Rules of Thumb in Saving for Down-Payment and Life Cycle Consequences

Research Proposal for the 'Public Finance and Household Finance' Course taught by Prof. Ofer Setty

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Abstract

This research investigates the saving behavior of first-time homebuyers, emphasizing the use of simple heuristics—rules of thumb—as opposed to complex intertemporal optimization strategies. By integrating these behavioral patterns into a tractable model, the study explores how such saving decisions influence household outcomes over the life cycle. The framework may enables analysis of policy-relevant scenarios, such as shifts in wealth requirements and their impact on homeownership rates and rental market dynamics. These insights contribute to a deeper understanding of household finance and its macroeconomic implications.

1 Introduction

Numerous studies compare the effectiveness of rule-of-thumb strategies with optimization approaches. In certain cases, such as the basic life-cycle model without uncertainty (Jappelli and Pistaferri (2017), sec. 1.4) or for individuals with infinite lifespans (Ljungqvist and Sargent (2004)), these rules can align with optimal behaviour and offer practical alternatives to more complex solutions.

Love (2013) (Table 6) examines two consumption rules: consumption of a fixed share of permanent income, $c_t = \theta y_t^p$, and consumption of a fixed share of total wealth, $c_t = \kappa (x_t + h_t)$, where total wealth consists of human capital, h_t, representing the present value of future labor income, together with accumulated financial wealth, including current income, , $x_t = w_t + y_t$ (cash on hand). Moreover, under a realistic borrowing constraint, the condition $c_t \leq x_t$ is added. His findings is that consumption rules generate larger welfare losses, but an effective rule is to consume 70–80% of annuitised lifetime wealth.

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Winter et al. (2012) simulate life-cycle saving decisions using three simple rules and compute utility losses relative to the solution of the optimization problem. One of their rules, is as Love (2013), the permanent income rule proposed by Friedman (1957). These simulations suggest that utility losses induced by following simple decision rules are relatively low. Moreover, the two main saving motives reflected by the canonical life-cycle model long-run consumption smoothing and short-run insurance against income shocks – can be addressed quite well by saving rules that do not require computationally demanding tasks, such as backwards induction.

Berger et al. (2018) present research that is both highly relevant and partially related, employing a model of consumption with incomplete markets and housing, calibrated to detailed cross-sectional micro data. Their findings indicate that responses in consumption to permanent house price shocks can be effectively characterized by a straightforward and reliable **rule-of-thumb formula**: specifically, the marginal propensity to consume out of temporary income multiplied by the value of housing.

There is a substantial body of literature featuring detailed household optimization models that incorporate homeownership and mortgages, and generate life-cycle outcomes—see, for example, Kaplan et al. (2020); Campbell et al. (2021); Guren et al. (2021); Boar et al. (2022). These models are complex and rich in structure. However, household behavior can often be represented in a simplified framework that still captures key dynamics and provides valuable insights. It's important to recognize that even complex models require approximations from a different perspective, and simplified models—when carefully calibrated—can offer meaningful contributions.

My contribution lies in integrating the interaction between the housing and mortgage markets into a simplified yet realistic framework. This approach introduces practical considerations and allows for addressing policy-relevant questions without relying on overly complex models. The model is transparent, tractable, and computationally light, making it both reliable and accessible. Furthermore, it can serve as a benchmark for validating more complex models, which are often prone to computational issues and bugs. By extending the basic rule-of-thumb framework to include home purchases financed through mortgages, the model better reflects the economic realities faced by households.

2 Rules of Thumb in Saving for Down-Payment

For households that are likely to become homeowners—a group comprising the majority—it is reasonable to formulate an appropriate rule of thumb by presuming that the necessary savings are allocated evenly over a defined period. For the initial derivation, I will assume the non-growth case ($R = \beta = 1$); however, this can be readily generalized without significant complexity.

