Sahra Wagenknecht

The Limits of Choice

Saving Decisions and Basic Needs in Developed Countries

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Tables with the detailed outcome of the regressions and a number of additional graphics are provided on the website http://bit.ly/campus39916.

Sahra Wagenknecht is a German economist and politician. She is Vice President of the Left Party (Die Linke) and author of several books. From 2004 to 2009 she was a member of the European Parliament. Since 2011 she has been First Vice President of the Left parliamentary group in the Bundestag. Sahra Wagenknecht studied philosophy and modern German literature in Jena, Berlin, and Groningen. With the present study, she obtained a PhD in economics in 2012.

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Contents

List of Figures

List of Variables and Abbreviations

BEA	National Bureau of Economic Analysis
CEX	Consumer Expenditure Survey (U.S.)
COICOP	Classification of Individual Consumption by Purpose (European Standard)
DIW	German Institute of Economic Research
EVS	Einkommens- und Verbrauchsstichprobe (Germany)
FoF	Flow of Funds
NIPA	National Income and Product Accounts (U.S.)
PSID	The Panel Study of Income Dynamics
SCF	Survey of Consumer Finances (U.S.)
SOEP	German Socio-Economic Panel
VGR	Volkswirtschaftliche Gesamtrechnung des Statistischen Bundesamtes (Germany)
destatis	Statistisches Bundesamt

Own Model:

Y	disposable income	
Y_j	individual disposable income	
y_j	individual relative income:	$y_j = \frac{Y_j}{Y}$
S	saving	
s	saving rate:	$s = \frac{S}{Y}$

S_j	individual saving	
s_j	individual saving rate:	$s_j = \frac{S_j}{Y_j}$
C	total consumption expenditure	
C^*	necessity (or: basic) expenditure	
c^*	mean necessity share in total consumption outlay:	$c^* = \frac{C^*}{C}$
c_j^*	individual necessity share in consumption outlay:	$\mathrm{c}_j^* = \frac{C^*}{C_j}$
cc^*	mean necessity share in income:	$cc^* = \frac{C^*}{Y}$
cc_j^*	individual necessity share in income:	$cc_j^* = \frac{C^*}{Y_j} = \frac{c^*}{y_j}$
$\alpha 1$	propensity to save	
$\alpha 2$	propensity to dissave	
k	share of non-saving households	
$y\{ns\}$	average relative income of non-saving households	
P	price level	
p_i	price of good i	
p°_i	relative price of good i	
c_i	quantity of good i	
c_i^*	quantity of basic good i	
ε	elasticity parameter	
X	welfare level (utility of a continuum of goods)	
θ	Dixit-Stiglitz-inflation of P	
$g(t)$	growth rate	
$g^*(t)$	growth of basic expenditure	$g^*(t) = \frac{\int_0^1 p_{it}\, c_{it}^{*\prime} di}{\int_0^1 p_{it}\, c_{it}^* di}$
$g^{**}(t)$	excess basic growth:	$g^{**}(t) = g^*(t) - g(t)$
$i(t)$	inflation rate	
$i^*(t)$	inflation rate of basic expenditure:	$i^*(t) = \frac{\int_0^1 p_{it'}\, c_{it}^* di}{\int_0^1 p_{it}\, c_{it}^* di}$
$i^{**}(t)$	excess basic inflation:	$i^{**}(t) = i^*(t) - i(t)$

Historic Path of the Necessity Share (Different Approaches):

$$c1^*_{VGR}(t) = \frac{\sum Basic\ Expenditure\ VGR\ (t)}{\sum Consumption\ Expenditure\ VGR\ (t)} \qquad 1970 - 2010$$

$$c1^*_{EVS}(t) = \frac{\sum Basic\ Expenditure\ EVS\ (t)}{\sum Consumption\ Expenditure\ EVS\ (t)} \qquad 1963 - 2008$$

$$c1^*_{NIPA}(t) = \frac{\sum Basic\ Expenditure\ NIPA\ (t)}{\sum Consumption\ Expenditure\ NIPA(t)} \qquad 1955 - 2009$$

$$c1^*_{CEX}(t) = \frac{\sum Basic\ Expenditure\ CEX(t)}{\sum Consumption\ Expenditure\ CEX(t)} \qquad 1984 - 2009$$

$$c2'^*_{VGR}(t) = [(i^*(t) - i(t)) + (g_{10year}(t) - g(t))]\ c2^*_{VGR}(t) \qquad 1970 - 2010$$

$$c2'^*_{NIPA}(t) = [(i^*(t) - i(t)) + (g_{10year}(t) - g(t))]\ c2^*_{NIPA}(t) \qquad 1955 - 2009$$

