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The immediate needs annuity and long-term care insurance

1. Introduction

Our research analyzes the role of an immediate needs annuity (INA) as a late-life insurance product. The market for traditional long-term care insurance (LTCI) is quite small in high-income countries, even those that lack universal insurance. For example, in the United States, only about 10% of individuals aged 61 or over held policies between 1992 and 2012, even though care costs can be extremely burdensome for individuals to bear.[1] Moreover, some individuals are denied coverage at any price (Hendren, 2013; Braun et al., 2019), and some policyholders lapse their policies and forego all benefits (Friedberg et al., 2023). Theoretical calculations show that over a large part of the wealth distribution much of the gain from holding LTCI in the United States accrues not to policyholders but to the government in the form of lower Medicaid outlays (Brown & Finkelstein, 2008). In short, LTCI policies don't significantly reduce financial risk and might even increase it, while low take-up leaves the government bearing high costs. In their absence, income annuities (annuities that pay an income stream for life) might fill a similar insurance function for individuals facing high care costs late in life, and thus the risk of spending all their wealth before they die. However, in the United States, income annuities aren't medically underwritten, which makes them a poor deal for individuals needing care, nor are they sold to individuals at very advanced ages. This leaves a missing market for individuals seeking to insure consumption or bequests late in life.

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1 Braun et al. (2019), based on data from the Health and Retirement Study.

The U.K. market is similar to the U.S. market in many dimensions, including in morbidity, mortality, and the availability of public long-term care services on a heavily means-tested basis. One difference is that traditional income annuities in the United Kingdom are often priced based on health and geographic location (an indicator of socioeconomic status), affording the possibility of enhanced income protection for those in poor health.[2] On the other hand, long-term care insurers have withdrawn completely (Lloyd, 2011), while a different product has emerged—an immediate needs annuity (INA).[3]

Individuals purchase an INA at the point when the need for care arises. INAs are medically underwritten, like LCTI but unlike U.S. income annuities. Annuity payments are not dependent on care usage but may be paid directly to care providers, in which case they aren't taxable. INAs insure against the risk of surviving longer than expected, as do income annuities. Compared to purchasers of income annuities, though, the expected remaining lifespan of an INA purchaser is likely to be considerably diminished. The variance, relative to expected longevity, might be considerably increased, though, and a high variance raises willingness to pay for insurance by risk-averse individuals. The variance of expenses for individuals needing expensive care for an uncertain duration may also be correspondingly high. Thus, individuals needing care may be concerned about outliving their capacity to pay either for private care or for noncare consumption, at extreme realizations of "right-tail" risk, or about a substantially eroded bequest, at lesser extremes.

Our research describes the functioning of INAs in the U.K. market and evaluates the potential demand for them in a theoretical model, with implications for the U.S. market. Our analysis has three objectives. The first objective is to acquaint U.S. readers with developments in the U.K. market, one that closely resembles the United States in terms of the wealth and health status of retired households, the limited role of the government (which only provides heavily means-tested long-term care), and the role of insurers facing difficulties in pricing and sustaining sales volumes for long-term care policies.[4] INAs offer some advantages relative to conventional insurance products. With payments reflecting the purchaser's poor remaining life expectancy, an INA avoids many of the pitfalls of traditional LTCI, including long time horizons that require forward-thinking individuals to plan far ahead and that increase vulnerability of policies to adverse selection, inflation, interest rate fluctuations and unexpected LTC cost growth (Braun et al., 2019). Though denials of coverage are frequent for LTCI (Hendren, 2013; Braun et al., 2019), they appear to be nonexistent for INAs—because anyone purchasing an INA needs care and, from the insurance company perspective, the worse their health, the better the risk.[5] Since the premium for an INA is paid in a lump sum, policies can't lapse, avoiding the individually costly and advantageously selected lapses pointed out in Friedberg et al. (2023). And, as the payments are made over a relatively short period of time immediately following purchase, the insurer faces little interest-rate risk. Administrative costs may be lower, and the value may more closely resemble the comparatively high money's worth offered by other annuity products, rather than the much lower money's worth offered by LTCI products (Brown & Finkelstein, 2009). LTCI policies often cap the duration or dollar amount of benefits, so that purchasers retain the risk of living exceptionally long. In contrast, INA benefits are paid for life. Offsetting these practical advantages is a key theoretical drawback: In principle, traditional LTCI can offer greater insurance protection per dollar of premium than an INA because the premiums of those who die without ever needing care can be reallocated to those needing care. It's an empirical question which product is more effective at transferring risk.

Our second objective is to gauge the potential money's worth of INAs, relative to calculated values from the academic literature of the money's worth of traditional long-term care policies and income annuities. *Money's worth* is defined as the expected present value of lifetime benefits as a percentage of the premium paid. Importantly, that definition doesn't capture the full value of the product to insured individuals—a point we elaborate on in detail below. It can, however, offer a yardstick for evaluating whether an insurance market may be competitive, offering low costs of distributing its products and insuring its policyholders. Given that individuals are required to consult financial advisors before purchase, policies are relatively homogeneous (like immediate annuities but unlike LTCI), and because several competitors exist in the market, it appears unlikely that insurers earn excess profits.

2 Historically, most annuities in the U.K. were purchased through defined contribution pension accounts on a mandatory basis. Since 1995, that mandate has been phased out, but most individuals currently in advanced old age (the population on which we focus) were subject to those rules, and extremely few have purchased individual annuities.

3 Lloyd (2011) reports that the last company offering long-term care insurance left the market in 2010. One source describing the market for INAs reports £110 million in premiums paid in 2018, with two insurers selling policies at scale and two in pilot phase (Fröhling, 2019).

4 The U.K. has similar morbidity and mortality rates as the U.S., while public long-term care is provided on a means-tested basis, as in with U.S. Medicaid. A major difference is that means-testing in the U.K. does not apply to the assets and income of the spouse of the individual who needs care.

5 Braun et al. (2019) report a 20% formal denial rate based on industry surveys (as cited in Thau et al., 2014), and they estimate that 36% to 56% of HRS respondents at ages 55–66 (a common purchase age range) would be denied, were they to apply.

