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Do consumers respond symmetrically to positive and negative income shocks?

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Recent research finds that consumers respond more strongly to negative than to positive transitory income shocks, for example, a temporary income tax increase as opposed to a one-off bonus payment. It also suggests that the response can depend on the size of the change in income. These findings lend empirical support to economic models that incorporate liquidity constraints and precautionary saving.

Determining how consumers adjust their consumption to changes in income, as well as understanding which economic models are more consistent with the consumption adjustments observed in the data, is important for evaluating the effects of a wide range of policy actions, including monetary policy measures on household and aggregate consumption.

Model predictions and measuring the adjustment of consumption to shocks

Standard life-cycle models of consumption with permanent income assume that lifetime disposable income rather than current income determines consumption and that credit markets are perfect. Such models predict that all consumers should make the same proportional adjustment in their consumption in response to positive, negative, larger or smaller transitory income shocks. That is, their marginal propensity to consume (MPC) does not vary. But life-cycle models in which households face liquidity constraints (i.e. they cannot borrow against their future income) and use savings to buffer income fluctuations predict that consumers will make a larger adjustment to a negative shock than to a positive one of the same size. They also predict that the size of the underlying shock matters.[2]

Evaluating the validity of these different model predictions has proved challenging. In general, the existing literature has examined a number of real life events to measure the consumption response to various income shocks. For example, some studies have measured how consumption responds either to positive income shocks (e.g. tax rebates) or to negative income shocks (e.g. unemployment or disability).[3] However, the estimates of the MPC in these studies are hard to generalise as they depend, to a certain extent, on the (observed and unobserved) characteristics of the selected sub-group of consumers that has experienced a given type of a shock. In other words, it is hard to find in real life situations in which every household experiences a positive or a negative income shock. Moreover, the estimated MPC often reflects the phase of the business cycle during which the shocks occur. As a result, it is difficult to identify and measure a possible asymmetric consumption response to negative/positive shocks that is representative of the entire population and can hence be used to test competing theories.

Empirical evidence on the adjustment of consumption to shocks

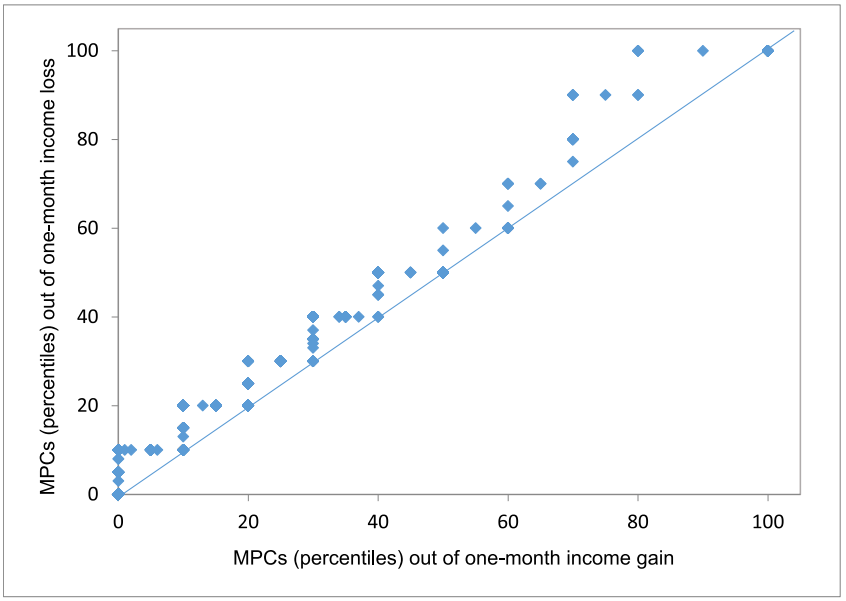
Christelis et al. (2017) address the above issues by designing a special set of questions for an internet consumer survey that is representative of the Dutch population.[4] In particular, consumers were asked how much they would consume out of a one-time bonus unexpectedly received from the government (i.e. an unexpected, transitory and positive change in income). The same consumers were also asked how much they would reduce their consumption in response to a one-time tax unexpectedly imposed by the

government (i.e. an unexpected, transitory and negative income change). In addition, the survey questionnaire allowed respondents to distinguish between relatively small income changes (an increase or reduction equivalent to a month's income) and larger ones (equivalent to three months' income). Such questions allow a comparison between the consumption responses of the same consumer to hypothetical positive and negative (as well as larger and smaller) transitory income shocks, making it possible to estimate effects that are representative for the population as a whole.

According to the responses to the survey questions, following an increase equivalent to a month's income, a consumer would allocate on average 19.6% of the additional income to non-durable consumption, i.e. they would spend it on food, clothes and travel, etc.[5] The response to a drop in income by the same amount is larger, with consumers expecting to reduce non-durable spending by an average of 23.8%. Thus, the MPC in response to negative income shocks is, on average, higher than the MPC in response to positive shocks. As regards consumption responses to larger income shocks, a rise in income equivalent to three months' income would increase non-durable consumption by 14.3%, while the likely consumption reduction if income fell by that amount is 24.0%. Therefore, the MPC gap between positive and negative income changes is wider for larger income shocks (i.e. 24.0% - 14.3% = 9.7%) than for smaller income shocks (i.e. 23.8% - 19.6% = 5.2%). These patterns seem to provide qualitative support for life-cycle models with liquidity constraints and/or buffer stock behaviour. However, the average MPC estimates just discussed may hide considerable variation from consumer to consumer.

