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A COMBINED FLOW-OF-FUNDS MODEL FOR THE EXPENDITURE AND PORTFOLIO DECISIONS OF THE HOUSEHOLD SECTOR IN FINLAND: STRUCTURE AND SOME PRELIMINARY EMPIRICAL ESTIMATES

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Abstract

The aim of this paper is to present the approach adopted in building the submodel for the household sector in the financial market model of the Research Institute of the Finnish Economy. The model presented here is a flow-of-funds model of the combined type where both real expenditures and financial portfolio allocations are considered simultaneously. Also a theoretical framework for the decision-making of a household under credit rationing, a typical feature of the Finnish financial markets, is presented in the beginning of the paper. The main part of the paper is devoted to the derivation of an empirical flow-of-funds model for the household sector and to present a preliminary estimation result of the model.

* This is a report of an early phase of the work. I thank professors Erkki Koskela and Pentti J.K. Kouri for valuable suggestions on building the model and the topics considered here.

1. Introduction

The aim of this paper is to present in short the approach used in the model for the expenditure and financial portfolio decisions of the household sector, a submodel of the whole financial market model being built at the Research Institute of the Finnish Economy. The paper starts with presenting a simple theoretical framework for household behaviour under credit rationing, and then proceeds to consider the stock demand functions and the adjustment mechanism of the behavioural equations. The paper presents empirical figures on assets and liabilities, both in stocks and flows, of the household sector in Finland, as well as the rate of return variables, and also shows a preliminary estimation result of the model.

2. Behaviour of households under credit rationing

The available sources of finance, i.e. wage income y_t, property income and increase in liabilities $\Delta\ell_t = \ell_t - \ell_{t-1}$ is used to purchase a consumption goods bundle c_t, a capital goods bundle which we here identify as housing i_t and a basket of financial assets a_t. The intertemporal utility function U is supposed to be additive, its arguments being c_t, k_t and a_t.[1)]

$$(1) \qquad U = \sum_t U_t(c_t, k_t, a_t) \; ,$$

where k_t is the stock of the capital good. The price of the capital good in terms of the consumption good is denoted by p_k. The financial asset a is yielding a constant real rate of interest r, also taken to be the real loan rate of interest. The budget constraint in real terms is now

$$(2) \qquad a_t = y_t - c_t - p_{kt} i_t + (a_{t-1} - \ell_{t-1})(1+r) + \ell_t \; .$$

One central institutional feature influencing monetary research in Finland is (permanent) credit rationing in the bank loan market. Accordingly, we want to describe households to be typically, not wealth but liquidity constrained of varying degree and introduce some constraints to describe the "imperfect" functioning of the credit markets. Here we consider two types of constraints on borrowing. First, it is a uniform practice that the lenders require a collateral on their loans, and as a consequence, the total amount of loans extended to a single household cannot exceed the total amount of real wealth of the household, or a certain fraction m of the wealth,

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1) The inclusion of financial assets (money) in the utility function can be "justified" by means of the transactions cost argument. It is also, as Brock and Turnovsky (1981) say, a "convenient device for capturing the reasons for holding money in a certainty world" (or model). Of course, we are not here dealing with money but with an interest-bearing asset. In the Finnish conditions, obviously also elsewhere, the bulk of the transactions balances of the households is made by bank deposits, the share of cash and check accounts being rather small.

(3) $\ell_t \leq m(p_{kt}k_t)$, $m \leq 1$.

On the other hand, the banks screen their customers on the basis of how worth of credit they are, how good clients they have been and are in future, etc. Important factors in this respect are deposits accumulated in the past and income (prospects), i.e. future deposits of the household as a source of funds for the bank's credit supply. Naturally, these are also taken into account because of risk assessment and the risk avoidance goal in bank lending behaviour. So for instance, we might specify a second constraint of the type

(4) $\ell_t \leqq h_0 + h_1 y_t + h_2(a_{t-1} - \ell_{t-1})$, $h_0, h_1, h_2 \geq 0$.

An obvious question is, whether (3) and (4) are binding at the same time or whether usually only one of them is in effect. A normal situation is probably the one where (3) is not a binding constraint because loans are not typically extended just to even out a discrepancy between incomes and consumption, at least not to a great extent, but to finance acquisition of some real capital asset, e.g. housing or consumption durables. On the other hand, for good customers of a bank the role of the constraint (4) is smaller and the constraint (3) is of a greater importance.

We further assume for simplicity that there is no depreciation of the capital good,

(5) $k_t = k_{t-1} + i_t$.

Let us now denote by λ_t and μ_t the Lagrangean multipliers related to the constraints (3) and (4) respectively. In order to maximize the intertemporal utility function (1) we solve c_t from (2) and k_t from (5). The conditions for optimum are as follows (maximization is done with respect to a_t, i_t and ℓ_t)

(6) $$\frac{\partial U}{\partial a_t} = -U_{c_t} + U_{a_t} + U_{c_{t+1}}(1+r) + h_2\mu_{t+1} = 0$$

(7) $$\frac{\partial U}{\partial i_t} = -U_{c_t} p_{kt} + \sum_{i=0}^{\infty} U_{k_{t+i}} \underbrace{\frac{\partial k_{t+i}}{\partial i_t}}_{=1} + m \sum_{i=0}^{\infty} p_{k,t+i}\lambda_{t+i} = 0 .$$