I will define the household income process, y_t, initial wealth, w_0, wealth requirements, $\overline{w}_0$, and initial duration expectations n —each of which should be calibrated subsequently. Next, I will introduce the following consumption rule of thumb (base on underline optimization, derived in Cohen (2025)):

$$c_t = y_t - \Delta w \quad (1)$$

When savings remain constant over time,

$$\Delta w = \frac{\overline{w}_0 - w_0}{n}$$

Accordingly, the accumulation of wealth is determined (using equation (1)),

$$w_{t+1} = y_t - c_t + w_t = \Delta w + w_t$$

This process will proceed until $w_t \geq \overline{w}_t$. If there are no unexpected events, $\overline{w}_t = \overline{w}_0$, this is expected to be a-n period duration.

However, if there is a shift in the required wealth—whether due to changes in credit conditions, regulatory adjustments, or fluctuations in house prices—this duration will adjust accordingly. The level of consumption, on the other hand, will remain almost unaffected. It is assumed that Δw is determined during the initial period as a fixed parameter and remains constant thereafter. Consequently, the condition $w_t \geq \overline{w}_t$ will require additional time to be fulfilled.

This result is formally derived in the appendix of my research proposal (Cohen (2025)); the underlying intuition is explained as follows. For renters, rising home prices represent a negative wealth effect, which may lead them to slightly reduce consumption over many periods. While they are financially unconstrained and capable of smoothing consumption, they are already operating at a low consumption level due to saving for a home. Therefore, further reductions in consumption are extremely costly (due to high marginal utility), and thus the main adjustment is likely to occur through an extended saving horizon.

Additionally, after the household purchases a home, I assume it is no longer constrained by mortgage eligibility requirements, as it has already qualified and completed the purchase. While it's true that the household may face difficulties in taking on additional debt, I choose to abstract from this issue (see Kaplan et al. (2014), for a discussion of such cases). Furthermore, I assume that rental payments are effectively replaced by fixed mortgage payments, along with housing depreciation and logistical costs associated with homeownership. In summary, I treat the home purchase as a one-time barrier—meeting the mortgage requirements—and assume that, beyond this point, there are no significant frictions or constraints. These post-purchase frictions are neglected here, under the assumption that they are relatively minor compared to the initial barrier.

3 Extending the Time Horizon: Impacts on Household Outcomes Across the Life Cycle

Here I will extend the down payment saving period and its influence on household outcomes throughout the various stages of the life cycle. For the purpose of this analysis, I will adopt a simplified perspective and reference established heuristics from previous research (Winter et al. (2012), Love (2013)). In particular, I will apply the permanent income rule, wherein consumption is defined as a fixed proportion of total wealth, $c_t = \kappa \left(w_t + y_t + h_t \right)$.

Accordingly, I will divide the life cycle into two distinct phases: the initial phases involve renting and accumulating savings for a down payment, while the subsequent phase consists of homeownership paired with standard consumption smoothing as described by the Permanent Income Hypothesis (PIH).

The consumption rule of thumb is

$$c_t = \begin{cases} y_t - \Delta w & , w_t < \overline{w}_t \\ \kappa_t \left(w_t + y_t + h_t \right) & , \ w_t \geq \overline{w}_t \end{cases}$$

I can approximate this further (approximation of the annuity term κ, see Winter et al. (2012) and Jappelli and Pistaferri (2017)),

$$c_t = \begin{cases} y_t - \Delta w & , w_t < \overline{w}_t \\ \frac{1}{T-t} \left(w_t + y_t + h_t \right) & , \ w_t \geq \overline{w}_t \end{cases}$$

One advantage of this model is that it enables us to obtain the ownership status of the household as defined by my methodology.

$$o_t = \begin{cases} rent & , w_t < \overline{w}_t \\ owner & , \ w_t \geq \overline{w}_t \end{cases}$$

Therefore, it is feasible to develop statistics regarding the ownership life cycle.

4 Simulation Results

A preliminary simulation[1] comparison was conducted between the rule of thumb model and the buffer stock (BS) model discussed in class. Notably, both models exhibit similar outcomes. In the initial decade, consumption remains low due to limited income. In the housing-inclusive model, individuals save for a down payment, while in the BS model, precautionary saving occurs. Both approaches result in closely aligned trajectories for consumption and savings.