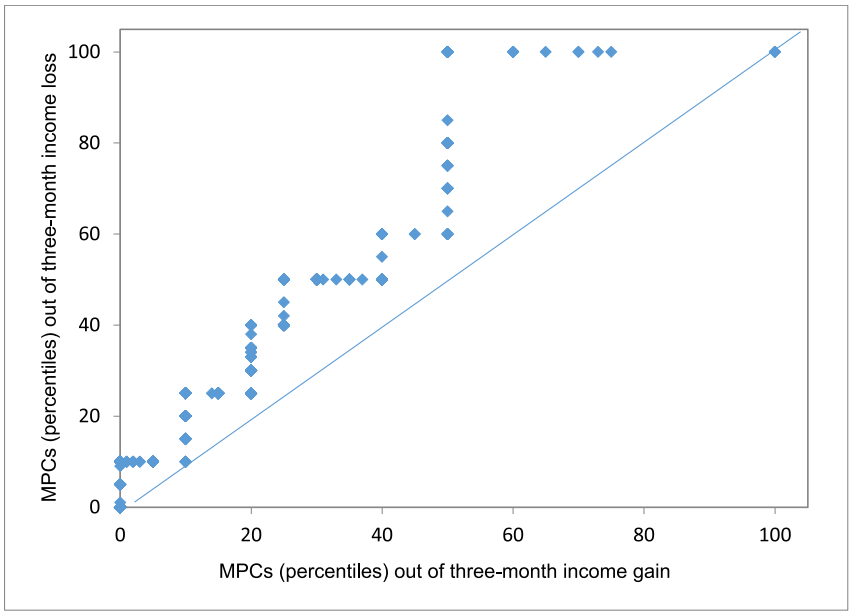
To show how MPCs can vary across households, we plot the percentiles of the distribution of MPCs related to positive income shocks (horizontal axis) against those for negative income shocks (vertical axis). Figure 1 gives the responses to one-month income changes and Figure 2 the responses to three-month income changes. Each graph also features a 45-degree line which represents symmetric MPCs for positive and negative income shocks. In both graphs the empirical plots are above the 45-degree line, showing that percentiles of the MPC distribution out of positive income shocks are matched to comparatively higher percentiles of the MPC distribution out of negative income shocks. For example, the median MPC out of a one-month income gain (10%) is graphed against the median MPC out of a one-month income loss (20%) and is shown in Figure 1 by the point (10, 20) which lies above the 45-degree line. In other words, these graphs suggest that the consumption adjustment to negative income changes is larger than that induced by positive changes. It should be also noted that this difference is more evident for three-month than for one-month income changes. These patterns are broadly in line with those suggested by the average MPCs reported above.

Figure 1: Marginal propensities to consume out of one-month positive and negative income shocks



Note: The figure plots the percentiles of the distribution of MPCs following a one-month positive income shock against the corresponding percentiles of the MPCs following a negative income shock of the same size.

Figure 2: Marginal propensities to consume out of three-month positive and negative income shocks



Note: The figure plots the percentiles of the distribution of MPCs following a three-month positive income shock against the corresponding percentiles of the MPCs following a negative income shock of the same size.

Another way to look at the survey results is to classify the different households according to the economic models that better characterise their consumption behaviour. Christelis et al. (2017) report that about 40% of households give asymmetric responses consistent with models incorporating liquidity constraints or buffer stock behaviour, while about a third of respondents have symmetric MPCs in response to shocks of different sizes and directions (as in the standard life-cycle models with permanent income and perfect credit markets). The remaining households report asymmetric MPCs that appear inconsistent with both types of model, possibly reflecting behavioural biases or a lower level of financial sophistication.

Concluding remarks

The research findings highlighted in this Research Bulletin article suggest important differences in the way consumers respond to income shocks of different signs and sizes. These differences in consumption responses that are revealed by micro data analysis could help to better assess the impact of various policy measures that affect household incomes. In particular, they could ultimately help to deepen our understanding of fluctuations in aggregate demand and possible inflationary pressures, as well as help in the analysis of the distributional effects of policy changes.

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[1] Disclaimer: This article was written by Dimitris Georgarakos (Senior Economist, Directorate General Research, Monetary Policy Research Division). It is based on a paper entitled “Asymmetric Consumption Effects of Transitory Income Shocks”, by D. Christelis, D. Georgarakos, T. Jappelli, L. Pistaferri and M. van Rooij. The author gratefully acknowledges the comments of Maarten Dossche, Michael Ehrmann, Ruth Imkemeier, Geoff Kenny, Michele Lenza, Silvia Margiocco, Zoë Sprokel and Michael Steen. The views expressed here are those of the author and do not necessarily represent the views of the European Central Bank and the Eurosystem.

[2] For negative income shocks, the consumption adjustment should increase with the size of the shock, particularly for consumers with limited resources. For positive shocks, consumers facing liquidity constraints should find it easier to overcome them when the shock is larger, so the consumption adjustment from large positive income shocks should be relatively smaller than that triggered by small positive shocks.

[3] See for example Souleles (1999), Browning and Crossley (2001), Misra and Surico (2014) and Sahm et al. (2015). Jappelli and Pistaferri (2011) provide a thorough review of the literature.

[4] The survey is sponsored by De Nederlandsche Bank and was conducted over a cross-section of 1,543 households. Similar internet consumer surveys have been set up by the Federal Reserve Bank of New York, the Bank of England and the Bank of Canada, as they make it possible to introduce questions that are of special interest and to collect the underlying information in a very timely manner.

[5] The average net monthly household income of participants in the survey was €2,833.

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