The Labour Market Effects of Insurance for Disability Supports *

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Abstract

Most evidence on disability insurance focuses on income-replacement schemes that insure foregone earnings but depress labour market outcomes. Yet little is known about the economic effects of programmes that fund disability-related supports – aids and services which assist with activities of daily living and expand functional capacity. This paper provides the first causal evidence on the labour market effects of large-scale funding for disability supports. Leveraging a staggered difference-in-differences design around the the roll-out of Australia's National Disability Insurance Scheme (NDIS), I find that the reform increased participants' total annual earnings by 11.1% in the four years following exposure, while receipt of income-replacement benefits declined. The effects are highly heterogeneous: earnings gains are driven almost entirely by participants with prior labour force attachment, while those with no employment history remain unaffected. Using a novel administrative dataset on funding allocations and participant outcomes, I provide evidence that the NDIS increased economic participation mainly through indirect channels – by reducing care constraints and increasing autonomy – rather than through direct channels such as employment services or training supports. The results demonstrate that supports-focused disability policy can raise economic participation without incurring the labour trade-offs typical of income-replacement schemes.

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1 Introduction

Disability insurance programmes provide essential economic support for people with disabilities, but often at the cost of reduced incentives to work. A central challenge for policymakers is how to support people with disabilities while enabling greater economic participation. Whereas the economics literature almost exclusively focuses on income-replacement schemes that provide cash benefits to compensate for foregone earnings, little is known about the economic effects of programmes that fund disability-related supports. These are aids and services such as personal care, assistive technologies, and skills training, which build capacity and may reduce barriers to work rather than discourage it. This paper provides novel causal evidence on this question by studying a large-scale expansion of funding for disability supports in Australia.

The disability supports reform I study is the introduction of the National Disability Insurance Scheme (NDIS), Australia's largest social policy reform since the establishment of universal healthcare in 1984. The NDIS replaced a fragmented patchwork of State and Territory programmes with a single national system of individualised budgets, providing eligible participants with substantially greater funding for disability supports. This provides for an appealing quasi-experimental setting to study the impact of a large-scale change in the financing and delivery of disability supports. Unlike income-replacement schemes, systems that fund disability supports in other countries are often highly decentralised and fragmented, which hinders systematic evaluation.[1] In contrast, the NDIS covers a wide range of disability-related aids and services which are intended to improve independence, capacity, and social and economic participation. Importantly, the NDIS is independent and distinct from Australia's income-replacement scheme (the DSP), which replaces foregone earnings due to work incapacity.

For causal identification, I leverage a staggered difference-in-differences design around the introduction of the NDIS between 2013 and 2020, using linked adminis-

[1]For example, in England adult social care budgets are set by local authorities rather than via a national entitlement. In the United States, the Medicaid Home- and Community-Based Services system is targeted at low-income individuals, managed at the state level, and is focused on preventing institutionalisation rather than building capacity. For an overview of funding schemes in Europe, see EASPD (2020). In many cases, gaps in disability support services are filled by not-for-profits and community organisations.

trative data on incomes, welfare receipt and NDIS participation. For the most part, the approach compares participants living in regions where the NDIS has been introduced with future participants who are not currently enrolled due to the timing of the roll-out. I estimate event study-style regressions using the method of Callaway and Sant'Anna (2021) to account for bias due to heterogeneous treatment effects. Using my preferred specification and summary measure, which takes a simple average of the event study coefficients between one and four years post-exposure, I find that exposure to the NDIS roll-out increased annual earnings by 11.1%, relative to the control group of future participants. Employment, however, was not significantly affected, suggesting that most of the earnings effect is mediated by individuals already in employment. The results are robust to alternative specifications which control for baseline characteristics, and sensitivity analyses show robustness to counterfactual linear trends and some non-linearities. Next, I provide evidence that the NDIS reform had spillover effects on receipt of income-replacement (the DSP). Around 82% of my analysis sample comprise participants who are also in receipt of the DSP. I find that DSP receipt decreased by 1.7 ppts on average in the four years following exposure. This is consistent with the rules around DSP benefits because as with most income-replacement schemes, DSP benefits scale with income.

In the second part of my analysis, I uncover substantial heterogeneity in the labour supply responsiveness of the population of disability supports recipients. I find that the positive earnings effect is entirely concentrated among participants with prior labour force attachment. Those with *any* history of employment before the roll-out, who make up around half the sample, account for nearly all of the earnings gains. In contrast, the earnings response of the other half of the sample is close to zero. The results underscore that care should be taken when interpreting local estimates of labour supply responses to disability benefits. In particular, the responsiveness of those at the margin of employment may differ substantially from that of the broader population of recipients.[2] I then show that consistent with the above findings, the earnings response is stronger the greater the individual's prior earnings capacity. A natural question that arises is whether these differential earnings responses by prior earnings

[2]For example, "judge" identification strategies in the style of Maestas et al. (2013) and French and Song (2014) estimate effects from a complier population of disability insurance applicants who would have received different judgements from "tough" versus "lenient" examiners. These effects may not to translate to the non-compliers who would have been accepted by tough and lenient examiners alike, and who make up the bulk of the eligible population.

and employment capacity are driven by correlated differences in functional capacity. Surprisingly, I find that they are not: there are no clear differences in the earnings effects among individuals with low, medium, or high functional capacity. Differences do emerge, however, by *type* of disability. Individuals with physical disabilities experience the strongest effects, followed by those with psychological disabilities, while I detect null effects for individuals with neurodevelopmental disabilities. The null effect in the latter group rules out transitions to or within supported employment arrangements as a key driver of the overall results. Supported employment refers to specialised employment arrangements for people with high support needs, which typically include a not-for-profit employer, on-site supervisors, and exemptions allowing wages to be set below the mandatory minimum.[3] Because the vast majority of people in supported employment have intellectual disabilities, transitions through this channel can be ruled out. In other words, the evidence suggests that the earnings effects are driven primarily by individuals in regular, open employment.

Finally, to better understand how disability supports funding can generate labour market gains, I analyse confidential data provided by the National Disability Insurance Agency (NDIA), which contain rich information on participants' funding allocations, plan characteristics, and self-reported outcomes across multiple domains of support and well-being. These data offer a unique window into the intermediate mechanisms through which disability supports can influence economic participation. Overall, I find consistent evidence that the NDIS improved participants' functioning and autonomy: measures of activities of daily living (ADLs), perceived independence, and choice and control all rise for the vast majority of participants following enrolment. Most participants also reported better health and well-being outcomes, suggesting that access to funded supports may have alleviated constraints on physical capacity and/or mental health that may otherwise hinder participation in work. By contrast, among the participants most likely to experience earnings gains, there is little evidence of improvements in employment or education-related outcomes, and relatively little funding is directed toward these supports. These patterns imply that the positive labour market effects documented in the main analysis likely operate through indirect channels: by enhancing participants' ability to manage their impairments, reducing reliance on unpaid care, and freeing time and energy for work, rather

[3]People in supported employment in Australia are subject to the Supported Employment Services Award.

than through direct channels such as job placement or training programmes. In this sense, the NDIS appears to have acted primarily as an enabler of functional capacity and independence, rather than as a conventional employment intervention.

My findings carry several important implications for the design of disability policy. First, unlike income-replacement programmes that entail a trade-off between benefit generosity and labour market participation, funding for disability supports need not discourage work. Funding for disability supports provides an appealing avenue to expand disability insurance while encouraging labour market participation and maintaining fiscal sustainability. As my results on DSP show, it may even reduce long-term reliance on income-replacement schemes. Second, my paper uncovers a large degree of heterogeneity in the labour supply responsiveness of the disability population. Many participants appear largely unresponsive to changes in funding, whereas those with prior labour force attachment experience meaningful earnings gains. Given this, policymakers should exercise caution when applying across-the-board adjustments to benefits, as these impose universal costs on a population that is only partially responsive. Targeting supports toward individuals with existing or potential attachment to the labour market while maintaining a strong safety net for those with limited capacity may yield more efficient and equitable outcomes. Third, policies aimed at improving labour market outcomes should consider indirect supports that assist with daily living and lower barriers to work; as opposed to direct supports such as employment or education programmes.

This paper contributes to the large empirical literature on the labour market effects of disability insurance programmes (see Low and Pistaferri 2020 and Koning and Lindeboom 2015 for reviews). Studies focusing on causal identification have typically found that increases in the generosity of disability insurance reduce incentives for labour force participation (Autor et al. 2019; Autor et al. 2016; French and Song 2014; Maestas et al. 2013; von Wachter et al. 2011). The effects of disability insurance have been studied across a variety of margins, including changes in eligibility criteria versus benefits (Haller et al. 2020); income versus substitution effects (Autor and Duggan 2007; Becker et al. 2024; Gelber et al. 2017; Marie and Vall Castello 2012); and child versus adult receipt of benefits (Deshpande 2016; Deshpande and Li 2019; Duggan and Kearney 2007). However, the literature almost exclusively fixates on income-replacement schemes. In contrast, I study a reform to funding for

disability supports. Specifically, I provide novel causal evidence of the labour market effects of the NDIS reform, Australia's largest social reform since the introduction of universal healthcare, and one of the largest transitions to a personalised budgets approach to disability supports in the world. To the best of my knowledge, this is the academic first paper to systematically study the causal effects of the NDIS on labour market outcomes.[4] Income-replacement, as the name suggests, comes in the form of cash benefits and is intended to replace foregone income due to disability-related work incapacity. The scheme I study funds only disability-related supports which are intended to help overcome barriers to economic and social participation due to disability. A smaller body of literature explores the effects of policies designed to increase incentives for people with disabilities to work. Examples of these type of active labour market policies include the Ticket-to-Work programme in the US, which provides free employment services to disability benefits recipients, or wage subsidies which incentivise employers to hire people with disabilities (Datta Gupta et al. 2015; Thornton et al. 2007). These studies tend to find modest or negligible effects on increasing the labour market participation of people with disabilities. Rather than examine the effects of a specific type of employment support, this paper instead examines the effects of the introduction of a scheme which increased funding for a broad range of disability-related supports which, as discussed above, may activate labour market outcomes through more indirect channels.

The rest of the paper proceeds as follows. Section 2 describes the institutional context of the NDIS reform and provides an overview of NDIS funding and eligibility. Section 3 describes the data and construction of the sample used for analysis. Section 4 details the empirical strategy. Section 5 presents descriptive statistics on the analysis sample and provides evidence for the first stage of the analysis. Section 6 presents the results and Section 7 explores heterogeneous effects by prior employment and earnings capacity, disability characteristics and age. Section 8 presents supplementary evidence on mechanisms. Section 9 concludes.

[4] A limited causal analysis of the NDIS is also included in the supplementary analysis of the "Working together to deliver the NDIS" report by the Australian government (Commonwealth of Australia, Department of the Prime Minister and Cabinet 2023).

2 Institutional Context

The NDIS constitutes Australia's largest social reform since the introduction of Medicare (Australia's universal public health insurance scheme) in 1984. Annual expenditure on disability supports expanded massively from roughly AUD 6 billion in 2010 to more than AUD 17 billion by end of the rollout in the 2019–20 financial year, delivered through a national, legislated entitlement reform.

Prior to the NDIS, disability support services were delivered through a fragmented mix of local, state and federal programmes, often operating under capped budgets. A report in 2011 by the Productivity Commission, an independent research and advisory body for the Australian Government, found that the system was "underfunded, unfair, fragmented and inefficient" (Commission 2011). To address this, the reform implemented two structural changes in addition to the massive expansion of funding. First, it nationalised disability supports, replacing the patchwork of jurisdiction-specific programmes with a single scheme administered by the National Disability Insurance Agency (NDIA). Second, it replaced the existing block-funded model of service delivery with a demand-driven model of individualised funding, under which eligible individuals receive personalised budgets ("NDIS plans") that can be spent on disability-related supports from providers of their choice.[5]

In the following subsections, I describe key features of the NDIS, including eligibility criteria, NDIS plan components and disability support categories .[6]

Eligibility: Australian citizens and permanent residents under 65 years of age with a disability caused by a permanent impairment which substantially reduces functional capacity are eligible for the NDIS.[7] Children are thus also covered by the NDIS, although they are not the focus of this paper. The NDIS provides two lists of potentially eligible disabilities: List A comprises eligible conditions that generally do not require further assessment, and List B comprises "conditions for which permanent impairment/functional capacity are variable and further assessment of functional

[5] In the block funding model, disability services providers received government funding for providing services to eligible recipients.

[6] More detailed information can be found on the NDIS website: https://www.ndis.gov.au/

[7] The disability requirements for NDIS eligibility are detailed in Section 24 of the *NDIS Act 2013 (2013)*.

capacity generally is required".[8] The lists are to streamline the process only and NDIS participants may have a disability not listed as long as they meet the other requirements. Evidence of disability is provided by the participant's treating health-care professional, and is assessed by the NDIA.

NDIS plans and funding: After confirming eligibility, an NDIS planner, together with the NDIS participant (and possibly the participant's carer), formulate an NDIS plan (usually reviewed annually). The NDIS plan is a personalised budget which stipulates the individual goals of the participant, the allocation of funding, how the funding relates to the participant's goals, and the way in which funding is managed. The amount of funding is determined on an individual basis and centred on disability-related need. This means that people with the same disability and the same functional capacity may have different funding amounts and different types of supports covered, depending on their individual needs and goals. Participants' goals can vary widely, and may cover skills-building, independent living, employment, education, and social engagement. Participants may also choose how their plan is managed. Self-managed plans allow the participant the most choice and control over their funding, allowing them to flexibly choose their disability supports. In this case, the participant is responsible for paying support providers, claiming from the NDIS, and keeping administrative records of their transactions. Plan-managed plans set aside funding for a plan manager to organise purchases and claiming on behalf of the participant. Agency-managed plans have the least flexibility, allowing the participant to only use the services of providers registered with the NDIS, but are the most administratively convenient since the participant can directly claim supports with the NDIS.[9]

It is important to note that the NDIS does not fund supports that are more appropriately covered by another scheme. For example, the NDIS does not fund medications or doctor visits, which are funded by Medicare, or income-replacement due to work incapacity, which is funded by the DSP. Figure C1 in the Appendix illustrates the range of different Federal government programmes available to households

[8]The NDIS also provides early intervention support, which has different eligibility criteria (see Section 25 of the *NDIS Act 2013 (2013)*). These are supports which help to reduce the functional impacts of an impairment and may only be needed for a short period of time. Participants receiving early intervention support are not included in this paper's analysis.

[9]NDIS-registered providers need to meet specific quality and safeguard requirements set out by the NDIA. They are also subject to NDIA pricing regulations. Unregistered providers are not subject to these requirements, however they are not able to service participants on Agency-managed plans.

with disability.

Disability support categories: NDIS plans provide funding for a wide range of disability supports, which can be allocated across three main categories. Core supports assist NDIS participants with everyday activities and include funding for formal care services, consumables, transport and activities for social and community participation. This category of supports has the most flexibility with respect to spending: with some exceptions, the participant can freely allocate their funding between different types of core supports. The second category is capacity building supports, which help to build independence and skills, and includes employment-related support, skills-building, relationships support, and administrative assistance with coordinating supports. This category is relatively less flexible and funding can only be spent within specified subcategories. For example, funding allocated to the subcategory of employment-related supports cannot be spent on other subcategories, such as relationships support. The final category is Capital supports, which funds higher-cost "one-off" purchases such as assistive technology (like a wheelchair), equipment, and home and vehicle modifications. Capital supports are the least flexible, with funding allocated only to items specified in the participant's NDIS plan. A list of the most commonly claimed line items can be found in Appendix Table B1. Some commonly claimed items include transport; assistance with managing and coordinating the NDIS plan budget (support coordinator); assistance with self-care; and community activities.

3 Data

To study the effects of the NDIS on labour market outcomes, I use the Australian Person Level Integrated Data Asset (PLIDA). PLIDA is a confidential, population-level data asset linking administrative and survey data on demographics, health, education, income and taxation. Importantly, each data set within PLIDA can be linked at the individual level through a person-linkage spine. A recent addition to the data asset is the NDIS data set, which I use to identify and characterise the sub-population of NDIS participants. To measure economic outcomes, I use data from personal income tax returns, which contain information on earnings.[10] To measure receipt of welfare payments, including the DSP, I use the DOMINO dataset, which

[10]I observe earnings for anyone who paid taxable income and submitted a tax return for the relevant financial year, including those with reported earnings under the tax-free threshold.

is provided by the Australian Department of Social Services.[11] Below, I describe my method of treatment assignment and the construction of the sample used for analysis.

