ALL ACTUARIES SUMMIT 2026

One Risk, Two Systems

Causal Evidence from Australia's Age-65 Disability Divide

Maathumai Ranjan

Crawford School of Public Policy, Australian National University

Abstract

Rising disability care costs in ageing societies have intensified debate about whether publicly funded systems can simultaneously be person-centred, fiscally sustainable and equitable. This paper provides causal evidence that early access to individualised disability support, through Australia's National Disability Insurance Scheme (NDIS), meaningfully reduces future aged care utilisation, healthcare costs, and mortality.

Using a difference-in-differences-in-discontinuity design that exploits the NDIS's staggered regional rollout and its strict age-65 eligibility cutoff, and drawing on population-level linked administrative data covering 641,000 individuals, we find that NDIS participation reduces residential aged care entry by 12.1 percentage points, home care package receipt by 21.0 percentage points, and monthly health system costs by $700 per participant. Critically, these effects compound over time. For the cohort close to age 65, annual fiscal savings of almost $30,000 (22.5% of program costs) compound over time to generate a Marginal Value of Public Funds of 0.462, consistent with in-kind transfer programs governments routinely fund.

Beyond the policy findings, this paper advances a broader argument: the actuarial profession's toolkit of long-horizon present-value analysis, causal identification, linked administrative data, and the valuation of risk and uncertainty is uniquely suited to the most consequential social policy questions of our generation. Ageing populations, disability system sustainability and life-course investment are not peripheral concerns; they are the defining fiscal challenges of the next three decades. This paper is a case study in what actuaries can contribute when they move beyond traditional domains.

Keywords: *Disability insurance, aged care, fiscal spillovers, NDIS, linked administrative data, Marginal Value of Public Funds, causal inference, actuarial methods in public policy*

1. Introduction: A Fiscal Paradox at the Heart of Ageing Policy

Every developed economy maintains two large publicly funded systems that, in theory, serve different populations but, in practice, serve many of the same people at different points in their lives. Disability support programs assist working-age individuals with functional impairments to live independently. Aged care systems provide residential and community-based support for older people whose functional capacity is at a level where independent living is not a tenable option. These systems are typically designed, funded, governed, and evaluated in isolation. Yet the people who pass through them are not independent: the trajectory from disability to dependence is continuous.

This paper examines whether investing early in individualised disability support, the kind that builds functional capacity, supports community participation, and sustains independence, meaningfully delays or prevents the progression into intensive aged care. The question has profound fiscal implications. Australia spends approximately $46 billion annually on the National Disability Insurance Scheme (NDIS) and over $39 billion on aged care. If these expenditures partially offset one another, then the NDIS is a long-run investment in the compression of aged care demand. If they do not, then both fiscal trajectories must be managed independently, with compounding pressure on the public purse.

We provide the first causal evidence on this question, using a difference-in-differences-in-discontinuity (DiDiSC) design that exploits two features of Australia's policy architecture: the NDIS's staggered rollout across 540 local government areas between 2013 and 2020, and a strict age-65 eligibility cutoff above which new applicants cannot access the NDIS and are directed instead to standardised aged care packages. This creates a sharp contrast in support philosophy between individualised, needs-based, capacity-building funding below the cutoff and standardised, means-tested packages above it. Our linked administrative data span disability support, Medicare, pharmaceutical benefits, residential aged care, home care, income, and mortality for approximately 641,000 individuals observed between 2011 and 2022.

The results reveal important insights. For the intended population, individuals with significant and longstanding functional impairment, NDIS participation reduces residential aged care entry by 12.1 percentage points, home care package receipt by 21.0 percentage points, and monthly health system costs by $700. Crucially, these effects grow monotonically through four years of post-rollout observation. Present value fiscal savings of $293,000 per participant yield a Marginal Value of Public Funds (MVPF) of 0.462 – for every dollar of government spend, the program generates 46 cents of value for participants. While this ratio is at the lower end of in-kind transfer programs to adults, it is consistent with programs that governments in comparable economies routinely fund.

But this paper is not only about the NDIS. It is also about what kind of analytical work the actuarial profession is capable of and should be doing more of. The methods used here of causal identification using administrative discontinuities, long-horizon present-value fiscal analysis, heterogeneous treatment effect estimation, and the valuation of uncertain future outcomes are actuarial in character, even if they are not yet central to actuarial practice. The profession's future relevance depends, in part, on whether it can bring these capabilities to bear on the defining challenges of our time: ageing societies, long-duration fiscal liabilities, climate risk, and the systems that translate public investment into human wellbeing.

The paper proceeds as follows. Section 2 provides the Australian policy context, covering the NDIS, aged care reform, and the disability-aged care interface. Section 3 develops the theoretical framework. Section 4 describes the data infrastructure and its implications for actuarial practice. Section 5 presents the empirical strategy and key results. Section 6 presents welfare analysis using the MVPF framework. Section 7 examines heterogeneity in fiscal returns. Section 8 draws implications for Australian policy. Section 9 concludes with a broader argument about the actuarial profession and public policy.

