Return-to-Work Policies' Clawback Regime and Labor Supply in Disability Insurance Programs*

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Abstract

Exploiting a quasi-natural experiment and using administrative data, we examine the effects of the return-to-work policies' clawback regime in Disability Insurance (DI) programs on beneficiaries' labor supply decisions, allowing them to collect reduced DI payments while working. We compare two return-to-work policies: one with a single rate clawback regime and another with a progressive clawback regime where a reform further increased its progressiveness. The reform caused an increase in the mean labor supply; beneficiaries who already work, work more, and those who did not work start working. The effects are heterogeneous by beneficiaries characteristics, and the increase is driven mainly by top percentiles of earnings. Findings suggest an essential role for the clawback regime in return-to-work policies and targeted policies to increase the labor supply in DI programs.

JEL classification: D3; H3; I3; J3.

Keywords: disability insurance; clawback rate; return-to-work policy, financial incentives; labor supply.

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1 Introduction

Return-to-work policies in Disability Insurance (DI) programs allow beneficiaries to work and collect reduced DI payments under a clawback regime, characterized by the earnings thresholds, marginal clawback rates, and DI payments. These policies intend to provide financial incentives to beneficiaries to return to the labor force to potentially improve their economic well-being, ensure their broader integration into society, and decrease the programs' cost. Previous studies have examined the effects of return-to-work policies on beneficiaries' labor supply decisions from the introduction of return-to-work policies, changes in the DI payments, eligibility, and screening process, with mixed findings.[1] However, little is known about the effect of variations in the clawback regimes, which influence the size of the induced financial incentives and the labor supply response in the return-to-work policies. The scarcity of work in that area could be due to the lack of such policy variations. Results in this area would be important for understanding labor supply policies' ramifications and better design of DI policies.

We examine the effects of return-to-work policies' clawback regimes on DI beneficiaries' labor supply decisions. Specifically, we compare return-to-work policies in two Canadian provincial DI programs with similar screening, eligibility criteria and benefits but different clawback regimes. One is Alberta's "Assured Income for the Severely Handicapped" (hereafter AISH) program, with a progressive clawback regime featuring an earnings exemption threshold,[2] wherein monthly DI payments gradually get reduced as earnings increase. A reform in April 2012 further increased its progressiveness, allowing the beneficiaries to work more while collecting a larger portion of their DI payments. The second program is the "Ontario Disability Support Program" (hereafter ODSP), with a single rate clawback regime. We estimate the causal effects of AISH's clawback

[1]Some authors find positive effects of return-to-work policies on labor supply (e.g., Zaresani, 2018; Vall Castelló, 2017; Kostol and Mogstad, 2014; Campolieti and Riddell, 2012). However, some other authors find negative effects (e.g., Ruh and Staubli, 2019; Gelber et al., 2017; Maestas et al., 2013; Marie and Vall Castello, 2012). Yet, another group of authors find neutral effects (e.g., Bütler et al., 2015). There is incipient work on explaining these findings by considering adjustment costs in the labor supply decision (see, for example, Zaresani, 2020 and Gelber et al., 2020a).

[2]The earnings exemption threshold in Canadian DI program is comparable to the Substantive Gainful Activity (GSA) in the US system. Earnings below the threshold do not affect DI payments.

regime change on the beneficiaries' earnings and labor force participation decisions in a Difference-in-Differences (DD) framework using ODSP as a control group. We provide suggestive evidence on the relative magnitude of the substitution versus income effects of the reform. To gain further insight into the effects of the reform apart from mean effects, we employ a quantile DD framework. Finally, we estimate the elasticity of earnings in the exempted range with respect to the progressiveness measure of the clawback regime.

We use individual-level longitudinal administrative data on monthly earnings of AISH and ODSP beneficiaries spanning two years of pre- and two years of post-reform obtained from the Alberta and Ontario governments, respectively. Observing monthly earnings is essential since the earnings thresholds are monthly based. The data also has information on beneficiaries' characteristics, including gender, age, family structure, type of disability, and residence location.

Our analysis provides three main conclusions. First, a more progressive clawback regime causes an increase in the mean labor supply along both the intensive and the extensive margins. The DD model's estimated effects, controlling for individual fixed effects, are an 11.87% increase in the average inflation-adjusted monthly earnings and a 0.79% point increase in the labor force participation rate.

Second, the estimates are heterogeneous by beneficiaries' family structure, age, gender, type of disability, and location of residence. The estimates are larger for men, younger beneficiaries, those with dependents, those with psychotic disabilities, and beneficiaries who reside in metropolitan areas. Suggestive evidence shows that the income effects of the reform are negligible, and a more progressive clawback regime affects work incentives. The quantile DD estimates show that the higher percentiles of the earnings are the driver of the increase in mean earnings. Findings suggest that targeted policies may work better to encourage DI beneficiaries to return to work.

Third, an increase in the progressiveness of a clawback regime decreases the portion of the beneficiaries with earnings in the exempted range. The estimated elasticities suggest that a 10% increase in progressiveness decreases the portion of beneficiaries with earnings in the exempted range by 11.4% and 3.3% for the beneficiaries without and with

dependents, respectively.[3]

Our findings provide evidence on the labor supply responses to different clawback regimes of return-to-work policies in DI programs, an important policy domain. While the return-to-work policies aim to get DI beneficiaries into the labor force by providing financial incentives, empirical findings from the effectiveness of such policies are mixed. Hoynes and Moffitt (1999), Benitez-Silva et al. (2011), Weathers II and Hemmeter (2011) and Bütler et al. (2015) find no effects from financial incentives to work in the US and Switzerland, and Ruh and Staubli (2019) find earnings threshold provides work disincentive in Austrian DI program. Meanwhile Zaresani (2018), Kostol and Mogstad (2014) and Campolieti and Riddell (2012) find positive responses respectively in Norway and Canada. Gelber et al. (2017); Maestas et al. (2013); Marie and Vall Castello (2012); Lemieux and Milligan (2008); Fortin et al. (2004); Campolieti (2004) and Gruber (2000) find that providing more generous benefits has negative effects on labor supply in social assistance programs in Canada, the US, and Spain. Garcia Mandico et al. (2020); Borghans et al. (2014) and Staubli (2011) examine the effects of terminating benefits and stricter eligibility criteria in DI programs in the Netherlands and Austria. They find that individuals substitute DI benefits by collecting more from other social assistance programs. Beyond a change in financial incentives, medical reassessment of DI recipients and trial work periods in the US do not affect the labor supply (Autor and Duggan, 2006). Moore (2015) finds that losing benefits due to the removal of drug and alcohol addictions as qualifying conditions for DI benefits increase the labor supply. We contribute to this literature by examining the impacts of financial incentives induced by the return-to-work policies' clawback regime on labor supply decisions.

[3]The exemption threshold is higher for AISH beneficiaries with dependents than those without dependents.

2 Institutional background and data

2.1 DI programs

DI programs are among the largest social insurance programs in advanced countries. OECD countries, on average, spend more than 2.5% of their GDP on these programs (OECD, 2010). These programs provide benefits to compensate individuals for lost employment earnings due to health conditions that limit the amount or type of paid work they can perform. These programs have been criticized because of their high cost and providing work disincentives to the beneficiaries.

As such, many countries are considering or have recently implemented return-to-work policies in their DI programs to encourage beneficiaries to work.[4] Return-to-work policies provide work incentives to the beneficiaries by allowing them to work and collect reduced DI payments. For instance, as part of the Ticket to Work and Work Incentives Improvement Act of 1999 in the US, the Social Security Disability Insurance (SSDI) program underwent through a Benefit Offset National Demonstration (BOND), a random assignment test of a $1 for $2 offset applied to annual earnings above the SSDI's Substantial Gainful Activity (SGA) threshold. BOND allows the beneficiaries in the treatment group to retain some of their monthly cash benefits while earning more than the SGA, whereas entirely suspending the benefits for the control group. Various evaluations find no confirmatory evidence of an impact of BOND on average earnings (SSA, 2018; Weathers II and Hemmeter, 2011; Wittenburg et al., 2015).

2.2 DI programs in Canada

The federal DI program in Canada provides benefits to individuals with medically verifiable physical or non-physical disabilities that limit the amount of paid work they can perform. This federal program provides short-term benefits to participants, while the

[4]The UK, Norway, and Switzerland are among the countries that recently implemented policies in their DI programs to increase the beneficiaries' labor supply. The UK's program allows beneficiaries to keep half of their benefits for up to a year if they work. In Norway's program, benefits are reduced by $0.6 for every $1 earned above an exemption threshold (Kostol and Mogstad, 2014). Switzerland tested a program that offered a conditional cash payment if DI recipients started to work or increased their earnings (Bütler et al., 2015).

eligibility criteria are based on individuals' employment history. This program aims to enable benefit recipients (and their dependents) to live independently in their communities as much as possible. However, most individuals with lifelong and severe disabilities would not be eligible for the federal program –due to lack of employment history– and need long-term assistance. The provincial DI programs complement the federal program by providing long-term benefits to those not eligible for the federal program, or needing more assistance. Each province operates its DI program under different ministries, but they feature comparable eligibility criteria and benefits, but specifics of the programs varies across the provinces.

2.3 Alberta and Ontario provincial DI programs

The "Assured Income for the Severely Handicapped" (AISH) is Alberta's provincial DI program. AISH is a means-tested program where eligible individuals are entitled to a prescribed amount of assistance. The eligibility to enter the program is determined by the applicant's disability, age, income, and assets. Eligible individuals must be permanently disabled in that there is no curative therapy to materially improve their condition (SASR, 2010). They must also be 18–65 years old, live in the province and be Canadian citizens or permanent residents.[5] An eligible benefit recipient and their partner's total assets –excluding their primary residence and means of transportation– cannot be worth more than C$100,000. A social worker makes the final decision on an application file after receiving all the relevant medical reports from a qualified health professional. In 2012, entitled individuals received monthly DI payments of C$1,188, in addition to supplemental assistance, such as health benefits and subsidized transport.

The "Ontario Disability Support Program" (ODSP) is the provincial DI program in Ontario. The eligibility criteria and the determination process are similar to the AISH. Beneficiaries receive monthly DI payments and similar supplementary assistance. Individual circumstances, including the number and age of dependants, and geographic location, determine the monthly DI payments in the range of C$1,086 to C$1,999 during

[5]Beneficiaries older than 65 years are eligible to receive the guaranteed income support or the old age security pension.

our study period of 2010-2014.[6]

Once an individual enters into the AISH or the ODSP, there are three main pathways out of the programs. First, a benefit recipient may die. Second, they may no longer be eligible to receive the benefits. For example, a benefit recipient may reach the retirement age of 65 and be eligible to receive the guaranteed income support or the old age security pension. Third, a benefit recipient may no longer meet the medical, or income and asset criteria for receiving the benefits. However, eligibility-based exits account for a tiny fraction of the exits from both programs.

2.4 AISH's return-to-work policy

AISH has a return-to-work policy that allows beneficiaries to work while collecting reduced DI payments under a clawback regime, characterized by earnings thresholds, marginal clawback rates, and DI payments. AISH's clawback regime is progressive wherein the marginal clawback rate gradually rises as earnings increase. It has an exemption threshold below which the earnings are exempted and do not affect the payments (0% marginal clawback rate), but the DI payments are gradually reduced for earnings accumulated above the exemption threshold. Figure 1 plots the budget constraints of beneficiaries. The horizontal axis denotes the monthly employment earnings, and the vertical axis denotes the total monthly disposable income, which is earnings and net DI payments added together.[7] The exemption thresholds are C$400 and C$975 for beneficiaries without and with dependents, respectively. The DI payments are reduced by C$1 for every C$2 of earnings accumulated between the exemption threshold and the second threshold, which is C$1,500 and C$2,500 for beneficiaries without and with dependents, respectively (50% marginal clawback rate).[8] The DI payments are reduced by C$1 for

[6]The ODSP's DI payments range from C$1,341 to C$1,739, as of August 2020. For more details see Section 30.(1) in https://www.ontario.ca/laws/regulation/980222#BK34.

[7]We abstract from income taxes in our study, but DI beneficiaries' earnings are subject to federal and provincial income taxes. However, most DI beneficiaries' annual earnings fall into the lowest income tax bracket. Alberta's lowest income tax bracket in the 2012-2013 financial year is C$43,561, with a combined federal and provincial tax rate of 25%. The corresponding bracket and rate in Ontario are C$39,723 and 25.05%. For more information see: https://www.taxtips.ca/priortaxrates/tax-rates-2012-2013.htm.

[8]The second threshold increased to C$1,500 from C$1,000 for the beneficiaries with dependents and to C$2,500 from C$2,000 for the beneficiaries with dependents in July 2008.

every C$1 of earnings accumulated above the second threshold (100% marginal clawback rate).

We combine the features of a clawback regime –earnings thresholds, marginal clawback rates and and DI payments– to define Payment Reduction Rate (PRR) as a measure for the progressiveness a regime. The PRR for earnings z denotes the portion of DI payments reduced if a beneficiary earns z. Abstracting from the income taxes for simplicity, the PRR for earnings z is defined as below:[9]

$$PRR^z = \begin{cases} 0 & z \leq \text{exemption threshold} \\ 1 - \frac{I^z - I^0}{z} & \text{Otherwise} \end{cases} \tag{1}$$

where I^0 and I^z denote the average disposable income of beneficiaries with earnings below the exemption threshold and those with earning z above the threshold. The disposable income is defined as the earnings, and net DI payments added together.

A progressive clawback regime –wherein marginal clawback rate increases as earnings rise– provides financial incentives to the beneficiaries to work by gradually reducing the DI payments and allowing them to work more. Comparing two progressive clawback regimes, a more progressive one has lower PRRs for all earnings levels.

2.4.1 Change in AISH's return-to-work policy and the expected effects

After Alberta's 2012 provincial election, the new premier changed the ministry responsible for administering AISH and, as part of a campaign promise, increased the progressiveness of the clawback regime in April 2012. First, the monthly exemption threshold was doubled. It was increased to C$800 from C$400 for beneficiaries with no dependents and to C$1,950 from C$975 for those with dependents (see Figure 1). Second, the monthly DI payments were increased by 35%. It was increased by C$400 to C$1,588 from C$1,188 for all the beneficiaries. This reform increases the financial incentives to work by allowing

[9] Kostol and Mogstad (2014) use a similar formula for the participation tax rate to estimate the elasticity of labor force non-participation with respect to participation tax rate form work incentives induced by a policy change in a Norwegian DI program where the marginal taxes on earnings above a threshold is decreased.

beneficiaries to collect more DI payments while working and earning more.

Figure 2 plots the PRR for each earnings level, before and after the reform. PRR is zero for the earnings below the exemption threshold, and it increases gradually for the higher earnings. The reform decreases the PRR for all earnings levels, where the largest decrease is right above the former exemption threshold, where the PRR jumps down to 0 from 50%.

Expected effects of the reform In a static labor supply model, beneficiaries choose their hours of work at a given offered wage, which let us assume is constant.[10] Let us also assume that leisure and income are normal goods. Consider a beneficiary who, before the reform, locates at points on the budget segment ab in Figure 1. Depending on their preferences, the increase in the monthly DI payments and the increase in the exemption threshold could lead to either of three responses. First, they might exit the labor force, move to point A, and collect the new higher DI payments. Second, they might increase their earnings and move to a point on the AB segment. Third, they may not change their earnings. In either case, the disposable income rises, and the decision would suggest the size of the income versus substitution effects of the reform. A decision not to change, or increase the labor supply would suggest that the income effects are negligible, and the substitution effects, which provide work incentives, are the dominant effects of the reform.

Consider next a beneficiary who, before the reform, locates at points on the budget segment bc but to the left of B. They might move to B or some point at the budget segment BC post-reform. The DI payments are gradually reduced while disposable income increases. For beneficiaries who before the reform locate on the budget constraint bc but to the right of B, or those located at points on the budget segment cd, the reform could lead to either of these two responses, depending on their preferences. First, if the disutility of working is sufficiently high, they might reduce their earnings. Second, they might not change their earnings, suggesting that the reform's income effects could be

[10]The education level of most of the provincial DI beneficiaries is less than high school, and most of the beneficiaries who work do so in low skilled, minimum wage jobs (Kneebone and Grynishak, 2011). The minimum hourly wages in 2012 were C$9.75 and C$10.25 in Alberta and Ontario, respectively.

negligible.

