Liquid wealth heterogeneity, asymmetric consumption dynamics, and myopic loss aversion

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Abstract

Using transaction-level bank account data on Belgian career starters, we empirically study the effect of liquid wealth on consumption dynamics in the absence of both illiquid wealth and debt. We find an asymmetric consumption response to anticipated income changes, with a stronger response to income increases than to decreases. This asymmetry in consumption responses originates from the asymmetric consumption smoothing effect of liquid wealth. Rational models of consumption are unable to fully explain the results. These results are consistent, however, with the predictions of a behavioural model of myopic loss aversion. Early in a career, individuals thus exhibit a combination of greater sensitivity to losses than to gains and a tendency to evaluate outcomes frequently.

Keywords: anticipated income changes ; consumption ; liquid wealth ; myopic loss-aversion ; revealed behaviour

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1 Introduction

Understanding individuals' consumption responses to anticipated income increases and decreases [1] plays an important role in designing and evaluating monetary and fiscal policies. How will consumption evolve when a policy is expected to affect income? Will an income increase have the same effect on consumption as a decrease? Does this reaction differ throughout the wealth distribution? If so, what drives this? Answering these question precisely has however been difficult due to limited empirical data.

Prior work has mostly relied on data from small, survey-based sources (Jappelli and Pistaferri (2010, 2018)) facing known issues such as measurement error and recollection bias (C. Moore et al. (2000)). Recently, detailed revealed financial data has become available for research (Gelman et al. (2014); Baker (2018)). One trend has been to use data from financial aggregator platforms (FAP) (Baker and Yannelis (2017); Olafsson and Pagel (2018); Gelman et al. (2018)). Although the nature of FAP data solves recollection biases and eliminates any potential motivations to misreport, concerns remain about selection bias and the salience effect of platform usage on financial behaviour (Baker (2018)). Recent work by Ganong and Noel (2019) has addressed these concerns by employing representative de-identified bank account data which suffer less from selection bias in financial literacy [2]. To the best of our knowledge, such granular revealed data have only been used to investigate consumption responses to one type of anticipated income change (increase or decrease) at a time. This paper seeks to fill the gap by investigating the consumption responses to both anticipated income increases and decreases in the presence or absence of liquid wealth.

Theories developed to explain this behavior fall into two categories: forward-looking, (near-)rational theories and behavioural theories. Rational theories that received much attention are the well-know Life Cycle/Permanent Income Hypothesis (LCH/PIH) (Friedman (1957); Brumberg and Modigliani (1954)), and models based on credit- and/or liquidity-constrained

[1] In this paper we focus on anticipated income changes. This has the advantage of not making any assumption about the income process, with income shocks and the error term being modelled jointly. In the remainder of the paper, when we refer to income increases or decreases, we always imply anticipated income decreases or increases.

[2] Financially literate individuals will be more likely make use of FAP, whereas this is not the case for regular bank accounts.

agents (Kaplan et al. (2014)). Widely used behavioural models are the myopic agent model (Laibson (1997); Campbell and Mankiw (1989)), and the loss-averse agent model (Kahneman and Tversky (1979); Bowman et al. (1999)). These various models entail different expected reaction patterns and can thus be tested in an empirical setting.

The LCH/PIH predicts no consumption response to anticipated income changes and has been rejected in all recent empirical research (i.a. Christelis et al. (2017); Baker and Yannelis (2017); Fuster et al. (2018); Bunn et al. (2018); Albuquerque (2019)). Enriching the LCH/PIH with credit and liquidity constraints allows for the violation of LCH/PIH in the case of anticipated income increases. It states that credit-constrained individuals cannot (fully) borrow against expected future income increases and will thus only react once the increase materialises. Empirical research on anticipated income increases (e.g. tax rebates, temporary government shutdown) (Souleles (1999); Shapiro and Slemrod (2009); Gelman et al. (2018)) has validated this predicted behaviour. For anticipated income decreases, the liquidity- and credit-constrained agent model does not predict a reaction, since there is no reason why a liquidity-constrained individual should fail to save in anticipation of an income decrease.

Among the behavioural models, the myopic agent model does predict a consumption reaction to both expected income increases and decreases. It allows individuals to have different levels of present-bias or myopia, leading to consumption reactions when the income change occurs. We thus have an opposite prediction for anticipated income decreases between the credit- and liquidity-constrained agent model (no consumption reaction) and the myopic agent model (sudden consumption decrease). Using data on the phasing out of unemployment benefits, an expected income decrease, Ganong and Noel (2019) found evidence in support of the myopic agent model. Myopia can thus explain the response to both anticipated income increases and decreases, in line with much of the previous mentioned findings.