Money's worth of INAs may be expected to be somewhat lower than money's worth of income annuities, potentially reflecting greater risk and higher underwriting costs. Calculations of money's worth depend on numerous features. For example, INAs may involve greater longevity risk than do income annuities. An insurer selling an immediate income annuity that starts at age 65 can be relatively certain that the purchaser will survive to age 66. The insurer faces greater uncertainty about survival to older ages, but old-age payments are subject to substantial time discounting. In contrast, INA providers not only face the cost of medical underwriting but also the risk that purchasers may live substantially longer than the insurer expects, whether due to underwriting errors, unexpected improvements in medical technology or information asymmetries. These factors can lead to an expensive risk pool, though the use of detailed medical questionnaires reduces the information asymmetry between insurer and insured that gives rise to adverse selection (in which individuals use private information about their risk when deciding whether to purchase insurance, as suggested by evidence in Finkelstein & Poterba, 2004). However, the insurer may suffer from an additional source of passive adverse selection, in that better-quality care may result in greater longevity.[6] INA providers will be required to hold greater capital or make greater use of reinsurance than providers of traditional immediate annuities relative to their premium income, and this risk capital must be compensated.[7] These factors give us reason to expect that money's worth may be lower (but not dramatically lower) for INAs than for immediate annuities, reflecting the greater risk that INA providers face and the resulting need to hold regulatory capital, along with the costs of medical underwriting.

Our third research objective is to explore potential demand for INAs, with implications for the U.S. market. To do this, we calculate willingness-to-pay (WTP) for INAs of risk-averse households, based on an optimizing model of individuals facing the need for long-term care. For traditional LTCI, theoretical models point to low WTP over much of the wealth distribution, as a result of several factors, including government provision (Brown & Finkelstein, 2008), the value of bequests (Lockwood, 2018), and the illiquidity of housing wealth (Friedberg et al., 2024). Yet even those explanations generally leave a shortfall between predicted and actual take-up, especially toward the upper end of the wealth distribution, and it's possible that INAs might help fill that gap.[8]

Analysis of our optimization model shows that WTP for INAs is generally quite high among those with at least moderate wealth levels, for whom the implicit tax imposed by means-tested state benefits is relatively low. We focus on retired individuals who are unmarried (since they're much more likely to use paid formal care) and consider their optimal decision upon first needing care. At the lowest wealth level we consider, someone with £200,000 upon first needing care is willing to pay £24,151 for the ability to purchase an INA that initially covers 50% of their care cost, if their risk aversion is moderate (when they have a coefficient of relative risk aversion of two). In comparison, someone in the same circumstances but with £300,000 is willing to pay £75,716, and someone with £1,000,000 is willing to pay £194,452.[9] The reason for these high values is that, with a short time horizon, the degree of uncertainty of remaining lifetime care expenses (and thus the ability to maintain consumption and preserve a bequest) is quite high (unlike the case for someone who's healthy and whose potential care costs may arise well in the future). Individuals who purchase INAs can sustain higher levels of consumption in their remaining lifetime, and while their assets initially drop at purchase, asset levels (and hence potential bequests) decline more slowly afterward than they would have otherwise.

In further results, we demonstrate that the tax benefits of purchasing an INA and directing payments to care providers have small effects on willingness-to-pay. WTP for the income protection derived from INAs is generally similar for men and women and for different ages of onset of care needs, since the distribution of morbidity, mortality and expected care costs is similar in each case. Lastly, we find that for individuals at the lower end of the wealth levels we consider, the optimal choice of purchasing an INA results in a moderate reduction (from 15.9% to 9.6%) in the likelihood of ending up in government-financed care. Higher-wealth individuals are extremely unlikely to use government care, whether or not they purchase INAs; and for them, the INA purchase affects their level of spending and bequests.

6 Grabowski and Gruber (2007) demonstrate that higher-quality nursing home care improves outcomes, and numerous additional studies (including: Harrington et al., 2012; Ouslander & Berenson, 2011; Xu et al., 2010; and Kim et al., 2009) demonstrate an association between quality measures like staffing and improved health and longevity outcomes.

7 The U.K. regulator, the Prudential Regulatory Authority, requires no more than a one in 200 risk of failure.

8 In addition to market failures reflected in information asymmetries and incompleteness of available insurance, behavioral failures in this market may arise from a lack of awareness of the insurance product, of the limited role of Medicare in paying for long-term care, and of the risk entailed in not holding insurance.

9 Median wealth for households aged 85 and over was £269,600 in the years 2018–2020: https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/distributionofindividualtotalwealthbycharacteristicingreatbritain/april2018tomarch2020.

2. Long-term care insurance risk

Long-term care, including both nursing home and home health care, represents a substantial financial risk in old age. The types of long-term care are similar in the United Kingdom and the United States, government financial support is similar, and the health status of the elderly is also broadly similar. So, it's reasonable to examine U.S. data to inform our assessment of care usage patterns in England (which is the direct focus of this analysis, since the care system differs slightly in the remainder of the United Kingdom). Using U.S. data, Friedberg et al. (2014) showed that, although the likelihood of ever using care is high, the mean duration of stay in nursing homes, conditional on using care, was quite short—less than a year for men and 1.37 years for women—and the likelihood of exiting care and returning home was nontrivial. This accords with estimates from Hurd, Michaud, and Rohwedder (2014), that someone aged 50 observed in the U.S. Health and Retirement Study between 1992 and 2010 had a 53% to 59% chance of ever entering a nursing home before death. Given the high cost of nursing care, Braun et al. (2019) further estimate that one in 10 will incur out-of-pocket care costs of over $200,000 in their lifetime.

Yet long-term care insurance holdings are quite low—and, in any case, traditional long-term care insurance only partially insures against the financial risks posed by long-term care. Individuals typically purchase policies when in their 50s or 60s. If they delay purchasing, they run an increased risk that the onset of a health condition may make them ineligible for coverage, as denials are frequent (Hendren, 2013). Insurers must take a view on interest rates and claim rates over many years and, to protect themselves, reserve the right to increase premiums. Historically, blocks of LTCI policies (those issued during a specific time period, often under similar terms and managed together for purposes of underwriting and regulation) have experienced dramatic premium increases, and policies that were initially affordable may have become unaffordable.[10] Worse, policyholders who are at greater risk of requiring imminent care are disproportionately likely to lapse their policies (Friedberg et al., 2023) forfeiting all benefits.

