Taxing the Wealth of the Poor: Evidence from the Danish Old-Age Support Asset Test

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Abstract

We document strong behavioral responses to an asset test for an old-age support program in Denmark using comprehensive administrative data. We show that the density distribution of the liquid assets targeted by the test exhibits large but diffuse excess mass below the threshold for the treated group relative to control groups of comparable but ineligible individuals. A cohort analysis exploiting the panel structure suggests that the program reduces liquid assets by 20 percent around the threshold. Analyzing high-frequency bank data on assets and cash withdrawals shows that the excess mass around the threshold largely reflects permanent rather than temporary responses. (*JEL* H24, H53)

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While wealth taxation for the rich is getting substantial attention in the academic and policy debates,[1] the poor face the stiffest taxes on wealth due to asset testing of many transfer programs. Most US means-tested programs have asset tests in addition to income tests.[2] The logic is that beneficiaries should first exhaust (most of) their own wealth before getting government support. This reduces incentives to accumulate wealth, economically equivalent to a wealth tax. The implicit tax is large as often all benefits are lost once wealth crosses a certain threshold–the asset disregard–creating a "notch" in the budget set. A rich theoretical literature has analyzed the social insurance vs. efficiency tradeoff of asset tests.[3]

In spite of the ubiquity of such taxes on the wealth of the poor, there is limited empirical evidence on their effects, primarily because wealth is generally self-reported with no comparable wealth information for ineligible individuals. As wealth at the bottom provides safety, asset tests could create substantial crowd-out of private safety by public safety programs.[4] There is valuable work on this issue in the US context, but it uses survey data which is not ideal for notch and bunching analysis (Kleven, 2016). It finds suggestive but not systematic evidence of adverse effects on savings and wealth.[5]

In this paper, we analyze the Danish "old-age check" while leveraging comprehensive administrative wealth data, covering the full population, not just the beneficiaries. The old-age check, part of the Danish public retirement system, is an annual payment (around $3,000 for a single person) to low-income and low-wealth elderly. While the check is phased out smoothly with income, the asset test is sharp: the entire check is lost once end-of-year liquid wealth exceeds a threshold around $15,000, creating an enormous implicit tax on liquid wealth.

The policy design and the comprehensive administrative wealth data allow us to compare the liquid wealth distribution of individuals eligible in terms of age and income (65+ years, low-income) to two groups of comparable but ineligible individuals: those just below the age

[1] Saez and Zucman (2019) and Scheuer and Slemrod (2021) provide recent surveys and discussions.

[2] This is true for Medicaid health insurance, Supplemental Nutrition Assistance Program SNAP (formerly food stamps), Temporary Assistance for Needy Families TANF (formerly AFDC), Supplemental Security Income SSI for the elderly, and Federal student aid for parents with children in college. Boyens et al. (2024) provide a detailed description.

[3] Golosov and Tsyvinski (2006) show that asset testing is optimal for disability insurance. Braun, Kopecky, and Koreshkova (2017) and Wellschmied (2021) provide quantitative analysis of asset testing for US social insurance using structural models.

[4] Hubbard, Skinner and Zeldes (1995) show that asset-tests in US transfer programs can rationally induce a large fraction of US households with modest incomes to hold virtually no wealth in a standard life-cycle model, consistent with empirical evidence.

[5] See Powers (1998), Hurst and Ziliak (2006), Sullivan (2006), Nam (2008), and Hamilton (2021) for the AFDC/TANF program; Neumark and Powers (1998) for SSI; and Gruber and Yelowitz (1999) and Maynard

threshold (60-64 years, low-income) and those somewhat above the income threshold (65+ years, higher-income).

First, using cross-sectional analysis, we find a large impact of the asset test on the density distribution of liquid wealth with substantial excess density below the threshold for individuals satisfying the age and income criteria compared to those failing one of them. The fraction of individuals with wealth between 50 percent and 100 percent of the wealth threshold is almost twice as large for the treatment group as for the two control groups. This excess bunching mass increases with age consistent with slow learning about the program. The dynamics around the introduction and expansion of the old-age check is consistent with a causal interpretation of these findings: there is no excess mass below the threshold before the introduction of the old-age check and the excess mass shifts when the threshold is increased discretely. Generally, the density distribution responds gradually to changes in the program, with the response growing over time. The excess density is not spiky at the threshold but diffuse below the threshold. It is of similar magnitude when looking solely at third party reported wealth before any self-reported adjustment. This suggests it is not driven by misreporting.

Next, conducting a cohort analysis that exploits the panel dimension of the data, we estimate the causal effect of the asset test at different percentiles of the liquid wealth distribution of the low-income elderly. Our approach compares the liquid wealth distribution for the same cohorts at age 60-64 (when they are not yet eligible) vs. age 70-74 (5 to 9 years after they become eligible) while adjusting for nominal growth in the economy. The two distributions are almost identical in the upper part, consistent with the asset test having no impact on liquid wealth far above the threshold, and highly similar in the lower part. However, around the threshold, individuals have significantly less liquid wealth at age 70-74 than at age 60-64. The difference is largest exactly at the threshold (66th percentile) where it is 20 percent. In a broader range around the threshold (55th to 75th percentiles), the average difference is 10 percent. Therefore, the excess mass below the threshold represents individuals who would have more liquid wealth absent the asset test and the causal effect on liquid wealth around the threshold is sizable.

Finally, we link customer data from a large bank to the administrative data to investigate whether the reduction in liquid wealth caused by the old-age check reflects that the elderly *permanently* lower their liquid wealth or that they retime purchases and withdraw cash to *tem-*

and Qiu (2009) for Medicaid. Outside the US, Bosch et al. (2019) find no response for an asset-test for child benefits in the Netherlands.

porarily lower their account balances just before the end of the year. Clearly, the consequences for financial safety are much more severe if the responses are permanent rather than temporary. The bank data measures liquid wealth, spending and cash withdrawals on a continuous basis allowing us to study monthly dynamics. For treated individuals, we find that the excess mass below the threshold of the asset test exists in all months of the year, but is somewhat more pronounced in December. For the control group of slightly younger individuals, there is no systematic variation in the wealth distribution over the year. We also find excess cash withdrawals in December for the treatment group with end-of-year wealth just below the threshold which can explain this result. The results suggest that while temporary responses to the old-age check do exist, most of the reduction in the liquid wealth of the treated group reflects permanent responses.

Our paper is organized as follows. Section I presents the institutional framework and the data. Section II presents the empirical results using the administrative wealth data. Section III presents the results using the financial bank data. Section IV concludes.

I Institutional Framework and Data

I.A Social Security and the Old-Age Check

In Denmark, all citizens at or above the statutory retirement age (65 years during our sample period) are eligible for social security benefits.[6] The monthly payments have two parts: a *base amount*, which is means-tested against labor income and has a maximum annual value of DKK 77,000, and a *supplement* which is means-tested against all personal income and has a maximum annual value of DKK 85,000 for singles (half for people in couples).[7]

Our analysis focuses on an additional social security element: the *old-age check*, which is an annual cash transfer to elderly individuals with almost no income other than social security and little liquid wealth. It amounts to DKK 18,000, paid out each year in late January. It is means-tested against all annual personal income (except social security) with a disregard of DKK 42,000 and a phase-out rate of 34 percent for singles (DKK 21,000 and 17 percent for people in couples). In addition to the means test, the old-age check is subject to a sharp asset

[6] We report social security parameters for 2020 stated in Danish Kroner (DKK). The average exchange rate in 2020 was 6.53 DKK per USD.

[7] Abrahamsen (2021) analyzes the income test of the base amount and finds evidence of bunching of wage earnings where the phase-out starts.

test. The check falls away entirely when liquid wealth exceeds DKK 90,000 with no gradual phase-out. For couples, the asset test applies the same DKK 90,000 threshold to their joint liquid wealth. Hence, most of the recipients (58 percent) are single.

Administration of the old-age check. To determine eligibility for the old-age check, the government relies on a combination of third-party reported and self-reported information. The liquid wealth concept used for the asset test includes the balance on checking, savings and security accounts as well as cash, but excludes all consumer durables, real estate, and pension accounts and does not net out debt. This implies that the government has information from financial institutions about all the components of liquid wealth except cash.

