | 18 | – 1.4 | | | 10 |
| 3 | 1980 Q1 | 2.4 | | 3.1 | | | |
|  | Q2 | – 0.5 | | 3.6 | | | |
|  | Q3 | 5.1 | | 11.9 | | | |
|  | Q4 | 12.7 | 13 | 5.7 | | | 6 |
| 4 | 1981 Q1 | 6.8 | | 14.2 | | | |
|  | Q2 | 6.8 | | 3.8 | | | |
|  | Q3 | 14.5 | | 11.1 | | | |
|  | Q4 | 16.3 | 15 | 13.5 | | | Directive |
| 5 | 1982 Q1 | 6.1 | | 6.5 | 3.1 | 4.7 | |
|  | Q2 | 2.7 | | 1.5 | 1.0 | 1.3 | |
|  | Q3 | 6.4 | | 9.5 | 0.3 | 8.1 | |
|  | Q4 | 9.3 | 14 | 10.6 | 4.3 | 7.3 | 7 |
| 6 | 1983 Q1 | 1.4 | | 9.2 | – 2.2 | 3.2 | |
|  | Q2 | 2.8 | | 9.6 | – 4.4 | 2.2 | |
|  | Q3 | 6.1 | | 11.7 | – 11.1 | – 0.3 | |
|  | Q4 | 8.4 | 11 | 10.6 | – 11.9 | – 1.2 | 11 |

*Source:* Various Central Bank Bulletins.

*NOTES:*
1. Data is exclusive of loans for housing and foreign currency based lending as these are exempt from the guidelines.
2. The personal credit guideline was extended to include the Non-Associated Banks instalment credit in 1981 I.
3. The 1983 data on total private sector credit relates to the Licensed Banks. Lending by the Associated Banks was not available for this year.

quantitative guideline, columns 1 and 2 show that lending was generally in line with the first four guidelines and that the banks did not maximize their lending bases in 1982 and 1983. It was only in the earlier part of the period, therefore, that this guideline could have acted as a constraint. It should be noted, that the reduction in lending in 1979 IV followed consultations between the Central Bank and the Associated Banks and that the acceleration in lending in 1980 IV which maximized the lending base, followed a conservative policy towards lending in the earlier quarters (see Leddin, 1983).

The data relating to the sectoral credit guideline is given in column 3. At first sight this data is somewhat perplexing because it indicates a negative growth in personal loans over the period September 1978 to February 1980. This is unusual because this growth rate is inconsistent with the trend prevailing both before and after this sub period and indeed with the trend in total credit. In the twelve months to 1978 III for example, personal loans increased by 42.8% (which is why the sectoral guideline was introduced) and there is no apparent reason for such an abrupt change.

If this negative growth rate could be explained by a fall in credit demand then no rationing could have occured. However, the data indicates that a more plausible explanation may have been an attempt by the banks to maximize group profits subject to the constraint of the credit guidelines. The reason for this is that the Associated Banks have important subsidiaries in the unregulated but considerably more expensive instalment credit market.[2] If the Associated Banks reserved for "productive" borrowers the permitted increase in total credit, the subsidiaries could expect a significant increase in business as rationed personal borrowers sought alternative sources of funds. With the Associated Banks concentrating on productive loans within the constraint of the quantitative credit guidelines (as mentioned above, it was necessary for the Central Bank to enfore this guideline, in 1979) the net effect would be to maximize group profits.[3]

The available data tends to support this point of view. Between 1978 IV and 1979 IV, instalment credit *increased* by 25.9% whereas the Associated Banks personal credit *decreased* by 10.9%, even though interest rates on instalment credit are roughly double those charged on personal loans. Since it is irrational to pay higher interest rates than necessary, the demand for credit cannot explain these paradoxical growth rates. In the absence of any other explanation, the group profit maximization suggestion seems the most logical, but it carries the implication that personal loans were rationed at the Associated Banks during this sub period. If this explanation is correct, then the unusual situation has arisen

where the quantitative credit guideline has resulted in personal loans being rationed while simultaneously making the sectoral guideline redundant.

