



Saving in the world

Francesco Grigoli^{a,*}, Alexander Herman^b, Klaus Schmidt-Hebbel^c

^a International Monetary Fund, Research Department, 700 19th Street NW, Washington DC 20431, United States

^b U.S. Department of Treasury, Office of International Affairs, United States

^c Instituto de Economía, Pontificia Universidad Católica de Chile, Chile



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ABSTRACT

This paper presents new evidence on the behavior of saving in the world, by extending previous empirical research in several dimensions. After extensively surveying the relevant theoretical and empirical literature, the paper reports estimates of saving determinants relying on the newly constructed and largest available database covering 165 countries over 1981–2012. The empirical specification includes determinants not considered in the literature, explores differences in saving behavior nesting the 2008–10 crisis period and four different country groups, searches for commonalities across key saving aggregates (national, private, household, and corporate saving rates), and is subject to a robustness analysis based on different estimation techniques. The results confirm in part existing research, but also shed light on some ambiguous or contradictory findings and highlight the role of neglected determinants. Compared to the literature, we find a larger number of significant determinants, changes across periods and country groups, and similarities across different saving aggregates.

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1. Introduction

What does consumption theory say about the main determinants of private saving decisions and which are the empirical measures that should be used to test for their relevance in explaining aggregate consumption/saving patterns? What determines the behavior of national, private, household, and corporate saving rates in the world? Did the exceptional depth of the Global Financial Crisis change the behavioral relationships of private saving and its determinants? And do saving determinants change across different country groups?

There is a small body of empirical saving studies using macroeconomic panel datasets that address some of these questions. A review of 15 empirical studies of mostly private saving rates reveals large differences in their sample size and coverage, data sources, saving rate definitions, model specifications, and estimation methodologies. Unsurprisingly, they also show large differences in empirical results that are difficult to reconcile.

This paper addresses limitations and contradictory findings of previous empirical research, extending it in six dimensions. First, we survey consumption theories to identify expected signs of potential saving determinants and review the previous empirical

saving studies based on aggregate panel data. Then, we construct and use the largest available panel database for world saving, covering 165 countries from 1981 to 2012.¹ This is almost four times the size of the most comprehensive panel study published to date, by Loayza, Schmidt-Hebbel, and Servén (2000). Third, we specify and estimate a baseline saving specification and subject it to robustness analysis by applying different estimation techniques. Fourth, the empirical search is expanded by including potential saving determinants identified by theory but not previously considered in the empirical literature. Then, the paper explores differences in saving behavior across time and space, nesting the 2008–10 crisis period and four different country groups. Finally, while this paper's focus is on private saving, we also search for commonalities and differences in behavior across national, private, household, and corporate saving rates.

Our results confirm some of the findings of the previous literature and unveil many novel features. Private saving rates are generally persistent and positively associated with income levels and income growth. Permanent components of income and the terms of trade increase saving, and temporary parts of the terms of trade are saved to a larger extent than permanent parts. Saving is spurred by inflation, possibly due to precautionary motives. Increased credit availability, which is often associated with a process of financial liberalization, depresses private saving. A higher

* Corresponding author.

E-mail address: fgrigoli@imf.org (F. Grigoli).

¹ The dataset is available from the authors upon request.

old-age dependency ratio reduces saving as the elderly finance their consumption needs with accumulated savings. Urbanization lowers private saving rates. Higher public saving reduces private saving, but exhibiting only partial Ricardian offsetting. Higher expected future growth has a positive effect on private saving, as does access to foreign borrowing. A higher share of young dependents reduces saving. Importantly, we find that these results generally hold for other saving aggregates but they differ somewhat across time periods and country groups.

The paper structure is the following. In the next section we review briefly the determinants of private saving by discussing the main underlying consumption theories and previous panel data studies on the behavior of private saving rates. Section 3 summarizes our data sources and construction and presents some stylized facts on saving patterns. Section 4 outlines our empirical strategy, describing our choice of regression models. The empirical results are reported in Section 5. Section 6 concludes.

2. Survey of consumption theories and empirical saving determinants

The starting point of modern theoretical research on consumption and saving is defined by two dominant models: the permanent-income hypothesis (PIH) and the life-cycle hypothesis (LCH). In contrast to the preceding Keynesian hypothesis (KH), in which consumption is determined by current income, PIH focuses on a representative, infinitely-lived consumer who equates consumption to permanent income net of the present value of taxes (Friedman, 1957; Hall, 1978). As a variant of PIH, the Ricardian-equivalence hypothesis (REH) derives permanent income as net of the present value of government spending, by linking the representative consumer's and the government's budget constraint (Barro, 1974). If a large number of stringent (and empirically implausible) conditions are satisfied (Seater, 1993), REH predicts that an increase in permanent government consumption is fully offset by lower private consumption.