Several aggregate and survey studies (Shea (1995); Fuster et al. (2018)), however, have found an asymmetric consumption response, with higher reactions to income decreases than increases, something that myopia in itself is unable to explain. These studies have in turn proposed the (forward-looking but) loss-averse agent model as an explanation (Shea (1995);

Bowman et al. (1999)). Herein an individual cares much more about losses than about gains, relative to their reference point. This idea that individuals might tenaciously "hang on" to their former living standards was already noted in Stone and Stone (1938).

We conclude that the empirical work on the subject has led to a host of often contrasting theories. One consistent observation however has been that individuals with higher levels of liquidity have lower consumption reactions Kaplan et al. (2014); Jappelli and Pistaferri (2018). This makes sense from a consumption smoothing perspective. Liquidity enables individuals to quickly react to income changes of any sorts. In light hereof, we home in on liquidity –in the form of liquid wealth– to investigate consumption reactions to anticipated income changes.

In modern economies, the start of a professional career stands as a major life event and offers unique opportunities to study how wealth inequality interacts with consumption dynamics. In Belgium, career starters hardly have any debt (Vandone (2009)) [3], hold most of their wealth as liquid wealth, and are all in the same phase of their life. This makes the population particularly well suited to tease out the consumption response heterogeneity to anticipated income changes in the presence, or absence, of liquid wealth. We combine data from all financial transactions, financial wealth and demographic characteristics of several million Belgian clients obtained from a large European bank between 2006 and 2016. As a result, we identify career starters as individuals exhibiting a transition to a wage income during the time window of the data set. We then create an annual account of the financial progress of each career starter from a year before their start to six years into their careers. This data set has the same benefits as the bank data utilised by Ganong and Noel (2019).[4].

We find that individuals without liquid wealth or debt exhibit a marginal propensity to consume, or MPC ($= \Delta Consumption/\Delta Income$), of (approximately) one to both anticipated income increases (MPC^{+}) and decreases (MPC^{-}) early in their career. This is in line with the predictions of myopia or present-bias. Further, in line with what has been consistently observed in literature, we find that higher levels of liquid wealth lead to lower consumption reactions.

[3]Belgium has no tradition of student. Tuition fees are low and there are several options for lower income households to get financial support and/or reduced housing and tuition rates from the government.

[4]In Belgium, government benefits are, as a rule, paid on a bank account. Furthermore, Europeans have a right to a basic payment account.

This indicates that having liquid wealth enables career starters to smooth their consumption in anticipation of income changes. The consumption smoothing is however not symmetric. Those with liquid wealth are found to smooth more for income decreases than for increases, as one would expect from loss-averse individuals. Combined, these findings lead to an average MPC^+ of 0.7, and MPC^- of 0.4.

Overall our results indicate that consumer dynamics early in a career are driven by a combination of both myopia and loss-aversion. Myopia makes individuals less forward-looking than the rational models suggest, making them react to income changes when they materialise, even if they were anticipated. At the same time, the career starters seem to be loss-averse and resist reducing their consumption below their reference point. Hand-to-mouth (HtM) consuming career starters have no choice but to fully react to the income changes. Career starters with liquid wealth, on the other hand, are able to smooth their consumption. They do so especially when faced with income decreases, expressing their loss aversion. To sum, when faced with anticipated income changes early in a career, individuals exhibit myopic loss aversion – a combination of a greater sensitivity to losses than to gains and a tendency to evaluate outcomes frequently. The same behavior has been observed when individuals are faced with investment choices (Kahneman and Lovallo (1993); Thaler et al. (1997)) [5].

While the data used in this paper is limited to individuals early in their careers, the resulting finding of myopic loss aversion seems to be in line with much of the partial findings in the MPC-literature. This may indicate that our results extend beyond our sample of career starters. A better understanding of the mechanisms driving consumption decisions in the face of income changes may help us to design more effective policy interventions.

The remainder of the paper is organised as follows. Section 2 discusses the data and empirical strategy, section 3 presents the results, and section 4 discusses the results.

[5] Strong experimental evidence has been found for myopic loss aversion to explain the equity premium puzzle (Thaler et al. (1997); Larson et al. (2016)).

2 Data and empirical strategy

We use de-identified data from a European bank in Belgium. The data covers the period of 2006-2016 and includes information on personal characteristics, individual incoming and outgoing monetary transactions, and financial portfolio compositions. From this data, we extracted individuals who started their careers between 2009 and 2011. A detailed description of the data and the identification procedure can be found in (van den Heuvel et al. [6]).

The variables extracted from the data and their definitions are given in Table 1. For income, electronic transfers above €10,000 and thus windfalls above this size are excluded. This ensures that the results are not driven by such outliers. Our final dataset consists of 8,940 career starters which we observe three years prior to starting their career up to and including their sixth working years. Summary statistics of the selected sample are reported in Table 2. The population sample contains a unique level of granularity and reliability to study the effects of liquid wealth on consumption dynamics in the first years of a career.

Table 1: Overview of all variables extracted from the data and their definition.