The main challenge for administration relates to the timing of the payouts and the information flows. Legally, eligibility for the old-age check paid out in year t depends on liquid wealth at the end of year $t-1$. However, at the time the old-age checks are sent out, in January of year t, this information is not yet available in the administrative registers. By default, the authorities therefore rely on the most recent administrative wealth information that is available, typically for year $t-2$ but sometimes for year $t-3$. We refer to this measure of liquid wealth, based entirely on administrative data and used to determine eligibility in the absence of self-reported information, as *default wealth*.

Due to the lack of precise administrative data at the time of the pay-out, individuals are allowed to override the default by self-reporting income and liquid wealth through a purpose-built government website. The website displays the default values and allows individuals to adjust them by, for instance, adding cash or reducing bank account balances. Any information self-reported before the end of year $t-1$ is used to determine eligibility in year t. We refer to self-reported liquid wealth as *reported wealth*. As administrative wealth data for year $t-1$ becomes available, generally in the course of year t, the authorities can make reconciliations, i.e. reclaim old-age checks from those who received it despite being ineligible and vice versa.

The old-age check over time. The fundamental design of the old-age check has remained the same since the introduction in 2003, but the policy parameters have changed over and above standard indexation to nominal average wages, as illustrated in Appendix Figure A.1.[8]

[8]Nominal amounts in the Danish tax and transfer system are adjusted annually so that they approximately follow nominal average wages.

First, the value of the old-age check was increased several times and more than doubled in real indexed terms over the period of analysis (panel a). Second, the threshold of the asset test has been constant in real terms over the full period except for a 15 percent increase in 2010 (panel b). Finally, the income test was initially very strict, both in terms of the threshold at which phase-out starts and the phase-out rate, but has been looser and roughly constant since 2005 (panel c). We leverage some of the policy variation in the empirical analysis. In recent years, approximately 25 percent of the elderly above the statutory retirement age received the old-age check in Denmark and aggregate outlays are about 0.2 percent of GDP.[9]

I.B Economic incentives

The asset test of the old-age check creates an incentive for individuals who satisfy the age and income criteria to hold less liquid wealth. For instance, a 70-year old with no other income than social security who would aim to hold DKK 100,000 in liquid wealth absent the check may instead aim to hold DKK 50,000 to qualify for the DKK 18,000 annual check. In contrast, for individuals well below the threshold to start with, the old-age check could boost wealth mechanically. The main goal of the paper is precisely to identify such a permanent effect of the asset test on liquid wealth.

The asset test also creates incentives for other types of behavior that do not change long-run liquid wealth. First, individuals can temporarily lower liquid wealth around the end of the year by retiming purchases. This is a legal way to avoid the asset test. Second, they can lower the liquid wealth that enters the asset test by withdrawing and not self-reporting cash. This is misreporting, which could trigger legal sanctions, and which is also impractical due to the transaction costs associated with cash.[10]

I.C Data

Administrative data. The analysis uses data on assets, income and demographics from government administrative registers. Mirroring the administration of the old-age check, we employ two measures of liquid wealth. Default liquid wealth is the third-party reported value of current accounts, savings accounts, and securities accounts. This measure is available for

[9]The most comparable program in the United States would be Supplemental Security Income (SSI) for the elderly and disabled, which is also both income and asset-tested.

[10]The use of cash has been declining steeply in Denmark (Danmarks Nationalbank 2023).

the full population. Reported liquid wealth starts from default liquid wealth and adds self-reported corrections. This measure is available for all individuals above the statutory retirement age. Unfortunately, the reported liquid wealth variable at our disposal does not capture the corrections made close to year-end and therefore does not correspond completely to the variable that the administration uses to evaluate the asset test. For income, we only have the default measure based on third-party reported information and available for the full population.

Bank data. We leverage data from Danske Bank, the largest Danish retail bank (as in Andersen, Johannesen and Sheridan, 2024) to study short-term responses such as increased spending or cash withdrawals close to year-end. The bank data are linked to the administrative data with a unique individual identifier and provides monthly information about spending, cash withdrawals and account balances for the period 2014-2016. Restricting attention to individuals with at least one spending transaction through the bank in every month of the year gives us a bank sample that constitutes around 20 percent of the Danish elderly population.

Indexing. We generally pool observations from multiple years when we construct distributions of liquid wealth. Before pooling, we make the observations comparable by inflating to 2020-values with the average wage index that the tax administration uses to adjust the nominal parameters of the tax and transfer system (including the wealth threshold of the old-age check). After indexation, the relevant asset test threshold for all observations is the 2020-value.

Sample. We generally restrict the sample to singles. As the rules governing eligibility are more complicated and stricter for couples, this sample restriction allows us to simplify the analysis while keeping the majority (58 percent) of old-age check beneficiaries in the sample. We use observations for 2014-2018 in the main cross-sectional analysis (2014-16 when we analyze bank data); however, we draw observations from different periods when we study policy reforms and when we exploit the panel structure in the cohort analysis.

Summary Statistics. Table 1A reports summary statistics on wealth, income, and demographics for for four groups: (1) singles age 60+, (2) singles age 60-64 who are hence age-ineligible (3) singles age 65+ who are hence age-eligible (4) singles age 65+ who are also income-eligible. In the latter group, around 60 percent have liquid wealth below the asset

test threshold, which makes them eligible for the old-age-check. Panel A1 describes the population sample pooling the years 2014-2018. Panel A2 describes the bank sample pooling the years 2014-2016.

The table allows us to assess the representativeness and completeness of the bank data (Baker, 2018). First, the administrative wealth measures are similar across the two panels, suggesting that the bank sample is broadly representative of the population. Second, the bank measure of liquid wealth is only slightly smaller than the administrative measure, notably for the low-income group, suggesting that the bank data is relatively complete.

II Overall Responses: Wealth Data Evidence

Asset test. We first document the discontinuity in the likelihood of receiving the old-age check created by the asset test in Figure 1(a). The analysis includes individuals who are eligible in terms of age and income. The likelihood of receiving the check drops from more than 80 percent to less than 20 percent when crossing the asset threshold. The discontinuity is fuzzy because our reported liquid wealth variable does not correspond perfectly to the one used to administer the check, as discussed above.

Non-parametric wealth density. Figure 1(b) depicts the density distribution of reported liquid wealth for individuals who are both age-eligible and income-eligible (dashed blue line). It is visually clear that the density exhibits significant excess mass below the threshold, consistent with a large impact of the asset test on the liquid wealth distribution. Interestingly, the excess density is not spiky right at the asset threshold, as predicted by the basic model of utility maximization (Kleven and Waseem 2013), but diffuse in a broader region below the threshold, suggesting that individuals are not able to fully control their end-of-year liquid wealth to target the threshold precisely. Various factors can explain why bunching is not sharp just below the threshold. Individuals face uncertainty in their spending needs which then affect their liquid wealth. Individuals may also need to make lumpy purchases and hence may not be able to fully fine tune their spending to the exact threshold incentive. Individuals may also not know or pay attention to the exact location of the threshold. Indeed, there is no clear gap in the dominated region just above the threshold, suggesting that some individuals are inattentive to the incentives created by the old-age check, as found in most notch studies following Kleven

and Waseem (2013).

Default vs. reported liquid wealth. The distribution of reported liquid wealth in Figure 1(b) could be affected by strategic misreporting. We therefore compare it to the distribution of default liquid wealth, which is based entirely on third-party reported information. Default liquid wealth exhibits excess mass below the threshold of the asset test (solid green line) to the same extent as reported liquid wealth (dashed blue line): the fraction with wealth between 50 percent and 100 percent of the threshold is 20.6 percent for default liquid wealth vs. 19.0 percent for reported liquid wealth. This finding shows that excess mass below the threshold is not an artifact of strategic misreporting.[11]

Total net wealth. Finally, we construct a measure of total wealth from third-party administrative data as the sum of liquid assets, pension assets, and housing equity net of all debt and depict the density distribution in Figure 1(b) (brown dotted line). The shape of the density around the threshold shows that total net wealth is also affected by the old-age check. This is to some extent mechanical, as a significant fraction of the low-income elderly singles have no housing nor pension wealth, which implies that liquid assets is their only form of wealth.

Age and income variation. To strengthen the causal interpretation of these results, we exploit the variation in eligibility that comes from age and income. Figure 1(c) depicts the density distributions for individuals who are eligible in terms of age and income (65+ years, low-income) to two control groups of ineligible individuals: those just below the age threshold (60-64 years, low-income) and those somewhat above the income threshold (65+ years, higher-income).[12] The wealth measure is default liquid wealth, which is available for all age groups. In contrast to the treatment group, the density distribution for the control groups is smooth around the threshold and exhibits no excess mass below the threshold. Quantitatively, the fraction with wealth between 50 percent and 100 percent of the threshold is 20.6 percent for the treatment group but only 11.6 percent for the age-ineligible and 11.2 percent for the income-

[11] Appendix Figure A.2 depicts the default liquid wealth density distribution over a broader range and provides percentiles. Although the densities are generally much higher at the bottom than around the threshold – one third of this group has liquid wealth below DKK 20,000 – the excess mass between 50 percent and 100 percent of the threshold remains a clear and salient feature of the distribution.