Standard Models:

CEQ	certainty-equivalent
CES	Constant Elasticity of Substitution
CRRA	Constant-Relative-Risk-Aversion
LCPIH	Life Cycle/Permanent Income Hypothesis
MPC	Marginal Propensity to Consume
U(c)	Utility Function
V	t-period felicity function
w	wage income
r	real interest rate
δ	discount factor
F	financial wealth
H	human wealth
λ	Lagrange multiplier
μ	dynamic multiplier

ρ	parameter of a CES-function specifying the intertemporal elasticity of substitution

Buffer-Stock-Model:

x(t)	cash on hand
p(t)	persistent income
v(t)	transitory income
TN	truncated normal distribution

Data Sources

CEX	data freely available at: http://www.bls.gov/cex/
EVS	data available on demand via: https://www.destatis.de/DE/Meta/AbisZ/Einkommens_Verbrauchsstichprobe.html
FoF	data freely available at: http://www.federalreserve.gov/RELEASES/z1/Current/data.htm
NIPA	data freely available at: http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1
PSID	data freely available at: http://simba.isr.umich.edu/data/data.aspx
SCF	data freely available at: http://www.federalreserve.gov/econresdata/scf/scfindex.htm
SOEP -	papers and data analyses available at: http://www.diw.de/soep
VGR	historic data available on demand; recent data freely available at: https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/VGR/VolkswirtschaftlicheGesamtrechnungen.html

Introduction

Despite a large amount of detailed economic research studying consumption and saving behaviour in several countries, utilizing high-level mathematics as well as highly powerful statistical software, the performance of theories attempting to explain the empirical facts still seems to be unsatisfactory. In fact, there is a clear gap between empirically oriented papers about saving on the one hand, and on the other one that part of the literature, which is primarily concerned with estimating the parameters for models of intertemporal utility maximisation that are assumed to guide consumer behaviour. While the issues raised by the latter interest only those believing in the respective models, publications with an empirical focus often reveal interesting relationships of undeniable meaning. Ultimately, these studies mostly note a conflict between their findings and the predictions of mainstream theories.

However, saving is certainly one of the crucial economic variables. Since private-household saving usually accounts for the major part of national saving, it is desirable indeed to clarify what drives an ordinary consumer to save or consume his wealth, and to understand how such decisions are affected by changes in the economic environment or by politically controlled parameters.

For decades, the Life Cycle/Permanent Income Hypothesis (LCPIH), originally formulated by Friedman (1957) and Modigliani & Brumberg (1954), subsequently highly formalised by making use of dynamic programming techniques and optimal control theory, has been the central paradigm in economics for studying consumption and saving behaviour. The LCPIH assumes households optimise the utility of consumption intertemporally, subject to permanent income or life-time wealth. In this approach, saving is merely a by-product of the optimal consumption path. The exclusive purpose of saving is future consumption since the only

trade-off a consumer faces is the trade-off between current and future spending.

The mainstream models are based on the assumption of homothetic preferences and additive intertemporal utility. Preferences are assumed not to be interdependent. The optimal intertemporal consumption path is presumed to be governed by the relationship between the real interest rate, rewarding the accumulation of financial wealth, and a discount factor measuring the degree at which households depreciate future consumption compared to immediate pleasure.

The central prediction of these models under perfect foresight or certainty-equivalent conditions states that consumption does not respond to current changes in income if these have been expected in advance. The effect of an unexpected income shock depends on its impact on permanent income. If the income shock is considered to be transitory, consumption remains stable; a transitory income gain will be mainly saved, while a transitory loss will be balanced by dissaving. Only if the consumer expects the shock to be persistent, is consumption adjusted upwards or downwards. The marginal propensity to consume (MPC) out of an increase in current income is consistently assumed to be exactly the same as the MPC out of an increase of equal present value in expected future income.

Vital issues of research within such an approach are to distinguish transitory and permanent income shocks as well as expected and unexpected events. A major focus within empirical work is on estimating the intertemporal elasticity of substitution as the crucial parameter determining the curvature of the intertemporal utility function. In order to refer to aggregate data, the representative agent approach is adopted in most cases, analysing an economy as if it carries out an infinite horizon optimisation problem of a single, immortal, foresighted consumer. This approach requires a number of simplified assumptions about individual preferences.

