Summary and Conclusions

This final chapter summarizes the four studies in this thesis, draws broader conclusions from these studies and discusses possible avenues for future research. Time preferences are very important for economists and policy makers because all decisions that include future outcomes are affected by how patient people are. Still, to be able to take time preferences into account in, for instance, policy making, it is necessary to measure them correctly. This thesis compares various ways to measure time preferences and investigates their advantages and limitations.

6.1 Summary

Chapter 2 focuses on hyperbolic discounting, the notion that people are less patient in decisions that concern the present than in decisions regarding the more distant future. The chapter discusses that hyperbolic discounting can be measured either by looking at violations of stationarity or at violations of time consistency. Stationarity is violated when at a fixed moment in time, people decide differently for trade-offs in the near versus the more distant future. Time consistency on the other hand is violated if the optimal allocation for two specific dates changes over time. Figure 1 on page 8 illustrates the concepts stationarity and time consistency graphically. We can only be sure that someone is an hyperbolic discounter if she violates both stationarity and time consistency. Nevertheless, most experiments only measure one of these concepts. Chapter 2 discusses a field experiment in Nigeria in which we investigate to what extent the two concepts overlap. Violations of time consistency and stationarity rarely coincide, especially among more liquidity-constrained participants. In a context of
liquidity constraints, eliciting only stationarity or time consistency without controlling for the changes in the situation outside of the experiment is therefore not sufficient to identify hyperbolic discounting. These findings illustrate that the choices people make in time preference experiments are affected by someone’s situation outside the experiment: stationarity is affected by *expected* changes in a person’s wealth and time consistency is affected by *unexpected* changes over time.

Chapter 3 examines whether changes outside the experiment also influence choices over effort in time preference experiments. Over the last few years, there has been increasing attention for the limitations of the use of monetary rewards in these experiments. One important limitation is that experimental choices are likely not only reflect underlying time preferences, but also the interest rate people face in real life, for instance on their savings account. To circumvent such issues, Augenblick et al. (2015) recently suggested to use real effort allocations to measure time preferences: participants choose whether they prefer working on a boring task for less time at a sooner date or for a longer period of time at a later date. In such an experiment, there are no arbitrage opportunities. Additionally, participants cannot spread the ‘consumption’ over a longer period of time, the way they can do with monetary rewards, as the work has to be completed entirely during one of the experimental sessions. In time preference experiments that use such real effort allocations, researchers generally find aggregate hyperbolic discounting, while many recent experiments that use monetary rewards do not (see e.g. Augenblick et al., 2015).

Andreoni and Sprenger (2012a) discuss that earlier findings of aggregate hyperbolic discounting may in fact have been caused by differences in transaction costs between payment dates. The effects of these differential transaction costs on experimental choices were mistakenly attributed to hyperbolic discounting. Still, in time preference experiments that use real effort allocations, the duration of the experimental sessions is not fixed. This implies that unexpected changes in participants’ lives may affect experimental choices. Someone who is, for instance, suddenly assigned an exam for the next day, just before she gets an opportunity to revise the choice she made within the experiment, may well decide to work for a longer period of time at the later date. This allows her to study for her exam today. Although this violation of time consistency is a reflection of unexpected changes in a participant’s life, experimenters who are not aware of these changes may mistakenly see the present-biased revision as hyperbolic discounting.

Chapter 3 tests for the presence of hyperbolic discounting in real effort allocations with a new design which keeps the duration of the experimental sessions fixed.
Fixing the duration of the experimental sessions substantially reduces the possible influences of changes in life outside the experiment on experimental choices. The findings show that when the length of the experimental sessions is fixed, there is no evidence of aggregate hyperbolic discounting. Therefore, Chapter 3 emphasizes that in order to measure time preference correctly, experimenters need to try either to keep circumstances as equal as possible across participants or to control for changes in life outside the experiment.

Chapter 4 analyzes to what extent violations of time consistency, or plan revisions, are related to present bias or to unexpected changes participants experience in their lives. In the chapter, we analyze a unique data set, which combines a time preference experiment with financial diaries and data on subjective expectations regarding future income. The combination of subjective expectations and financial diaries allows us to capture unexpected changes in wealth over time. We show that the magnitude and significance of the effects of present bias and of unexpected changes strongly depend on whether corner allocations are taken into account. In a corner allocation, a participant chooses to allocate the entire experimental budget to one of the two payment dates, rather than allocating some of it to the sooner date and some to the later date. For participants who select the same corner allocation both in the initial visit and in the revisit, preferences are only weakly revealed, as it is impossible to determine whether the underlying optimal allocation remained the same or whether it changed. Not taking corner allocations into account in the analyses therefore yields a lower bound of the effect, while analyses that consider all double corner allocations as plan revisions yield upper bounds of the true effects. When we only consider actual revisions and ignore corner allocations, there are no significant relations between plan revisions on the one hand and our measure of present bias and unexpected changes outside the experiment on the other hand. Nevertheless, once corner allocations are taken into account, we find that there is a significant effect of our measure of present bias on plan revisions: more present-biased participants are more likely to revise their earlier decision. Additionally, participants who experienced a shock, such as death in the social network or a damaged or lost asset, are also more likely to revise their initial decision in a present-biased direction when corner allocations are also considered plan revisions.

Finally, Chapter 5 investigates whether framing questions as gains or losses affects the estimated parameters in time preference experiments. In most time preference experiments in economics, participants repeatedly choose between a smaller sooner and a larger later amount and the interest rate increases monotonically across the
questions. Some experiments implement monotonically increasing interest rates by increasing the later amount, while keeping the sooner amount constant. By contrast, other experiments decrease the sooner amount, while keeping the later amount constant. In experiments with decreasing sooner payments, questions are framed as losses, compared to reference point of the first question: while the later payment remains the same, the sooner payment worsens from one question to the next. Although results from the two types of experiments are frequently directly compared, the estimated time preference parameters may in fact differ if the choices participants make are affected by loss aversion. Loss aversion may cause people to behave more patiently and display less hyperbolic discounting to avoid losing out when questions are framed as losses. Experiments in which questions are framed as losses may therefore overestimate the discount factor and the level of hyperbolic discounting compared to experiments in which questions are framed as gains. Based on a laboratory experiment in which a random half of the participants faced increasing later options and the other half decreasing sooner options, I find that framing does not significantly affect the estimated discount factor and quasi-hyperbolic discount factor. These results therefore suggest that findings from time preference experiments with decreasing sooner amounts and those with increasing later amounts can still be compared directly.