Variable	Definition
Consumption (Yearly)	Debit card payments at P.O.S., cash withdrawals, written cheques, credit card payments, outgoing electronic transfers below €10,000 single transaction value.
Income (Yearly)	Cash deposits, consumer cheque deposits, and incoming electronic transfers below a single transaction threshold of €10,000.
Liquid wealth (Yearly)	Saving deposits, checking deposits, trading account deposits, pension savings, and financial insurances.
Married	Dummy variable equal to 1 if an individual is married.
Female	Dummy variable equal to 1 if the individual is female.
Belgian	Dummy variable equal to 1 if the individual is Belgian.

[6]A mimeo of this paper can be requested by mail.(Koen.Schoors@UGent.be)

Table 2: Summary statistics for all career starters that have worked for 6 years within the data set time frame. The variables are always measured at the beginning of the calendar year.

variable	mean (1)	std (2)	min (3)	median (4)	max (5)
Start income	15,537.69	5,529.19	10,000.09	17,721.05	150,393.89
Income after 6y	26,346.38	10,190.07	10,018.81	23,990.78	99,474.29
Start consumption	12,110.72	5,458.95	2,402.29	11,438.32	149,912.48
Consumption after 6y	23,526.05	10,125.44	2,678.17	21,514.38	174,543.82
Start wealth	4,438.20	10,443.91	0.00	1,394.98	380,239.32
Wealth after 6y	14,609.42	23,911.55	0.00	5,718.57	385,841.21
Female	0.48	0.50	0	0	1
Married at start	0.01	0.09	0	0	1
Married after 6y	0.09	0.29	0	0	1
Belgian at start	0.97	0.16	0	1	1
Belgian after 6y	0.98	0.14	0	1	1
Start year	2009.98	0.81	2009	2010	2011
Start age	22.8	2.23	18	23	30

To unpack the relationship between the consumption reaction to both positive (β_x^+) and negative (β_x^-) income changes, and liquid wealth, we use the following estimation equation:

$$\begin{aligned}\Delta \mathrm{C}_{i,t} &= \beta_1^+|\Delta \mathrm{Inc}_{i,t}| + \beta_2^-|\Delta \mathrm{Inc}_{i,t}| + \beta_3^+|\Delta \mathrm{Inc}_{i,t}| \times \log(1+\mathrm{W}_{i,t-2}) \\ &+ \beta_4^-|\Delta \mathrm{Inc}_{i,t}| \times \log(1+\mathrm{W}_{i,t-2}) + \gamma \log(1+\mathrm{W}_{i,t-2}) \\ &+ \lambda \mathrm{X}_{i,t-1} + \eta_i + \epsilon_{i,t}.\end{aligned} \tag{1}$$

Herein, $\Delta \mathrm{C}_{i,t} = \mathrm{C}_{i,t} - \mathrm{C}_{i,t-1}$, and $\mathrm{C}_{i,t}$ is the total consumption during working year t ($\in [2,6]$) of individual i. The distribution of $\Delta \mathrm{C}_{i,t}$ over all starters is shown in Fig. 1. $|\Delta \mathrm{Inc}_{i,t}| = |\mathrm{Inc}_{i,t} - \mathrm{Inc}_{i,t-1}|$, and $\mathrm{Inc}_{i,t}$ is the total income during working year t ($\in [2,6]$) of individual i. The distribution of $\Delta \mathrm{Inc}_{i,t}$ over all starters is shown in Fig. 2. $\mathrm{W}_{i,t-2}$ is the amount of liquid wealth owned by i at the start of calendar year $t-2$. Each individual's time series thus starts with the wealth one year before the start of their careers, and income and consumption in their first working year. Lastly, $X_{i,t-1}$ includes a set of dummy variables for civil state (Married), gender interacted with civil state (Married:Female), calendar year (one dummy for each year), and nationality (non-Belgian). $\mathrm{X}_{i,t-1}$ are always a snapshot of the state at the start of calendar year $t-1$. The errors $\epsilon_{i,t}$ are clustered at the individual level. Next to using year-on-year differences in income, further endogeneity concerns between income and liquid wealth are addressed in three ways. Firstly, by explicitly excluding all types of rents and financial income from our income measure, we avoid wealth from generating income. Secondly, by lagging liquid wealth by a full year, we avoid changes in income to be included in liquid wealth. Lastly, by using person-fixed effects (η_i), we control for any individual time-constant unobserved heterogeneity.