Another obstacle in the market for long-term care insurance may be private information on the part of individuals seeking insurance. Adverse selection occurs when purchasers of insurance are more likely to claim or make larger claims than nonpurchasers, conditional on the information held by the insurer and used to price the coverage. Traditional long-term care insurance may suffer from both advantageous and adverse selection from differing sources (Finkelstein and McGarry, 2005). Given that INA benefits start immediately, it seems likely that policies are purchased when the need for nursing home or home health care arises and not before.

3. Immediate needs annuities

3.1 How immediate needs annuities work

An immediate needs annuity is simply a medically underwritten immediate income annuity. Table 1 compares key features of INAs with long-term care insurance policies and conventional income annuities. Immediate income annuities offer households a lifetime income (paid monthly, in the case of INAs) upon payment to the insurer of an irrevocable lump sum. The structure of annuities offered in the conventional market are described in detail in Friedberg and Webb (2022). Similar to the pricing of immediate annuities in the United Kingdom, insurers are prohibited from varying price by gender, although gender-specific risk factors can be incorporated in the insurer's pricing model. In contrast to long-term care insurance policies—where available products subject benefits to a dollar or duration cap (leaving the purchaser exposed to the tail risk of needing care of very high cost or for an exceptionally long period)—INA payments are for life. Benefits may be level, increasing at a predetermined rate, or linked to the U.K. Retail Price Index, but they aren't conditional on receiving care. Insurers offer an option to return to the individual's estate a percentage of premiums, less benefits paid to the date of death, in case death occurs before a date specified in the contract; such provisions are commonly available for income annuities as well.

In the U.K., taxation of income annuities, including INAs, is similar to the taxation of annuities purchased outside of qualified retirement accounts in the U.S. The portion of income payments that represents a return of capital is free of tax and the remainder is subject to the personal income tax.[11] U.K. tax authorities mandate the life tables used to calculate the taxable portion. These vary with age, but not with gender or health status, and thus INA purchasers have a higher taxable portion by reason of their shorter life expectancy. However, benefits are completely free of tax if they're paid direct to the care provider. Although the product is relatively straightforward and transparent, insurers require that purchases be made through professional investment advisors.

10 A 2022 study cites a report of a data call by the NAIC Long-Term Care Insurance Task Force, indicating an average requested rate increase of 78% and an average approved rate increase of 37% (National Association of Insurance Commissioners, 2022).

11 The personal income tax system in the U.K. consists of three rates. Income below a personal allowance of £12,570 is currently not taxable; income between £12,571 and £50,270 is taxed at a 20% rate; income between £50,271 and £125,140 is taxed at a 40% rate; and income above £125,140 is taxed at a 45% rate.

3.2 Money's worth of related insurance products

In theory, INAs should be a more expensive product than traditional LTCI because those who die without ever needing care are excluded from the risk pool. In practice, INAs may be a more attractive product because they don't suffer from the drawbacks associated with traditional LTCI. Premiums are paid in a lump sum and thus insurers are better able to hedge interest rate risk. Benefits are predetermined and can't be reduced if the insurance company experiences greater than expected claims.

By way of comparison, it's relevant to consider evidence about the money's worths of INAs and LTCI. Money's worth calculations, which must forecast benefit payouts for existing policies, are sensitive to the assumed interest and mortality rates. Mitchell et al. (1999) calculated money's worths for immediate annuities, discounting the payments at both the Treasury and corporate bond interest rates, and assuming both annuitant and population mortality, and found values of money's worth in the range of 80% to 90%, while Poterba and Solomon (2021) have recently estimated money's worth of 92% for U.S. income annuities offered to 65-year-old men and women.

Money's worth estimates for traditional LTCI policies are even more sensitive to assumptions, including about lapse rates, which have declined over time but remain elevated (Friedberg et al., 2023), as well as past and prospective premium increases. Given past difficulties in predicting care costs, policies sold in recent years limit daily or lifetime benefit payouts, reducing the amount of insurance that they provide to individuals. Long-term care insurers charge the same rates for both men and women, even though women are at greater risk of requiring care and, conditional on using care, have longer durations of stay (Friedberg et al., 2014). An early study (Brown & Finkelstein, 2009) reported loads of 18% assuming no lapses, and 51%, based on their assumed lapse rates, implying money's worth of 84.7% without lapses and 66.2% with lapses. Given increases in premiums per dollar of benefits, current money's worth will be even lower. A recent study reported cumulative rate increases of 112%, implying money's worth as low as 40.0% without lapses (depending on how soon after purchase the premium increases occurred) and as low as 31.2% with lapses, though lapse rates have declined subsequent to the period covered by Brown and Finkelstein (2009).[12]

From the insurer's perspective, INAs are a higher risk product than a traditional annuity. With a traditional annuity, the insurer can be almost certain that an individual who purchases at age 65 will be alive at age 66. The worst that can happen is that the survival rate of the annuitant pool increases from about 99% to 100%. Although there is more uncertainty about survival at older ages, payments at these ages are subject to substantial discounting. In contrast, a provider of INAs faces the risk of misestimating survival probabilities, perhaps as a result of medical progress or because a rival company has developed a better risk-measurement technology. Insurers are required to either hold capital against a one in 200 risk of financial ruin or purchase reinsurance and if they're required to hold significant capital or reinsurance, that capital requires compensation. In consequence, we expect money's worth to be lower for INAs than for traditional annuities.

3.3 Money's worth of INAs

Preliminary indications from the United Kingdom are that the INA market is competitive, with several suppliers, and that money's worth of INAs purchased by those at very old ages (mid-90s and older) may be 80% to 85%. This is slightly lower than immediate annuity loads calculated using the same interest rate assumptions, and perhaps considerably higher than LTCI loads in the United States.