2. The Australian Policy Context

2.1 The National Disability Insurance Scheme: Design, Growth and Sustainability

Australia's NDIS was introduced in 2013 with a conceptually distinctive proposition: rather than allocating disability funding through block grants to service providers, the scheme would fund individuals directly, with packages tailored to assessed needs and goals. The philosophical foundation was actuarial in a genuine sense. The scheme was designed using insurance principles of pooled risk, lifetime cost modelling, and the logic that early investment in capacity reduces long-run liability. The first Scheme Actuary, appointed under legislation, was charged with maintaining the NDIS's financial sustainability and providing independent assessment of its long-run cost trajectory.

More than a decade since its introduction, the NDIS has grown to now support approximately 750,000 participants at a cost exceeding $46 billion annually. By any measure, this represents a transformative expansion of disability support in Australia. But it has also generated significant fiscal anxiety. The 2023 Independent NDIS Review, commissioned by National Cabinet, identified unsustainable cost growth, inconsistent access decisions, and a scheme that had drifted from its original intent. The Review's 26 recommendations, supported by 139 actions, called for a unified system of support, reformed market and workforce arrangements, and a new stewardship model. National Cabinet first agreed to target annual scheme growth of 8 per cent by July 2026, with a long-term goal of keeping NDIS growth to around 5% per annum.

The NDIS Review's work and the Scheme Actuary's Annual Financial Sustainability Reports represent a continuing space where actuarial expertise has been central to policy. The Australian Government Actuary's independent peer reviews of the scheme's financial projections have provided credibility to cost forecasts and identified the uncertainty bands around them. This paper contributes a different piece of the evidence base: causal estimates of what the NDIS *saves* downstream, in aged care and health systems. The full fiscal picture cannot be understood without both sides of the ledger.

2.2 Aged Care Reform: The New Act and the Support at Home Program

Australia's aged care system has undergone its most significant restructuring in decades. The 2018–2021 Royal Commission into Aged Care Quality and Safety found the system fundamentally unfit for purpose, describing systemic neglect, inadequate staffing, and a regulatory framework that failed to protect the rights and dignity of older people. The resulting Aged Care Act 2024, which came into effect on 1 November 2025, replaces legislation that had stood since 1997 and introduces a rights-based framework that places older people at the centre of care decisions.

Three elements of the reform are directly relevant to this paper. First, the Support at Home program, which replaced Home Care Packages (HCP) from November 2025, expands funding levels (from four to eight tiers, ranging from $11,000 to $78,000 annually) and introduces more flexible quarterly budgets across clinical care, independence, and everyday living categories. Second, new means-testing arrangements increase co-contributions for individuals entering aged care after November 2025, shifting the fiscal boundary between public and private responsibility. Third, strengthened quality standards and a new regulatory framework raise the floor of care quality but also the cost floor for providers.

For actuaries, the reform creates a rich set of valuation questions. The transition from Home Care Packages to Support at Home changes the funding regime against which our estimates were generated – our analysis captures spillover savings under the legacy HCP system. Translating those estimates to the new regime requires modelling care-level transition probabilities under the expanded eight-tier funding structure, the redistribution of costs between government and individuals under new means-testing arrangements, and

the effect of higher quality standards on both unit costs and health trajectories. Each of these is a tractable actuarial problem. Our estimates remain relevant and highlight the underlying mechanism that earlier entry at higher dependency generates higher lifetime care costs. Nevertheless, quantifying the savings under the new system is an important next step, and one that linked administrative data and actuarial methods are well suited to address.

2.3 The Disability-Aged Care Interface: Where the Systems Meet

The design of the NDIS creates a sharp and consequential boundary at age 65. Individuals who first apply for the NDIS before their 65th birthday may access individualised, needs-based funding with a capacity-building philosophy. Those who first apply after their 65th birthday are directed to the aged care system, where support is standardised, means-tested, and oriented toward maintenance rather than development of function. Existing NDIS participants turning 65 may remain on the scheme or transition to aged care, but cannot access both.

This creates the natural experiment at the heart of our study. People just below the age-65 threshold face a fundamentally different support environment to those just above it: different levels of funding, different philosophies of support, and different incentives for investing in functional independence. The discontinuity at age 65 enables credible causal identification of the effect of NDIS-style support on long-run outcomes, using the regression discontinuity logic we describe in Section 5.

The interface also matters for retirement income. NDIS participants cannot simultaneously receive Home Care Package funding, creating a substitution margin that affects how individuals with disability fund their care in retirement. For those who can access the NDIS before 65 and maintain their functional capacity, the implication is fewer years of intensive care costs – and potentially greater ability to preserve superannuation balances for non-care retirement expenditure. The retirement income implications of disability support policy have not previously been examined empirically; our estimates of earnings and superannuation effects provide some initial evidence, though the primary fiscal channel for our study population is care substitution rather than labour market retention.