Yet, the hypothesis of consumers monadically calculating their optimal consumption path far into the future by use of dynamic programming techniques and taking into account the probability distributions of future income streams, life-expectancy and real interest rates, is not just an approach to consumption behaviour. It is one of the cornerstones of modern macroeconomics. As noted by Hahn & Solow (1997), post-Lucas macroeconomic theory stems from two essential commitments: first, a valid macroeconomic model should be the exact aggregation of a microeconomic model; second, the appropriate microeconomic model is based on inter-

temporal utility maximisation subject to budget constraints and technology only.

In fact, only extremely simplified models at the micro level allow for exact aggregation as the heterogeneity of agents has to be strictly curbed. Except for some recent developments in Dynamic Stochastic General Equilibrium modelling, heterogeneous agents have been entirely excluded in the dominant range of macroeconomic theory. We are not concerned with the consequences for the modelling of firms and competition here. Concerning the theory of the consumer, excluding heterogeneity requires a presumption of homothetic preferences; otherwise distributional parameters influence the aggregate outcome and devaluate the representative agent approach. Interdependencies and strategic interactions also have to be neglected. In fact, the standard LCPIH perfectly fulfils these needs and has therefore been used as an essential module of modern macroeconomic theory.

These models, impressive due to their sophisticated mathematical apparatus impeccably concealing bizarre underlying assumptions, are often the basis for straightforward policy advice. Lucas' critique of the Keynesian consumption function (Lucas, Sargent 1981) was in fact not so much targeted at theory than at policy. Indeed, if people do immediately calculate the permanent income value of a transitory income gain, any political attempt to stimulate demand during an economic downturn by, say, improved social benefits, is simply nonsense. Generally, if forward-looking consumers translate each piece of public debt into an expectation of an additional future tax burden, public deficit spending will only force private households to become particularly eager savers due to adjusted life-time consumption plans. If preferences are, moreover, homothetic, individual saving rates will be completely independent from permanent income. Under such conditions, suggesting a policy that favours low-income families in order to encourage effective demand is just an attestation of economic imbecility.

Therefore, the choice of which theory of saving is acceptable as a description of real consumer behaviour and which should better be disregarded, has far reaching consequences. Ultimately, this should lead to a scrutinising of the reality of the micro foundation of modern macroeconomics.

Already in the early nineties, numerous papers expressed disappointment at the weak empirical performance of the standard LCPIH. It turned

out that the results of the empirical tests depended crucially on the incorporated assumptions about the income process. Since income expectations are virtually unobservable, it remains an open question, whether the demarcation line between transitory and permanent income shocks, assumed by theory, corresponds to the perception of any consumer. Discount rates are also unobservable. The only time series which empirical estimations can really rely on are real interest rates. But real rates refuse to confirm a significant link to consumption growth. The striking incapability of empirical research to provide a serious estimate of the vital parameter of intertemporal elasticity of substitution, has contributed to a growing dissatisfaction.

Concerning testing of the model predictions at the micro level, empirical evidence suggests rejection of the framework. Consumption was shown to track income closely over the life-cycle. The MPC out of transitory income fluctuations was obviously significantly higher than the permanent income value of these fluctuations. Saving rates appeared to be boosted rather than diminished in the case of predictable income growth.

This led to a number of amendments to the standard approach such as the introduction of precautionary saving, liquidity constraints and habit formation. As a result, the LCPIH became compatible with a much richer variety of short-run and long-run consumption patterns. Constant-Relative-Risk-Aversion(CRRA)-utility in an uncertain environment under appropriate parameter specification can explain why consumption tracks income over a lifespan, why the MPC out of transitory income is relatively high, or why median wealth holdings are low. Parameter values sufficient to justify these phenomena are more realistic if the precautionary motive is combined with the assumption of imperfect capital markets and liquidity constraints. Habit formation provides a rationale for a positive correlation between income growth and saving rates.

However, despite the gain in realism due to the introduction of the considered amendments, numerous empirical facts remain unexplained. The most striking patterns that are still entirely dubious are: the strong and lasting disparity of saving rates across income groups; the extreme variance in wealth holdings; and the relatively high share of households that save virtually nothing during their life-time.