(8) $$\frac{\partial U}{\partial \ell_t} = U_{c_t} - (1+r)U_{c_{t+1}} - \lambda_t - \mu_t - h_2\mu_{t+1} = 0$$

(9) $$\lambda_t(-\ell_t + mp_{kt}k_t) = 0$$

(10) $$\mu_t(-\ell_t + h_0 + h_1 y_t + h_2(a_{t-1} - \ell_{t-1})) = 0 .$$

(11) $$\lambda_t, \mu_t \geq 0 .$$ [1)]

From (8) we see that if one of the credit constraints is binding and so λ_t, μ_t or μ_{t+1} is positive, we have

(12) $$U_{c_t} - (1+r)U_{c_{t+1}} > 0 .$$

So, when compared to the case of perfect credit markets, the marginal rate of substitution is higher in the credit rationing case, more of the volume of consumption is postponed into the future because of lack of funds, see on this more closely the theoretical analysis of Koskela and Virén (1983).

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1) The constraints on the sign of c_t, k_t, a_t, $\ell_t \geq 0$ are not explicitly taken into account here.

The optimum conditions above can also be written as

$$(8') \qquad U_{c_t} - (1+r)U_{c_{t+1}} = \lambda_t + \mu_t + h_2\mu_{t+1}$$

$$(6') \qquad U_{a_t} = \lambda_t + \mu_t$$

$$(7') \qquad U_{k_t} = p_{kt}(U_{c_t} - (1+\dot{p}_{kt})U_{c_{t+1}} - m\lambda_t) ,$$

where $\dot{p}_{kt}$ is the expected rise in the relative price of the capital good in terms of the consumption good. In deriving (7)', the multiperiod nature of the decision problem is taken into account, i.e. that i_{t+1} is also planned to be made optimally.

We may make some partial observations from these equations. According to (8') the marginal rate of substitution, or the implicit rate of interest $(U_{c_t}/U_{c_{t+1}} -1)$, rises as the present tightness of credit (λ_t or μ_t) or the expected tightness (μ_{t+1}) increase. Equation (6') shows that the demand for financial assets decreases if the indicators of the tightness of credit λ_t or μ_t increase. The demand for capital, i.e. housing, decreases by (7') and (8') if m is less than one, as the constraint (3) of the housing finance becomes tighter (λ_t rises) and also if the general credit constraint (4) becomes tighter. A rise in the expected real price of housing, i.e. a rise in $\dot{p}_{kt}$, increases housing investment.

It is naturally questionable how the functioning of the credit market should be described, and whether both of the above constraints (3) and (4) should be included in the model. Anyway, by introducing the constraint (4) we are able to illustrate the dynamic aspect of credit rationing.

The model could be analyzed by means of comparative statics. In this short paper we do not discuss the conclusions which this theoretical model would reveal on the characteristics of household behaviour any further, but go now over to discuss the empirical model.

3. The stock demand equations and the adjustment mechanism

We devide the derivation of a system of equations to be estimated in the usual manner into two phases. First, we specify the notional asset and liability demand functions without imposing any quantity constraints, i.e. availability of credit constraints. These equations for the real stock variables could be of the following type[1)]

$$
(13)\quad
\begin{aligned}
c_t^* &= W_t(r_t, \dot{p}_{kt}) \\
a_t^* &= W_t(r_t, \dot{p}_{kt}) \\
p_{kt}k_t &= W_t(r_t, \dot{p}_{kt}) \text{ and} \\
\ell_t^* &= c_t^* + a_t^* + p_{kt}k_t^* - W_t .
\end{aligned}
$$

Let us denote by x_t^* the column vector of the desired quantities in (13). We now utilize the fairly standard quadratic loss approach where the total loss consists of two components, the cost of deviation from the optimum and the cost of adjustment towards the optimum, see on this Wachtel (1972), Hunt and Upcher (1972) and Kennan (1979). Let us specify a dynamic adjustment problem with the matrix H_1 describing the costs of the first type and H_2 the costs of adjustment, and which also takes into account

1) If the utility function exhibits constant relative risk aversion and the asset returns obey normal or lognormal distributions, optimal portfolio allocations are linear homogeneous in wealth.

the constraint on the sources of finance because of credit rationing[1],

(14) $$C = \frac{1}{2}\sum_t (1+r)^{-t}[(x_t - x_t^*)'H_1(x_t - x_t^*) + (x_t - x_{t-1})'H_2(x_t - x_{t-1})]$$

$$+ \lambda_t [i'(x_t - x_{t-1}) - s_{t-1} - (y_t - y_{t-1}) - (\ell_t - \ell_{t-1})]$$

By derivativing with respect to x_t we get

(15) $$\frac{\partial C}{\partial x_t} = H_1(x_t - x_t^*) + H_2(x_t - x_{t-1}) - (1+r)^{-1}H_2E_t(x_{t+1} - x_t) + (\lambda_t - E_t\lambda_{t+1})\, i = 0$$

In the case of certainty, see Kennan (1979) more closely on this, we can write this as a system of second order matrix difference equations,

(16) $$[(1+r)^{-1}H_2 - (H_1 + (1+(1+r)^{-1})H_2)B + H_2B^2]\, x_{t+1} = - H_1x_t^* + i(\lambda_{t+1} - \lambda_t)\,,$$

where B is the backward difference operator. In the simplest case both H_1 and H_2 are diagonal, and the system (16) can be decomposed into a set of independent difference equations which can then be solved in the way shown by Kennan (1979),