The overall impact of the AISH's reform on the labor supply decisions of beneficiaries is theoretically ambiguous. Nevertheless, this simple static model makes two predictions. First, beneficiaries with earnings around the exemption threshold might increase their earnings with a more progressive clawback regime. Second, the portion of beneficiaries with earnings in the exempted range might decrease with a more progressive clawback regime. We will empirically investigate these predictions by analyzing the distributional effects of the reform in Section 5 and estimating the elasticity of portion of beneficiaries with earnings in the exempted range with respect to PRR of the clawback regime in Section 6.

2.5 ODSP's return-to-work policy

The ODSP also has a return-to-work policy that allows its beneficiaries to work while collecting reduced DI payments under a clawback regime. Unlike AISH, ODSP's clawback regime does not have an exemption threshold, and is not progressive. Its clawback regime is single rate wherein DI payments are reduced at a fixed rate of 50% for all earnings. DI payments are reduced by C$1 for every C$2 of earnings, starting from the first earned dollar (50% marginal clawback rate).[11] Figure 3 plots the budget constraint of ODSP beneficiaries.

3 Emprical analysis

3.1 Data and sample selection

We use individual-level administrative data on the monthly earnings of the AISH and ODSP beneficiaries obtained from the governments of Alberta and Ontario. Observing monthly earnings is essential since the earnings thresholds are monthly based. The data spans from April 2010 to March 2014 (two years before the AISH reform and two years

[11] In September 2013, ODSP introduced an exemption threshold at C$200, the clawback rate above which is 50%. We estimate our models excluding the affected period, and it does not seem to affect the estimates. See Figure 4 and Table 2.

after it), and includes only beneficiaries with non-physical disabilities. In addition, the data includes information on individuals' gender, age, family structure, type of disability, and residence location. Our study sample includes 18–64 years AISH and ODSP beneficiaries with non-physical disabilities, excluding those who entered AISH after the reform was announced.

Those who enter the AISH post-reform might be relatively healthier than those who entered before the reform, and they might be able to work more. This is because the new return-to-work policy allows the beneficiaries to work more while collecting higher DI payments. The reform was announced in February 2012 and came into effect two months later in April 2012. Given the short time between the announcement and implementation of the reform, anticipatory responses from the beneficiaries are unlikely but they could potentially bias the estimates upwards.[12] To avoid this issue, we take a similar approach to Marie and Vall Castello (2012) and exclude the AISH beneficiaries who entered the program after February 2012 from our study sample. Therefore, our estimates provide a lower bound on the effects of the reform on all beneficiaries.

We do not have data on beneficiaries with physical disabilities in Alberta, which is about half of all the reported disabilities in the program (SASR, 2010). However, studying beneficiaries with non-physical disabilities fits the purpose of this research. Non-physical disabilities, such as depression, are hard-to-verify, and individuals with these conditions are the marginal entrants into the DI programs (Autor and Duggan, 2006; Liebman, 2015) who might have at least some ability to work (Bastani and Waldenström, 2020; Maestas et al., 2013). Marginal entrants' work decisions might be more sensitive to financial incentives. They might decide to work if, for instance, they can find a suitable job that possibly accommodates their disability.

3.2 Descriptive evidence

Table 1 presents the summary statistics broken down into two years of pre- and two years of post-reform. The sample size in AISH is 452,000 individual-months (around 10,000

[12]See Figure 5 for the trends in average monthly earnings, and Figure 8 and Figure 9 for earnings distributions before and after the reform. The figures suggest no anticipatory responses.

individuals over four years), and in ODSP's is 6.9 million individual-months (around 150,000 individuals over four years).[13]

The first panel of the table presents the labor market statistics. The average net monthly payments in both programs are similar before the reform (C$1,160 in AISH versus C$1,020 in ODSP), but it is higher in AISH after the reform, since AISH's DI payments increased by C$400 (C$1,530 versus C$1,015). About half of AISH beneficiaries participate in the labor market –have positive earnings– compared with less than 10% in the ODSP. The average inflation-adjusted monthly earnings are higher in AISH than ODSP (C$255 versus C$50). Post-reform earnings in AISH increase (C$255 versus C$285), but it does not change much in ODSP (C$50 versus C$55). Post-reform labor force participation does not change much in both programs.

The second panel of Table 1 presents a summary of the beneficiaries' characteristics. The demographic characteristics in AISH and ODSP are comparable and do not change post-reform. Half of the beneficiaries in each program are female. In both programs, about half of all beneficiaries have non-physical disabilities (SASR, 2010). We divide non-physical disabilities into three groups of Psychotic (i.e., Schizophrenia and Bipolar disorder), Neurological (i.e., Autism and Down Syndrome), and Mental conditions (i.e., Anxiety and Depression). The composition of disability types is comparable, where the Psychotic and Mental disabilities are the largest and the smallest groups, respectively, and the composition does not change post-reform. A larger portion of AISH beneficiaries live in metropolitan areas.[14] In both programs, most of the benefit recipients do not have dependents.

3.3 Graphical evidence

To graphically assess the impact of the reform on AISH beneficiaries' labor supply decisions, we plot the trends in the inflation-adjusted average monthly earnings and the labor force participation rates in AISH and ODSP two years of pre- and two years of

[13] Alberta and Ontario's population in the latest 2016 Census survey are 13,448,494 and 4,0067,175 respectively.

[14] The metropolitan areas in Alberta are Calgary and Edmonton, and in Ontario are Toronto and Ottawa.

post-reform in Figure 4. Labor force participation is defined as a dummy variable that switches on for positive earnings. Panel (a) shows that the earnings in both AISH and ODSP are relatively stable before the reform. However, in the months following the reform, the earnings in AISH gradually rise. Panel (b) shows a similar trend for the labor force participation, where the post-reform increase in AISH is much smaller. This could be because adjusting work hours for individuals already employed can be easier than finding a job and starting to work.

As mentioned before, the reform in AISH came into effect in April 2012, but it was publicly announced two months earlier in February 2012. Figure 4 also suggests that there are no anticipatory effects in earnings nor labor force participation of the beneficiaries.

3.4 Identification strategy

Estimating causal effects from the return-to-work policies' clawback regime on labor supply decisions of DI recipients is challenging. Individuals' labor supply is endogenous since the selection process into a DI program strongly depends on having low earnings. We estimate causal effects of the AISH's reform from a DD model using the ODSP as a control group. ODSP beneficiaries represent an appropriate control group because, except for the clawback regime of its return-to-work policy, ODSP is similar to AISH regarding eligibility criteria and beneficiary characteristics. In addition, ODSP did not undergo major reforms during the period of our study.[15] In our DD framework, the first difference is over time since AISH's clawback regime became more progressive after April 2012. The second difference is across the programs; there was a reform in AISH but not in the ODSP. We implement a DD comparison by estimating a regression of the form:

$$y_{it} = \beta(POST_t \times AISH_i) + X'_{it}\delta + \gamma_i + \lambda_t + \epsilon_{it} \tag{2}$$

where i and t respectively denote individuals and time, and y_{it} denotes the outcome variable. We use inflation-adjusted monthly earnings and labor force participation as

[15]The ODSP introduced an exemption threshold at C$200 in September 2013. As a robustness check for the main analysis, we exclude this period, see the Section 4.1.

outcome variables, examining the effects on the labor supply decisions in intensive and extensive margins, respectively. $AISH_i$ is a dummy variable for the treatment group, the AISH beneficiaries. This variable controls for program-specific trends and is equal to one for those in the AISH program and zero otherwise. $POST_t$ is another dummy variable that switches on for the post-reform months. The vector X_{it} is a set of time-varying individual characteristics to control for any observable differences that might confound the analysis, including age, family structure, and the location of residence. We include a vector of individual fixed effect γ_i, capturing individual-specific factors such as ability or tastes for work. We also include a vector of time fixed effects λ_t to control possible economy-wide changes in economic conditions. ϵ_{it} captures any remaining unobserved factors affecting individuals' labor supply decisions. The coefficient of interest is β, which captures the effects of the reform on labor supply decisions of AISH's beneficiaries relative to ODSP's over time.

The key identification assumption of a DD model is common trends between AISH and ODSP, indicating that there are no unobserved program specific change that first, are correlated with the reform; and second, are correlated with program specific changes in the outcome variable. To provide suggestive evidence on the plausibility of this assumption, we generalize Equation (2) by replacing $POST_t \times AISH_i$ with a full set of treatment and quarterly time interaction terms and estimate an event study regression of the form:

$$y_{it} = \sum_{t=-8}^{t=7} \beta_t (q_t \times AISH_i) + X'_{it}\delta + \gamma_i + \lambda_t + \epsilon_{it} \tag{3}$$

where q_t denotes a set of dummies switching on for quarter t. The pre-reform interaction terms β_t provide a specification test, where zero or very small pre-reform estimates provides suggestive evidence for the plausibility of the common trend assumption.

4 Results

Table 2 presents the estimated effects from DD model specified in equation (2), using a long panel (April 2010 to March 2014) and a shorter panel (October 2010 to August 2013).

Standard errors are clustered at the individual level. The estimated intensive margin effect is an 11.87% increase in monthly earnings (C$29.98 increase from a pre-reform average of C$252.47). The table shows a positive effect in the extensive margin, a 0.79% point increase in the labor force participation rate (from an average participation rate of 48.12%).[16] This finding is consistent with recent evidence that the extensive margin of labor supply is more sensitive to non-linear budget sets than commonly thought, which can have welfare implications (Gelber et al., 2020a; Eissa et al., 2008).[17] Controlling for individual characteristics does not change the estimates. This can be explained by the fact that the estimates already include individual fixed effects, and there might not be much variation in the included time-varying individual characteristics.

The estimates presented in Table 2 will be biased if the treatment and control groups have different labor supply trends before the reform. We plot the estimated coefficients of the interaction terms β_t from the event study specified in Equation (3) for the earnings and labor force participation rate in Figure 5. Each dot indicates the estimated coefficient for the quarter relative to the reform, and the bars represent the corresponding 95% confidence intervals. The estimated pre-reform coefficients are almost zero and then gradually increase in the quarters following the reform in both panels, and they are statistically significant.[18]

The estimates in Table 2 represent a lower bound on the increase in beneficiaries' labor supply from the reform. Adjusting labor supply in response to changes in work incentives may involve adjustment costs; the money and time required to find a new job,

[16] Zaresani (2018) quantifies the effect of the reform in AISH on earnings and labor force participation using a Regression Discontinuity Design, exploring the sharp discontinuity in the increase in work incentives at the month of the reform. Her findings are similar.

[17] Gelber et al. (2020a) examine the impact of the US Social Security Annual Earnings Test (AET) on older workers' labor supply. They estimate 0.49 for the extensive margin elasticity, implying more than a 1% point increase in the participation rate in the absence of the AET. Eissa et al. (2008) develop a theoretical framework to show that labor force participation is more responsive to taxes and transfers than hours worked. They apply their framework to examine the welfare effects on single mothers in the US from tax acts passed in 1986, 1990, 1993, and 2001.

[18] However, the estimated coefficients for the labor force participation in the earlier two quarters are slightly larger than zero. This could be due to delayed responses to an earlier reform in AISH in July 2008. The responses to this reform might be delayed since it might take longer for individuals to find a new job than increase their work hours if they are already employed. We estimate our models using shorter panels excluding the affected periods as a robustness check, and the estimates are quite similar. See Section 4.1 and Table 2.

negotiate increased or reduced hours with an employer, and adjust non-work schedules. The adjustment costs could attenuate beneficiaries' response to work incentives (Zaresani, 2020; Gelber et al., 2020b; Chetty et al., 2011). Zaresani (2020) explores AISH's reform and finds that beneficiaries face adjustment costs to adjust their labor supply, which are more than 10% of their earnings. The size of the induced financial incentives from the return-to-work policies' clawback regimes affects beneficiaries' labor supply decisions. Beneficiaries might increase their labor supply only if the financial incentives are large enough to offset the adjustment costs they face. This emphasizes the importance of the size of the financial incentives induced by the return-to-work policies' clawback regime.

4.1 Robustness analysis

The estimates using the data spanning two years of pre- and post-reform might be contaminated. First, the second earnings threshold in AISH increased to C$1,500 from C$1,000 for those with no dependents and C$2,500 from C$2,000 for those with dependents in July 2008. Second, an exemption threshold at C$200 was introduced in the ODSP in September 2013. The expected effects of these reforms are increases in labor supply in both AISH and ODSP, although it does not seem to affect ODSP, as shown in Figure 4. To check the robustness of our estimates with these possible contaminations, we estimate the effects of the reform excluding the affected periods. The shorter pre-reform period spans October 2010 to March 2012, and the post-reform period spans April 2012 to August 2013. The last column of each block of Table 2 shows the estimates using the shorter panel. The estimated effects are similar to the main estimates using the long panel, suggesting that the contamination effects are negligible.

4.2 Heterogeneity analysis

The treatment effects literature explicitly recognizes that the effect of the treatment can be heterogeneous across different individuals (Heckman et al., 1997; Heckman and Singer, 1985). Table 3 presents the estimated effects of AISH's reform by beneficiaries' family structure, age, gender, type of disability, and residence location. It is instructive to

examine the effects of the reform on beneficiaries with and without dependent separately since the earnings thresholds are higher for those with dependents (see Figure 1). The estimated increases in the earnings and labor force participation are higher for those with dependents (17.88% versus 12.77% increase in earnings and 4.31% points versus 0.62% points increase in the labor force participation).

There are sizeable differences in the effects of the reform across age groups. AISH's more progressive clawback regime increases the labor supply of the 18–34 age group in both extensive and intensive margins (22.97% increase in earnings and 4.21% points increase in the labor force participation rate). The effect on the 35–49 age group is mostly in extensive margins where the earnings increase by 9.82%, and the participation rate decreases by 0.79 % points. The estimated effect on the beneficiaries over 50 years old is mainly a decrease in the extensive margin, a 4.07% point decrease in labor force participation rate, and a smaller 1.83% decrease in the earnings.

The estimated effects are slightly larger for men in intensive margins but almost identical in extensive margins. The estimated effects for men and women are respectively 14.36% and 10.82 % increase in the earnings and 0.80% and 0.79% point increase in the labor force participation rate.

Health condition plays an essential role in the labor supply decisions of individuals. Table 3 shows the estimated effects broken down by disability type. The largest increase in labor supply along the intensive and extensive margins is for beneficiaries with psychotic disabilities (15.07% increase in the earnings and 1.46% point increase in the participation rate). The increase in the labor supply of beneficiaries with neurological and mental disabilities is only along the intensive margin (respectively 11.84% and 7.58% increase in the earnings), and small insignificant decreases along the extensive margin (respectively 0.07% and 0.50% points decrease).

The last panel of Table 3 shows the estimates by beneficiaries' location of residence: metropolitan versus non-metropolitan areas. The estimated effects on the intensive margin are very similar (13.12% and 13.37% increase in the earnings), but the increase on the extensive margin in the metropolitan area is much larger (1.83% point increase versus

0.18% point decrease in the participation rate). This could be because there might be more new job openings in metropolitan areas.

To investigate the plausibility of the common trend assumption required for a causal interpretation of our estimates, we estimate event study models specified in Equation (3) for each sub-sample. We plot the quarterly time and treatment interaction term coefficients (β_t) and the 95% confidence intervals in Appendix A. Pre-reform coefficients are close to zero and gradually rise post-reform for almost all sub-samples.[19] Similar to the estimates for the whole sample plotted in Figure 5, the estimated coefficients for the two earliest pre-reform quarters are slightly larger than zero. It could be a delayed response to the AISH's July 2008 reform. Excluding the affected periods does not change our estimates.

Our estimates show that return-to-work policies' clawback regime has heterogeneous effects on beneficiaries' labor supply decisions. This finding suggests that targeted policies might be more effective in encouraging DI recipients to return to work.

4.3 Income and substitution effects

The reform in AISH has two components: an increase in the exemption thresholds, an increase in the monthly DI payments. In principle, the reform may well have both income and substitution effects. Assuming that leisure and labor are normal goods, the increase in DI payments should induce beneficiaries to work less or stop working, resulting in a negative income effect on the labor supply. The increase in the exemption thresholds is comparable to a decrease in the implied marginal tax rate on the payments, making leisure more expensive, and increasing incentives to substitute leisure with work, a positive substitution effect on labor supply. The relative size of income versus substitution effects has important welfare implications (Autor and Duggan, 2007).