3.1 Treatment assignment

The staged roll-out of the NDIS was stipulated by bilateral intergovernmental agreements between the Federal government and the State and Territory governments.[12] The agreements contain details on the timing of the roll-out across 84 NDIA service districts covering the whole of Australia.[13] In some cases, the roll-out was also age-based – with respect to adults, this only occurred in the state of Tasmania and the ACT.[14] Using this information, I assign each NDIS participant a roll-out year (financial year) based on the service district (in Tasmania and the ACT, age $\times$ service district) they are living in when first joining the NDIS. In Australia, the financial year begins on 1 July and ends on 30 June each calendar year.[15] Figure 1 illustrates the geographical staging of the NDIS roll-out across Australia. The roll-out began in July 2013, when the NDIS was launched across four trial sites, later expanding to nine sites. There were 5,400 participants (children and adults) in the first 9 months of the Scheme. In 2016, the full transition began, and by 2020, the NDIS was fully operational across Australia. By 2022, there were 502,413 participants in the Scheme (around 2% of the population). Note that some regions in Australia (highlighted in dark grey) are not assigned a treatment year – these are either regions in Western Australia in which an alternative scheme (called the WA NDIS) was piloted or regions in which the population is very small (see Section 3.2 below for more details). People living in these regions are not included in the analysis.

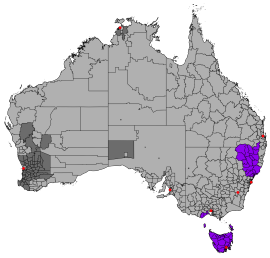
[11] DOMINO stands for Data Over Multiple Individual Occurrences.

[12] These agreements can be found here: https://www.ndis.gov.au/about-us/governance/intergovernmental-agreements

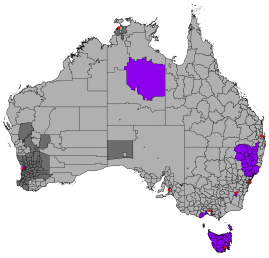
[13] My sample comprises people living in Australia's six states and two main territories: New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania, Northern Territory, and the Australian Capital Territory (ACT).

[14] The roll-out was also age-based for children in the Nepean Blue Mountains in New South Wales, and in South Australia. In the ACT, people in group home accommodation were phased in from July 1 2014. In some areas where the roll-out was age-based, people in supported accommodation were also phased in at different times, which I account for.

[15] Treatment assignment is based on financial year rather than calendar year because tax returns, from which I derive economic outcomes, are reported by financial year.



Year = 2013/14



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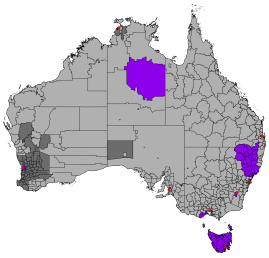

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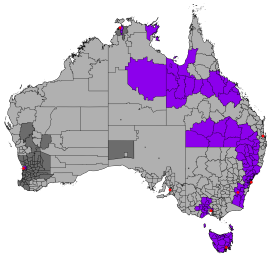
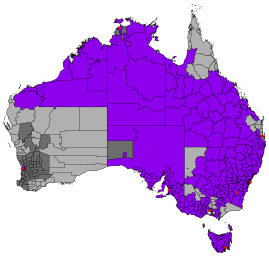


Year = 2016/17



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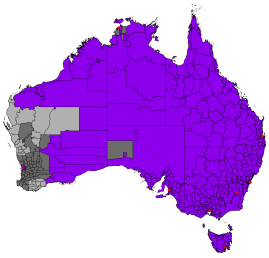
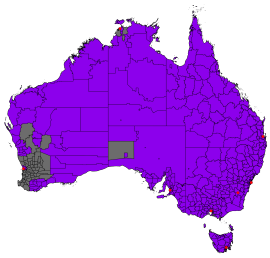


Year = 2018/19



Year = 2019/20

Figure 1. The NDIS roll-out in Australia

Notes: This figure illustrates the geographical staging of the NDIS roll-out for adults across Australia, using geographical units at the level of the 2016 Local Government Area (LGA). The red dots indicate capital cities. The LGAs highlighted in purple denote regions in which the NDIS has rolled out as at the current financial year. The light grey LGAs are yet to receive the NDIS. The dark grey LGAs are either regions in which the alternative scheme (the WA NDIS) was piloted, or regions which have a very small population. These regions are excluded from the analysis.

3.2 Constructing the analysis sample

To construct the sample used for analysis, I start with the sub-sample of current NDIS participants as at December 2022. I transform the data into a balanced panel spanning the financial years of 2011/12 to 2018/19, with the requirement that all individuals have an ABS-identified location in each year. Further details of the steps taken to construct the analysis sample are described in Appendix A. Below, I describe the most important sample restrictions. First, the sample is restricted to participants whose first NDIS plan was approved between the ages of 25 to 58. Given the sample period, this means that the in-panel age ranges between 17 and 64. The maximum in-panel age was chosen because NDIS participants must be younger than 65 when they apply, and because pension age in Australia starts at 65. Second, the sample is restricted to NDIS participants who transitioned from an existing Commonwealth or State Scheme. This restriction ensures a strong "first stage", since the NDIS was intended to replace these schemes (many of these pre-existing schemes became obsolete when the NDIS roll-out was completed). It also means that prior to the roll-out of the NDIS, all participants had a disability and were already eligible for disability supports funding from the government. Third, a separate programme (which was later absorbed into the NDIS), called the WA NDIS, was also trialled in Western Australia concomitantly to the roll-out of the national NDIS. To avoid contamination from this scheme, I exclude from the analysis any NDIS participant living in the trial regions of the WA NDIS. Finally, there are only very few participants assigned to the 2015 roll-out year – due to confidentiality concerns, I drop these participants from the sample. Following these restrictions, the analysis sample comprises 68,800 participants over 8 years for a total of 550,400 observations.

3.3 The NDIA data set:

A drawback of PLIDA is that there is only limited information on funding allocations and plan characteristics for NDIS participants. This limits my ability to move beyond reduced-form analysis to learn more about potential mechanisms that may be at play. To address this, I turn to a unique data source, provided by the NDIA, which collects data on NDIS participants as part of its function in implementing and monitoring the NDIS. In particular, I construct an individual-level data set (hereafter referred to as the "NDIA data set") which contains information on NDIS budget allocations, plan characteristics and participant survey results. In the ideal scenario, the information

in the NDIA data set would be linked to the participants in the main analysis sample. Unfortunately, the data cannot be linked to PLIDA or other outside sources. Since the NDIA data set contains the same universe of people as the PLIDA-linked population of NDIS participants, I can achieve a similar sample of individuals as in the main analysis sample by following the same steps in sample construction as outlined in Appendix A. The only difference is that I cannot drop participants who move state, or who are otherwise invalid due to where they are living at a point in time, as I only observe their region of residence at the time of joining the NDIS. The NDIA data set will be utilised in Section 8 to provide descriptive evidence on the mechanisms behind the main reduced-form results.

4 Empirical strategy

My empirical strategy constitutes a dynamic difference-in-differences (DiD) design which exploits the staggered adoption of the NDIS in Australia between the years 2013/14 and 2019/20. The main regression specification can be formulated as a two-way fixed effects regression as follows:

$$Y_{i,t} = \alpha_i + \alpha_t + \sum_{k=-\underline{K}, k\neq -1}^{\overline{K}} \lambda_k D_{i,t}^k + \epsilon_{i,t} \tag{1}$$

$Y_{i,t}$ is the outcome of interest (e.g. annual earnings), where i denotes the individual and t denotes the financial year. α_i and α_t are individual- and time-fixed effects respectively. $D_{i,t}^k$ is an indicator variable for k periods relative to the treatment year assignment, which is primarily determined by i's NDIA service district on first joining the NDIS. The reference period is at $k = -1$. Since the sample comprises only current and future NDIS participants, all units are eventually treated. The coefficients of interest are the event study coefficients, $\lambda_k : k \geq 0$, which give the average treatment effect on the treated (ATT) at k periods post-treatment. The pre-treatment coefficients, $\lambda_k : k < 0, k \neq -1$, serve as a validation test for parallel trends in the pre-treatment period. Standard errors are clustered at the NDIA service district level.

Under treatment effect heterogeneity, conventional two-way fixed effects estimation of Equation 1 with staggered treatment can lead to negative weights and biased estimates (Baker et al. 2022). To correct for this, I use the estimator of Callaway and Sant'Anna (2021), which is well-suited to settings where all units are eventu-

ally treated. The method estimates individual group-time ATTs, explicitly omitting the so-called "forbidden" comparisons in which the control group has already been treated. With no controls, these group-time ATTs are easily estimated:

$$ATT(g,t) = E[Y_t - Y_{g-1}|G_g = 1] - E[Y_t - Y_{g-1}|D_t = 0] \tag{2}$$

g refers to the first year of treatment for a particular group or cohort. For example, the average treatment effect in 2014 for the cohort treated in 2013 is ATT(2013,2014), and is estimated by comparing the difference in outcomes from 2014 to 2012 (the reference period) for the 2013 cohort against the difference in outcomes for the cohorts not yet treated in 2014. The event study coefficients are then recovered by aggregating the ATTs:

$$\lambda_k = \sum_{g \in \mathcal{G}} \mathbf{1}\{g + k \leq T\} P(G = g | G + k \leq T) ATT(g, g + k) \tag{3}$$

For the sake of comparison, I also estimate the conventional two-way fixed effects specification. The identification assumption is that there are no contemporaneous trends that are correlated with the roll-out of the NDIS and the outcome of interest. For robustness, I also estimate a specification which includes baseline covariates, which loosens the parallel trends assumption to hold conditionally on the covariates.[16] Confidence in the absence of counterfactual post-period trends driving results can be gained in assessing the pre-period event study coefficients. However, conventional pre-trends tests may lack power and cannot reject the presence of linear or non-linear counterfactual trends. Given this, I also conduct sensitivity analysis on the main results using the method of Rambachan and Roth (2023). The sensitivity analysis tests the robustness of the results against counterfactual trends which range from linear to increasingly non-linear.

5 Descriptive statistics

Table 1 shows summary statistics by treatment cohort and in the full analysis sample. In the full sample, the average age is 42. Recipients of disability benefits in income replacement schemes typically skew older – the average age of DSP recipients in 2015, for example, was 49. 16% of participants are assigned to supported independent living (SIL) – these are personal care arrangements for participants with high support and

[16] For details on the estimation procedure with covariates, see Callaway and Sant'Anna (2021).

personal care needs, including those living in shared accommodation with other NDIS participants.[17] SIL plans require significantly more funding than non-SIL plans. On average, participants have a low-moderate level of function, and around 30% of them express an employment-related goal in their first NDIS plans. These are goals related to maintaining or gaining employment. The most common type of primary disability in the sample is neurodevelopmental disability, at 44%, followed by physical disability, at 33%, and psychosocial disability, at 23%. Table 2 lists the most common disabilities in the sample within each disability type. Turning to the sample averages by treatment cohort, the cohorts appear broadly similar across the dimensions of age, gender, Indigenous status, level of function and broad disability category. The ratio of participants living in a major city does vary to some degree over the cohorts, which is not surprising considering the geographical nature of the roll-out. There are also some differences in culturally and linguistically diverse (CALD) status and SIL arrangements. Finally, note that the size of the treatment cohorts vary considerably – this is because the NDIS roll-out began as a trial in the first three years, before accelerating to full expansion from 2016/17.

Figure 2 plots enrolment rates by event time (years relative to exposure to the roll-out). The grey lines show the rates for each treatment cohort, and the black line shows the overall rate. Note that since every participant in the sample were registered with the NDIS as at December 2022, enrolment rates mechanically approach one. However it is the shape of the enrolment rates that illustrates the strength of the treatment assignment strategy. Prior to exposure to the NDIS roll-out, enrolment rates are close to 0%. In the same year of exposure to the roll-out, the overall enrolment rate is already more than 60%, and two years later, the rate exceeds 90%.

[17] The NDIS describes higher support needs as requiring a "significant amount of help throughout the day, 7 days a week. This includes overnight support" (NDIA 2021).

Table 1. Summary statistics

	2013/14	2014/15	2016/17	2017/18	2018/19	2019/20	Full sample
Age at first plan approval	39.09	41.01	41.49	42.35	42.44	42.43	41.97
	(11.36)	(10.99)	(10.28)	(9.96)	(9.78)	(9.78)	(10.12)
Female (=1)	0.47	0.45	0.45	0.46	0.47	0.44	0.46
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Major city (=1)	0.80	0.95	0.60	0.64	0.71	0.84	0.67
	(0.40)	(0.21)	(0.49)	(0.48)	(0.45)	(0.36)	(0.47)
Indigenous (=1)	0.05	0.05	0.05	0.05	0.06	0.06	0.05
	(0.21)	(0.22)	(0.23)	(0.22)	(0.24)	(0.24)	(0.23)
CALD status (=1)	0.03	0.10	0.09	0.08	0.10	0.11	0.09
	(0.18)	(0.30)	(0.29)	(0.27)	(0.30)	(0.31)	(0.28)
Level of function	9.35	9.84	8.50	9.01	9.13	9.76	8.96
	(2.96)	(2.88)	(3.08)	(2.97)	(2.91)	(2.95)	(3.00)
SIL status at first plan (=1)	0.23	0.27	0.18	0.15	0.13	0.21	0.16
	(0.42)	(0.44)	(0.39)	(0.36)	(0.33)	(0.40)	(0.37)
First plan budget	165,062	169,018	85,405	87,360	97,575	125,561	95,684
	(171,282)	(161,469)	(87,028)	(88,982)	(98,227)	(117,568)	(100,988)
First plan budget, excl. SIL	93,672	97,537	54,895	58,616	70,294	79,189	63,358
	(101,076)	(105,994)	(53,644)	(52,326)	(63,193)	(73,576)	(61,101)
Employment goal (=1)	0.37	0.37	0.29	0.33	0.28	0.40	0.31
	(0.48)	(0.48)	(0.45)	(0.47)	(0.45)	(0.49)	(0.46)
Physical disability (=1)	0.27	0.31	0.33	0.32	0.35	0.31	0.33

	(0.44)	(0.46)	(0.47)	(0.47)	(0.48)	(0.46)	(0.47)
Neurodevelopmental disability (=1)	0.51	0.50	0.47	0.44	0.40	0.52	0.44
	(0.50)	(0.50)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)
Psychosocial disability (=1)	0.22	0.18	0.20	0.23	0.25	0.17	0.23
	(0.42)	(0.39)	(0.40)	(0.42)	(0.43)	(0.37)	(0.42)
Agency Managed (=1)	0.42	0.35	0.75	0.53	0.38	0.54	0.54
	(0.49)	(0.48)	(0.43)	(0.50)	(0.49)	(0.50)	(0.50)
Plan Managed (=1)	0.45	0.42	0.16	0.37	0.48	0.28	0.35
Self Managed (=1)	0.13	0.23	0.08	0.10	0.13	0.18	0.11
No. participants	3,138	1,345	17,380	26,761	16,295	1,816	66,735

Notes: This table shows means and standard deviations (in parenthesis) of key variables by treatment cohort, and in the overall sample used for analysis. The label "(=1)" denotes indicator variables. CALD status refers to participants from Culturally and Linguistically Diverse backgrounds. SIL status indicates participants with Supported Independent Living arrangements in their first NDIS plan. Level of function is a score from 1 and 15 which measures a participant's functional capacity. A score of between 1 and 5 indicates relatively high level of function, 6 to 10 indicates moderate level of function, and 11 to 15 indicates low level of function. There are three primary disability categories: physical, neurodevelopmental and psychosocial. There are three plan-management types: Agency-managed, Plan-managed, and Self-managed. The number of participants used to calculate the summary statistics is slightly lower than the full sample due to missing observations of some outcomes.

Table 2. Most common disabilities by broad disability category

Physical	%	Neurodevelopmental	%	Psychosocial	%
Traumatic brain injury	18.9	Unspecified intellectual disability	43.0	Schizophrenia	47.5
Cerebral palsy	15.3	Autism disorder	13.9	Other psychosocial disorders	28.0
Other physical	12.7	Moderate intellectual disability	12.5	Bipolar affective disorder	8.9
Visual impairment	10.3	Down syndrome	11.2	Major depressive illness	6.1
Multiple sclerosis	10.1	Mild intellectual disability	5.9	Borderline personality disorder	3.7

Notes: This table lists the top five most common disabilities in the main sample, for each broad disability category

6 Results

This section presents the main results on the effects of the NDIS roll-out on participants' economic outcomes. I begin by examining the impact on annual earnings and employment, the two primary measures of labour market participation. I then assess how the reform affected receipt of the Disability Support Pension (DSP), which provides income replacement for people with work incapacity. Together, these outcomes capture both the direct effects of disability supports on labour supply and the indirect fiscal implications through reduced benefit dependence.