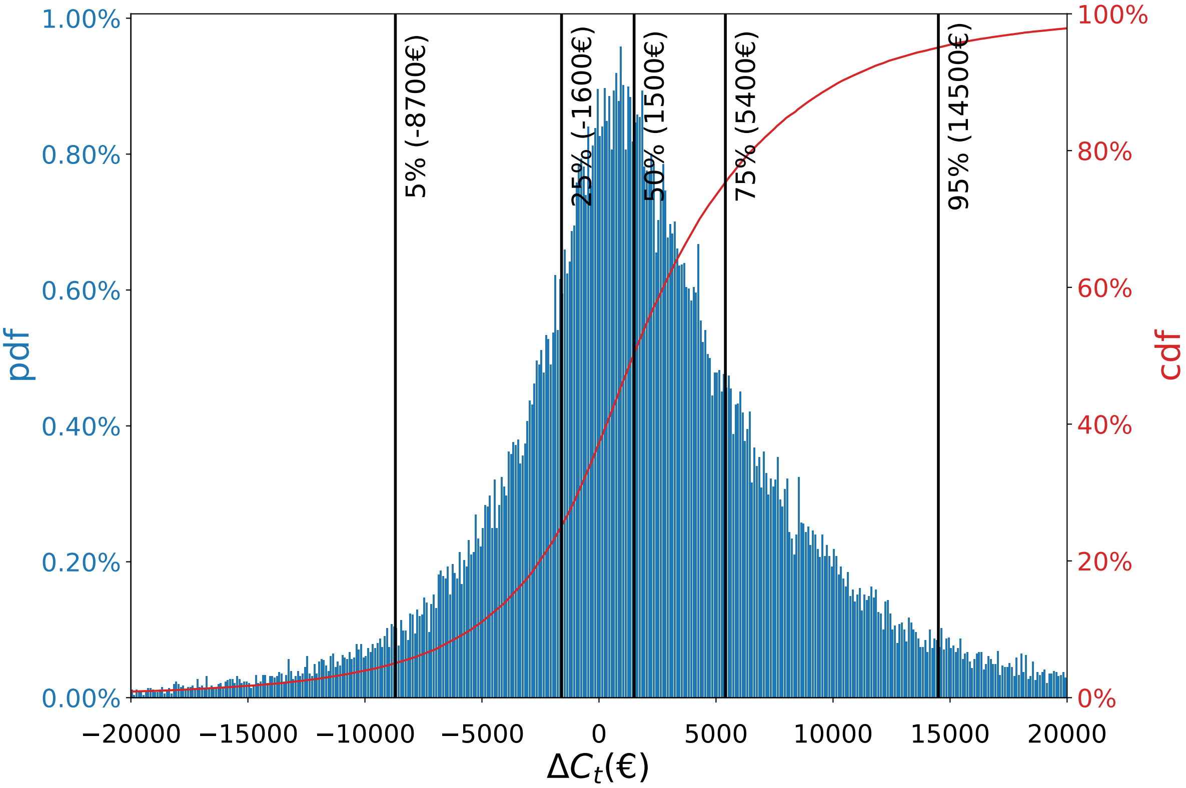

Figure 1: Distribution of the year on year consumption changes for the full Belgian career starting sample over their first 6 working years. In blue the density plot is shown. In red the cumulative distribution function (cdf) is shown. The black vertical lines show the 5th, 25th, 50th, 75th, and 95th percentiles values of the cdf.