[12] To be precise, the two former groups have income below the income threshold at which the old-age is entirely phased out. The latter group have income between 150 percent and 200 percent of this threshold.

ineligible control groups.[13] While this finding is strong evidence that the bunching in the liquid wealth distribution is causally linked to the asset test, we cannot infer where the excess mass is coming from without a full counterfactual distribution (see below).

Dynamics. To understand the dynamics of the response, we plot the density distributions of default liquid wealth for low-income individuals by 5-year age cohorts in Figure 1(d). The excess mass below the threshold builds up over time: the fraction with liquid wealth between 50 percent and 100 percent of the threshold increases from 11.6 percent at age 60-64 to 16.2 percent at age 65-69 and then increases to 18.3 percent at ages 70-74, 20.5 percent at ages 74-79, and 24.3 percent at ages 80+. This result shows that, as they age, more and more elderly locate in the range between 50 percent and 100 percent of the asset test threshold, consistent with a sluggish response building over time.

Reform variation. An additional source of variation to probe the causal effects of the old-age check comes from the introduction of the program in 2003 and the increase in the asset-test threshold in 2010.

Figure 2(a) depicts the density distributions of reported liquid wealth for individuals who are eligible in terms of age and income in three different time periods: 2001-2002 (pre-introduction), 2003-2005 (post-introduction, years 0-2), and 2006-2007 (post-introduction, years 3-4). Strikingly, there is no excess mass below the threshold prior to the introduction of the old-age check. Rather, the excess mass emerges after the introduction and grows over time, consistent with a response mediated by learning. Quantitatively, the density mass between 50 percent and 100 percent of the threshold grows from 14.4 percent (before), to 16.8 percent (first 3 years after), and 20.6 percent (years 4-5 after).[14]

Figure 2(b) analyzes the discrete increase in the threshold of the asset test in 2010 (over and above the usual indexation). It depicts the density distribution of reported liquid wealth for individuals who are eligible in terms of age and income in three different time periods: 2005-2009 (pre-increase), 2010-2012 (post-increase, years 0-2), and 2013-2015 (post-increase, years

[13] For ease of comparison, we report this statistic for all cross-sectional analysis in Table 1, Panel B1.

[14] The income test changed significantly in this period: it was very strict in 2003, and then gradually relaxed in 2004 and 2005 (appendix Figure A.1c). To construct the figure, we consistently use the low 2003-threshold adjusted by the indexation used throughout to delimit the eligible group. This is why the excess bunching mass is somewhat higher before the introduction than for the control groups employed above.

3-5). The vertical lines depict the thresholds before and after the reform. The figure shows that the excess mass shifts when the threshold is increased.

The reform analysis provides additional evidence that excess mass below the threshold is caused by the asset test. Moreover, the two sets of results both highlight that the dynamic adjustment to changes in the environment is sluggish, consistent with learning and frictions in adjusting the stock of liquid wealth.

Cohort approach. While the cross-sectional analysis has made clear that the old-age check has a large effect on the wealth density around the threshold, estimating how it affects liquid wealth at each percentile is more challenging because the control groups we have used so far do not provide full counterfactual distributions. Absent such a counterfactual, it cannot be rigorously asserted whether the excess mass around the threshold reflects that individuals reduce liquid wealth to pass the asset test (i.e. excess mass coming from above) or that they build liquid buffers with cash from the old-age check (i.e. excess mass coming from below).

We therefore propose a cohort approach to construct a counterfactual distribution. The cohort approach exploits the panel structure of the data by following the *same cohorts* over time as they age into eligibility. Specifically, for given cohorts, we compare the distribution of liquid wealth (always indexed to the asset test threshold) for the low-income elderly at age 60-64 (when they are just too young to be eligible for the old-age check) and at age 70-74 (5-9 years after they became eligible) and interpret the difference as the effect of the old-age check. At each age, we include only the income-eligible in that year (the panel is therefore not balanced). The admittedly strong identification assumption is that the two distributions would be the same absent the old-age check. To assess the validity of this assumption, a key diagnostic is whether the upper parts of the two distributions are aligned as, theoretically, the wealth densities well above the threshold should not be affected by the asset test.[15]

Figure 3 shows the density distribution and cumulative distribution of liquid wealth at age 60-64 (full line) and at age 70-74 (dashed line) for the cohorts born in 1941-1945 including solely the income eligible in any given year.[16] Consistent with the identification assumption, both the

[15]Income-ineligible individuals are wealthier with a much thicker upper tail. This upper tail is also not quite as stable with age as for the income-eligible (see below). Hence, for simplicity and for reducing noise, we present a simple difference approach focusing on the income-eligible only rather than a difference-in-difference approach comparing the income-eligible to the income-ineligible.

[16]Appendix Figure A.3 presents evidence on the transition from age 60-64 to age 70-74, including in a regression framework with individual fixed effects.

density and the cumulative distributions are almost perfectly aligned above the 75th percentile (around 250 percent of the threshold).[17] Comparing the density distributions in Figure 3(a) provides evidence of excess mass below the wealth threshold similar to the cross-sectional results. The density mass between 50 percent and 100 percent of the threshold is 12.9 percent at age 60-64 and 18.4 percent at age 70-74. The implied excess mass of 5.5 percentage points is just below two thirds of the excess mass in Figure 1(c). The difference likely reflects that our cohort analysis cannot include the oldest age groups where the excess mass is largest (see Figure 1(d)).

Causal effects on wealth. While visual inspection of Figure 3(a) suggests that the excess mass below the threshold is largely shifted from above, we are now able to estimate the causal effect of the program on liquid wealth as the horizontal distance between the two cumulative distributions in Figure 3(b). As reported in Table 1, Panel B2, we find the largest effect at the 66th percentile where liquid wealth is 20.2 percent lower at age 70-74 than at age 60-64. The 66th percentile coincides almost exactly with the asset-test threshold at age 70-74. The estimated effects are generally negative between the 55th and 75th percentiles. In this range, average liquid wealth at age 70-74 is 9.9 percent lower than at age 60-64. We find essentially no effect above the 75th percentile. For the entire range above the 75th percentile, average liquid wealth at age 70-74 is a mere 0.8 percent lower than at age 60-64. Overall, this analysis shows that the excess mass between 50 percent and 100 percent of the threshold found in Figure 3(a) implies sizable treatment effects on liquid wealth around the threshold.

Finally, this type of analysis also suggests that there are small positive effects below the 55th percentile. Theoretically, the old-age check could increase liquid wealth far below the threshold as the transfer could be partly saved and thus increase liquid wealth. However, it is also possible that our identification assumption fails at the bottom of the distribution. Therefore, while we are reasonably confident about the negative effects we uncover around the asset test threshold, we are less confident about the validity of the identification assumption and the estimated effects at the very bottom and we do not report them.

[17] Appendix Figure A.3(c) shows that the remarkable alignment of the upper part of the two distributions continues beyond the range captured in Figure 3.

III Permanent vs. Temporary Effects: Bank Data Evidence

The strong behavioral response documented in the previous section could be due to changes in real savings behavior with permanent effects on liquid wealth. Alternatively, they might reflect retiming of purchases that only temporarily reduce liquid wealth around the end of the year when the asset test is conducted, or cash withdrawals. We address this important distinction empirically by exploiting the bank data with high-frequency information about spending, cash withdrawals and account balances for a subsample of the population. For data availability reasons, the analysis pools observations for the shorter period 2014-2016.