6.1 Effects on annual earnings and employment

Figure 3a plots the event study coefficients λ_k from estimating Equation 1 on annual earnings (in 2015 AUD), which includes zeroes for non-employment. The red bars show estimates from the benchmark specification, which uses the method of Callaway and Sant'Anna (2021) and the blue bars show estimates from the conventional two-way fixed effects regression. For point estimates of the results on main economic outcomes, see Table 3 (point estimates from the conventional two-way fixed effects regressions can be found in Table B3). I find that the NDIS roll-out increased the annual earnings of NDIS participants, relative to future NDIS participants not yet exposed to the roll-out. The magnitude of the effect increases as exposure increases – five years post-exposure to the NDIS roll-out, the effect is a statistically significant increase of 1,675 AUD (1,260 in 2015 USD) over the control group. Note that since the sample is balanced in calendar-time, it is (mechanically) unbalanced in event-time.[18] This results in compositional changes in the treatment and control groups

[18]For a detailed discussion on the "efficiency" versus "robustness" trade-off of event study estimates using this methodology, see Callaway and Sant'Anna (2021).

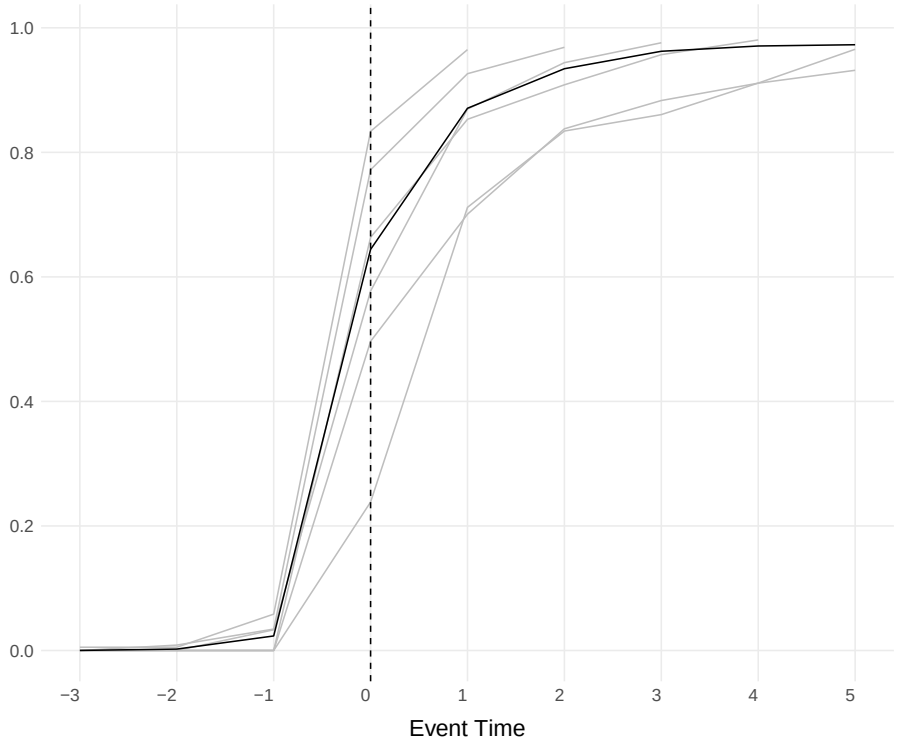
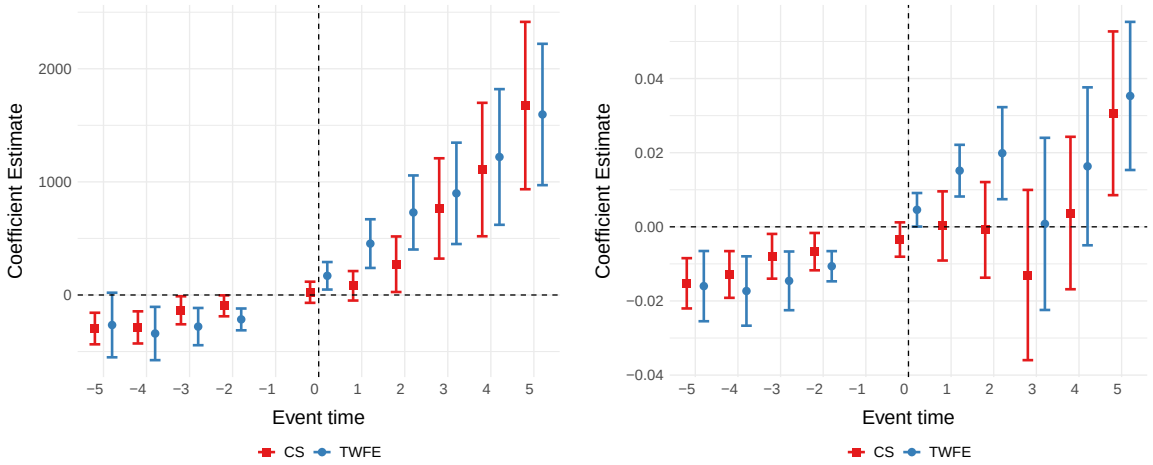


Figure 2. Enrolment rates in the NDIS

Notes: This figure shows actual enrolment rates in the NDIS by event time (years relative to treatment year assignment). The grey lines show enrolment rates in each treatment cohort, and the black line shows the overall enrolment rate.

over time – for example, the estimate at $k = 5$ is compares only the 2013/14 cohort to the last-treated 2019/20 cohort (acting as control). In Section 6.3, I check the robustness of the results against compositional instability. My preferred summary estimate of the effects of the NDIS on earnings is to take a simple average of the event study coefficients over periods $k = 1$ to $k = 4$, which only includes event study estimates calculated from at least two treatment cohorts.[19] This ensures that each event study coefficient utilises observations from at least two different roll-out years. The summary measure yields an estimate of 557 AUD (503 USD) or around 11.1% of the average pre-treatment earnings. Turning to the pre-exposure event study coefficients, the estimates are small relative to the post-exposure estimates, and close to zero. This lends confidence in the identification strategy, which rests on parallel counterfactual trends.



(a) Earnings (b) Employment

Figure 3. Effects of the NDIS roll-out on labour market outcomes

Notes: The main specification using the estimator of Callaway and Sant'Anna (2021) is labelled "CS". "TWFE" estimates the conventional two-way fixed effects specification. The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

As shown in Figure 3 and Column (2) of Table 3, the event study estimates on employment (defined as having an annual earnings greater than zero) are mostly insignificant and close to zero. These results, together with the results on annual earnings, suggest that the effect of the NDIS roll-out on earnings operated mostly on the intensive margin – that is, people already in employment experiencing earnings

[19] I omit $k = 0$ since the actual roll-out date and hence exposure varies within the year of exposure.

Table 3. Effects of the NDIS on economic outcomes

	(1) Earnings	(2) Employment	(3) DSP	(4) DSP basic
Event time:				
−5	-296.59***	-0.015***	-0.001	-13.13
	(71.21)	(0.003)	(0.002)	(35.95)
−4	-286.55***	-0.013***	-0.001	-1.63
	(72.51)	(0.003)	(0.002)	(25.69)
−3	-135.27**	-0.008***	-0.001	-7.23
	(63.15)	(0.003)	(0.002)	(18.71)
−2	-95.90**	-0.007***	0.000	-0.35
	(47.17)	(0.003)	(0.001)	(13.23)
0	24.03	-0.003	-0.002**	-7.42
	(47.67)	(0.002)	(0.001)	(22.21)
1	81.24	0.000	-0.006	-48.95
	(66.48)	(0.005)	(0.004)	(49.02)
2	271.92**	-0.001	-0.010*	-71.48
	(125.29)	(0.007)	(0.005)	(51.81)
3	765.18***	-0.013	-0.025***	-205.28*
	(226.25)	(0.012)	(0.003)	(112.65)
4	1109.11***	0.004	-0.028***	-345.25**
	(300.98)	(0.010)	(0.006)	(143.44)
5	1674.80***	0.031***	-0.019***	-190.47
	(377.44)	(0.011)	(0.006)	(181.71)
N	550400	550400	550400	550400
Pre-treatment mean outcome	5013.13	0.302	0.818	15000.00

Notes: Estimates correspond to event-time coefficients from Equation 1 using the estimator of Callaway and Sant'Anna (2021). Earnings and DSP basic are measured in AUD 2015. DSP basic refers to the amount received of the basic rate of DSP. DSP is a binary outcome which equals one if a person received any basic DSP benefit during the year. Standard errors are clustered at the NDIA service-district level.Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

gains in response to the NDIS.

Finally, I estimate Equation 1 by gender. The effects on earnings and employment are positive for both males and females, with generally stronger effects on females, especially with respect to employment. These results can be found in Figure C2 in the Appendix.

6.2 Effects on disability support pension (DSP)

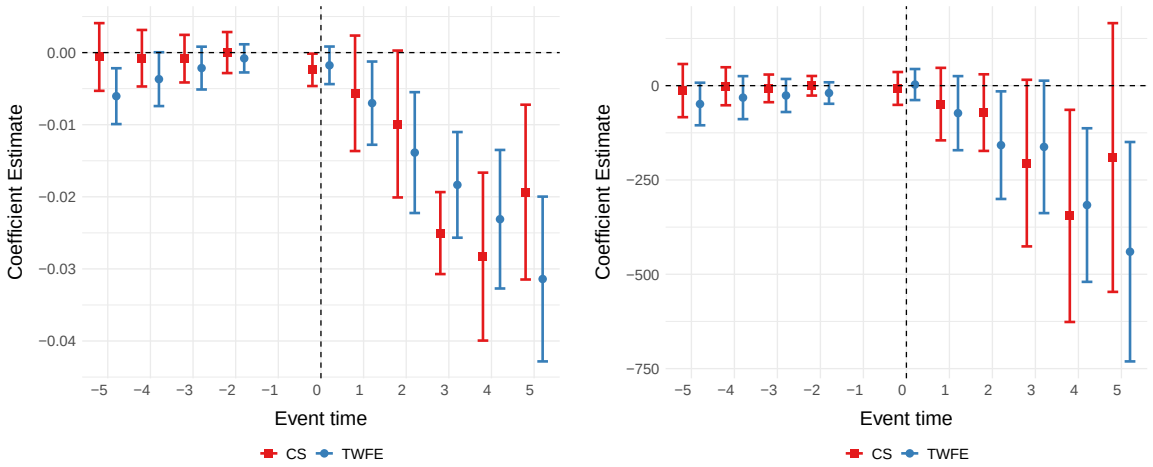
Next, I investigate how the NDIS interacts with Australia's income-replacement scheme for people with disabilities, the DSP. Although the schemes operate independently from each other, there is significant cross-over – 82% of the NDIS sample are enrolled in DSP in the pre-treatment period. As shown in Figures 4a and 4b, I find negative effects on both DSP receipt and amount (see Columns (3) and (4) of Table 3 for point estimates).[20] Using my preferred summary measure, DSP receipt and amount reduced by 2.1% and 1.1% of the pre-treatment average respectively. There does not appear to be significant evidence of pre-trends in the pre-treatment coefficients. Robustness results on the effects on DSP can be found in Figure C4 in the Appendix.

Given the findings on earnings and employment, these results on DSP are unsurprising. As is typical for income-replacement schemes for disability, DSP payments decline with income. The threshold at which this kicks in is relatively low – in 2015 it was 4,212 AUD annually for singles and 3,744 AUD (each member) for couples, after which DSP payments reduced by 50c on the dollar for singles and 25c on the dollar for couples. The results imply that the NDIS reform boosted labour market outcomes even at the expense of some loss in DSP benefits.

6.3 Robustness

To test the robustness of the main results on earnings, employment, and DSP receipt, I perform a variety of checks. Figures C3 and C4 in the Appendix plot event study estimates of Equation 1 for several different specifications. The first specification

[20] My measure of DSP amount is the basic DSP, which is the amount received not including extra or supplemental payments.



(a) DSP receipt (b) DSP basic amount

Figure 4. Effects of the NDIS roll-out on DSP

Notes: The main specification using the estimator of Callaway and Sant'Anna (2021) is labelled "CS". "TWFE" estimates the conventional two-way fixed effects specification. The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

adds baseline covariates to the regression.[21] The second excludes NDIS participants living in Western Australia to check for potential spillover effects from the parallel roll-out of the WA NDIS (individuals exposed to the WA NDIS are dropped from the main sample – see Section 3.2 for more details). The third specification checks for robustness to compositional changes in the control group. The latter occurs as a result of the control group being comprised of not-yet-treated individuals (who, aside from those treated in the final year, will eventually transition to the treatment group). To obtain a stable control group, I use a "donut-hole" strategy which excludes the groups treated in 2016/17 and 2017/18, and uses the groups treated in 2018/19 as a stable,"never-treated" control group. Across all three of these modified specifications, the results remain consistent. Next, in Section B of the Appendix, I estimate Equation 1 using an alternative measure of earnings, derived from individually-submitted tax returns. Briefly, the results using this alternative measure reinforce my findings that the NDIS had positive effects on earnings and that this primarily operated through the intensive margin.

Sensitivity analysis: Whilst an inspection of the pre-period event study coeffi-

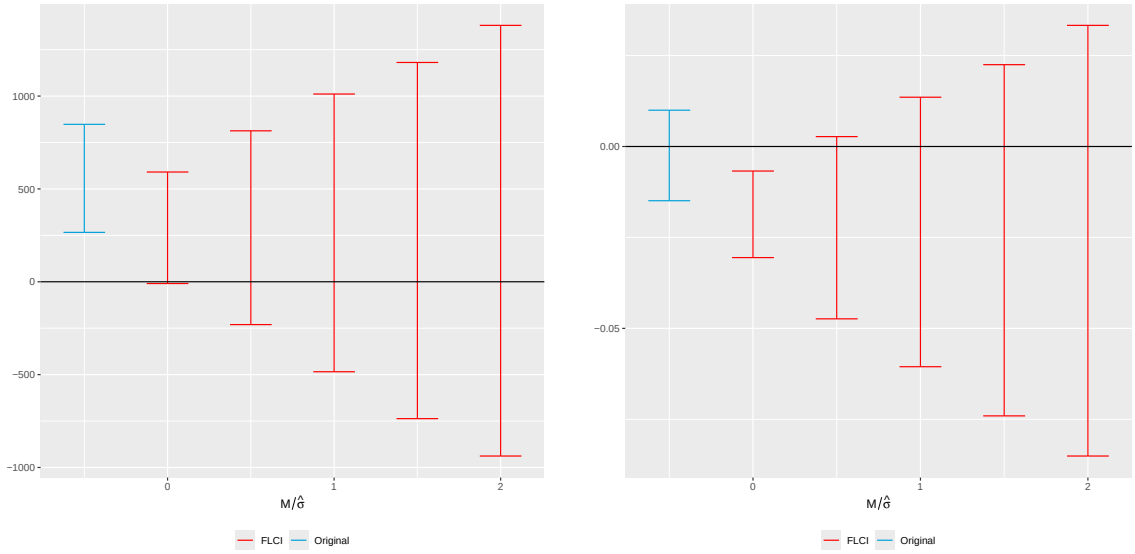
[21]The covariates include: gender, an indicator for living in a major city, 5-year first plan age category, an indicator for Indigenous and Torres Strait Islander, level of function category, and an indicator for whether the first plan involves Support Independent Living (SIL).

cients of the main results adds confidence to the parallel trends assumption, violations due to linear or non-linear trends cannot be discounted. In this section, I provide a more formal analysis of potential violations of parallel trends using the method of Rambachan and Roth (2023). This approach imposes smoothness restrictions on a counterfactual trend measured in the pre-period. Specifically, it limits the maximum change in the slope of the measured pre-trend by a parameter, M. $M = 0$ corresponds to a counterfactual linear trend, while larger values allow increasingly non-linear departures. The estimates are tested against these counterfactual trends. I test using my preferred summary estimate which takes a simple average of the post-treatment coefficients from $k = 1$ to $k = 4$. The results are shown in Figures 5 and 6a for different values of M, where M is normalised by the standard error of λ_{-2}. The blue bar replicates the summary estimate and the red bars plot the estimate and its confidence intervals assuming the counterfactual trend implied by M. For DSP receipt, the estimates are robust to a counterfactual linear trend and marginally robust to non-linear trends, with the estimated effect becoming insignificant from zero at around one standard deviation of the pre-treatment estimate (λ_{-2}) from linearity. The event study estimates for earnings and DSP basic amount are marginally robust to counterfactual linear trends.

7 Heterogeneity analysis

The results in Section 6 show that while the disability supports reform on average increased earnings, these gains were concentrated among individuals already in employment prior to the roll-out. Given that the employment rate of participants prior to entering the NDIS is only 30%, this pattern suggests that the overall results conceal considerable heterogeneity in the earnings responses of participants. A key advantage of my setting is that, unlike most disability insurance studies which focus on marginal program entrants or subsets of beneficiaries, the NDIS reform was universal among eligible individuals. Combined with rich administrative data, this allows me to examine heterogeneity across the full population of disability supports recipients, providing novel insights into which groups are most responsive to expanded funding.