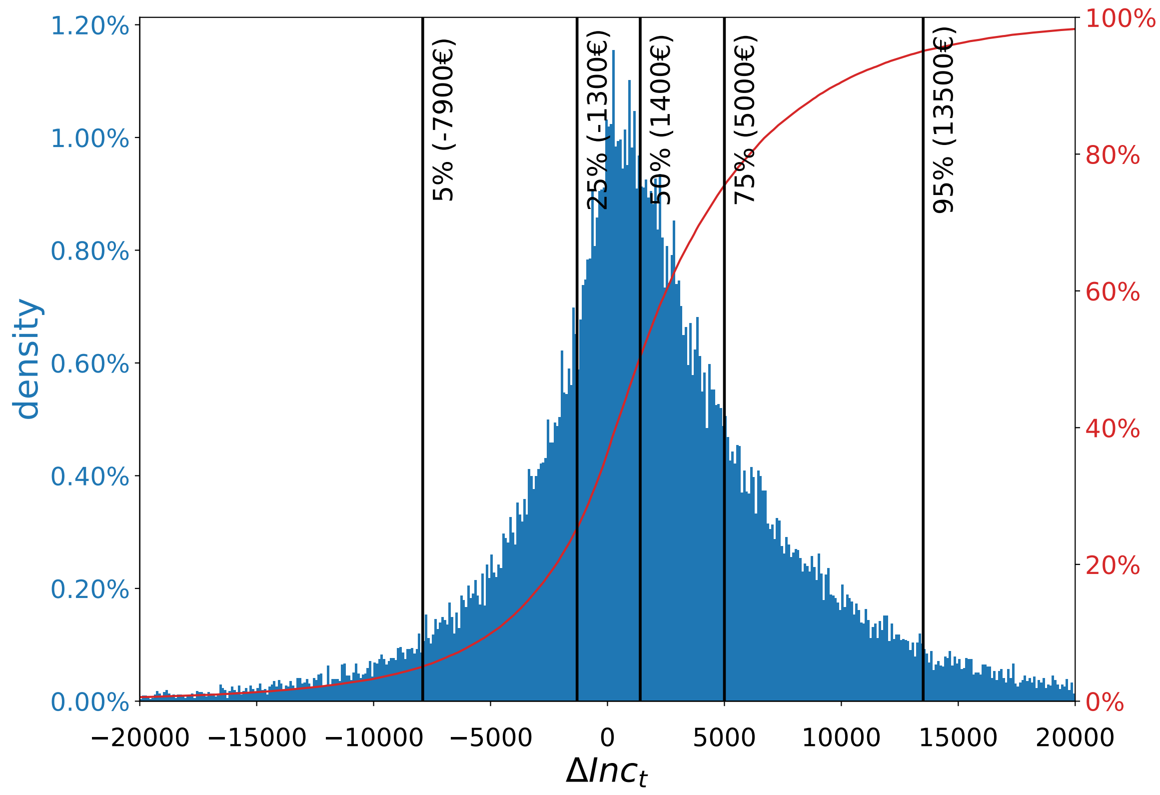

Figure 2: Distribution of the year on year income changes for the full Belgian career starting sample over their first 6 working years. In blue the density plot is shown. In red the cumulative distribution function (cdf) is shown. The black vertical lines show the 5th, 25th, 50th, 75th, and 95th percentiles values of the cdf.

3 Results

We gradually extend the model towards the specification in Eq. 1 and show the results in Table 3. The first two columns of Table 3 provide insights into the overall average consumption response to anticipated income increases and decreases. We find a higher consumption response to anticipated income increases than to income decreases, respectively 0.7, and 0.4. Adding the level of liquid wealth (and the other controls) does not explain away this asymmetry but does show that liquid wealth decreases the general consumption responses.

To see how liquid wealth influences this asymmetric consumption response, we add interaction terms between liquid wealth and the income changes in the third column of Table 3. We find that career starters without liquid wealth - the poor HtM individuals - adjust their consumption entirely to a change in income, both for anticipated income increases and decreases. This is in line with the hypothesised reaction of the myopic or present-bias agent model (Laibson (1997); Campbell and Mankiw (1989)). An agent who is focused on the short term, will only react once the change has materialized. These observations firmly reject the rational, forward-looking agent models for career starters. For the LCH/PIH model, we reject the hypothesis of insensitivity to anticipated income changes. For the credit-constrained agent model we reject the hypothesis of exclusive sensitivity to anticipated income increases.

For the career starters with liquid wealth, we see that increasing levels of liquid wealth decreases the consumption response to both signs of income changes. While not significant at the 5% level, the size of the consumption smoothing effect of liquid wealth seems larger for anticipated income decreases than for increases. Following Jappelli and Pistaferri (2010), who argue that individuals might not react to very small anticipated income changes, we exclude the income changes below 10% in the fourth column of Table 3. We find that the asymmetry becomes larger and the smoothing effect of liquid wealth now significantly differs between anticipated income increases and decreases.

Table 3: Estimates of the consumption response to positive and negative income changes without (columns 1-2) and with (column 3-4) liquid wealth interaction using person-fixed effects regressions over the first 6 working years of the career starters. Reported errors are person-clustered.

	Dependent variable: ΔC_t			
	basic	all controls	interaction	
			exclude ΔInc_t	
			none	$<10\%$
	(1)	(2)	(3)	(4)
$\Delta Inc_{t,+}$	0.718^{***}	0.700^{***}	1.021^{***}	0.958^{***}
	(0.048)	(0.052)	(0.092)	(0.120)
$\Delta Inc_{t,-}$	0.411^{***}	0.392^{***}	0.949^{***}	1.017^{***}
	(0.043)	(0.044)	(0.188)	(0.178)
$\log(1 + W_{t-2})$		-373.775^{***}	-281.524^{***}	-387.845^{***}
		(43.526)	(58.409)	(92.552)
$\Delta Inc_{t,+} \times \log(1 + W_{t-2})$			-0.039^{***}	-0.027^{*}
			(0.012)	(0.016)
$\Delta Inc_{t,-} \times \log(1 + W_{t-2})$			-0.065^{***}	-0.080^{***}
			(0.023)	(0.021)
Controls		✓	✓	✓
Fixed effects	Person	Person	Person	Person
F Statistic	277.72^{***}	322.61^{***}	312.95^{***}	210.77^{***}
Between Adj R^2	0.508	0.515	0.520	0.503
Within Adj R^2	0.162	0.174	0.182	0.150
Overall Adj R^2	0.332	0.338	0.345	0.398
Observations	50,807	50,807	50,807	32,605

Note: *p<0.1; **p<0.05; ***p<0.01

Career starters are thus not observed to behave as (near-)rational forward-looking agents but rather as myopic agents. But, while myopia can explain the consumption response to both signs of income changes, it alone can not explain why liquid wealth asymmetrically smooths consumption.