Figure 1 shows the budget constraint of AISH's beneficiaries before and after the reform. For all earnings levels –except for earnings between the old and the new exemp-

[19]The estimates for beneficiaries with dependents, those over 50 years, and beneficiaries with mental disabilities are exceptions. This could be because these sub-samples are small (see Table 1), and therefore coefficients are less precisely estimated.

tion thresholds– the budget constraints pre- and post-reform are parallel, suggesting a dominant income effect. We estimate the effects of the reform on the labor supply of beneficiaries with earnings in the parallel ranges using a DD model. We use the ODSP's beneficiaries in similar earnings ranges as control groups.

Panels (a) and (b) of Figure 6 plot the trends in the inflation-adjusted earnings for AISH and ODSP beneficiaries with no dependents whose monthly earnings is always below C$300 within 6 and 12 months prior to the reform (earnings below the old exemption threshold). Panels (c) and (d) plot the trends for the beneficiaries without dependents whose monthly earnings is always more than C$900 within 6 and 12 months before the reform (earnings above the new exemption threshold). Panel (e) plots the trends for the beneficiaries with dependents whose earnings six months before the reform is always less than C$850 (earnings below the old exemption threshold).[20] These figures suggest that earnings trends in AISH are similar to ODSP, both before and after the AISH reform, suggesting that the effects of the reform on earnings are rather small.

Table 4 presents the estimated effects of the reform for each subgroup presented in Figure 6. The estimated effects are either very small or negative and insignificant. In addition to the positive estimates from the reform on labor force participation rate, these findings suggest that the income effect of the reform is negligible, and a more progressive clawback regime affects work incentives (Autor and Duggan, 2007).[21]

5 Distributional effects

The DD model estimates the mean impacts of a more progressive clawback regime on beneficiaries' labor supply decisions, which masks the distributional effects of the reform. A more progressive clawback regime provides different work incentives to low and high-earner beneficiaries. Looking separately at different sub-samples also does not improve the performance of mean impacts (Bitler et al., 2006). To assess the effects of the reform

[20] There are very few beneficiaries with dependents whose earnings for 6 or 12 months is always above the new exemption threshold.

[21] Marie and Vall Castello (2012) finds that a 35% increase in the payments in the Spanish DI program decreased the labor force participation rate. They conclude that the effects are mostly due to income effects since the DI benefits are not employment contingent.

across different earnings percentiles, we estimate a quantile DD model. This model compares each earnings decile of AISH to the corresponding decile of the ODSP as a control group in a DD framework.[22]

Figure 7 plots the estimated quantile DD models with bootstrapped 95% confidence intervals for beneficiaries without and with dependents in each panel. The blue dashed line illustrates the estimated average effect of the reform on earnings from the DD model presented in Table 3. As shown in Table 1, around 50% and 90% of the beneficiaries in AISH and ODSP respectively do not participate in the labor force and have zero earnings. This is why the estimated effects for the lower percentiles are zero. The figure suggests that the mean effect is driven mostly by the higher earnings deciles, especially those with earnings between the former and the new exemption thresholds.

We present the quantile DD estimates for the whole sample and by beneficiaries' age, gender, type of disability, and residence location in Appendix B. The distributional effects are heterogeneous by beneficiaries' characteristics, and the effects for the lower deciles of earnings are zero, and they rise for the higher deciles, suggesting that high earners are the main drivers of the mean estimated effects.

The quantile estimations suggest that the estimated mean effects on earnings from a more progressive clawback regime from the DD model show a great deal of heterogeneity. The estimated effects are consistent with the predictions from the labor supply model presented in Section 2.4.1 that the effects at the bottom should be small, and it should gradually increase for the higher earnings deciles, specially those closer to the exemption threshold. This finding suggests that targeted return-to-work policies might work better to increase the labor supply in DI programs.

[22]For any variable Y with cumulative distribution function $F(y) = P[Y \leq y]$, the q^{th} percentile of F is defined as the smallest value y_q such that $F(y_q) = q$.

6 How does a progressive clawback regime affect exempted earnings?

The reform in AISH increase the progressiveness of the clawback regime by decreasing the PRR –defined in Equation (1)– for all earnings level. It allows allows beneficiaries to keep a larger portion of the DI payments while working more. Figure 2 plots the PRTs in AISH before and after the reform, where the largest decrease is right above the former exemption threshold, where the PRR jumps down to 0 from 50%.

Figure 8 and Figure 9 plot the earnings distribution of AISH beneficiaries before and after the reform for those without and with dependent, respectively. There are bunching (excess mass) at the old and the new exemption thresholds, suggesting that beneficiaries are responsive to the PRR. However, the post-reform figures with a more progressive clawback regime have a thicker right tail, suggesting that lower PRR is associated with the lower portion of beneficiaries with Earnings Below exemption Threshold (EBT). This observation is consistent with the prediction of the model presented in Section 2.4.1.

We estimate an aggregate elasticity of EBT with respect to the PRR, defined as below:[23]

$$\epsilon = -\frac{\Delta EBT/EBT_0}{\Delta PRR/PRR_0} \tag{4}$$

where Δ denotes the change in the corresponding variable after the reform relative to the before the reform. 0 and 1 indexes refer to pre- and post-reform, respectively.

We use data on AISH beneficiaries from April 2010 to March 2014 (two years of pre- and two years of post-reform) for estimating the elasticity. We divide the monthly earnings into $[z - \delta/2, z + \delta/2]$ bins with width $\delta = \$10$. ΔPRR is the average change in PRR weighted with the portion of the beneficiaries in each bin z before the reform, denoted by p_0^z:

$$\Delta PRR = \mathbb{E}_z[p_0^z(PRR_1^z - PRR_0^z)] \tag{5}$$

[23]This definition is similar to the elasticity of labor force non-participation with respect to participation tax rate defined in Kostol and Mogstad (2014). This specification ignores the income effects of the reform. In Section 4.3, we provide suggestive evidence that the income effect of the reform on the labor supply is negligible.

We estimate the standard errors using a non-parametric bootstrap by drawing 200 samples with replacement. For each bootstrapped sample, we then estimate the elasticity. The standard error of a parameter is the standard deviation of its bootstrapped parameters.

Table 5 presents the estimated elasticities. The estimated elasticity for beneficiaries without and with dependents are 0.114 and 0.033, respectively. A 10% decrease in PRR decreases the portion of beneficiaries with earnings below the exemption threshold by 11.4% and 3.3% for those without and with dependent, respectively.[24]

7 Conclusion

Many countries have recently implemented –or are considering implementing– return-to-work policies to provide financial incentives to DI beneficiaries to increase their labor supply. Return-to-work policies allow beneficiaries to work while collecting reduced DI payments based on a clawback regime. Previous works investigate the effects on beneficiaries' labor supply decisions from increased financial incentives, but the empirical findings are mixed. The clawback regime of return-to-work policies is an important factor that could impact beneficiaries' labor supply decisions, but little is known about the effects of its variations, mainly due to the scarcity of such policy variations. A better understanding of beneficiaries' labor supply responses to the financial incentives of the return-to-work policies is critical for designing such policies better.

We examine how the clawback regime of return-to-work policies impacts benefit recipients' labor supply decisions. We use individual-level longitudinal administrative data and a DD model to compare the labor supply in two DI programs with similar eligibility criteria and beneficiary characteristics but different clawback regimes in return-to-work policies. One program has a progressive clawback regime in which DI payments are gradually reduced as earnings increase, and a reform further increased the progressiveness. The second program has a single rate clawback regime wherein DI payments are reduced

[24]The size of these estimates is comparable to the estimates of Kostol and Mogstad (2014) in the range of 0.119 to 0.186.

at a fixed rate for all earnings levels.

We find that the increase in the clawback regime's progressiveness causes an increase in labor supply in intensive and extensive margins. Beneficiaries who already work, work more (11.87% increase in earnings), and those who did not work start working (0.79% point increase in labor force participation rate). The estimated effects are heterogeneous by beneficiaries' family structure, age, gender, type of disability, and residence location. The estimates from quantile DD models show that top percentiles of earnings drive the increase in earnings. Suggestive evidence further shows that the substitution effects dominate the income effects, and a more progressive clawback regime provides work incentives. A smaller portion of beneficiaries earns below the exemption threshold with a more progressive clawback regime. The estimated elasticities are 0.11 and 0.03 for beneficiaries without and with dependent, respectively. Our findings suggest that targeted return-to-work policies with a more progressive clawback regime could increase the labor supply in DI programs.

Our estimates provide a lower bound on the effect on beneficiaries' labor supply decisions from the financial incentives induced by the clawback regime of return-to-work policies due to the adjustment costs they face (Zaresani, 2020). Beneficiaries would adjust their labor supply in response to change in clawback regimes only if the incentives are large enough to offset the adjustment costs they face, suggesting an important role for the size of the financial incentives in beneficiaries' labor supply decisions.

Our findings show the importance of the clawback regime of return-to-work policies to increase labor supply in DI programs, an important policy domain, but it has caveats. Our study does not explore the welfare effects and the optimal clawback regime for return-to-work policies. The study of those issues is left for future work.

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Tables

Table 1: Summary statistics

	AISH		ODSP	
	Two years pre-reform	Two years post-reform	Two years pre-reform	Two years post-reform
Labor market statistics				
Labor force participation (%)	48.1	48.4	9.9	9.4
Average monthly employment earnings (2012 C$)	255 (420)	285 (470)	50 (235)	55 (245)
Average net monthly DI payments (2012 C$)	1,160 (120)	1,530 (150)	1,020 (470)	1,015 (460)
Number of new entries	1,215	636	8,440	9,965
Individual characteristics				
Male (%)	55.3	55.4	53.4	53.9
Average age (years)	38.5 (12.5)	39.8 (12.8)	43.0 (12.6)	42.9 (12.9)
No dependent (%)	91.3	90.8	82.1	82.2
Type of disability				
-Psychotic (%)	42.1	42.1	42.6	43.5
-Neurological (%)	50.1	51.0	36.3	36.4
-Mental (%)	7.3	6.9	21.1	20.2
Metropolitan area resident (%)	49.5	48.9	29.1	29.0
Average number of individuals	8,940	9,890	142,970	160,775
Total number of observations	214,595	237,285	3,431,300	3,385,615

Notes: This table provides summary statistics for the data from the AISH and ODSP. According to Statistics Canada's confidentiality guidelines, the average inflation-adjusted (2012 C$) monthly earnings and DI payments are rounded to the closest five. The metropolitan area of Alberta are Calgary and Edmonton, and Ontario's are Toronto and Ottawa. The standard deviations of the continuous variables are provided in the parenthesis.

Table 2: Estimated effects from DD model

	Earnings ($)			Labor Force Participation Rate (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
AISH × Post	29.98***	31.02***	29.87***	0.79***	0.79***	0.78***
	(1.34)	(1.34)	(1.53)	(0.15)	(0.15)	(0.17)
Sample	Long panel	Long panel	Short panel	Long panel	Long panel	Short panel
Individual and time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual co-variates	No	Yes	Yes	No	Yes	Yes
Pre-reform mean in AISH	252.47	250.18	250.89	48.12	48.12	47.60
	(420.40)	(420.65)	(421.03)			
R-Sq.	0.04	0.04	0.04	0.08	0.10	0.10
Num. of. Obs.	7,741,795	7,741,795	5,810,529	7,741,795	7,741,795	5,810,529

Notes: This table presents the estimated effects of the reform in AISH from the DD model specified in Equation (2). The long panel spans April 2010 to March 2013. The shorter panel covers October 2010 to August 2014. The included individual covariates are age, family structure, and the location of residence. The earnings are inflation-adjusted (2012 C$). All the estimates include individual fixed effects. Standard errors are clustered in individual levels and are presented in the parenthesis.
$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 3: Heterogeneity analysis from DD model

	Earnings ($)		Labor Force Participation Rate (%)		
	AISH × Post	Mean	AISH × Post	Mean	Num. of. Obs.
A. Family structure					
No dependent	31.81***	249.06	0.62***	49.87	6,400,493
	(1.37)	(404.04)	(0.16)		
With dependent	42.39***	237.11	4.31***	29.76	1,341,302
	(5.37)	(498.67)	(0.47)		
B. Age					
18-34 years	57.29***	249.38	4.21***	45.27	2,323,720
	(2.19)	(425.70)	(0.23)		
35-49 years	25.82***	262.85	-0.79***	50.80	2,660,571
	(2.39)	(420.75)	(0.26)		
+50 years	-4.11*	224.29	-4.07***	49.63	2,757,504
	(2.33)	(375.49)	(0.30)		
C. Gender					
Male	37.79***	263.09	0.80***	49.02	4,162,168
	(1.88)	(428.66)	(0.20)		
Female	24.82***	229.36	0.79***	47.00	3,579,627
	(1.89)	(392.29)	(0.22)		
D. Type of disability					
Psychotic	32.65***	216.60	1.46***	39.22	3,329,884
	(2.02)	(403.23)	(0.23)		
Neurological	32.28***	272.41	-0.07	55.40	2,878,196
	(1.91)	(418.40)	(0.21)		
Mental	19.72***	260.00	-0.50	48.86	1,533,715
	(5.03)	(420.88)	(0.56)		
E. Location of residence					
Metropolitan area	34.34***	261.63	1.83***	46.82	2,338,947
	(1.97)	(428.07)	(0.21)		
Other	31.40***	234.69	-0.18	49.39	5,402,848
	(1.81)	(397.81)	(0.21)		

Notes: See notes to Table 2.
$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 4: Estimated income effects

	No dependent				With dependent
	(1)	(2)	(3)	(4)	(5)
AISH × Post	-1.61	4.74***	-4.99	18.97	-4.76
	(1.23)	(1.22)	(12.48)	(10.40)	(11.12)
AISH	44.66***	37.36***	-133.79***	-81.01***	2.21
	(0.81)	(0.83)	(8.23)	(7.19)	(6.67)
Sample	$0 < earnings \leq 300$ 12 months before reform	$0 < earnings \leq 300$ 6 months before reform	$earnings \geq 900$ 12 months before reform	$earnings \geq 900$ 6 months before reform	$0 < earnings \leq 850$ 6 months before reform
Individual and time fixed effects	Yes	Yes	Yes	Yes	Yes
Individual co-variates	Yes	Yes	Yes	Yes	Yes
Mean in AISH before policy change	138.76	135.59	1,248.98	1,140.49	307.25
	(103.65)	(118.55)	(421.28)	(492.57)	(348.25)
R-Sq.	0.06	0.04	0.07	0.07	0.01
Num. of. Obs.	213,642	268,394	29,361	52,104	55,667

Notes: See notes to Table 2.
$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 5: Estimates of elasticity of earnings below the exemption threshould with respect to DI payment reduction rate

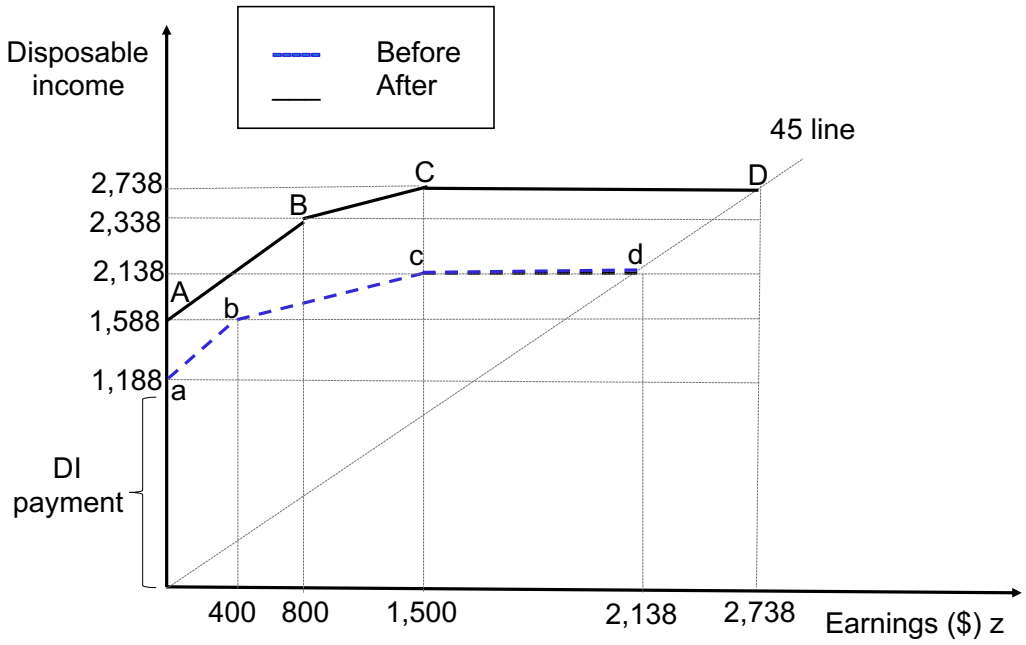
	No dependent	With dependent
ϵ	0.114***	0.033***
	(0.004)	(0.003)
ΔEBT	-0.035	-0.030
	(0.001)	(0.003)
EBT_0	0.747	0.879
	(0.001)	(0.002)
ΔPRR	-0.190	-0.204
	(0.001)	(0.002)
PRR_0	0.480	0.205
	(0.007)	(0.004)
Num. of Obs.	411,373	40,507