(17) $$x_{it} - x_{i,t-1} = N(\tilde{x}_t^* - x_{i,t-1})$$ where

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1) Here i is a unit column vector. From here on y_t refers to total income. Consumption c_t is treated here as the last, the kth asset. As a consequence, the budget constraint includes the lagged saving rate $s_{t-1} = y_{t-1} - c_{t-1}$ and the change in income $y_t - y_{t-1}$.

$$\tilde{x}_t^* = (1 - \delta(1 - r)) \sum_{s=0}^{\infty} \delta^s (1+r)^{-s} [E_t(x_{t+s}^* + (\lambda_{t+s+1} - \lambda_{t+s}))]$$

Here δ is a root of the equation (16) in the case of variable i. So, $\tilde{x}_t^*$ is weighted sum of the future desired levels of x_{it}^* added by the weighted expected change in the tightness of credit rationing here.

So far, however, only models of the traditional type derived from a single period static wealth maximization have been used in empirical estimation.

4. The empirical model

The combined model for the expenditures and the financial portfolio allocations of the household sector considers as endogeneous variables the following items of uses of finance:[1)]

c_{nd}	non-durable consumption
c_d	durable consumption
i_h	housing investment
Δdep	change in time deposits at banks
Δb_g	change in the stock of government bonds

One essential feature here is the omission of the private bond and equity market. The main reason for this is the "underdeveloped" nature of the Finnish

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1) Luukkainen (1983) has constructed a combined model for the household sector with which our model has some similarities, see also Mellin and Virén (1981).

financial market system where the banking sector has a central role in financial intermediation and loan finance is the dominating form of finance of the firms.[1] The share market has so far been quite tiny, although there are signs of its becoming more important. The government has virtually "monopolized" the bond market for its own finance. Therefore we feel entitled to omit these markets in the model at this phase.

The secondary market for claims on real capital is potentially of much more importance in the case of the housing capital, the share of which of the the sum of the four assets treated in our model is of the order of 60 per cent, see figure 3. The housing capital is in the figure valued at the prices of the secondary market. This is done fully aware of the extreme risks and difficulties attached to the empirical measurement of these prices.[2]

The main sources of finance are the following

y real disposable income (gross)

$\Delta \ell_{hb}$ change in bank loans to households

ghlend government housing lending.

The budget constraint for period t is now the following

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1) Kähkönen (1982) discusses the lack of theoretical macroanalysis taking these, in many countries quite common, features as a starting pont of of model building.

2) The housing stock is valued at secondary market prices by assuming that the q-ratio between market prices and prices of housing investment was on average unity in the period 1961-79.

(18) $$c_{nd} + c_d + i_h + \Delta dep + \Delta b_g = y + \Delta \ell_{hb} + ghlend - \dot{p}A^n_{-1} ,$$

$A^n = dep + b_g - \ell_{hb}$ and $\dot{p}$ refers to the rate of inflation

All the variables are measured at the price level of the period or the moment of observation, i.e. all stock variables refer to real stocks and flows are real flows. That is why on the right hand side there is as a new "source of finance" decrease in the real value of the net financial assets. The real capital gain on the housing capital is not explicitly presented in (18) because this is supposed to be invested in the first period directly back in housing, see on a similar procedure Backus and Purvis (1980).

The theoretical portfolio model with stock adjustment, e.g. (17), considers as its endogeneous variables changes in real stocks. The flow budget (18) operates with investment flows in durables and in housing. A stock adjustment equation of the following type

$\Delta k_t = N(k^*_t - k_{t-1})$, where k_t is net stock and

$\Delta k_t = i_t - dk_{t-1}$, $0 \leq d \leq 1$,

can be further written as

(19) $$i_t = NK^*_t - (N - d)k_{t-1} .$$

The coefficients of the lagged stocks in the empirical model cannot so be directly taken to reflect the speed of adjustment.

Because we want to treat all uses of finance in a symmetrical way, nondurable consumption c_{nd} is also in the difference form in the model, see footnote on page 7. The budget constraint (18) is now written as

$$(18)' \qquad \Delta c_{nd} + c_d + i_h + \Delta dep + \Delta b_g = \Delta y + (y - c_{nd})_{-1} + \Delta\ell_{hb} + ghlend - \dot{p}A^n_{-1} ,$$

i.e. there is as a "new source of finance" the lagged "non-durable" saving rate and the income of period t is replaced by its change.

In the following figures 1-4 the sources and uses of finance of the household sector[1], as well as the corresponding stocks and the real yield or cost on these assets and liabilities are presented. We do not aim in this context to discuss any more these time series but directly proceed to consider some problems related to the estimation of the flow of funds type model presented above in section 3.

If we distinquish as Friedman and Roley (1979) have done, "the less costly (and hence more sensitive to asset yield expectations) allocation of the current investable cash flow (here income y_t and increase in other exogeneous sources of finance covered by the symbol $\Delta\ell$ in equations (20) to (23)) from the re-allocation of the existing holdings", the model is as follows

$$(20) \qquad x^*_{it} = W_t\alpha_{it} , \text{ in vector notation } x^*_t = W_t\alpha_t \text{ and}$$

$$\Delta x_{it} = h_i'(W_t\alpha_t - x_{t-1}) + y_t\alpha_{it} + \Delta\ell_t\alpha_{it}', \; h_i' = (h_{i1},\ldots,h_{ik}) \;{}^{2)}$$

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1) The household sector consists of the "pure" households and the non-profit institutions including also the housing sector.