[1]The simulation has been completed in Excel, and the corresponding file is attached for reference.

During the later phase, both models demonstrate consumption smoothing, reflecting the consideration of reduced income during retirement and the resulting motivation for increased wealth accumulation. In the housing model specifically, this pattern is further supported by the presence of mortgage payments (not implicitly in the model).

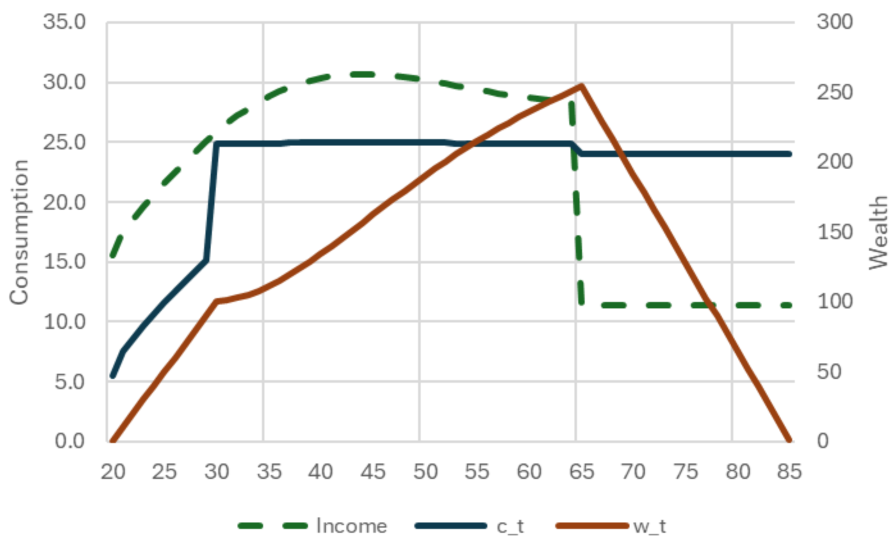

Figure 1: Rule of thumb model with housing

Another point of reference is the comprehensive model that includes the housing market, as presented by Kaplan et al. (2020). Notably, the consumption path demonstrates similarities with those observed in prior models.

For some questions, it's possible to use the basic model we've learned and calibrate it so that it also captures behavior and provides insights. In current case, as mentioned, we're dealing with a situation where households desire ownership, but it requires sufficient equity. Although the model mechanism here is one of precautionary saving, it seems that the behavior is quite similar.[2] Of course, this requires deeper analysis, but that's the idea.

A perhaps a similar case is DSGE models, which—even though they may lack certain components of the economy—can still be calibrated, along with their shocks, to answer many diverse questions beyond their basic framework. Of course, all of this must be done with great caution.

[2]Similar analyses are commonly done in option pricing using the Black-Scholes model for plain vanilla options. Even when some of the assumptions don't hold, the model can still price products through appropriate calibration. The most prominent example is the implied volatility in market prices of options, where things are more complex and there is a volatility curve.