Note: This table presents the estimates of the elasticity of Earnings Below exemption Threshold (EBT) with respect to Payment Reduction Rate (PRR) from Equation (1). The bootstrapped standard deviations are in the parenthesis.
$*p < 0.10, **p < 0.05, ***p < 0.01$

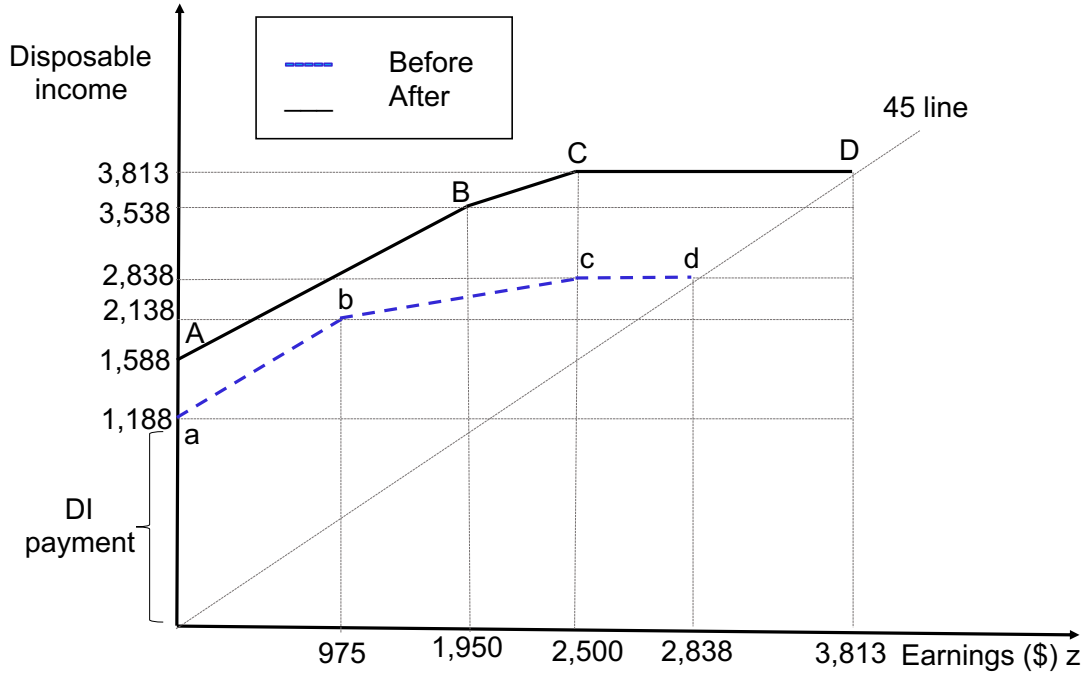
Figures

Figure 1: Budget constraints of AISH beneficiaries

(a) No dependent



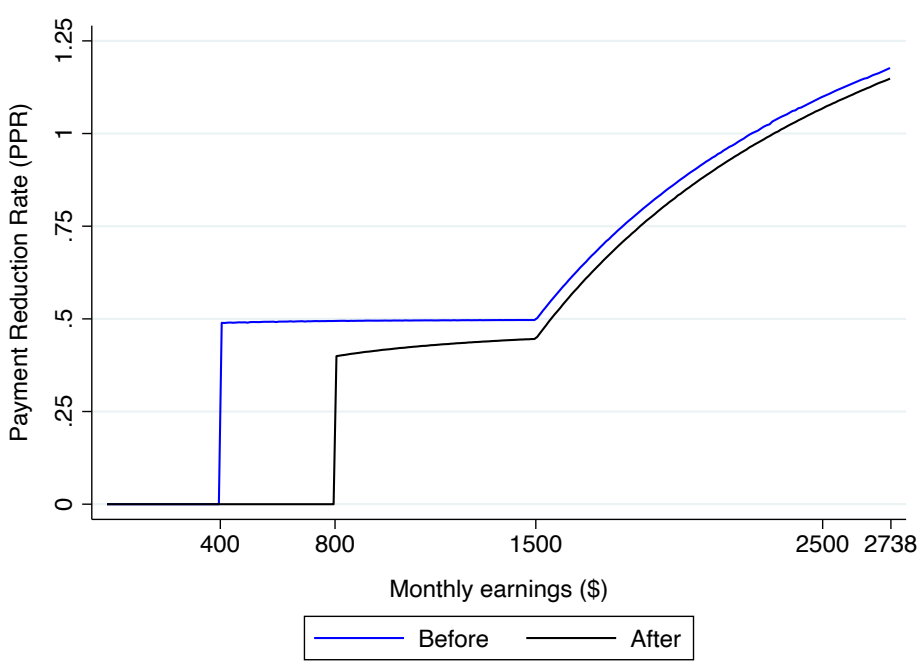
(b) With dependent



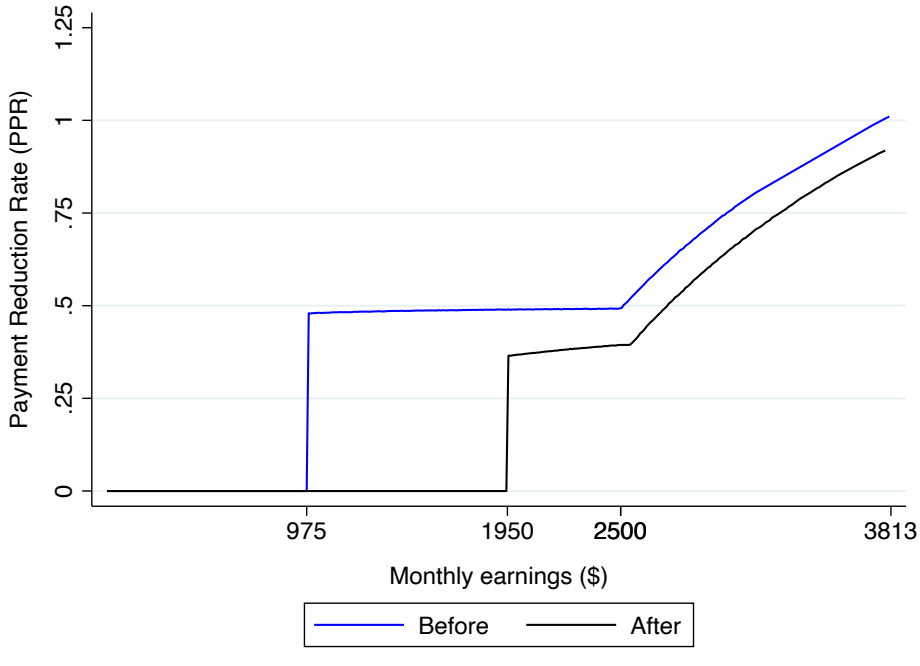
Note: This figure illustrates the budget constraints of AISH beneficiaries before and after the reform. The horizontal axis represents the monthly earnings, and the vertical axis denotes the disposable income which is earnings and net DI payments added together. The monthly DI payments are C$ 1,188 and C$ 1,588 before and after the reform, respectively. The marginal clawback rate of DI payments at each bracket are respectively zero, 50% and 100%.

Figure 2: Paymnet reduction rate in AISH

(a) No dependent

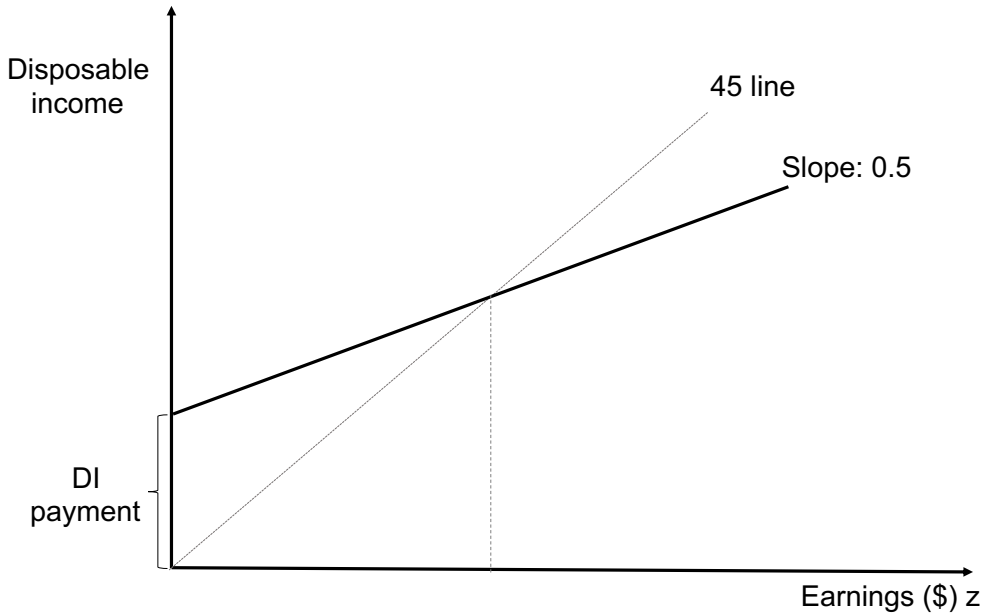


(b) With dependent



Note: This figure illustrates the DI Payment Reduction Rate (PRR) in AISH's return-to-work policy's clawback regime, before and after the reform as defined in Equation (1).

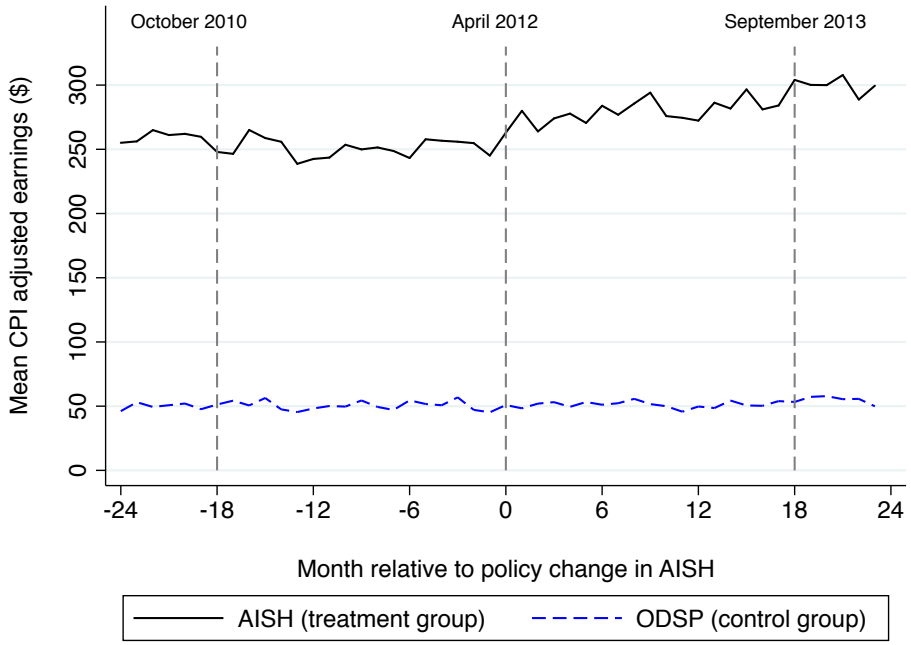
Figure 3: Budget constraint of ODSP beneficires



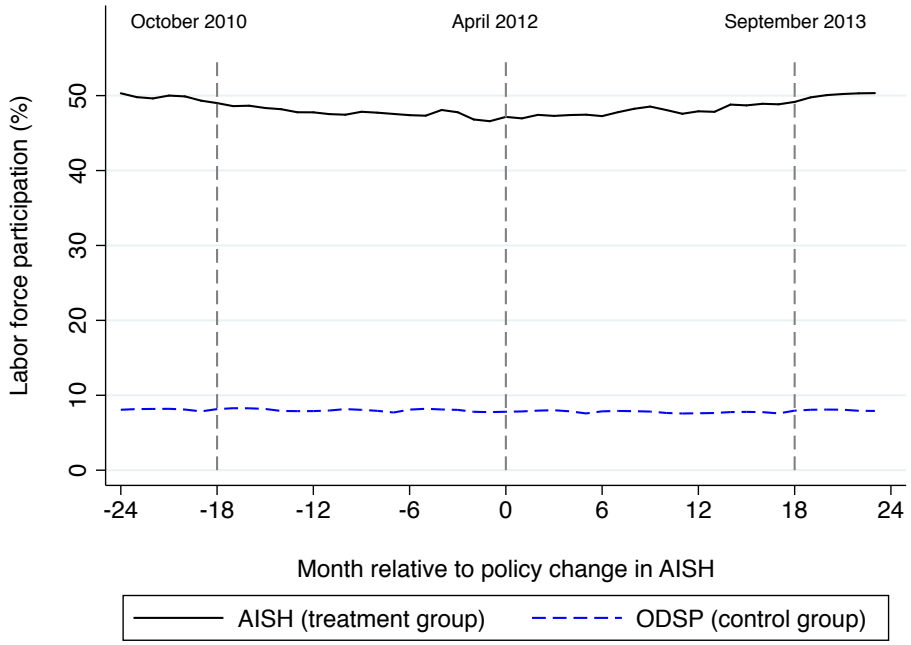
Note: This figure plots the budget constraint of ODSP beneficiaries. The horizontal axis represents the monthly earnings, and the vertical axis denotes the disposable income which is earnings and net DI payments added together. DI payments range from C$1,086 to C$1,999. The DI payments clawback rate is 50%.

Figure 4: Trends in the labor supply

(a) Earnings



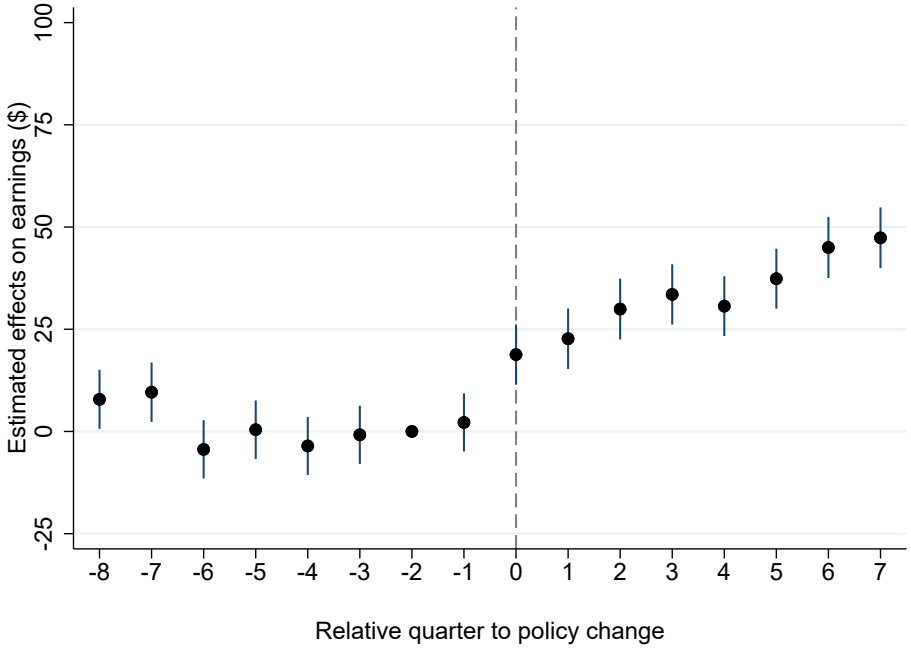
(b) Labor force participation



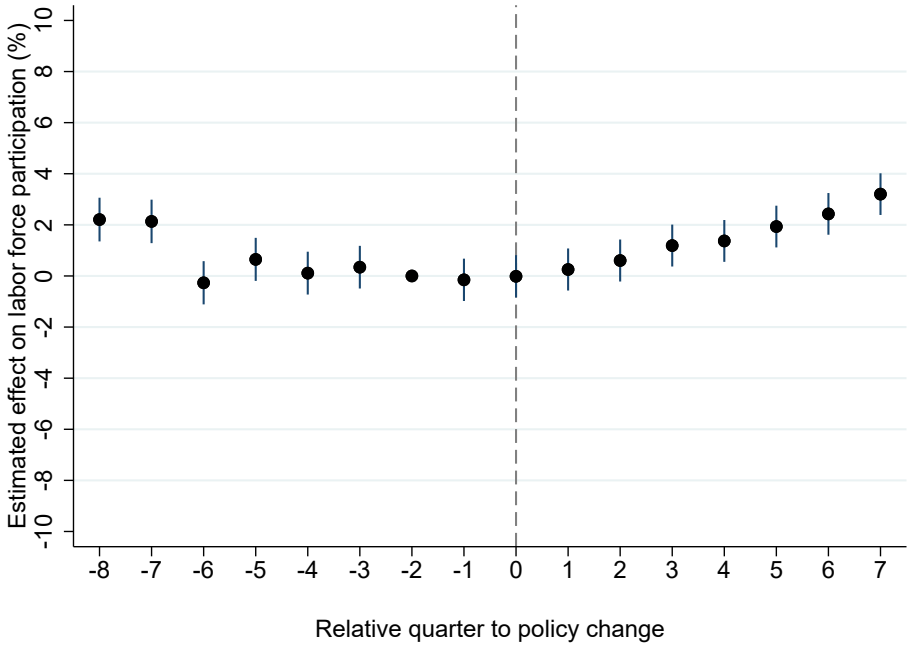
Notes: This figure plots the average monthly earnings and labor force participation rate in the AISH and ODSP. The horizontal axis represents the month relative to the reform. The labor force participation is defined as a dummy that switches on for positive earnings.

