ASYMMETRIC EFFECTS OF INTEREST RATE CHANGES: THE ROLE OF THE CONSUMPTION-WEALTH CHANNEL

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Abstract

This paper examines the role of the consumption-wealth channel in explaining asymmetric effects of monetary policy changes. Towards this end, we draw upon available literature on the consumption function and behavioural finance to construct a framework for asymmetric effects of monetary policy caused by the impact of wealth changes on aggregate consumption. We then employ data from the UK to examine the validity of the proposed framework. In the context of a liberalized economy with easy access to consumer credit, monetary tightening is expected to have weaker impact on spending than interest rate cuts. Our results validate the above hypothesis.

JEL Classifications: E21, E50

Keywords: Consumption-wealth channel; monetary policy; asymmetry

1. Introduction

There is overwhelming evidence to show that monetary policy exerts significant influence on national output through aggregate demand (Bernanke and Blinder, 1992; Christiano et al, 1996). It is also well known in the theoretical literature that the transmission channels of monetary policy are the credit channel, the interest rate channel, the exchange rate channel and the wealth channel. While the first three channels have been extensively examined, empirical research on the wealth channel has remained restricted to the impact of monetary policy on asset prices. What has not received adequate attention is the entire pass-through of monetary policy changes on consumption expenditure through movement in asset prices and household wealth. On the other hand, the theoretical roots of this consumption-wealth channel can be traced back to as early as works by Modigliani (1963) and Ando and Modigliani (1963). Their life-cycle theory of consumption emphasizes the role played by household wealth in planning for life-time

consumption. However this theory and subsequent work on the permanent income hypothesis by Friedman (1957) postulates that households are consumption smoothers and plan for an entire life-time consumption pattern. In such a framework, there can be little role of monetary policy in so far as the impact of interest rate shocks would be muted. This would be more so in developed financial systems where easy access to consumer credit would allow households to smoothen their consumption patterns.

However recent work has raised concerns about the strong co-movement exhibited by asset prices and consumption. Such correlation has strong bearings on the conduct of monetary policy to the extent that monetary policy shocks impact asset prices and thereby household wealth. While this sensitivity of consumption to wealth changes does not appear to be consistent with the traditional views on consumption, policy makers have been taking increasing cognizance of the importance of this phenomenon. The explanation for this apparent puzzle could lie in the easy access to mortgage equity withdrawals, mortgage re-finance and cheap trading in shares that are possible in developed financial systems. Such easy access to funds whenever required means that any changes in asset prices can be readily translated into liquidity which can then be used for spending on durable or non-durable goods and services. Thus, developed countries could have a section of such 'impatient' consumers whose transitory component of total consumption is significant and easily affected by asset price changes. This would imply the existence of a consumption-wealth channel of monetary policy transmission in such economies.

A recent strand of the monetary policy literature examines asymmetric effects of policy changes. However, as Florio (2004) points out, most of the work related to asymmetric effects of monetary policy has been empirical in nature and the theoretical underpinnings of this phenomenon have been less discussed. Florio (2004), in a survey of the asymmetry literature, documents the following as available explanations: expectations (about future business outlook or inflation), asymmetric price adjustment and credit market imperfections. In this context, the purpose of the present work is to examine the role of consumption-wealth channel as a possible factor in explaining asymmetric effects

of monetary policy changes. Towards this end, we draw upon available literature on the consumption function and behavioural finance to construct a framework of asymmetric effects of monetary policy caused by the consumption-wealth channel. We then employ data from the UK to examine the validity of the proposed framework. In the context of a liberalized economy with easy access to consumer credit, monetary tightening is expected to have weaker impact on spending than interest rate cuts. Our results provide empirical support for this argument.

2. Consumption-wealth channel and asymmetry

The consumption-wealth channel of monetary policy traces the impact of interest rate changes on aggregate consumption through change in market value of assets. Modigliani (1971) is one of the earliest works to demonstrate that consumer spending plays a critical role in transmitting the effects of monetary policy changes to the real economy through the wealth channel. In reality, the changes in wealth could arise due to changes in value of either financial assets or housing. Consequently, consumption may be affected by housing wealth and housing wealth holdings directly rather than indirectly, say through company pension funds. Interest rate shocks can affect consumption through the wealth channel in three ways. First, lower interest rates would lead to higher house prices which increases the asset wealth of existing house owners. Such households can then convert these capital gains from their property into liquid spending power through mortgage equity withdrawal, i.e. extracting equity from the higher value of houses by borrowing more.[1] This enhanced liquidity can then be used for financing consumption of durables or non-durables. Second, lower interest rates lead to rise in value of housing collateral which implies increase in the households' capacity to borrow and willingness of banks to lend. Third, lower interest rates can also boost the market value of financial assets (e.g. market price of shares and bonds are sums of future income streams discounted by what is now a lower interest rate). Thus higher financial wealth can also reduce the need to save and hence release liquidity for consumption spending.

