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

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1. INTRODUCTION

- The paper focuses on the wealth channel of monetary (interest rate) policy.
- The impact of changes in interest rates on consumption via their effects on asset prices and wealth is the focus.
- Additional influences through other channels, particularly with regard to investment and the ‘credit channel’ are ignored, but are all clearly not mutually exclusive.
- The paper is motivated by:
 - recent interest in the effect of fluctuations in asset (house and stock market) prices on wealth and consumption;
 - increased access to credit and (house) equity withdrawal by consumers (as a result of ‘financial innovation’).

- The core hypothesis to be tested is that increases in wealth (driven by asset price increases, particularly in housing) may drive increases in consumption.
- But there may be an asymmetry in that falls in asset prices may not engender less than proportionate falls in consumption.
- This in turn has implications for the conduct of monetary policy.

- **The Consumption – Wealth Channel**

- (Private Sector) consumption is the largest component of aggregate demand (much larger than investment, with public sector expenditure in between).
- Wealth effects on consumption have long been postulated (Modigliani et al – Life cycle hypothesis)
 - we are however postulating shorter term influences, potentially conflicting with Friedman’s related Permanent Income Hypothesis
- As household wealth accumulates it is affected by seemingly increasing asset prices swings.
- ‘Low’ interest rates (‘cheap money’) seems to drive asset price inflations and bubbles.
- Capital gains (e.g. in houses) can be converted to spending power by equity withdrawal (re-mortgaging).
 - alternatively, rising asset values increase the value of collateral, making borrowing easier and cheaper.
 - lower interest (and hence discount) rates will also boost market values of expected future income streams.

3). Asymmetry

- Will rises ('hikes') in interest rates have a symmetric effect?
- The behavioural finance literature (Kahneman & Tversky, 1979), finds that individuals loath losses more than they like gains.
- Hence the losses implicit in asset price falls may not be recognised (in the hope that they may soon be reversed and consumers may attempt to maintain the consumption levels to which they have become accustomed.
 - they may take on extra debt to achieve this if needs be, and greater availability of consumer debt in the last couple of decades has facilitated this;
 - or they may run down savings.
- Hence consumers try to 'smooth' consumption by taking on ('net') debt to avoid reducing consumption.
 - this may be more sustainable in the short term than the medium term;

- the sustainability of the debt levels may be dependent on how rapidly rates are raised and how large the cumulative rise is (these are matters for further investigation).
- If, however, consumers do manage to avoid reducing consumption proportionately in the face of interest rate (cumulative) hikes, then we have a rationalisation for the ‘Ratchet Effect’ uncovered by Duesberry (1949)
 - note that Duesberry focused on income fluctuations whilst we focus on wealth effects.

4) Data

- The aim is to test the hypotheses:
 - that the consumption – wealth channel exists, and
 - that it operates asymmetrically.
- The UK, the US, and Australia are initially chosen for analysis given the importance of housing (and equities) in wealth in these countries and that they have experienced fluctuation in house prices potentially related to fluctuations in interest rates.
 - further, their highly developed mortgage (home loan) markets permit housing equity withdrawal (re-mortgaging) and consumer credit markets are also well developed.
- Other countries may increasingly experience similar asymmetric wealth-consumption effects as financial innovation progresses in their home loan and consumer credit markets.

- Our initial results are derived using UK data (results for the US and Australia to be added in due course).
- Data are quarterly from 1989 to 2006. We could perhaps go back further, but this period starts at the peak of the last house price boom in the UK and covers a period of rapid financial innovation.

5. The Model

- Following Cover (1992), we employ a two-step OLS procedure devised by Barro (1997, 1978) to test for the asymmetric affects of monetary policy on consumption via wealth effects.
- Unlike Cover (1992), who focuses on money supply shocks, we follow Morgan (1993) and Florio (2005) in focusing on interest rate shocks.
- Our modified system (focusing on wealth rather than income effects) is as follows:

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

- Where r_t is the policy interest rate, π_t is the inflation rate and u_t the unexplained residual.
- The estimated residuals are used to construct positive (easy money) shocks (u_t^+) and negative (tight money) shocks (u_t^-)

- And the second equation (introducing wealth) becomes

$$w_t = \delta_0 + \delta^+ u_t^+ + \delta^- u_t^- + v_t \quad (2a)$$

- Where w_t is aggregate (sum of the financial and non financial household) wealth.
- we define $\delta^+ u_t^+$ as Tight Wealth (TW) , and $\delta^- u_t^-$ as Easy Wealth (EW)
- Relating income to wealth (via implied the consumption effects of wealth changes) yields the third equation:

$$y_t = \beta_0 + \sum_{i=1}^P \beta_i^y y_{t-i} + \sum_{i=1}^S (\gamma_i^+ u_{t-i}^+ + \gamma_i^- u_{t-i}^-) + v_t \quad (3a)$$

- The estimated value of γ_i^+ and γ_i^- from equation 3a will reflect the degree of asymmetry.

