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The welfare effects of asset mean-testing income support

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This paper studies the savings and employment effects of the asset means-test in US income support programs using a structural life-cycle model with productivity, disability, and unemployment risk. An asset means-test incentivizes low-income households to hold few financial assets making them vulnerable to predictable and unpredictable income changes. Moreover, it incentivizes relatively productive households that happen to have few financial assets to leave the labor force. However, it allows for relative generous transfers to households in most need. Moreover, it counteracts relatively productive households leaving the labor force after the age of 50. In terms of the welfare of an unborn household, the asset means-test that optimally trades off these effects is $150,000, and abolishing it is close to optimal.

Keywords. Means-tested programs, public insurance, incomplete markets.
JEL classification. D91, I38, J26.

1. Introduction

One major change in the US welfare state over the last decades is the vanishing use of an asset means-test (*AMT*, hereafter) to determine households' eligibility for transfers. At the beginning of the 1990s, a household would only receive transfers from programs such as *Food Stamps* (*FS*), *Aid to Families with Dependent Children* (*AFDC*), and the *Low Income Home Energy Assistance Program* (*LIHAP*), if its financial assets were below $2000 ($3000 for an elderly household). By 2018, 39 states have abolished the *AMT* for *LIHAP*, 37 states for *FS*, and eight for the successor of *AFDC*.[1] As a consequence, all households

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[1] Starting with the welfare reform in 1996, *broad-based categorical eligibility* allows states to harmonize eligibility criteria across different welfare programs and waive the federal *AMT*. Moreover, several other states have increased the financial asset limit (see Gehr (2018)).

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with an income below a certain threshold qualify for transfers. Proponents of an *AMT* argue that it allocates transfers to those households with the most need. Opponents stress that the implicit tax on financial assets leads households to impoverish themselves and miss private means to finance consumption when income is low.

Using a structural life-cycle model with idiosyncratic household risk and incomplete markets, this paper studies the trade-off between better insurance and the distortions arising from asset means-testing. I consider reforms that alter the asset limit for means-tested programs but leave the size of government unchanged in the stationary equilibrium. Hence, a less stringent test leads to more households qualifying and fewer benefits for every household. Abolishing the *AMT* is close to optimal, and an unborn household is willing to give up 1.87% of lifetime nondurable consumption for the policy reform. About two-thirds of this welfare gain arise from households' improved savings decisions. The remaining one-third arises from households' improved employment choices; a margin that has received much less attention in the public discussion.[2]

In the model, households face several sources of risk: a health shock (disability) that alters its idiosyncratic productivity, permanent productivity shocks unrelated to health (such as changes in the price of its skills), and persistent unemployment risk resulting from stochastic job loss and job offer arrival rates.[3] Households may accumulate financial assets to insure against risk, finance consumption during retirement, and leave bequests. Durable consumption goods are not subject to the *AMT* and provide a substitute for financial assets. Substitution is only partial because a household cannot adjust its stock by incremental amounts and the utility derived from consumer durables is concave. During working-life, households decide whether to stay employed, and when nonemployed, whether to accept job offers. The government affects these decisions through the asset means-tested programs and several nonasset means-tested programs: unemployment benefits, progressive income taxation, disability insurance (*DI*, age 50 onwards), and social security. Additionally, households have preferences for leisure.

I calibrate the model to match moments of disability risk, earnings risk, employment decisions, and wealth holdings in the Survey of Income and Program Participation (SIPP) during the early 1990s. The model replicates well-relevant nontargeted features in the data. In particular, at any point in the life cycle, a substantial fraction of households have few financial assets, leaving these households vulnerable to predictable and unpredictable income declines. Moreover, low financial assets, coupled with substantial wealth in the form of consumer durables, are concentrated at low-income households and are prevalent even close to retirement. For example, the median household aged 50–64 who left the labor force holds less than $2000 in financial assets. At the same time, the median durable consumption stock among these households is $30,000. Besides many households holding almost no financial assets, the model is consistent with small nondurable consumption changes when households enter nonemployment during working life or when entering into retirement.

[2]Most literature studying the employment effects of means-tested programs focus on the size of their benefits. Recent examples include Low, Meghir, and Pistaferri (2010), Chan (2013), Blundell, Dias, Meghir, and Shaw (2016), and Ortigueira and Siassi (2017).

[3]Job search is exogenous in the model. Koehne and Kuhn (2015) study the incentives for job search when unemployment benefits depend on the level of assets.

Using a counterfactual simulation, I show that abolishing the *AMT* while holding constant total government spending improves low-income households' self-insurance. The share of working-age households entering nonemployment with less than $3000 in financial wealth decreases from 34% to 15%. In particular, financial assets of the low-income, elderly rise. The median financial assets of households aged 50–64 that are out of the labor force increase from $1988 to $18,318. As a result, their nondurable consumption increases by 5.1% and they better smooth consumption over the life cycle when abolishing the asset means-test. On the negative side, abolishing the *AMT* requires a reduction in the level of means-tested transfers by 4% to keep the government budget unchanged. What is more, some transfers are allocated to households in less need. The 90th percentile of nondurable consumption expenditure of households receiving transfers rises by 21% which increases the 90/50 nondurable consumption ratio of transfer recipients from 1.25 to 1.46.

Turning to the employment choices, households have substantial extensive margin labor supply responses in the model. In response to a permanent 10% decline in productivity, aggregate employment declines by 1.1 percentage points before age 50 and by 4.9 percentage points after age 50, where the strong response of the elderly is driven by *DI*. *DI* provides benefits to households that are substantially higher than other welfare benefits. What is more, households see *DI* and the asset means-tested programs as complements which increases households' benefits yet further. Consequently, households leaving the labor force after the age of 50 are on average relatively productive households.

An *AMT* affects these employment choices in three distinctive ways. First, it excludes households with high financial assets, thereby, discouraging nonemployment. This effect becomes the strongest close to retirement when households wish to hold substantial financial assets for life-cycle purposes which, potentially, counteracts the aforementioned incentive of relatively productive households to leave the labor force. Second, financial assets become a stronger motivating factor in employment choices (apart from productivity). Households with few financial assets are more likely not to work because they can receive transfers. Third, by excluding relatively low productive households with substantial financial assets, the asset means-test allows for relatively high benefits to those households receiving benefits. The higher benefits make nonemployment more attractive.

When abolishing the asset means-test, the employment rate of households aged 25–50 increases by one percentage point. The key to this is the decline in benefits by 4% that is required to keep total governmental expenditures unchanged. As a result, nonemployment becomes less attractive. Importantly, by eliminating the link between households' financial assets and employment choices, the most productive of the formerly nonemployed households decide to join the labor force. The 90th percentile of the potential earnings distribution of households out of the labor force declines by 11%. This reallocation of relatively productive households into employment increases social welfare.

Abolishing the *AMT* is only close to optimal. The optimal *AMT* is at $150,000, that is, it excludes the wealthiest households in society. However, households are only willing to

give up an additional 0.01% of lifetime nondurable consumption relative to abolishing the *AMT*.

The paper contributes to the literature that studies savings decisions under risk when income support is asset means-tested. Hubbard, Skinner, and Zeldes (1994, 1995) found that an *AMT* can explain the low average net wealth holdings (financial assets plus consumer durables) of low educated households. Here, I show that an *AMT* can also explain the joint distribution of financial assets and consumer durables. De Nardi, French, and Jones (2010) showed that the *AMT* in *Medicaid* explains the low wealth holdings of some households during retirement. Similarly, Braun, Kopecky, and Koreshkova (2017) studied the decisions of elderly households in the presence of welfare programs.[4] They find that means-tested programs available to retired households are not generous enough relative to the nonmeans-tested social security. While these papers focus on savings decisions of elderly households under medical expenditure risk, the present paper studies savings and employment decisions over the entire life cycle in the presence of earnings, unemployment, and disability risk. Golosov and Tsyvinski (2006) showed that an asset means-test for disability insurance is optimal in an environment where the government cannot observe the individual's health status because it discourages fraudulent applications by healthy households. I find that most households receiving disability insurance already behave as if it was asset means-tested because they see it as a complement to the asset means-tested programs that are in place. Nevertheless, abolishing the *AMT* changes the number of disability insurance recipients little because, similar to the finding in Low and Pistaferri (2015), the program is effective in denying applications by healthy households.

The structure of the paper continues as follows: The next section specifies the theoretical model and the section, thereafter, discusses calibration. Section 4 compares simulation results to nontargeted moments in the data. Section 5 discusses the implications of abolishing the *AMT* and solve for the optimal asset limit. The last section concludes.

2. Model

2.1 *Demographics and labor market risk*

The economy is populated by a finite number of households, $\mathcal{I}$. The model period is 4 months.[5] At each age, h, a household has N_h household members. A household dies at age h with probability ι_h and dies with certainty after H periods. When a household dies, it is replaced by a newborn household.

A household faces four types of earnings risks. First, at the beginning of life, $h = 1$, household i draws a random log productivity, p_{i1}. Second, during working life, its log productivity follows a random walk with a drift component that depends on the em-

[4]Similarly, Barczyk and Kredler (2018) studied long-term-care decisions in the presence of the asset-means-tested *Medicaid* program.

[5]A 4-months decision period provides a reasonable trade-off between computational feasibility on the one hand, and modeling nonemployment risk on the other hand.

ployment state and age. Define the productivity after shocks have realized by $\tilde{p}_{ih}$:

$$\tilde{p}_{ih} = \begin{cases} p_{ih} + \nu_1 + \epsilon_{ih} & \text{if employed and } \leq 50 \text{ years}, \\ p_{ih} + \nu_2 + \epsilon_{ih} & \text{if employed and } > 50 \text{ years}, \\ p_{ih} + \delta_1 + \epsilon_{ih} & \text{if nonemployed and } \leq 50 \text{ years}, \\ p_{ih} + \delta_2 + \epsilon_{ih} & \text{if nonemployed and } > 50 \text{ years}, \end{cases}$$

where $\epsilon_{ih} \sim N(0, \sigma_\epsilon^2)$. In the data, earnings of the employed peak around age 50, and ν_1 and ν_2 allow the model to match this earnings profile. To reduce notation, I refer to the skill parameters in either age bracket by ν_x and δ_x with $x = 1, 2$. During nonemployment, households have either no skill gains or their skills depreciate: $\delta_x = \min\{0, \nu_x\}$. Third, households experience persistent health shocks (disability) that affect their productivity. When a household is in good health, $D = g$, it becomes disabled with probability π_h^{gb}, and its log productivity decreases by ξ. Reversely, a household who is disabled, $D = b$, becomes nondisabled with probability π_h^{bg} and its log productivity increases by ξ. Hence, a household's next period productivity is given by

$$p_{ih+1} = \begin{cases} \tilde{p}_{ih} & \text{if } D = g \text{ and } \pi_h^{\text{gb}} = 0, \\ \tilde{p}_{ih} & \text{if } D = b \text{ and } \pi_h^{\text{bg}} = 0, \\ \tilde{p}_{ih} - \xi & \text{if } D = g \text{ and } \pi_h^{\text{gb}} = 1 \\ \tilde{p}_{ih} + \xi & \text{if } D = b \text{ and } \pi_h^{\text{bg}} = 1, \end{cases}$$

Fourth, households face spells of nonemployment and the employment risk depends on their disability status and age. When employed, a household is forced into non-employment with probability $\omega_h(D)$. When nonemployed, it receives a job offer with probability $\lambda_h(D)$.