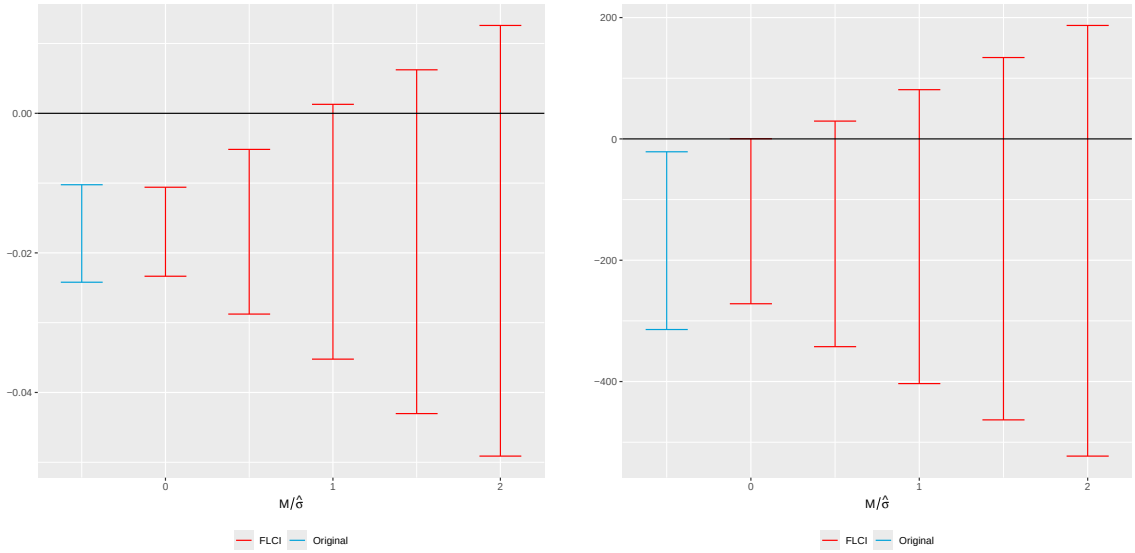
Guided by the above findings, I begin by examining how differences by prior labour market attachment and earnings capacity translate to differences in earnings response. I then investigate whether these differences are simply reflections of vari-



(a) Earnings (b) Employment

Figure 5. Sensitivity analysis: Labour market outcomes

Notes: This figure illustrates the sensitivity of my preferred summary estimate, which is the simple average of the event study estimates in the main specification from periods $k = 1$ to $k = 4$. The blue bar replicates the summary estimate. The red bars test against increasing values of M, which is standardised by the pre-trend estimate of λ_{-2}. The bars represent 95% confidence intervals.



(a) DSP receipt (b) DSP basic amount

Figure 6. Sensitivity analysis: DSP

Notes: This figure illustrates the sensitivity of my preferred summary estimate, which is the simple average of the event study estimates in the main specification from periods $k = 1$ to $k = 4$. The blue bar replicates the summary estimate. The red bars test against increasing values of M, which is standardised by the pre-trend estimate of λ_{-2}. The bars represent 95% confidence intervals.

ation in underlying functional capacity or disability type. The latter analysis is also informative for distinguishing between two different types of employment: open employment and supported employment. Most people with intellectual disabilities who are employed participate in supported employment: these are specialised arrangements typically provided by not-for-profit organisations, in which employees work under close supervision and may receive wages below the statutory minimum wage. In contrast, people with physical or psychosocial disabilities are far more likely to work in open employment – that is, regular jobs in the competitive labour market. Examining heterogeneity by disability type therefore helps distinguish whether the earnings effects of the NDIS reflect transitions within supported employment or improvements among those in open employment. Finally, I examine whether older participants, who are also more likely to have prior labour force attachment, exhibit greater earnings responses to the reform. For the remainder of the analysis, I focus on two outcomes: earnings and DSP receipt.

7.1 The role of prior employment and earnings capacity

To examine the role of prior employment history, I first split the sample into those with any history of employment since the 2000 financial year, and those with no employment history, and regress Equation 1 in the respective sub-samples.[22] The results on earnings and DSP receipt are shown in Figure 7 and Columns (1) and (2) of Tables 4 and 5. The difference in the magnitudes of the effects is striking. For individuals without any employment history, who make up around half of the sample, the NDIS has close to zero effect on earnings. The effect is precisely estimated. Instead, the earnings effects are concentrated in the other half of the sample with any history of employment – the summary measure of the earnings effect is around 851 AUD.

Having determined the importance of prior employment history, I next examine the role of prior earnings capacity. Within the sub-sample with employment history, I distinguish between individuals who have ever earned above the tax-free threshold and those who have ever earned above the minimum wage. These thresholds, while somewhat arbitrary, provide a coarse ranking of individuals by prior earnings capacity: the tax-free threshold identifies whether a person ever earned enough to pay tax, while the minimum wage identifies whether they ever earned at least the equivalent of a full-time minimum-wage job. By construction, the minimum wage group

[22] The 2000 financial year is the first year that tax data is available.

Table 4. Effects on earnings by earnings and employment history

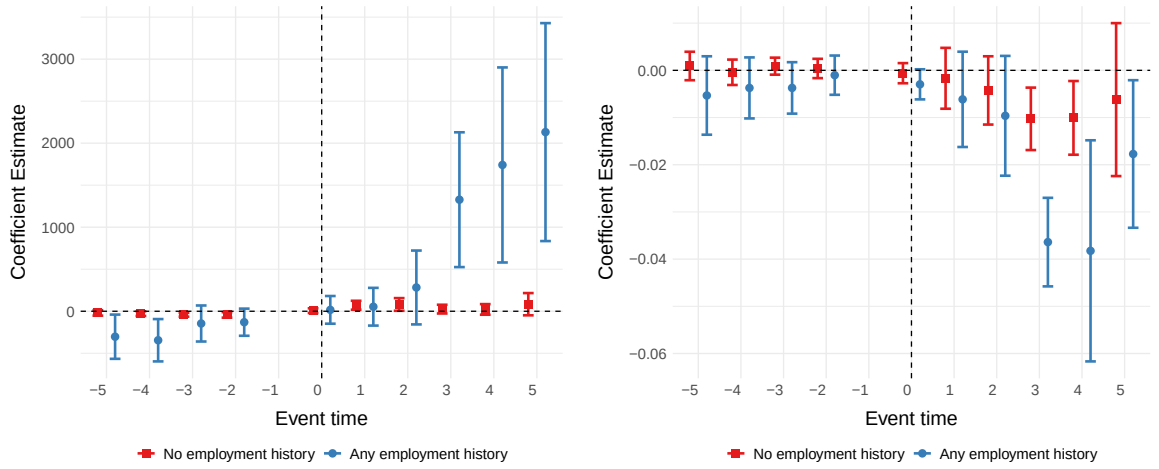
	(Earnings > 0)		(Earnings > TFT)		(Earnings > MW)	
	(1) = 0	(2) = 1	(3) = 0	(4) = 1	(5) = 0	(6) = 1
Event time:						
−5	-19.80	-302.99**	37.30	-1158.09***	-68.12*	-1280.19***
	(16.44)	(134.29)	(41.93)	(308.65)	(40.32)	(374.12)
−4	-28.37**	-344.94***	22.33	-1152.84***	-48.51	-1465.00**
	(14.07)	(128.51)	(31.65)	(363.49)	(37.57)	(678.74)
−3	-41.38***	-145.82	14.65	-459.59*	-25.51	-461.32
	(11.67)	(109.37)	(26.03)	(258.94)	(37.39)	(407.78)
−2	-43.53***	-130.39	1.10	-307.54*	-16.13	-360.53
	(16.62)	(82.38)	(31.59)	(174.77)	(33.70)	(254.17)
0	6.82	16.61	9.76	-31.45	-11.98	48.81
	(14.36)	(84.05)	(25.51)	(185.42)	(36.70)	(283.29)
1	71.55***	53.80	-37.35	295.53	-24.07	368.09
	(27.00)	(114.56)	(49.68)	(320.07)	(72.94)	(479.84)
2	81.10**	282.91	-69.90	1247.24*	51.70	1267.85
	(38.41)	(224.24)	(55.80)	(695.19)	(94.87)	(807.85)
3	25.29	1327.50***	-136.22	2250.22**	-104.52	3155.14**
	(26.52)	(409.17)	(112.75)	(1104.42)	(131.09)	(1305.43)
4	21.86	1740.88***	-68.93	3447.95***	53.00	4317.55***
	(32.14)	(592.11)	(143.93)	(1242.22)	(154.36)	(1511.00)
5	83.93	2131.72***	-89.38	7090.59***	139.93	9817.89***
	(67.53)	(661.57)	(192.56)	(1702.28)	(223.93)	(2016.95)
N	252,552	297,848	432,208	118,192	469,728	80,672
Pre-treatment mean outcome	94.54	9141.73	1310.20	18000.00	1798.27	23000.00

*Notes: This table shows event study coefficients from estimating Equation 1 in subsets split by earnings and employment history. Columns (1) and (2) show results for people with no and any employment history respectively. Columns (3) and (4) show results for people with no and any annual earnings history above the tax-free threshold in 2015 (TFT; 18,200 AUD) respectively. Columns (5) and (6) show results for people with no and any annual earnings history above the minimum wage in 2015 (MW; 34,165 AUD) respectively. Standard errors clustered at the NDIA service-district level. *** p<0.01, ** p<0.05, * p<0.1*

Table 5. Effects on DSP by earnings and employment history

	(Earnings > 0)		(Earnings > TFT)		(Earnings > MW)	
	(1) = 0	(2) = 1	(3) = 0	(4) = 1	(5) = 0	(6) = 1
Event time:						
−5	0.001	-0.005	-0.000	-0.007	-0.000	-0.008
	(0.002)	(0.004)	(0.002)	(0.006)	(0.002)	(0.008)
−4	-0.000	-0.004	-0.001	-0.003	-0.001	-0.000
	(0.001)	(0.003)	(0.001)	(0.005)	(0.002)	(0.006)
−3	0.001	-0.004	-0.001	-0.003	-0.001	0.001
	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.005)
−2	0.000	-0.001	-0.001	0.001	-0.000	0.000
	(0.001)	(0.002)	(0.001)	(0.004)	(0.001)	(0.005)
0	-0.001	-0.003*	-0.001	-0.006	-0.001	-0.006
	(0.001)	(0.002)	(0.001)	(0.005)	(0.001)	(0.005)
1	-0.002	-0.006	-0.001	-0.019	-0.002	-0.022
	(0.003)	(0.005)	(0.002)	(0.015)	(0.002)	(0.014)
2	-0.004	-0.010	-0.002	-0.034**	-0.004	-0.042***
	(0.004)	(0.006)	(0.003)	(0.014)	(0.004)	(0.014)
3	-0.010***	-0.036***	-0.011***	-0.045***	-0.013***	-0.053***
	(0.003)	(0.005)	(0.002)	(0.008)	(0.002)	(0.013)
4	-0.010**	-0.038***	-0.012***	-0.048***	-0.015***	-0.060***
	(0.004)	(0.012)	(0.003)	(0.015)	(0.004)	(0.016)
5	-0.006	-0.018**	-0.003	-0.053***	-0.006	-0.071***
	(0.008)	(0.008)	(0.005)	(0.020)	(0.006)	(0.014)
N	252,552	297,848	432,208	118,192	469,728	80,672
Pre-treatment mean outcome	0.913	0.738	0.901	0.522	0.884	0.446

*Notes: This table shows event study coefficients from estimating Equation 1 in subsets split by earnings and employment history. Columns (1) and (2) show results for people with no and any employment history respectively. Columns (3) and (4) show results for people with no and any annual earnings history above the tax-free threshold in 2015 (TFT; 18,200 AUD) respectively. Columns (5) and (6) show results for people with no and any annual earnings history above the minimum wage in 2015 (MW; 34,165 AUD) respectively. Standard errors clustered at the NDIA service-district level. *** p<0.01, ** p<0.05, * p<0.1*



(a) Earnings (b) DSP

Figure 7. Effects by employment history

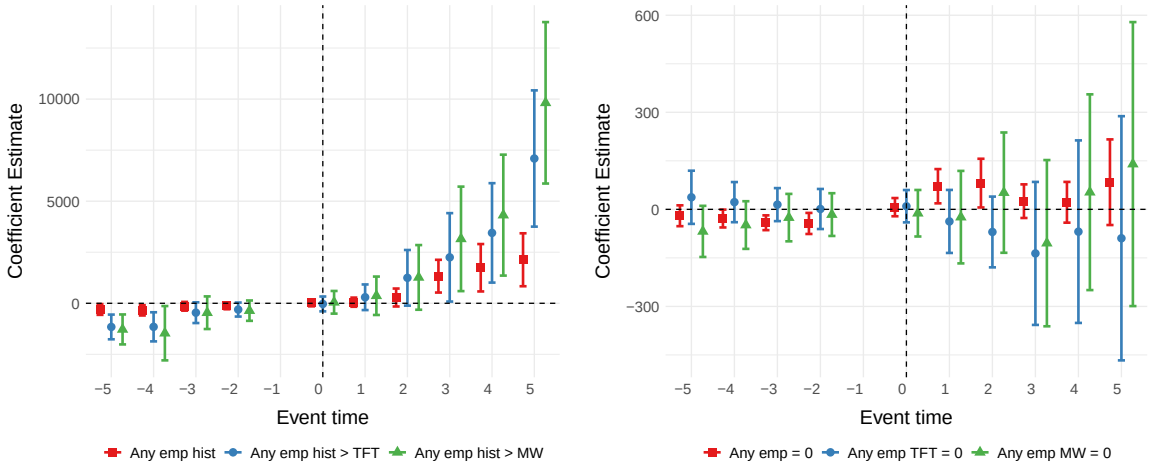
Notes: The figures report estimates for individuals with any (in blue) and no (in red) observed employment history. The vertical bars show 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

is a subset of the tax-free threshold group, which in turn is a subset of those with any employment history. In line with the previous findings, the results show stronger effects of the NDIS for individuals with higher prior earnings capacity: the summary average effect is AUD 1,810 (10% of the pre-treatment mean) for those above the tax-free threshold, and AUD 2,277 (9.9%) for those above the minimum wage.

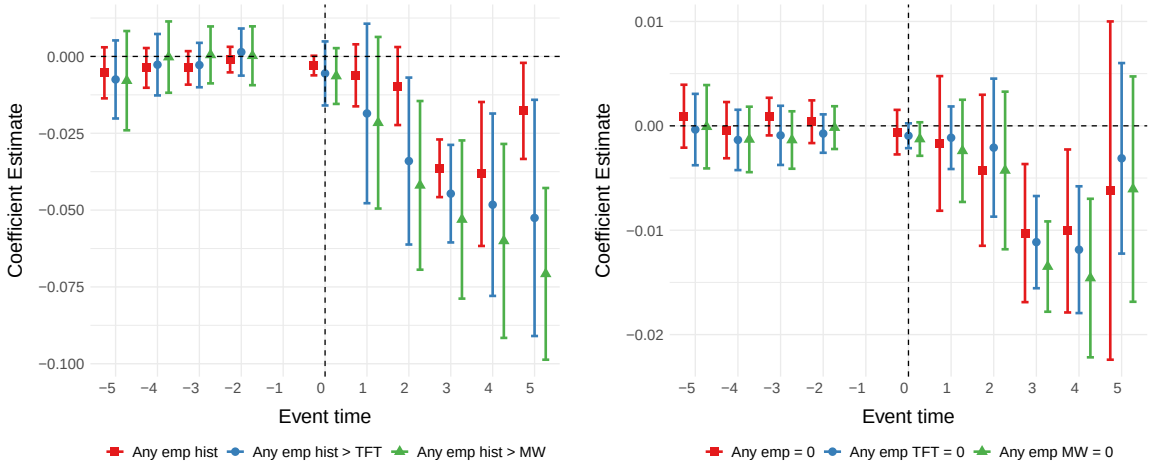
Overall, these results suggest that the magnitude of the effect of the NDIS on earnings is directly related to the degree of prior labour force attachment and earnings capacity. Individuals with pre-existing attachment to the labour force were more likely to improve their economic outcomes, whereas individuals with no prior employment were largely unaffected.

