

Research Report

Was Friedman Right? New Evidence on Household Consumption in Response to Permanent and Transitory Income

UNDERSTANDING HOW HOUSEHOLDS REACT TO THE ARRIVAL OF PERMANENT AND TRANSITORY INCOME IS OF INTEREST FOR RESEARCHERS AND REGULATORS. PREVIOUS STUDIES HAD TO USE IMPRECISE SURVEY DATA TO MEASURE CONSUMPTION AND THUS CONCLUSIONS OFTEN DIVERGED. WE LEVERAGE GRANULAR PERSONAL FINANCE MANAGEMENT FINTECH DATA TO TEST FRIEDMAN'S PERMANENT INCOME HYPOTHESIS AND TO ASSESS HOUSEHOLD SPENDING ELASTICITY AND MARGINAL PROPENSITY TO CONSUME FOR VARIOUS SPENDING CATEGORIES IN RESPONSE TO DIFFERENT INCOME TYPES.

Gregor Becker

Introduction

Friedman's (1957) permanent income hypothesis (PIH) states that households plan and smooth consumption contingent on nearterm permanent income. Consumption patterns should thus be unaffected by the timing of anticipated income, unless households are liquidity-constrained. And if large windfall income arrives, households would not consume all of it right away (Friedman, 1957; Deaton, 1991; Carroll, 2001).

Predicting households' consumption elasticity and marginal propensity to consume (MPC) in response to permanent and transitory income is in the interest of researchers and regulators. They share the mutual interest in an effective design

Andreas Hackethal

and in the respective assessment of economic stimulus programs, taxation schemes, and social security systems.

Consequently, the validity of Friedman's PIH was tested frequently, yet with mixed results. A drawback of previous studies is the use of survey data to assess consumption, which could econometrically bias results.

New research opportunities with cleaner data have developed since the emergence of digital personal finance management (PFM) FinTechs such as mint.com. These FinTechs record and automatically group households' current account transactions into granular income and spending

categories. Still, despite using this new data, recent results by Gelman et al. (2014) and Olafsson and Pagel (ftc.) on the validity of PIH are contradicting. While Gelman et al. (2014) confirm Friedman's theory, Olafsson and Pagel (ftc.) find evidence against PIH but "remain agnostic about which [...] theories drive" results. Researchers and regulators are thus still left with differing results and unclear validity of the PIH.

Our research aims to test the validity of Friedman's PIH by leveraging even more granular PFM data, which we source from a major European bank in Germany. As we observe over 65,000 customers and 42 million transactions, this dataset is currently the largest of this kind in household finance. Its size and granularity allows us to run more detailed analyses than possible for Gelman et al. (2014), while we find additional insights that can help avoiding the agnosticism in the results by Olafsson and Pagel (ftc.).

Method: Leveraging Granular PFM Data to Observe Household Income and Spending

Since part of the diverging results on validity of PIH are driven by different interpretations of what theory actually predicts (Carroll, 2001), we initially generate testable, normative predictions based on most recent amendments to the model (Deaton, 1991; Carroll, 2001). We differentiate income types by sustainability (permanent or transitory) and by degree of anticipation.

By using proprietary PFM data, we benefit from more complete household income and spending records – compared to survey data. Additionally, we take advantage of the PFM's identification as

transactions are allocated into specific income and spending categories.

However, using current account data has caveats. Following Gelman et al. (2014) and Olafsson and Pagel (ftc.), we first exclude recurring spending, which might coincidentally occur on the same day as income arrivals and thus cannot be used to test PIH validity. Additionally, it is necessary to identify savings and peer-to-peer outflow transactions, which should be differentiated from immediate consumption. We further distinguish spending into durable and non-durable consumption. Moreover, not all current account inflows are income in an economic sense. In particular, transactions right after self-initiated cash inflows, e.g., from selling securities out of one's own portfolio or from taking out a consumer loan, are of interest for researchers, but should not be relevant for testing PIH validity. Fortunately, the granular PFM data allows to identify these types of transactions and thus to run several adapted analyses.

To account for heterogeneity, we group households by income decile, which we use as proxy for liquidity constraints (Johnson et al., 2006). We run cluster robust panel regressions with individual- and time-fixed effects to assess the impact of permanent income, including salary and governmental transfer payments, and transitory income arrival, e.g., tax refunds and dividend payments, on spending elasticity and MPC of different spending types, e.g., gross household spending including savings and peer-to-peer transactions, durable and non-durable consumption, and only non-durable consumption.