2.2 *Nonasset means-tested transfers*

The government provides several nonasset means-tested redistribution schemes that provide partial insurance against risk. During the last 15 working years (age 51 onwards), households may exit the labor market permanently and receive *Disability Insurance* (*DI*).[6] To be eligible, the legislation requires an "inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment" (Social Security Administration (2014)). Moreover, a household has to be continuously non-employed for 5 months, and it has to have worked before that period. Thus, eligibility is conditional both on a household's health and employment opportunities. In the model, to approximate the effect of health, the probability that a *DI* application is granted, $\upsilon(D)$, depends on the households' health status as in Low and Pistaferri (2015). That is, disabled households have a higher probability to be granted benefits,

[6]The legislation permits households to apply throughout their working life. Yet, most people apply after the age of 50, possibly reflecting the fact that eligibility requirements loosen at that age.

but healthy households that apply may be lucky and receive benefits because of screening errors. Regarding the employment factors, a household may only apply for *DI* the period after becoming nonemployed and its work possibilities must have deteriorated in the period of becoming nonemployed, $p_{ih} - p_{ih-1} \leq 0$. Finally, a household may not search for a job within the same period of the application. *DI* benefits follow:

$$S(\bar{E}_{ih}) = \begin{cases} 0.9\bar{E}_{ih} & \text{if } \bar{E}_{ih} \leq d_1, \\ 0.9d_1 + 0.32(\bar{E}_{ih} - d_1) & \text{if } d_1 < \bar{E}_{ih} \leq d_2, \\ 0.9d_1 + 0.32(d_2 - d_1) + 0.15(\bar{E}_{ih} - d_2) & \text{if } \bar{E}_{ih} > d_2, \end{cases}$$

where d_1, d_2 are bend points that govern the concavity of benefits. $\bar{E}_{ih}$ are the average earnings of a household over its life cycle, following

$$\bar{E}_{ih+1} = \begin{cases} (E_{ih} + \bar{E}_{ih}h)/(h+1) & \text{if employed,} \\ \bar{E}_{ih}h/(h+1) & \text{if nonemployed,} \\ \bar{E}_{ih} & \text{if disabled or retired,} \end{cases}$$

where E_{ih} is gross income. A household retires at age $H_{120}+1$ (65 years) and receives social security benefits. Benefits follow the same formula as disability benefits. Besides social security benefits, a retired household also receives private-sector pensions, $\mathcal{P}_{ih}$. The amount of pensions usually depends on previous earnings; therefore, to reduce complexity, I assume they also depend on lifetime average earnings: $\mathcal{P}_{ih}(\bar{E}_{ih})$.[7] To summarize, households' gross income is given by

$$E_{ih} = \begin{cases} \exp(p_{ih}) & \text{if employed,} \\ b_h + E_h^u & \text{if nonemployed,} \\ S(\bar{E}_{ih}) & \text{if disabled,} \\ S(\bar{E}_{ih}) + \mathcal{P}_{ih}(\bar{E}_{ih}) & \text{if retired,} \end{cases}$$

where b_h are nonmeans-tested unemployment benefits, and E_h^u are household earnings when the main earner is nonemployed. Labor market and retirement earnings are subject to the income brackets and tax rates from the statutory US federal income tax code in 1992:

$$E_{ih}^{\text{net}} = E_{ih}\big(1 - \tau(E_{ih})\big).$$

2.3 *Savings and asset means-tested transfers*

To insure against risk and to save for old age, a household may accumulate a risk-free financial asset, a, that pays certain returns from the world capital market, $R = (1+r)$.[8] It

[7] To quantify this dependence of pensions on lifetime earnings, I calculate for retired households their pension income relative to their social security income.

[8] This paper focuses on the savings decisions of the relative poor which hold little of the country's capital stock. Therefore, changes in their savings behavior are unlikely to have major impacts on equilibrium prices.

faces a borrowing constrained of the form: $a_{ih+1} \geq \underline{a}$. Additionally, households choose a durable consumption stock, d_{ih+1}, from a discrete set, $d_{ih+1} \in \mathcal{D}$. Durable consumption includes housing and vehicles. The discrete nature of the set bars households to incrementally adjust these types of assets. Thus, durables imperfectly substitute financial assets for precautionary and old age savings purposes. Substitution is imperfect because a household currently in an asset means-tested program may find it unattractive selling off a part of its durables because the large one-time rise in financial assets may disqualify it from the program. Similarly, a participating household may find it difficult to accumulate durable consumption goods because it first needs to accumulate sufficient financial assets.

When financial assets, a_{h+1}, and gross earnings, E_{ih}, are sufficiently low, a household is eligible to asset means-tested programs by the government. I assume the government perfectly observes households' financial assets.[9] Denote by $E_j^{\text{elig}}(h)$ the gross earnings threshold that makes a household of age h eligible to a specific asset means-tested program j. Appendix A provides details on the earnings eligibility thresholds for the different programs and the benefits each program pays conditional on households' characteristics. To reduce notation here, denote by $E_{\max}^{\text{elig}}(h)$ the gross earnings threshold that makes a household of age h eligible to the transfer program with the highest of these earnings threshold. I assume a common financial assets limit across all programs that I take from the federal Food Stamps program. A household may have financial assets up to $\bar{a} = 2000$ before retirement and $\bar{a} = 3000$ when receiving *DI* or social security benefits.

AMT programs available at all ages Three programs are available to households at all stages of their life cycle. The *Food stamps program* (*FS*) provides households with vouchers for food. The goal of the program is to make high-quality nutrition food available to low-income households. Depending on household i's gross income and its size, the household may receive benefits $\text{TR}^{\text{FS}}(E_{ih}, N_h)$. The *Low Income Home Energy Assistance Program* (*LIHAP*) provides energy assistance to households. Eligibility is usually guaranteed when a household participates in another welfare program, and I find little correlation between income and the amount of transfers in the data. Therefore, I assume that each eligible household receives a common amount of benefits, which differs among working and retired households: $\overline{\text{TR}}_W^L$ and $\overline{\text{TR}}_R^L$. Finally, every period, households pay deterministic out-of-pocket medical expenditures $\mathcal{M}_h$. However, households satisfying the income and asset-test receive *Medicaid* that pays for these expenditures.

AMT programs available to non-DI/nonretired Before reaching age H_{121} (65 years), a household may receive *Aid to Families with Dependent Children* (*AFDC*) that provides cash and in-kind transfers to families with children under 19 years of age. The latter serve basic needs such as child care, education, and transportation. Denote by $\text{TR}^A(E_{ih}, N_h)$

[9]A household would like to hide savings when its income is high, that is, before entering into an asset means-tested program, and consume these savings and receive transfers after an adverse shock. When applying to a program, a household has to disclose all its bank accounts to prevent such behavior. Lying about financial assets outside of these accounts may be prosecuted under either federal or state fraud statues that carry a possible prison sentence.

the benefits a household with gross income E_{ih} and household size N_h receives. Pregnant women or those with children less than 5 years of age may be eligible to the *Special Supplemental Nutrition Program for Women, Infants, and Children*. Households are eligible when they participate in any of the above programs and receive a flat transfer of $\overline{\text{TR}}^{\text{WI}}$. In the data, almost no households older than 38 years participate in the program, and I impose this limit in the model. The total amount of benefits an eligible household receives is, thus

$$\text{TR}^W(E_{ih}, N_h, h) = \text{TR}^{\text{FS}}(E_{ih}, N_h) + \overline{\text{TR}}^L_W + \mathcal{M}_h + \text{TR}^A(E_{ih}, N_h) + \overline{\text{TR}}^{\text{WI}}\mathbb{I}_{h<42},$$

where $\mathbb{I}_{h<42}$ is an indicator variable which is one when the household is younger than 38 years.

AMT programs available to DI/retired When receiving *DI* or during retirement, households may receive benefits from *Supplemental Security Income* (*SSI*). Let $\text{TR}^S_{ih}(E_{ih}, N_h)$ be the benefits after income deductions. Total transfers to an eligible households that is in *DI* or retired are, thus

$$\text{TR}^R(E_{ih}, N_h) = \text{TR}^{\text{FS}}(E_{ih}, N_h) + \overline{\text{TR}}^L_R + \mathcal{M}_h + \text{TR}^S(E_{ih}, N_h).$$

Summarizing the above yields:[10]

$$\text{TR}(E_{ih}, N_h, h) = \begin{cases} 0 & \text{if } a_{h+1} > \bar{a} \text{ or } E_{ih} > E^{\text{elig}}_{\max}(h), \\ \text{TR}^W(E_{ih}, N_h, h) & \text{if } a_{h+1} \leq \bar{a} \text{ and } E_{ih} \leq E^{\text{elig}}_{\max}(h) \text{ and not } DI/\text{retired}, \\ \text{TR}^R(E_{ih}, N_h) & \text{if } a_{h+1} \leq \bar{a} \text{ and } E_{ih} \leq E^{\text{elig}}_{\max}(h) \text{ and } DI/\text{retired}. \end{cases}$$

2.4 *The household problem*

The household chooses each period nondurable consumption expenditure, c_h, next period financial assets, a_{t+1}, and the durable consumption stock, d_{h+1}. It derives utility from

$$U_{ih}(c_{ih}, d_{ih}, N_h, \mathbb{P}_{ih}, \mathbb{T}_{ih}) = \frac{\left(\Theta(N_h)\left[c_{ih}\exp(-\phi\mathbb{P}_{ih})\exp(-\kappa\mathbb{T}_{ih})\right]^{\alpha}[d_{ih}+\bar{d}]^{1-\alpha}\right)^{1-\gamma}}{1-\gamma},$$

where γ guides the risk-aversion, α is the weight of nondurable consumption in utility, and $\bar{d}$ is a stock on durable consumption every household has. A Cobb–Douglas specification between durable and nondurable consumption is consistent with the studies Fernandez-Villaverde and Krueger (2011) review. $\mathbb{P}_{ih}$ is an indicator function that is equal to one whenever a household is employed. The latter implies that from the same expenditure on consumption, the nonemployed derive more utility reflecting the insurance stemming from additional home production and reduce shopping costs during nonemployment as in Aguiar and Hurst (2005). $\mathbb{T}_{ih}$ is an indicator function that

[10]Some readers may want to compare my specification to the one put forward by Hubbard, Skinner, and Zeldes (1995). They specify $\text{TR}(a_{h+1}, E_h) = \max\{0, \bar{C} - [(1+r)a_{h+1} + E_h]\}$ where $\bar{C}$ is a guaranteed consumption floor. In this set-up, all households participating in the program choose $a_{h+1} = 0$.

is equal to one whenever a household is eligible and chooses to receive asset means-tested transfers. The lower consumption level from the same expenditure level for participating households has two interpretations. For one, most of the benefits are in-kind transfers that the household may value less than cash transfers. Moreover, it represents the time cost to apply for these benefits and the possible stigma that is associated with it. The function Θ translates the flow of nondurable and durable consumption into a person-equivalence flow depending on the household size as in Scholz, Seshadri, and Khitatrakun (2006). Household's nondurable consumption expenditures read

$$c_{ih} = E_{ih}^{\text{net}} + \mathbb{T}_{ih}\text{TR}_{ih}(E_{ih}, N_h, h) + Ra_{ih} - a_{ih+1} + d_{ih} - d_{ih+1}.$$

An already retired or disabled household of age h with financial asset position a, durable consumption stock d, and accumulated earnings $\bar{E}$, solves, respectively

$$\mathcal{V}_h^R(a, d, \bar{E}) = \max_{a', d', \mathbb{T}} \{U(c, d, N_h, 0, \mathbb{T}) + \beta[\iota_h \bar{V}(a', d') + (1 - \iota_h)\mathcal{V}_{h+1}^R(a', d', \bar{E}')]\},$$
$$\mathcal{V}_h^D(a, d, \bar{E}) = \max_{a', d', \mathbb{T}} \{U(c, d, N_h, 0, \mathbb{T}) + \beta[\iota_h \bar{V}(a', d') + (1 - \iota_h)\mathcal{V}_{h+1}^D(a', d', \bar{E}')]\},$$

where *primes* denote next period values, β is the discount factor, ι_h is the probability of dying, and $\bar{V}$ is the value of bequests. As in French and Jones (2011), bequests are a luxury good:

$$\bar{V}(a', d') = \theta_b \frac{(a' + d' + Z)^{1-\gamma}}{1 - \gamma},$$

where θ_b guides the strength of the bequest motive and Z permits households to die with nonpositive wealth. The bequest motive and stochastic death constrain households' willingness to reduce their financial assets as a response to the *AMT* because they wish to avoid to die with little wealth.

