Monetary Deregulation and Consumption: Evidence from Certain Components of Consumption

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Abstract

This paper investigates the impact of the monetary deregulation in Greece that occurred in 1988 on the relationship between real money balances and real credit and certain components of consumption, namely, durables and non-durables. The Granger-causality methodology is used to examine this relationship over the 1958-1987 and 1988-1996 periods. The results demonstrate that the deregulation has affected only the consumption of durable goods.

1. Introduction

THE objective of this paper is to investigate the connection between disaggregated consumption behaviour and regulation - in the sense that households are unable to use capital markets to smooth consumption- in the monetary sector in Greece. In particular, we examine the impact of monetary deregulation, which occurred in 1988, on two main categories of consumption expenditure, i.e. consumer durables and consumer non-durables. Expenditures by consumers tend to be affected by monetary policy actions. Monetary deregulation is expected to increase competition, implying lower financial intermediation costs. As a result, consumers are expected to react more to changes in their income and to increase their demand for durable goods.

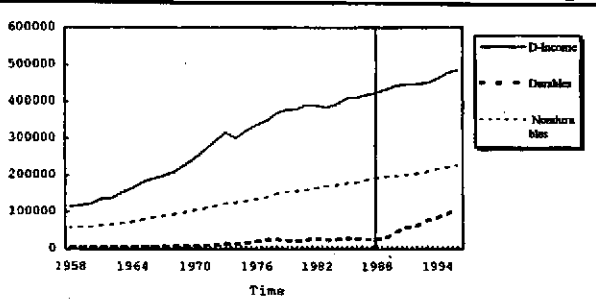

Figure 1: Disposable income, durable and non-durable goods

Deregulation actions have been shown to play a significant role by affecting spending on durables (Jappelli and Pagano, 1989; Campbell and Mankiw, 1989; Wilcox, 1990). Bayoumi (1993) has also shown that deregulation has a substantial impact on consumption, mainly through the influence of deregulation on interest rates, which in turn affect aggregate consumption.

During the regulation era in Greece the main instruments used by the monetary authorities to manage domestic liquidity were direct controls on bank lending and regulation of the terms of bank borrowing. Such direct controls reduced the effectiveness of both monetary and credit policy. Certain deregulation actions included the liberalisation of most interest rates leading to positive real interest rates, the lifting of certain credit rules and direct controls, the creation of an active money market, the reduction of the administrative allocation of bank deposits which account for nearly two-thirds of private deposits, and the abolishment of regulations on foreign exchange (Apergis *et. al.*, 2000). The deregulation of monetary and financial markets opened up new opportunities for household borrowing, leading to an upsurge in households' demand for credit. Households used this credit to purchase mainly real assets, such as durable goods and

housing. Only very recently (over the last two years), households have used the abundance of credit to buy financial assets such as equities. Figure 1 shows that following the deregulation in 1988, there were large increases in consumer expenditure on durables (but not in consumer expenditure on non-durables), although disposable income did not exhibit dramatic changes.

Grieves (1983) argues that monetary and credit conditions influence consumption through their effect on the durables component. Therefore, it is expected that the monetary deregulation should have affected the demand for durables via various aspects of the borrowing-lending process, such as interest rates, term to maturity, down payments, collateral, and transaction costs. It has also been argued that monetary policy actions are associated with future changes in the inflation premium as well as with future changes in real interest rates (Fama, 1990). The latter, in turn, are closely associated with changes in the demand for consumer durables. To examine the impact of deregulation on the consumption of durables as well as non-durables we split the entire period into the pre- and post-deregulation period and, following Ramey (1993), the Granger causality methodology is employed.

The remainder of the paper is organised as follows: section 2 presents empirical results through the Granger-causality methodology over the two sub-periods under investigation, i.e. 1958-1987 and 1988-1996, while section 3 concludes the paper and provides some policy implications.

2. *Empirical Analysis*

Description of Data

Quarterly data on money supply (*M*) defined as M3, credit (*CR*) defined as non-housing loans to the private sector, prices proxied by the consumer price index (1970=100), and the nominal interest rate proxied by the one-year return on public debt, were obtained from National Accounts published by the National Statistical Service of Greece over the period 1958-1996. Data for *M3* were not available from 1958 to 1985. For the empirical purposes of this study, they were calculated by simply taking the sum of its components. In addition, annual data on expenses on durables (*DU*), expenses on non-durables (*NDU*), prices of durables (*PDU*) (1970=100), and prices of nondurables (*PNDU*) (1970=100) were obtained from National Accounts published by the National Statistical Service of Greece covering the same time span.[2] However, to provide an adequate number of degrees of freedom we interpolated observations in expenses on durables, expenses on non-durables, prices of