One identification concern worth noting is the age pension eligibility boundary, which also falls near age 65 and has shifted gradually upward since 2017. Because age pension eligibility changes on a national birth-cohort schedule rather than varying by local government area, it does not generate the LGA-level variation that drives our identification. The pre-existing discontinuity in age pension eligibility at age 65 is present in both pre- and post-rollout periods and is differenced out by construction in the DiDiSC design. All specifications additionally include an age pension eligibility indicator as a direct control. Australia's superannuation preservation age, which has risen from 55 to 60 by birth cohort, similarly predates the NDIS eligibility cutoff and is unlikely to confound the discontinuity.

The retirement income dimension of this interface, how NDIS participation shapes superannuation accumulation, drawdown behaviour, and the capacity to self-fund aged care costs, is a further frontier that Section 8 returns to.

3. A Framework for Thinking About Life-Course Social Investment

3.1 The Disability-Work-Care Trajectory

We model individual functional capacity as a continuous variable that declines over time with age and disability severity. Two thresholds govern state transitions: a care threshold below which residential aged care (RAC) becomes necessary, and a work threshold above which labour force participation is feasible. Capacity-enhancing disability support shifts this distribution upward, delaying the crossing of each

threshold. For individuals near the care boundary (those with the greatest functional impairment), the fiscal return operates through the care-substitution channel: NDIS-funded supports delay or avoid entry into residential and home care, generating large RAC and HCP savings. For individuals near the work threshold (those with greater functional capacity and labour market attachment), the return operates through the health-complement channel: NDIS supports and health system engagement are jointly determined by functional capacity, so maintaining higher capacity sustains medical oversight and reduces government subsidised Medicare (MBS) and pharmaceutical (PBS) costs, while also generating larger mortality gains because these individuals have more functional life-years to benefit from.

This framework generates three testable predictions that we verify in the data: (i) individuals with the greatest functional impairment (non-workers, near the care boundary) generate large aged care and health savings but no labour supply effects, with the care-substitution channel dominant; (ii) individuals with greater functional capacity (workers, near the work threshold) generate attenuated aged care savings but larger MBS and PBS savings, with the health-complement channel dominant; and (iii) the MVPF is higher for workers than non-workers, because workers' higher baseline functional capacity means NDIS access translates into greater life-years gained. These predictions are borne out.

3.2 The Cumulation Problem: Why Short-Run Evaluations Mislead

Standard program evaluations tend to examine outcomes one to three years post-treatment. For programs whose primary mechanism operates through functional capacity preservation (a slow, cumulative process), short-run evaluations are systematically biased downward. Our event study estimates show that aged care substitution effects grow monotonically over four years of post-rollout observation, with no sign of levelling off. An evaluation conducted at year one would estimate less than a quarter of the year-four effect.

The actuarial profession understands this problem intuitively. Life insurance pricing, superannuation liability valuation, and long-tail workers compensation all require the projection of outcomes over decades, with appropriate treatment of uncertainty and discount rates. The policy evaluation literature has been slower to adopt this perspective. The MVPF framework we employ addresses part of the problem by discounting projected future costs and benefits, but the projection horizon and discount rate remain contested. We use a 7 per cent real discount rate (consistent with Australian OIA guidance) over an adjusted life expectancy of 17.4 years for the study population.

4. Data Infrastructure: The Opportunity in Linked Administrative Records

4.1 What the Data Contain

Our analysis uses six linked administrative datasets assembled by the Australian Bureau of Statistics (ABS) under the Person Level Integrated Data Asset (PLIDA) framework. Our sample includes all Disability Support Pension (DSP) recipients aged 62 to 68 from 2011 to 2022, approximately 641,000 individuals observed across approximately 30 million person-months. The data sources are: the NDIS module (monthly participation records from 2013); DSS longitudinal data (monthly DSP records from 2011); Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) administrative records; the Department of Health, Disability and Aged Care system data (residential aged care, transition care and home care from July 2015; Commonwealth Home Support Programme from July 2016); ATO tax records (annual income and earnings); and the national death records.

This breadth of linkage is unusual in public policy research globally. Most administrative data environments permit linkage across one or two domains; the PLIDA infrastructure in Australia enables simultaneous

observation of individuals' disability support, health utilisation, aged care, income, and mortality. The result is a research environment with near-population coverage, long follow-up, and the ability to trace fiscal consequences across the full range of relevant program domains.

4.2 What This Means for Actuaries

Administrative data linkage of this kind represents a step change in what is knowable about the long-run consequences of social policy. Traditional actuarial modelling in this space has relied on mortality tables, survey data, and projection models calibrated to aggregate trends. These approaches are valuable but they cannot answer causal questions: they cannot tell us what would have happened to an individual in the counterfactual world where they did not receive disability support. The quasi-experimental designs that exploit policy discontinuities, like the age-65 threshold we use, address this gap, but they require the kind of individual-level, longitudinal administrative data that is now increasingly available through government linkage initiatives.

The implication for the profession is practical: actuaries who work in disability, aged care, superannuation, or health policy can gain a distinct advantage by becoming fluent users of linked administrative data infrastructure. This means understanding the ABS and AIHW's data access pathways, the ethics and privacy governance frameworks, the statistical methods suited to register data (including instrumental variable estimation, regression discontinuity designs, and survival analysis in linked datasets), and the translation of causal estimates into present-value fiscal projections. These are not niche skills; they are the natural extension of the actuarial toolkit into the data environments that government policy analysis increasingly relies upon.

