

Micro Foundations for how Firm Ownership by Consumers can affect Consumer Preferences: The Case of Mutual Bank Deposits

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Abstract

Girotti and Meade (2017) present results from the estimation of Multinomial Logit (MNL) and Random Coefficient Logit (RCL) models of US bank deposit demand. Their specification of indirect utility assumes that bank ownership type – in particular, “mutual”, “depositor” or “customer” bank ownership – interacts with deposit rate. Empirically they find that these interaction terms enter depositors’ indirect utility functions (IUFs) with a negative sign. This note provides micro foundations for the inclusion of this interaction term, and further derives conditions under which it enters depositors’ IUFs negatively. We show that inclusion of an interaction terms arises in the standard, two-period household inter-temporal utility maximisation problem, and show that the interaction term enters depositor’s IUFs negatively if depositors’ are sufficiently patient. To our knowledge, this is the first time that firm ownership by consumers has been shown using micro foundations to affect consumer preferences.

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1 Introduction

This note uses standard micro foundations to illustrate how a bank's ownership type can affect the sensitivity of its depositors' IUFs to deposit rate. This motivates the inclusion of an interaction term between an ownership type dummy variable and deposit rate in the indirect utility specification adopted in Girotti and Meade (2017) equations (1) and (2). It also enables conditions to be derived under which the coefficient on that term in depositors' IUFs is negative, as they find empirically.

To our knowledge this is the first time it has been demonstrated that a firm's ownership attribute – here, mutual or customer ownership of a deposit-taking bank – can directly affect the specification of consumer preferences.

The next section modifies the standard two-period household inter-temporal utility maximisation problem to incorporate ownership impacts on deposit rate in depositors' IUFs. Section 3 then derives conditions under which that interaction can enter IUFs negatively, while section 4 concludes.

2 Incorporating Mutual Bank Ownership in the Standard Household Inter-Temporal Utility Maximisation Problem

2.1 Recasting Utility Maximisation to be in terms of Deposit Choice

We assume the standard two-period household inter-temporal utility maximisation problem. Exogenous income is y_t in periods $t \in \{1, 2\}$, while consumption in each period is c_t .

The household makes a deposit $D_1 > 0$ in period 1, earning per period exogenous deposit rate $r^D(CO)$ with:

$$CO = \begin{cases} 1 & \text{if the bank is customer owned (i.e. mutual)} \\ 0 & \text{if the bank is investor owned.} \end{cases} \quad (1)$$

We assume $\frac{\partial r^D}{\partial CO} > 0$ based on the theoretical prediction of Girotti and Meade (2017) that $r_{CO}^D > r_{IO}^D$.¹ Abstracting from taxes, risk and differ-

¹Specifically, see the theoretical model of bank behaviour set out in the Appendix to Girotti and Meade (2017). Due to a mutual bank internalising depositor and lender surplus as well as profits, it chooses r^D such that the bank breaks even, thereby maximising surplus. This involves a mutual bank offering a higher deposit rate than an equivalent

ences in household preferences, the household's financial resources in period 2 include the proceeds from deposit D_1 upon maturity.

The household's inter-temporal budget constraints therefore write in the usual way as:

$$c_1 = y_1 - D_1 \quad (2)$$

$$c_2 = y_2 + D_1 (1 + r^D(CO)) \quad (3)$$

These constraints allow us to write the household's inter-temporal utility problem in terms of our choice variable of interest, D_1 . Specifically, for ease of exposition (i.e. enabling closed-form derivations), and without loss of generality, we assume logarithmic and time-invariant preferences. Thus in period t we have $u_t(c) = u(c) = \log(c)$ with $u' > 0$ and $u'' < 0$.

Hence, the household's inter-temporal utility maximisation problem writes as:

$$\max_{c_1, c_2} [\log(c_1) + \beta \log(c_2)] \quad \text{s.t. (2) and (3)} \quad (4)$$

$$\Leftrightarrow \max_{D_1} [\log(y_1 - D_1) + \beta \log(y_2 + D_1 (1 + r^D(CO)))] \quad (5)$$

As usual, $\beta \in [0, 1)$ is a discount factor reflecting the household's rate of time preference. The only difference between our setup and the standard utility maximisation problem is due to our inclusion of the CO effect on r^D , and writing the utility maximisation in (5) in terms of D_1 instead of $\{c_1, c_2\}$.