[1] For older house owners, equity release is another channel of extracting equity from higher house prices to finance current consumption.

However recent empirical research has provided only weak support for the existence of the consumption-wealth channel of monetary policy transmission. Ludvigson et al (2002) employed US data from 1966 to 2000 to study the monetary policy transmission to consumption. Their results reveal only a weak role for the wealth channel in transmitting the Federal Reserve's monetary policy changes to consumption spending. Siokis (2005) investigated the consumption-wealth channel of monetary policy transmission in the Euro area by examining data from 1977 to 2002. The results indicate that the wealth channel does not play an important role in transmission of interest rate changes to consumption. Both these papers employed the structural vector auto regression (SVAR) methodology that requires imposition of restrictions on the coefficients of the model. On the other hand, borrowing from the two-step OLS procedure which has been extensively used to study the impact of unanticipated money growth on output (Barro, 1977, 1978), we intend to revisit the issue of consumption-wealth channel of monetary policy transmission by examining data from the UK.

Kahneman and Tversky (1979) in their influential work on what has come to be known as behavioural finance offer the concept of prospect theory. According to this theory, individuals loath losses more than they like gains. This is manifested in a utility function that is concave in gains but convex in the region of losses. It is reasonable to expect that such preferences would suggest consumption behaviour of the Duesenberry (1949) type where the consumption function is steeper for increases in wealth but flatter for wealth reductions. This is the well known Ratchet effect in consumption. Following from these rationales, it is reasonable to expect that increase in wealth may lead to higher consumption but a fall in wealth may lead to a smaller reduction in consumption in absolute terms. Consumers may take recourse to past savings or other sources of credit (primarily unsecured, e.g. credit cards) to mitigate the adverse impact of wealth reduction on consumption.

Thus, this argument introduces the possibility of asymmetry in the consumption-wealth channel of monetary transmission. In other words, the pass-through is now as follows. Lower interest rates lead to higher wealth which can be used by households to finance

higher consumption through equity withdrawals, higher mortgage or increased willingness to spend in general. On the other hand, higher interest rates lead to lower wealth which may not proportionately reduce consumption due to the prospect theory and ratchet effect arguments. In sum, interest rate changes inversely affect asset value which may have asymmetric effects on consumption. Clearly, we are dealing with two issues here. First, does the consumption wealth channel work? Second, can the consumption-wealth channel explain the asymmetric effects of interest rate changes?

Previous studies have explored asymmetries in the response of household consumption to changes in financial and non-financial wealth. Apergis and Miller (2004) found that positive stock market wealth shocks affect consumption more than negative shocks. Disney et al (2002) found that impact of house prices on consumption in the UK is stronger when house prices are rising rather than falling. However our objective is to examine asymmetries in the impact of monetary policy shocks on aggregate wealth and consumption. In other words, we intend to study the monetary transmission channel through aggregate wealth, its impact on consumption expenditure, and examine the presence of asymmetries therein.

3. Data and Methodology

The data were downloaded from the website of the Office of National Statistics (www.statistics.gov.uk) where recent time-series data on financial and non-financial wealth have been made available. Quarterly data from 1990 to 2006 are considered for the following variables; GDP, consumption, financial and non-financial wealth, inflation and Bank of England's official base rate. GDP, consumption and wealth variables are real and de-seasonalized. Inflation is also de-seasonalized. Table 1 presents summary statistics of the data. Figure 1 plots wealth and consumption growth and the interest rate (base rate). The figure shows that interest rate appears to be negatively correlated with consumption growth. Thus, consumption expenditure reacts to interest rate movements. However, how much of these responses can be attributed to wealth changes and whether such responses are asymmetric are the issues to which we turn next.