2) k is the number of assets (including non-durable consumption expenditures), and $x_k = c_{nd}$, α includes the asset yield variables r_k.

Figure 1. Uses of finance of the household sector in Finland, 1961-82, real flows and changes in real stocks in ratio to real disposable income in previous year

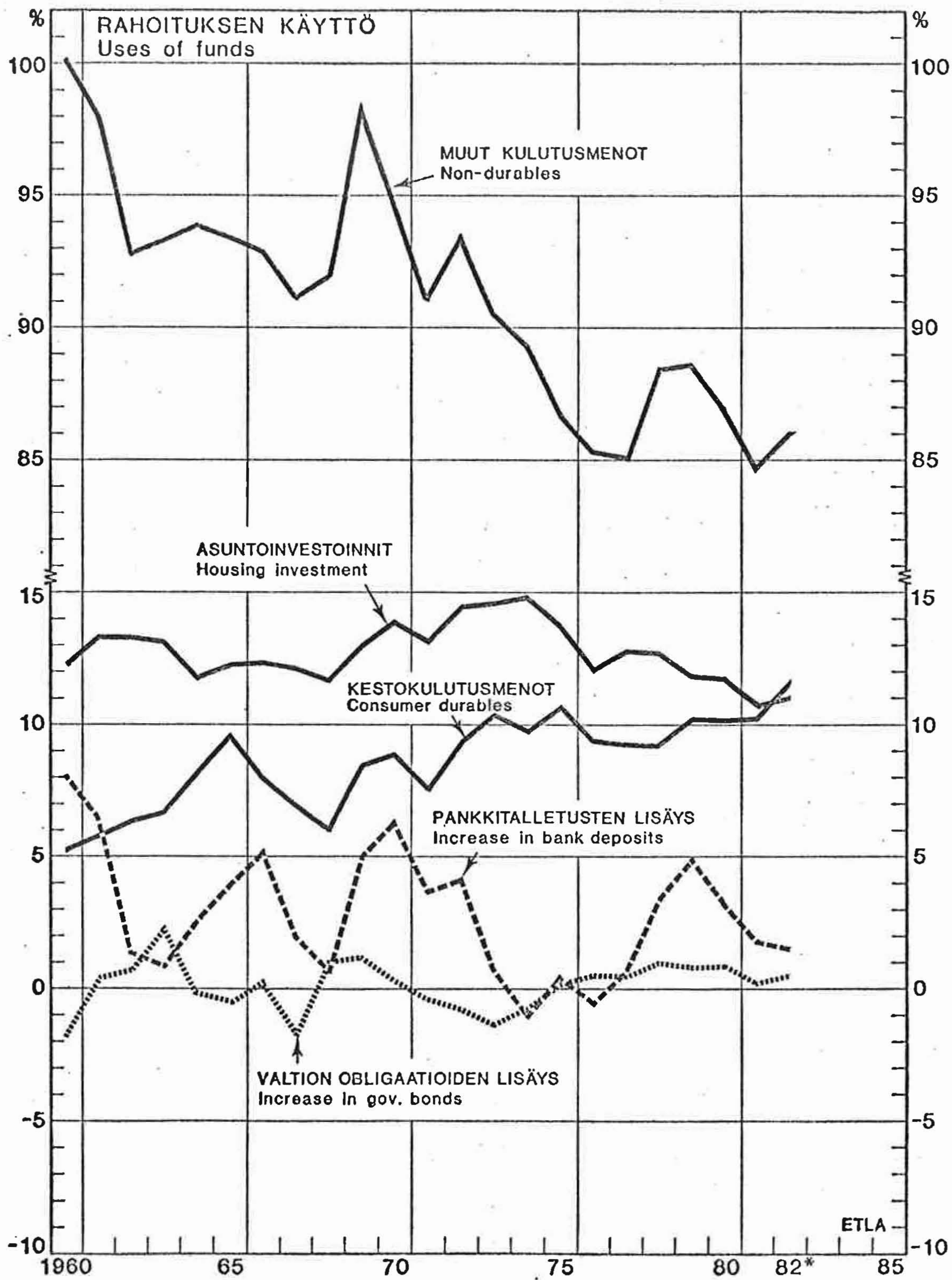


Figure 2. Sources of finance of the household sector in Finland, 1961-82, real flows and changes in real stocks in ratio to real disposable income in previous year.