Most individuals at very advanced ages suffer from one or more health conditions, and tabulations in the U.S. Health and Retirement Study show that many have one or more activity of daily living (ADL) limitation, even if they're not receiving formal care. Someone purchasing an INA at age 95, then, may have similar life expectancy to the average person aged 95.[13] After all, the sickest individuals at those ages are in the hospital and aren't in the market to purchase an INA. Meanwhile, INA purchasers, by reason of their higher-than-average socioeconomic status and consequent access to superior care, are likely to live longer than average, conditional on their ADL status. Then, building on the observation that premiums vary little with age, we can further apply economic logic to assume that money's worth varies little with age. This would imply that life expectancy of INA purchasers varies only a little with purchase age, which is to be expected if purchase is triggered by the onset of ADL limitations that afflict only a minority of younger individuals, so that purchasers of all chronological ages have similar biological ages. This logic allows us to back out possible ratios of life expectancies of INA purchasers relative to the general population at younger ages. This approach suggests, for example, that at age 75 the life expectancy of

12 https://www.financialplanningassociation.org/learning/publications/journal/DEC23-ltci-rate-increases-and-reduced-benefit-reductions-insights-financial-planners-OPEN

13 2024 English life tables show that someone aged 95 has life expectancy of 34.5 months if male or 38.7 months if female (based on data from the U.K. Office for National Statistics: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/datasets/nationallifetablesunitedkingdomreferencetables).

INA purchasers may be only 20% of the population average, a figure obtained by comparing population-level life expectancy in the United Kingdom at ages 75 and 95. Therefore, traditional income annuities without medical underwriting would be an extremely unattractive product to individuals who are in need of care but aren't in very old age, so INAs may fill a market that is missing in the United States.

In short, values of money's worth are in the range we would expect—lower than for immediate annuities, reflecting the greater risk INA providers face and the need to hold regulatory capital—but not dramatically lower, suggesting a competitive market with prices constrained by actual and potential rivals. In this regard, the requirement that policies be purchased through financial advisors yields several benefits that plausibly exceed the cost of the fees paid to the advisors. The advisors not only ensure that the policies purchased are appropriate to the needs of the purchaser but also stimulate price competition among providers.

4. Model

We build on the analysis of Friedberg et al. (2024), which combined a model of LTCI purchase in the presence of means-tested Medicaid (based on Brown & Finkelstein, 2008) with a luxury bequest motive (based on Lockwood, 2012) and the long-term care transition estimates of Friedberg et al. (2014).[14] We focus on the decision of whether to purchase an INA by a single individual upon needing care. We thus abstract from earlier consumption and savings decisions; while those may have been predicated on the availability of an INA in the United Kingdom, the model might capture the response to a new product in the United States.

4.1 Setup

We focus on demand by single individuals (often widows or widowers), because they're much more likely to enter nursing homes and to rely on public assistance if they exhaust their assets paying for care, compared with married individuals. In the intertemporal optimization model, individuals are endowed with financial assets and receive pension income (the U.K. state pension plus income from defined benefit pensions). Each month, an individual faces gender and age-varying probabilities of transitioning between four care states (well, home health care, care in assisted living, or nursing home care) or dying. The individual optimally decides how much to consume, given constant relative risk aversion utility and public care provision policies. We calculate willingness-to-pay for INAs: the amount of additional wealth someone requires in compensation if they do not have the option to purchase an INA if the need arises.

These calculations further allow us to calculate the impact on government means tested financial support for care costs if INAs are used optimally. Previous models (most notably, Brown & Finkelstein, 2008), have shown that in the United States, the Medicaid implicit tax can render traditional LTCI unattractive to a large share of the population, since Medicaid benefits from LTCI policies that prevent households from spending down to means-tested thresholds. We can undertake a parallel analysis of crowd-out of INA holdings by the U.K. equivalent of Medicaid.

4.2 Model details

4.2.1 Care needs

In each month, the representative individual can be in one of five health states, healthy (health state 1), at home receiving home health care (health state 2), living in an assisted living facility (health state 3), living in a nursing home (health state 4) or dead (health state 5). An individual's care needs determine whether they are in state 1, 2, 3, or 4. Our model commences when individuals first enter health state 3, but allows for the possibility that they can transition back to health state 2 or, occasionally, health state 1; these transitions to healthier states are important to capture since U.S. data demonstrates that they occur nontrivially (Friedberg et al., 2014). The individual thus faces the following age- and gender-dependent care transition matrix:

$$\Omega_t^g = \begin{bmatrix} p_{11t}^g & p_{12t}^g & p_{13t}^g & p_{14t}^g & p_{15t}^g \\ p_{21t}^g & p_{22t}^g & p_{23t}^g & p_{24t}^g & p_{25t}^g \\ p_{31t}^g & p_{32t}^g & p_{33t}^g & p_{34t}^g & p_{35t}^g \\ p_{41t}^g & p_{42t}^g & p_{43t}^g & p_{44t}^g & p_{45t}^g \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad (1)$$

where $g \in \{m, f\}$ indicates the gender of the individual, and t indicates the age of the individual, measured as the number of months after the model begins. The 25 elements in the matrix represent the transition probabilities from health states 1 through 5 at age t to the corresponding health states at age $t + 1$, respectively, $\sum_{j=1}^{5} p_{ijt}^g = 1$.

14 In that case, the focus was on the use of illiquid housing wealth as a form of self-insurance to cover late-life care costs. Here, with the possibility of purchasing an INA, the value of illiquid housing will be lower.

4.2.2 Optimization problem

Retired individuals begin the model upon first needing care. In each month, individuals derive utility from time-separable general goods consumption, $C_{s,t}$ and, if they're in a nursing home or assisted living facility, from food and shelter provided by the institutions, $F_{s,t}$.[15] They don't receive utility from spending on long-term care. The individual gets expected discounted lifetime utility from the following expression:

$$U(C,F) = \sum_{t=0}^{T} \sum_{S=1}^{5} \frac{Q_{S,t}}{(1+\rho)^t} \frac{(C_{S,t}+F_{S,t})^{1-\gamma}}{1-\gamma} \quad (2)$$

where $Q_{s,t}$ is the probability of being in health state s at age t, calculated from the above care transition matrix. The terminal period is T. ρ is the time preference rate. γ measures the degree of risk aversion.