Table 1: Integration tests

Variable	Phillips-Perron test	
	Levels	First differences
Period 1958-87		
m	-0.12	-4.52*
cr	-0.36	-4.31*
du	-0.64	-4.09*
ndu	-0.22	-4.16*
pdu/p	-0.95	-5.06*
Period 1988-96		
m	-1.77	-5.72*
cr	-0.33	-4.49*
du	-1.27	-4.75*
ndu	-1.09	-4.19*
pdu/p	-0.94	-5.75*
R	-1.37	-4.48*

Notes: *m, cr, du, ndu, pdu/p* and *R* denote respectively, the natural logarithms of real money balances, real credit, real expenditure on durable goods, real expenditure on non-durable goods, the relative prices of durables to non-durables and the real interest rate (not in logs). Critical values obtained from Dickey and Fuller (1981).
* denotes significant at 1%

$$\Delta du_t=\alpha_{10}+\sum_{j=1}^{q1}\beta_{1j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{1k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{1s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{1i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{1r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{1x}\Delta R_{t-x}+w_{1t} \quad (1)$$

$$\Delta ndu_t=\alpha_{20}+\sum_{j=1}^{q1}\beta_{2j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{2k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{2s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{2i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{2r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{2x}\Delta R_{t-x}+w_{2t} \quad (2)$$

$$\Delta m_t=\alpha_{30}+\sum_{j=1}^{q1}\beta_{3j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{3k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{3s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{3i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{3r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{3x}\Delta R_{t-x}+w_{3t} \quad (3)$$

$$\Delta cr_t=\alpha_{40}+\sum_{j=1}^{q1}\beta_{4j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{4k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{4s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{4i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{4r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{4x}\Delta R_{t-x}+w_{4t} \quad (4)$$

$$\Delta relp_t=\alpha_{50}+\sum_{j=1}^{q1}\beta_{5j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{5k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{5s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{5i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{5r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{5x}\Delta R_{t-x}+w_{5t} \quad (5)$$

$$\Delta R_t=\alpha_{60}+\sum_{j=1}^{q1}\beta_{6j}\Delta du_{t-j}+\sum_{k=1}^{q2}\gamma_{6k}\Delta m_{t-k}+\sum_{s=1}^{q3}\delta_{6s}\Delta cr_{t-s}+\sum_{i=1}^{q4}\varepsilon_{6i}\Delta ndu_{t-i}+\sum_{r=1}^{q5}\zeta_{6r}\Delta relp_{t-r}+\sum_{x=1}^{q6}\eta_{6x}\Delta R_{t-x}+w_{6t} \quad (6)$$

durables, and prices of non-durables by replicating the data for each quarter and then applying an exponential smoothing process (Karfakis and Phipps, 1999). The real interest rate (R) was calculated using the nominal interest rate minus the annual percentage change in prices (Bayoumi, 1993; Olekalns, 1997). Throughout the paper, lower-case letters define variables expressed in natural logarithms. Finally, the empirical analysis takes place for the pre- and post-deregulation periods. The pre-deregulation period dates from 1958:1 to 1987:4, while the post-deregulation period starts in 1988:1.

Integration Analysis

Unit root tests, developed by Phillips (1987) and Phillips and Perron (1988), reported in table 1, indicate that all variables, i.e. *m*, *cr*, *du*, *ndu*, and *pdu/pndu* are characterised as I(1) variables in both sub-periods. R is also an I(1) variable in the second period. Cointegration tests (available upon request) revealed the absence of a cointegrating relationship among the variables in both sub-periods.

Short-Run Dynamics

Following the specifications of the model by Alessie et al. (1997) and in terms of the Granger-causality methodology, a model is specified as shown in the panel above, where Δ denotes first differences, *du* is real expenditure on durables, *ndu* is real expenditure on non-durables, *m* is real money balances, *cr* is real credit, *relp* = *pdu/p* is defined as the relative price of durables with respect to the price of non-durables, R is the real interest rate and w_{it} with $i = 1, \ldots 6$ is assumed to be a white noise series.

Testing for Granger causality depends crucially on the order of lag length. Kang (1985) has shown that Granger-causality results are

very sensitive to the choice of lag length. For purposes of the empirical analysis Akaike's (1970) final prediction error (FPE) criterion has been used to determine the optimal lag length. Hsio (1981) has shown that the FPE criterion is appealing because it provides a balance between the risk emerging from the bias of a lower order selection and the risk emerging from an increase in variance from a higher order selection. In addition, over the pre-deregulation period, the vector autoregressive system was estimated without the real interest rate variable, because interest rates over the regulated period were determined through direct control decisions. Having removed non-stationarity from the variables under investigation, appropriate lag lengths were estimated based on the criterion of minimum FPE. The causality tests were performed in both the pre- and post deregulation sub-period.