If evidence were required that borrowers would prefer to pay lower interest rates, then the data relating to the 1982 and 1983 offers verification. In May 1982, the sectoral credit guideline was extended to include instalment credit and this virtually equalized the personal lending bases of the Associated and the non-Associated Banks. Columns 3 and 4 show that the growth rates in the two forms of credit are now reversed. In 1983, in particular, the increase in the Associated Banks personal lending was more than offset by a fall in the non-Associated Banks personal lending, and as a result, total personal lending fell. Because special deposits only apply to banks that have excess lending at a time when overall lending is also in excess, the sectoral credit guideline did not act as a constraint in this year. Also, the conditions that existed in 1978 and 1979 were not reproduced in this period. The quantitative credit guideline was not maximized and this indicates that the demand for "productive" loans was not sufficient to permit a re-enactment of the 1978/79 rationing of personal loans.

Finally, the period 1980 I to 1982 II is noteable in that it is characterized by a strong correlation between Central Bank communications to the Associated Banks requesting compliance with the sectoral guidelines and a reduction or a more moderate increase in these banks personal loans. It will be observed from column 3 that in 1980 IV, 1981 II, IV and 1982 II, the Associated Banks personal lending either decreased or moderated significantly. All of these quarters were proceeded by Central Bank communications.[4] This would tend to suggest that in this particular sub period, the sectoral guidelines were restrictive and that personal borrowers at the Associated Banks were again rationed.

### Empirical Analysis

The tests to establish if the quantitative or sectoral credit guidelines affected real expenditures in based on the prediction errors obtained from estimating a series of credit and expenditure equations. As a first step, the following equations explaining the Associated Banks personal loans (P.L.), the Non-Associated Banks instalment credit (I.C.) and real consumer durable expenditures (C.D.) were estimated using pre guideline data;[5]

1. $P.L_t = \alpha_o + \alpha_1 AA_t + \alpha_2 PI_t + \alpha_3(RL - RD)_t + \alpha_4 RG_t + \alpha_5 D^S + U_t$

2. $I.C_t = \beta_0 + \beta_1 NAA_t + \beta_2 PI_t + \beta_3(RL^*-RD^*)_t + \beta_4 RG$
$\beta_5 D^S + U_t$

3. $C.D_t = a + b(Y_t - (1-d)Y_{t-1}) + c(RL_t - (1-d)RL_{t-1}) + e(P_t - (1-d)P_{t-1}) + f(M_t - (1-d)M_{t-1}) + (1-\phi)CD_{t-1} + U_t$

where AA and NAA are respectively, the Associated and non-Associated Banks discretionary balances (total resources minus required reserves) which act as scale variables, PI is the industrial production index which indicates the risk associated with lending; RL, RD, $RL^*$ and $RD^*$ are respectively the Associated and non-Associated Banks lending and deposit rates. The difference between these rates reflects loan profitability and helps reduce multicollinearity between the various interest rates. RG is the yield on Exchequer bills which reflects the opportunity cost of lending, $D^S$ are seasonal dummy variables and $U_t$ are the associated disturbance terms. Equation 3 is derived from a stock adjustment model of consumer durable expenditure due to Hamburger (1967) where Y is real national income, which is proxied by the production index, P is the price of consumer durable goods relative to all other consumer goods and M is real money balances. The parameter d is the depreciation rate for which, following an iterative procedure, a value of 2.5 precent per quarter was assumed and $\phi$ is the reaction coefficient which shows the rate actual stocks adjust towards desired stocks.

Equations 1 and 2 were estimated, using quarterly data, over the period 1974I–1978III and equation 3 over the period 1972I–1978III. The lower observation was dictated by the availability of data and 1978III is the quarter immediately preceeding the introduction of the guidelines. The regression results are given in Table 2. In general, the equations have a high explanatory power and are well specified. All of the significant variables have the correct sign. A disappointing aspect, however, is the insignificance of the interest rate variables in all three equations.

The C.D. equation and the investment equation given below are unusual in that the disturbance term is added to the final equation to be estimated. If, as is normally the case with stock adjustment models, a disturbance term was added to the reaction function or the equation explaining the desired capital stock, then it is possible that the error term in regression 3 (and also regression 6 below) is autocorrelated. Also, because of the lagged endogenous variable in both equations, the D.W. statistic may not be an appropriate test to detect this autocorrelation. However, Durbins h test substantiated the earlier results by indicating no autocorrelation in either the C.D. or investment equations. Furthermore, estimation by G.L.S. resulted in significantly poorer empirical results. Both the

explanatory power of the equations and the significance of the individual coefficients was reduced. As a consequence, it was decided to proceed using the results presented in regressions 3 and 6.