Behavioral economics has however shown that individuals often exhibit loss aversion when faced with decisions under risk (Kahneman and Tversky (1979)). Herein an individual exhibits a greater sensitivity to losses than to gains.

In a consumption context, this would imply that individuals should be more sensitive to having to decrease consumption than to having to increase it. Furthermore, one would expect loss aversion to become more visible for larger changes, since these entail a higher loss and more psychological stress. To test this hypothesis, we exclude the absolute income changes below the 5_{th} (P_5), 25_{th} (P_{25}), 50_{th} (P_{50}), and 75_{th} (P_{75}) percentiles in Table 4. The distribution of absolute income changes together with the position of the different percentiles are shown in Fig. 3. We find that the asymmetry does become larger for larger income changes, in line with the loss aversion theory. We perform a robustness analysis in Table 5 by excluding outliers in MPC values. The results are in line with the main results. Career starters are thus found to behave as myopic loss-averse agents who resist consumption decreases more than increases via liquid wealth.

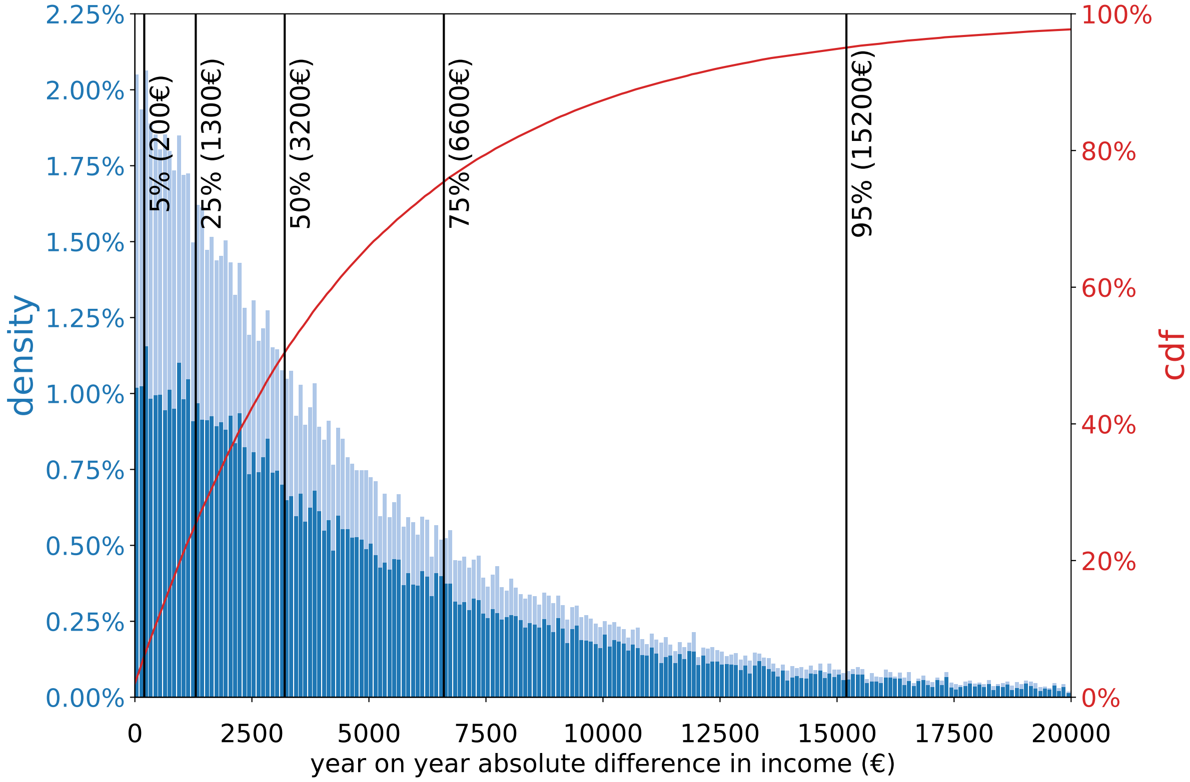

Figure 3: Distribution of the year on year absolute income changes for the full Belgian career starting sample over their first 6 working years. In light blue the density plot is shown for the income decreases, in dark blue the same is shown for the income increases. In red the cumulative distribution function (cdf) is shown. The black vertical lines show the 5th, 25th, 50th, 75th, and 95th percentiles values of the cdf.

Table 4: Estimates of the consumption response to positive and negative income changes excluding the bottom 5 (column 1), 25 (column 2), 50 (column 3), and 75 (column 4) percentiles of absolute income changes. Person-fixed effects and person-clustered errors are used.