Wealth densities by month. Figure 4(a) depicts the density distributions of liquid wealth at the end of various calendar months for the treated group eligible in terms of both age and income. These are the individuals who receive the old-age check if their liquid wealth in December is below the threshold (vertical line). Consistent with the main analysis, there is significant excess mass below the threshold in December (solid green line).[18] This is consistent with the findings above suggesting that the asset test causes the low-income elderly to hold less liquid wealth. More importantly, the figure shows that excess mass below the threshold also exists in all the other months of the year too. This suggests that the reduction in liquid wealth is permanent. While there is a slight shift in the distribution from other months (brown dash dotted line) to December suggestive of temporary responses aiming to pass the asset test at the end of the year, the difference is rather small. There is also an outward shift in the distribution from December to January (dashed red line), which is likely to reflect the receipt of the old-age check in January.[19]

To gauge the potential role of cash withdrawals in reducing liquid balances in the bank between November and December, Figure 4(a) also plots the density distribution of liquid wealth at the end of December while adding back all December cash withdrawals into the liquid wealth measure (blue dashed line). The implicit assumption is that *all* the cash withdrawn in December is added to liquid reserves outside the bank while *none* of it is spent or given away, which provides an upper bound on the mis-measurement of true liquid wealth due to December

[18] The distributions based on bank data for the end of December (solid green line) and individually matched third-party reported administrative data for the end of the year (black dotted line) are almost identical showing that bank wealth is essentially the only form of liquid wealth for this group.

[19] We have plotted each month separately and found that the distribution is much more stable between February and November (results by month not reported).

cash withdrawals. The figure shows that liquid wealth continues to exhibit significant excess mass below the threshold after this cash withdrawal adjustment. This suggests that cash reserves outside of the banking system could potentially explain only a modest fraction of the old-age check's impact on liquid wealth identified in the main analysis.

We show analogous monthly density distributions for the control group of income-eligible individuals aged 60-64 in Figure 4(b). The densities are very similar from month to month and do not exhibit excess bunching below the threshold, validating our causal interpretation for the treated group in panel (a).

Cash withdrawals. We use the bank data to provide more evidence on the dynamics in cash withdrawals in panels (c) and (d). We compare monthly means in December (solid green line), January (red dashed line) and all other months (brown dash dotted line) across individuals with different end-of-year bank liquid wealth. We show results for the treated group of income-eligible individuals above the age threshold (age 65+) in panel (c) and the control group of income-eligible individuals who are just below (age 60-64) in panel (d).

Panel (c) shows that individuals in the treated group generally make more cash withdrawals in December than in other months. The difference is most pronounced for individuals with end-of-year liquid wealth just below the threshold, i.e. around DKK 1,000 compared to around DKK 500 at higher and lower liquid wealth levels. By contrast, in the control group in panel (b), cash withdrawals are only slightly higher in December than in other months and the difference is not systematically larger around the threshold. These results suggest that the emergence in December of some additional excess mass below the threshold, documented in Figure 4(a), is only to a small extent explained by unusually high cash withdrawals. We cannot tell whether the cash is spent, given to family or friends, or kept as liquid reserves outside the bank. Appendix Figure A.4 shows that, in contrast to cash withdrawals, there is no excess spending or debt repayment in December for the treated group below the asset-test threshold.

In sum, while the main analysis shows that the asset test of the old-age check causes a substantial reduction in liquid wealth, the bank data analysis suggests that the effect is largely permanent. Nonetheless, temporary responses to manage liquid wealth around the end of the year do exist and take the form of cash withdrawals (rather than spending or debt repayment).

IV Conclusion

Exploiting unusually rich data from Denmark, our study provides the first evidence of clear and quantitatively important reductions in liquid wealth in response to an asset test for a government support program. The responses we obtain are not sharp bunching as predicted by the standard budget set model, but diffuse and sluggish consistent with informational frictions. We therefore rely on reduced-form graphical and quantitative analysis rather than structural estimation of behavioral elasticities, which is challenging in the presence of frictions (Kleven, 2016; Kosonen and Matikka, 2020). Our headline number is that the asset-test reduces wealth the most–by about 20 percent–at the wealth percentile corresponding to the asset-test threshold.

The results have important implications for welfare and policy design. Liquid wealth helps individuals weather unexpected economic shocks. Credit constraints are significant for the elderly with low income and limited collateral. In this case, liquid wealth can be important by providing safety against uninsured economic shocks. Implicitly taxing wealth by asset testing government transfers discourages liquid wealth formation and creates a standard deadweight loss assuming rationality in saving behavior. In this case, the old-age check asset-test faces a standard insurance vs. efficiency tradeoff. Limiting the old-age check to those with low wealth improves the targeting to those most in need of it, which has an insurance value. But it also discourages wealth accumulation which generates efficiency costs. These welfare costs are further increased if the elderly do not accumulate enough buffer stock savings for other reasons such as myopia or self-control problems.

Two external validity concerns should be noted. First, the elderly in Denmark benefit from generous and stable health and retirement benefits, and therefore private wealth for low-income households may not be as valuable in Denmark as in countries with less developed safety nets. Therefore, it is conceivable that behavioral responses to the asset-test in Denmark might be larger than in other contexts, where liquid wealth has higher value. Second and conversely, the asset-test in Denmark is administered with high quality third-party reporting from financial institutions. Most asset-tests outside Denmark are administered with self-reported wealth which creates more scope for behavioral responses through misreporting.

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Table 1: Summary Statistics and Results

Panel A. Summary statistics

A1. Population sample (includes years 2014-18)	All singles 60+	Singles 60-64	Singles 65+	Singles 65+ low-income
Default liquid wealth, DKK	498,500	367,800	529,200	252,300
Reported liquid wealth, DKK	–	–	471,600	243,700
Fraction below assets test threshold	0.47	0.54	0.45	0.60
Total income, DKK	291,100	344,700	278,800	221,600
Earned income, DKK	124,800	213,900	104,400	21,300
Fraction low-income eligible	0.59	0.46	0.62	1
Age	73.80	61.98	76.51	77.16
Fraction male	0.34	0.46	0.32	0.30
Number of observations	2,526,421	471,434	2,054,987	1,283,721
A2. Bank sample (includes years 2014-16)				
Default liquid wealth, DKK	535,500	410,600	564,100	226,500
Reported liquid wealth, DKK	–	–	502,800	225,200
Bank liquid wealth, end-of-year, DKK	458,100	343,800	484,400	206,500
Annual cash withdrawals, DKK	32,600	32,800	32,500	34,200
Annual non-housing spending, DKK	129,400	155,800	123,300	95,400
Number of observations	461,471	86,101	375,370	220,858

Panel B. Summary results

B1. Bunching below threshold

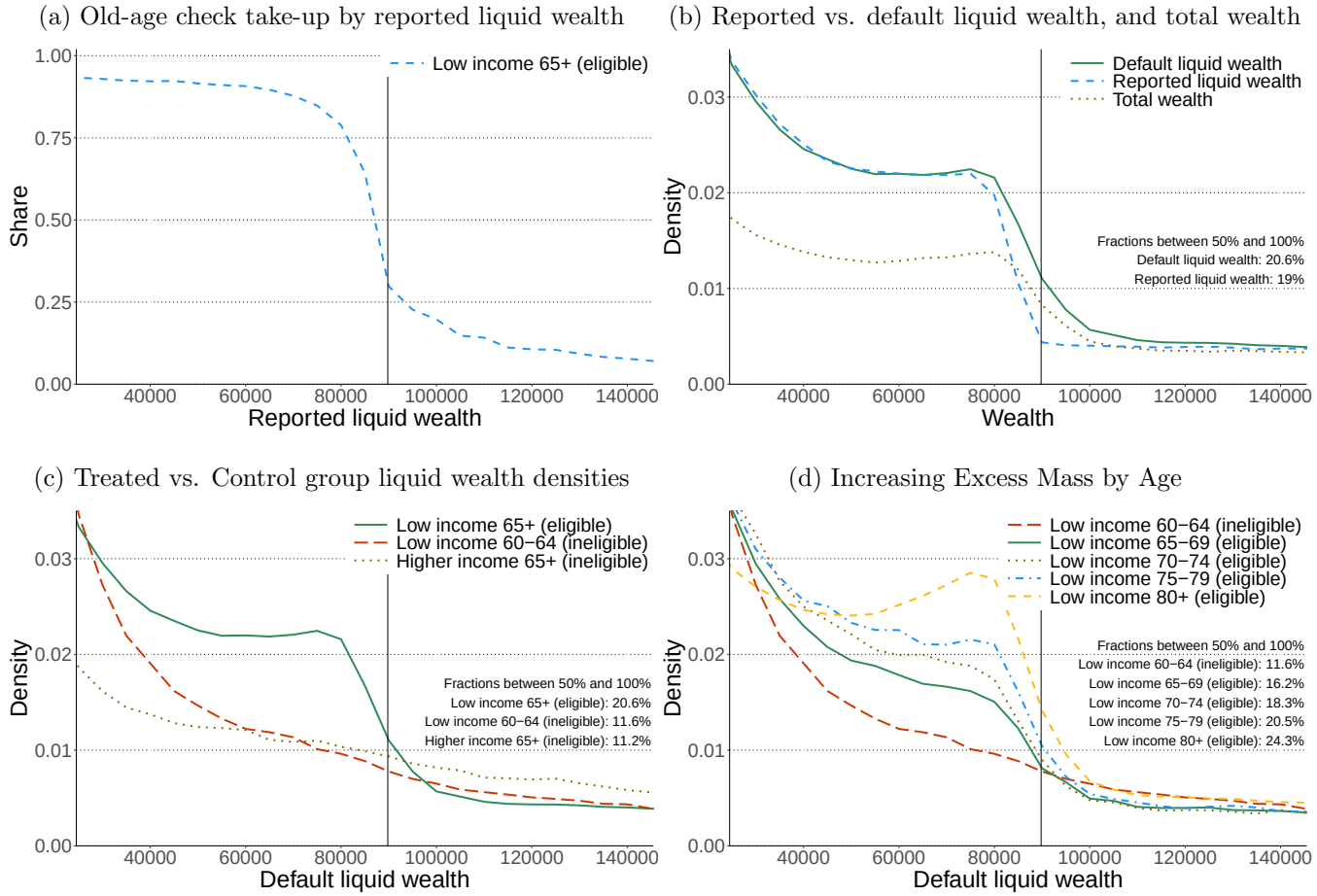
By age group (2014-2018)	65+	65+	60-64	65-69	70-74	75-79	80+
Income group:	low	higher	low	low	low	low	low
Eligible by age and income:	yes	no	no	yes	yes	yes	yes
Fraction in 50%-100% of threshold	0.206	0.112	0.116	0.162	0.183	0.205	0.243
By years around 2003 introduction	2001-2	2003-5	2006-7				
Eligible by age and income:	no	yes	yes				
Fraction in 50%-100% of threshold	0.144	0.168	0.206				