(Table 1 here)

(Figure 1 here)

To test whether interest rate changes have asymmetric effects and whether such asymmetry can be attributed to the consumption-wealth channel, we need to develop an empirical framework to test the above hypotheses. Cover (1992) employed a simple test of asymmetric effects of monetary policy. He used the two step OLS procedure of Barro (1977, 1978) to estimate a money equation and an output equation. The money equation is as follows.

$$m_t = \alpha_0 + \sum_{i=1}^{N} \alpha_i^m m_{t-i} + \sum_{i=1}^{M} \alpha_i^x x_{t-i} + u_t \qquad (1)$$

where m_t is the money growth rate, x_t is a vector of other relevant variables that affect the money supply process and the error term u_t represents the money supply shock. From the estimated residual series, Cover constructed two distinct series of money supply shocks, viz. easy money supply shocks, $u_t^+ = \max(u_t,0)$ and tight money supply shocks, $u_t^- = \min(u_t,0)$. The output equation is as follows:

$$y_t = \beta_0 + \sum_{i=1}^{P} \beta_i^y y_{t-i} + \sum_{i=1}^{Q} \beta_i^r r_{t-i} + \sum_{i=1}^{S} (\gamma_i^+ u_{t-i}^+ + \gamma_i^- u_{t-i}^-) + v_t \qquad (2)$$

where y_t is the output growth rate, r_t is the three-month treasury bill rate. The estimated values of γ_i^+ and γ_i^- would indicate the presence of asymmetry.

However the use of money supply has been criticized because it may not correctly reflect the changes in monetary policy. Morgan (1993) modified the above analysis by substituting the interest rate set by the monetary authorities (or 'policy rate') in place of money growth. The modified system, which has been subsequently employed by others (e.g. Florio, 2005), is as follows:

$$r_t = \alpha_0 + \sum_{i=1}^{N} \alpha_i^r r_{t-i} + \sum_{i=1}^{M} \alpha_i^y y_{t-i} + \sum_{i=1}^{R} \alpha_i^\pi \pi_{t-i} + u_t \qquad (3)$$

where r_t is the level of the policy rate, π_t is the inflation rate and u_t is the residual that denotes the interest rate shocks not explained by the regressors. The estimated residuals are used to construct positive (easy) monetary shocks $u_t^+ = \min(u_t,0)$ and negative (tight) monetary shocks $u_t^- = \max(u_t,0)$. The second stage regression is as follows:

$$y_t = \beta_0 + \sum_{i=1}^{P} \beta_i^y y_{t-i} + \sum_{i=1}^{S} (\gamma_i^+ u_{t-i}^+ + \gamma_i^- u_{t-i}^-) + v_t \qquad (4)$$

From the estimated values of γ_i^+ and γ_i^-, Cover (1992) and Florio (2005) are able to conclude that the impact of monetary tightening (increase in policy rate) is large and significant while the impact of easy monetary policy (cut in policy rates) is not. However the missing link between the two equations that comprise this two stage procedure is the explanation for this asymmetry. In other words we propose to fill this gap by examining the impact of interest rate shocks on aggregate wealth. In other words, in equation (4), we test for the asymmetric impact of interest rate shocks on wealth changes and then on consumption growth. Thus, we estimate equations (3) and (4) where the estimated values of γ_i^+ and γ_i^- will give us our asymmetry coefficients.

4. Empirical Results

The empirical results indicate the importance of the consumption-wealth channel in explaining asymmetric effects of monetary policy. We estimate equations 3 and 4 in a two-stage regression as explained above. We use OLS regressions with the appropriate lags selected from various information criteria which in all cases turn out to be one. However for the wealth equation we use contemporaneous interest rate shocks because the transmission of monetary policy to financial variables is expected to be quicker which is also supported by the value of various information criteria. Following the above approach, the estimated interest rate equation 3 is presented in Table 2. The residuals from this equation are collected and two distinct series of positive (easy) and negative (tight) monetary policy shocks are constructed as explained earlier. With these series as regressors and growth in aggregate wealth (sum of financial and non-financial wealth) as the dependent variable, equation 4 is estimated and the results are presented in Table 2.[2] As expected, the coefficient of the easy interest rate shock variable is positive whereas that of the tight shock variable is negative. In other words, a monetary policy induced cut in the base rate raises wealth growth and a hike in the base rate leads to a fall in wealth growth. The subsequent effects on consumption are analyzed next.

[2] In this and subsequent regressions, we incorporate a dummy as control for the turbulent period of mid-1992 to mid-1994 when house prices collapsed, stock prices crashed and mortgage equity turned negative.

(Tables 2 and 3 here)

We now consider the dependent variable in equation 4 as consumption growth and re-estimate it. The results are presented in Table 3. The coefficients of the interest rate shocks indicate that monetary tightening has a weaker impact on consumption growth than easy monetary policy as the latter effect is not statistically significant. The test for equality of the two coefficients suggests that the two effects are significantly different from each other. This result is similar to the evidence from Italy where the coefficients of tight and easy monetary policy shocks had negative and positive signs respectively in an equation for output growth (Florio, 2005). For the UK, our results of weaker impact of monetary tightening on consumption growth can be related to Disney et al (2002) who found that consumption responses to house price shocks are asymmetric in the UK. Their analysis of household survey data revealed that consumption impacts of house price shocks are stronger when house prices are rising.