## Table 2: *Regression Results*
### *Dependent: Associated Banks Personal Lending [PL]*

| Regression Number | Constant | AA | PI | (RL-RD) | RG | D1 | D2 | D3 | DW | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | − 288 | .1 | 2.6 | 3.5 | − .8 | 9.3 | − 13 | 4.1 | 1.57 | .98 |
| | (5.6) | (6.1) | (3.5) | ( .3) | ( .5) | ( .9) | (1.9) | ( .5) | | |

### *Dependent: Non Associated Banks Instalment Credit [1.C]*

| | Constant | NAA | PI | (RL*-RD*) | RG | D1 | D2 | D3 | DW | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | − 271 | .28 | 5.1 | − 13.2 | 2.2 | 37.3 | −13.6 | 10.9 | 1.66 | .96 |
| | (2.3) | (2.8) | (4.2) | (1.6) | ( .3) | (2.2) | ( .9) | ( .7) | | |

### *Dependent: Consumer Durable Expenditure's [C.D.]*

| | Constant | $\Delta Y$ | $\Delta RL$ | $\Delta P$ | $\Delta M^S$ | CD-1 | | DW | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 1.77 | .57 | .5 | − 64.0 | .02 | .98 | | 2.18 | .82 |
| | ( .2) | (3.9) | ( .2) | (2.1) | ( .8) | (8.9) | | | |

*Notes:* t — statistics in brackets.

When the equations are now reestimated using additional data from the guideline period (1978IV – 1984I), each of the equations fail the Chow test for stability. Compared to a theoretical F statistic of approximately 2.4, F statistics of 2.8, 11.1 and 3.4 were calculated for regression 1, 2 and 3 respectively.[6] Furthermore, when the pre-guideline regression estimates are used to predict the dependent variables over the guideline period, the prediction errors reveal that equations 1 and 3 over predict whereas equation 2 under predicts the dependent variable. That is, both the supply of Associated Bank personal loans and consumer durable expenditures are less than the pre-guideline estimates would suggest whereas instalment credit is significantly higher.

A further test, suggested by Hamburger and Zwick (1977) was also applied. For consumer durable expenditures, it was found that the average algebraic residual for the period 1978IV to 1982I (the period the analysis in section 1 suggested personal loans were rationed) was significantly higher than the average residual for either the full sample or total guideline observations. It was also found that the average algebraic

residual for the sub period 1980I – 1982I was greater than that for 1978IV – 1979IV even though the growth in personal loans was negative in the latter period. This perhaps reflects different degrees of substitution to instalment credit in the two periods.

In general the results accord with the analysis in section 1 and they point to a guideline induced reduction in consumer expenditures. A more formal test is implemented below to verify the direction of causation. Before examining this however the following two equations explaining the Associated Banks productive lending (P.R.L. is defined as total private sector credit, including foreign currency based lending, minus personal credit) and real fixed investment (INV) were estimated;

4. $P.R.L_t = \psi_0 + \psi_1 AA + \psi_2 E + \psi_3(RL-RD) + \psi_4 RG + \psi_5 D^S + U_t$

5. $INV_t = h + i\,(Y_t - (1-d)\,Y_{t-1}) + J(UC_t - (1-d)UC_{t-1})$
$\quad\quad + k(INF_t - (1-d)INF_{t-1}) + (1-\phi)INV_{t-1} + lD^S + U_t$

Equation 4 is similar to equations 1 and 2 except that employment, E, is used as a risk variable (this was decided on the basis of higher $R^2$ in the regression results). Equation 5 is the Chow (1967) investment function where $UC = (RL+d)/(P_K/C.P.I.)$ is the user cost of capital, $P_K$ is the price of capital goods, C.P.I. is the consumer price index, 1NF is the inflation rate and all other variables are as previously defined.[7]

The results of estimating equation 4 over the period 1974I-1978III and equation 5 over the period 1972I-1978III are given in table 3. Again the equations are well specified and have a high explanatory power. With the exception of the RG variable in equation 4, all of the significant variables have the correct signs.