B2. Effect across wealth percentiles

Percentile groups	P55	P60	P65	P70	P75	P55-75	P75-100
Percent effect on wealth	1.5%	-7.6%	-18.7%	-11.4%	-1.8%	-9.9%	-0.8%

Notes: Panel A reports averages for the balance sheet, income, and demographic variables used in the analysis for four subsamples. Panel A1 samples from the full population and pools observations for 2014-2018. Panel A2 samples from Danske Bank customers with at least one spending transaction in every month of the year and pools observations for 2014-2016. All amounts are in 2020 DKK ($1 = 6.53 DKK in 2020) using the average wage indexation of the tax and transfer system. Default liquid wealth is the third-party reported value of bank deposits and listed securities. Reported liquid wealth is default liquid wealth net of self-reported corrections. Bank liquid wealth is the value of bank deposits and listed securities in the bank. Low-income eligible refers to incomes below the income threshold where the old-age check is fully phased out. Panel B summarizes the results from the graphical analysis. Panel B1 reports the fraction with liquid wealth between 50 percent and 100 percent of the asset-test threshold by age and income group for the period 2014-2018 (Figure 1(c)-(d)) and by time period for the sample who are eligible in terms of age and income (Figure 2(a)). For consistency, Figure 2(a) uses the very low income threshold applicable in 2003 throughout the period 2001-2007. Panel B2 reports the percentage difference in indexed liquid wealth at age 70-74 (5-9 years into eligibility) compared to age 60-64 (before eligibility) for single income-eligible individuals born in 1941-1945 at various percentiles of the liquid wealth distribution (Figure 3).

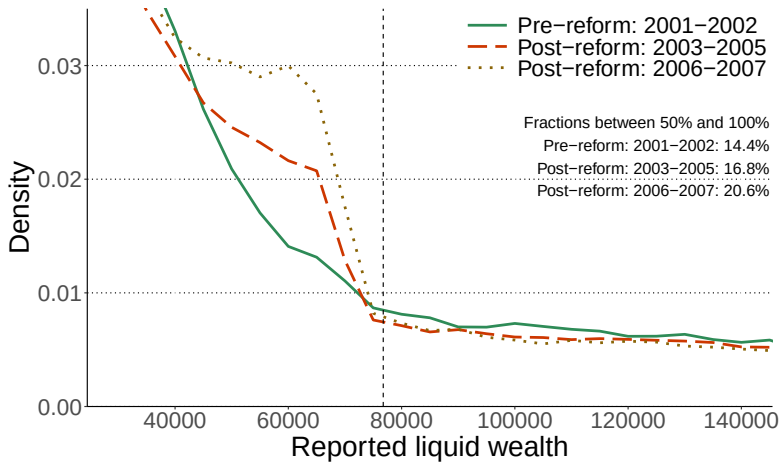
Figure 1: Excess Density below the Asset Testing Threshold



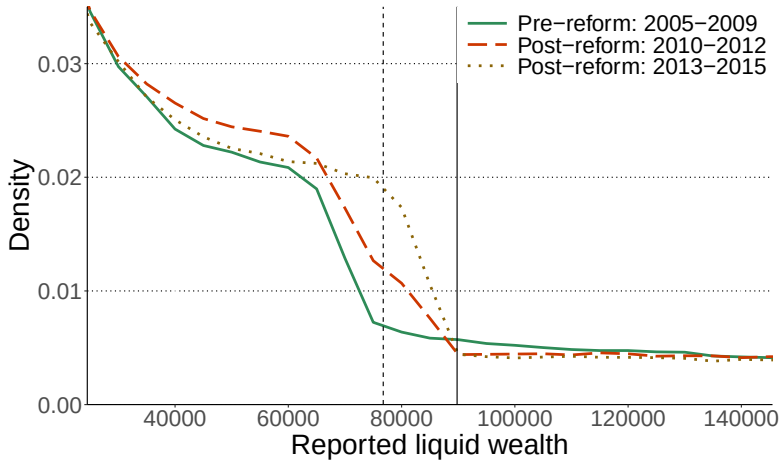
Notes: Panel (a) illustrates the discontinuity in eligibility for the old-age check created by the asset test. It depicts the likelihood of receiving the old-age check by reported liquid wealth for low-income elderly (age 65+) singles. They are eligible for the old-age check when their liquid wealth is below the threshold. Low-income refers to income below the threshold where the old-age check is fully phased out. Panel (b) illustrates the excess mass in wealth densities below the threshold of the asset test for various wealth measures: reported liquid wealth (blue dashed line), default liquid wealth (green solid line), and total wealth (brown dotted line) for age-eligible low-income singles. Default liquid wealth is the third-party reported value of bank deposits and listed securities. Reported liquid wealth is default liquid wealth net of self-reported corrections. Total wealth is default liquid wealth plus pension wealth and housing wealth and net of liabilities (which approximates total net wealth for this population). Panel (c) contrasts excess mass in the default liquid wealth distribution between the treated group (as in panel (b)) and two control groups: low-income singles aged 60-64 and not yet eligible (red dashed line) and slightly higher-income singles aged 65+ with incomes between 150 percent and 200 percent of the threshold at which the old-age check is entirely phased-out (brown dotted line). Panel (d) illustrates how the excess mass below the asset test threshold increases systematically with age. It depicts the density distribution of default liquid wealth for low-income singles by 5-year age groups (and grouping together those aged 80+). All panels pool observations for 2014-2018. The vertical line indicates the nominal value of the asset test threshold in 2020 ($1 = 6.53 DKK in 2020). Liquid wealth is inflated to 2020-values with the growth rate in the asset test threshold which is indexed to average wage economy wide. The horizontal axis groups individuals into DKK 5,000 bins of liquid wealth. Densities refer to the full distribution and not just the portion of the distribution displayed.