The buffer-stock model is able to justify why the median saver builds up relatively limited wealth. But it is entirely incomprehensible why the lowest two or three deciles seldom accumulate any financial assets. Pre-

cisely because households at the bottom of the income ladder face an over-proportional risk of negative income shocks caused by unemployment or poorly paid jobs, the precautionary motive should drive them toward a particular saving effort. To justify the strong link between income and consumption of poorer consumers by liquidity constraints implies that these consumers actually wish to borrow, but are not allowed to do so. This is also not plausible. Nowadays, most households in the bottom deciles have little reason to expect strong income growth in the future. Their desire to borrow cannot therefore be rationalised under optimality conditions. Instead, assuming poorer households to be liquidity-constrained strengthens the prediction of a strong incentive to build up a buffer-stock of wealth.

Habit formation can explain why a consumer who has just experienced a negative and permanent income shock will attempt to preserve a better standard of living at the cost of saving. But all models of habit formation assume habits to be fixed only in the short-run and to be flexible in the long-run. After some periods the saving rate of a deprived consumer should be the same as it was before. In reality it is not.

In fact, the rising saving rate curve over income in cross-sectional data as such does not challenge the standard approach. The usual explanation since Friedman (1957) has been the concentration of high transitory income households in the upper deciles, and of low transitory income consumers in the lower deciles. A similar argument has been put forward by the life-cycle approach stating that only households at the peak of their hump-shaped life-time income curve are concentrated in the upper deciles, which save most intensely for retirement. So, standard models justify the positive correlation between income and saving rate in cross-sectional data as the outcome of income fluctuations at the individual level, be it short-term or long-term.

The problem is, however, that the lifelong income variance of a typical consumer is not sufficient by far to explain the extreme variance in cross-sectional saving rates. Hence, that saving rates rise with permanent income—more correctly, with the consumer's enduring income position relative to his contemporaries—can soundly be considered a stylised fact. The effect of permanent income on a consumer's saving rate is obviously much stronger than the age effect or the impact of income fluctuations. Households in the bottom permanent income deciles save virtually nothing

over their life-cycle, while the permanently rich appear to be exceptionally eager to save.

To cope with the fact of varying saving rates across permanent income groups is a serious challenge for the standard approach and the usual explanations are hardly convincing. Social security provisions are often referred to in order to rationalise low or completely absent saving by low income groups. The argument is that in the case of a negative income shock or after retirement, social security benefits cover a much higher proportion of the income of poorer households than of affluent people. Therefore, low-income consumers are assumed to have less incentive to save in order to prepare for the uncertainties of life or for retirement.

However, if this was correct, saving rate differentials in cross-section would have to be much smaller and average saving significantly higher in countries with poorer social security systems. Empirical evidence does not support such a hypothesis. While Feldstein (1980) tried to prove a negative influence of public pension schemes on private saving, his result has been refuted on empirical and theoretical grounds by subsequent studies. At least within the OECD-sample, countries with better social security and more generous pension plans tend instead to display higher saving rates. Furthermore, examining saving data from the pre-1914-era and comparing them to current saving behaviour provides strong evidence for the fact that low-income households, despite the absent social security net, saved virtually nothing in the early twentieth century. Cross-sectional saving patterns actually appear to be quite similar over long periods, in spite of vast differences in social security provisions and safety net arrangements.

Another strand of the literature considers different discount factors of different income groups to give reasons for divergent saving behaviour. Since discount factors are not observable, this approach is essentially immune to empirical refutation. However, in surveys asking people about their motives to save or not to save, poorer households would be expected to indicate that they are not particularly concerned about the future, thereby confirming the assumption of a high discount factor. In fact, these people mostly respond that they cannot afford to save, although they would like to do so.

It is not only the absence of saving by low income groups that remains incomprehensible within the LCPIH models. The same is true for the enormous assets accumulated by the rich. It has been acknowledged by many researchers that neither the standard LCPIH nor the buffer-stock

model provides a reasonable explanation for the saving behaviour of the wealthiest. It is too obvious that the savings of the latter, adding dollar after dollar to already available millions or even billions, are not dedicated to a later life period and also not for consumption by their heirs. However, the wealthiest one or two percent of the population easily account for half of the financial wealth creation in a typical capitalist economy[1]. Several studies consistently conclude that only a minority of financial assets is indeed accumulated with the purpose of future consumption. As Carroll (1997) noted, if all households behaved according to, say, the buffer-stock model, the aggregate capital-income ratio would be far smaller than we observe it to be.