Individuals face the following budget constraint when they are ineligible for public care:

$$W_{t+1} = W_t + R_t + A_t + INA * G_t - X_{s,t} - T_{s,t} - C_{s,t} \quad (3)$$

where W_t is financial wealth at age t. R_t is interest income at age t. A_t is pension income at age t. INA is an indicator that takes the value 1 if an individual purchases an INA product, and is 0 otherwise, which yields annuity income G_t. $X_{s,t}$ is the cost of long-term care in health state s and age t. $T_{s,t}$ are income taxes paid in health state s and age t, with all interest and pension income subject to income tax, while annuity income used to pay care costs is exempt. There is the usual no-borrowing constraint, so that $W_t \geq 0$ for all t.

If an individual qualifies for public care, the budget constraint becomes:

1) If wealth W_t is lower than $\underline{W}$,

$$W_{t+1} = W_t + \min\left(R_t + A_t - T_{s,t}, \underline{C_s}\right) - C_{s,t}$$

2) If wealth W_t is higher than $\underline{W}$, but lower than $\underline{\underline{W}}$,

$$W_{t+1} = W_t - \frac{(W_t - \underline{W})}{W_r} + \min\left(R_t + A_t - T_{s,t}, \underline{C_s}\right) - C_{s,t}$$

where $\underline{W}$ and $\underline{\underline{W}}$ are two means-test wealth thresholds for publicly provided care in the United Kingdom. W_r is the rate of additional wealth that needs to be contributed to care costs. Public care requires that the individual contributes financial assets above the asset eligibility limits and income above the income eligibility limit $\underline{C_s}$ (which varies with long-term care status) toward care costs first.

We can rewrite the model in Bellman equation form to solve the multi-period optimization problem:

$$V_{s,t}(\theta_{s,t}) = \max_{C_{s,t}} \left\{ U(C_{s,t}, F_{s,t}) + \sum_{s'=1}^{4} \frac{q_{t+1}^{s,s'}}{1+\rho} V_{s',t+1}(\theta_{s',t+1}) + \frac{q_{t+1}^{s,5}}{1+\rho} B(W_{t+1}) \right\} \quad (4)$$

where $V_{s,t}$ is the value function at health state s and age t and $B(W_{t+1})$ is the utility of bequeathing terminal wealth. The bequest utility function takes form of Lockwood (2012):

$$B(W_{t+1}) = \alpha\left(\sum_{i=1}^{\infty} \beta^{i-1}\right) \frac{\left(y_h + \frac{W_{t+1}}{\sum_{i=1}^{\infty}(1+r)^{-(i-1)}}\right)^{1-\sigma}}{1-\sigma}$$

$\theta_{s,t}$ is the state space of the model, including financial wealth, pension income and annuity income. The control space of the model is general consumption, $C_{s,t}$. $q_{t+1}^{s,s'}$ is the care transition probability from current health state s to health state s' next period. Individuals are subject to equations (3), (4), (5), and (6).

The model is solved by backward induction. We discretize the continuous variables in the state and control spaces and interpolate the values between the grid points. At the last period T, since individuals know they will be dead at the end of the period, they will maximize utility by splitting their remaining wealth between their final-period consumption and bequest. One period before, at period $T-1$, individuals choose their optimal consumption amount based on their preferences, the state variable set $\theta_{s,T-1}$ and the information on the value function calculated at period T, to maximize the summation of their current-period utility and expected discounted utility at the terminal period T. We undertake the same procedure back to the first period, yielding a set of decision rules and we apply the decision rules to compute simulated moments.

4.2.3 Parameter values

The model starts for an individual who first needs care at age 75, 85 or 95, and the terminal age T is set at 105. For the INA purchase, we consider annuity income that covers 25%, 50%, 75% or 100% of care costs. We assume the benefit amounts and care costs increase with inflation rate. The coefficient of risk aversion is assumed to be 1.5 or 2, and the rate of time preference is assumed to be 3%, as is conventional in

15 The latter term is necessary to avoid having the individual save in order to prevent consumption from reaching extremely low levels if institutionalized.

the relevant literature.[16] Based on our discussion earlier, we assume money's worth of INAs of 83%, which is similar to values estimated in the literature for income annuities. Also, as discussed earlier, someone purchasing an INA at age 95 may have similar life expectancy as the average person aged 95, and, if money's worth and life expectancy are similar across by age, then it is reasonable to assume similar life expectancy of elderly individuals when they first need care, regardless of their age.

The age- and gender-dependent monthly care transition probabilities are adapted from Friedberg et al. (2014) and calibrated to the life expectancy assumption mentioned above. The transition probabilities were estimated for the United States using the latest National Long-Term Care Survey (NLTCS) and the Health and Retirement Study (HRS) data. Those care transition estimates fix a key design flaw in the Robinson (2002) model used in Brown and Finkelstein (2008) and other related papers; provide a correct distribution of care use; and closely match the latest care use statistics reported by Hurd et al. (2014).[17]

The English means-tested long-term care provision program is administered by local governments, with program parameters set by the national government. Eligibility is based on the income and assets of the individual. Assets of less than £14,250 (at 2024/25 rates) are disregarded, qualifying an individual for fully subsidized care. Assets of between £14,251 and £23,250 are deemed to produce an imputed income of £1 for each increment of £250 per week. Assets in excess of £23,250 disqualify individuals from support until their wealth has been spent down to that level. Individuals are required to contribute income plus imputed income in excess of a needs allowance of £30.15 per week when in nursing homes or £228.70 per week when receiving care at home (if single).

While data point to wide variation in cost, we assume care costs of £1,500 per week in private nursing homes, £1,150 per week in local authority–funded nursing homes, and £500 per week when receiving home health care. Private nursing homes often, but not always, permit individuals to top up the amounts that local authorities are willing to pay from their own resources.