7.2 Heterogeneity by disability characteristics

Building on the previous section, a natural question arises: to what extent are the observed effects by prior earnings capacity actually driven by differences in disability characteristics? Individuals with more severe or congenital disabilities are less likely to participate in the labour force, so the lack of labour supply response may simply reflect greater functional limitations. To measure functional capacity, I use the NDIA-assessed level of function score, taken at baseline. This score ranges from



(a) Earnings



(b) DSP

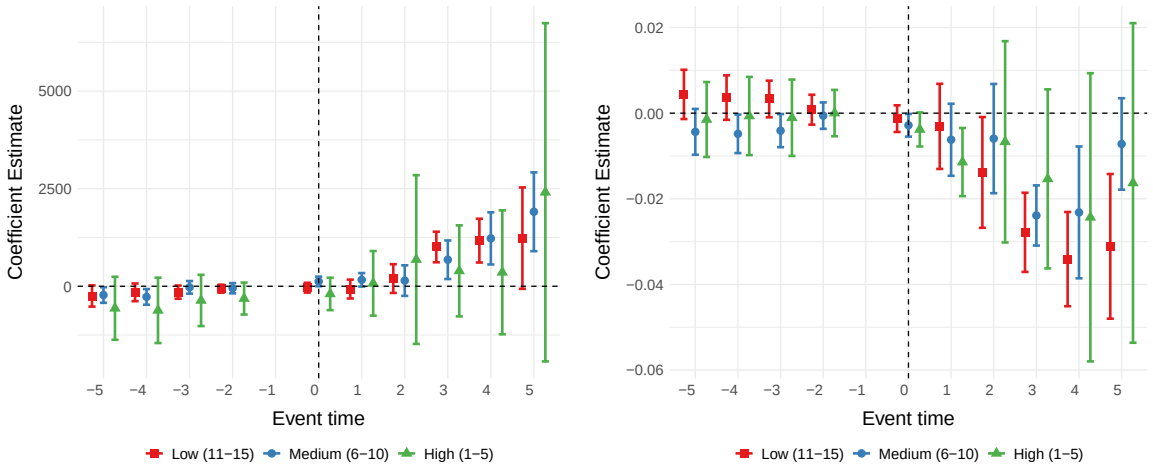
Figure 8. Effects by employment and earnings history

Notes: The panels on the left report estimates for individuals with any prior employment, any annual earnings above the tax-free threshold in 2015 (TFT; 18,200 AUD), and any annual earnings above the minimum wage in 2015 (MW; 34,165 AUD). The panels on the right show the corresponding estimates for those who do not meet these criteria. The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

1 to 15 and summarises a participant's ability to perform everyday activities and participate in work, education, and community life, based on information provided by treating health professionals. Lower scores indicate higher levels of function and independence, while higher scores indicate greater support needs and lower functional capacity. On the contrary, Figure 9a and Table 6 show no clear differences in effects on earnings or DSP receipt between sub-samples split by baseline level of function categories. The sharp differences by prior employment and earnings capacity do not appear to reflect differences in functional capacity. I do, however, find differential effects by disability *type*, as shown in Figure 11 and Table 8. The NDIS reform had the largest impacts on the earnings and DSP receipt of people with physical disabilities, followed by people with psychological disabilities, and small or nil effects on people with neurodevelopmental disabilities. Broad disability type does not reveal significant differences in functional capacity – as seen in Table 7, the average NDIA-assessed level of function (the range is 1 to 15, where 1 is highest functioning and 15 is lowest functioning) is 9.03 for the physical disability category, 8.93 for neurodevelopmental and 8.87 for psychosocial. It does, however, distinguish prior earnings capacity. Mean pre-treatment earnings for people with physical disabilities are 9,530 AUD, compared with 3,483 AUD for people with psychological disabilities and 2,377 AUD for people with intellectual disabilities.

The null effects on people with intellectual disabilities also suggest that the overall results on earnings and DSP are unlikely to be influenced by transitions to supported employment. Supported employment in Australia is usually provided by not-for-profit organisations and refers to the extra support provided to workers who, due to their disability, have high support needs. For example, the support may include an on-site supervisor, funded from the participant's NDIS plan. Given that the vast majority of workers in supported employment have intellectual disabilities, transitions through this channel are unlikely to explain the overall earnings effects. (Joyce et al. 2025).

I also examine heterogeneity by NDIS plan-management type in Appendix Figure C5. As described in Section 2, participants can choose between three plan types that differ in flexibility and the degree of administrative responsibility: self-managed, plan-managed, and agency-managed. The figure shows that the estimated effects are strongest for participants with self-managed and plan-managed plans—the two more flexible plan types—and weakest for those with agency-managed plans. This pattern



(a) Earnings (b) DSP

Figure 9. Effects by functional capacity

Notes: Functional capacity is measured by level of function, an NDIA-assessed score between 1 and 15. A score of between 1 and 5 indicates relatively high level of function, 6 to 10 indicates moderate level of function, and 11 to 15 indicates low level of function. The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

Table 6. Heterogeneity analysis by functional capacity

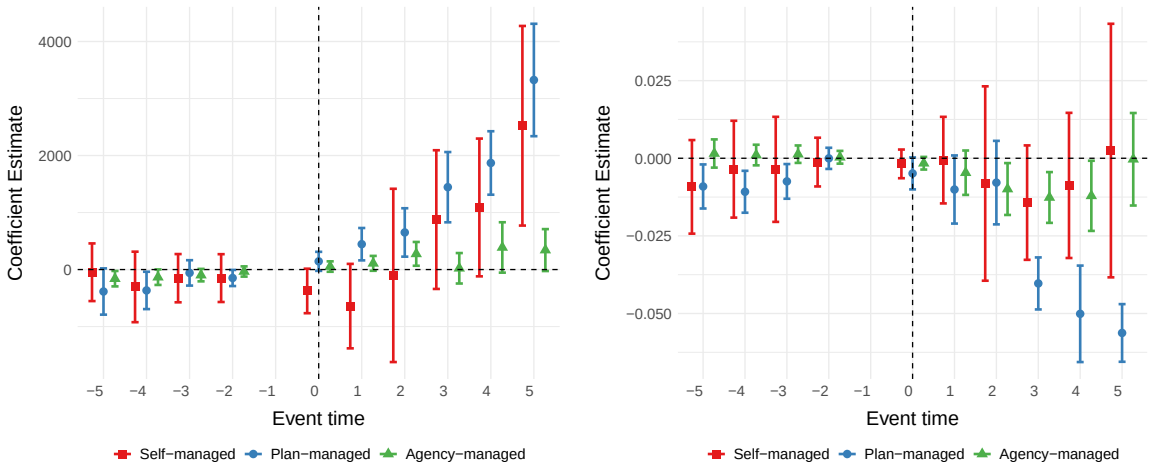
	Earnings			Employment		
	(1) Low	(2) Medium	(3) High	(4) Low	(5) Medium	(6) High
Event time:						
−5	-116.70	-218.34*	-530.10	-0.001	-0.002	-0.017
	(182.30)	(124.98)	(528.89)	(0.003)	(0.004)	(0.011)
−4	-67.94	-357.68***	-395.69	-0.001	-0.004	-0.015*
	(163.10)	(99.73)	(508.99)	(0.004)	(0.003)	(0.009)
−3	-40.55	-120.98*	-146.73	0.001	-0.006***	0.004
	(80.98)	(72.76)	(354.50)	(0.002)	(0.002)	(0.007)
−2	-42.86	4.00	-23.12	-0.000	-0.003	0.002
	(42.82)	(61.28)	(221.27)	(0.002)	(0.002)	(0.006)
0	-12.21	190.54***	87.68	0.002	0.001	0.008
	(66.15)	(62.37)	(153.29)	(0.002)	(0.003)	(0.006)
1	25.35	249.49**	198.38	0.006**	0.007**	0.010
	(114.61)	(97.47)	(355.27)	(0.003)	(0.003)	(0.012)
2	193.33	578.44***	786.50	0.012***	0.021***	0.015
	(191.26)	(198.24)	(963.12)	(0.005)	(0.005)	(0.018)
3	1125.71***	826.25***	660.06	0.023***	0.019*	-0.004
	(157.33)	(275.86)	(447.57)	(0.008)	(0.011)	(0.018)
4	1212.48***	1177.03***	743.43	0.027***	0.013	0.039
	(310.99)	(287.83)	(838.69)	(0.009)	(0.009)	(0.027)
5	1432.04**	2383.48***	3431.90	0.045***	0.040***	0.112**
	(688.38)	(379.56)	(2128.52)	(0.010)	(0.011)	(0.053)
N	183,792	295,016	71,480	183,792	295,016	71,480
Pre-treatment mean outcome	2,286.02	4,214.51	9,696.07	0.08	0.16	0.28

Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

Table 7. Level of function by broad disability category

	Mean	Standard deviation	No. participants
Physical	9.03	3.43	22,561
Neurodevelopmental	8.93	2.84	30,446
Psychosocial	8.87	2.62	15,564

Notes: This table shows means and standard deviations of baseline level of function scores of the sample by broad disability category.

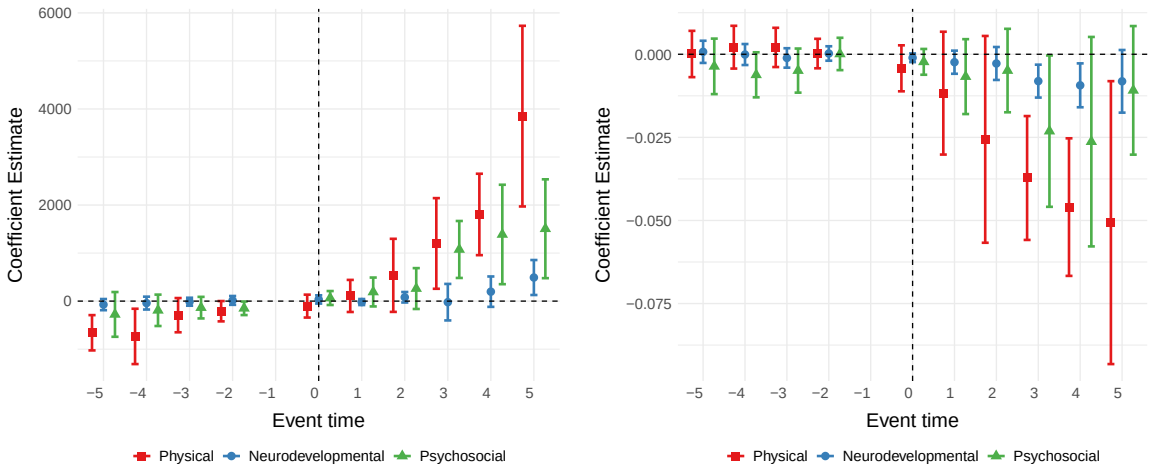


(a) Earnings (b) DSP

Figure 10. Effects by plan type

Notes: The vertical bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

closely mirrors differences in prior earnings capacity: average pre-treatment earnings were 12,000 AUD for self-managed participants, 4,896 AUD for plan-managed participants, and 3,588 AUD for agency-managed participants. Hence, the gradient in effects across plan types also reflects underlying variation in labour market attachment and earnings history. Participants with higher prior earnings, who also prefer to more independently manage their plans, appear to be those best able to translate NDIS supports into improved economic outcomes. Section 8 further examines the role of increased independence in mediating the economic effects of the reform.



(a) Earnings (b) DSP

Figure 11. Effects by broad disability category

Notes: The vertical bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

7.3 Heterogeneity by age

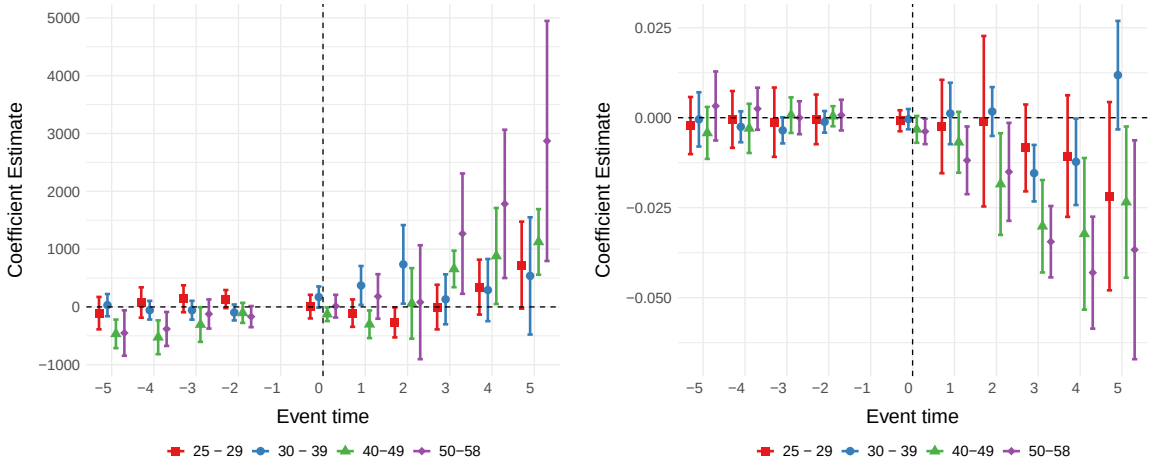
Figures 12 and Table 9 show the results by age category at first plan approval. The event study coefficients are in almost all cases positive, though not always significant at the 5% level. The effects are generally stronger and more significant at the older age categories of 40 - 49 and 50 - 58. This suggests two things. First, it rules out differences in age between the NDIS sample and the samples studied in income-replacement schemes (which tend to skew older) as an explanation for my contrasting results (this could be the case if income effects are stronger in older age groups). Second, it rules out the possibility that my results are driven by reforms to the DSP in 2014, which required that people under 35 years of age with an assessed work capacity of eight hours or more per week participate in compulsory activities aimed

Table 8. Heterogeneity analysis by broad disability category

	Earnings			Employment		
	(1) Physical	(2) Psychosocial	(3) Neurodevelopmental	(4) Physical	(5) Psychosocial	(6) Neurodevelopmental
Event time:						
−5	-446.67**	-198.07	-115.26**	-0.007	-0.003	-0.005
	(174.35)	(214.05)	(46.04)	(0.006)	(0.006)	(0.003)
−4	-561.45***	-200.26	-75.37	-0.005	-0.011**	-0.004*
	(212.45)	(151.93)	(56.62)	(0.005)	(0.005)	(0.002)
−3	-211.18	-137.34	-24.31	-0.005	-0.011***	-0.002
	(164.44)	(88.66)	(43.31)	(0.003)	(0.004)	(0.002)
−2	-41.67	-151.91**	29.25	-0.007**	-0.003	-0.001
	(117.51)	(62.90)	(28.23)	(0.003)	(0.003)	(0.001)
0	79.30	82.87	40.02	0.004	-0.002	-0.003
	(115.58)	(87.40)	(43.89)	(0.004)	(0.004)	(0.003)
1	215.75	268.81**	43.99	0.019***	0.005	-0.001
	(190.04)	(136.07)	(62.32)	(0.004)	(0.009)	(0.005)
2	674.54*	505.13**	237.41***	0.031***	0.021	0.008
	(384.33)	(199.80)	(88.78)	(0.007)	(0.013)	(0.005)
3	1468.50***	1084.80***	131.05	0.025*	0.028**	-0.001
	(501.62)	(310.22)	(112.80)	(0.013)	(0.011)	(0.011)
4	2023.41***	1286.46***	169.27	0.043***	0.032*	-0.006
	(473.99)	(491.49)	(116.33)	(0.009)	(0.017)	(0.013)
5	4239.50***	2199.06***	713.36***	0.075***	0.065***	0.025*
	(818.13)	(784.50)	(89.69)	(0.019)	(0.022)	(0.014)
N	180,504	124,560	243,616	180,504	124,560	243,616
Pre-treatment mean outcome	9,172.91	3,058.55	1,180.58	0.23	0.14	0.09

Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

at assisting them to find employment.



(a) Earnings (b) DSP

Figure 12. Effects by age category

Notes: The figures show event study estimates in subsamples divided by age category at first plan. The vertical bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.