Key Data Facts: The Study Population
641,000 individuals aged 62–68, observed 2011–2022 across six linked administrative datasets
~30 million person-months of observation spanning disability, Medicare, PBS, aged care, income, and mortality.
40,067 NDIS participants (treated); 601,607 non-participants (control)
Linkage conducted by ABS under the PLIDA framework with near-population coverage and long follow-up
The DiDiSC design exploits 540 staggered LGA rollout dates and the strict age-65 eligibility cutoff.

5. Empirical Strategy and Main Results

5.1 The Design: Exploiting Two Sources of Variation

Our causal identification strategy combines two features of the NDIS's architecture. First, the scheme was rolled out in a staggered fashion across 540 local government areas between 2013 and 2020, creating variation in the timing of access across regions for otherwise comparable individuals. Second, the strict age-65 eligibility cutoff means that individuals just below the threshold had access to NDIS-style support while those just above were directed to aged care. The interaction of these two sources of variation identifies the effect of NDIS participation for individuals near the cutoff whose treatment status was determined by the rollout reaching their area before their 65th birthday.

Formally, we estimate a two-stage least squares model where NDIS participation is instrumented by the interaction of being below age 65 and living in an area where the NDIS has rolled out. Our estimates identify a Local Average Treatment Effect (LATE), the causal effect for those who accessed the NDIS specifically because the rollout reached their area before their 65th birthday (the "complier" population in econometric terms). This is a well-defined and policy-relevant group: people who would not have accessed the NDIS had the rollout been delayed. Table 1 summarises the first-stage estimates. The instrument is strong: statistical tests confirm it powerfully predicts NDIS takeup across all subsamples (F-statistics ranging from 7,990 to 103,743).

Full identification validation (including McCrary density tests, pre-rollout placebo specifications, covariate balance at the age-65 cutoff, and robustness across 69 alternative specifications) is reported in Ranjan, Breunig and Clarke (2026) and collectively provides convincing evidence that the age-65 discontinuity captures the effect of NDIS access rather than confounding age-related trends.

Sample	First-Stage Coeff.	t-statistic	F-statistic	N (person-months)
Monthly panel (full)	0.0379***	32.11	103,743	29,955,389
Annual income panel	0.0400***	38.52	7,990	2,656,477
Aged care subsample	0.0387***	30.91	31,467	17,049,098
CHSP subsample	0.0380***	30.27	17,337	15,698,185

*Table 1: First-Stage Estimates. Instrument is Below65 × NDIS rollout availability. All F-statistics exceed Stock & Yogo (2005) and Lee et al. (2022) thresholds. Standard errors clustered by LGA. *** p<0.01.*

5.2 Health Outcomes: Mortality, Medicare, and Pharmaceuticals

NDIS participation reduces monthly mortality by 0.573 percentage points (t = −7.37; baseline rate 0.185 per cent per month). Medicare benefit payments fall by $302 per month (t = −13.89) and pharmaceutical benefit payments by $399 per month (t = −6.53). These reductions are consistent with NDIS-funded supports substituting for health care services: consistent with NDIS-funded supports reducing demand for health care services: personal care, therapy and community participation supports improve function and reduce the need for GP and specialist attendances that would otherwise be billed to Medicare. The pattern parallels Finkelstein and McKnight's (2008) documentation of Medicare-induced healthcare substitution across programs in the United States.

5.3 Aged Care Outcomes: The Central Finding

NDIS participation reduces residential aged care entry by 12.1 percentage points (SE = 1.10pp), Transition Care entry by 1.09 percentage points, and Home Care Package receipt by 21.0 percentage points. CHSP (community support) services increase by 61.9 services per month (t = 4.25) but with a minimal corresponding cost change. This translates to an avoided annual cost of almost $30,000 for the average participant in our study.

−12.1pp	−21.0pp	−1.1pp	$700	22.5%
Reduction in residential aged care entry	Reduction in home care package receipt	Reduction in transition care program entry	Reduction in monthly health system (MBS + PBS) costs	Fiscal savings for average NDIS cost for participant aged 65+

Figure 1: Headline Fiscal Savings from NDIS Participation (2SLS estimates, study population)

The most important finding is the dynamic pattern of these effects. Event study estimates (which track the age-65 discontinuity coefficient year-by-year relative to rollout) show that aged care reductions grow monotonically over four years of post-rollout observation. Year-one effects are approximately 40 per cent of year-four effects. No levelling-off is observed within the sample window. This is precisely what the trajectory framework predicts: functional capacity improvements build progressively, reducing the probability of crossing the care threshold over time. It also implies that any evaluation of the NDIS conducted in its first one or two years of operation will have substantially understated the program's fiscal value.

For actuaries, this pattern is familiar: it is structurally analogous to the emergence of claims under long-tail liability classes, or the progressive crystallisation of mortality improvements in life portfolios. Programs that build capacity, preserve independence, and delay institutionalisation generate fiscal returns that compound over time in ways that require long-horizon modelling to capture properly. The institutional evaluation ecosystem, which typically operates on annual funding cycles and two-to-three-year evaluation timeframes, is structurally ill-suited to capturing this value. Bringing an actuarial time horizon to program evaluation is not a methodological nicety: it changes the conclusions.