Figure 5: Event study estimates

(a) Earnings



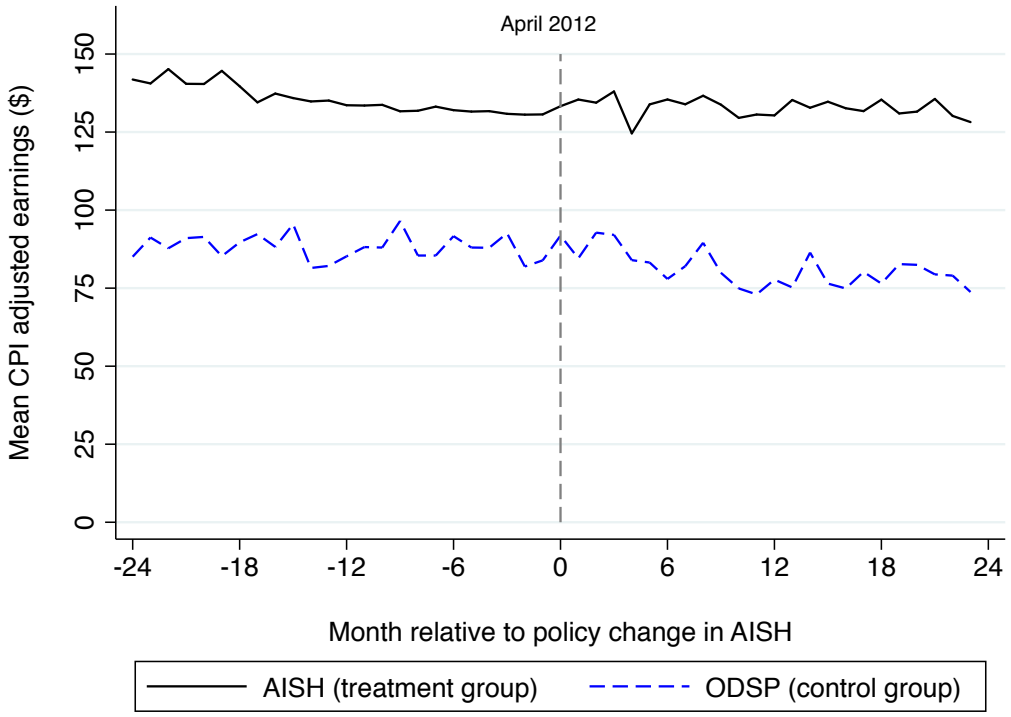
(b) Labor force participation



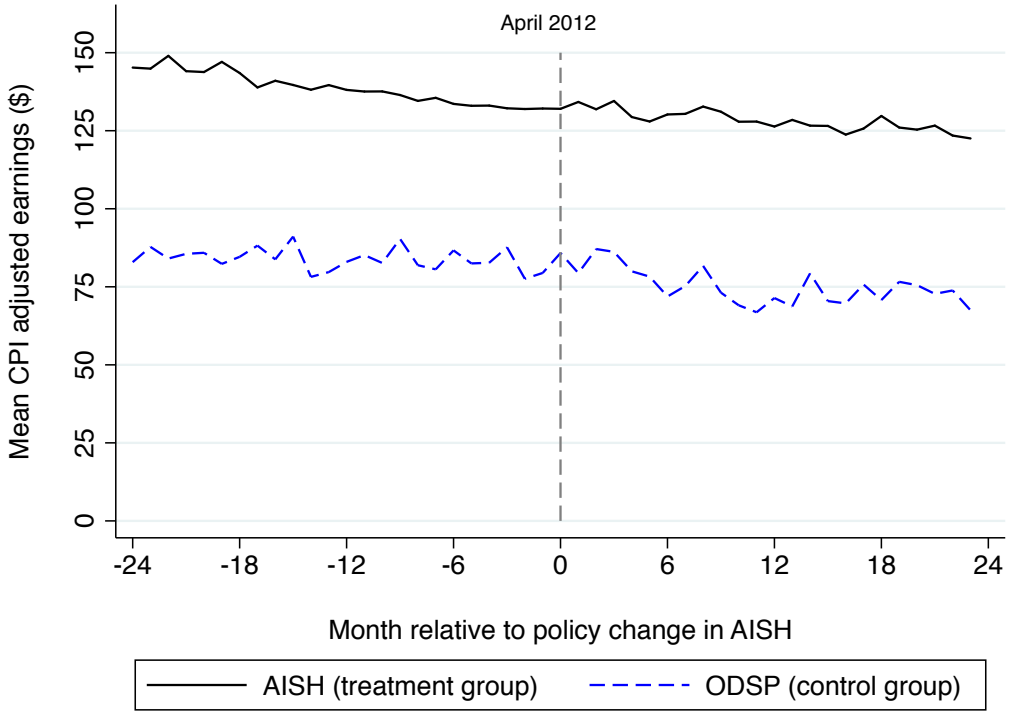
Notes: This figure plots the estimated time trend coefficients (β_t) from Equation (3) and the 95% confidence intervals.

Figure 6: Trends in monthly earnings of AISH and ODSP beneficiaries with likely dominant income effecsts

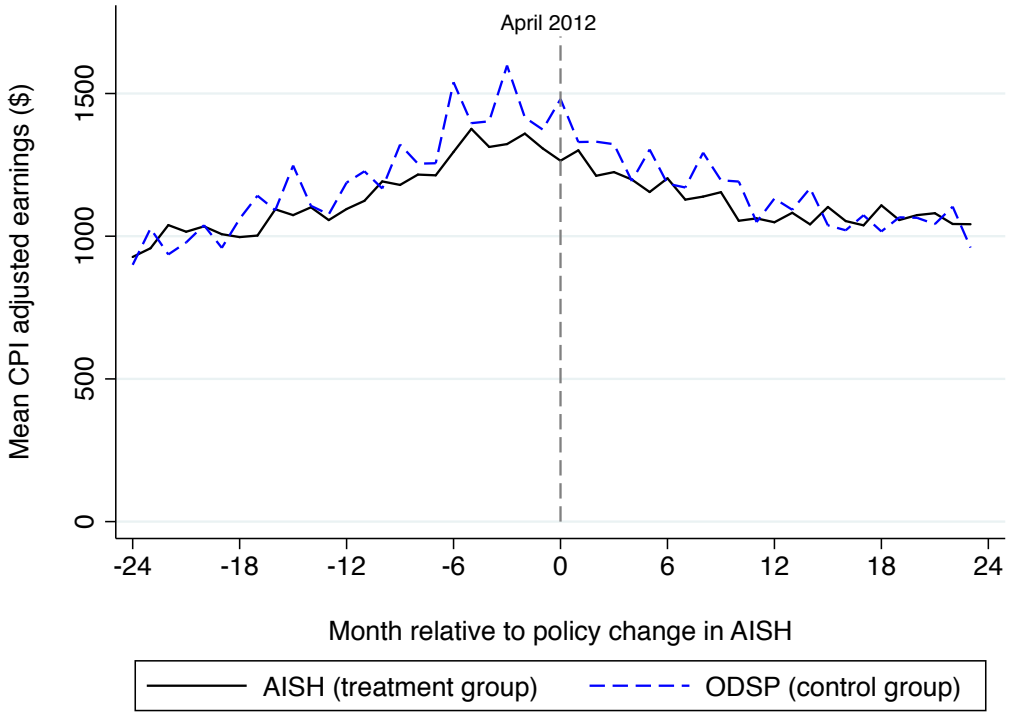
(a) Monthly earnings below $300 for 6 months before the reform (no dependent)



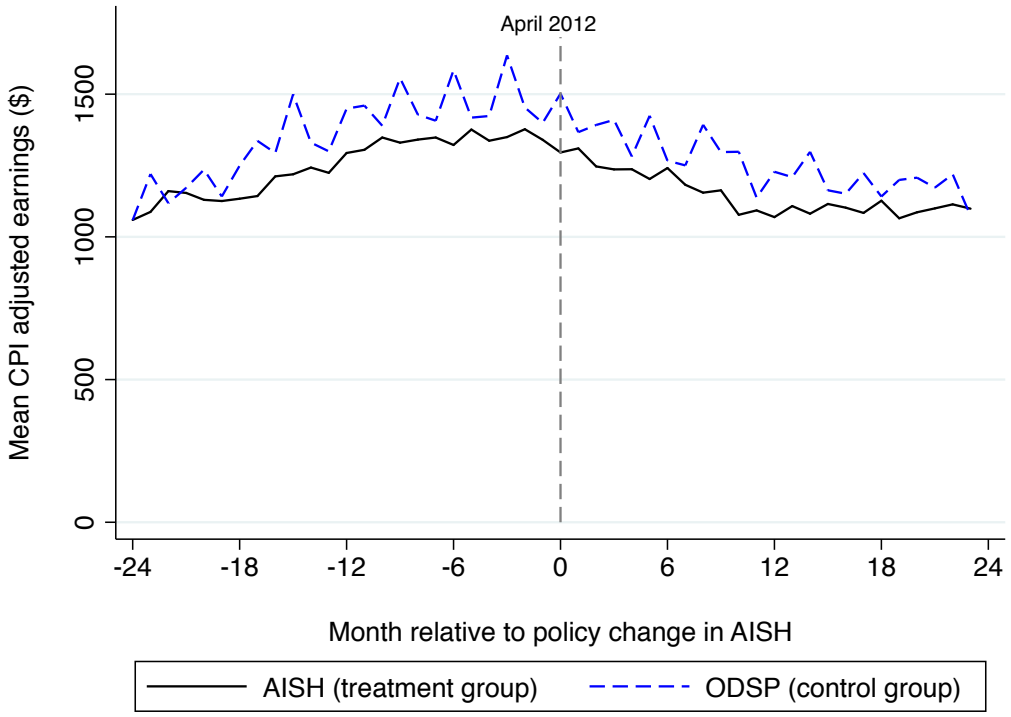
(b) Monthly earnings below $300 for 12 months before the reform (no dependent)



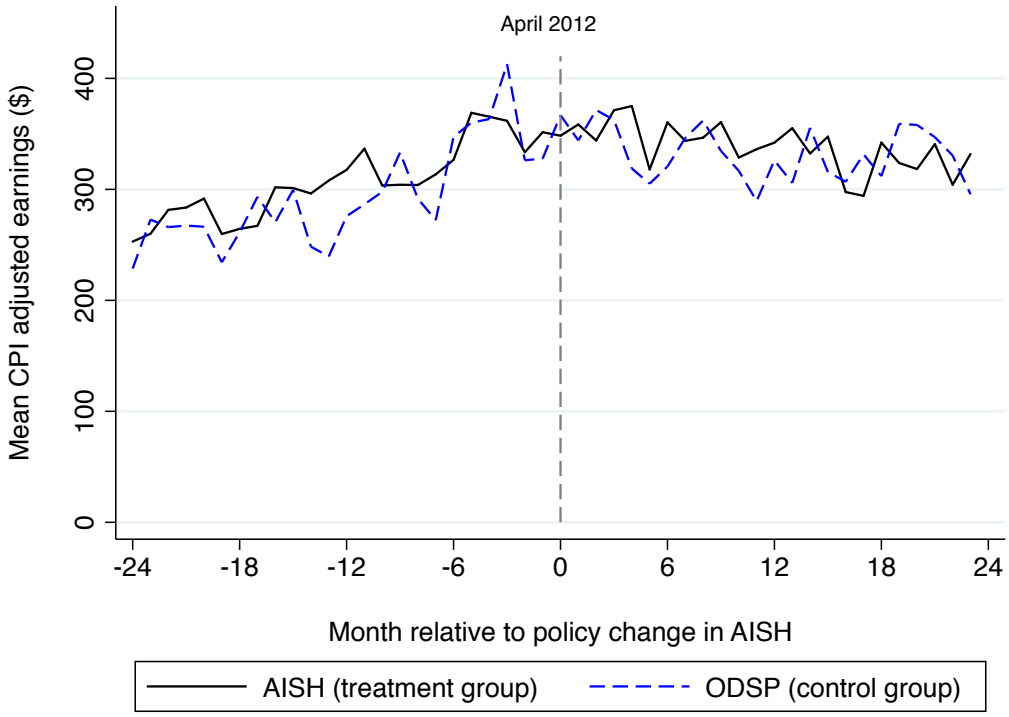
(c) Monthly earnings over $900 for 6 months before the reform (no dependent)



(d) Monthly earning over $900 for one year before the reform (no dependent)



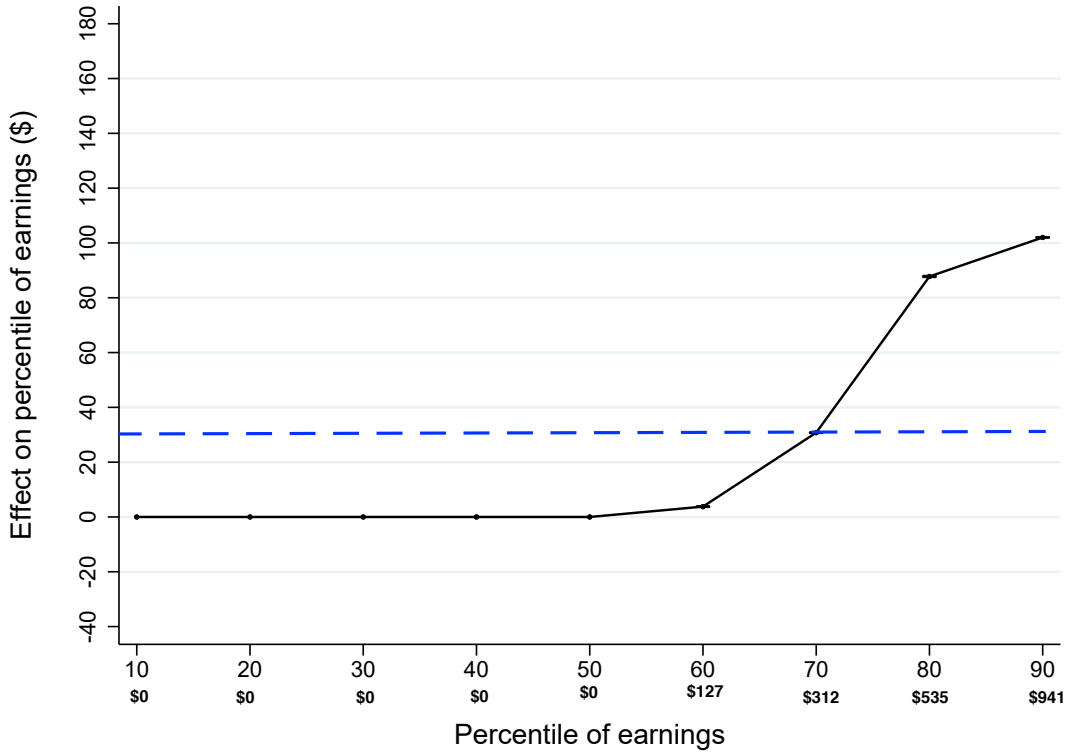
(e) Monthly eearnings below $850 for 6 months before the reform (with dependent)