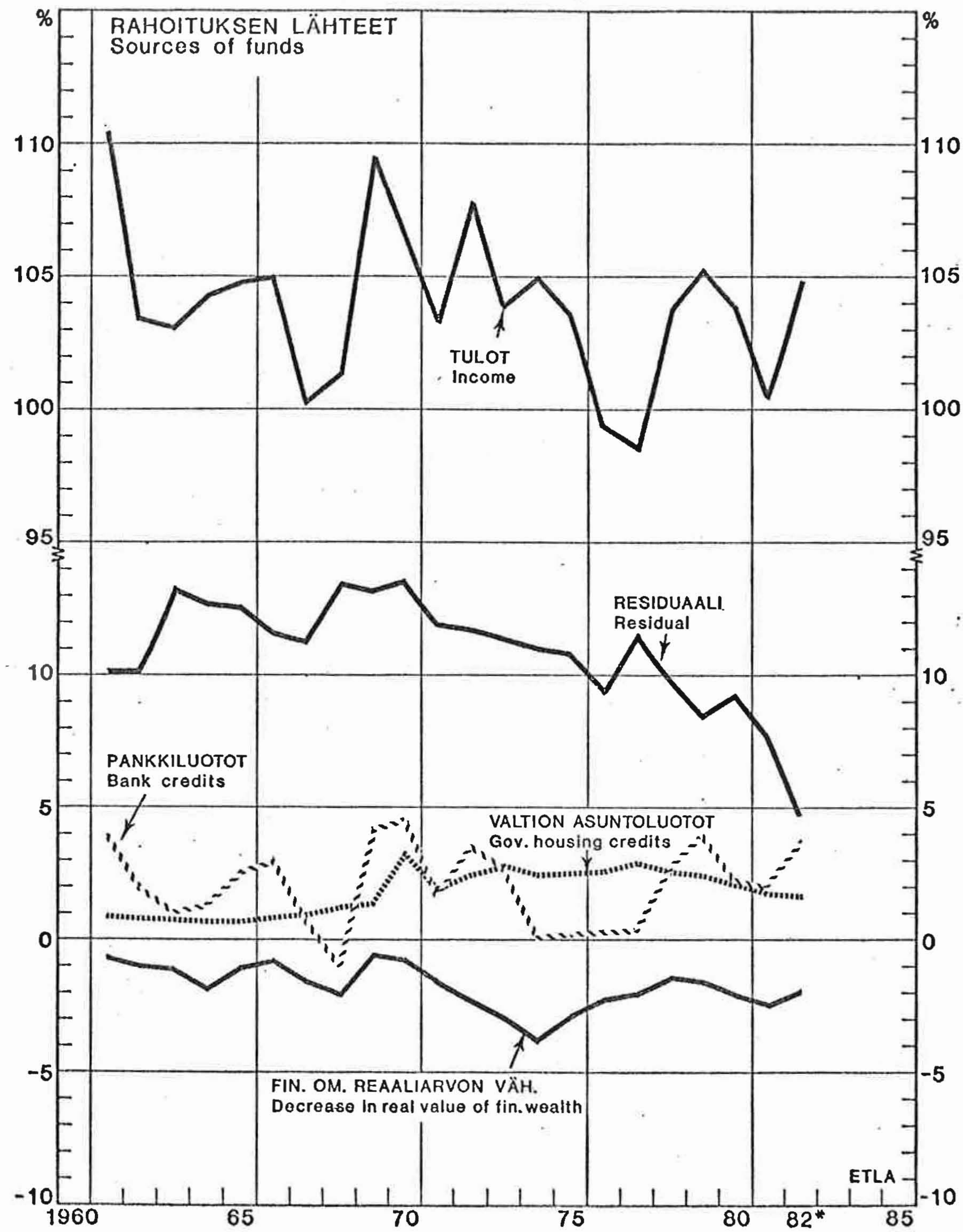


Figure 3. Assets and liabilities of the household sector in Finland, 1961-82, in ratio to disposable income