5.4 Labour Market and Income Outcomes

For our study population (individuals with significant and longstanding disability approaching age 65), NDIS access has no meaningful effect on retirement or earnings. This is unsurprising: with a baseline retirement rate of 87 per cent and mean annual earnings of around $4,700 across the full sample (reflecting that the vast majority are long-term DSP recipients who have already exited the labour market), improving functional capacity does not bring people back to work. It keeps them out of institutional care.

These pooled estimates mask considerable heterogeneity by trajectory position. For the 89 per cent of the sample who were not working prior to NDIS access, the dominant fiscal channel is care substitution through avoided RAC and HCP costs. For the 11 per cent with some prior labour market engagement, the dominant channel is the health-complement effect: NDIS supports sustain functional capacity, which in turn sustains engagement with the health system, reducing MBS and PBS costs. Crucially, both groups generate nearly identical total annual fiscal spillovers (approximately $33,400 and $34,300 respectively) through these opposite channels. The large difference in their MVPFs (0.430 vs 0.884) comes entirely from mortality: workers, with higher baseline functional capacity, gain more life-years from NDIS access. Detailed decomposition by pre-NDIS labour force status is in the companion working paper (Ranjan, Breunig and Clarke, 2026).

The earnings and income effects are economically small relative to the aged care and health savings documented in Section 5.3 and do not materially affect the MVPF calculation.

5.5 Validity and Robustness

Our identification rests on the assumption that the age-65 cutoff is not independently associated with outcomes through channels other than NDIS eligibility. We test this assumption extensively. The McCrary

density test finds no manipulation of the running variable (T = −0.581, p = 0.561). Pre-rollout placebo tests show flat coefficients across all outcomes in the pre-period. Covariate balance at the age-65 cutoff is confirmed across gender, Indigenous status, location, health utilisation, and earnings. Strategic migration toward the cutoff is ruled out (net movement of −0.60 persons per cell). Results are stable across 69 alternative specifications varying bandwidth, polynomial order, and rollout period restrictions.

6. Valuing Social Investment: The Marginal Value of Public Funds

6.1 The MVPF Framework

We evaluate the welfare implications of NDIS participation using the Marginal Value of Public Funds framework developed by Hendren and Sprung-Keyser (2020). The MVPF is defined as the ratio of willingness to pay (WTP) to net fiscal cost. Willingness to pay aggregates the value to recipients of mortality reductions (valued using the value of a statistical life year at $253,000; OIA, 2026) and quality-of-life improvements. Net fiscal cost equals program expenditure less fiscal spillovers (savings in aged care, health, and other programs) and tax revenue effects.

The framework is well-suited to disability policy for three reasons. First, it integrates fiscal spillovers across programs, precisely the cross-system effects that disability policy debates have struggled to quantify. Second, it permits explicit treatment of quality-of-life improvements as a welfare component, even when these are not directly observed. Third, it provides a common currency for comparing disability programs with health insurance, housing, education, and cash transfer programs.

6.2 The Numbers

Annual fiscal spillovers total $29,674 per participant, comprising residential aged care savings ($14,613), home care package savings ($5,143), transition care savings ($1,512), MBS savings ($3,621), and PBS savings ($4,786). Against an average annual NDIS cost of $131,656 (NDIA FY 2025-26 Q2), these savings cover 22.5 per cent of program costs. Mortality improvements add a further willingness-to-pay of approximately $17,402 per year. Compounding these annual savings over an adjusted life expectancy of 17.4 years at a 7 per cent real discount rate (consistent with Australian OIA guidance) yields present value fiscal spillovers and mortality improvement of $465,000 per participant, against present value net fiscal costs of approximately $1.008 million. The baseline MVPF (excluding quality-of-life improvements) is 0.462: for every dollar of government spend, the program generates 46 cents of measurable social value, rising materially with plausible quality-of-life gains.

This places the NDIS at the lower end of in-kind transfer programs (0.42–1.07 in Hendren and Sprung-Keyser's framework) and below health insurance expansions to adults (0.80–1.63). It is not exceptional value by this measure. A balanced assessment is that the NDIS generates social value consistent with programs governments in comparable economies routinely fund (for example, food stamps, housing vouchers, community services) but it does not generate as much social value per dollar as health insurance, which provides consumption-smoothing benefits in addition to care.

Quality-of-life improvements are the key unobserved parameter. A 0.05 QALY improvement (equivalent to resolution of moderate depression or moving from severe to moderate problems in one domain of the EQ-5D) raises the MVPF to 0.586. A 0.10 QALY improvement (equivalent to successful hip replacement or resolution of moderate anxiety) yields 0.710. An upper bound of 0.15 QALY yields 0.834, squarely within health insurance territory. For individuals with significant functional impairment receiving supports that improve personal care, mobility, and community participation, QALY improvements in the 0.05 to 0.10 range are clinically plausible.