We assume public pension income of £20,000 and wealth of levels beginning from £200,000 and reaching as high as £1,000,000. We do not consider lower wealth levels because well-established results from Brown and Finkelstein (2008) show that low-income individuals have an incentive to forgo saving or insuring themselves for late-life care expenses, in favor of means-tested public provision of long-term care services. We incorporate the progressive income tax system that operates in the United Kingdom. In 2024/25, the personal allowance is £12,750, and the marginal tax rates are 20% for income above that amount up to £50,720, 40% for income above that amount up to £125,140, and 45% for income above that amount. These tax rates apply to pension benefits and nominal returns on assets. Any INA payments that go to care providers are not taxable, while a portion of INA payments to individuals are taxable, when they represent earnings on assets rather than the return of capital (that is, the lump-sum payment for the annuity).[18]

4.3 Results

In this section, we report willingness-to-pay for INAs among individuals when they first need care. We consider males and females; initial age of receiving care of 75, 85 or 95; and initial wealth of £200,000, £300,000, £400,000, £500,000 or £1,000,000. For the INA purchase, we consider amounts that cover 25%, 50%, 75% or 100% of care costs. A positive value indicates the amount by which an individual would have to be compensated if they weren't offered the opportunity to purchase an INA, while a negative value indicates that the individual doesn't want to purchase an INA, and the absence of a value indicates that the INA is too expensive for the individual, given their assets.

We calculate that willingness-to-pay for INAs is generally high. Values appear in table 2 for males (in the upper panel) and females (in the lower panel) who are aged 75. The only individuals who don't value an INA are those in the lowest asset category of £200,000, when their risk aversion is low and the amount of coverage is high. For such individuals, when their coefficient of relative risk aversion takes a value of 2, their willingness-to-pay for the right to purchase an INA that pays 50% of their care costs is £24,151, while it becomes negative if the INA covers 75% or more of their care costs. If such an individual has, instead, £500,000, their willingness-to-pay is considerably higher, at £128,209, and if they have £1,000,000, it is £194,452. For females, willingness-to-pay is a little lower at the lowest wealth level that we consider, and somewhat higher at other wealth levels, compared with men. Willingness-to-pay is substantially lower when the coefficient of relative risk aversion is 1.5, rather than 2. Tables 3 and 4 show results for individuals who initially need care at age 85 or 95, and these values of willingness-to-pay are generally lower at low wealth levels and similar at the highest wealth levels.

16 This coefficient of risk aversion is in the range reported in the literature, which tends to cluster between 2 and 10, depending in part on whether the estimates are derived from portfolio theory, purchases of insurance, economic experiments or preferences over lotteries (Chetty, 2006).

17 Nonannuitized wealth includes IRAs, 401(k)s and nonpension financial assets. Annuitized wealth includes the expected present value of public and employer pensions.

18 We implement a version of the regulations governing annuities that has been issued by His Majesty's Revenue and Customs.

Relatively little of the value of an INA derives from the tax-exempt status of payments made directly to care providers. We reach this conclusion by calculating willingness-to-pay, were INA payments to providers taxed in the same way that they are when paid to individuals. For example, in the particular case of a male aged 95, with £1,000,000 in assets and a coefficient of relative risk aversion of 2, willingness-to-pay for an INA covering 100% of care costs diminishes by about 1%. This is because very little of the INA payment to the individual is taxable, given that most of it represents a return of capital (that is, the initial lump-sum premium). For example, if we calculate the expected present value of remaining lifetime tax payments at age 95, an individual who does not purchase an INA owes an average of £32,029. An individual who purchases an INA, with payments going to the care provider, instead pays lifetime taxes of £23,383, while if they received the payments directly, they would pay lifetime taxes of £47,670.

Our results demonstrate that the capacity to smooth consumption late in life and to avoid running out of funds to pay is highly valued. It may seem surprising that someone who is relatively quite close to the end of life is so willing to insure themselves, yet a simple numerical example demonstrates the logic that results when individuals face substantial and immediate uncertainty over their date of death. In a two-period model in which an individual has a 50% chance of dying before the second period, it is optimal to consume 58.6% of one's wealth in the first period, absent the ability to annuitize—so considerable wealth is left on the table. The compensation required if one lacks the capacity to annuitize is a 29.5% increase in wealth, demonstrating how valuable the consumption-smoothing gain from insurance is.[19] Moreover, these values increase substantially with even relatively small increases in risk aversion, similar to our results for INAs.

We can see further evidence of the impact of INA purchase in figure 1, which focuses on simulation results for a male aged 95 with £1,000,000 of initial assets. It compares trajectories of key variables over the remaining lifetime, without an INA or with the purchase of an INA that covers 100% of care costs. The upper-left panel shows the average consumption path over the remaining months of life, and the upper-right panel shows remaining wealth (which is the bequest, if the individual dies). If the individual purchases an INA, wealth immediately drops, but declines more slowly afterward, compared to not purchasing an INA. Moreover, the INA allows individuals to consume higher amounts throughout the period, as they don't face the risk of running out of assets. The lower-left panel shows care costs paid out of pocket, while the lower-right panel shows the probability of exhausting all of one's assets and relying on government care.

In earlier research, Brown and Finkelstein (2008) demonstrated the critical role that public provision of long-term care services on a means-tested basis plays in crowding out both life insurance purchases and saving of all except quite high-wealth individuals. This leaves the government paying a very high share of care costs for much of the population. Therefore, we examine the impact of INAs in reducing public outlays for this population.

Table 5 demonstrates this for males who initially need care at age 75, have a coefficient of relative risk aversion of 2, and have initial wealth of either £200,000 or £500,000. As expected, higher-wealth individuals end up exhausting their assets and relying on public provision of long-term care services much less often. This happens 3.6% of the time if the individual doesn't purchase an INA, and essentially not at all if the individual purchases an INA that pays 100% of care costs (which is optimal in this case). For a lower wealth individual, with initial assets of £200,000, purchase of an INA is more consequential. If such an individual purchases an INA that covers 50% of initial care costs (which is preferred to covering 25% or 75% of initial care costs), it reduces the probability of exhausting assets and relying on government care from 15.9% to 9.6%. It similarly reduces the share of their lifetime care costs paid for by the government from 15.1% to 6.0%.