The value function of a nonemployed household who may not apply for disability solves

$$\mathcal{V}_h^U(a, d, \bar{E}, p, D) = \max_{a', d', \mathbb{T}} \{U(c, d, N_h, 0, \mathbb{T}) + \beta[\iota_h \bar{V}(a', d') + (1 - \iota_h)\text{EVU}_h(a', d', \bar{E}', p, D)]\},$$

where EVU_h is the value of search in nonemployment:

$$\begin{aligned}&\text{EVU}_h(a', d', \bar{E}', p, D)\\ &\quad = (1 - \lambda_h(D))\mathbb{E}_{p', D'|p, D, h, \mathbb{P}=0}\mathcal{V}_{h+1}^U(a', d', \bar{E}', p', D')\\ &\qquad + \lambda_h(D)\mathbb{E}_{p', D'|p, D, h, \mathbb{P}=0}\max\{\mathcal{V}_{h+1}^E(a', d', \bar{E}', p', D'), \mathcal{V}_{h+1}^U(a', d', \bar{E}', p', D')\}.\end{aligned}$$

When searching, a nonemployed household finds a new job with probability $\lambda_h(D)$. When it accepts the job, it receives the value of employment, $\mathcal{V}_{h+1}^E(a', d', \bar{E}', p', D')$.

Define by Θ_h the value of applying for *DI*. A household decides whether to apply after the asset decision but before the end-of-period uncertainty reveals. When applying, it may not search in the labor market and knows that the application is denied with probability $1 - \upsilon(D)$:

$$\begin{aligned}&\Theta_h\big(a', d', \bar{E}', p, D\big)\\&\quad = \upsilon(D)\mathcal{V}^{\mathcal{D}}{}_{h+1}\big(a', d', \bar{E}'\big) + \big(1 - \upsilon(D)\big)\mathbb{E}_{p', D'|p, D, h, \mathbb{P}=0}\mathcal{V}^{U}_{h+1}\big(a', d', \bar{E}', p', D'\big).\end{aligned}$$

Therefore, the value function of a nonemployed household with the option to apply for disability is given by

$$\begin{aligned}\mathcal{V}^{\mathrm{UD}}_h(a, d, \bar{E}, p, D) = \max_{a', d', \mathbb{T}} \big\{U(c, d, N_h, 0, \mathbb{T}) + \beta\big[\iota_h \bar{V}\big(a', d'\big)\\ + (1 - \iota_h)\max\big\{\Theta_h\big(a', d', \bar{E}', p, D\big), \mathcal{V}^{U}_h\big(a', d', \bar{E}', p, D\big)\big\}\big]\big\}.\end{aligned}$$

A currently employed household solves

$$\begin{aligned}\mathcal{V}^{E}_h(a, d, \bar{E}, p, D) = \max_{a', d', \mathbb{T}} \big\{U(c, d, N_h, 1, \mathbb{T}) + \beta\big(\iota_h \bar{V}\big(a', d'\big)\\ + (1 - \iota_h)\mathbb{E}_{p', D'|p, D, h, \mathbb{P}=1}\big[\omega_h(D)\Xi\\ + \big(1 - \omega_h(D)\big)\max\big\{\mathcal{V}^{E}_{h+1}\big(a', d', \bar{E}', p', D'\big), \Xi\big\}\big]\big)\big\},\end{aligned}$$

with Ξ being the value of becoming nonemployed. This value depends on whether the household becomes eligible for *DI* which occurs when he is older than 50 years, $\mathbb{I}_{h>75}$, and the productivity development is sufficiently poor, $\mathbb{I}_{p'-p\leq 0}$:

$$\Xi \equiv \mathbb{I}_{h>100}\mathbb{I}_{p'-p\leq 0}\mathcal{V}^{\mathrm{UD}}_{h+1}\big(a', d', \bar{E}', p', D'\big) + (1 - \mathbb{I}_{h>75}\mathbb{I}_{p'-p\leq 0})\mathcal{V}^{U}_{h+1}\big(a', d', \bar{E}', p', D'\big).$$

3. Data description and calibration

3.1 *Data description*

The analysis uses the 1990–1993 (years 1989–1995) samples from the SIPP which is a representative sample of the noninstitutionalized civilian population maintained by the US Census Bureau. The period provides a relatively stable institutional framework. In particular, it is after the 1984 reform of *DI*[11] but before the welfare reform of 1996 that has transformed the *AFDC* program into the *Temporary Assistance for Needy Families* program. A major benefit of the SIPP is its panel dimension that allows computing employment and health transition rates. Every 4 months, referred to as a wave, the Census Bureau interviews all household members above the age of 16 about the proceeding 4 months. The interview collects detailed information on earnings, transfers from different means-tested programs, wealth, and household affiliation. Some of the information

[11] Autor and Duggan (2006) showed that the reform has increased the relative importance of employment factors in determining eligibility. Michaud, Nelson, and Wiczer (2018) show that this has resulted in a rise in granted applications due to employment factors, in contrast to health factors.

is reported on a monthly frequency, and I aggregate all data to the model frequency of 4 months (a wave). All income data is converted to 1992 nominal values using the CPI.

The SIPP defines a household as a group of persons living at a common address, and I assign to a household the demographic information of the person with the highest income (the head). The data counterpart to household earnings when employed, $\exp(p_{ih})$, is the total income received from an employer. To mimic the within household insurance present in the model, I aggregate these earnings across spouses. The data counterpart to gross household income, E_{ih}, is broader and adds retirement income and unemployment compensation to household earnings.

A household is nonemployed whenever its unemployment benefits are larger than its earnings from work during the 4 months. Moreover, a household is nonemployed when its 4-months earnings are less than \$400. Taken together, nonemployment risk in the model represents persistent nonemployment spells instead of short spells of only a few weeks. A nonemployed household is out of the labor force when its head reports not searching for a job or reports receiving *DI*.[12] I exclude a household from the original sample whenever the head is school enrolled, works as a family worker, or is a public employee or public retiree.[13]

Finally, I need to measure financial assets and the durable consumption stock in the data.[14] This raises the issue of how savings that create an income stream late in life should be treated. These savings can be exempt from the means-test when they are not *readily available*. Federal law deems individual retirement plans (*IRA*) and retirement plans of the self-employed (*KEOGH*) as *readily available*, and hence, I treat these as financial assets.[15] Moreover, retirement plans managed by the employer (*401k* plans) are transferred under some conditions into an *IRA* account in the case of nonemployment. Therefore, I also treat these as financial assets. The net value of housing and vehicles is the data counterpart to the durable consumption stock.

3.2 *Calibration*

Table 1 summarizes the calibration. All age-specific data moments are computed using an age-smoothed series following Garcia (2010). A household enters the labor-market at age 25 and its economic live ends at age 84 which is the oldest age group the SIPP collects data on. Bell and Miller (2002) reported survival probabilities over age for females and males. In my sample, 63% of household heads are male, and I compute the average household survival probability, ι_h, using this share as weight. I compute the number

[12]The SIPP allows identifying households receiving *DI* in two ways. First, it asks households when they started receiving *DI* payments. Second, it asks households the reason for receiving social security transfers and households may report being disabled as a reason. I consider a household receiving *DI* payments when either of the two is true.

[13]Public employees face different retirement ages and pension schemes than those in the model.

[14]These may not reflect precautionary saving motives or retirement saving decisions, but necessary business equity which a household holds resulting from incomplete markets for business financing. I exclude all households holding business equity to account for this latter concern.

[15]The individual states have some freedom in determining which savings are *readily available* for the eligibility for *AFDC*.

TABLE 1. Calibration.

Variable	Mean value	Target/Source
ι_h	1.02%	Bell and Miller (2002)
N_h	2.35	Mean household size
$\Theta(N_h)$	1.41	*Thrifty food plan*
γ	2.00	
$\Gamma_1(a, d, p, \mathbb{P}, D)$		25 years old in the data
ν_1	0.53%	Earnings change 25–50
ν_2	−1.17%	Earnings change 50–65
b_h	\$452	Mean *UI* benefits nonemployed
E_h^u	\$147	Mean earnings nonemployed
$\mathcal{M}_h$	\$468	Average medical expenditures
σ_ϵ	0.05	Income eligible households age 50
ξ	0.34	Earnings nondisabled/disabled
π_h^{gb}	0.35%	Nondisabled to disabled rate
π_h^{bg}	0.05%	Disability rate
$\upsilon(D = g)$	2.08%	*DI* rate nondisabled age 50–64
$\upsilon(D = b)$	31.04%	*DI* rate disabled age 50–64
ϕ	0.16	Nonemployment rate age 50
$\omega_h(D = g)$	2.07%, 1.87%	EN rate below/above age 50
$\omega_h(D = b)$	3.00%, 6.79%	EN rate below/above age 50
$\lambda_h(D = g)$	50.25%, 44.68%	UE rate below/above age 50
$\lambda_h(D = b)$	38.85%, 38.10%	UE rate below/above age 50
r	1.33%	Siegel (2002)
$\underline{a}$	−2853	Median negative fin. assets
$1 - \beta$	0.58%	Mean financial assets at age 50
θ_b	460	Mean financial assets at age 84
Z	105,000	Median fin. assets at age 84
α	0.88	Mean durable stock across all ages
$\bar{d}$	2000	Nonreported durables
κ	0.34	*AMT* share age 50

Note: The left column states the calibrated parameter and the second states the age-averaged value. The third column displays the calibration moment. Dollar values are expressed in 1992 dollars.

of household members, N_h, as the mean household size by age in the data. Regarding the function mapping the number of household members into consumption weights, $\Theta(N_h)$, I use the weights from the *Thrifty Food Plan* and normalize a household of size three to a weight of one. The risk aversion parameter, γ, takes the value of 2.

Households of 25 years of age identify the initial distribution over states, $\Gamma_1(a, d, p, \mathbb{P}, D)$. I match the density in initial productivity to the density of household earnings. The initial nonemployment rate is 9.0%. Conditional on employment, I match the densities of the financial assets and the durable consumption stocks. To compute disability in the data, I use the heads' response to the question "Has ever indicated having a physical, mental, or other health condition which limits the kind or amount of work he/she can do?" The resulting disability rate is 8.1% at age 25.