The PIH assumption of homogeneous consumers contradicts observed consumer heterogeneity along several dimensions, including age, income, and access to borrowing. This leads to the main competitor of the PIH, the LCH, which introduces age-related consumer heterogeneity (Attanasio & Weber, 2010; Modigliani & Brumberg, 1954). Here, aggregate saving reflects the addition of saving by different age specific, finitely-lived cohorts who save for their old-age while working, dissave during retirement, and do not leave bequests.² However, these LCH predictions are at odds with the evidence. Planned bequests are empirically large and sensitive to income levels, implying elasticities of consumption to permanent income that are significantly lower than one.

Contradicting PIH and LCH, consumption tends to exhibit excess sensitivity, i.e., its change is correlated with predictable changes in other variables.³ This is partly explained by the presence of durable goods (Caballero, 1993), consumption habits (external habits—Abel, 1990—or internal habits—Ferson & Constantinides, 1991), or consumer time inconsistency reflected in hyperbolic discounting (Laibson, 1997).⁴

² Winter, Schlafmann, and Rodepeter (2012) show that complex life-cycle saving decisions that require computationally demanding tasks can be replaced by simple rules of thumb that yield results consistent with LCR.

³ Related to excess consumption sensitivity is the empirical rejection of stochastic versions of the consumption Euler equation (Hansen & Singleton, 1982) and evidence of excessive equity return premiums over fixed-income asset returns (Mehra & Prescott, 1985).

⁴ Hyperbolic discount functions present a high discount rate over short horizons and a low discount rate over long horizons. This discount structure induces dynamically inconsistent preferences, implying a motive for consumers to constrain their future choices.

Uncertainty can also explain the failures of the deterministic versions of PIH-REH and LCH. Classical uncertainty or risk about future realizations of stochastic variables (but not about distributions of stochastic variables, which are assumed to be known and stationary) leads to precautionary saving by risk-averse consumers (Skinner, 1988; Zeldes, 1989). When risk-averse consumers face additional Knightian uncertainty (i.e., distributions of stochastic variables are unknown), precautionary saving is raised further (Hansen & Sargent, 2010; Miao, 2004).

Other theories substantially modify several key assumptions of PIH-REH and LCH to derive behavioral predictions that are more consistent with the data. Borrowing constraints—the fact that interest rates on loans cannot be expected to rise to clear financial markets because they raise default risks (Stiglitz & Weiss, 1981) or because human capital cannot be used as collateral (Hayashi, 1982)—push consumers toward corner solutions and make borrowers' consumption levels more sensitive to credit volumes and current income than to interest rates and wealth. When precautionary saving and borrowing constraints are combined, forward-looking, risk-averse consumers incur in buffer-stock saving, anticipating tighter future borrowing constraints (Schechtman, 1976).⁵

According to the “capitalist spirit” model, which traces back to Smith and Marx, both consumption and wealth are valued by consumers (Cole, Mailath, & Postlewaite, 1992; Fershtman & Weiss, 1993). If consumption and wealth are gross substitutes in utility, higher wealth does not raise consumption; instead, it is largely saved, contradicting PIH-REH and LCH.

Another dimension of consumer heterogeneity reflects differences in income and wealth across different population groups. Absolute poverty affects aggregate consumption because the poor save little. Then, utility is a positive function of the difference between current consumption and a subsistence consumption level (Christiano, 1989).⁶ Therefore, the saving rate declines with absolute poverty (given income distribution) and rises with the level of income—a refined version of autonomous consumption in a conventional KH model.

Post-Keynesian models stress the positive effect of functional income inequality on aggregate saving based on the observation that workers save less than capitalists (Kaldor, 1957; Lewis, 1954). More recent models focus on various channels from personal income inequality to saving, which, taken together, suggest that the effect of income distribution on saving is ambiguous.⁷

We end this brief survey of consumption theories by referring to the integration of household and corporate saving behavior. If a set of strict (and empirically implausible) assumptions are met, household owners of corporations are indifferent between saving as households or through their corporations. They are then able to “pierce the corporate veil,” offsetting one-to-one higher corporate saving by lower household saving. This hypothesis is the

⁵ Challe and Ragot (2015) derive a precautionary saving model for risk-averse consumers that face borrowing constraints. The time-series behavior of aggregate consumption fits better the latter model than either the hand-to-mouth or the representative-agent models.

⁶ Variants of this theory specify the intertemporal elasticity of substitution as an increasing function of wealth (Atkinson & Ogaki, 1993) or of the distance between permanent income and subsistence consumption (Ogaki, Ostry, & Reinhart, 1995). An implication of the two latter hypotheses is that the sensitivity of consumption substitution grows with the level of income.

⁷ On the one hand, according to LCH with bequests, wealthier individuals should have higher saving rates as bequests are a luxury (Kotlikoff & Summers, 1981, 1988). Thus a larger share of poorer individuals can depress private saving. Similarly, the inability to borrow generally affects the poorest and this is likely to negatively affect saving (Deaton, 1991). On the other hand, income inequality may positively affect private saving through the precautionary motive (Carroll & Kimball, 1996). Moreover, if the poor face more limited access to risk diversification options or are more risk averse (especially in light of higher uncertainty), they would increase saving.

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