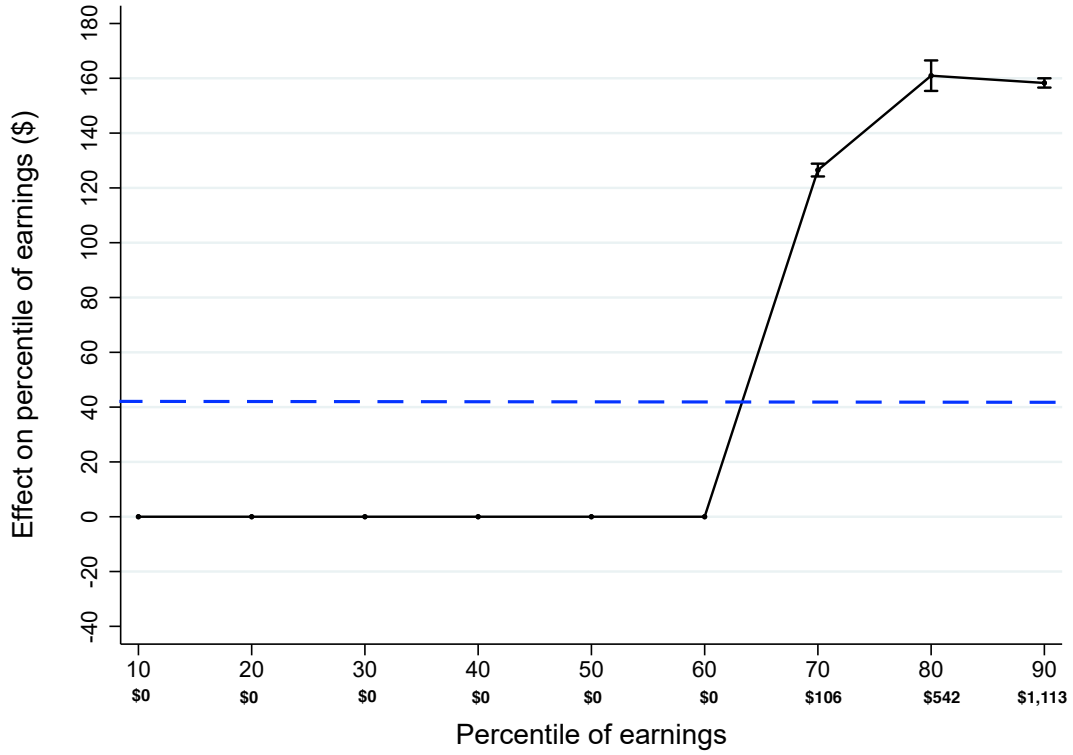
Note: This figure plots the trends in the monthly earnings of AISH and ODSP beneficiaries with likely dominant income effects.

Figure 7: Quantile DD estimates by family structure

(a) With no dependent



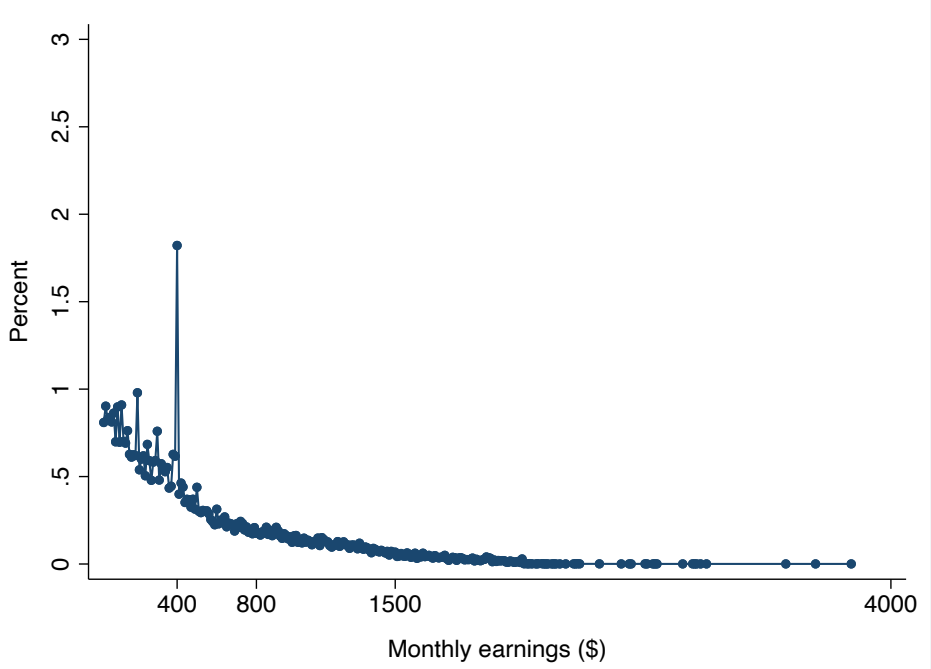
(b) With dependent



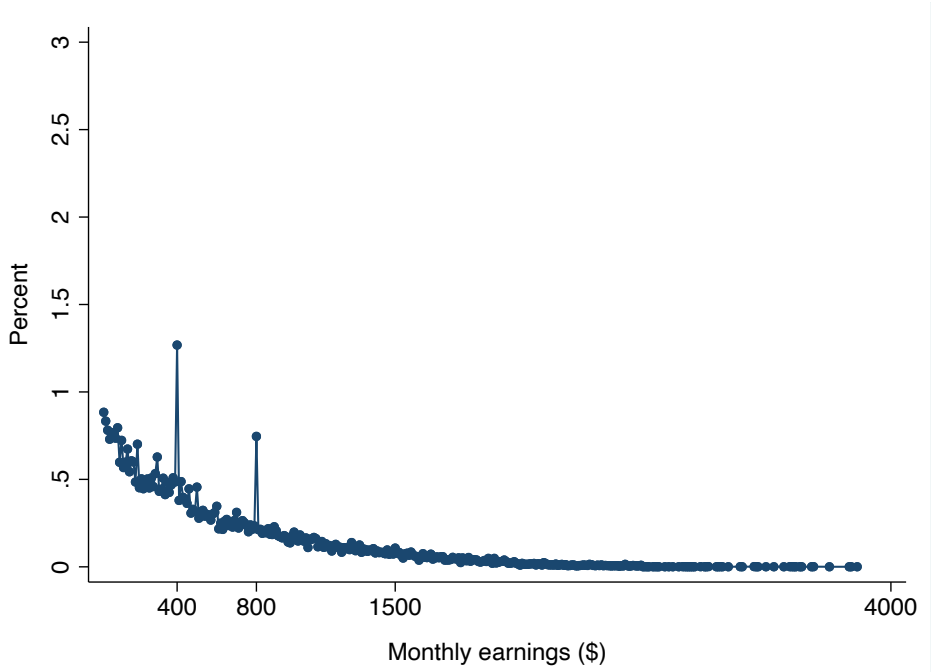
Notes: This figure plots the estimated quantile DD models. Bars represent the 95% bootstrapped standard errors, and the dashed blue line shows the estimated mean effect from the DD model presented in Table 3.

Figure 8: Earnings distribution of AISH's beneficiaries with no dependent

(a) Two years before reform



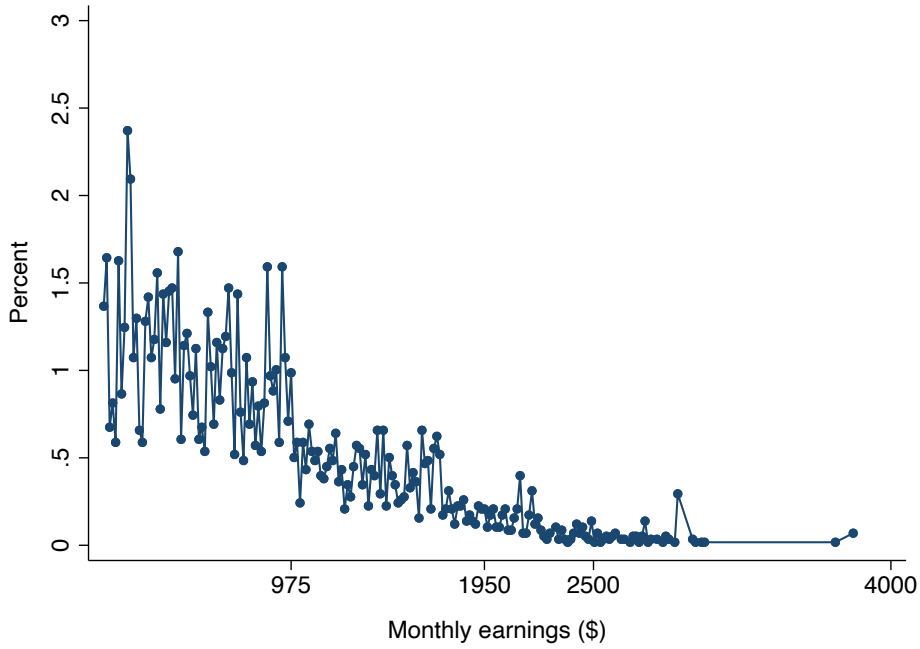
(b) Two years after reform



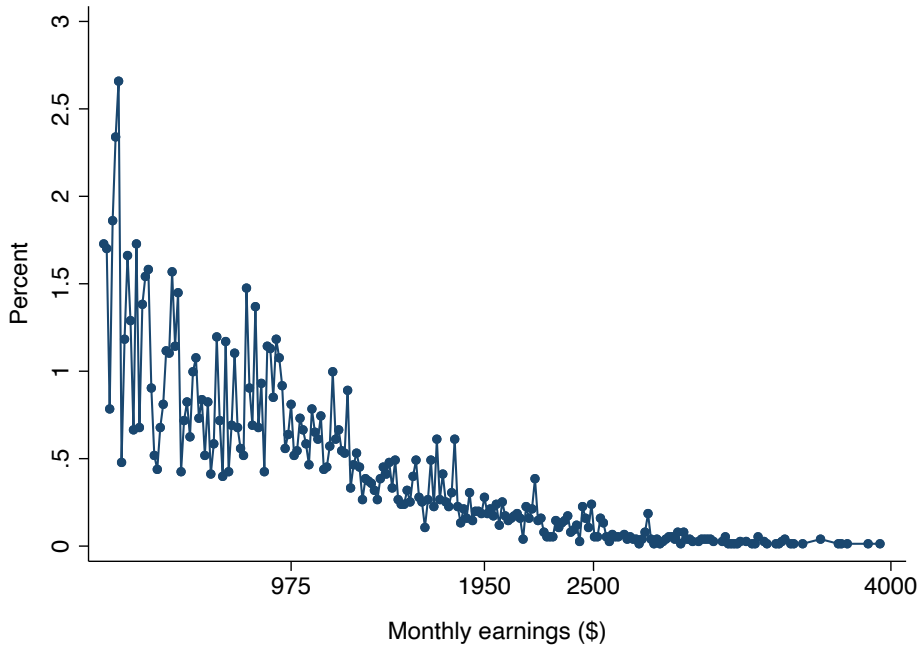
Note: The sample includes only beneficiaries with positive earnings. About half of all the beneficiaries have zero earnings (see Table 1).

Figure 9: Earnings distribution of AISH's beneficiaries with dependent

(a) Before reform



(b) After reform



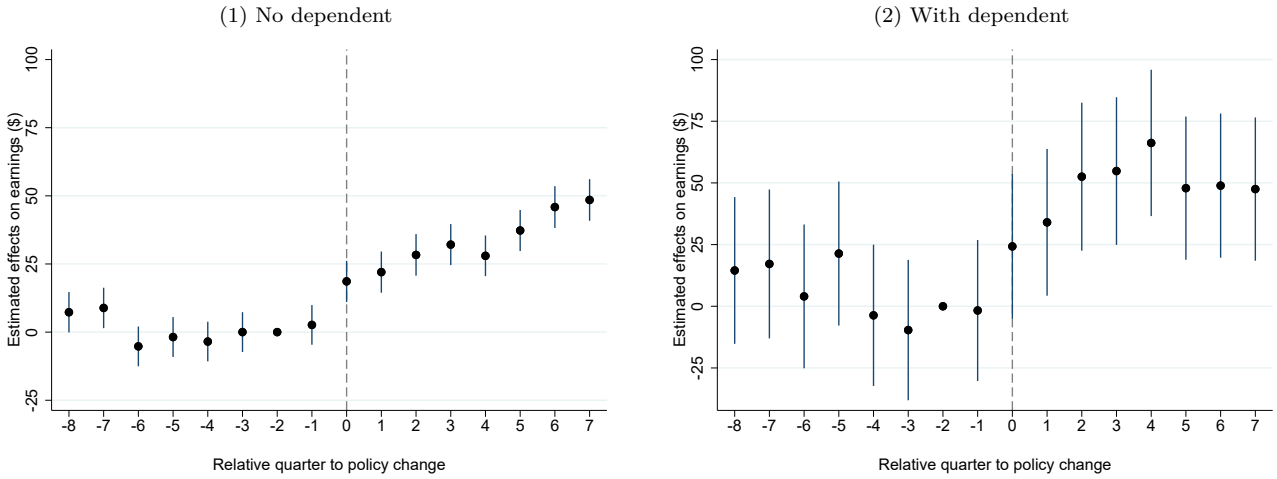
Note: See notes to Figure 8.

Appendix: For on-line publication

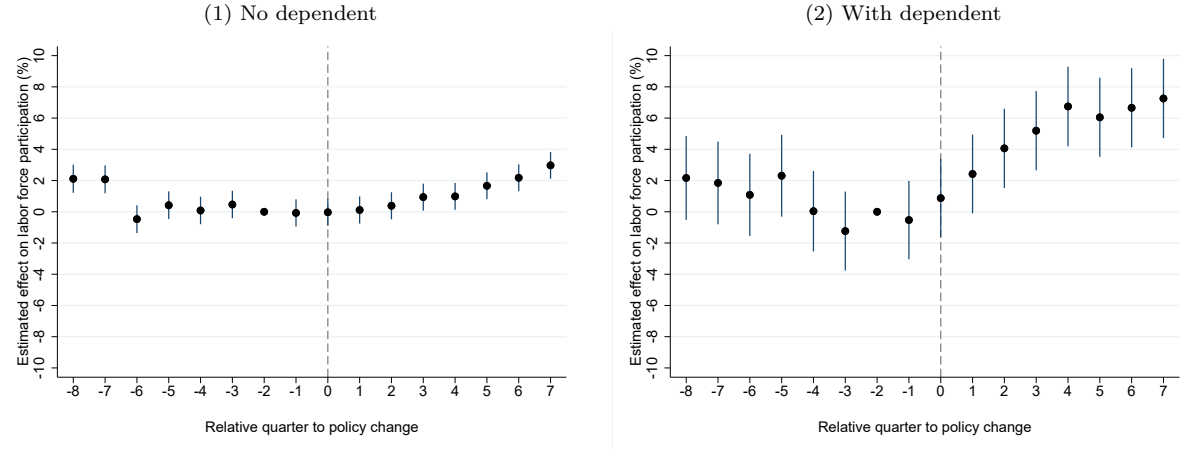
A Event study estimates for sub-samples

Figure A.1: Event study estimates by family structure

(a) Earnings



(b) Labor force participation

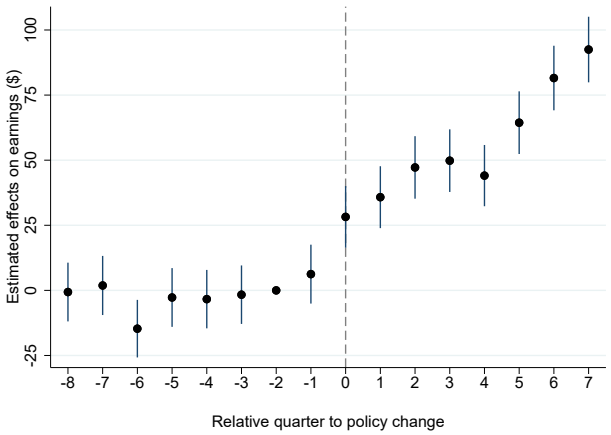


Notes: This figure plots the estimated time trend coefficients (β_t) from Equation (3). Bars show the 95% confidence intervals from individual level clustered standard errors.