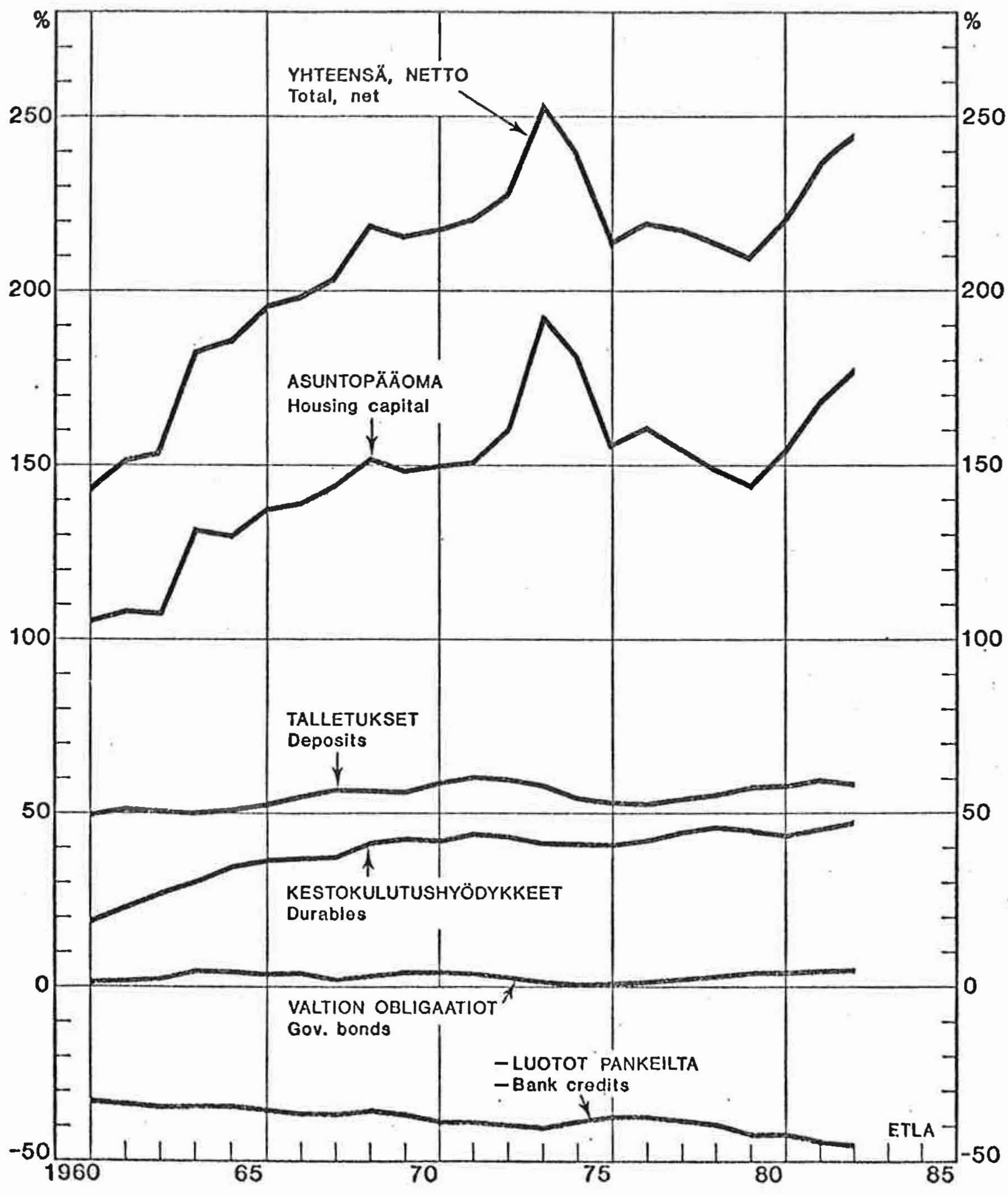
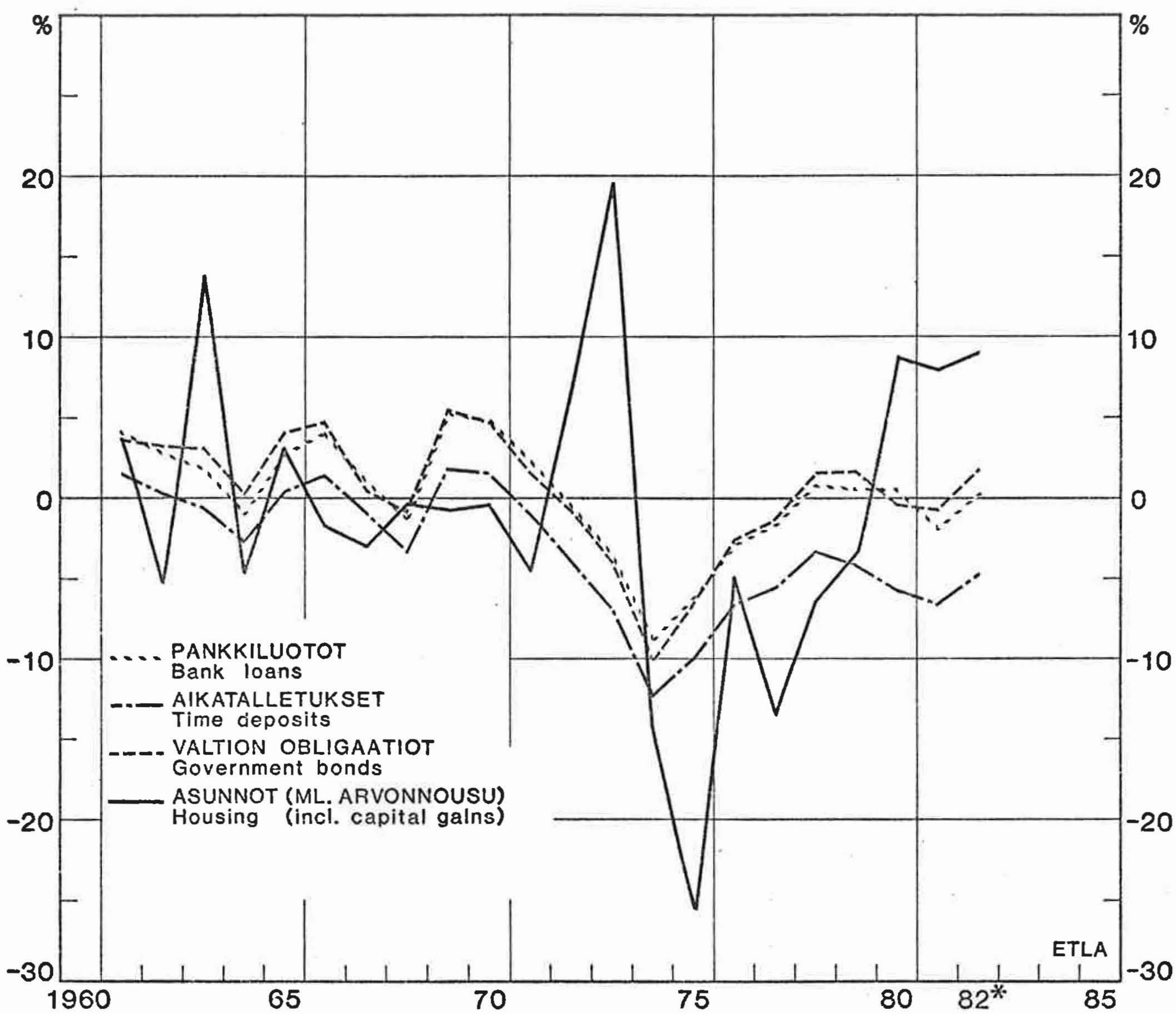


Figure 4. The real yields or costs of the assets and liabilities of the household sector in Finland, 1961-82



The total wealth consists of the human and non-human wealth components,

(21) $$W_t = wI_{t,\infty} + \sum_{i=1}^{k-1} x_{i,t-1} ,$$

where $wI_{t,\infty}$ is the discounted expected future wage income.