Figure 2: Exploiting Reform Variation for Identification

(a) Introduction of the old-age check



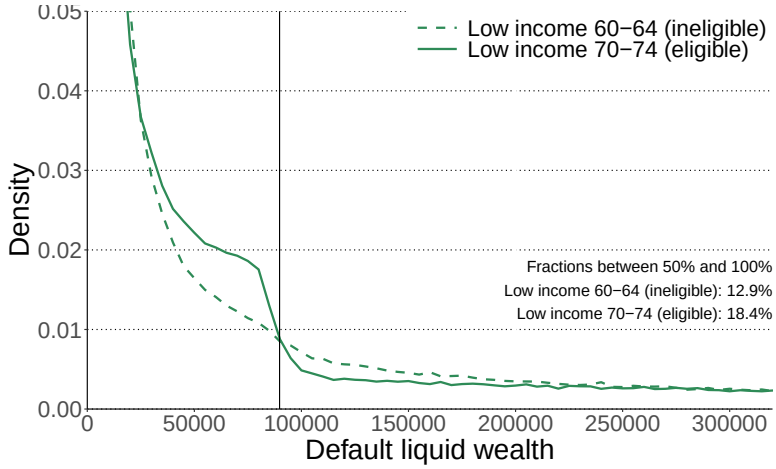
(b) Increase in the asset test threshold



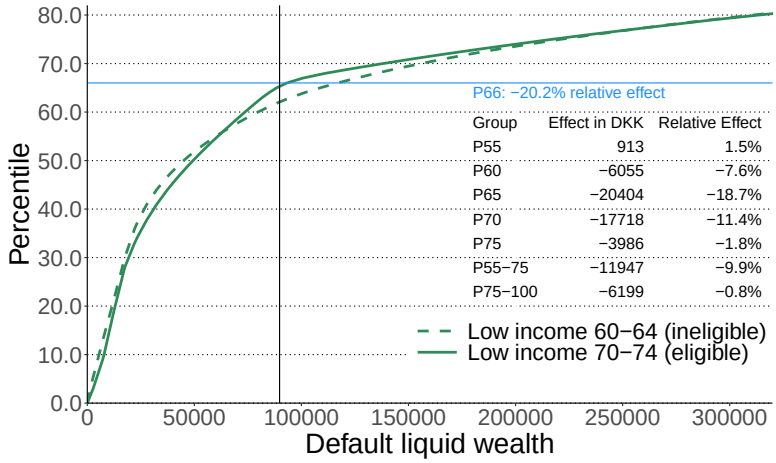
Notes: Panel (a) illustrates how the wealth distribution of the low-income elderly changed around the introduction of the old-age check in 2003. It plots the density distribution of reported liquid wealth for age-eligible, low-income singles in three different periods: before the reform, 2001-2002 (solid green line); the short run after the reform, 2003-2005 (dashed red line), the medium run after the reform, 2006-2007 (dotted brown line). Panel (b) illustrates how the wealth distribution of the low-income elderly changed around the reform that discretely increased the asset test threshold in 2010. It plots the density distribution of reported liquid wealth for age-eligible, low-income singles in three different periods: before the reform, 2005-2009 (solid green line); the short run after the reform, 2010-2012 (dashed red line), medium run after the reform, 2013-2015 (dotted brown line). Age-eligible means age 65 or older. Low-income refers to incomes below the threshold where the old-age check is fully phased out. In panel (a), we apply the low 2003 income threshold to all years 2001-2007 for consistency. The initial threshold in 2003 was low and increased in 2004 and 2005 (see appendix Figure A.1). The vertical lines indicate the asset test thresholds in 2010 (solid vertical line) and before 2010 (dotted vertical line). All wealth figures are inflated to 2020 DKK ($1 = 6.53 DKK in 2020) using the tax/benefit system indexation tied to average wage growth.

Figure 3: Estimating the Impact of the Asset Test on Wealth Percentiles: A Cohort Approach

(a) Treated vs. control density distributions

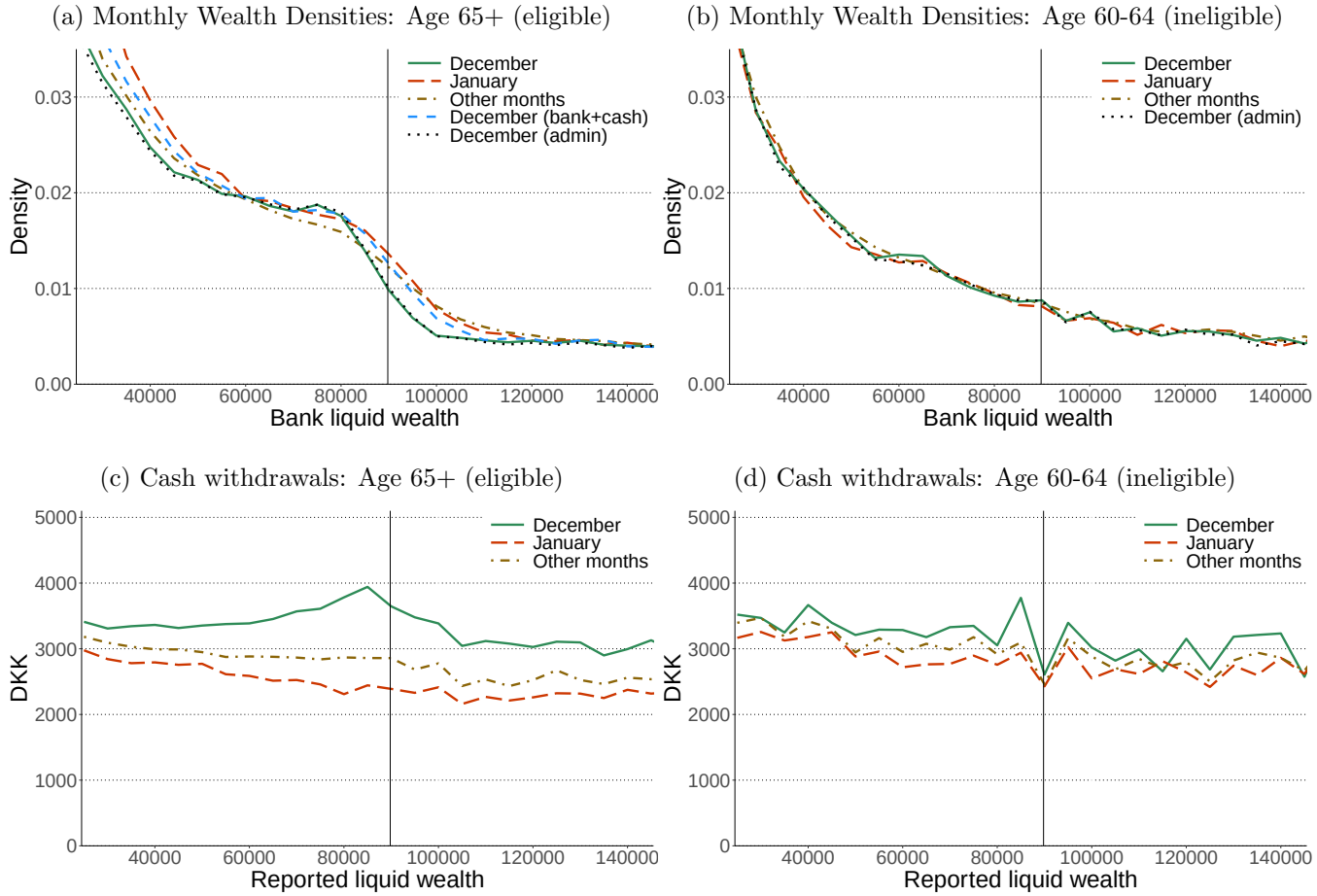


(b) Treated vs. control cumulative distributions



Notes: Panel (a) depicts indexed default liquid wealth densities of low-income elderly born in 1941-1945 at age 60-64 in dashed line (when they are not yet eligible for the old-check) and at age 70-74 in solid line (5 years after they become eligible at age 65). Panel (b) depicts the corresponding cumulative default liquid wealth distributions. Under the identification assumption that any difference between the two distributions is created by the old-age check and its asset test, then at a given percentile on the vertical axis, the estimated causal effect of the old-age check is the horizontal distance between the two curves. The differences at some selected percentiles and percentile ranges are reported on the right side of the figure. The horizontal blue line indicates where the horizontal difference is largest. Appendix Figure A.3(b) depicts a wider range of the distribution showing that the upper part of the two distributions match very well over a much wider range. The vertical line indicates the nominal value of the asset test threshold in 2020. Wealth is always inflated to 2020 DKK ($1 = 6.53 DKK in 2020) using as index the asset-test threshold which is tied to the average wage economy wide. Densities refer to the full distribution and not just the portion of the distribution displayed.