Table 9. Heterogeneity analysis by age category

	Earnings				Employment			
	(1) 25-29	(2) 30-39	(3) 40-49	(4) 50-58	(5) 25-29	(6) 30-39	(7) 40-49	(8) 50-58
Event time:								
−5	-28.45	45.61	-295.89**	-409.83**	-0.001	0.002	-0.003	-0.010**
	(121.25)	(96.92)	(117.13)	(200.25)	(0.005)	(0.006)	(0.004)	(0.005)
−4	95.01	-69.44	-307.23***	-465.78***	0.001	-0.002	-0.005*	-0.007***
	(114.95)	(95.38)	(107.91)	(135.58)	(0.006)	(0.004)	(0.003)	(0.003)
−3	188.05*	-99.30	-180.36	-116.99	0.001	-0.005*	-0.002	-0.003
	(110.12)	(89.68)	(114.13)	(114.58)	(0.006)	(0.003)	(0.003)	(0.003)
−2	181.15**	-107.73	57.30	-104.47	0.005	-0.005*	0.000	-0.005**
	(76.95)	(74.98)	(78.93)	(78.14)	(0.005)	(0.003)	(0.003)	(0.002)
0	124.70*	148.48*	-16.64	117.12	0.004	0.001	-0.000	0.003
	(64.09)	(81.08)	(85.15)	(141.71)	(0.004)	(0.005)	(0.003)	(0.003)
1	28.45	313.29***	-207.48	381.92	0.001	0.006	0.005	0.012***
	(126.67)	(117.77)	(198.36)	(316.71)	(0.011)	(0.008)	(0.009)	(0.003)
2	-56.23	580.87**	291.04	450.75	0.007	0.010	0.014*	0.026***
	(188.52)	(251.11)	(350.92)	(638.58)	(0.016)	(0.011)	(0.008)	(0.006)
3	309.11	355.22**	793.73***	1365.78***	-0.001	-0.001	0.026**	0.024*
	(191.03)	(174.88)	(280.02)	(518.78)	(0.010)	(0.012)	(0.012)	(0.012)
4	423.20**	252.31	1000.59**	1871.96***	0.010	-0.009	0.025*	0.037***
	(213.01)	(221.67)	(467.14)	(602.32)	(0.009)	(0.012)	(0.013)	(0.014)
5	1035.60***	728.98**	1686.83***	3416.50***	0.057***	0.005	0.048***	0.065**
	(342.05)	(363.31)	(279.15)	(1223.70)	(0.018)	(0.012)	(0.016)	(0.028)
N	82,848	146,168	161,216	160,168	82,848	146,168	161,216	160,168
Pre-treatment mean outcome	1,690.46	3,545.51	5,074.49	5,400.09	0.11	0.15	0.16	0.16

Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

8 Mechanisms

Thus far, I have presented reduced-form evidence on the effects of the NDIS on earnings, employment and disability welfare receipt. In this section, I examine the mechanisms underlying these effects – whether they arise through direct supports, such as education, training, and employment services, or through indirect supports that enhance capacity, improve health or assist in daily activities. To learn more about potential mechanisms requires granular data on NDIS budget compositions and plan details. This is outside of the scope of PLIDA, the data asset I use for the main analysis. In this section, I turn to a novel source of data, the NDIA data set, which contains detailed individual-level data on budget allocations, NDIS plan characteristics, and NDIS survey results (see Section 3.3 for further details). The NDIA data set cannot be directly linked to PLIDA or other outside sources – nevertheless the richness of the data affords a rare opportunity to explore heterogeneity in disability support recipients across three key dimensions: funding allocation, life objectives, and self-reported outcomes. In light of the evidence on heterogeneous results by prior earnings and employment capacity, I split the NDIA sample into three self-reported employment types, measured at baseline (that is, prior to starting

the first plan): open employment, which describes regular employment arrangements where individuals are paid at least the minimum wage; supported employment; and no employment.[23] The reduced-form evidence I have presented strongly indicates that those in open employment were the most responsive (in terms of economic outcomes) to the NDIS roll-out. [24]

8.1 Budget allocations

Figures 13 and 14 present box-plots of first plan budget allocations in each of the subsamples of individuals who at baseline, are either in open employment, supported employment, or have no employment. Rather than indicating the range, the 'whiskers' of the plots represent the 10th and 90th percentiles.[25] Descriptions of the budget allocation categories, including examples of line item supports, can be found in Table B1. First, the plots show that the averages and dispersion of total plan budgets were lower for those in open employment, at 26,000 AUD relative to supported employment (38,000 AUD) and no employment (59,000 AUD). This means that despite receiving less funding compared to others, individuals in open employment had a larger labour supply response to the NDIS. Second, spending on employment-related services and capital equipment (like wheelchairs) are unlikely to be driving my findings on the labour supply responses of NDIS recipients. In the case of employment-related services, the only significant spending occurs in those in supported employment, who, as established in the previous section are not the main drivers of the positive earnings effect. In the case of capital spending – while some people do receive significant capital supports, the median person in open employment receives zero budget allocation in this category. Instead, the category receiving the largest allocation of spending for

[23]Table B5 in the Appendix shows that the NDIA sample is very similar to the sample used in the main analysis.

[24]To some extent, I can directly cross-check this with the same definitions of employment types used in the NDIA data, as the PLIDA data does have some of the same information – however there are important caveats. First, as shown in Appendix Table B6, the vast majority of observations are missing in the early years. Second, the regression in the baseline open employment sub-sample likely suffers from downward bias because the control groups are positively selected (by construction, they will be employed at the time they start their first plan). The results, which can be found in Appendix Figure C7, are nevertheless consistent with the results by prior earnings and employment capacity, although the standard errors are considerably larger (likely for the reasons described above). In Appendix Figure C8, I also report results by the standard observation of employment derived from tax records in the 2012/13 FY, the year before the beginning of the NDIS roll-out. This avoids the selection bias mentioned earlier, but doesn't distinguish between open employment and supported and employment. These results are in line with the findings in Section 7.1.

[25]This is for data confidentiality reasons.

those in open employment is activities of daily living (ADLs), with a median value of 27% of the total budget. The figure is similar for those in supported employment, and those in non-employment have around 42% of their budget allocated to ADLs. Funding for ADLs covers services which assist with essential everyday tasks like personal hygiene, domestic tasks and independent living. After ADLs, the largest budget allocations are for those in open employment are for independent skills (the median allocation is 17%) followed by community activities (13%). Unlike ADLs, funding for independent skills are longer-term oriented and aimed at capacity-building, and includes allied health therapy (such as dieticians and occupational therapists) and behavioural intervention supports.

8.2 Plan goals

A feature of NDIS plans is that participants list key life objectives, or "goals". NDIS goals are personalised and may be short- or long-term. While not necessarily directly linked to a participant's goals, NDIS funding for supports is intended help overcome disability-specific barriers in the pursuit of these goals. For example, goals can include finding and keeping a part-time job, improving mobility to complete daily tasks, or building confidence to use public transport. This data offers valuable insight into key life objectives and motivations for NDIS participants at the outset, before the utilisation of NDIS funding. Figure 15 shows the distribution of goal categories for first NDIS plans, again for each of the employment types. As before, I focus mostly on those in open employment, as they were most economically responsive to the NDIS. The plurality of goals are focused on improving daily life, comprising 21% of total goals for those in supported employment, 25% for those in no-employment and 29% for those in open employment. This is consistent with the evidence on funding allocations, which showed that ADLs received the funding. For those in open employment, the next most common goals are about "Health and well-being", at 17%, followed by "Social and community activities" (16%). Work-related goals are not as common, only making up 11% of goals.

8.3 Evidence from NDIS outcomes surveys

Evidence from NDIS goals highlights the key objectives of participants, while the data on NDIS budgets reveals the categories where spending was most concentrated. The final piece of descriptive evidence I present sheds light on the areas where NDIS support was most effective in driving improvements. Figure 16 presents key results from

the NDIS Outcomes Survey for participants, three years after starting their first plan. The results aggregate responses to questions in the survey that ask about whether funding support from the NDIS helped with various aspects of quality of life (for the most part, answers to these questions take the form of a binary "Yes" or "No"). The NDIS was most helpful in improving ADLs across all employment types, with more than 80% of respondents responding positively. Hence NDIS participants, including those in open employment, whose most common goals were related to ADLs, and who had the most funding allocated to ADLs, also reported that the NDIS was most helpful in improving their ADLs. For those in open employment, the next greatest improvements were in the areas of Choice and control (80%), Community involvement (60%) and Health and well-being (60%).[26] Consistent with the evidence from NDIS goals and funding allocations, I find that the NDIS was not as helpful for work-related aspects or for learning and education outcomes.

Figure 17 zooms in on improvements in health related outcomes. It shows how NDIS participants are faring 3 years on relative to their baseline responses to the NDIS outcomes survey. For those in open employment, there was a 6-ppt decline in participants reporting positive health compared to baseline. This means that while participants reported that the NDIS was helpful for their health and well-being, they still experienced deteriorating health, probably due to ageing and disability progression. However, I do also find that hospitalisations over the past year decreased by 7.5-ppts and a small decrease (1.4-ppt) in those having difficulty accessing health services.

Overall, the evidence presented in this section suggests that the NDIS improved labour market outcomes by lowering barriers to work and increasing capacity. Specifically, the individuals most likely to respond experienced significant improvements in supports targeting ADLs and independence. Improvements in health may also have been a factor leading to increased work capacity. In contrast, access to employment services and educational supports do not appear to have played a significant role in mediating the observed labour market effects.

[26] "Choice and control" refers to a participant's control over how their NDIS funding is managed, who provides their supports and services, and how they achieve their personal goals and live their lives.

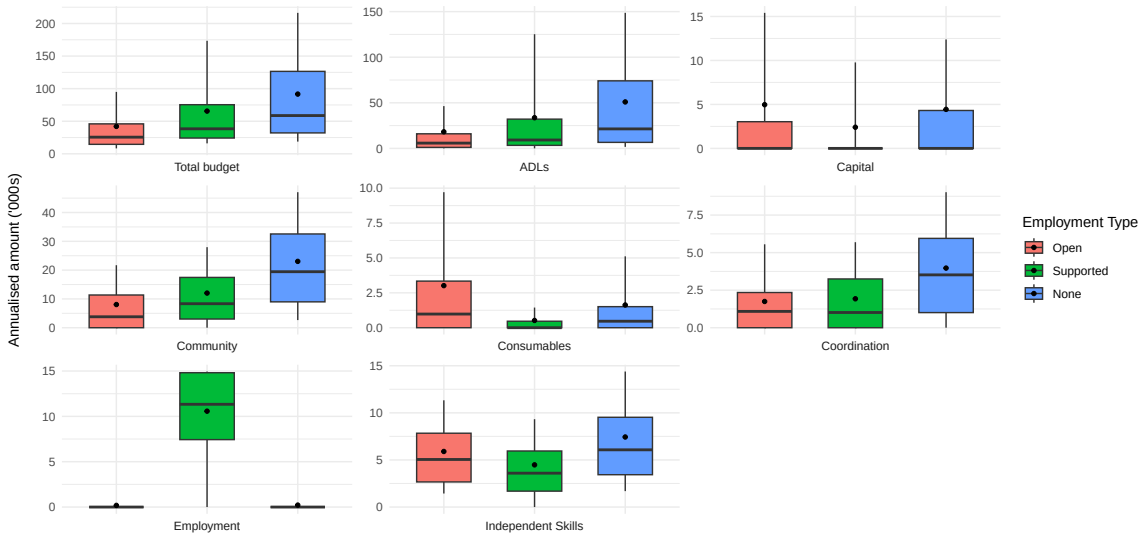


Figure 13. Budget allocations by support category

Notes: This figure shows box and whisker plots of first plan funding allocations by baseline employment type in each support category. Allocations are annualised and reported in thousands, in 2015 AUD. The ends of the whiskers represent the 10th and 90th percentiles. The boxes span the interquartile range. The circle denotes the mean and the middle line denotes the median.

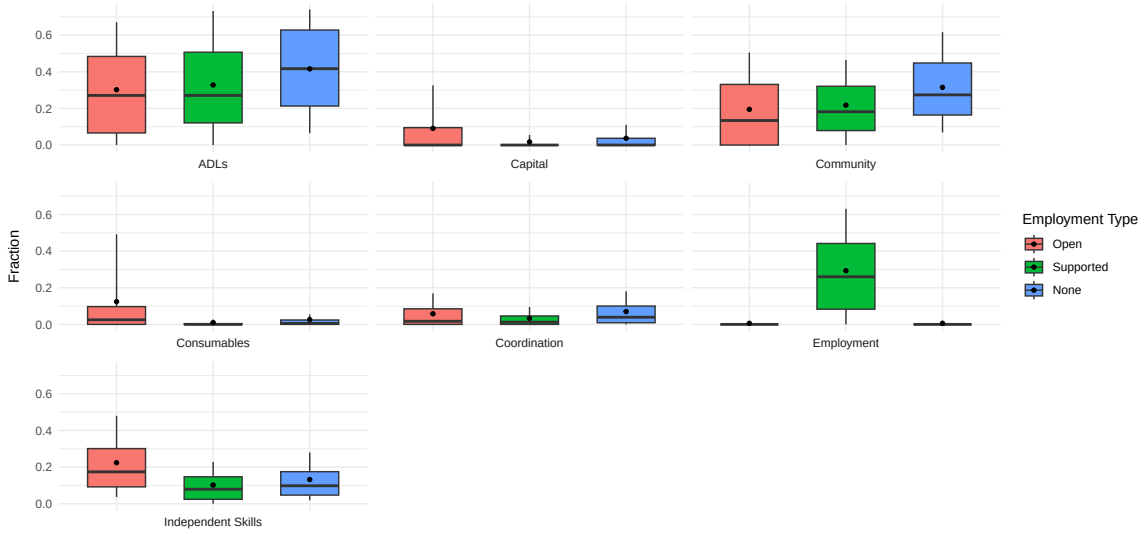


Figure 14. Budget compositions

Notes: This figure shows box and whisker plots describing the fraction of total budget in the first plan allocated to each support category, by baseline employment type. The ends of the whiskers represent the 10th and 90th percentiles. The boxes span the interquartile range. The circle denotes the mean and the middle line denotes the median.

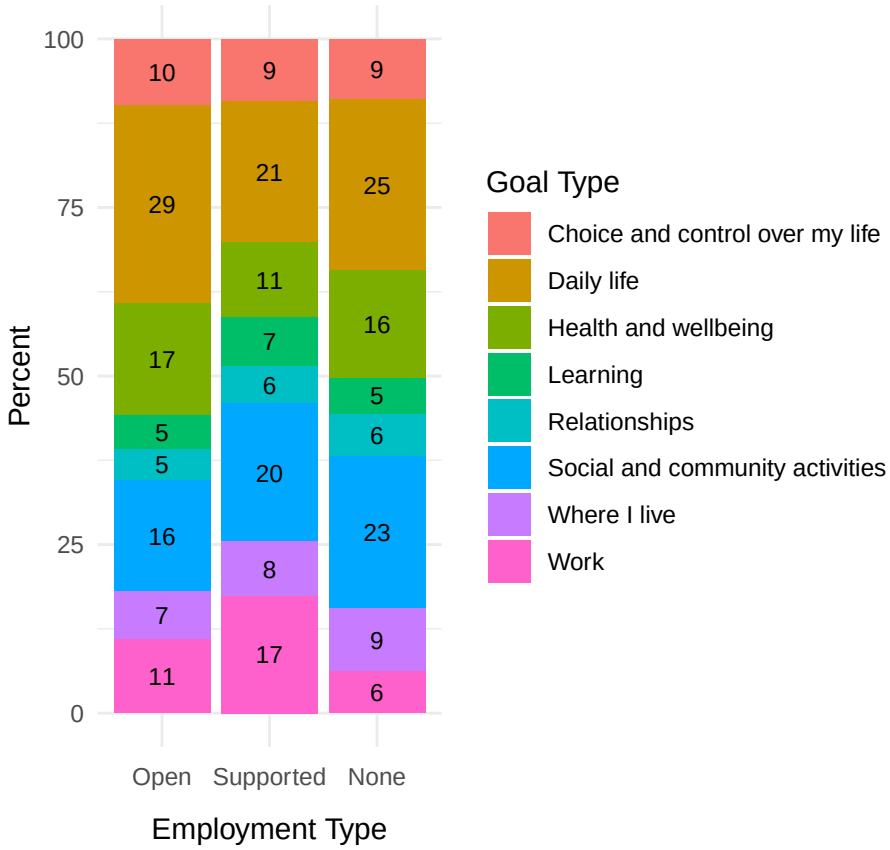


Figure 15. Plan Goals

Notes: This figure shows the distribution of participants' first plan goals by baseline employment type. Goals are individually stated but grouped by goal type.

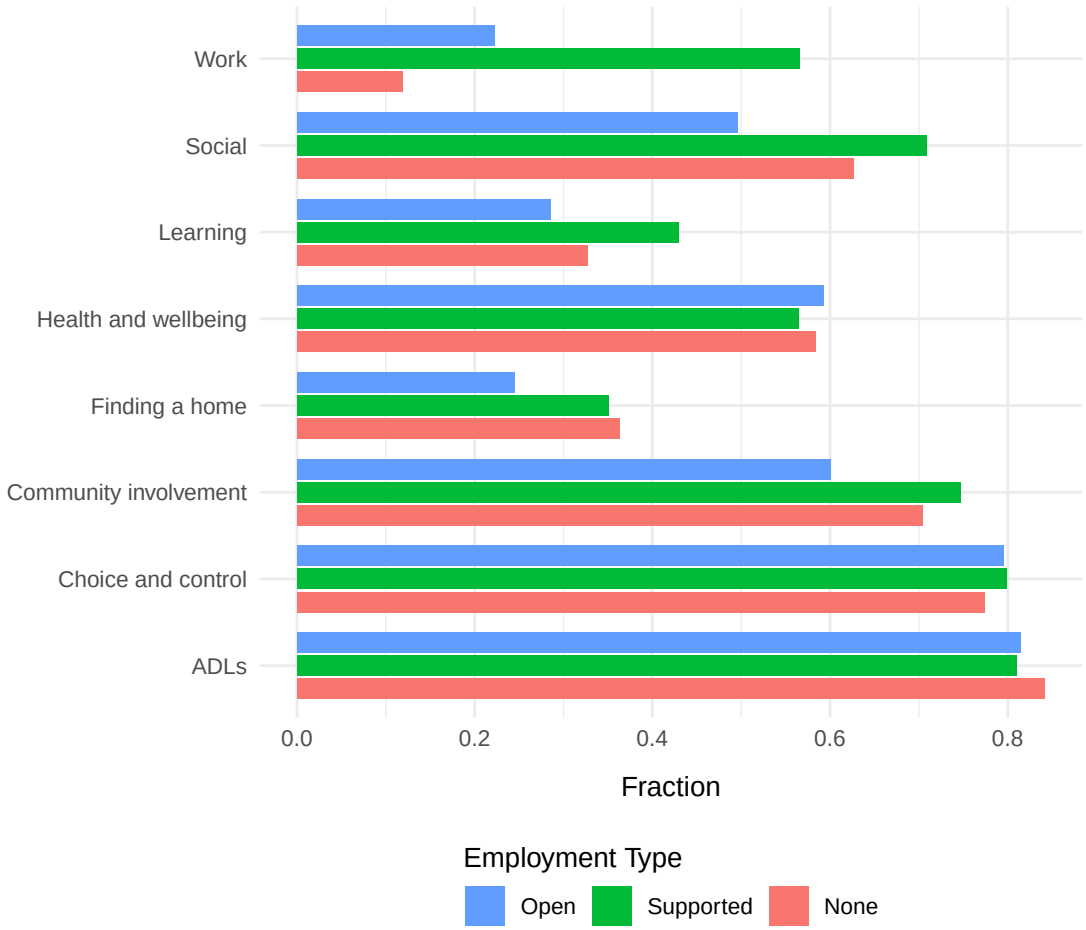


Figure 16. Did the NDIS help with ...? (at Year 3)

Notes: This figure presents selected survey results from the NDIS Short Form Outcomes Questionnaire, which asks participants whether the NDIS has helped them in specific areas of support. Each item begins with a question along the lines of: "Has your involvement with the NDIS helped you. . . ?" and offers three possible responses: "Yes", "No", or "It's my first plan". Appendix Table B2 details the specific questions and how they map to the corresponding area of support. Because the figure reports outcomes after three years of NDIS participation, responses are restricted to "Yes" or "No". Accordingly, the x-axis represents the proportion of participants who answered "Yes".