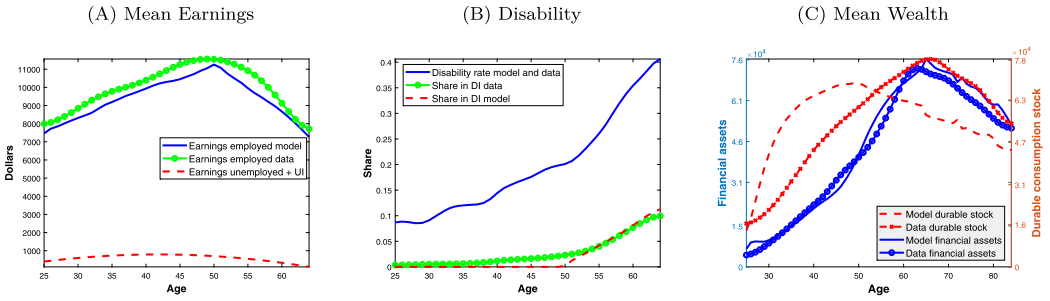

FIGURE 1. Selected calibration moments. Notes: *Panel A* shows average household earnings when employed and the average household income when non-employment. *Panel B* displays the share of household heads reporting that they have a disability limiting the kind of work they can do and the share of households that receive disability insurance (*DI*). *Panel C* displays mean household financial assets and the average net value of housing and vehicles over age. All data is from the SIPP sample described in Section 3.1 and converted to 1992 dollars.

Next, consider deterministic life-cycle earnings. Figure 1(A) displays average earnings of employed households in the data and the model.[16] In the model, the skill accumulation parameter in productivity, ν_1, matches the increase between age 25 and 50, and the parameter ν_2 matches the decrease that occurs thereafter. Regarding unemployment insurance, b_h, I aggregate all unemployment benefits to the household level. Similarly, earnings during nonemployment, E_h^u, are the sum of spouses' earnings of a nonemployed household. The dashed line in Figure 1(A) displays the household-averaged sum of the two. The graph shows that the average income of nonemployed households is only 10% of the average income of employed households, thus, implying large risk from persistent non-employment periods as modeled here. I calculate the exogenous medical expenditures, $\mathcal{M}_h$, as the mean out-of-pocket expenditure of households not receiving means-tested benefits by age.[17]

Turning to the productivity risk households face, I calibrate the dispersion of productivity shocks, σ_ϵ^2, to the fraction of low-income households at age 50. Resulting from the growth in average earnings until the age of 50 shown in Figure 1(A), the share of households with relatively low incomes is declining. Working against this, persistent productivity shocks increase the dispersion in households' incomes, thus, leading to more relatively poor households. I target with the standard deviation of these shocks that 17 percent of households are eligible for the means-tested program with the highest income threshold at age 50, $E_{\max}^{\text{elig}}(70)$. Regarding the disability risk, the probability of a household reporting not being disabled in one wave and reporting to be disabled in the next wave measures the flow rate from nondisability to disability, π_h^{gb}. I use the flow

[16]In the data, earnings at age 25 are the unconditional mean. To compute the age profile, I regress log earnings on a full set of age dummies, dummies for sex, education, race, metropolitan area, state of residence, and time fixed effects.

[17]This measure understates the benefits of receiving *Medicaid* as households receiving large health shocks may endogenously choose to enter the program. Particularly, households in *DI* will find it beneficial also to qualify for *Medicaid*.

rate from disability to nondisability, π_h^{bg}, to match the share of disabled households by age. Figure 1(B) shows that the disability rate rises from 8% at age 25 to around 40% by age 65. To obtain the skill loss parameter associated with disability, ξ, consider the following reduced-form regression model for earnings of employed households:

$$\ln(E_{ih}) = \Theta X_{ih} + \vartheta D_{ih} + \psi_{ih},$$

where X_{ih} are household observables, and D_{ih} is a dummy variable for disability.[18] The regression implies $\vartheta = -0.27$, that is, disabled households' earnings are on average 27 log points below those of nondisabled households. Resulting from households sorting into nonemployment after becoming disabled and only the most productive staying employed, this number is a lower bound for the skill loss parameter. Indeed, calibrating this parameter to match the average earnings difference in the data leads to $\xi = 0.34$. The parameters guiding the acceptance probability into *DI*, $\upsilon(D)$, match the share of disabled and nondisabled households receiving *DI* after age 50. Table 1 shows that the acceptance probability is close to zero for households without a disability and around one-third for those with a disability. Figure 1(B) shows the resulting shares of households in *DI* across ages which are by assumption zero until the age of 50 in the model.

Turning to employment risk, the disutility of working parameter, ϕ, targets an average nonemployment rate of 10% at the age of 50. The calibration implies a nonemployed has a 15% higher nondurable consumption level for the same expenditure level as an employed. In the data, I calculate the average probability of an employed household to become nonemployed and the average probability of an unemployed household to become employed. In the model, the former corresponds to the sum of households choosing non-employment and households experiencing an exogenous separation. I use the exogenous separation rate, $\omega_h(D)$, to match this sum to the total flow rate in the data where I allow for different rates before age 50 and after age 50 and conditional on the health status. The job-finding rate, $\lambda_h(D)$, matches the unemployment to employment flow rate, again, allowing for different rates before age 50 and afterward and conditional on the health status. The unemployed in the model are nonemployed households that are not in *DI* and want a job. Table 1 shows that households with a disability have higher job destruction rates and lower job-finding rates than those without a disability.

Next, consider the parameters guiding households' asset accumulation. Consistent with Siegel (2002), I set the yearly world interest rate to 4%, and I set the borrowing constraint for financial assets, $\underline{a}$, to \$−2853 which is the median of negative financial asset holdings in the data. The time preference parameter, β, and the strength of the bequest motive, θ_b, match mean households' financial asset holdings at age 50 and 84, respectively. Figure 1(C) shows that the model closely traces the households' mean financial assets throughout the entire life cycle. The autonomous bequest parameter, Z, controls the lower part of the distribution of wealth holdings at old age, and I use it to match median financial assets of \$10,828 at age 84. The weight of durable consumption in the utility function, $(1-\alpha)$, targets their average stock across all ages. The SIPP data does not report durables such as furniture, and I set the parameter $\bar{d}$ to 2000 to reflect this

[18]The regression controls for age, year, sex, race, metropolitan area, education, and state dummies.

fact. Figure 1(C) displays the mean durable consumption stock over the life cycle in the model and the data. Similar to the data, the model shows a hump-shaped behavior over the life cycle, but the peak occurs too early. This implies that prime-aged households hold too many consumer durables. Appendix B shows that the main conclusions of the paper remain when calibrating to the average stock across working age instead across all ages.

Finally, to calibrate the utility costs associated with receiving *AMT* transfers, κ, consider the number of households participating in these programs. As described above, the calibration targets that 17% of all households pass the income test at age 50. I calibrate κ such that 12.6% of all households actually receive transfers at age 50. The calibrated value implies that, for a given expenditure level, nondurable consumption is reduced by 29% when participating in an *AMT* program.

4. Comparing model implications with the data

Figure 2(A) shows that the model closely tracks the bottom income inequality in the data over the life cycle. The share of households passing the (most generous, $E^{\text{elig}}_{\max}(h)$) income test decreases until the age of 50 and increases thereafter as average earnings decline and households leave employment. It is around 36% at age 64. It increases, yet, further upon retirement because income declines on average, and the income threshold for the food stamps program is less strict for retired households. The model also traces the life-cycle behavior of the share of households receiving means-tested income. This share decreases from age 25 to age 50 and rises thereafter; however, the model overstates this increase. Yet, as in the data, the share of households receiving transfers after the age of 50 increases more slowly than the share of income-eligible households because households build up financial assets for retirement and bequests. The top row in Table 2 shows that the model matches closely the importance of *AMT* transfers in terms of total

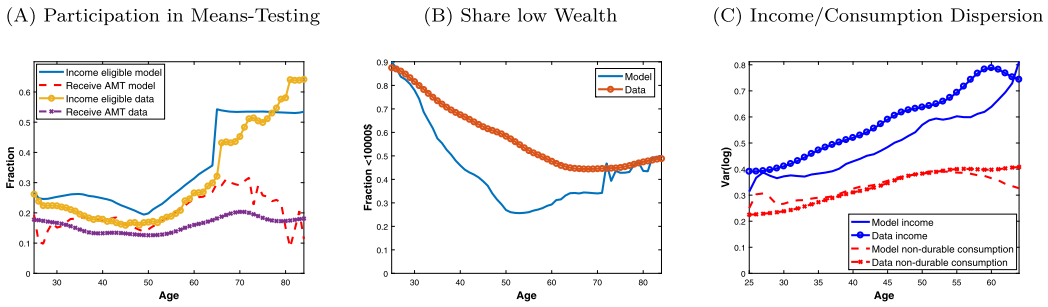

FIGURE 2. Comparing model and data. Notes: *Panel A* displays the fraction of households whose income is low enough to qualify for means-tested transfers (income eligible) and the fraction of households actually receiving transfers (receive *AMT*). *Panel B* shows the fraction of households with less than $10,000 in financial assets. All data is from the SIPP sample described in Section 3.1. *Panel C* displays the cross-sectional variance of log household income and log nondurable consumption over the life cycle. The data is provided by Krueger and Perri (2006).

TABLE 2. Untargeted model moments.

	Data	Model
Transfers' share in income	0.42	0.47
Median fin. assets 50–64, OLF	435	1988
Median durable stock 50–64, OLF	27,053	30,000
Median fin. assets 50–64, *DI*	0	1647
Median durable stock 50–64, *DI*	11,818	30,000
Low fin. assets, *EN*	0.67	0.34
Low fin. assets, nonemployed	0.70	0.74
Share fin. assets, *AMT*	0.19	0.13
Share fin. assets, low income	0.20	0.17
Powers (1998) $\Delta\bar{a} = 1$	0.245	−0.01
Hurst and Ziliak (2006) $\Delta\bar{a} = 1$	−0.15	−0.10
$\Delta \log(c_h)$ upon nonemployment	−6.8%	−6.8%
$\Delta \log(c_h)$ upon retirement	−7.0%	−13.5%

Note: The table compares moments from the data and model. *fin.*: financial assets, *low fin. assets*: fewer than \$3000, *Share fin. assets*: ratio of financial assets relative to consumer durables, *OLF*: Households out of the labor force, *AMT*: Households receiving means-tested transfers. All data is from the SIPP sample described in Section 3.1. $\Delta\bar{a} = 1$: change in financial assets as response to a \$1 increase in $\bar{a}$. The last two rows show the change in log nondurable consumption. *Data* refers to Gruber (1997) for the nonemployment transition and Aguiar and Hurst (2013) for the transition into retirement.

household income. For the cross-section of households receiving *AMT* transfers, these transfers represent 47% of household income in the model and 42% in the data.

To be eligible for this additional income, some households find it optimal to have few financial assets. Figure 2(B) displays the share of households with few financial assets, here defined as those with less than \$10,000, over the life cycle. The share decreases from 90% at age 25 to 26% at age 55 and rises back to 49% at age 84. In the data, the decline up to prime-age is less pronounced, but the life-cycle behavior is similar to the model.[19] Hence, as in the data, at any point in the life cycle, a substantial fraction of households have little life-cycle savings and little self-insurance, leaving these households vulnerable to predictable and unpredictable income declines. Even close to retirement, many households hold almost no financial assets. Table 2 shows that this is particularly the case for elderly households that are out of the labor force, either because they are in *DI* or do not want a job. The median financial assets of this group of households are only \$1988, which compares well with the \$435 observed in the data. Focusing on the subgroup of those in *DI*, the median financial assets is \$1647, which is close to the \$0 in the data. Besides retirement, also the transition to nonemployment during working life is associated with a large income decline. Table 2 shows that many households are not well prepared for this decline. In the data, 67% of working-age households entering nonemployment have almost no financial assets (defined as at most \$3000). The statistic in the model is smaller, yet still sizable. 34% of working-age households have such low financial assets holdings when entering nonemployment. Looking at working-age non-

[19]Similarly, Hubbard, Skinner, and Zeldes (1995) found that a model with a consumption floor overpredicts the savings of medium-income households.

employed as a pool, the model and data match-up even better. 74% of nonemployed (nonretired) households have less than $3000 in financial assets.