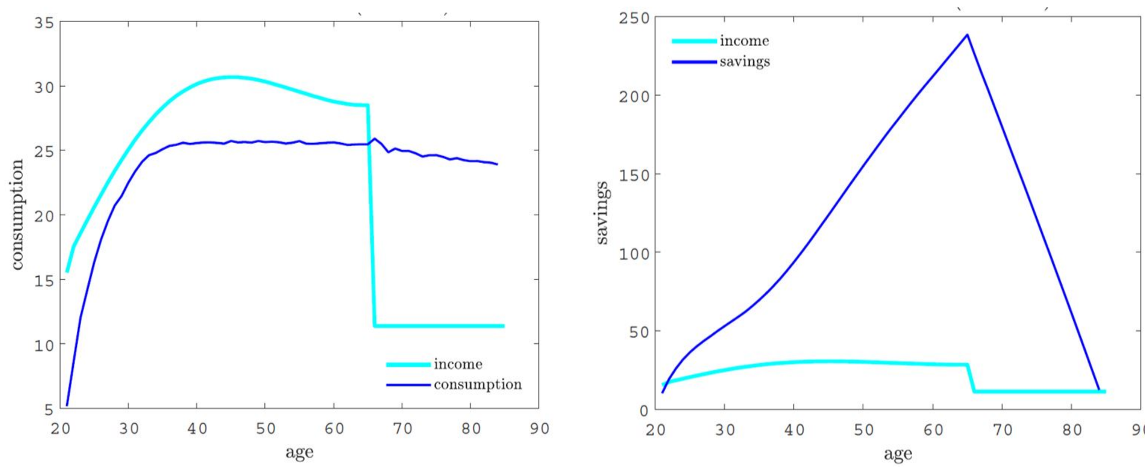

Figure 2: Canonical life-cycle buffer-stock model we learn in class. Decrease income stream in retirement by 30%.

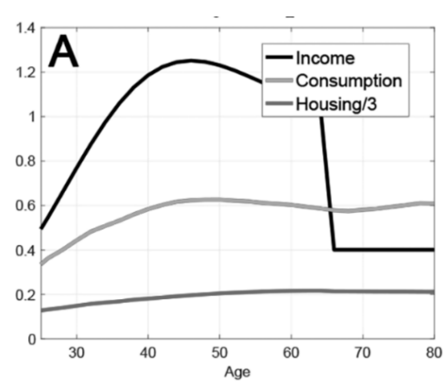

Figure 3: Results from Kaplan et al. (2020)

5 Next Steps

5.1 Ownership rate

For this calculation, it is necessary to generate a comprehensive set of households with varying incomes and initial wealth levels that reflect both the income distribution and ownership distribution, as illustrated in Figure 4, from the literature.

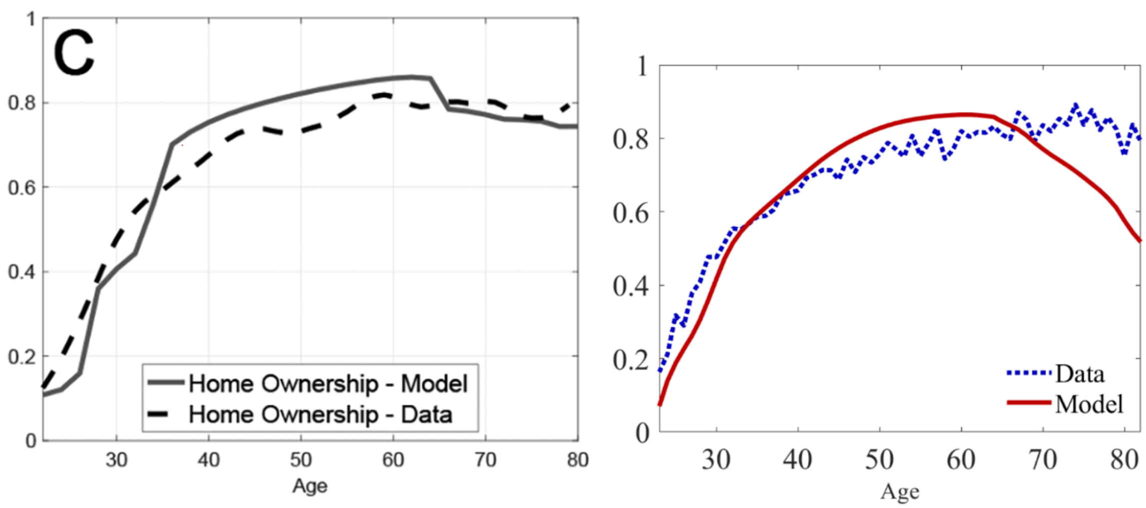

Figure 4: Simulation wish example: Homeownership in the model and in the data, left Kaplan et al. (2020), right Balke et al. (2024).

5.2 Response to wealth requirement change

A relatively small and flexible model that includes the key components of household decision-making can serve as a useful tool for evaluating various policy instruments, particularly in the housing and mortgage markets. While the model relies on approximations and heuristics, it offers more direct insights and is easier to operate compared to complex and highly detailed models. In many cases, complex models make it difficult to extract deep insights due to internal channels and interactions that are hard to disentangle.