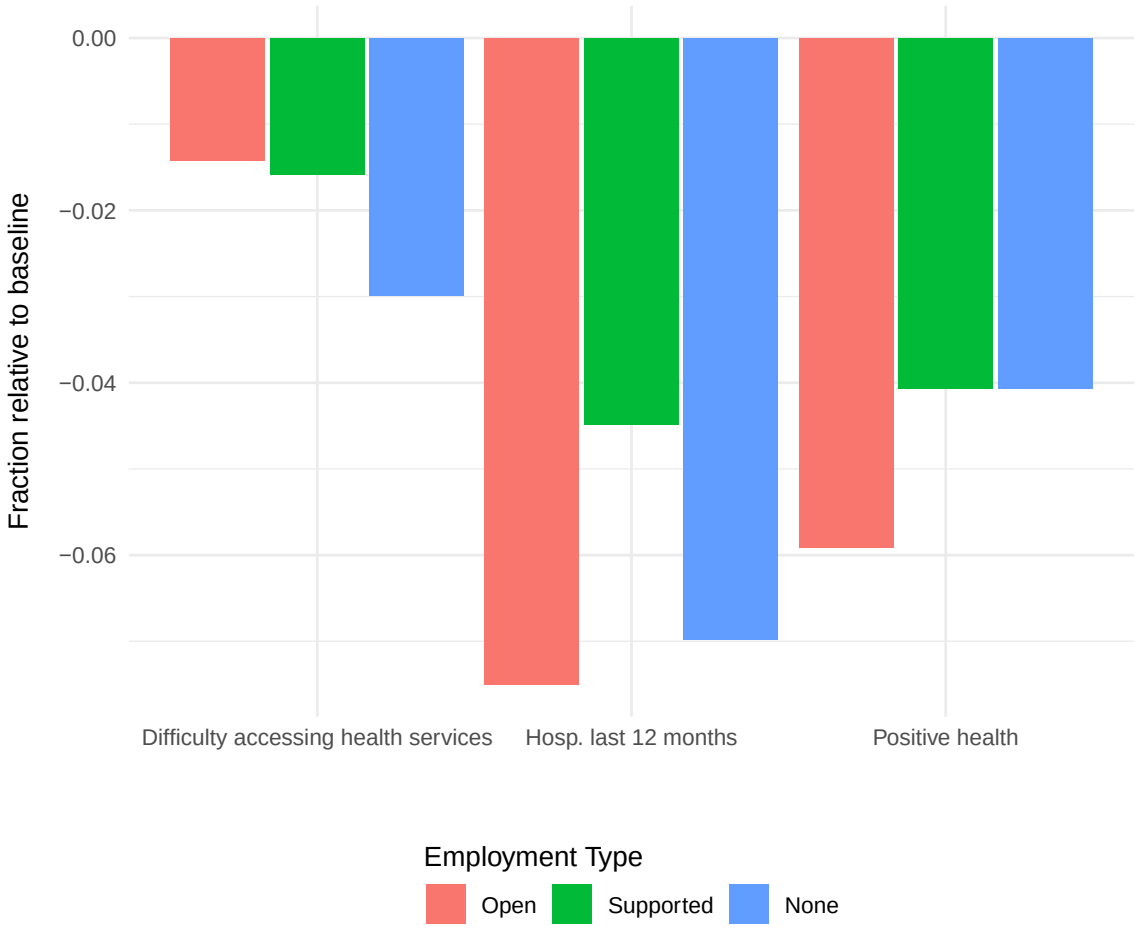


Figure 17. Health outcomes from the NDIS survey

Notes: This figure presents selected health-related survey results from the NDIS Short Form Outcomes Questionnaire. It shows the proportion of participants who: reported having difficulty accessing health services in column (1); went to hospital in the last 12 months in column (2); and reported having positive health in column (3). See Appendix Table B2 for details on the specific questions and transformation of responses. Results are reported at year three of participation in the NDIS, relative to participants' responses at baseline.

9 Conclusion

This paper provides new causal evidence on the labour market effects of funding for disability-related supports, using the staggered introduction of Australia's National Disability Insurance Scheme (NDIS) as a natural experiment. Unlike most studies in the disability insurance literature, which focus on income-replacement schemes, I study the effects of a large-scale reform that expanded access to funded supports intended to improve independence, capacity, and participation. I find that exposure to the NDIS increased annual earnings by around 11 percent in the first four years following exposure, with most of the effect operating on the intensive margin among individuals already in employment. The reform also reduced receipt of income-replacement benefits (DSP), consistent with higher earnings. However, the average effects mask substantial heterogeneity: the positive earnings response is concentrated among participants with prior labour force attachment and higher prior earnings capacity, while the remainder of the population shows little to no response.

Analysis of confidential administrative data from the National Disability Insurance Agency further suggests that these gains are not primarily driven by direct employment interventions. Rather, the evidence points to improvements in participants' functioning, autonomy, and well-being—consistent with indirect mechanisms such as better access to personal care services, improved health, and increased capacity to manage work and daily life. In this sense, the NDIS acted less as an employment programme and more as an enabler of independence and productivity.

Taken together, the results have several implications for the design of disability policy. First, unlike income-replacement schemes, funding for disability supports need not entail a trade-off between social protection and labour market participation. When resources are directed toward services that enhance capability rather than substitute for earnings, disability policy can achieve both social and economic goals. Second, the substantial heterogeneity in responsiveness underscores the importance of targeting: broad-based benefit adjustments that affect all participants may be inequitable when many are unresponsive. Third, the findings suggest that indirect supports which lower practical barriers to participation – such as assistance with daily living, mobility, and mental health – may be more effective in promoting work than conventional employment services or wage subsidies. Overall, the evidence from the NDIS suggests that disability support policy can be designed to improve

both individual welfare and aggregate labour market participation. The challenge for policymakers lies in identifying which forms of support most effectively enhance capacity, and in maintaining a balance between universal entitlement and targeted activation. By shifting focus from income replacement to capability enhancement, disability policy can move closer to achieving its dual objectives of equity and economic inclusion.

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A Appendix: Construction of the analysis sample

The sample for analysis was constructed as follows:

1. Create a balanced individual-year panel (2011 – 2020) using PLIDA combined locations data set. Each individual must have an ABS-identified location in each year (either Mesh Block or SA2).

2. Merge with NDIS participants in NDIA dataset (2013 – 2022)

    - Must have person-linkage SPINE_ID
    - Must be current NDIS participant (as of Dec 2022)
    - Location must be identified on the date of the individual's first NDIS plan

3. Assign each individual a roll-out year based on bilateral State and Territory government agreements with the Federal government

    - In Tasmania and ACT, assignment is based on age X service district, otherwise assignment is based on service district
    - Service district is inferred from the Mesh Block granular location. If an individual's Mesh Block is missing, use SA2 location instead.

4. Merge with Income Tax Returns data set by individual-financial year (2011/12 - 2019/20)

5. Cleaning:

    - People with addresses in overseas territories dropped
    - State movers dropped
    - Restrict age at first plan approval between 25 and 58
    - Restrict to NDIA participants who transferred from existing Commonwealth/State Schemes
    - Drop if participant in roll-out year 2015 (too few observations in the cohort)
    - Final sample size: 550,400 observations; 68,800 individuals

B Appendix: Alternative measure of earnings and employment

My preferred measure derives earnings from mandatory payment summaries provided by employers each year. The advantage is that the measure covers all employees, regardless of whether they submit a tax return. People who don't pay taxes – in particular people whose annual income is less than the tax-free threshold – may not submit a tax return. This detail is important for the purposes of this paper, given that many people with disabilities are likely to have earnings below or around the threshold. However, the disadvantage with using employer payment summaries is that self-employed workers are not required to submit a payment summary and are thus not included. To check the robustness of my results, I also use an alternative measure of earnings derived from submitted tax returns. This measure does cover self-employed workers, but misses observations of people who do not submit a tax return in a particular year (these observations are assigned zero earnings). The results on shown in Table A1. While the results on earnings are consistent with the main results, the results on the tax-return derived employment indicator are positive and significant in the post-exposure period. Taken together with the main findings showing no significant effects on employment using the employer-based measure, this suggests that the earnings gains from the NDIS led many participants to cross the tax-free threshold and begin filing tax returns.

C Appendix: Tables

Appendix Table A1. Effects of the NDIS on annual earnings from tax returns data

	(1) Earnings (TR)	(2) Employment (TR)
Event time:		
−5	-218.84***	-0.004
	(76.03)	(0.003)
−4	-248.30***	-0.004**
	(65.60)	(0.002)
−3	-100.90*	-0.003*
	(56.42)	(0.002)
−2	-26.21	-0.002
	(43.49)	(0.002)
0	95.01**	0.002
	(43.77)	(0.002)
1	165.48***	0.007**
	(63.52)	(0.003)
2	428.42***	0.017***
	(118.70)	(0.005)
3	928.62***	0.017*
	(207.22)	(0.010)
4	1158.05***	0.022**
	(264.57)	(0.010)
5	2058.73***	0.048***
	(337.08)	(0.011)
N	550400	550400
Pre-treatment mean outcome	4273.08	0.148

Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

Appendix Table B1. Commonly claimed disability support items

Item description	Support category	Budget category
Category: Transport	Transport	Core
Support Coordination Level 2: Coordination of Supports	Support Coordination	Capacity Building
Access Community Social And Rec Activities - Weekday Daytime	Social Community and Civic Participation	Core
Assistance With Self-Care Activities - Standard - Weekday Daytime	Daily Activities	Core
Group Based Activities In A Centre - Flat - Weekday Daytime	Social Community and Civic Participation	Core
Plan Management - Financial Administration	CB Choice and Control	Capacity Building
House Cleaning And Other Household Activities	Daily Activities	Core
Assessment, Recommendation, Therapy And/Or Training (Incl. AT)	CB Daily Activity	Capacity Building
Access Community Social And Rec Activities - Weekday Daytime - TTP	Social Community and Civic Participation	Core
Group Activities In The Community - 1:2 - Standard - Weekday Daytime	Social Community and Civic Participation	Core

Notes: This table lists the top ten most commonly claimed items in the NDIA sample. The items are at line item level, except for the "Category: Transport", which collects all transport-related line items.

D Appendix: Figures

Appendix Table B2. NDIS Short Form Outcomes Questionnaire

Question	**Domain**	**Coding**
Has the NDIS helped with choice and control?	Choice and control	= 1 if "Yes"
Has the NDIS helped with daily activities?	ADLs	= 1 if "Yes"
Has the NDIS helped you be more involved socially?	Social	= 1 if "Yes"
Has your involvement with the NDIS helped with finding a home?	Finding a home	= 1 if "Yes"
Has your involvement with the NDIS helped with health and wellbeing?	Health and well-being	= 1 if "Yes"
Has your involvement with the NDIS helped with learning?	Learning	= 1 if "Yes"
Has your involvement with the NDIS helped with work?	Work	= 1 if "Yes"
Has the NDIS helped you be involved in your community?	Community inclusion	= 1 if "Yes"
Overall, do you feel positive about your health?	Positive health	= 1 if "Excellent", "Very Good" or "Good"; 0 if "Poor" or "Fair"
Have you had difficulty accessing health services?	Access to health care	= 1 if "Yes because I can't afford it", "Yes because I don't have support", "Yes because of access issues", or "Yes because of attitudes and/or expertise of health professionals"; 0 if "No"
How many times have you been hospitalised in the last 12 months?	Hospitalisation	= 1 if "1", "2", "3–5", or "6+"; 0 if "0"

Notes: This table presents the text of the relevant questions of the NDIS Short Form Outcome Questionnaire, administered annually to all participants. The last column describes how responses are coded.

Appendix Table B3. Effects of the NDIS on economic outcomes, TWFE

	(1) Earnings	(2) Employment	(3) DSP	(4) DSP basic
Event time:				
−5	-265.36*	-0.016***	-0.006***	-48.67*
	(143.39)	(0.005)	(0.002)	(28.32)
−4	-340.51***	-0.017***	-0.004**	-31.77
	(118.27)	(0.005)	(0.002)	(28.61)
−3	-279.41***	-0.015***	-0.002	-26.10
	(82.66)	(0.004)	(0.001)	(21.99)
−2	-215.83***	-0.011***	-0.001	-19.60
	(48.38)	(0.002)	(0.001)	(14.30)
0	169.68***	0.005**	-0.002	2.91
	(61.09)	(0.002)	(0.001)	(20.66)
1	454.30***	0.015***	-0.007**	-72.94
	(108.06)	(0.004)	(0.003)	(49.30)
2	729.58***	0.020***	-0.014***	-157.76**
	(164.37)	(0.006)	(0.004)	(71.60)
3	898.68***	0.001	-0.018***	-162.34*
	(225.01)	(0.012)	(0.004)	(88.11)
4	1220.21***	0.016	-0.023***	-316.50***
	(301.12)	(0.011)	(0.005)	(102.20)
5	1595.94***	0.035***	-0.031***	-440.15***
	(313.69)	(0.010)	(0.006)	(145.98)
N	550400	550400	550400	550400
Pre-treatment mean outcome	5013.13	0.302	0.818	15000.00

Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

Appendix Table B4. Heterogeneity analysis by gender

	Earnings		Employment	
	(1) Female	(2) Male	(3) Female	(4) Male
Event time:				
−5	-199.97	-239.46**	-0.002	-0.005*
	(136.12)	(105.84)	(0.006)	(0.003)
−4	-152.02	-329.35***	-0.002	-0.006***
	(119.77)	(72.64)	(0.005)	(0.002)
−3	-100.89	-106.69	-0.001	-0.005**
	(92.59)	(71.87)	(0.003)	(0.002)
−2	-33.16	-22.25	-0.002	-0.002
	(61.11)	(50.83)	(0.002)	(0.002)
0	86.13	100.39*	0.007*	-0.003
	(54.85)	(52.94)	(0.004)	(0.002)
1	156.25	172.83**	0.016***	0.000
	(95.53)	(85.62)	(0.005)	(0.004)
2	556.87***	325.49**	0.031***	0.005
	(136.97)	(162.61)	(0.009)	(0.004)
3	997.09***	868.22***	0.025***	0.011
	(160.56)	(278.30)	(0.008)	(0.012)
4	1328.23***	1007.89***	0.036***	0.009
	(254.75)	(344.13)	(0.007)	(0.013)
5	2042.77***	2036.50***	0.075***	0.027*
	(592.61)	(353.27)	(0.008)	(0.016)
N	251,920	298,480	251,920	298,480
Pre-treatment mean outcome	3,911.10	4,579.10	0.15	0.15