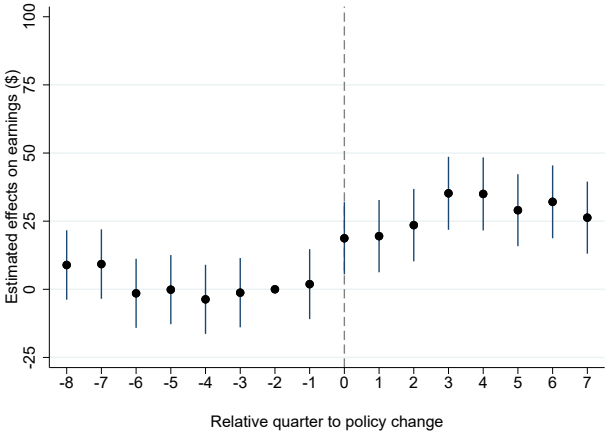
Figure A.2: Event study estimates by age

(a) Earnings

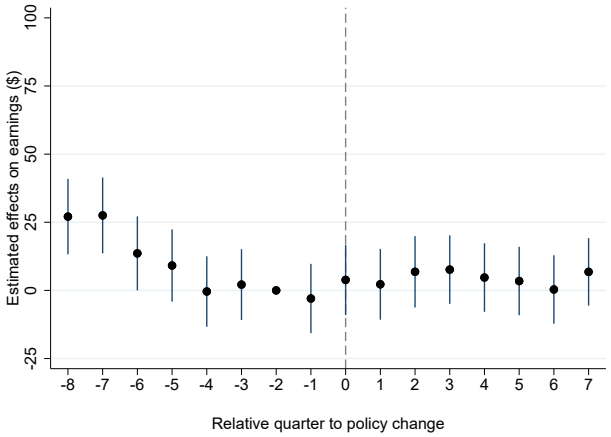
(1) 18-34 years



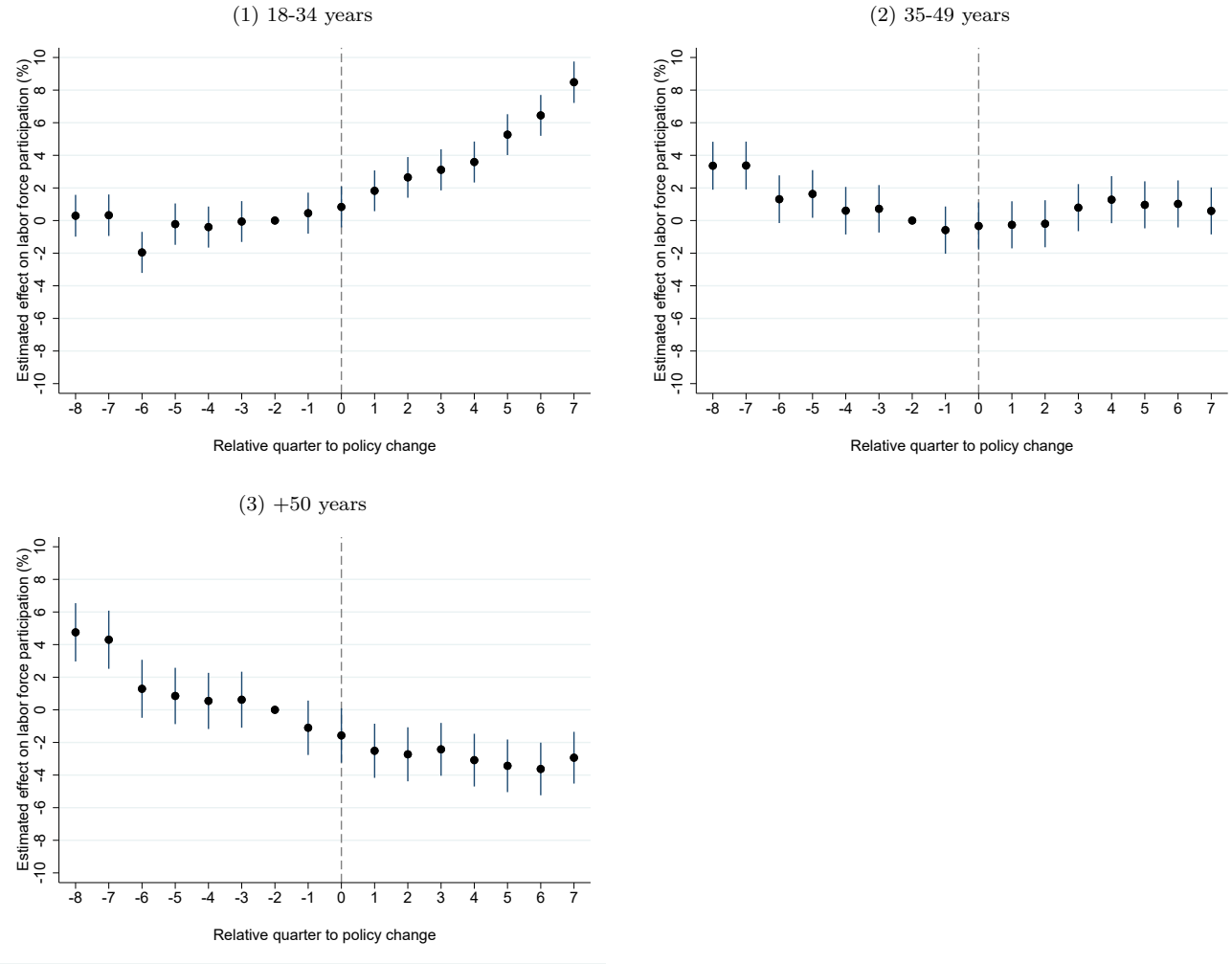
(2) 35-49 years



(3) +50 years



(b) Labor force participation

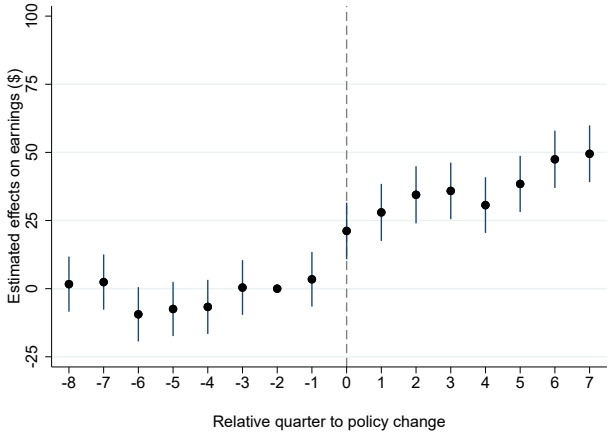


Notes: See notes to Figure A.1.

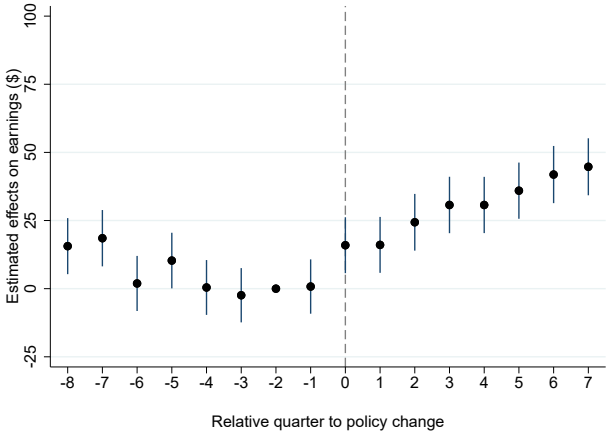
Figure A.3: Event study estimates by gender

(a) Earnings

(1) Male

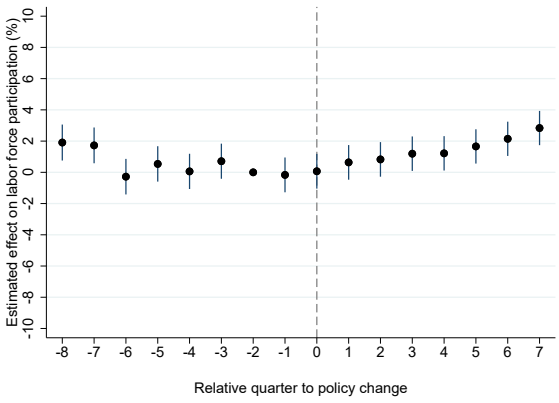


(2) Female

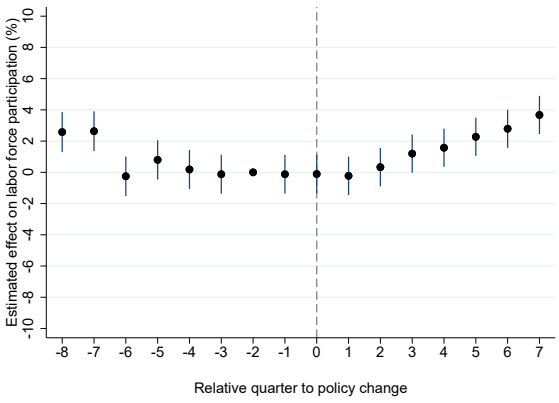


(b) Labor force participation

(1) Male



(2) Female

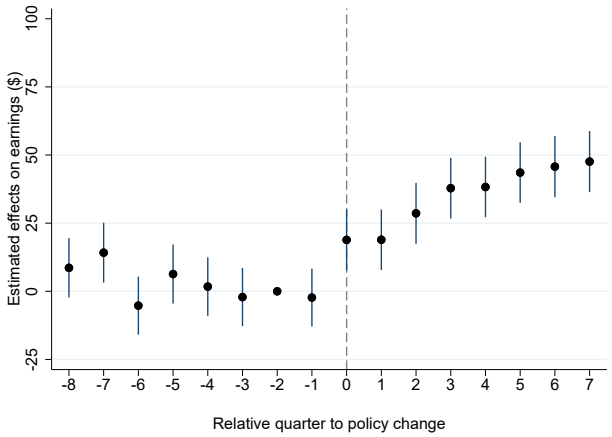


Notes: See notes to Figure A.1.

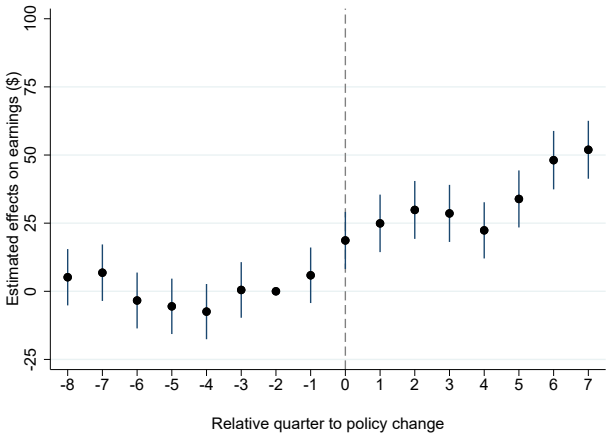
Figure A.4: Event study estimates by type of disability

(a) Earnings

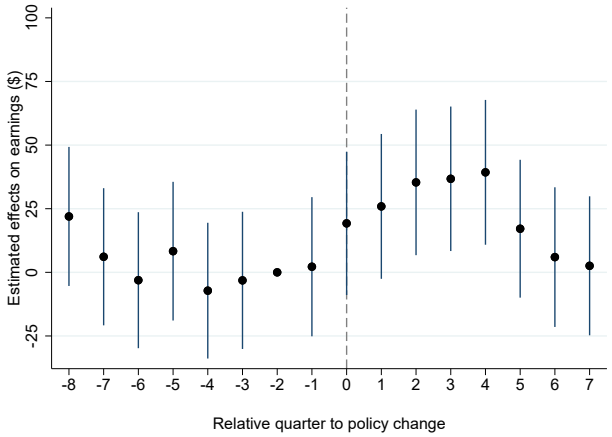
(1) Psychotic



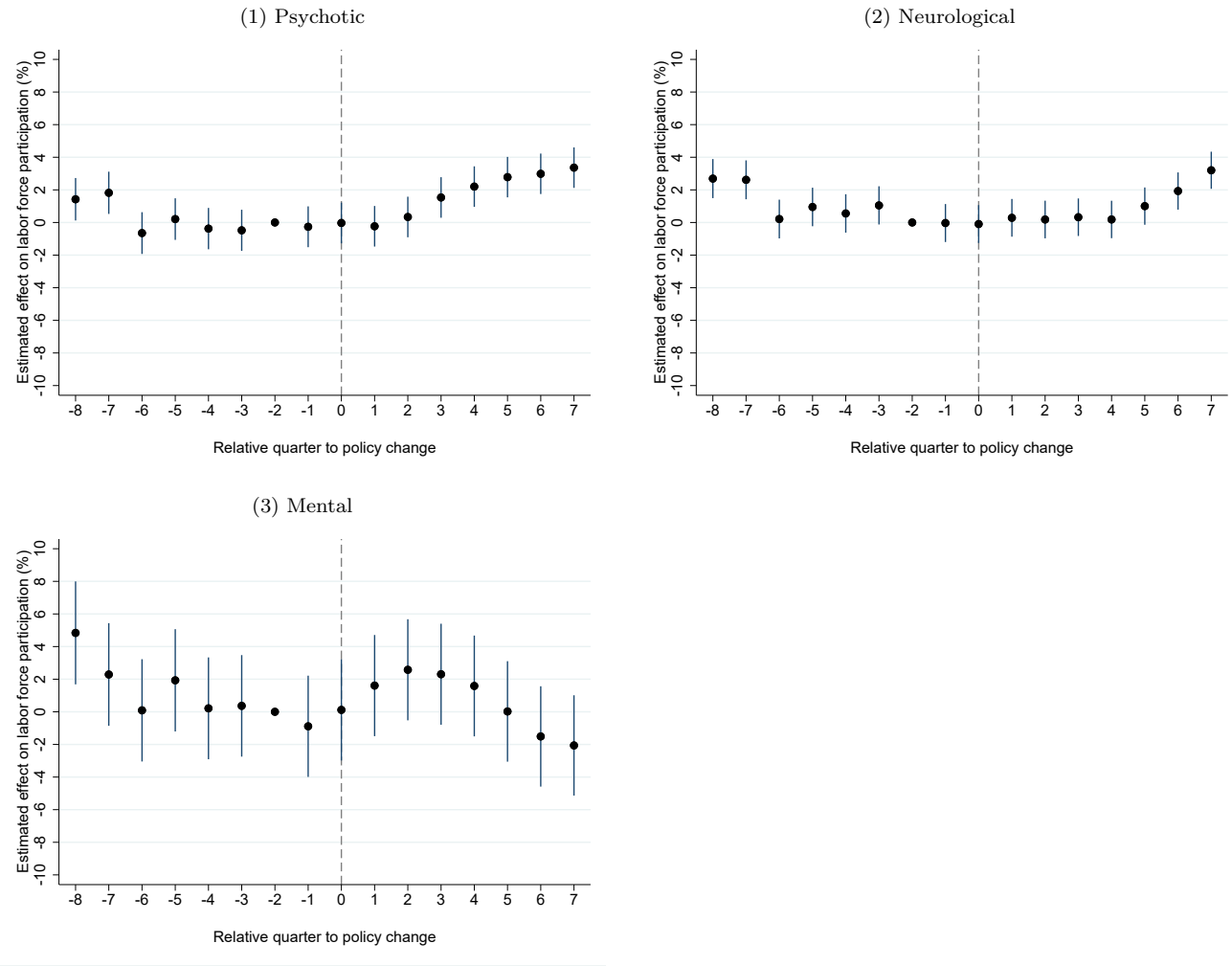
(2) Neurological



(3) Mental



(b) Labor force participation

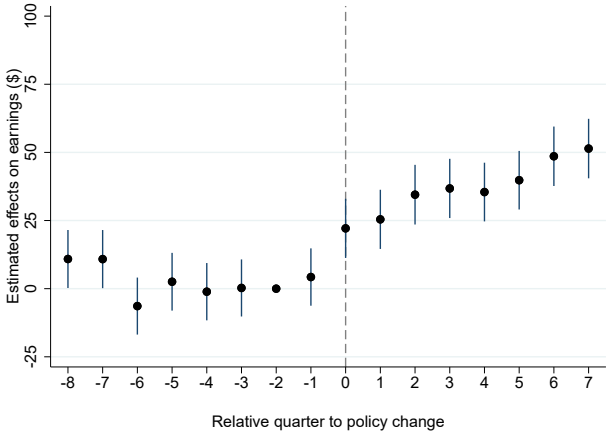


Notes: See notes to Figure A.1.