The sizable fraction of households with low financial assets allow the model to feature large wealth inequality; though, it falls short of the data. The Gini coefficient of financial assets is 0.69 in the model and 0.82 in the data. Importantly, the model matches the fact that the durable consumption stock reduces households' wealth inequality. The Gini coefficient of financial assets plus the durable consumption stock is 0.47, compared to 0.66 in the data. More equally distributed consumption durables have two sources. First, durable consumption enters the utility function directly; therefore, households have an extra incentive to smooth the stock of durables. Second, the *AMT* is based only on financial assets. That is, households at the low end of the income distribution are not disincentivized to accumulate a durable consumption stock, leading to low-income households holding almost all their wealth in the form of consumer durables. Table 2 shows that the median durable consumption stock of households aged 50–64 and who are out of the labor force is close to $30,000 both in the model and the data. This pattern of wealth accumulation also holds for broader definitions of low-income households. For example, conditional on receiving *AMT* transfers, the mean ratio of financial assets to the durable consumption stock is only 0.13 (0.19 in the data). The same ratio is 0.17 (0.2 in the data) for households in the bottom 25% of the income distribution.

The existing empirical literature finds mild responses of savings to asset means-testing. Powers (1998) and Hurst and Ziliak (2006) estimated the response of young single mothers' wealth to changes in the asset limit. They identify these from heterogeneous changes in the asset limits of *AFDC* across states. The former finds a mild positive increase in total household wealth over 5 years. The later estimates a negative point estimate in the response of financial assets over 7 years. The present model is not rich enough in its demographic structure, cross-state heterogeneity, and cross-program heterogeneity to fully replicate these research designs. However, to show that the mild savings elasticities found in the literature are not necessarily inconsistent with the model, I simulate the average increase in asset limits reported in these studies and replicate their regressions using households in the lowest 20% of the productivity distribution as the model counterpart to single-female headed households. Table 2 shows that the model also implies savings responses that are almost zero. Several factors contribute to this small response. Foremost, slightly increasing the asset limit of *AFDC*, yet, keeping the federal asset limits for the other programs in place limits households' responses. Moreover, a looser asset-test may actually decrease households' savings. For one, the reform effectively expands insurance, and thus, lowers the need for precautionary savings. Moreover, households that before the reform did not participate in the program because of too high financial assets may want to participate with higher thresholds and start decumulating financial assets.

What matters ultimately for social welfare is how predictable and unpredictable earnings changes translate into consumption. Figure 2(C) takes a "Macro" perspective to this question. It plots the cross-sectional variance of log household income and nondurable consumption over the working-life. The data estimates result from regressing

log income (nondurable consumption) on a full set of age and cohort fixed effects. Despite calibrating only the share of low-income households at age 50, the model matches reasonably the variance of cross-sectional log household income over the entire working cycle. The level is somewhat too low in the model, reflecting heterogeneity in household composition not present in the model, but the increase over the life cycle is almost identical. What is more, as in the data, cross-sectional consumption inequality is lower than income inequality and grows by substantially less with age implying that some income changes do not translate into consumption changes.

One particularly large income change is the transition from employment to nonemployment. As Table 2 shows, many households hold almost no financial assets and are, thus, ill-prepared for this income decline. Despite this fact and despite households having lower consumption expenditure needs during nonemployment, households decrease their nondurable consumption expenditure upon nonemployment by only 6.8% which is consistent with the change in food expenditures reported by Gruber (1997). The small nondurable consumption response results in part from the *AMT*. Faced with nonemployment, some households find it optimal to spend down their remaining financial assets to become eligible for the income support programs. Similarly, despite one-third of all 65 years old households holding almost no financial assets (see Figure 2(B)), Table 2 shows that average consumption expenditures upon retirement change little.

5. Reforming asset means-testing

This section studies the implications of asset means-testing. To understand the mechanisms of the means-test, the first comparison is between the baseline model and no *AMT* at all. Afterward, I evaluate the optimal level for the *AMT* in the stationary equilibrium. When increasing the financial asset threshold for the means-test, more households become eligible to the income support programs, thus changing their expenditures. Moreover, households change their employment decisions and, thereby, tax revenues and expenditures of other programs. The next subsection ignores these changes and describes the changes in the stationary equilibrium when abolishing the *AMT*. The subsection thereafter changes the benefit levels and taxes to keep the government budget unchanged.

5.1 *Unchanged benefit levels*

5.1.1 *Asset allocation* Figure 3(A) shows that abolishing the *AMT* reduces sharply the fraction of households with few financial assets, that is, less than $10,000, before retirement. This fraction levels off around 26% in the economy with the *AMT* (blue straight line), and it decreases to around 6% in the economy without an *AMT* (red dashed line). Regarding the cross-sectional distribution of financial assets, the rows labeled "All, fin." in Table 3 show that the levels increase substantially at the lower end of the distribution. The median household holds about $5000 more in financial assets and financial assets more than triple at the 25th percentile in the economy without an *AMT*. In contrast, financial asset holdings at the upper end of the distribution, for example, the 75th

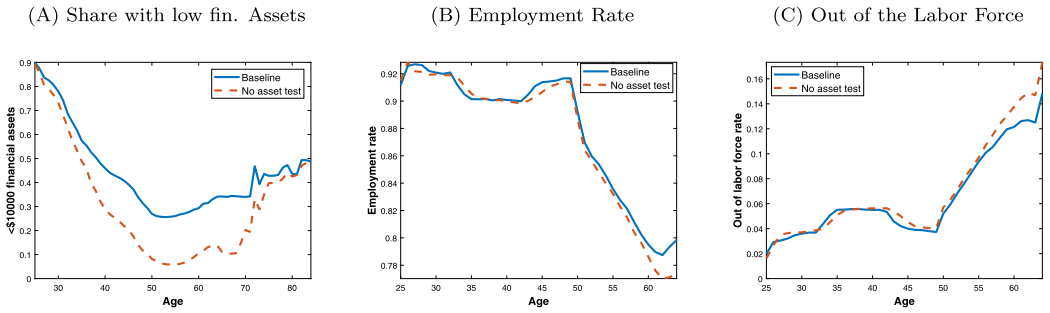

FIGURE 3. Asset means-test and aggregate outcomes. Notes: *Baseline*: Baseline model. *No asset test*: $\bar{a} = \infty$. *Panel A* shows the fraction of households with less than \$10,000 in financial assets. *Panel B* displays the employment rate over the life cycle. *Panel C* displays the fraction of households that are out of the labor force over the life cycle.

percentile, are similar in the two economies. With more financial assets at the bottom of the distribution, the economy displays less overall inequality. The Gini coefficient of financial assets decreases from 0.69 to 0.63.

Different from financial assets, the rows labeled "All, dur." show that the distributions of the durable consumption stock are very similar in the two economies. The Gini coefficient is slightly higher in the baseline economy, but the interquartile ratio is the same. One implication of this finding is that, in the presence of an *AMT*, households do not accumulate substantially more consumer durables to substitute for holding fewer

TABLE 3. Asset means-test and wealth allocation.

		Wealth percentiles		
	Gini	25th	50th	75th
Baseline				
All, fin.	0.69	2000	15,000	51,348
All, dur.	0.35	30,000	45,000	75,000
OLF, aged 50–64, fin.	0.75	1000	1988	2000
OLF, aged 50–64, dur.	0.35	15,000	30,000	45,000
DI, aged 50–64, fin.	0.76	447	1647	2000
DI, aged 50–64, dur.	0.27	30,000	30,000	45,000
No AMT				
All, fin.	0.63	7000	20,541	55,873
All, dur.	0.33	30,000	45,000	75,000
OLF, aged 50–64, fin.	0.45	11,000	20,336	25,945
OLF, aged 50–64, dur.	0.11	30,000	30,000	45,000
DI, aged 50–64, fin.	0.41	10,347	19,327	22,343
DI, aged 50–64, dur.	0.11	30,000	30,000	45,000

Note: The table compares moments of the wealth distribution in the model with the statutory asset means-test (Baseline) and no asset means-test (No AMT). *All, fin.*: financial assets using all households, *All, dur.*: consumer durables using all households, *OLF, aged* 50–64, *fin.* financial assets using households aged 50–64 who are out of the labor force, *DI, aged* 50–64, *fin.*: financial assets using households aged 50–64 who receive *DI*.

financial assets. Instead, they choose the quantity they would have found optimal in the absence of this motive.

Table 3 also shows that particularly low-income households hold more financial assets without an *AMT*. The rows labeled "OLF, aged 50–65" in Table 3 focus on a particularly vulnerable group: those households close to retirement who are out of the labor force. In the baseline model, these households hold almost no financial assets. Even those at the 75th percentile of the financial asset distribution satisfy the *AMT*. Instead, these households hold almost all their wealth in the form of consumer durables. Abolishing the *AMT* increases the amount of financial assets of this group throughout their distribution.[20] Households receiving *DI*, who are a subgroup of elderly households that are out of the labor force, show almost the same patterns. Other definitions of income-vulnerable households yield similar results. For example, households below the 25th income percentile have an average ratio of financial assets relative to the durable consumption stock of only 0.17 in the baseline model compared to 0.56 in the model without an *AMT*. Similarly, for those households receiving transfers, the ratio increases for 0.13 to 0.49 when abolishing the *AMT*. Households are also better prepared to face income losses. The share of households entering nonemployment with less than \$3000 drops from 34% to 17% when abolishing the *AMT*.

5.1.2 *Employment effects* For the *AMT* to affect employment outcomes, there needs to be a mass of households with productivities sufficiently close to their outside option, that is, not working and receiving government benefits. Put differently, their extensive margin labor supply elasticities are nonzero. I compute uncompensated extensive margin labor supply elasticity as the change in the employment rate from a one-time permanent drop in log productivity by 0.1. With the *AMT*, the labor supply elasticity of those aged 25–50 is 0.11, and the labor supply elasticity of those older than 50 is 0.41.[21] The high labor supply elasticity of the elderly implies that relatively many high-productivity households leave the labor force at old age. The average potential earnings of households younger than age 50 who are out of the labor force are \$1469. This number rises to \$2427 after the age of 50. This phenomenon arises from *DI* benefits being relatively generous to the benefits a nonemployed household may receive before the age of 50. In an economy where the government does not provide *DI*, the labor elasticity falls to 0.04 for households older than age 50, and the employment rate after age 50 rises by 6.7 percentage points relative to the baseline model.

[20] Because all these households have low productivity and, thus, similar past career paths, financial assets, and the durable consumption stocks show little dispersion across these households in a model without the *AMT*.

[21] Comparing these numbers to the literature, Chetty, Guren, Manoli, and Weber (2013) reported a mean across different studies of 0.25. Using cross-country differences in taxes and labor supply, Blundell, Bozio, and Laroque (2011) found an elasticity of 0.25 for men and 0.34 for women. The relatively high elasticity of the elderly (0.41) is consistent with the latter study finding that most cross-country differences in labor supply arise from elderly workers. There are two caveats in comparing these numbers to the estimate here. First, most of these studies exploit tax reforms that might be better thought of measuring compensated supply elasticities and those should be larger than uncompensated elasticities. Second, and in line with Erosa, Fuster, and Kambourov (2016) and Attanasio, Levell, Low, and Sánchez-Marcos (2018), the elasticity depends on the population under study and the specific institutional environment.