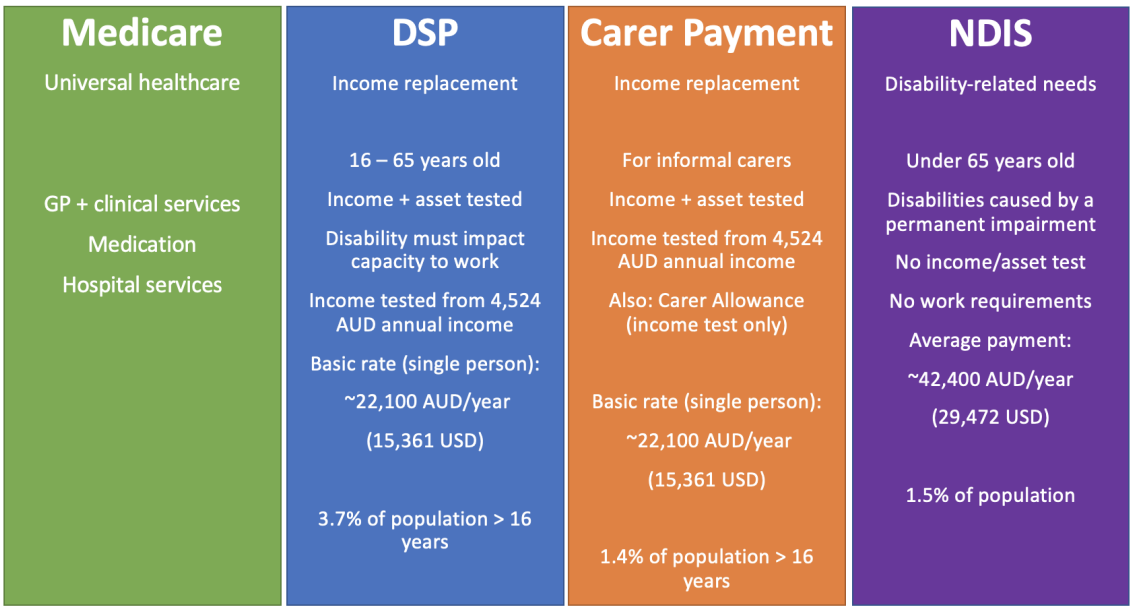
Notes: Standard errors clustered at the NDIA service-district level.
**** p<0.01, ** p<0.05, * p<0.1*

Appendix Table B5. Sample comparison: Main analysis sample (PLIDA) vs NDIA sample

	PLIDA		NDIA	
Baseline employment status	Count	%	Count	%
Open employment	5,881	8.28	4,803	7.75
Supported employment	11,782	16.58	10,297	16.62
No employment	53,389	75.14	46,842	75.62

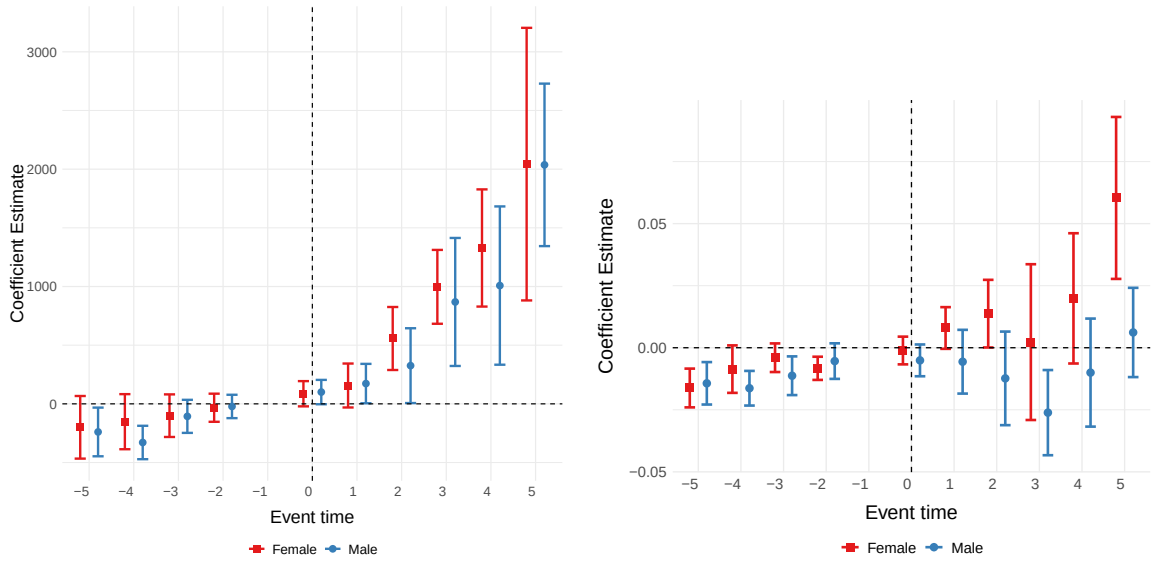
Appendix Table B6. Attrition of the main analysis sample by baseline employment type

	2013	2014	2016	2017	2018	2019	Full sample
Fraction missing	0.85	0.75	0.07	0.04	0.04	0.04	0.10
No. participants	3194	1363	17924	27542	16894	1883	68800



Appendix Figure C1. Federal government programmes for households with disabilities

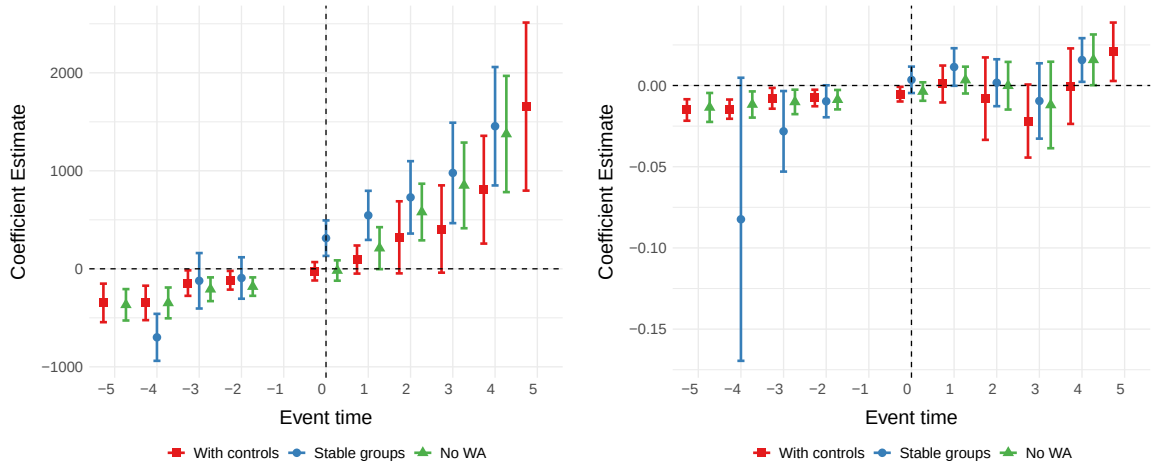
Notes: This figure outlines the key Australian federal government programmes for people with disabilities. Benefit amounts and statistics quoted in this figure are as at 2019.



(a) Earnings (b) Employment

Appendix Figure C2. Effects by gender

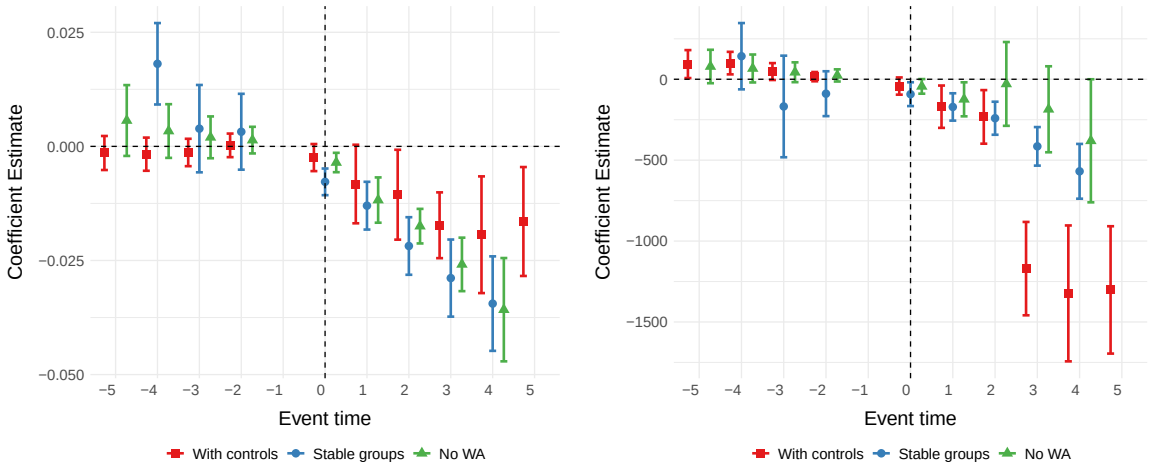
Notes: The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) Earnings (b) DSP

Appendix Figure C3. Robustness results on labour market outcomes

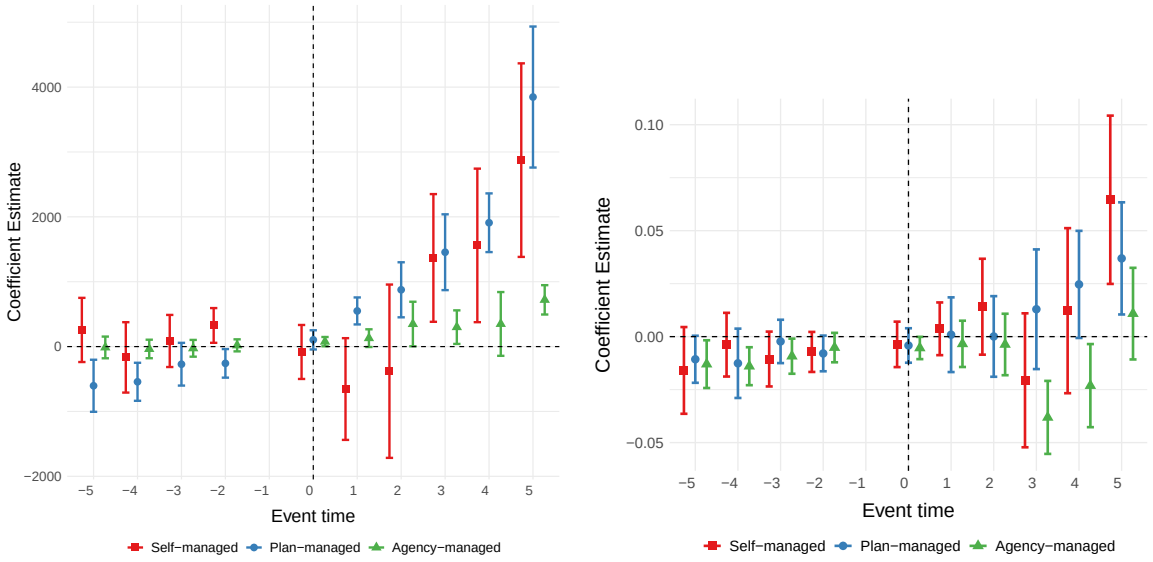
Notes: Control variables included in the "With controls" specification include: gender, an indicator for living in a major city, age at first plan category (5-year bins), an indicator for Indigenous and Torres Strait Islander, level of function category, and an indicator for whether the first plan involves Support Independent Living (SIL). The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) DSP (b) DSP basic

Appendix Figure C4. Robustness results on DSP

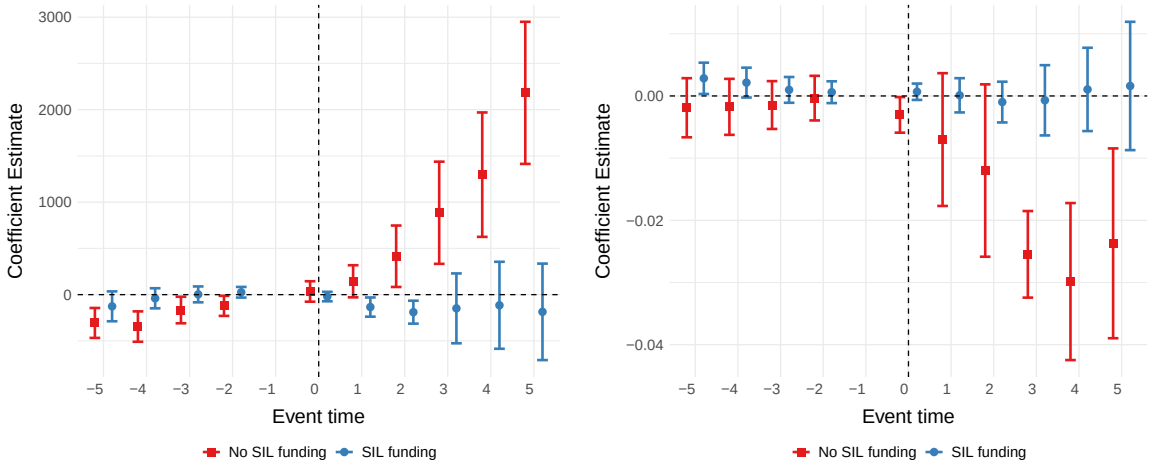
Notes: Control variables included in the "With controls" specification include: gender, an indicator for living in a major city, age at first plan category (5-year bins), an indicator for Indigenous and Torres Strait Islander, level of function category, and an indicator for whether the first plan involves Support Independent Living (SIL). The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) Earnings (b) DSP

Appendix Figure C5. Effects by NDIS plan type

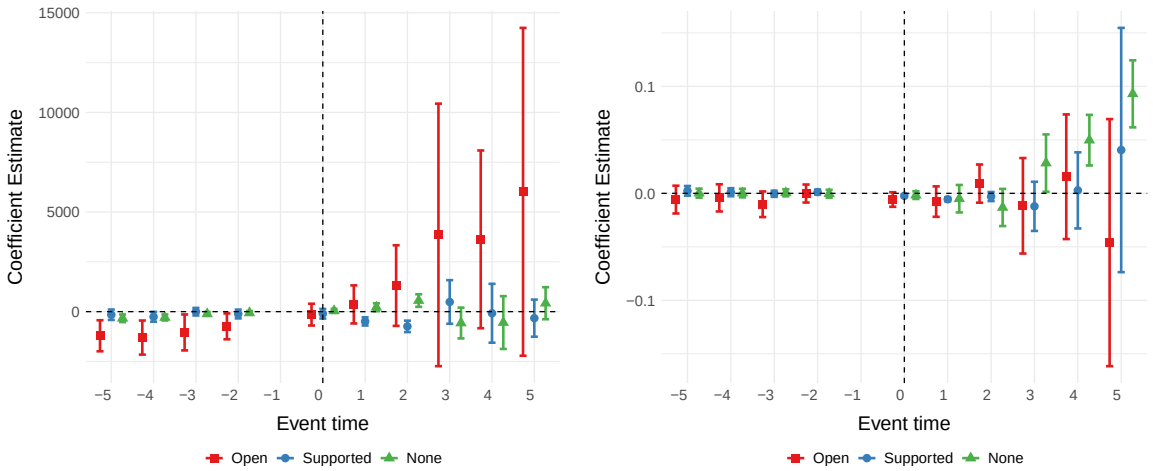
Notes: The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) Earnings (b) DSP

Appendix Figure C6. Effects by SIL funding in first plan

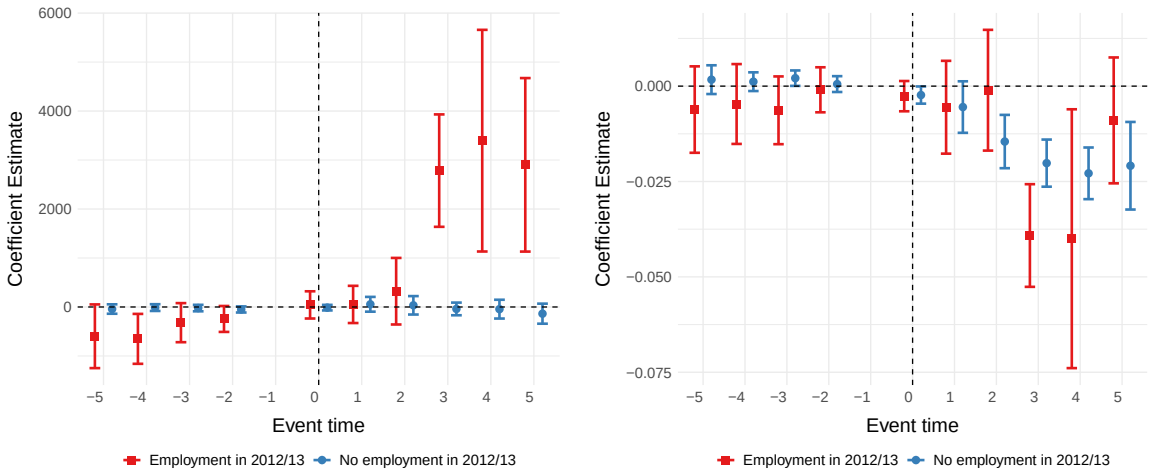
Notes: The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) Earnings (b) DSP

Appendix Figure C7. Effects by employment type at baseline

Notes: The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.



(a) Earnings (b) DSP

Appendix Figure C8. Effects by employment in 2012/13

Notes: The bars represent 95% confidence intervals. Standard errors are clustered at the NDIA service-district level.