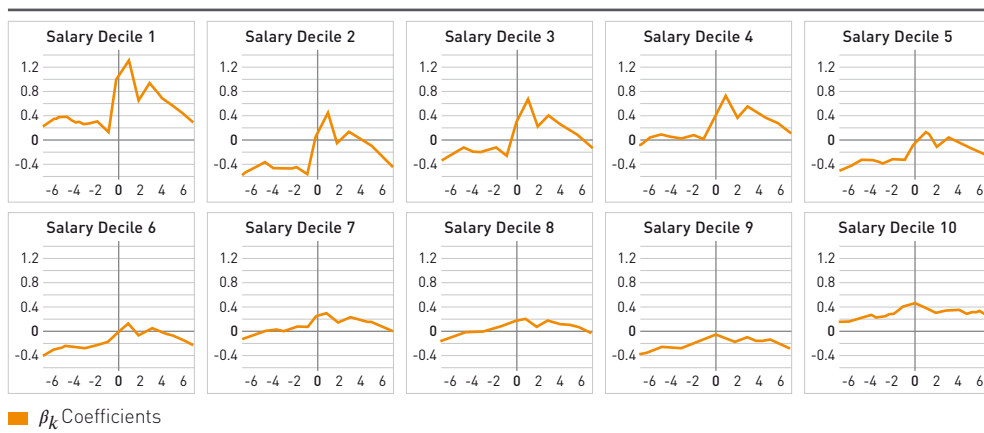


Figure 1: Household Durable and Non-Durable Consumption Elasticity in Response to Permanent Income Arrival by Income Decile (The β_k Coefficients Reflect Additional Consumption on Days Before and After Payment Arrival)

Empirical Findings

We find that only low-liquidity households increase consumption after permanent income arrival. More liquid households hardly react to the arrival of permanent income (Figure 1). Reaction to salary, social security, and unemployment payments confirm these results and show no increase in MPC nor spending elasticity for high-liquidity households.

Considering the reaction to aggregate transitory inflow, we find excessive household spending on the day of arrival. On first sight, this appears to confirm results by Olafsson and Pagel (ftc.). Yet, other than Olafsson and Pagel (ftc.), we find that this effect is very heterogeneous for different income and spending categories. In our data, it is largely driven by spending on specific non-consumption purposes, such as savings and peer-to-peer transactions. When assessing the effect of transitory income arrival on durable and non-

durable consumption, we do not observe amplified elasticity. Additionally, the observed response to transitory income arrival is driven by anticipated, self-initiated transactions, e.g., cash deposits. Yet, these financial transactions might not reflect exogenous income in an economic sense. When assessing household consumption reaction in response to the arrival of anticipated, exogenous, transitory income, effects on spending elasticity and MPC are negligible. In response to the arrival of transitory tax refunds, we observe consumption spikes for low-income households. However, MPCs remain in line with Friedman's normative predictions (Carroll, 2001).

Finally, we provide evidence that contradicting research results by Olafsson and Pagel (ftc.) compared to Gelman et al. (2014) and this paper might be driven by differences in the observed retail payments clearing system, by differences in data availability and compilation (esp. for income

types), and by analyzing both elasticities and MPCs.

Given our findings, we conclude that Friedman's (1957) PIH, expanded by Deaton's (1991) liquidity constraints model, is a fairly good description of households' consumption reaction to the arrival of permanent and transitory income. The observed "earmarking" of self-initiated, transitory income for specific spending purposes hints at mental accounting.

We contribute to research on the lifecycle consumption/permanent income hypothesis (LCPIH) by testing and confirming PIH with new and granular data, which might affect the whole economic profession.

Regulators can benefit from our finding that PIH is an adequate predictor of household consumption response to income arrivals. As the economic stimulus program of quantitative easing is losing supporters, the urgency to know whether and which households increase consumption in response to permanent or transitory income arrivals has increased. Regulators thus might more credibly rely on Friedman's (1957) PIH for new taxation or governmental support schemes.

Conclusion

Friedman's PIH predicts households' reaction to the arrival of permanent and transitory income, which is highly relevant for researchers and regulators. Yet, previous studies disagree on theory's validity. We leverage granular household spending and income data from a PFM FinTech to test this theory for a variety of income

and spending types. We conclude that PIH (Friedman, 1957; Deaton, 1991) is a fairly good description of household behavior.

References

- Carroll, C. D.:**
A Theory of the Consumption Function, with and without Liquidity Constraints.
In: *The Journal of Economic Perspectives*, 15 (2001) 3, pp. 23-45.
- Deaton, A.:**
Saving and Liquidity Constraints.
In: *Econometrica*, 59 (1991) 5, pp. 1221-1248.
- Friedman, M.:**
A Theory of the Consumption Function.
In: *National Bureau of Economic Research General Series*, pp. 1-6., Princeton University Press, 1957.
- Gelman, M.; Kariv, S.; Shapiro, M. D.; Silverman, D.; Tadelis, S.:**
Harnessing Naturally Occurring Data to Measure the Response of Spending to Income.
In: *Science*, 345 (2014) 6193, pp. 212-215.
- Johnson, D.; Parker, J.; Souleles, N.:**
Household Expenditure and the Income Tax Rebates of 2001.
In: *American Economic Review*, 96 (2006) 5, pp. 1589-1610.
- Olafsson, A.; Pagel, M.:**
The Liquid Hand-to-Mouth: Evidence from Personal Finance Management Software.
Forthcoming in: *Review of Financial Studies*, pp. 1-56.