5. Discussion

This paper describes the functioning of immediate needs annuities in the U.K. market and evaluates the potential demand for them in a theoretical model, with implications for the U.S. market. Given that individuals are required to consult financial advisors before purchase, policies are relatively homogeneous (like immediate annuities but unlike long-term care insurance), and there are several competitors in the market, it appears unlikely that insurers are earnings excess profits. Comparing across insurance products, money's worth of INAs may be expected to be somewhat lower than money's worth of income annuities, reflecting greater risk and higher underwriting costs, and are perhaps considerably higher than the quite low values of money's worth that has been estimated for long-term care insurance.

19 In this example, we use a relative risk aversion parameter of 2, assume no bequest motive, and set the rates of both interest and time preference to zero.

Analysis of our model demonstrates that purchasing an INA upon first needing care makes individuals better off if they have moderate to high wealth levels. INA purchasers can sustain higher levels of consumption in their remaining lifetime, and while their assets initially drop because of the cost of an INA, asset levels (and hence potential bequests) decline more slowly afterwards than they would otherwise. We also find that, for individuals at the lower end of the wealth levels at which an INA purchase is optimal, the likelihood of ending up in government-financed care drops by a moderate amount, while higher-wealth purchasers are unlikely to use government care no matter what.

In future analysis, we plan to gain further insights from suppliers in the INA product market. This will help us add additional details to our theoretical analysis. We can explore other refinements as well. For example, a common assumption in the literature on saving and consumption in old age is that the marginal utility of consumption remains constant. However, evidence of declining marginal utility of consumption for individuals at very old ages (Rohwedder et al., 2022) and in poor health (Finkelstein et al., 2013) would reduce the value of insuring consumption through purchase of an INA. Lastly, we plan to further gauge the potential for INAs to fill in a missing market in the United States for individuals seeking to insure consumption or bequests late in life.

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TABLE 1. FEATURES OF INSURANCE CONTRACTS

Features	Long-term care insurance	Income annuity	Immediate needs annuity
Insurer may deny coverage?	Yes (occurs for high-risk individuals)[a]	No (insurers set prices based on annuitant mortality tables that reflect the mortality of high risk individuals)[b]	No indication that denials occur (and reinsurers set no limits on policies)[b]
Premium is paid…	On regular frequency (i.e., annually)	One-time lump sum	One-time lump sum
Maximum age of purchase	A common upper age limit set by insurers is 75 or 80.	A common upper age limit set by insurers is 85. The market at older ages is thin.	Varies, but at least one insurer sells to the very elderly.
Pricing:			
Subject to change after purchase?	Yes	No	No
Gender-specific?	No	Yes in the U.S., unless purchased with assets in an employer-plan. No, in the U.K. due to European Union Gender Directive that has not been repealed.	Priced on a case-by-case basis
Depends on current health?	Yes	No in the U.S. Priced based on geographic location (correlated with socioeconomic status and thus longevity) in the U.K. A U.K. market exists for impaired life/ enhanced annuities.	Yes
Benefits are paid…	In event of care claims	As monthly income	As monthly income or monthly payment to care provider
Benefits are taxable?	No	Yes, exempting capital portion	No, if paid to care provider; otherwise yes, exempting capital portion

[a] Hendren (2013).
[b] Based on discussion with industry experts.

TABLE 2. WILLINGNESS TO PAY FOR AN IMMEDIATE NEEDS ANNUITY

Males age 75				
	Share of EPV of care costs covered by INA			
Financial assets	25%	50%	75%	100%
	CRRA = 1.5			
£200,000	2,266	-7,436	-51,807	-
£300,000	14,678	17,834	2,952	-33,314
£400,000	20,893	29,552	23,502	4,101
£500,000	24,078	36,170	35,127	23,105
£1,000,000	31,647	52,816	64,450	69,209
	CRRA = 2			
£200,000	16,289	24,151	-15,343	-
£300,000	37,936	75,716	92,881	65,269
£400,000	53,279	106,201	142,673	149,941
£500,000	64,888	128,209	176,856	201,289
£1,000,000	100,617	194,452	274,626	336,217
Females age 75				
	CRRA = 1.5			
£200,000	-8,866	-26,453	-	-
£300,000	9,656	18,663	15,341	-41,947
£400,000	22,229	44,226	55,114	38,570
£500,000	30,933	60,777	77,242	71,731
£1,000,000	50,820	91,009	116,985	129,601
	CRRA = 2			
£200,000	-1,459	-11,765	-	-
£300,000	20,735	48,827	79,631	39,792
£400,000	38,700	89,741	151,992	190,177
£500,000	53,419	121,184	202,047	263,279
£1,000,000	105,403	220,137	335,707	432,202

TABLE 3. WILLINGNESS TO PAY FOR IMMEDIATE NEEDS ANNUITY

Males age 85				
	Share of EPV of care costs covered by INA			
Financial assets	25%	50%	75%	100%
	CRRA = 1.5			
£200,000	-13,248	-37,612	-105,621	-
£300,000	5,553	8,372	5,410	-26,924
£400,000	17,416	33,331	40,213	27,720
£500,000	25,358	46,581	57,221	52,351
£1,000,000	40,143	70,253	88,426	97,506
	CRRA = 2			
£200,000	-7,880	-29,969	-104,674	-
£300,000	16,012	33,086	52,979	48,173
£400,000	34,781	75,709	124,765	156,534
£500,000	49,642	107,608	171,290	218,112
£1,000,000	97,427	198,798	296,932	375,687
Females age 85				
	CRRA = 1,5			
£200,000	-32,550	-88,844	-	-
£300,000	-8,322	-17,198	-18,165	-72,161
£400,000	10,585	28,119	53,127	48,752
£500,000	24,632	57,000	89,105	95,742
£1,000,000	57,636	109,683	148,339	169,091
	CRRA = 2			
£200,000	-30,028	-85,468	-	-
£300,000	-4,143	-10,031	-7,887	-27,851
£400,000	17,900	46,701	103,004	167,847
£500,000	36,398	89,695	173,195	259,808
£1,000,000	101,496	220,047	352,077	474,132