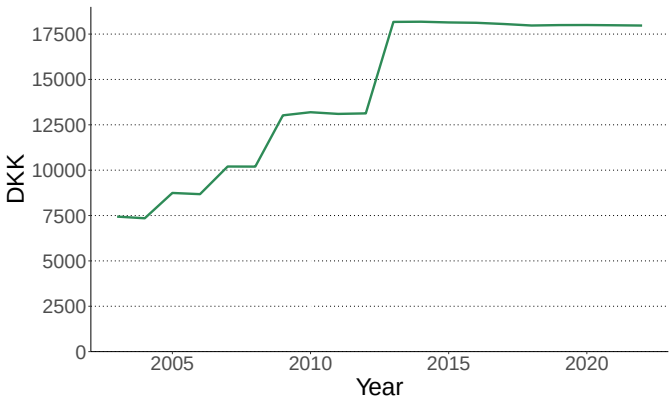
Figure 4: Bank Data Evidence on Response Timing and Cash Withdrawals



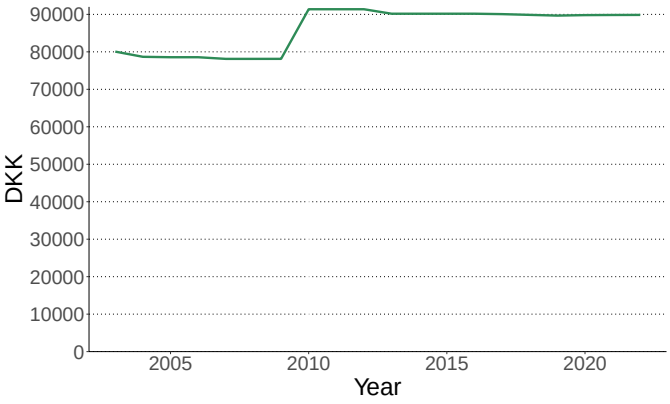
Notes: The figure uses monthly bank data from 2014-16 to illustrate how the distribution of liquid wealth changes within the year. Panel (a) shows the density distribution of bank liquid wealth for age-eligible, low-income singles at the end of December (green solid line), January (red dashed line) and the average for the 10 other months (dash dotted brown line). It also shows the density distributions of cash-adjusted bank liquid wealth at the end of December (blue dashed line) and default liquid wealth from administrative data (black dotted line). Panel (b) shows the same density distributions for a control group of low-income, but age-ineligible singles (age 60-64). Bank liquid wealth is the value of bank deposits and listed securities in the bank. The cash-adjustment adds in cash withdrawals made in the course of the month. Panel (c) and (d) uses bank data to identify temporary responses to the asset test of the old-age check around the end of the year. It shows cash withdrawals by bank liquid wealth comparing within each panel December (solid green line), January (dotted brown line) and other months (dotted red line) and comparing across panels the treated group of age-eligible (aged 65+), low-income singles (left panel) to a slightly younger control group of age-ineligible (age 60-64), low-income singles (right panel). Low-income refers to incomes below the income threshold where the old-age check is fully phased out. The vertical line indicates the nominal value of the asset test threshold in 2020. Liquid wealth is inflated to 2020-values with the growth rate in the asset test threshold ($1 = 6.53 DKK in 2020).

ONLINE APPENDIX NOT FOR PUBLICATION

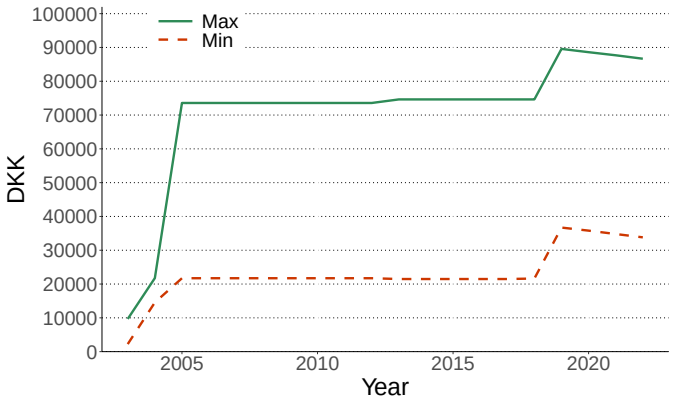
Figure A.1: Indexed Parameters of the old-age check



(a) Value of the old-age check



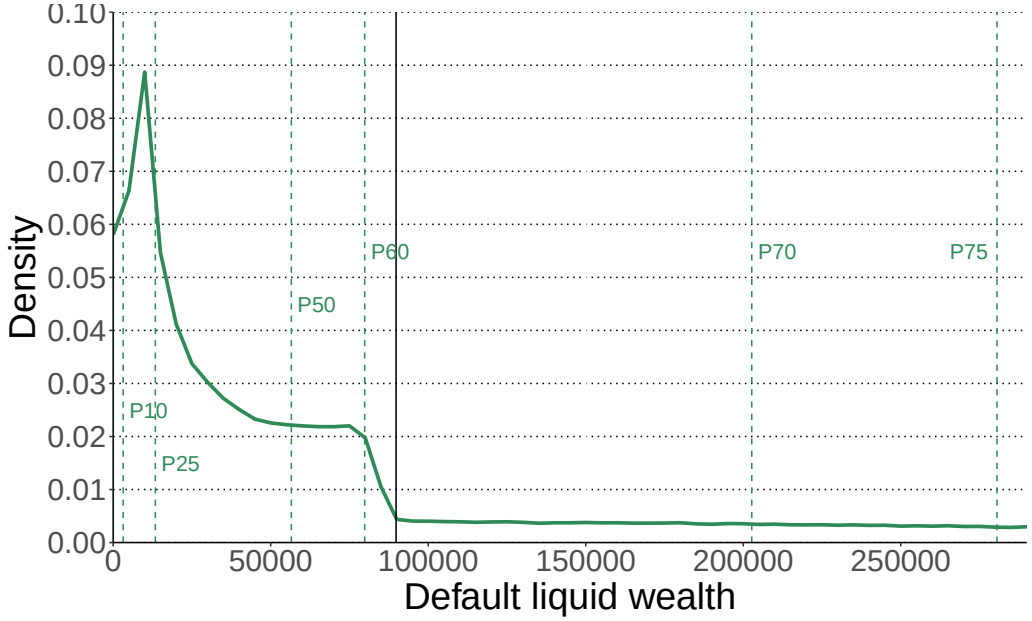
(b) Threshold value of the asset test



(c) Threshold values of the income test

Notes: The figure illustrates how the the parameters of the old-age check have evolved over time since its creation in 2003. Panel (a) shows the maximum value of the old-age check in 2020-values, inflating nominal values with the index used to automatically adjust nominal tax and transfer parameters (roughly equal to nominal wage growth). The figure highlights that the value of the old-age check was increased over and above the normal indexation in 2005, 2007, 2009, and 2013. Panel (b) shows the threshold value of the asset test in 2020-values inflating nominal values with the same index ($1 = 6.53 DKK in 2020). The figure highlights that the threshold was increased over and above the normal indexation by around 15 percent in 2010. Panel (c) shows the threshold income levels where phase-out of the old-age check begins (red dashed line) and where it ends (green solid line) (inflating nominal values with the same index). The figure highlights that the income test was initially very strict but has been unchanged (in real terms) since 2005 except for a small increase in the income threshold values in 2019.

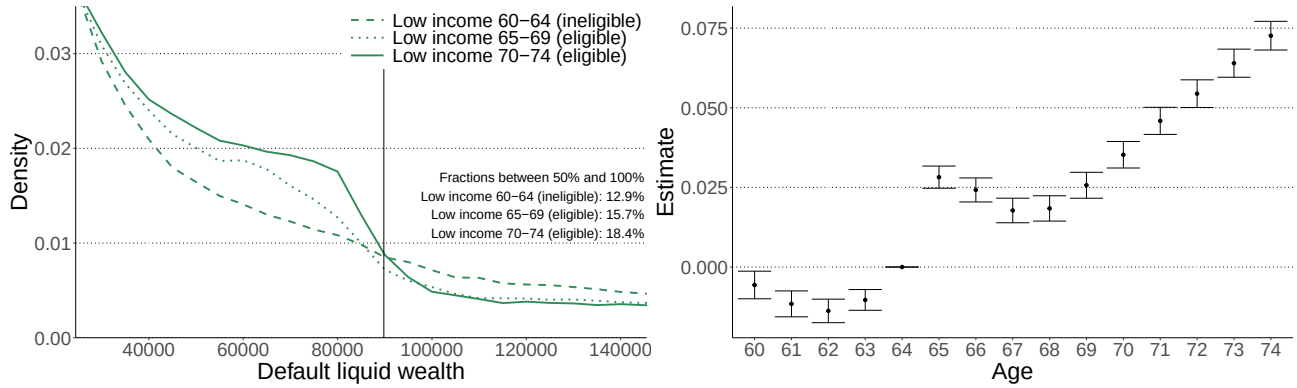
Figure A.2: Wider Density Distribution of Default Liquid Wealth