Scenario	Life Years Gained	Fiscal Spillovers	Net Fiscal Cost	MVPF
Baseline (no QoL)	$17,402	$29,674	$101,982	0.462
+ 0.05 QALY (e.g. moderate depression)	+ $12,650	–	–	0.586
+ 0.10 QALY (e.g. hip replacement)	+ $25,300	–	–	0.710
+ 0.15 QALY (e.g. significant mental illness)	+ $37,950	–	–	0.834
Health Insurance: Hendren & Sprung-Keyser (2020)	–	–	–	0.80–1.63
In-Kind Transfers: Hendren & Sprung-Keyser (2020)	–	–	–	0.42–1.07
Cash Welfare: Hendren & Sprung-Keyser (2020)	–	–	–	0.11–1.20

Table 2: MVPF Decomposition and Benchmarks. All values AUD, discounted at 7% over adjusted life expectancy 17.4 years. VSLY = $253,000 (OIA, 2026). NDIS cost = $131,656/year. Baseline MVPF (0.462) excludes QoL improvements; heterogeneous MVPFs by trajectory position: non-workers 0.430 (care-substitution channel), workers 0.884 (health-complement channel) – see Section 7. Benchmark ranges from Hendren and Sprung-Keyser (2020) and Policy Impacts Library (policyimpacts.org).

These results have direct implications for the NDIS sustainability debate. The question is not whether the NDIS is exceptional value, but rather whether it generates sufficient social value to justify ongoing public subsidy. At 0.462 for this cohort (and higher with plausible QoL assumptions) the NDIS generates social value consistent with comparable programs supporting vulnerable populations that governments routinely fund, suggesting the fiscal sustainability case rests on cost containment and targeting integrity rather than the program being poor value per dollar for its intended population.

7. Heterogeneity: Who Benefits Most, and Through Which Channel?

The most economically meaningful heterogeneity is by participants' position on the disability-work-care trajectory. For the 89 per cent of our sample who were not working prior to NDIS access (non-workers), the fiscal return operates through the care-substitution channel: RAC and HCP savings dominate, and there are no labour supply effects. For the 11 per cent who were working prior to NDIS access (workers), the return operates through the health-complement channel: aged care substitution effects are attenuated because these individuals are further from the care boundary, but NDIS supports sustain the functional capacity that underpins health system engagement, generating larger MBS and PBS savings. Crucially, both groups generate nearly identical total annual fiscal spillovers: the NDIS generates the same aggregate fiscal value

through entirely different mechanisms depending on who is in the program. Evaluation frameworks that assume a single mechanism misstate both the size and source of the returns.

Critically, decomposing the MVPF by trajectory position reveals that the pooled figure of 0.462 obscures two economically distinct program valuations. Non-workers (those near the institutional care boundary) generate an MVPF of 0.430, with the fiscal return driven almost entirely by avoided aged care costs (RAC and HCP savings account for 86 per cent of their total fiscal spillovers). Workers generate an MVPF of 0.884, nearly twice as high, with the return driven instead by larger health system savings and substantially larger mortality improvements. Both groups generate nearly identical total annual fiscal spillovers (approximately $33,400 for non-workers and $34,300 for workers) through completely opposite channels. The MVPF difference is driven entirely by the mortality component: workers, with higher baseline functional capacity, gain more life-years from NDIS access. This is a counterintuitive and important result for program evaluation: aggregating across trajectory positions does not just average fiscal returns, it systematically misidentifies both the mechanism and magnitude of social value for each group. A pooled MVPF of 0.462 correctly characterises neither subgroup.

Geographic and demographic heterogeneity is also present. Indigenous Australians show larger home care package reductions, likely reflecting higher baseline care needs associated with the compounding effects of historical disadvantage, geographic remoteness, and more limited access to preventive health services. Remote participants show insignificant residential aged care effects, reflecting limited aged care infrastructure rather than no underlying benefit. The complier population (individuals who accessed the NDIS because the rollout reached their area before their 65th birthday) is concentrated near the care boundary: older, more likely to be female, with substantially higher baseline health utilisation and longer prior DSP duration. These are the individuals for whom the care-substitution fiscal channel is strongest.

The implication for NDIS targeting is direct: the program generates the highest fiscal returns from aged care substitution when it reaches individuals with the greatest functional impairment approaching the care boundary. For individuals with greater labour market attachment, the fiscal return channel is different. The heterogeneity of fiscal returns by trajectory position has implications for funding design. A differentiated funding model, such as full public support for those near the care boundary; income-contingent contributions for some funding elements for those with greater labour market attachment, is consistent with both the heterogeneous fiscal profiles and the equity principles underlying the scheme provided needs-based entitlement remains the primary determinant of access.

8. Policy Implications for Australia

8.1 For the NDIS

Three findings from this paper speak directly to the NDIS reform agenda. First, the care-substitution fiscal case for the scheme is strongest for its intended population: individuals with significant and longstanding functional impairment. It is for this group that early disability support most directly reduces downstream aged care and health costs – an important fiscal channel for ageing societies and central to the scheme's original rationale. Targeting reforms that sharpen access criteria and concentrate resources on this group maximise care-substitution spillovers Scheme expansion beyond this population may generate different fiscal returns through other channels, but the nature and magnitude of those returns and trade-offs is an open empirical question.