	Dependent variable: ΔC_t			
	exclude $\lvert\Delta Inc_t\rvert$			
	$<P_5$	$<P_{25}$	$<P_{50}$	$<P_{75}$
	(1)	(2)	(3)	(4)
$\Delta Inc_{t,+}$	1.033^{***}	1.022^{***}	0.998^{***}	0.844^{***}
	(0.093)	(0.106)	(0.130)	(0.182)
$\Delta Inc_{t,-}$	0.939^{***}	0.951^{***}	0.975^{***}	1.108^{***}
	(0.189)	(0.188)	(0.197)	(0.264)
$\log(1 + W_{t-2})$	-250.304^{***}	-309.509^{***}	-414.795^{***}	-844.034^{***}
	(61.581)	(80.145)	(126.957)	(274.902)
$\Delta Inc_{t,+} \times \log(1 + W_{t-2})$	-0.040^{***}	-0.036^{***}	-0.030^{*}	-0.006
	(0.012)	(0.014)	(0.016)	(0.022)
$\Delta Inc_{t,-} \times \log(1 + W_{t-2})$	-0.064^{***}	-0.069^{***}	-0.077^{***}	-0.104^{***}
	(0.023)	(0.023)	(0.024)	(0.030)
Controls	✓	✓	✓	✓
Fixed effects	Person	Person	Person	Person
F Statistic	302.17^{***}	267.89^{***}	198.21^{***}	114.94^{***}
Between Adj R^2	0.485	0.5	0.518	0.55
Within Adj R^2	0.179	0.163	0.099	-0.077
Overall Adj R^2	0.35	0.372	0.409	0.455
Observations	48,272	38,111	25,405	12,708
Note:				*p<0.1; **p<0.05; ***p<0.01

4 Discussion

The major contribution of this paper is to show evidence for myopic loss aversion in the consumption dynamics during the first years of an individual's career. Specifically, we find an asymmetric consumption response to anticipated income changes, with greater sensitivity to income increases than to decreases.

We further find that this asymmetry can be explained by an asymmetric smoothing effect of liquid wealth on the consumption responses, with a stronger smoothing for income decreases than increases. Individuals without liquid wealth exhibit approximately a one-to-one reaction to both negative and positive income changes, which is in line with myopic or present-bias behavior. Liquid wealth, by enabling an individual to insulate their consumption from income decreases, allows them to express their loss aversion.

The presence of myopic loss aversion has been firmly established in investor behavior (Kahneman and Lovallo (1993); Thaler et al. (1997); Larson et al. (2016)). It is also able to explain many of the partial findings in the empirical literature on consumption dynamics. In our paper, it explains why individuals react to both positive and negative income changes and why individuals with higher liquidity exhibit lower consumption responses to anticipated income changes.

An important avenue for further research is to test whether our findings extend beyond our sample of career starters in a mature and relatively egalitarian economy. Specifically we want to make sure that our results also hold for more mature age cohorts and for emerging market economies.

Finally our results suggest there may be a link between a country's population structure and the effectiveness of its macroeconomic policies. Indeed, in ageing economies, where most people have liquid wealth and starters constitute only a small part of the total population, our results suggest that consumption may on average be less elastic to income. In young economies, in contrast, starters constitute a more substantial part of the population and the average level of liquid wealth is expected to be lower, suggesting that this country's consumption may on average respond stronger to changes in income. This hints to the possibility that Keynesian fiscal policies, that depend on fiscal multipliers and hence consumption dynamics, may be more effective in less mature and younger economies than in more mature and ageing economies. We defer the further analysis of this possibility to future research.

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Competing interests: The authors declare no competing interests.

A Robustness check

We perform a robustness check against outliers in Table 5 by excluding extreme MPC-values. Extreme MPC-values might originate from numeric artefacts such as a 10 $cent$ increase in income and a €10 increase in consumption leading to an MPC of 100. For outliers in either consumption or income, these extreme MPC-values might also occur. To avoid this we calculate a yearly MPC per individual and exclude observations in the top and bottom 5% (column 1) and 15% (column 2). The results are in line with our earlier findings.

Table 5: Robustness checks of the regression reported in column (3) of Table 3 for different MPC trimming schemes. The table excludes the top and bottom 5% (column 1), and 15% (column 2) of MPC-value observations. Person-fixed effects and person-clustered errors are used.

	Dependent variable: ΔC_t	
	exclude extreme MPC (bothways)	
	5%	15%
	(1)	(2)
$\Delta Inc_{t,+}$	0.991^{***}	1.051^{***}
	(0.076)	(0.063)
$\Delta Inc_{t,-}$	1.072^{***}	0.962^{***}
	(0.202)	(0.106)
$\log(1 + W_{t-2})$	-371.303^{***}	-315.510^{***}
	(78.056)	(59.283)
$\Delta Inc_{t,+} \times \log(1 + W_{t-2})$	-0.023^{**}	-0.020^{**}
	(0.010)	(0.009)
$\Delta Inc_{t,-} \times \log(1 + W_{t-2})$	-0.074^{***}	-0.041^{***}
	(0.025)	(0.014)
Controls	✓	✓
Fixed effects	Person	Person
F Statistic	376.81^{***}	569.93^{***}
Between Adj R^2	0.586	0.708
Within Adj R^2	0.289	0.455
Overall Adj R^2	0.437	0.586
Observations	45,217	35,057
Note:	*p<0.1; **p<0.05; ***p<0.01	

References

References

Albuquerque, B. (2019). Household heterogeneity and consumption dynamics in the presence of borrowing and liquidity constraints. *Applied Economics Letters 26*(6), 454–459.