Table 3: *Regression Results*

*Dependent: Associated Banks Productive Lending* [PRL]

| Regression Number | Constant | AA | PI | (RL-RD) | RG | D1 | D2 | D3 | DW | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | −2401 | 1.1 | 17.2 | 13.2 | 22.7 | 45 | 68 | 50 | 1.76 | .993 |
|  | (5.2) | (12.9) | (4.6) | ( .5) | (3.8) | (2.2) | (3.2) | (2.3) |  |  |

Dependent: Fixed Investment [*INV*]

| | Constant | ΔY | ΔUC | ΔINF | D1 | D2 | D3 | INV-1 | DW | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 98.5 | 1.98 | − 2.2 | − .47 | − 5.9 | 1.2 | − 36 | .79 | 2.1 | .75 |
|  | (1.7) | (2.8) | (1.4) | (1.0) | ( .7) | ( .1) | (3.8) | (5.0) |  |  |

*Note:* t — statistics in brackets.

In contrast to the previous results, both equations are found to be stable when estimated over the guideline period.[8] Compared to a theoretical F statistic of approximately 2.5, the respective F statistics for regression 4 and 5 are 1.79 and 2.3. Furthermore this stability result is not unique to the Chow investment function. Both Jorgensons (1963) and Tobins (1969) "q" investment functions were estimated and found to be stable. The Chow function is reported here because of its similarity to Hamburgers consumer durable expenditure equation.

With regards to the causation issue, the relationship between the various dependent variables prediction errors was examined. (The prediction error is derived by using the pre guideline regression estimates to predict the dependent variable over the guideline period. The actual values are than subtracted from the predicted value to obtain the error). In particular, the C.D. error was regressed on the P.L. and I.C. errors and the INV error on the PRL error. The results are given in table 4, regressions 6 and 7.

Table 4: *Regression Results*

*Dependent: Consumer Durable Expenditure's Prediction Errors*

| Regression Number | Constant | PL | PL-1 | IC | IC-1 | DW | $R^2$ |
|---|---|---|---|---|---|---|---|
| 6 | 22.6 | .14 | .74 | .007 | .02 | 1.54 | .38 |
|  | (1.1) | ( .4) | (2.13) | ( .2) | ( .9) |  |  |

Dependent: Investment Prediction Errors

| | Constant | PC | DW | $R^2$ |
|---|---|---|---|---|
| 7 | 38.5 | .17 | 2.3 | .04 |
|  | ( .5) | ( .6) |  |  |

*Note:* t — statistics in brackets.

It will be observed from regression 6, that the P.L. error lagged one quarter has a significant and correctly signed effect on the C.D. error (first differences were used in this equation to remove serial correlation). In contrast, regression 7 shows no relationship between the INV and PRL errors (this is also the case if lagged values of PRL are used). These results are consistent with the earlier findings that the guidelines reduced consumer expenditures but not fixed investment.

In order to establish the significant of this effect on consumer durable expenditures, one final test was implemented. The predicted values of the dependent variable in regression 6 (that is the explained C.D. prediction

error) is used as an indicator of the rationing induced real expenditure effect. This measure, denoted C.R., was then evaluated in the following equation explaining retail sales;

6. $R.S. = \lambda_0 + \lambda_1 YF + \lambda_2 RF + \lambda_3 G + \lambda_4 E + \lambda_5 E^* + \lambda_6 D^{EMS} + \lambda_7 C.R. + \lambda_8 D^S + U_t$

Where R.S. is the retail sales index, YF is the U.K.'s gross domestic product, RF is the euro-dollar interest rate, G is Government expenditure, E is the effective exchange rate index, $E^*$ is the expected Irish pound, sterling exchange rate calculated according to an adaptive expectations approach, $D^{EMS}$ is a dummy variable which takes the value of 1 when the currencies of the European Monetary System (E.M.S.) were realigned and $D^S$ are seasonal dummy variables. Equation 6 is a reduced form equation obtained from a portfolio equilibrium model of the Irish economy. This model is an adaption of Kouri-Porters (1974) model and is outlined in Leddin (1986).