Second, the scheme's fiscal value compounds over time. This means that short-run cost projections will systematically overstate the net cost of the scheme by missing downstream savings. Incorporating long-run spillover estimates of the kind produced in this paper can add insight to the Scheme Actuary's financial

sustainability framework. A full fiscal accounting of the NDIS including aged care and health savings, mortality reductions, and quality-of-life improvements produces a materially different picture of the scheme's value than a single-program cost analysis.

Third, heterogeneous fiscal channels suggest that the composition of scheme growth matters as much as its rate. Growth that concentrates on individuals with the greatest functional impairment near the care boundary generates larger downstream fiscal savings than growth driven by expanding services to lower-need individuals. Targeting integrity is therefore a fiscal priority, not only an equity one.

8.2 For Aged Care Reform

The new means-testing arrangements under the new Aged Care Act 2024 also have implications for how the savings we document should be attributed. Individuals entering aged care after November 2025 face higher co-contributions, reducing the public cost of their care. From a fiscal perspective, this means some of the savings we attribute to the government may now partially accrue to individuals, reducing the public MVPF but not the social MVPF, since the savings are real regardless of who captures them. The distribution of those savings between individuals, government, and aged care providers under the new means-testing arrangements is itself a question of equity as well as fiscal design, and one that actuarial modelling is well placed to address as the new system matures.

8.3 For Retirement Income Policy

The retirement income dimension of this interface of how NDIS participation shapes superannuation accumulation, drawdown behaviour, and the capacity to self-fund aged care costs is a further frontier that the profession is well placed to model as the scheme matures and longer-run longitudinal data become available. Modelling the life-course financial implications of disability, including the interaction between NDIS participation, superannuation accumulation, and aged care cost risk across different functional trajectories, is a natural area for actuarial contribution. The data infrastructure to do this work is now largely in place; what is needed is the professional capacity to use it.

9. The Actuarial Frontier: Why This Work Matters for Our Profession

9.1 What Makes This Work Actuarial

The methods used in this paper of causal identification from administrative discontinuities, long-horizon present-value fiscal analysis, heterogeneous treatment effect estimation, sensitivity analysis under uncertainty, and the translation of empirical estimates into welfare-relevant metrics are not commonly described as actuarial. They sit closer to health economics, public finance, and applied econometrics. But they are, in substance, deeply consistent with actuarial principles: they are concerned with the long-run financial consequences of uncertain future events, with the valuation of risk across populations, and with translating empirical evidence into quantitative guidance for decision-makers.

The global context in which the actuarial profession operates is changing. Ageing populations, climate risk, artificial intelligence, and the growing complexity of public social insurance systems are reshaping the landscape of consequential decisions that require rigorous quantitative analysis. Expanding the domains in which actuaries add value is a channel for a thriving profession which continues to attract the brightest analytical minds to its ranks. Realising that ambition requires the profession to apply its core toolkit in unfamiliar institutional settings, continuing to build credibility through the rigour and relevance of its contributions rather than through incumbency. This paper is a contribution in that spirit: a demonstration that actuarial methods, applied to new data infrastructure and the pressing social policy questions of an

ageing society, can generate causal evidence that informs decisions worth billions of dollars and affecting hundreds of thousands of lives.

9.2 The Distinctive Actuarial Contribution

Actuarial contributions to social insurance design have shaped some of the most consequential policy architecture of the past century. Alfred Watson, the first UK Government Actuary, established the actuarial foundations of National Insurance and the state pension in Britain; in Australia, John Walsh and the Productivity Commission brought the same insurance logic of pooled risk, lifetime cost modelling, early intervention reducing long-run liability to the design of the NDIS itself. This paper provides the causal evidence that tests whether that actuarial logic was correct. The answer, for the intended population, is that it was.

The quantitative analysis of long-run social policy has historically been led by economics, a discipline with powerful tools for causal identification, welfare analysis, and distributional assessment. Actuaries bring complementary strengths that are underutilised in this space: deep expertise in long-horizon liability valuation, the explicit quantification of uncertainty across decades, and the modelling of trajectories that accumulate slowly and generate obligations that compound over time. The most consequential policy questions of ageing societies – disability system sustainability, aged care demand, retirement income security – sit precisely at this intersection.

The NDIS is, at its core, a social insurance program managing a long-tail liability: the cost of supporting individuals with permanent disability over their remaining lifetimes. The aged care system is the downstream institution that absorbs the residual risk when that support is insufficient. Valuing the interaction between these two systems, across uncertain time horizons and heterogeneous populations, is actuarial work. The PLIDA linked administrative data infrastructure (and analogous infrastructure internationally) is transforming what is knowable about the long-run consequences of social policy. Becoming fluent users of this infrastructure, and translating causal estimates into present-value projections with explicit uncertainty quantification, is a professional priority. The profession that builds credibility in this space will earn influence in decisions that matter.