Both sides of the equation (20) are now divided by the lagged income y_{t-1}, and by combining similar terms we further get

(22) $$\frac{\Delta x_{it}}{y_{t-1}} = \frac{wI_{t,\infty}}{y_{t-1}} h_i'\alpha_t - \sum_{j=1}^{k-1} \frac{x_{j,t-1}}{y_{t-1}} (h_i'\alpha_t - h_{ij})$$

$$- h_{ik} \frac{c_{nd,t-1}}{y_{t-1}} + \frac{y_t}{y_{t-1}} \alpha_{it} + \frac{\Delta \ell}{y_{t-1}} \alpha_{it}' .$$

The model becomes in this way quite complicated and it is necessary to reduce it in some way. A possibility to cope with this would be to drop away the terms where the interest rate variables α_{jt} are multiplied with the lagged stock variables and with the income and loan flow variables.

Doing this gives us the following "final" form of the model

(23) $$\frac{\Delta x_{it}}{y_{t-1}} = b \frac{wI_{t,\infty}}{y_{t-1}} + \sum_{j=1}^{k-1} e_j \frac{x_{j,t-1}}{y_{t-1}} + e_k \frac{s_{nd,t-1}}{y_{t-1}} + e_o \frac{\Delta y_t}{y_{t-1}}$$

$$+ \sum_{j=1}^{k} \beta_{ij} r_j + \gamma_i \frac{\Delta \ell}{y_{t-1}} + \text{const.}, \quad s_{nd} = y - c_{nd} .$$

5. A preliminary estimation result of the model

In the model presented in table 1 we have not done any work to take account of the possible variation in the expected non-human wealth variable, but have just taken its ratio to lagged disposable income to be roughly a constant. Nor have we made any experimentation with the asset yield variables trying to capture the expected yield nature of these variables. Both the nominal yield and the inflation component of the real yield variable have simple been taken to be observations of period t.

Normally, real expenditures are taken to be influenced by real interest rates, whereas financial portfolio allocations depend just on the nominal interest rates. In order to take both these into account in a mutually consistent way in the model, ,(expected) inflation variable has also to be added to the financial asset equations and the coefficients of this variable have to be tied to be identical in all asset equations. So, a rise in the expected inflation rate shifts resources to the real expenditures and diminishes investment in financial assets, if the interest rate does not respond fully to a higher inflation rate. In addition, higher inflation dimineshes each financial asset category with the s

The scarce data available for estimation, i.e. annual observations from the year 1960 on, does not give many possibilities to carry out a formal testing procedure concerning the various restrictions which can be imposed on the flow-of-funds model in the manner Backus and Purvis (1980) have done. Given this situation, we have proceeded by first experimenting with the individual equations separately to find a proper set of explanatory variables and whether the a priori restrictions conform the data or not.

In principle all the yield variables and lagged stocks should be included in the model, but in practice this usually cannot be fulfilled and only some or even only one of the yield variables is included in the model.[1)]

Here we have used the short interest rate, the bank deposit rate as a relevant interest rate for consumption decisions and the long rate, the government bond rate in the housing equation. The rate of return variable on housing capital including the capital gain component did not prove to be uniformly significant and of the right sign, so it was deleted from the equations in table 1. The model should also include the relative price variables between the real expenditures but so far these have not been taken into the analysis. The price variable used as an indicator of the prive level is the implicit price of the consumption expenditures.

The government housing expenditures did not seem to have any spillover effects to other uses of finance than housing, primarily we could think about an effect on consumption. Consequently, this variable appears only in the housing equation (and has a coefficient of one). As (18) above shows, the decrease in the real value of net financial wealth is also in the model one "source" of finance. This variable is included in the demand for deposits (money) equation only to reflect that this loss is compensated just by running down in constant prices the level of the bank deposits. There is, however, some effect from this on the non-durable consumption, but in the full system estimation it did not get any significantly negative coefficient. As is known in the literature there are differing views on the inclusion of this variable in the consumption model, see Hendry and von Ungern-Sternberg (1980) and Deaton (1980).

1) See Wachtel(1972). On the other hand, Backus and Purvis(1980) include all the explanatory variables in their flow-of-funds model for the US household sector using quarterly data and a Bayesian estimation technique.

The effect of credit rationing is here simply described by the flow of bank lending variable and it is constrained to have an influence only on the durable consumption expenditures and the housing investment.

The stock of financial wealth, bank deposits, bonds and bank loans, appear as quite significant explanatory variables in the equation for non-durable consumption, the bond stock having the smallest coefficient, the coefficient of the loan stock being in absolute terms somewhat bigger than that of the deposit stock. Of the real wealth variables the housing stock works in the durables equation.

The coefficient of the lagged housing stock variable in the housing investment equation shows, as is obvious, a very slow speed of adjustment. In the deposit equation the market value of the housing stock is as a wealth variable. The stock of durables is a bit problematic as it does not get in its own equation a coefficient different from zero. As a probable cause for this we may refer to (19) above which shows how the coefficient of the lagged stock variable is the sum of two components, the negative adjustment coefficient and the positive replacement investment coefficient. Because the latter is quite big in this case, of the order of 20 per cent, it is much possible that the former is roughly of the same magnitude and so they would cancel each other in this equation.