When abolishing the *AMT*, households' labor supply elasticities increase yet further. The labor supply elasticity of those aged 25–50 rises slightly to 0.13 and the labor supply elasticity of those older than 50 rises to 0.49. As a consequence, Figure 3(B) shows that the employment rates would be almost the same until the age of 50, but average employment would be lower by one percentage points after the age of 50 without the *AMT*. Figure 3(C) highlights that the lower average employment rate of the elderly translates into a lower labor force participation rate. To understand how asset means-testing deters old aged households from quitting into nonemployment, that is, decreases their labor supply elasticities, note that, for most households, the average governmental benefits that they may receive from age 50 until the end of their lives is lower than their average earnings before the age of 50. Thus, these households would like to enter into nonemployment with substantial financial assets to smooth consumption. An *AMT* prohibits such behavior, and thus makes nonemployment less attractive. This effect is particularly large for low-productivity households. Conditioning on households being in the bottom 10% of the productivity distribution at age 25, the employment rate of these households after the age of 50 is 4.5 percentage points higher with the *AMT*.

The discussion above highlights that *DI* is crucial for the large drop in employment after the age of 50 which raises the question of how the *AMT* affects *DI* participation. In the present framework, *DI* itself is not asset means-tested. However, most recipients satisfy the income threshold of the asset means-tested program. As a result, households see *DI* and asset means-tested programs as complements and hold almost no financial assets (see Table 3). That is, asset means-testing also decreases the value of *DI* by forcing households to hold few financial assets despite low future income. Nevertheless, I find that abolishing the *AMT* leaves the share of households receiving *DI* almost unchanged. The *AMT* affects employment decisions by lowering the reservation productivity for employment. Because *DI* benefits are generous relative to other government transfers, disabled, low productivity households already find it optimal to receive *DI* even with an *AMT*. The remaining disabled, employed households are mostly far above their reservation productivities.[22] As a result, when abolishing the *AMT*, the vast majority of additional households that drop out of the labor force are households without a disability. Similar to the findings in Low and Pistaferri (2015), these households have, however, a low probability to be admitted into *DI*, leading to little change in the number of admitted households. Differently, Golosov and Tsyvinski (2006) assumed that households' health status is unobserved and find that an *AMT* in *DI* discourages fraudulent applications by healthy households and increases employment.

Turning to the employment rate before age 50, the *AMT* makes financial assets a stronger motivating factor in the employment choices of low-productivity households. That is, households with few financial assets have a stronger incentive to be nonemployed because they are eligible for benefits. To quantify this, consider the following

[22]To quantify these differences, consider households aged 50–64 in the baseline model. The average earnings potential (productivity) of *DI* recipients is \$2570. The corresponding number for disabled households that do not receive *DI* is \$7277 and for households that are out of the labor force but do not receive *DI* it is only \$1544.

reduced-form regression for households that in the simulation are in the bottom quarter of the productivity distribution:

$$\mathbb{P}_i^{+2} = \varphi_0 + \varphi_1 a_i^{\leq 3000} + \varphi_2 AMT_i + \varphi_4 a_i^{\leq 3000} AMT_i + o_i,$$

where $\mathbb{P}_i^{+2}$ is one when the household is employed 2 years in the future, $a_i^{\leq 3000}$ is one when the household currently has fewer than \$3000 in financial assets, and AMT_i is one when the economy features the *AMT*. First, consider a sample of households that are employed today. I find that φ_1 is positive (0.005), that is, there is a negative wealth effect on employment. Importantly, φ_4 is negative. With an *AMT*, an employed household has a 2.33 percentage point lower employment rate in 2 years ahead when the household has few financial assets. The effect is, yet, larger for households currently nonemployed. The *AMT* depresses the probability that a household with few financial assets becomes employed within the next 2 years by 26.97 percentage points relative to a household with more financial assets.

The effect of asset means-testing is not only present in short-term labor supply, but it also is visible in life-cycle employment choices. Using the same regression for households that are employed at age 30, I find that the *AMT* depresses the employment rate at age 64 by 0.85 percentage points for households with low financial assets. Even more striking, a household that is nonemployed at age 30 and has few financial assets has a 9.73 percentage point lower employment rate at age 64 when the *AMT* is present. Put differently, the *AMT* creates poverty traps where once a household has few financial assets, it is more likely to choose not to work, even many years later, and receive governmental transfers.[23]

Taken together, asset means-testing encourages employment for households with many financial assets. Yet, it also encourages nonemployed households to deplete their financial assets. Once these assets are depleted, the household has fewer incentives to build-up life-cycle savings by working and, instead, remains nonemployed. Figure 3(B) shows that these effects off-set each other before the age of 50 leading to almost no change in the employment rate when abolishing the *AMT*.

5.1.3 *Budgetary effects* Table 4 shows the impact of abolishing the *AMT* on the government's budget. Resulting from a lower employment rate after age 50, total tax revenues are lower and expenditures for unemployment benefits are higher. As the newly nonemployed accumulate lower lifetime earnings, social security expenditures decrease. As discussed above, abolishing the *AMT* has only minor effects on the number of *DI* recipients leading to a small increase in expenditures. The effect on expenditures of formerly asset means-tested programs is substantial; expenditures rise by 11% as more households are eligible for the program.

[23] Braun, Kopecky, and Koreshkova (2017), using a similar model, found only a weak relationship between elderly males' labor supply and means-tested transfers in retirement. In their framework, males are always employed at prime-age. The results here suggest that in the presence of an *AMT*, employment choices are taken under the consideration of the entire life cycle; hence, changes in prime-aged employment also change employment patterns of the elderly.

TABLE 4. Budget changes without asset means-test.

	Tax	Social security	Unemp.	Disability	Means-tested
$\Delta\%$	−0.47	−0.11	3.03	1.94	10.75

Note: The table displays the percentage change in tax revenues and program costs that occur when abolishing the asset means-test. *Tax*: tax revenue, *Social security*: social security expenditure, *Unemp*: unemployment benefits expenditures, *Disability*: disability insurance expenditures, *Means-tested*: means-tested program expenditures.

5.2 *Changing benefit levels and welfare analysis*

This section studies the welfare implications of changes in the *AMT*. The welfare measure is based on the percentage of lifetime nondurable consumption an unborn household is willing to forgo for the change in the *AMT* in the stationary equilibrium with the same initial conditions at birth.[24] Table 4 shows that changes in the *AMT* lead to changes in government expenditures. This section fixes program expenditure by adjusting the maximum benefit level of programs. Additionally, I adjust after-tax income proportionally to assure that government revenue stays the same across the simulations. Table A.3 report the changes in benefit levels for different levels of the *AMT*.

Consider first the case without an *AMT*. The equilibrium size of means-tested benefits is 4% lower in that case relative to the baseline model. What is more, the allocation of transfers is worse, that is, less needy households receive transfers. The 90th percentile of nondurable consumption expenditure of households receiving transfers rises from \$4378 to \$5293 implying that consumption dispersion among recipients rises. The 90/50 non-durable consumption ratio rises from 1.25 to 1.46.

However, the self-insurance of households improves without the *AMT*. The median financial assets of households in the bottom quarter of the income distribution increase from \$1991 to \$9072. Similarly, the median financial assets of nonemployed households increase from \$2000 to \$18,000. Focusing on the particularly vulnerable group of households aged 50–64 that are out of the labor force, median financial assets increases from \$1988 to \$18,318. Finally, The share of households entering into nonemployment with less than \$3000 decreases from 34 to 15%.

Despite substantially more financial assets, the mean nondurable consumption expenditures of those entering nonemployment is just 1% higher compared to the economy with the *AMT*. In the presence of an *AMT*, households wish to satisfy the eligibility criteria when their income declines leading them to overconsume initially when entering non-employment. Consumption differences become larger when considering all nonemployed working-age households. Average consumption is higher by 4.6 percentage points without the *AMT*. Other definitions for income-vulnerable households yield similar results. The households in the bottom 25th percentile of the income distribution have a 3.4% higher average consumption level in the economy without the *AMT*, households aged 50–64 who are out of the labor force have a 5.1% higher level, and households receiving transfers from *AMT* programs have a 7.5% higher consumption level.

[24]Wealth holdings at death are higher without a means-test. The household values these as bequests, but I assume that the assets are lost instead of transferred. Allowing for differences in intergenerational transfers would make a nonasset means-tested policy more attractive.

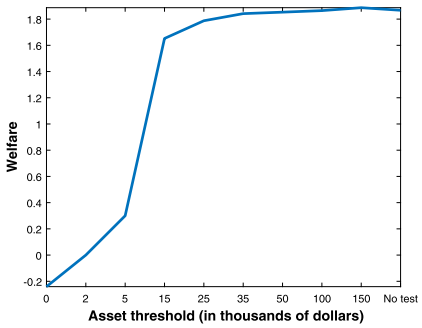

FIGURE 4. Welfare. Notes: The figure displays the welfare effects of changing the asset threshold of the means-tested programs. Welfare is measured as percent of lifetime nondurable consumption an unborn household is willing to forgo to change the policy.

Turning to welfare, Figure 4 shows that an unborn household is willing to give up 1.87% of lifetime nondurable consumption to abolish the *AMT*. Reducing the *AMT* threshold from its former level decreases welfare. For example, imposing a zero limit for financial assets decreases welfare by 0.24% of lifetime, nondurable consumption. Welfare is optimized at an *AMT* of \$150,000. An unborn household is willing to give up 1.88% of lifetime nondurable consumption to raise the asset limit to this level which is almost the same as the gain with no test at all. In fact, most of the welfare gains already realize with a threshold of \$35,000, and welfare becomes relatively insensitive at asset thresholds beyond this. Household's choices remain almost unaffected beyond a threshold of \$35,000 because the utility cost of receiving benefits makes it unattractive for asset-rich households to receive transfers, even when they are eligible. Consequently, Table A.3 shows that the changes in individual program expenditures that are required to keep the government expenditures unchanged become minor after passing the asset threshold of \$35,000.

Figure 5(A) shows that with the optimal *AMT*, the share of households with low financial asset holdings (less than \$10,000) declines by about 20 percentage points during the years leading up to retirement relative to the baseline model. Table 5 shows cross-sectional moments of the financial asset and durable consumption stock distribution. With the optimal *AMT*, financial asset holdings at the 25th percentile more than triple, and financial assets at the median increase by about \$5000. Again, particularly low-income households hold more financial assets. For example, elderly households that are out of the labor force now hold more than \$4000 in financial assets at the 25th percentile. Similar to no asset means-testing, the distribution of durable consumption goods is very similar to the baseline economy.

Turning to the employment choices, the top panel of Table 5 shows that asset means-tested benefits need to decrease by four percentage points to hold the total expenditures constant. Consequently, households' labor supply elasticity before age 50 decreases from 0.11 to 0.09 leading to an increase in the employment rate by one percentage point (see Table 5). Lower benefits also encourage employment after the age of 50.