Most studies of the consumption function have concentrated on the non-durables component of consumption expenditure both because of its theoretical appeal and its increasing share in total consumption (Fernandez-Corugedo et al, 2003). However it is important to investigate whether the expenditures on durables and semi-durables behave similarly to the more important non-durables component of consumption. For this purpose we re-estimate equation 4 first with growth in consumption expenditure on non-durables and then with growth in consumption expenditure on durables and semi-durables as the dependent variables. Results reported in Table 3 suggest that the two components of consumption follow the behaviour of aggregate consumption although for the latter the effects are not statistically significant. In other words, while households respond to increases in endogenous wealth caused by interest rate cuts, they do not reduce their consumption proportionately when interest rate rises. This suggests that consumers are able to finance their spending on all forms of consumption by accessing credit. Hence consumption does not fall significantly as a result of adverse changes in wealth due to monetary tightening.

5. Concluding Remarks

This paper attempts to examine asymmetries in the consumption-wealth channel of monetary policy. Towards this end, we examine macroeconomic data from the UK. We employ the two-step OLS methodology used by Cover (1992) and Morgan (1993) for testing asymmetric effects of monetary policy. Our results suggest that wealth and consumption (aggregate as well as disaggregated components) respond asymmetrically to changes in interest rates. This indicates that the consumption-wealth channel can be a possible reason behind the asymmetric effects of monetary policy. The above findings have important policy implications. The asymmetry in the consumption-wealth channel suggests that the central bank should take cognizance of the fact that monetary tightening will not reign in consumption growth to the desired extent, which makes it important to re-assess monetary policy measures especially during periods of asset price inflation and rising price inflation. Pre-emptive and progressive interest rate increases may be required to dampen asset price increases and contain future inflation.

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Table 1: Summary Statistics

	Consumption Growth	Wealth Growth	Interest Rate
Mean	2.407918	0.896532	6.813636
Median	2.63072	1.347963	5.91000
Maximum	5.041232	14.11552	14.8800
Minimum	-1.07939	-15.4619	3.5000
Std. Dev.	1.311667	5.659228	3.0896

Table 2: Interest rate and wealth equations

Interest rate equation		Wealth growth equation	
Variable	Coefficient	Variable	Coefficient
Intercept	-0.17527 (0.5209)	Intercept	1.776807 (0.1096)
Interest(-1)	0.968499 (0.0001)	Lag of Dependent Variable	-0.17501 (0.1852)
GDP Growth	0.230793 (0.0964)	u_{t-1}^{+} (Easy policy)	4.872834 (0.0626)
GDP Growth(-1)	-0.10969 (0.3738)	u_{t-1}^{-} (Tight policy)	-2.16659 (0.5394)
Inflation	0.099965 (0.3258)		
Inflation(-1)	-0.11412 (0.2646)		
Adjusted R-squared	0.974291	Adjusted R-squared	0.040948
Log likelihood	-33.0851	Log likelihood	-204.067
Durbin-Watson stat	1.115153	Durbin-Watson stat	1.790129
F-statistic	493.6514	F-statistic	1.693822
Prob(F-statistic)	0.0001	Prob(F-statistic)	0.163016
Akaike info criterion	1.184396	Akaike criterion	6.335376
Schwarz criterion	1.383455	Schwarz criterion	6.501259

Note: p-values in brackets

Table 3: Asymmetry in Consumption Growth equations

	Consumption Equation	Non Durables Equation	Durables Equation
Independent Variable	Coefficient	Coefficient	Coefficient
Intercept	0.8977 (0.0001)	1.03822 (0.0001)	0.973363 (0.0001)
Lag of Dependent Variable	-0.25478 (0.0422	-0.44099 (0.0003)	-0.22011 (0.0776)
u_{t-1}^{+} (Easy policy)	0.49111 (0.1065)	0.454943 (0.0983)	0.569286 (0.14870)
u_{t-1}^{-} (Tight policy)	-0.53902 (0.2120)	-0.51816 (0.1850)	-0.18971 (0.7316)
Adjusted R-squared	0.055098	0.179922	0.033182
Log likelihood	-64.6213	-57.9763	-81.8705
Durbin-Watson stat	1.958999	1.970216	1.909589
F-statistic (Prob)	1.947548 (0.11396)	4.565183 (0.002728)	1.55771 (0.197035)
Akaike criterion	2.109737	1.908372	2.63244
Schwarz criterion	2.27562	2.074255	2.798323

Note: p-values in brackets

Figure 1: Interest rate, consumption and wealth growth