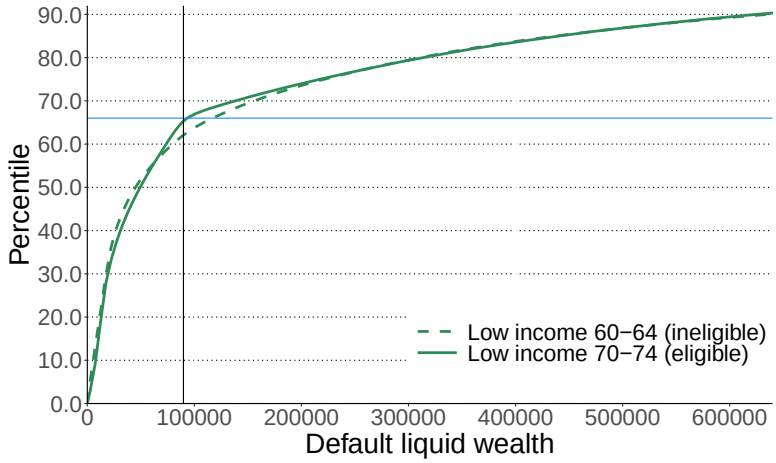
Notes: The figure illustrates the density distribution of default liquid wealth for age-eligible, low-income singles. It is analogous to Figure 1(b) except that it displays a larger portion of the distribution and plots the percentiles P10, P25, P50, P60, P70, and P75 (dashed green vertical lines). The excess mass below the asset test threshold (solid vertical line) remains a clear and salient feature of the distribution when taking a broader view than in the main analysis despite the large mass at very low wealth levels. Default liquid wealth is third-party reported value of bank deposits and listed securities before any self-reported corrections. Age-eligible means age 65 or older. Income is net of social security and before self-reported corrections. Low-income refers to incomes below the threshold where the old-age check is fully phased out. The figure pools observations for 2014-2018. Liquid wealth is inflated to 2020-values with the growth rate in the asset test threshold which is indexed to the average wage earnings per worker economy wide ($1 = 6.53 DKK in 2020). The horizontal axis groups individuals into DKK 5,000 bins of liquid wealth. Densities refer to the full distribution and not just the portion of the distribution displayed.

Figure A.3: Estimating the Impact as the Asset Test on Wealth Percentiles: Further Evidence

(a) Wealth densities by age groups for 1941-5 cohorts (b) Bunch-region regression by age with individual FE

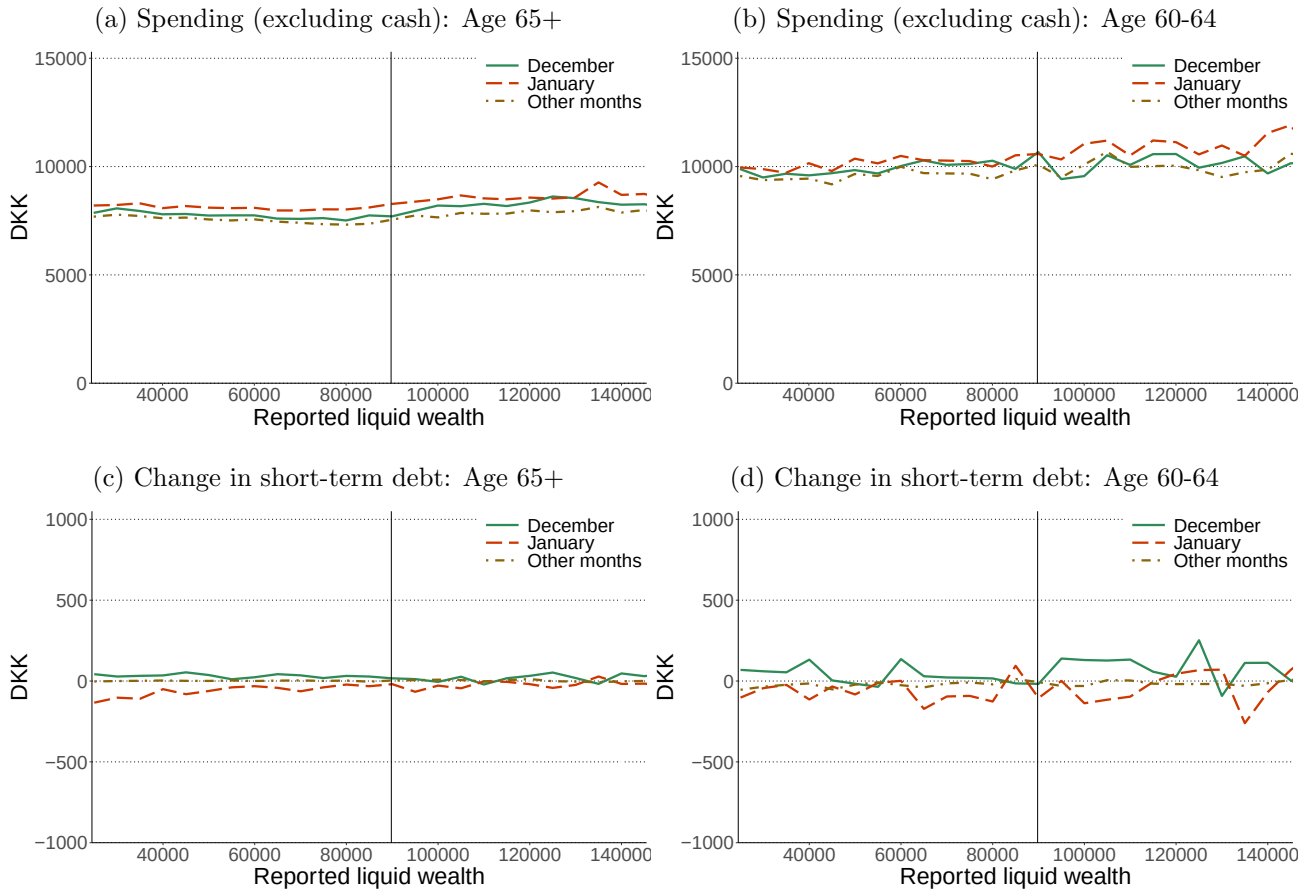


(c) Treatment vs. control cumulative distributions: wider range



Notes: Panel (a) depicts default liquid wealth densities of low-income elderly born in 1941-1945 for by age group 60-64, 65-69, 70-74. It shows that the excess bunching is much larger at age 70-74 than at age 65-69 as the response to the asset-test builds over time after the eligibility age of 65. Panel (b) depicts coefficients from a regression that takes a dummy for having default liquid wealth in the region between 50 percent and 100 percent of the threshold as the outcome regressed on age dummies and individual fixed effects. The horizontal bars are the 95 percent confidence intervals (clustered at the individual level). Coefficients are relative to age 64 (just before eligibility starts at age 65). The panel shows that excess bunching increases discretely by 2.5 points once a person becomes eligible at age 65 and that bunching continues to increase with age afterwards. Panel (c) depicts the cumulative default liquid wealth distributions as in Figure A.3(b) but doubling the length of the x-axis to 650K DKK to show that the wealth distributions for the control and treatment groups match remarkably well from the 75th percentile up to the 90th percentile, lending credence to our identification assumption that absent the old-age check, the two distributions would be identical.

Figure A.4: Spending, and Short-term Debt: Evidence from Bank Data



Notes: The figure uses bank data for 2014-2016 to identify temporary responses to the asset test of the old-age check around the end of the year following the model of Figure 4(c)-(d). It shows spending (top panels) and changes in consumer debt (bottom panels) by bank liquid wealth comparing with each panel December (solid green line), January (dotted brown line) and other months (dotted red line) and comparing across panels the treated group of age-eligible (aged 65+), low-income singles (left panels) to a slightly younger control group of age-ineligible (aged 60-64), low-income singles (right panels). Income is net of social security and before self-reported corrections. Low-income refers to incomes below the income threshold where the old-age check is fully phased out. The vertical line indicates the nominal value of the asset test threshold in 2020. Liquid wealth is inflated to 2020-values using the growth rate in the asset test threshold which is indexed on the average wage ($1 = 6.53 DKK in 2020). The horizontal axis groups individuals into DKK 5,000 bins of liquid wealth. The vertical axis plots the mean of the variable of interest by liquid wealth bin, month and income group.