The lagged loan stock variable appears, in addition to the consumption equation, in the deposit demand equation where it has a positive coefficient. This indicates an influence from credit tightness to money holdings, i.e. if the loan demand cannot be fulfilled, money holdings are used as a substitute to eliminate the effects of the lack of credit. The results in table 1 give a confirmation on this hypothesis.[1)]

The interest rate variables seem to work fairly well in the equations. The lagged consumption term, or the lagged saving rate in the non-durable consumption equation is quite important and shows a speed of adjustment around 30 % in a year. The deviation of the saving rate from equilibrium level seems to have stronger effects on the durable than the non-durable consumption expenditures.

The speed of adjustment of the demand for deposits is roughly of the same magnitude as that of non-durable consumption and is less than that of the bonds. This may be perhaps explained by the differences in the typical holder of these assets, the investor attitude dominating in a greater amount the typical bond holder than the typical deposit holder. There is also quite a big and significant cross adjustment effect from bonds to deposits, but the reverse effect is much smaller and not very significant. The substitutability between deposits and bonds is also quite clearly to be seen from the results, the demand for deposits reacting fairly much to a change in the bond rate but not vice versa. The inflation variable works in the way described above.

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1) A formal testing of the inclusion of the loan stock variable in the deposits and consumption equations gives the result that it cannot be excluded from these equations.

6. Some concluding remarks

The model presented here should be considered as a preliminary one for several reasons. We have not so far utilized the (scant) possibilities to test interesting restrictions which could be imposed on the flow-of-funds model. The outcome of some of these, e.g. whether the wealth variables could be aggregated to a single variable, can be obviously rejected on the basis of the model in table 1. The model does not include all the potentially important effects, some of which were already mentioned above. One of these is omission of the yield on the real asset, the housing capital. We have made some experiments with this variable, but so far with not good enough results.

The method used here in selecting the model presented in table 1 is one of trial and error which was necessiated by the small number of observations available. There is also another method to reduce the number of parameters to be estimated in a flow-of-funds model. In the financial model built in the Dutch Central Planning Bureau, Okker, den Haag and Hasselman(1983) derive a flow-of-funds submodel from a specified utility function of the representative decision-maker and are in this way able to reduce the number of the parameters to a small fraction from that of the standard model. This may one approach worth while to test also in our case.

In all, the explanatory power of the individual models is fairly satisfactory in an ex-post sense. The whole model is estimated from 100 observations with 35 explanatory variables and 16 linear restrictions, so there are 81 degrees of freedom in the whole model. The results are quite sensitive to the specification of the equations, especially the properties of the residuals seem to be of this kind.

Table 1. A flow-of-funds model for the household sector in Finland

Equation	Con- stant	$\frac{\Delta y}{y_{-1}}$	$\frac{bhlend}{y_{-1}}$	$\frac{ghlend}{y_{-1}}$	$\dot{p}\left(\frac{A^n}{y_{-1}}\right)$	$\left(\frac{s_{nd}}{y}\right)_{-1}$	$\left(\frac{p_k k_h}{y}\right)_{-1}$	$\left(\frac{dep}{y}\right)_{-1}$	$\left(\frac{b_g}{y}\right)_{-1}$	$\left(\frac{\ell_{hb}}{y}\right)_{-1}$	r_{dep}	r_{bond}	$\dot{p}$	res	R^2_{constr}, R^2_{free}	D-W
nondurables Δc_{nd} / y_{-1}	38.147 (7.189)	.499 (.045)				.333 (.069)		.300 (.058)	.206	-.670					.918, .922	1.984
durables c_{dur} / y_{-1}	56.362 (6.045)		.813 (.111)			.667 (.069)	.013 (.008)				-.201 (.060)		.201 (.060)	.676 (.075)	.912, .918	1.686
housing i_h / y_{-1}	12.135 (1.389)	.123 (.048)	.187 (.111)	1.000 (.000)			-.031 (.009)					-.303 (.056)	.303 (.056)	.324 (.075)	.673, .745	1.936
deposits Δdep / y_{-1}		.378 (.045)			-1.000 (.000)		.019 (.008)	-.385 (.057)	.360 (.104)	.670 (.089)	.201 (.060)	-.416 (.114)	-.252 (.028)		.915, .930	1.737
gov. bonds Δb_g/ y_{-1}	-6.636 (2.153)							.085 (.038)	-.566 (.105)			.719 (.119)	-.252 (.028)		.582, .599	1.717
column sums Σ	100	1	1	1	-1	1	0	0	0	0	0	0	0	1		

List of variables

c_{nd}	volume of nondurable consumption
c_{dur}	volume of durable consumption
i_h	volume of housing investment
dep	stock of time deposits at banks (end of year) in constant prices
b_g	stock of government bonds (end of year) in constant prices
ℓ_{hb}	stock of bank loans of the household sector (end of year) in constant prices
y	disposable income of the household sector in constant prices
bhlend	flow of bank lending to households in constant prices
ghlend	government housing finance in constant prices
$\dot{p}$	rate of inflation
A^n	stock of net financial wealth, A^n=dep+b_g-ℓ_{hb}
s_{nd}	y-c_{nd}, "nondurable" saving rate
p_k	secondary market prices of housing in terms of prices of housing investment
k_h	housing stock in constant investment prices
r_{dep}	interest rate on bank deposits (yearly average)
r_{bond}	interest rate on government bonds (yearly average)
res	the residual item in the budget constraint

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