Baker, S. R. (2018). Debt and the response to household income shocks: Validation and application of linked financial account data. *Journal of Political Economy 126*(4), 1504–1557.

Baker, S. R. and C. Yannelis (2017). Income changes and consumption: Evidence from the 2013 federal government shutdown. *Review of Economic Dynamics 23*, 99 – 124.

Bowman, D., D. Minehart, and M. Rabin (1999). Loss aversion in a consumptionsavings model. *Journal of Economic Behavior & Organization 38*(2), 155 – 178.

Brumberg, R. and F. Modigliani (1954). Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In K. Kurihara (Ed.), *Post-Keynesian Economics*. New Brunswick, NJ: Rutgers University Press.

Bunn, P., J. L. Roux, K. Reinold, and P. Surico (2018). The consumption response to positive and negative income shocks. *Journal of Monetary Economics 96*, 1 – 15.

C. Moore, J., L. L. Stinson, and E. J. Welniak (2000). Income measurement error in surveys: A review. *Journal of Official Statistics 16*(4), 331–361.

Campbell, J. Y. and N. G. Mankiw (1989). Consumption, income, and interest rates: Reinterpreting the time series evidence. *NBER Macroeconomics Annual 4*, 185–216.

Christelis, D., D. Georgarakos, T. Jappelli, L. Pistaferri, and M. van Rooij (2017, February). Asymmetric Consumption Effects of Transitory Income Shocks. CSEF Working Papers 467, Centre for Studies in Economics and Finance (CSEF), University of Naples, Italy.

Friedman, M. (1957). The permanent income hypothesis. In *A theory of the consumption function*, pp. 20–37. Princeton University Press.

Fuster, A., G. Kaplan, and B. Zafar (2018, March). What would you do with $500? spending responses to gains, losses, news and loans. Working Paper 24386, National Bureau of Economic Research.

Ganong, P. and P. J. Noel (2019, January). Consumer spending during unemployment: Positive and normative implications. Working Paper 25417, National Bureau of Economic Research.

Gelman, M., S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis (2014). Harnessing naturally occurring data to measure the response of spending to income. *Science 345*(6193), 212–215.

Gelman, M., S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis (2018). How individuals respond to a liquidity shock: Evidence from the 2013 government shutdown. *Journal of Public Economics*.

Jappelli, T. and L. Pistaferri (2010). The consumption response to income changes. *Annual Review of Economics 2*(1), 479–506.

Jappelli, T. and L. Pistaferri (2018, June). Reported MPC and Unobserved Heterogeneity. CSEF Working Papers 505, Centre for Studies in Economics and Finance (CSEF), University of Naples, Italy.

Kahneman, D. and D. Lovallo (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science 39*(1), 17–31.

Kahneman, D. and A. Tversky (1979). Prospect theory: An analysis of decision under risk. *Econometrica 47*(2), 263–91.

Kaplan, G., G. L. Violante, and J. Weidner (2014, April). The wealthy hand-to-mouth. Working Paper 20073, National Bureau of Economic Research.

Laibson, D. (1997, may). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics 112*(2), 443–478.

Larson, F., J. A. List, and R. D. Metcalfe (2016, September). Can myopic loss aversion explain the equity premium puzzle? evidence from a natural field experiment with professional traders. Working Paper 22605, National Bureau of Economic Research.

Olafsson, A. and M. Pagel (2018). The liquid hand-to-mouth: Evidence from personal finance management software. *The Review of Financial Studies 31*(11), 4398–4446.

Shapiro, M. D. and J. Slemrod (2009, May). Did the 2008 tax rebates stimulate spending? *American Economic Review 99*(2), 374–79.

Shea, J. (1995). Myopia, liquidity constraints, and aggregate consumption: A simple test. *Journal of Money, Credit and Banking 27*(3), 798–805.

Souleles, N. S. (1999). The response of household consumption to income tax refunds. *The American Economic Review 89*(4), 947–958.

Stone, R. and W. M. Stone (1938, 10). The Marginal Propensity to Consume and the Multiplier: A Statistical Investigation. *The Review of Economic Studies 6*(1), 1–24.

Thaler, R. H., A. Tversky, D. Kahneman, and A. Schwartz (1997, 05). The Effect of Myopia and Loss Aversion on Risk Taking: An Experimental Test*. *The Quarterly Journal of Economics 112*(2), 647–661.

Vandone, D. (2009). *Household Consumer Credit Demand*. Heidelberg: Physica-Verlag HD.