TABLE 4. WILLINGNESS TO PAY FOR IMMEDIATE NEEDS ANNUITY

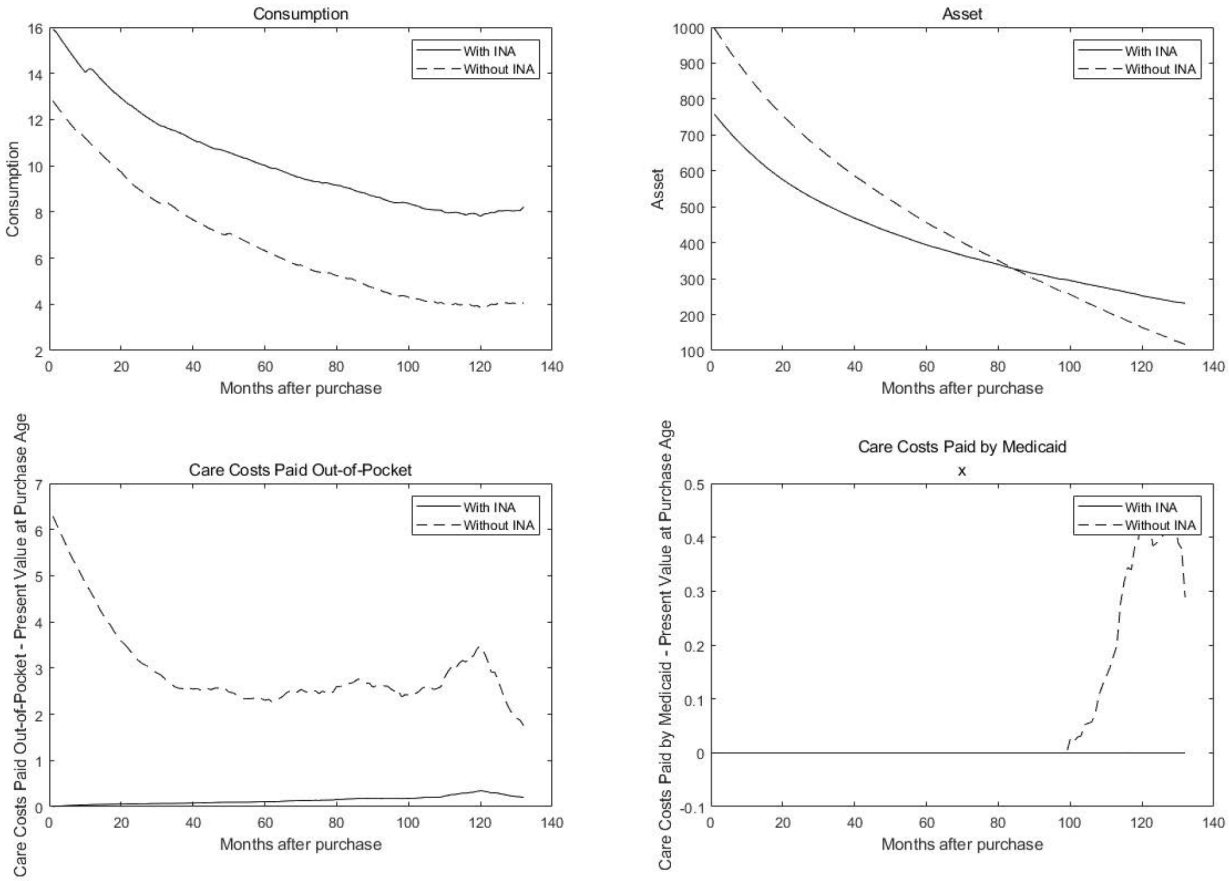
Males age 95				
	Share of EPV of care costs covered by INA			
Financial assets	25%	50%	75%	100%
	CRRA = 1,5			
£200,000	-6,694	-30,858	-100,865	-
£300,000	9,771	10,282	-3,634	-42,200
£400,000	18,658	26,888	21,815	3,182
£500,000	22,598	33,473	32,517	21,329
£1,000,000	25,837	42,118	51,363	54,532
	CRRA = 2			
£200,000	3,878	-17,055	-103,000	-
£300,000	28,296	47,122	54,024	24,677
£400,000	45,528	85,429	114,665	119,071
£500,000	57,692	109,421	149,235	167,468
£1,000,000	86,465	161,056	220,941	266,031
Females age 95				
	CRRA = 1,5			
£200,000	-19,850	-66,674	-	-
£300,000	2,426	-2,735	-18,634	-92,643
£400,000	17,969	32,321	37,028	14,427
£500,000	28,108	51,338	61,154	51,090
£1,000,000	41,064	67,397	83,193	90,458
	CRRA = 2			
£200,000	-11,061	-57,765	-	-
£300,000	15,004	18,963	13,054	-52,397
£400,000	35,661	71,005	111,534	130,243
£500,000	51,735	107,102	166,908	204,368
£1,000,000	94,997	187,603	264,123	321,697

TABLE 5. CONSEQUENCES OF INA PURCHASE FOR GOVERNMENT SPENDING ON LONG-TERM CARE SERVICES

	£500,000		£200,000	
	With INA	Without INA	With INA	Without INA
Care costs (average, £)	74,358	74,358	74,358	74,358
INA premium	239,770	0	59,942	0
INA benefits received (average, expected present value, £)	198,565	0	49,641	0
Share of individuals using gov't care	0	0.036	0.096	0.159
Share of care costs paid by INA	0.993	0	0.527	0
Share of care costs paid by individual	0.007	0.966	0.413	0.849
Share of care costs paid by gov't	0	0.034	0.060	0.151

FIGURE 1. TRAJECTORIES OF KEY VARIABLES IN MONTHS AFTER ONSET OF CARE NEEDS, WITH AND WITHOUT PURCHASE OF AN INA

(Results for male, aged 95, wealth of £1,000,000, coefficient of relative risk aversion of 2, INA covers 100% of care costs.)



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