One fundamental exercise worth exploring is the model's response to changes in capital requirements, as examined in Balke et al. (2024). A similar and related exercise would be analyzing the effects of a permanent increase in housing prices, which also translates into higher equity requirements for obtaining a mortgage. In both cases, we would expect homeownership to become more difficult to attain, leading to increased demand in the rental market and, consequently, rising rental prices. Since rent is the largest component of the price index, this has significant macroeconomic implications and a direct impact on monetary policy.

5.3 Further Research Directions

While the current model focuses on the transition from renting to owning, future work could extend the framework to incorporate post-purchase dynamics, such as refinancing decisions and the role of housing as a consumption good versus an investment asset. Additionally, integrating uncertainty—such as income shocks, interest rate shocks, or housing prices shocks—could enhance the realism of the model and allow for richer policy analysis. Exploring heterogeneity across households, including differences in income and initial wealth, would further improve the model's applicability and relevance.

6 Conclusion

In conclusion, this research aims to bridge the gap between complex household optimization models and practical, policy-relevant analysis by employing simplified rule-of-thumb frameworks. The proposed model captures essential dynamics of saving for homeownership and offers a transparent and computationally efficient alternative to traditional approaches. By simulating life-cycle outcomes and responses to changing wealth requirements, the study provides valuable insights into household behavior, ownership trends, and rental market pressures. These findings have the potential to inform housing policy and contribute to broader discussions in public and household finance.

References

Balke, Kasper Kragh, Markus Karlman, and Karin Kinnerud, "Down-payment requirements: Implications for portfolio choice and consumption," Working Paper Series, (2024) (CENTER FOR HOUSEHOLD FINANCE AND MACROECONOMIC RESEARCH).

Berger, David, Veronica Guerrieri, Guido Lorenzoni, and Joseph Vavra, "House Prices and Consumer Spending," *The Review of Economic Studies*, 85 ((2018)), 1502–1542 (Oxford Academic).

Boar, Corina, Denis Gorea, and Virgiliu Midrigan, "Liquidity Constraints in the U.S. Housing Market," *The Review of Economic Studies*, 89 ((2022)), 1120–1154.

Campbell, John Y., Nuno Clara, and João F. Cocco, "Structuring Mortgages for Macroeconomic Stability," *The Journal of Finance*, 76 ((2021)), 2525–2576.

Cohen, Nimrod, "From Renting to Owning: Anticipatory Behavior of First-Time Homebuyers," Ph.D. Research Proposal, (2025) (The Eitan Berglas School of Economics, Tel Aviv University).

Guren, Adam M., Arvind Krishnamurthy, and Timothy J. Mcquade, "Mortgage Design in an Equilibrium Model of the Housing Market," *The Journal of Finance*, 76 ((2021)), 113–168.

Jappelli, Tullio, and Luigi Pistaferri, “The Economics of Consumption: Theory and Evidence,” (Oxford, UNITED STATES, Oxford University Press, (2017)).

Kaplan, Greg, Kurt Mitman, and Giovanni L. Violante, “The Housing Boom and Bust: Model Meets Evidence,” *Journal of Political Economy*, 128 ((2020)), 3285–3345.

Kaplan, Greg, Giovanni L Violante, and Justin Weidner, “The Wealthy Hand-to-Mouth,” *Brookings Papers on Economic Activity*, spring 2014 ((2014)), 63.

Ljungqvist, Lars, and Thomas J. Sargent, “Recursive macroeconomic theory,” (Cambridge, Mass, MIT Press, (2004)).

Love, David A., “Optimal Rules of Thumb for Consumption and Portfolio Choice,” *The Economic Journal*, 123 ((2013)), 932–961.

Winter, Joachim K., Kathrin Schlafmann, and Ralf Rodepeter, “Rules of Thumb in Life-cycle Saving Decisions,” *The Economic Journal*, 122 ((2012)), 479–501.