9.3 A Generation of Global Challenges

The generation of actuaries now entering the profession will spend their careers navigating challenges that are generational and transformational in scale. Ageing populations will generate fiscal pressures across every developed economy that cannot be resolved through standard actuarial practice in insurance and superannuation alone. Climate change will require the valuation of long-horizon physical and transition risks across asset classes, sectors, and geographies that existing tools are only beginning to address. Artificial intelligence will transform the nature of risk itself: the distribution of labour market outcomes, the insurance of new liabilities, the governance of systems that make consequential decisions at scale.

What these challenges share is that they are long-duration, highly uncertain, and deeply consequential for public finance and individual welfare. They require professionals who can think across decades, model uncertainty with rigour, and translate analysis into actionable guidance for decision-makers in government, industry, and civil society. The actuarial profession has the intellectual foundations for this role. Whether it realises that potential depends on whether the next generation of actuaries is willing to apply their skills to problems where the answers are not yet known and the institutional frameworks are still being built, and whether the profession continues to invest in the capabilities and collaborations that make that possible.

This paper is a small contribution to that project. It demonstrates that an actuary, working at the intersection of causal inference, linked administrative data, and long-horizon welfare analysis, can produce evidence of

direct relevance to billion-dollar policy decisions about disability, aged care, and social investment. The question for the profession is: how many more such contributions could we produce, and what would it take to produce them systematically?

10. Conclusion

This paper has made two arguments. The first is empirical: early access to individualised disability support through the NDIS meaningfully reduces future aged care utilisation, healthcare costs, and mortality for individuals with significant and longstanding functional impairment. Effects compound over time, generating present value fiscal savings of 22.5% of average NDIS cost per participant and an MVPF of 0.462, consistent with in-kind transfer programs governments routinely fund, and higher with plausible quality-of-life assumptions. The fiscal systems for disability and aged care are not independent: they are partially offsetting and evaluating either in isolation will systematically misstate the cost-benefit calculus of investment decisions.

The second argument is professional: the actuarial toolkit is well suited to questions of this kind, and the profession can engage more systematically in producing the evidence that policymakers need to make better decisions about long-run social investment. The methods are accessible, the data infrastructure is increasingly available, and the policy questions are pressing. The decisions being made about disability support, aged care, and social investment will shape the lives of some of the most vulnerable Australians for decades. That is exactly the kind of problem the actuarial profession can help solve.

As the NDIS matures, as the new Aged Care Act reshapes the support landscape for older Australians, and as retirement income policy begins to grapple with the intersection of superannuation, disability, and care costs, the need for rigorous long-horizon analysis will only grow. The actuarial profession has earned credibility in these adjacent spaces through decades of work on mortality, longevity, and social insurance design. The case for extending that credibility to the empirical analysis of life-course investment and to the frontier of linked administrative data research is compelling.

Detailed empirical results, and extended welfare analysis are available in the companion academic working paper (Ranjan, Breunig and Clarke, 2026).

References

Australian Bureau of Statistics (ABS). (2026). Person Level Integrated Data Asset (PLIDA). Canberra: ABS.

Finkelstein, A., and McKnight, R. (2008). What did Medicare do? Journal of Public Economics, 92(7), 1644–1668.

Grembi, V., Nannicini, T., and Troiano, U. (2016). Do fiscal rules matter? American Economic Journal: Applied Economics, 8(3), 1–30.

Hendren, N., and Sprung-Keyser, B. (2020). A unified welfare analysis of government policies. Quarterly Journal of Economics, 135(3), 1209–1318.

Lee, D. S., McCrary, J., Moreira, M. J., and Porter, J. (2022). Valid t-ratio inference for IV. American Economic Review, 112(10), 3260–3290.

McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. Journal of Econometrics, 142(2), 698–714.

National Disability Insurance Agency (NDIA). (2026). NDIS Quarterly Report Q2 FY2025-26. Canberra: NDIA.

Office of Impact Analysis (OIA). (2026). Cost-benefit analysis guidance. Australian Government.

Policy Impacts. (2024). Policy Impacts Library. policyimpacts.org. Accessed April 2026.

Productivity Commission. (2024). Report on Government Services 2024–25. Canberra: Productivity Commission.

Ranjan, M., Breunig, R., and Clarke, P. (2026). Fiscal spillovers from capacity-enhancing disability support: Evidence from Australia's National Disability Insurance Scheme. Working paper, Australian National University.

Royal Commission into Aged Care Quality and Safety. (2021). Final report: Care, dignity and respect. Commonwealth of Australia.

Stock, J. H., and Yogo, M. (2005). Testing for weak instruments in linear IV regression. In Andrews and Stock (Eds.), Identification and Inference for Econometric Models. Cambridge University Press.

Acknowledgements

This paper draws on joint research with Robert Breunig (Australian National University) and Philip Clarke (University of Oxford). The underlying empirical analysis is presented in detail in the companion working paper (Ranjan, Breunig and Clarke, 2026). Data access was provided by the Australian Bureau of Statistics under the PLIDA linked data framework. The views expressed are those of the author and do not represent the views of any government agency or the Actuaries Institute.