

# Effectiveness of Interest rate policy in Stimulating Household Consumption: A Heterogenous System Dynamics Model of Euro Area Household Sector

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## Extended Abstract

In the last couple of decades, business cycle management has been delegated mainly to monetary policy authorities. The dominance of monetary policy is particularly true in the Euro area, where supranational fiscal instruments were absent until recently. Despite extremely loose monetary policy, the European Central Bank has been consistently undershooting its inflation target for a decade. That raises questions as to whether interest rate policy is effective at stimulating household consumption and aggregate demand. The prolonged period of loose monetary policy and negative interest rates also raises questions about potential negative side effects that could dampen the stimulative effect of low rates, particularly in the household sector.

This paper was motivated by one co-author's master's thesis titled "The Effectiveness of Interest Rate Policy in Stimulating Household Consumption" which combined two methodologies—vector autoregressive econometric analysis and system dynamics—to study how interest rates affect household consumption in Europe. We are now extending that analysis with a more rigorous system dynamics model.

**The Dynamic Problem.** Despite the low-interest-rate environment that has prevailed since the Great Recession, household consumption has grown more slowly than its pre-crisis rate. This is demonstrated in Figure 1 by the trends in both historical data (red) and the model's simulation results (blue).

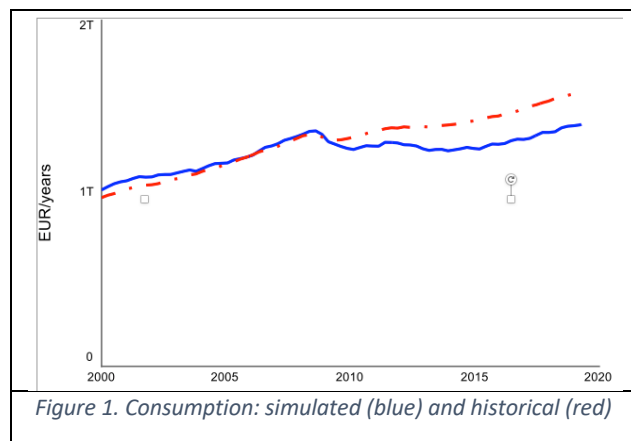


Figure 1. Consumption: simulated (blue) and historical (red)

The main channels through which monetary policy affects the household sector are cash flow, intertemporal substitution, wealth, indirect income, and foreign exchange. Lower rates should result in more borrowing, lower interest expenses, less saving, and higher asset values. Increased demand should boost employment and income further, thus reinforcing the benefit. Transmission through cash flow and saving channels are of particular interest. Households in Europe are net savers; thus, the gains from lower debt servicing costs might not be able to offset the lost interest income.

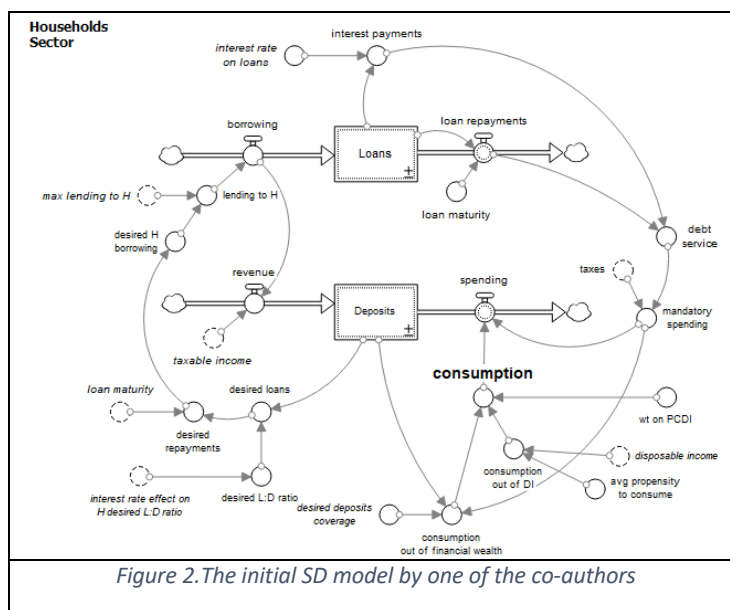
Thus, the saving behaviour of households is a contentious issue. If households do not engage in neoclassical lifetime smoothing of incomes but instead have saving targets (or even use rule of thumb saving), then the saving channel might actually *depress* demand and increase saving in a low-rate environment.

The situation is further complicated by adverse demographics in the Euro area. The society is rapidly ageing, and different age groups exhibit different economic behaviour patterns. Younger households have less wealth and are more willing to borrow and consume. Middle-aged households have higher incomes, but much of their income is directed towards wealth accumulation in anticipation of retirement. Older households are assumed to spend—dissave—their accumulated assets. Different age groups, therefore, are likely to be affected differently by monetary policy because they have different motivations. Thus, changing demographic structure should affect the monetary policy transmission.

**Household sector model.** In the thesis research, the SD model served as a complementary tool of analysis. The VAR model showed that interest rate policy may be stimulating household consumption via wealth effects and labour income channels. However, the statistical model revealed little about cash flow and saving channels. Moreover, interpreting correlation models requires an exercise in mental modeling of causal relationships. The system dynamics model was built to specify and test causal hypotheses more rigorously.<sup>1</sup>

The basic structure of that previous model was borrowed from a teaching model developed originally by the other co-author of this paper. The structure was expanded to include real household assets; i.e., housing. In addition, three parallel models were made for different age groups – younger, middle-aged and retired households. Finally, the model was calibrated with Euro Area data.

Initial stock values and various parameters (such as propensities to consume) were estimated for each age group using data from Household Finance and Consumption Survey (2016) conducted by the ECB.



The household model was not part of complete macroeconomic model, and interest rates and wage income were introduced exogenously. The model produced reasonable results when simulating patterns of consumption, loans, and deposits. Scenario analysis revealed that, in fact, households of different age (and therefore different balance sheet compositions and saving behaviour) are affected differently by interest rate policy. Young households seem to be the main beneficiaries of loose monetary policy, while middle-aged and older households are worse off due to lower interest income and changed saving behaviour.

**Future development.** The next step in developing the model will be to place it in a complete macro model with interacting sectors on both the demand side and the supply side. The goal is to have a model that could endogenously generate realistic behavior-over-time patterns for all variables along the main channels of monetary policy transmission. Once completed, such a model could be a valuable tool in both analysing the effectiveness of monetary policy by identifying potential bottlenecks of transmission. More importantly, it could provide a lens to analyse more nuanced social impacts of monetary policy and assess its effect on income and wealth distribution.

We look forward to comments and suggestions for this work-in-progress paper.

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<sup>1</sup> Link to the model: <https://exchange.iseesystems.com/public/vytenissimkus/households>

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