2.2 Solving for Household Deposit Demand

Taking first order condition with respect to D_1 from (5), a household's optimal deposit demand is given by:

$$D_1^*(r_D(CO), y_1, y_2) = \frac{\beta y_1 (1 + r^D(CO)) - y_2}{(\beta + 1)(1 + r^D(CO))} \quad (6)$$

3 Showing that Mutual Ownership and Deposit Rate Interact Negatively in Depositors' Indirect Utility

The household's indirect utility function in this case writes as:

$$v(r^D(CO), y_1, y_2) = u(y_1 - D_1^*(\cdot)) + \beta u(y_2 + D_1^*(\cdot)(1 + r^D(CO))) \quad (7)$$

investor-owned bank.

Showing that mutual ownership and deposit rate interact negatively in depositors' indirect utility is equivalent to showing that:

$$\frac{\partial}{\partial CO} \left(\frac{\partial v}{\partial r^D(CO)} \right) < 0 \quad (8)$$

Starting with the interior derivative $\frac{\partial v}{\partial r^D(CO)}$, rather than differentiating (7) directly we apply the envelope theorem by differentiating (5) with respect to $r^D(CO)$ and then substitute $D_1^*(\cdot)$ for D_1 using (6). This yields:

$$\frac{\partial v}{\partial r^D(CO)} = \frac{\beta y_1 (1 + r^D(CO)) - y_2}{(y_1 (1 + r^D(CO)) + y_2) (1 + r^D(CO))} \quad (9)$$

By the quotient rule, the sign of the derivative of (9) with respect to CO is given by the sign of the numerator of that derivative, which numerator is:²

$$-\frac{\partial r^D}{\partial CO} \left[\beta y_1^2 (1 + 2r^D + (r^D)^2) - y_2 (y_2 + 2y_1 (1 + r^D)) \right] \quad (10)$$

Recall that $\frac{\partial r^D}{\partial CO} > 0$ by assumption – i.e. deposit rate is predicted to be higher under mutual ownership than investor ownership. Thus, to establish that deposit rate interacts negatively with customer ownership in indirect utility, i.e. (8), it is sufficient to show that the term in square brackets in (10) is positive. This requires that:

$$\beta > \frac{y_2 (y_2 + 2y_1 (1 + r^D))}{y_1^2 (1 + 2r^D + (r^D)^2)} \quad (11)$$

Hence we find that mutual bank ownership is associated with depositors' IUFs being more negatively related to $r^D(CO)$ – when $\frac{\partial r^D}{\partial CO} > 0$, as predicted by Girotti and Meade (2017) – provided that depositors are sufficiently patient.

4 Conclusions

In this note we provide micro foundations for why deposit rate interacts with mutual ownership in depositors' IUFs, and derive conditions under which the interaction enters those IUFs negatively. This both motivates the inclusion of such ownership and deposit rate interactions in equations (1) and (2)

²By the quotient rule, the derivative of $\frac{f(CO)}{g(CO)}$ with respect to CO is $(f'g - fg')/g^2$, so to sign that derivative is sufficient to sign $f'g - fg'$.

of Girotti and Meade (2017). It also provides a possible explanation for why they empirically find that the coefficients on these interaction terms are negative.

More generally, to our knowledge this is the first time it has been demonstrated that a firm's ownership attribute – here, mutual or customer ownership – can directly affect the specification of consumer preferences. Furthermore, we have derived feasible conditions under which the attribute interacts with “price” (here, deposit rate) with a particular sign (here, negatively). Finally, we interpret those conditions in terms of a well-known feature of consumer preferences (i.e. discount factor).

References

- [1] Girotti, M. and R. Meade, 2017, *U.S. Savings Banks' Demutualization and Depositor Welfare*, Banque de France Working Paper #639, August.