This is not so much a problem for a microeconomic theory of saving that might explicitly limit its scope to the 90 or 95 percent of households below the top. But a macroeconomic model, designed to reveal the essential laws of motion of an economy, must not ignore the obvious disparity in saving behaviour that distinguishes the top percentiles of richest families from the mass of common savers.

The purpose of the following book, however, is not to provide a macroeconomic theory, but suggest a microeconomic model of saving that is closer to the facts than conventional models. Our approach focuses on the saving behaviour of the majority of households that are not exceptionally rich. Hence, we explicitly do not intend to provide a theory of saving by the wealthiest.

Before offering our own model of saving, we demonstrate how the predictions of the standard models fundamentally change if one simply departs from the assumption of homothetic preferences, and introduces Stone-Geary preferences instead. *Intratemporally*, homothetic preferences lead to the prediction of a linear expenditure expansion path that goes through the origin. The *intertemporal* consequence of homothetic preferences is that the intertemporal elasticity of substitution is independent from the level of permanent income. The fact that a linear expenditure expansion path is far away from real consumption patterns is confirmed by all empirical studies scrutinising Engel-curves. The composition of consumption undeniably depends on the amount of total outlay a consumer can afford to spend. In fact, why should we consider the hypothesis of an

1 See: data about financial assets of the extremely rich provided by the World Wealth Report (Capgemini and RBC Wealth Management) or D.A.C.H.-Report (Valuga AG)

intertemporal elasticity of substitution that is not influenced by permanent income, to be more realistic than horizontal Engel-curves?

Although not reflected in the mainstream literature, there has been an on-going debate about the role of subsistence needs with respect to saving. One of the first authors to raise the issue was Rebelo (1992). His starting point was the implausible prediction of the standard intertemporal utility function that the optimal saving rate is identical for two countries which have the same real interest rate but different income levels. Rebelo provides a model that is based on a simple extension of standard preferences, assuming that within-period utility has Stone-Geary-form. Under this condition, momentary utility is supposed to be derived not from the entire level of consumption, but from the difference between total consumption and a certain subsistence level.

The intuition behind this approach is that, as long as their most elementary needs are not satisfied, people do not care about consumption smoothing and intertemporal optimality. Beyond the subsistence point, intertemporal reflections might be undertaken but when close to survival, other considerations are incomparably more urgent. A comprehensive check of a model of saving taking into account basic needs is suggested by Ogaki, Ostry & Reinhart (1996). Estimating the parameters of an intertemporal utility function with subsistence consumption, the authors find strong empirical evidence in favour of such an approach.

In the debate about saving and consumption in developed countries subsistence points are typically not supposed to be crucial, since subsistence in the sense of naked survival is not regarded as a major concern. However, subsistence needs determining the minimum level necessary for *social survival* in current societies are possibly almost as equally important. No one will even think about saving, as long as the basic requirements of a modern life are not satisfied. It is fully consistent with such an approach that those families who do not save always report in opinion polls that they simply cannot afford to do so, because all their money is used up to pay for the basics of living.

One of the exemptions in the debate about the relevance of subsistence consumption in developed countries are Ravn, Schmitt-Grohe & Uribe (2008), who analyse the impact of good-specific subsistence points on the price elasticity of demand. The authors explicitly support a broader interpretation of necessities, including those dictated by social norms. Yet, while the subsistence level of a human being's biological survival can be

measured fairly, the question arises how necessities of social survival should be defined. Ravn, Schmitt-Grohe & Uribe (2008) suggest understanding subsistence points as an increasing function of long-run measures of output.

Indeed, expenditure devoted to satisfying basic needs according to a common standard of living should plausibly go up with this standard. A telephone or a car was still a luxury in the middle of the twentieth century, but they are a requirement for most households today. Mobile phones, computers, and internet connection have just recently transformed into basic equipment. Consequently, increases in the standard of living also boost the amount of expenditure for purchases, which are no longer a matter of choice.

To define Stone-Geary preferences this way not only overcomes the homotheticity property underlying the standard models. It also acknowledges the fact that individual preferences are interdependent. It is difficult to imagine the decision process of real people in terms of monadic processors running an optimisation program before purchasing a holiday trip or signing a life insurance contract. Actually, these models ignore one of the most essential characteristics of a human being; to be socially interconnected and to be acting in a social environment.