*Table 5: Regression Results*
*Dependent: Retail Sales [R.S.]*

| Regression Number | Constant | YF | RF | G | E | E* | D^EMS | CR | D1 | D2 | D3 | DW | R² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 227.3 | 1.1 | −.79 | .06 | −3.2 | 105 | −.28 | −.39 | 6 | 2.5 | 3.5 | 1.96 | .99 |
|  | (2.6) | (1.6) | (1.0) | (3.9) | (2.6) | (2.2) | ( .1) | (2.7) | (1.8) | ( .7) | (1.0) |  |  |

Note: t — statistics in brackets

The results of estimating equation 6 for the period 1978IV – 1984I are given in table 5. The equation explains 99% of the variance of the dependent variable and all the significant variables are correctly signed. The C.R. variable in particular is significant and this, in conjunction with regression 6, implies that the guideline induced reduction in Associated Bank personal loans did significantly affect retail sales.

## Conclusion

In section 1 of this paper, it was suggested that the Associated Banks rationed personal loans during the period 1978IV to 1982I. It was also pointed out that for the earlier part of this period, the rationing should not be attributed to the sectoral guidelines but rather to an attempt by the banks to maximize group profits within the constraints of the credit guidelines.

The subsequent empirical work in section 2 substantiated this interpretation. The results consistently showed that the guidelines did

reduce personal lending and that this in turn affected consumer durable expenditures and retail sales in the economy. An implication of these results is that there is imperfect substitution between personal loans and instalment credit in consumers portfolio's.

The results also showed that productive loans and as a consequence fixed investment, were unaffected by the guidelines. This may be partly explained by the foreign currency based lending exemption and by the discrimination against personal borrowers. In summary, the results point to the guidelines, somewhat inadvertently, reducing consumer expenditure without influencing productive investment.

## Appendix 1

The variables PI and G were obtained from the Folder of Irish Economic Statistics. The variables E and R.S. were obtained from Trends in Employment and Unemployment and the C.S.O.'s, Economic Series, respectively. The variable YF was obtained from Economic Trends, H.M.S.O. and RF was taken from the Bank of Englands Quarterly Bulletin.

The variables C.D., INV and $P_{cd}$ and $P_k$ were obtained from O'Reilly and Lynch (1983) and updated using data provided by the C.S.O. or from data in the Irish Statistical Bulletin.

All the remaining variables were obtained or derived from data contained in the Central Banks Quarterly Bulletins.

*NOTES*

1. The analysis concentrates on the Associated Banks because they accounted for 90% of personal credit and 62% of total credit subject to the guidelines as at February 1979.
2. In February 1979, instalment credit accounted for approximately 60% of total personal credit in the economy.
3. Browne and O'Connell (1979) find moderate support for the hypothesis that credit rationing due to Central Bank directives will be reflected in a reduction in non prime loans relative to prime loans. This discrimination of personal borrowers is perhaps due to the Central Banks insistance that credit be reserved as much as possible for productive purposes.
4. See the Central Bank Bulletins; 1980 IV p. 24, 1981 II, p. 16, 1981 IV, p. 24 and 1982 II, p. 15.
5. The analysis concentrates on consumer durable expenditures as this is the type of expenditure most likely to be affected by the credit guidelines. O'Reilly (1983) is the most recent of a large number of published articles relating to consumer expenditures, but, to this authors knowledge, consumer durables have not, as yet, been examined.
6. A distinction was also made between car sales and other consumer durable expenditures (the results are not reported). The former variable was found to be stable and the latter variable unstable when estimated over the guideline period.
7. To avoid possible simultaneous equation bias between the INV and Y variables, an instrumental variables technique was applied to the Y variable. The U.K.'s gross domestic product, the Euro-dollar

interest rate, Irish Government expenditure and Ireland's effective exchange rate index were used as the instrumental variables.

8. The data on the variables INV and $P_K$ were obtained from O'Reilly and Lynch (1983). It was not possible to update this data beyond 1980 IV. As a consequence this stability result relates only to this period. This should not, however, overly affect the conclusion because as was pointed out in section 1 the quantitative credit guideline was not restrictive in either 1982 or 1983.

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