The causality results, presented in table 2, indicate that a unidirectional causal order running from real money balances to real consumer durables as well as from real credit to real consumer durables is present only over the period following the deregulation. Over the same period, there also exists a unidirectional causal order running from the real interest rate to real consumer durables. Finally, there is a substantial causal order running from both credit and the real interest rate to the relative price of durables with respect to the price of non-durables.

Overall, the causality results demonstrate that real consumer expenditure on durables is the component of consumption most affected by the deregulation. In other words, it is evident that following the deregulation, consumers became capable of escaping the restrictions set by the monetary and credit authorities (set over the pre-deregulation era) on the financing of durable purchases. Despite this, disposable income was not affected - at least directly - by the deregulation; consumers man-

Table 2: Short-run dynamics

Dependent variable Period 1958-87, lags=2	Hypothesis tested	F-statistic	p-values
Δdu	Lagged Δm do not Granger-cause Δdu.	1.01	0.39
Δm	Lagged Δdu do not Granger-cause Δm.	0.61	0.56
Δdu	Lagged Δcr do not Granger-cause Δdu.	0.14	0.87
Δcr	Lagged Δdu do not Granger-cause Δcr.	0.11	0.89
Δndu	Lagged Δm do not Granger-cause Δndu.	1.95	0.27
Δm	Lagged Δndu do not Granger-cause Δm.	0.70	0.51
Δndu	Lagged Δcr do not Granger-cause Δndu.	1.07	0.37
Δcr	Lagged Δndu do not Granger-cause Δcr	2.38	0.13

Table 2 *continued*

Dependent variable Period 1988-96, lags=1	Hypothesis tested	F-statistic	p-values
Δdu Δm	Lagged Δm Granger-cause Δdu Lagged Δdu do not Granger-cause Δm.	10.69 0.15	0.00 0.74
Δdu Δcr	Lagged Δcr Granger-cause Δdu Lagged Δdu do not Granger-cause Δcr.	13.76 0.84	0.00 0.46
Δndu Δm	Lagged Δm do not Granger-cause Δndu Lagged Δndu do not Granger-cause Δm.	0.41 1.62	0.34 0.33
Δndu Δcr	Lagged Δcr do not Granger-cause Δndu Lagged Δndu do not Granger-cause Δcr.	2.56 0.10	0.25 0.78
Δdu ΔR	Lagged ΔR Granger-cause Δdu Lagged Δdu do not Granger-cause ΔR.	13.21 0.81	0.00 0.47
Δndu ΔR	Lagged ΔR do not Granger-cause Δndu Lagged Δndu do not Granger-cause ΔR	1.94 3.54	0.48 0.21

Notes: For the notation, see table 1. Δ denotes first differences

3.Concluding remarks and policy implications

The objective of this paper has been to investigate the direction of causality between real money balances and real credit versus the various components of consumer real expenditure, namely, consumer durables and non-durables, before and after the monetary deregulation that occurred in 1988. The Granger-causality methodology was followed, while the FPE criterion was used to select the optimal number of lag lengths.

The main conclusion from the empirical analysis is that the deregulation has significantly influenced the consumption of durables. In particular, a unidirectional causality exists from real money balances and real credit to real consumption expenditure on durables. By contrast, such a causal order was not detected in the case of non-durables.

Monetary deregulation is expected to make consumption less predictable in response to changes in income and wealth (Bayoumi, 1993). As a result, consumer behaviour -and more importantly business cycles - will be driven by unexpected rather than predictable changes in income and wealth. In other words, monetary

and financial deregulation reduces the ability of the monetary authorities to effectively operate countercyclical policies. By contrast, consumer expenditure on durables is driven (caused) by changes in the real interest rate, which indicates that monetary policy can have real effects since it can change the holding of durables relative to consuming non-durables.

Endnotes

1. University of Ioannina, Department of Economics. The author expresses his gratitude for valuable comments and suggestions, made by two anonymous referees, on an earlier draft of this paper. Needless to say, the usual disclaimer applies.

2. The components of consumption expenditure are as follows:
Durable goods: Furniture, furnishings, automobile purchases, recreation goods, household appliances, education goods, and communication goods.
Non-durable goods: Food, clothes, beverages, tobacco, rent, fuel and power, books, newspapers, magazines, non-durable toys, sport supplies, drugs, toilet products and cleaning.

3. The number of observations in the post-regulation is undesirably small. However, the Greek Statistical Service has publised no later data on consumer expenditure.

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