To consider Stone-Geary preferences with moving subsistence points is not only relevant from a theoretical point of view. The predictable response of consumers to policy changes is remarkably different under these assumptions compared to the standard approach. On the one hand, policy measures intended to encourage demand will definitely have an effect now, particularly if they concern low- and middle-income households. Since the latter's intertemporal elasticity of substitution is low under Stone-Geary preferences, their MPC out of an additional income unit will be high, even if this income increase is only transitory. On the other hand, whatever tax incentives are set, households at the lower end of the income scale will not respond with stronger saving effort, neither for private pension schemes nor for the general uncertainties of life, as long as their income does not significantly exceed the current value of the necessity basket. It is not a concern of this book to scrutinise policy implications, but they should at least be mentioned.

In the end, we depart from the entire approach of intertemporal utility maximisation. Models which explain saving as by-product of an intertemporal consumption plan do not only fail to match the facts. They addi-

tionally face serious theoretical malfunctions. In fact, those models are only mathematically solvable under extremely simplifying assumptions, and even in that case they are empirically worthless since nobody is equipped with the required information to determine the optimal consumption path. Neither is the exact probability distribution of anybody's real income process for the next 4 or 5 decades a known variable nor does a data base exist that equips us with the times series of real interest rates in the future.

In contrast to the mainstream, the core of our model of saving is a very simple rule of thumb supposed to govern the saving behaviour of rational households with basic needs, which have to be satisfied first.

The book is organised as follows. Chapter 1 reviews the major stylised facts of saving at the micro and the macro level as confirmed by the literature. At the macro level we find only few clear patterns, among them a positive link between income growth and saving. The relationship between income level and saving is weaker, significantly so in low- and middle-income countries. The most striking fact at the micro level is the steep rise of saving rates with relative income that is shown to be true for current as well as for permanent income. Another stylised fact at the micro level is the considerable share of households that save virtually nothing. Moreover, we find evidence that at a given point in time, saving rates in the lower-income deciles display less variance, while they are more volatile than saving rates of better-off people over time. Finally, the assumption of essentially two types of savers—the majority of households on the one hand, and the richest one or two percent on the other hand—is confirmed by the analysis of saving attitudes, wealth holdings and saving motives.

In Chapter 2 we consider the theoretical reasoning of the traditional models and their ability to account for the stylised facts of saving. The chapter concludes that major stylised facts of saving are not explicable within the frame of this approach.

Chapter 3 starts by introducing non-constant good-specific subsistence points into a standard Dixit-Stiglitz framework. Exploring the consequences of moving subsistence points for intertemporal optimisation, it is shown that the Euler equation in this case contains two additional variables, which are usually not considered to be relevant for saving behaviour: first, the growth rate of the necessity basket, possibly corresponding to long-term trends of income growth, and, second, the rate of excess basic price inflation defined as the difference between a particular price index

gauging the inflation rate of basic goods and the general consumer price index.

Finally, we present our model. Its core is a simple rule of thumb that is supposed to govern rational saving behaviour of consumers with a hierarchy of needs, some of them elementary and basic. The rule is: When current income exceeds necessity spending the consumer saves, while he dissaves (or searches for credit) when current income falls below the expenditure required for basic needs. We analyse the predictions of such an approach at the micro and the macro levels.

Chapter 4 is concerned with the patterns of consumption shares and searches for criteria to identify subsistence points empirically. Due to a thorough analysis of cross-sectional Engel-curves, a number of expenditure categories are qualified as being dominated by necessities: food and drinks, shelter (including rents, interests on mortgages, energy, water and heating costs), transport (as far as reliable data are available: excluding new car purchases), communication, education and health care. (Due to data problems, health expenditure is neglected in the case of Germany.) On this foundation, two approximations to the historic path of the necessity share are defined and calculated for the U.S. and Germany.

Chapter 5 scrutinises whether our approach offers more satisfactory explanations for the stylised facts of saving than conventional models. Moreover, we check whether the necessity share contributes to an explanation of real saving behaviour in the U.S. and Germany. We show that a significant negative correlation between the necessity share and the personal saving rate exists in both countries.

We demonstrate that cross-sectional saving rates can be matched quite well by our approach for data of the U.S. and Germany from different periods. Finally, we find that more than 90 percent of the variation of the personal saving rate between 1955 and 2009 in the United States, and between 1970 and 2010 in Germany, can be reproduced by our model under plausible parameter values.

Our analysis concludes that the hypothesis of subsistence needs is crucial for explaining saving patterns in cross-sectional and time-series data.