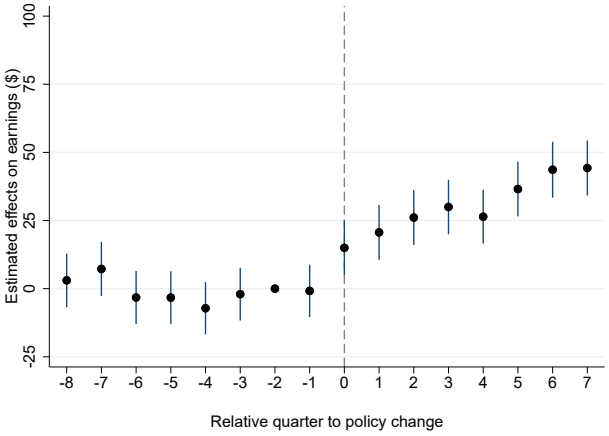
Figure A.5: Event study estimates by location of residence

(a) Earnings

(1) Metropolitan area

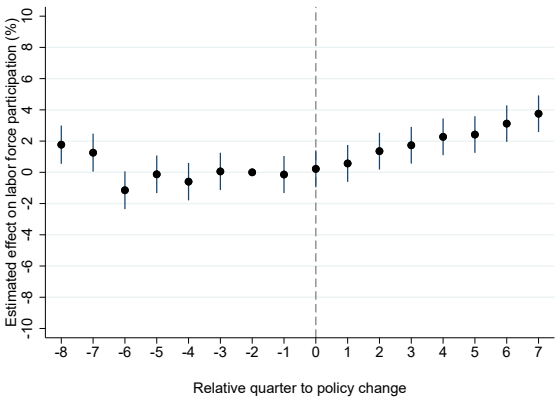


(2) Other

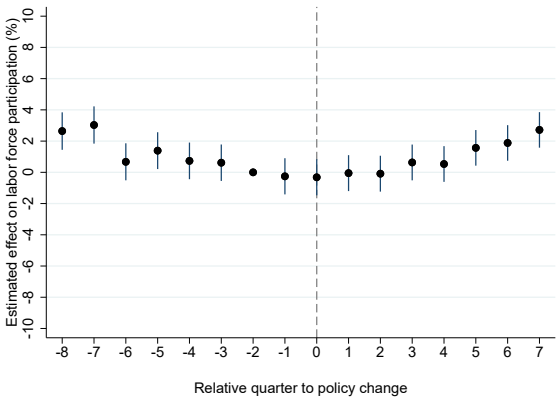


(b) Labor force participation

(1) Metropolitan area



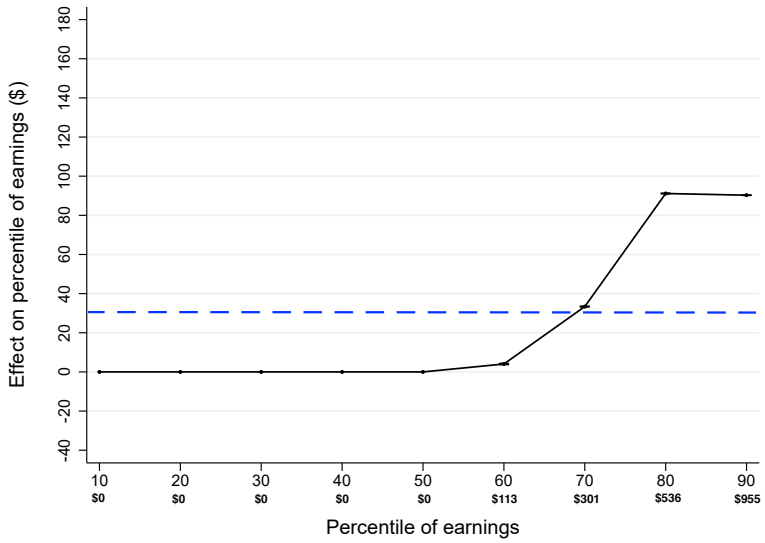
(2) Other



Notes: See notes to Figure A.1.

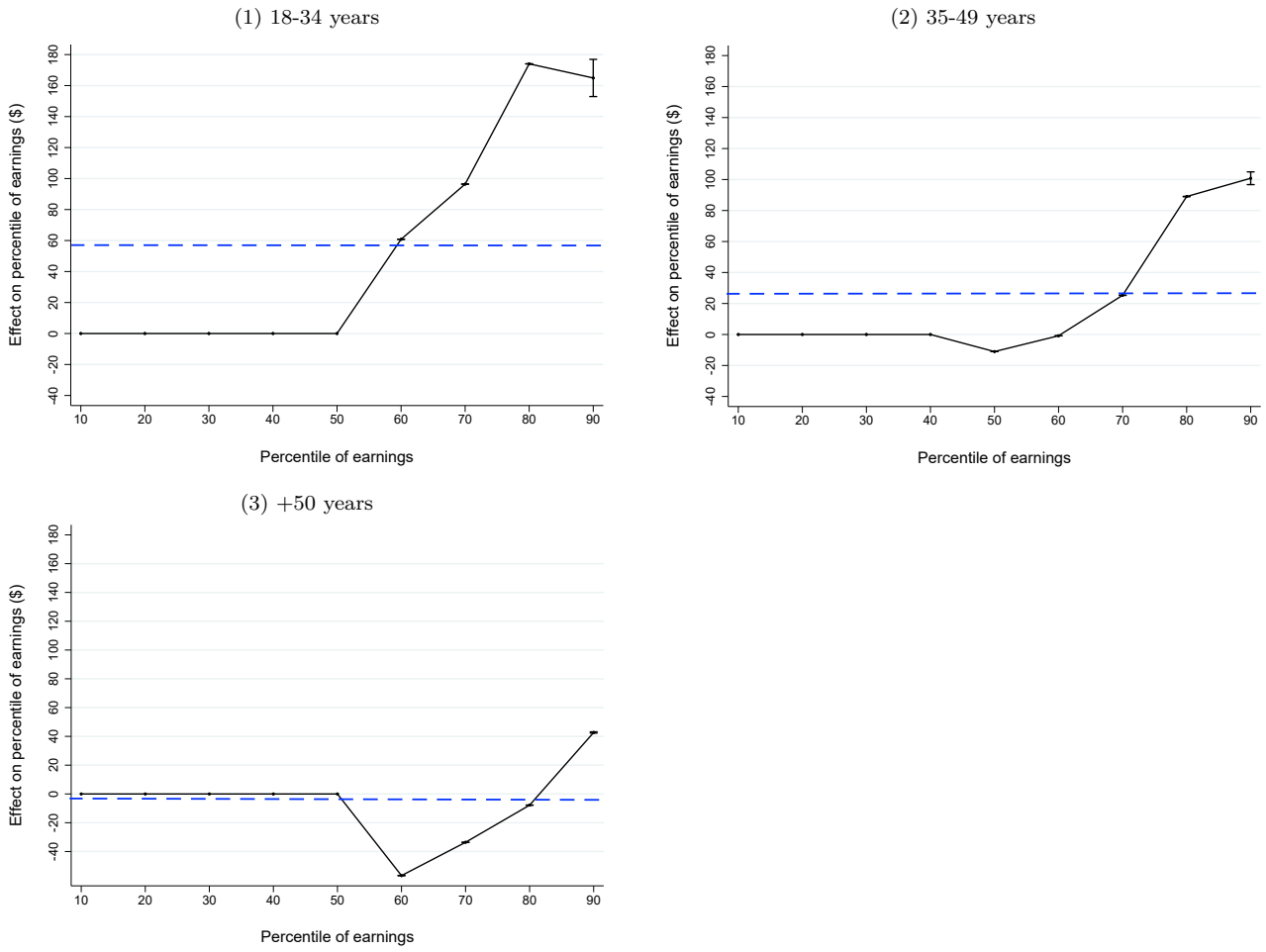
B Quantile DD estimates

Figure B.1: Quantile DD estimates for the whole sample



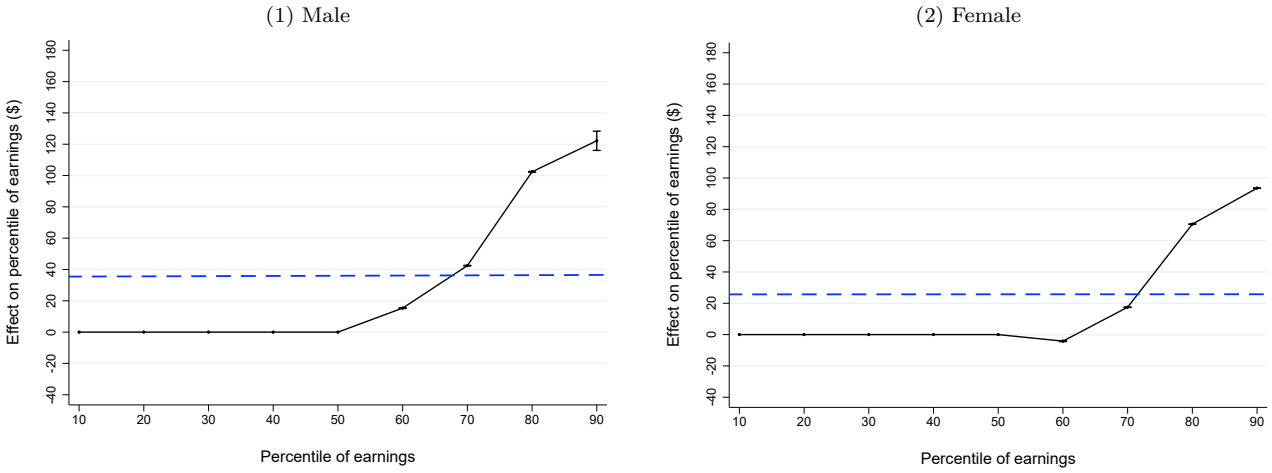
Notes: This figure plots the estimated quantile DD models. The bars show the bootstrapped 95% confidence intervals, which are very small. The blue dashed blue line shows the mean effect estimated from the DD model presented in Table 2.

Figure B.2: Quantile DD estimates by age



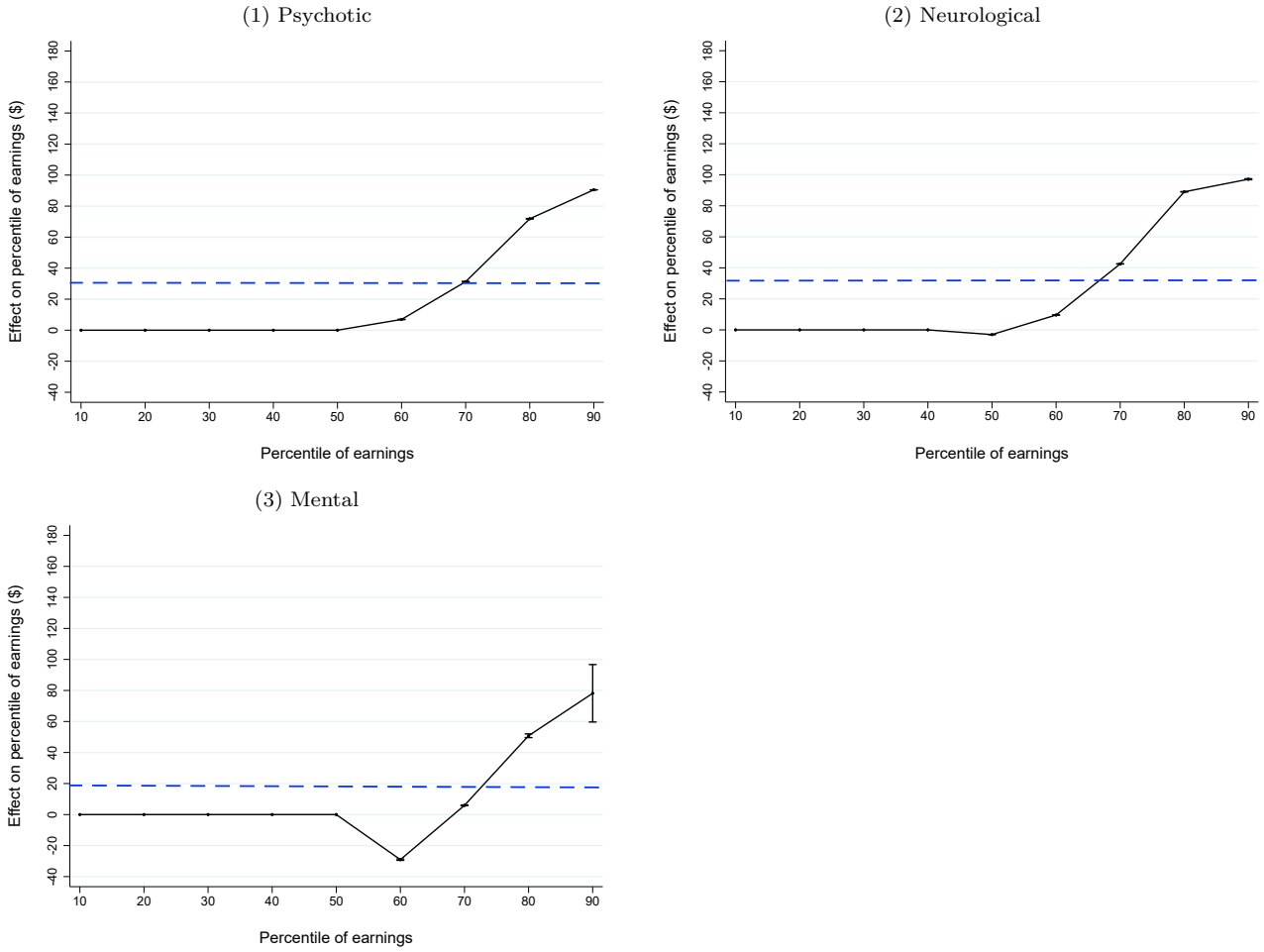
Notes: This figure plots the estimated quantile DD models. The bars show the bootstrapped 95% confidence intervals, which are very small. The blue dashed blue line shows the mean effect estimated from the DD model presented in Table 3.

Figure B.3: Quantile DD estimates by gender



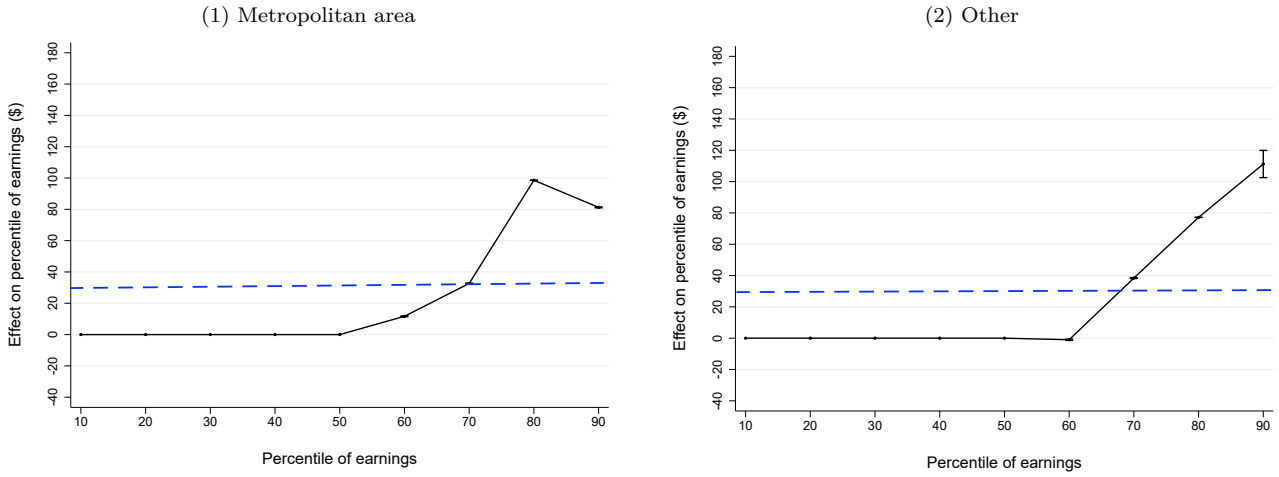
Notes: See notes to Figure B.2.

Figure B.4: Quantile DD estimates by type of disability



Notes: See notes to Figure B.2.

Figure B.5: Quantile DD estimates by location of residence



Notes: See notes to Figure B.2.