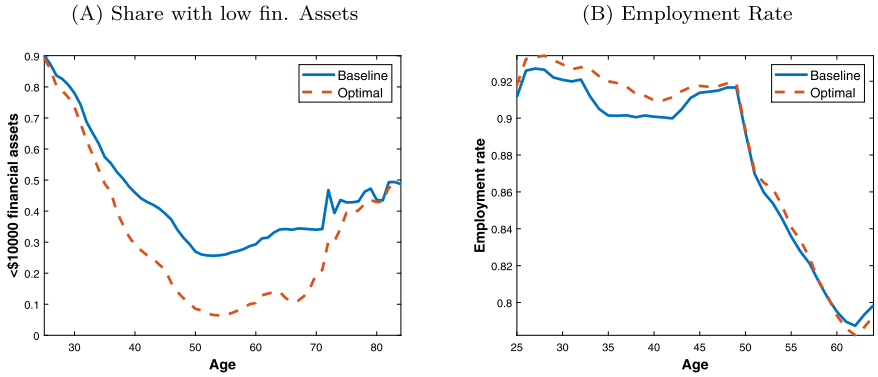

FIGURE 5. Aggregates with optimal asset means-test. Notes: The figure compares life-cycle moments from the baseline model to a model with the optimal asset means-test. *Panel A* shows the fraction of households with less than $10,000 in financial assets. *Panel B* displays the employment rate over the life cycle.

TABLE 5. Moments with optimal asset means-test.

Change in programs (%)				
Social security	Tax	Unemp.	Disability	Means-tested
−0.35	−0.01	7.62	0.60	−4.10

Change in aggregates (%)				
Output (Y)	Emp.	Y/E	Emp. 25–49	Emp. 50–64
0.05	0.68	−0.63	0.97	0.13

Wealth distribution				
	Gini	25th	50th	75th
All, fin.	0.63	7000	20,541	55,794
All, dur.	0.33	30,000	45,000	75,000
OLF, aged 50–65, fin.	0.49	4256	18,318	25,628
OLF, aged 50–65, dur.	0.11	30,000	30,000	45,000

Note: The table displays model moments with the optimal asset means-test ($150,000). The first panel displays the percentage change in program expenditure relative to the baseline model. *Tax*: tax revenue, *Social security*: social security expenditure, *Unemp*: unemployment benefits expenditures, *Disability*: disability insurance expenditures, *Means-tested*: means-tested program expenditures. The second panel displays the resulting percentage changes in total output (Y) and employment (Emp.). The last panel displays moments from the wealth distribution with the optimal asset means-test. *All, fin.*: financial assets using all households, *All, dur.*: consumer durables using all households, *OLF, aged* 50–64, *fin.* financial assets using households aged 50–64 who are out of the labor force.

However, resulting from low-productivity households accumulating more financial assets, and hence, having an incentive to leave employment after the age of 50, the employment rates after age 50 increases by only 0.13 percentage points.

To disentangle the welfare gains arising from employment choices from those arising from less distorted savings choices, I compute the willingness to pay to increase the asset threshold to \$150,000 in a model where households always choose employment over non-employment, that is, their labor supply elasticity is zero. In that counterfactual, welfare changes expresses the trade-off from better self-insurance against income changes and a better portfolio allocation on the one side, and lower benefits and a worse allocation of those on the other side. An unborn household is willing to give up 1.38% of lifetime nondurable consumption to increase the *AMT*. Put differently, a little more than two-thirds of the welfare gains arise from better self-insurance and asset allocation and the remaining one-third from employment choices.

For employment choices to improve welfare, relaxing the *AMT* needs to reallocate households from nonemployment to employment that also a social planner would reallocate, that is, relatively productive households. As shown in Section 5.1.2, the *AMT* makes households' financial assets, apart from their productivities, a quantitatively important factor in employment choices. When relaxing the *AMT*, households' productivity becomes the single dominant factor in employment choices, leading to fewer relatively high productive young households that are nonemployed. For example, the 90th percentile of potential earnings among young households who are out of the labor force declines from \$2379 to \$2112 when moving to the optimal *AMT*. Similarly, for those receiving benefits, it declines from \$7018 to \$6672 when moving to the optimal *AMT*. This reallocation of relatively productive young households toward employment increases social welfare.

6. Conclusion

Households' access to income support programs has been conditional on having less than \$2000 (\$3000 for the elderly) in financial assets at the beginning of the 1990s. This paper studies the social welfare implications of asset means-testing in an environment where households face productivity, disability, and persistent nonemployment risk. An *AMT* has advantages over a policy with no such test. First, it allows allocating relatively high transfers to those most in need. Second, the *AMT* reduces the temptations of relatively productive households to enter into nonemployment late in their working life. For life-cycle considerations, households aged 50–64 would like to hold substantial financial assets. However, with an asset means-test, these households would be denied benefits, and thus, are discouraged to leave the labor force.

At the same time, the asset limit incentivizes low-income households to accumulate few financial assets. In particular, low-income households aged 50–64 hold too few financial assets to smooth consumption over the life cycle. What is more, by making the stock of financial assets a more prominent motivating factor in employment decisions, an *AMT* implies that relatively productive households choose nonemployment.

From the perspective of an unborn, the *AMT* that optimally trades-off these forces is \$150,000. An unborn is willing to pay 1.88% of lifetime nondurable consumption to

raise the asset limit to this level. A little less than one-third of the welfare gains arise from more efficient employment choices, and better self-insurance and asset allocations explain the remaining gains. With the optimal asset means-test, the aggregate employment rate before age 50 increases by 0.68 percentage points. What is more, by reducing the role assets play as a motivating factor in employment choices, fewer high productivity households leave the labor market. Finally, I find that these employment effects are highly context-specific. In particular, the relatively generous *DI* benefits make it attractive for elderly workers to leave the labor force, and an *AMT* can counteract this, as in Golosov and Tsyvinski (2006). However, consistent with Low and Pistaferri (2015), I find that *DI* is relatively efficient in screening eligible workers in the US which reduces the need for an *AMT*.

Abolishing the *AMT* yields almost the same welfare gains as choosing the optimal *AMT* and would likely be the preferable policy given costly monitoring. The rationale behind this is the utility cost associated with receiving benefits that discourages very wealthy households from applying. In the data, a substantial fraction of households decide not to receive means-tested benefits despite being eligible suggesting that these utility costs are sizable.

This paper abstracts from political risk about the design of the welfare state. However, it highlights that households' employment and saving decisions in response to income support programs take into account their life-cycle implications. In particular, the savings decisions of young households affect their employment decisions at old age. Including political risk about changes in these programs would, potentially, uncover substantial costs of this type of risk as households long-term planning becomes distorted by frequent policy changes.

Besides political risks, households face other types of risk that are likely to interact with the earnings and disability risk studied here: unplanned pregnancies, divorce, and spousal death all create risk uncertainty about household composition, and thus, consumption expenditure needs. Moreover, De Nardi, French, and Jones (2010) showed that medical expenditure risk at old age provides incentives to households with little retirement income to hold almost no wealth to qualify for *Medicaid*. Incorporating these types of risks would yield a yet fuller picture on the interaction of asset means-testing and idiosyncratic risk.

Finally, this paper studies changes in the asset thresholds in isolation. Reforming the amount of benefits and eligibility criteria of asset means-tested and nonasset means-tested programs is likely to yield substantially larger welfare gains. In particular, this paper takes as given that benefits from the *DI* program are generous relative to other welfare programs and shows in that context that *DI* has strong reinforcing effects with the asset means-tested programs. An *AMT* works against the resulting withdrawal of relatively productive households from the labor force after the age of 50. However, this is a second-best solution and directly reforming the amount of benefits available to households at different stages of their life cycle is likely to be more efficient. Besides an *AMT*, states also may use other requirements to discourage take-up rates that this paper abstracts from. For example, Ortigueira and Siassi (2017) study state-imposed work requirements as an alternative eligibility factor.

TABLE A.1. Income thresholds.

State/program	Household members 1	2	3	4	Target/Source
Supplemental security income	1864	2756	2756	2756	The Green Book (1994)
Other programs					
Not in *DI*/retired	2951	3982	5014	6045	Ohls and Beebout (1993)
DI/retired	3746	5054	6364	7673	Ohls and Beebout (1993)

Note: The table shows the maximum amount of income over a 4-months period that households may have and still be eligible for means-tested programs. It distinguishes between Supplemental security income and all other programs. For the latter, I use the federal income thresholds that apply to the Food Stamps Program which are different for those households that receive social security benefits, either because they are retired or receive disability insurance (*DI*).

APPENDIX A: CALCULATION OF MEANS-TESTED TRANSFERS

This section describes the structure of the different *AMT* programs present at the beginning of the 1990s. Table A.1 displays the maximum amount of income households may have to be eligible for the programs. These income thresholds are stated in terms of households' gross income. The amount of transfers an eligible household receives depends on its net income which is its gross income minus certain deductions explained below. Table A.2 shows the maximum amount of transfers households may receive, that is, with zero net income, depending on household size.

The income threshold for *FS* is increasing in household size. Moreover, when receiving *DI* benefits or when retired, the gross income threshold is 1.65 times the federal poverty line. It is 1.3 times the federal poverty line otherwise. *SSI*, $\text{TR}^S(E_{ih}, N_h)$, counts toward households' gross income. When working, households may deduct 20% of their gross income to calculate their net income. Moreover, households have a monthly allowance of \$122. For all households, transfers are phased out at a 30% rate with net in-

TABLE A.2. Maximum transfers.

Variable	Household members 1	2	3	4	Target/Source
$\overline{\text{TR}}^{\text{FS}}$	444	812	1168	1480	Ohls and Beebout (1993)
$\overline{\text{TR}}^L_W$		475			Mean in the Data
$\overline{\text{TR}}^A$	0	0	1464	1798	The Green Book (2003)
$\overline{\text{TR}}^{\text{WI}}$		140			Mean in the Data
$\overline{\text{TR}}^L_R$		204			Mean in the Data
$\overline{\text{TR}}^S_h$	422	633	633	633	The Green Book (1994)

Note: The table shows the maximum amount of transfers over a 4-months periods that households may receive from means-tested programs. $\overline{\text{TR}}^{\text{FS}}$: Food Stamps, $\overline{\text{TR}}^L_W$: Low Income Home Energy Assistance Program when working age, $\overline{\text{TR}}^A$: Aid to Families with Dependent Children, $\overline{\text{TR}}^{\text{WI}}$: Special Supplemental Nutrition Program for Women, Infants, and Children, $\overline{\text{TR}}^L_R$: Low Income Home Energy Assistance Program when elderly, $\overline{\text{TR}}^S_h$: Supplemental Security Income.

TABLE A.3. Change in program generosity.