6. Empirical Results (UK Case)

- Equations 1a, 2a and 3a are estimated as a three stage regression. Residuals from the OLS regression of 1a are used to devise the positive (TIGHT) and negative (EASY) interest rate shocks, using the log of aggregate wealth (WEALTH) is the dependent variable, equation 2a is estimated.
- Table 2 reports the results, and as postulated, the coefficient of negative interest rate shocks is positive, and that of positive shocks is negative. i.e. wealth is inversely affected by interest rates shocks.
- From the estimates of 2a, the endogenous variables EW and TW are constructed.
- In the third stage, the output growth equation is estimated and the results are presented in Table 3.

- The coefficients of EW and TW suggest that the impact of wealth changes on GDP growth is stronger during easy monetary policy than during monetary tightening and that the two coefficients are significantly different in magnitude, in line with the proposition of asymmetry.
- To test whether the asymmetry in the effect of positive and negative interest rate shocks on income is via the consumption channel, we replace GPP growth by consumption growth in 3a and re-estimate. (see Table 3). The results are not as strong, implying that the consumption channel may not be the only source of asymmetry.
- Finally, we re-estimate 3a first with growth of consumption of non-durables and then with growth in consumption of durables and semi-durables to see if differential effects can be discerned (see Table 3).
 - there is no discernable difference, but generally the findings that consumption does not fall proportionately as wealth declines (relative to when it increases) is confirmed, as with aggregate (durable and non-durable) consumption.

7. Policy Implications

- There is evidence in the UK, and possibly elsewhere (Australia and US to be tested) of asymmetric effects of monetary policy induced by interest rate changes.
- We find evidence that the consumption wealth channel may explain this due to effects explored in the behavioural finance literature and easier access to consumer credit (debt). But the effects on income are not entirely explained by this channel, so that investment and government expenditure effects also need to be explored.
- Given asymmetry, central banks (especially in more advanced financial systems) need to take account of the likelihood that raising interest rates may not reign in consumption growth to the extent anticipated (if symmetry is assumed), especially in periods of accelerating asset price inflation and relatively low real interest rates. Pre-emptive and progressive interest rate increases may be required to dampen asset price increases and contain future inflation.
- In contrast, interest rate cuts may provoke a prompt stimulative effect.

Table 2: Interest rate and wealth equations

Interest rate equation		Wealth equation	
Variable	Coefficient	Variable	Coefficient
Intercept	-0.987674 (0.0036)	Intercept	9.867723 (0.0000)
INTEREST(-1)	0.978428 (0.0000)	u_t^+ (Easy policy)	0.193264 (0.0850)
GDPGR	0.203381 (0.1671)	u_t^- (Tight policy)	-0.302812 (0.0298)
GDPGR(-1)	0.102157 (0.4326)		
INFLATION	0.166253 (0.3317)		
INFLATION(-1)	-0.064014 (0.7064)		
Adjusted R-squared	0.973056	Adjusted R-squared	0.051061
Log likelihood	-55.44428	Log likelihood	-2.988000
Durbin-Watson stat	1.057519	Durbin-Watson stat	0.161810
F-statistic	521.0324	F-statistic	2.883313
Prob(F-statistic)	0.000000	Prob(F-statistic)	0.062815
Akaike info criterion	1.683405	Akaike criterion	0.161800
Schwarz criterion	1.871662	Schwarz criterion	0.256661

Table 3: Wealth effect in GDP Growth equation

	GDP Equation	Consumption Equation	Non Durables Equation	Durables Equation
Independent Variable	Coefficient	Coefficient	Coefficient	Coefficient
Intercept	0.032313 (0.8408)	0.893282 (0.0000)	1.040134 (0.0000)	0.985402 (0.0000)
Lag of Dependent Variable	0.961586 (0.0000)	-0.275877 (0.0268)	-0.443619 (0.0002)	-0.213273 (0.0827)
Lag of EW	4.519313 (0.0197)	4.730566 (0.0888)	4.371556 (0.0774)	5.696582 (0.0999)
Lag of TW	-1.368595 (0.1569)	1.770582 (0.1895)	1.695281 (0.1541)	1.416865 (0.3854)
Adjusted R-squared	0.885953	0.061624	0.177465	0.037068
Log likelihood	-43.88665	-71.14743	-63.03826	-86.65175
Durbin-Watson stat	1.504223	2.003931	2.012524	1.959934
Akaike criterion	1.396761	2.175641	1.943950	2.618621
Schwarz criterion	1.557368	2.336248	2.104557	2.779228
F-statistic (Prob)	135.0031 (0.000000)	2.132821 (0.086681)	4.721751 (0.002087)	1.664044 (0.169065)