$\bar{a}$	Tax	Social security	Means-tested	Unemp.	Disability
0	0.01	−0.05	0.90	−1.30	−0.20
5000	−0.01	−0.14	−1.70	2.74	0.40
15,000	−0.01	−0.54	−4.20	10.44	1.20
25,000	−0.01	−0.54	−4.00	8.14	0.70
35,000	−0.01	−0.44	−3.90	8.04	0.50
50,000	−0.01	−0.34	−4.00	7.94	0.50
100,000	−0.01	−0.34	−4.10	7.89	0.60
150,000	−0.01	−0.35	−4.10	7.62	0.60
∞	−0.01	−0.45	−4.10	7.80	0.48

Note: The table reports the percentage change of different transfer programs that keeps the expenditure of each fixed relative to the baseline economy when varying the asset means-test. *Tax*: tax revenue. *Social security*: Social security expenditure. *Means-tested*: Means-tested program expenditures. *Unemp*: Unemployment benefits expenditures. *Disability*: Disability insurance expenditures.

come. Hence, for an eligible household, transfers from food stamps are given by

$$\mathrm{TR}^{\mathrm{FS}}(E_{ih}, N_h) = \begin{cases} \max\{0, \overline{\mathrm{TR}}^{\mathrm{FS}}(N_h) - 0.3(0.8E_{ih} - 488)\} & \text{if } \mathbb{P}_{ih} = 1, \\ \max\{0, \overline{\mathrm{TR}}^{\mathrm{FS}}(N_h) - 0.3(E_{ih} - 488)\} & \text{if } \mathbb{P}_{ih} = 0, \\ \max\{0, \overline{\mathrm{TR}}^{\mathrm{FS}}(N_h) - 0.3\big(E_{ih} + \mathrm{TR}^{S}(E_{ih}, N_h) - 488\big)\} & \text{if } \mathrm{TR}^{S} > 0. \end{cases}$$

Regarding the *SSI* transfers, gross income thresholds are less generous than those of *FS*. The legislation differentiates between single and couple households with higher transfers and a higher gross income threshold for the latter. To compute net income, all households may deduct \$20 per month from their gross income. Transfers are phased out at a 50% rate with net income:

$$\mathrm{TR}^{S}_{h}(E_{ih}, N_h) = \max\{0, \overline{\mathrm{TR}}^{S}(N_h) - \big[E_{ih} - \big[(E_{ih} - 80)/2\big]\big]\}.$$

The *AFDC* program is a nonfederal program, and thus, its design varies across US states. Chief (1979) shows that having an additional needy family member increases benefits by about 20% across states and I use that number here. I assume that the gross income thresholds follow the same as those of the *FS* program. Most states allow to deduct at least \$30 per month when computing net income and several states phase out benefits at a 66% rate of net income (see Chief, 1979). This results in the following benefits formula:

$$\mathrm{TR}^{A}(E_{ih}, N_h) = \begin{cases} \max\{0, \overline{\mathrm{TR}}^{A}(N_h) - 0.66(E_{ih} - 120)\} & \text{if } \mathbb{P}_{ih} = 1, \\ \max\{0, \overline{\mathrm{TR}}^{A}(N_h) - 0.66(E_{ih})\} & \text{if } \mathbb{P}_{ih} = 0. \end{cases}$$

Finally, regarding the relatively small *LIHAP* and *WIC* programs, I assume that the gross income thresholds follow the same as those of the *FS* program reflecting that households are usually eligible for these programs when they are eligible to other welfare programs.

TABLE B.1. Welfare with fewer consumer durables.

	Full	No-employment
Δ Welfare %	1.26	0.95

Note: The table displays the welfare effects of changing the asset threshold of the means-tested program to $150,000 with the calibration described in Section B. Welfare is measured as percent of lifetime nondurable consumption an unborn household is willing to forgo to change the policy. The table shows this number for the full model and a model where households make no employment decisions.

APPENDIX B: FEWER CONSUMER DURABLES

The calibration strategy described in Section 3.2 overstates the quantity of consumer durables that households hold at prime-age. The baseline calibration targets the average consumer durable stock across all ages. Section 5.1.2 shows that the desire to build-up these life-time savings is important for young households' employment decisions. Nevertheless, to study the robustness of the baseline result, this section replicates the baseline calibration but targets the average consumer durables during working-life. As a result, the average stock of consumer durables is too low ($46,382 compared to $55,859 in the baseline).

The full recalibration can be found in the replication file *main_bobust.m*. Here, it is worth highlighting a couple of parameters. First, the weight of nondurable consumption in the utility function increases from 0.88 to 0.90. Second, with households entering old-age nonemployment with fewer consumer durables, they have a stronger incentive to accumulate financial assets for old age. To counteract this, the calibration requires that households become more impatient.

Households being more impatient implies that large reductions in consumption in old age are less problematic from a welfare perspective. As shown in Section 5.1, an *AMT* incentivizes such large reductions. As a result, a calibration with more impatient households reduces the welfare gains from raising the asset threshold. In addition to this, the higher weight on nondurable consumption implies that nondurable consumption becomes a larger fraction of the overall consumption basket. Hence, mechanically, households require less compensation for policy changes.

Table B.1 shows that these two effects reduce the welfare gains from raising the asset threshold to $150,000 from 1.88% to 1.26% of nondurable consumption. Moreover, as in the baseline model, somewhat less than one-third of this welfare gain results from improved employment choices. Thus, also with this alternative calibration there are substantial welfare gains from increasing the asset threshold.

APPENDIX C: COMPUTATIONAL DETAILS

I discretize the state space as follows: Financial asset, a, have 106 grid points, where 37 of these are below a level of 18,000.[25] The grid for productivity, p, has 17 equally spaced grid

[25]Increasing the grid size by 10% and resolving the model leads to practically the same calibration moments as displayed in Table 2.

points. The grid for average lifetime earnings, $\bar{E}$, uses seven grid points, where I assure that all discontinuities in the social security benefit formula are one of the grid points. Finally, the grid for the durable consumption stock, d, uses eleven equally spaced grid points between zero and 150,000.

Given these grids, I solve the household problem backward. Resulting from the discrete choices (employment, receiving *AMT* transfers, applying for *DI*) and the nonconvex budget set that results from *AMT* transfers, first-order conditions are not sufficient for an optimum. Therefore, I solve the problem on a discrete grid for financial assets allowing for 736 choices. I obtain the value function for the off-grid financial asset choices and the off-grid lifetime average earnings realizations by linear interpolation. After solving the household problem, I obtain the stationary distribution of the economy by a Monte-Carlo simulation of 65,000 households. In the simulation, all state variables but the durable consumption state may be off-grid. I use linear interpolation for all policies at off-grid points.

The main file is written in *Matlab*, however, the household's problem and the simulation are delegated to *Fortan90* using *.mex* files. These files are compiled for a *Windows* operating system with 64 bits and are available together with the underlying *.f* files and all *Matlab* files at my homepage.

References

Aguiar, M. and E. Hurst (2005), "Consumption versus expenditure." *Journal of Political Economy*, 113, 919–948. [224]

Aguiar, M. and E. Hurst (2013), "Deconstructing life cycle expenditure." *Journal of Political Economy*, 121, 437–492. [232]

Attanasio, O., P. Levell, H. Low, and V. Sánchez-Marcos (2018), "Aggregating elasticities: Intensive and extensive margins of women's labor supply." *Econometrica*, 86, 2049–2082. [236]

Autor, D. H. and M. G. Duggan (2006), "The growth in the social security disability rolls: A fiscal crisis unfolding." *Journal of Economic Perspectives*, 20, 71–96. [226]

Barczyk, D. and M. Kredler (2018), "Evaluating long-term-care policy options, taking the family seriously." *The Review of Economic Studies*, 85, 766–809. [220]

Bell, F. C. and M. L. Miller (2002), "Life tables for the United States social security area 1900–2100." In *Actuarial Study*, Vol. 16, Social Security Administration. [227, 228]

Blundell, R., A. Bozio, and G. Laroque (2011), "Labor supply and the extensive margin." *American Economic Review P&P*, 101, 482–486. [236]

Blundell, R., M. C. Dias, C. Meghir, and J. Shaw (2016), "Female labor supply, human capital, and welfare reform." *Econometrica*, 84, 1705–1753. [218]

Braun, A. R., K. A. Kopecky, and T. Koreshkova (2017), "Old, sick, alone, and poor: A welfare analysis of old-age social insurance programs." *Review of Economic Studies*, 84, 580–612. [220, 238]

Chan, M. K. (2013), "A dynamic model of welfare reform." *Econometrica*, 81, 941–1001. [218]

Chetty, R., A. Guren, D. Manoli, and A. Weber (2013), "Does indivisible labor explain the difference between micro and macro elasticities? A meta-analysis of extensive margin elasticities." *NBER Macroeconomics Annual*, 27, 1–56. [236]

Chief, E. (1979), "Need determination in AFDC program." *Social Security Bulletin*, 42, 11–21. [245]

De Nardi, M., E. French, and J. B. Jones (2010), "Why do the elderly save? The role of medical expenses." *Journal of Political Economy*, 118, 39–75. [220, 243]

Erosa, A., L. M. Fuster, and G. Kambourov (2016), "Towards a micro-founded theory of aggregate labour supply." *Review of Economic Studies*, 83, 1001–1039. [236]

Fernandez-Villaverde, J. and D. Krueger (2011), "Consumption and saving over the life cycle: How important are consumer durables?" *Macroeconomic Dynamics*, 15, 725–770. [224]

French, E. and J. B. Jones (2011), "The effects of health insurance and self-insurance on retirement behavior." *Econometrica*, 79, 693–732. [225]

Garcia, D. (2010), "Robust smoothing of gridded data in one and higher dimensions with missing values." *Computational Statistics & Data Analysis*, 54, 1167–1178. [227]

Gehr, J. (2018), "Eliminating asset limits: Creating savings for families and state governments." Policy brief, CLASP. [217]

Golosov, M. and A. Tsyvinski (2006), "Designing optimal disability insurance: A case for asset testing." *Journal of Political Economy*, 114, 257–279. [220, 237, 243]

Gruber, J. (1997), "The consumption smoothing benefits of unemployment insurance." *American Economic Review*, 87, 192–205. [232, 234]

Hubbard, G. R., J. Skinner, and S. P. Zeldes (1994), "Expanding the life-cycle model: Precautionary saving and public policy." *The American Economic Review, P&P*, 84, 174–179. [220]

Hubbard, G. R., J. Skinner, and S. P. Zeldes (1995), "Precautionary savings and social insurance." *Journal of Political Economy*, 103, 360–399. [220, 224, 232]

Hurst, E. and J. P. Ziliak (2006), "Do welfare asset limits affect household saving? Evidence from welfare reform." *Journal of Human Resources*, 41, 46–71. [232, 233]

Koehne, S. and M. Kuhn (2015), "Should unemployment insurance be asset-tested?" *Review of Economic Dynamics*, 18, 575–592. [218]

Krueger, D. and F. Perri (2006), "Does income inequality lead to consumption inequality? Evidence and theory." *Review of Economic Studies*, 73, 163–193. [231]

Low, H., C. Meghir, and L. Pistaferri (2010), "Wage risk and employment risk over the life cycle." *American Economic Review*, 100, 1432–1467. [218]

Low, H. and L. Pistaferri (2015), "Disability insurance and the dynamics of the incentive insurance trade-off." *American Economic Review*, 105, 2986–3029. [220, 221, 237, 243]

Michaud, A., J. Nelson, and D. Wiczer (2018), "Vocational considerations and trends in social security disability." *Journal of the Economics of Aging*, 11, 41–51. [226]

Ohls, J. C. and H. Beebout (1993), *The Food Stamp Program*. The Urban Institute Press. [244]

Ortigueira, S. and N. Siassi (2016), "Anti-poverty income transfers in the U.S.: A framework for the evaluation of policy reforms." Unpublished manuscript, University of Miami. [218, 243]

Powers, E. T. (1998), "Does means-testing welfare discourage saving? Evidence from a change in AFDC policy in the United States." *Journal of Public Economics*, 68, 33–53. [232, 233]

Scholz, J. K., A. Seshadri, and S. Khitatrakun (2006), "Are americans saving 'otimally' for retirement?" *Journal of Political Economy*, 114, 607–643. [225]

Siegel, J. (2002), *Stocks for the Long Run*. McGraw-Hill. [228, 230]

Social Security Administration (2014), "Annual statistical report on the social security disability insurance program." Tech. rep, https://www.ssa.gov/oact/STATS/table6c7.html. [221]

The Green Book (1994), *The Green Book 1994*, Committee on Ways and Means. [244]

The Green Book (2003), *The Green Book 2003*, Committee on Ways and Means. [244]

Wellschmied, F. (2021), "Supplement to 'The welfare effects of asset mean-testing income support'." *Quantitative Economics Supplemental Material*, 12, https://doi.org/10.3982/QE1241. [217]

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