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December 2014

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Discussion Paper No. 8715
December 2014

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IZA Discussion Paper No. 8715
December 2014

# ABSTRACT

## Financial Work Incentives for Disability Benefit Recipients: Lessons from a Randomised Field Experiment[1]

Disability insurance (DI) beneficiaries lose part of their benefits if their earnings exceed certain thresholds ("cash-cliffs"). This implicit taxation is considered the prime reason for low DI outflow. We analyse a conditional cash program that incentivises work related reductions of disability benefits in Switzerland. 4,000 randomly selected DI recipients receive an offer to claim up to CHF 72,000 (USD 71,000) if they expand work hours and reduce benefits. Initial reactions to the program announcement, measured by call-back rates, are modest; individuals at cash-cliffs react more frequently. By the end of the field phase, the take-up rate amounts to only 0.5%.

JEL Classification: H55, J14, C93, D04

Keywords: disability insurance, field experiment, financial incentive, return-to-work

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[1] This paper has been presented at research seminars of the University of Basel, the Swiss Federal Institute of Technology in Zurich, the University of Auckland, and the University of Groningen. We thank all participants as well as Lukas Inderbitzin and Magne Mogstad for helpful comments and discussions. The usual disclaimer applies.

## 1 Introduction

The high number of disability insurance (DI) recipients–about 6% of the working-age population of OECD countries received disability benefits in 2007–generates high costs to society. In 2007, OECD countries spent on average 1.2% of their GDP on DI benefits, which is almost 2.5 times higher than the fraction of GDP spent on unemployment benefits. Outflow from DI receipt is low at 1-2% per year (OECD 2003, 2009, 2010). Work disincentives are considered a major cause for the low outflow from DI (OECD 2010). In most countries, DI recipients lose either all or part of their benefits if their earnings increase beyond certain thresholds ("cash-cliffs"). Therefore, the OECD advocates reforms that increase return-to-work incentives to boost outflow from DI receipt.

Empirical evidence on the effectiveness of such reforms however is scarce.[2] Campolieti and Riddell (2012) evaluate a change in the "earnings disregard", which is the amount of earnings that DI recipients are allowed to receive without losing their benefits; Kostøl and Mogstad (2014) as well as Weathers and Hemmeter (2011), evaluate the introduction of a gradual reduction in benefits when people take up or expand work; and Gettens (2009) analyses the effect of expanding health insurance coverage to individuals who exit from DI into employment. While some of these policies increased employment, none of them affected

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[2] Other types of DI reforms include policies that reduce DI inflow, such as reducing benefit generosity, altering eligibility criteria, or implementing stricter screening. These policies are relatively successful in reducing the number of DI recipients (e.g., de Jong, Lindeboom and van der Klaauw 2011, Staubli 2011, van Vuren and van Vuuren 2007). Policies that aim at increasing DI outflow by providing access to vocational rehabilitation and employment integration are less effective. Results indicate low take-up and no or only small effects on outflow (e.g., Adam, Bozio und Emmerson 2010, Stapleton, et al. 2008, Thornton, et al. 2004, Kornfeld and Rupp 2000).

DI outflow. To our knowledge, no study so far examines conditional cash incentives that are paid out if individuals reduce their benefits or even exit from DI receipt.

This paper complements the literature with results of a field experiment in Switzerland: to stimulate employment and benefit reduction, the DI offered a conditional cash transfer ("seed capital") to 4,000 randomly selected DI recipients. The seed capital program differs in two ways from previous programs: first, eligibility depends directly on employment outcomes and benefit reduction. Individuals can only claim seed capital if they take up or expand employment, and if, as a consequence, their disability pension decreases by at least one quarter.[3] Second, the financial incentive is large compared to incentives in previously studied programs. Individuals receive a one-time payment of 18,000 Swiss francs (CHF) in the high treatment condition, or CHF 9,000 in the low treatment condition for a reduction of disability benefits by one quarter. The maximum payment to an individual with a full pension who completely exits from DI receipt thus amounts to CHF 72,000 (about USD 71,000 at the time of the introduction of the program in September 2010). This amount compares to the average disposable yearly income of Swiss households (FSO 2007). In addition, the lump-sum payment does not depend on the benefit level and enjoys preferential tax treatment.

We use a simple static labour supply model to simulate expected responses for individuals in our sample. The simulation suggests that for a majority of individuals, extending labour supply for a period of more than two years would not have been beneficial. These individuals need to be overcompensated for the loss in benefits to react to seed capital. Significantly higher take-up rates of 50% and higher can be expected for individuals with strong work

[3] A reduction in DI benefits is thus driven by an increase in labour supply. This is in contrast to papers that study the labour response to a change in DI benefits (e.g., Autor and Duggan 2007, Marie and Vall Castello 2012, Gruber 2000, Campolieti 2004).

disincentives. These are individuals who would lose a substantial amount of their benefits if they increase work hours and thus earnings by a small amount ("cash-cliff constrained" individuals).

Short-term responses to the announcement of seed capital (i.e., call-back rates to the local DI offices to ask for further information) confirm these predictions. Only 4% of individuals contacted their local case worker for more information; offering a higher payment did not change this response pattern. Individuals close to cash cliffs are more likely to contact their case worker in the initial program phase. However, the magnitude of this effect is relatively small; call-back rates of cash-cliff constrained individuals are only 3 to 4 percentage points higher, compared to individuals who are not close to cash-cliffs. Over the long run, we do not find that the program succeeded in increasing outflow. By the end of the field phase (September 2010–August 2013), only 0.5% of individuals took up seed capital. It is thus likely that seed capital generated windfall gains for a small number of individuals rather than incentivised work.

The paper proceeds as follows: section 2 provides a description of the disability insurance system in the Switzerland and discusses the design of the experiment. Section 3 describes the data. Section 4 outlines the expected impact in a standard labour supply model and presents simulation results of the program effects. Section 5 summarises the results, followed by a discussion in Section 6. Section 7 concludes.

## 2 The Swiss disability insurance system and the experimental design

### 2.1 *Institutional setting*

In Switzerland, individuals who partially or fully lose their ability to work due to health impairment can claim disability benefits. These benefits come from three different social security programs:[4] First, the mandatory public disability insurance serves all persons who live or work in Switzerland ("first pillar"). Second, the mandatory employer-based occupational pension scheme applies to all employees whose annual earnings exceed CHF 20,000 ("second pillar"). Third, the supplementary benefit scheme grants means-tested benefits to individuals in need. These are individuals who cannot cover basic costs of living with the benefits from the first two pillars as well as with other income sources (comparable to the Supplemental Security Income in the US). The generosity of these three different programs depends on various factors, such as contribution years, average lifetime earnings, and the number of dependent children. The first two pillars guarantee a replacement rate of 60-80% (net of tax). Means-tested benefits secure an income of CHF 3,000 for singles and CHF 4,500 for couples, in addition to health care costs (see Figure 1 for an example of a benefit pattern).

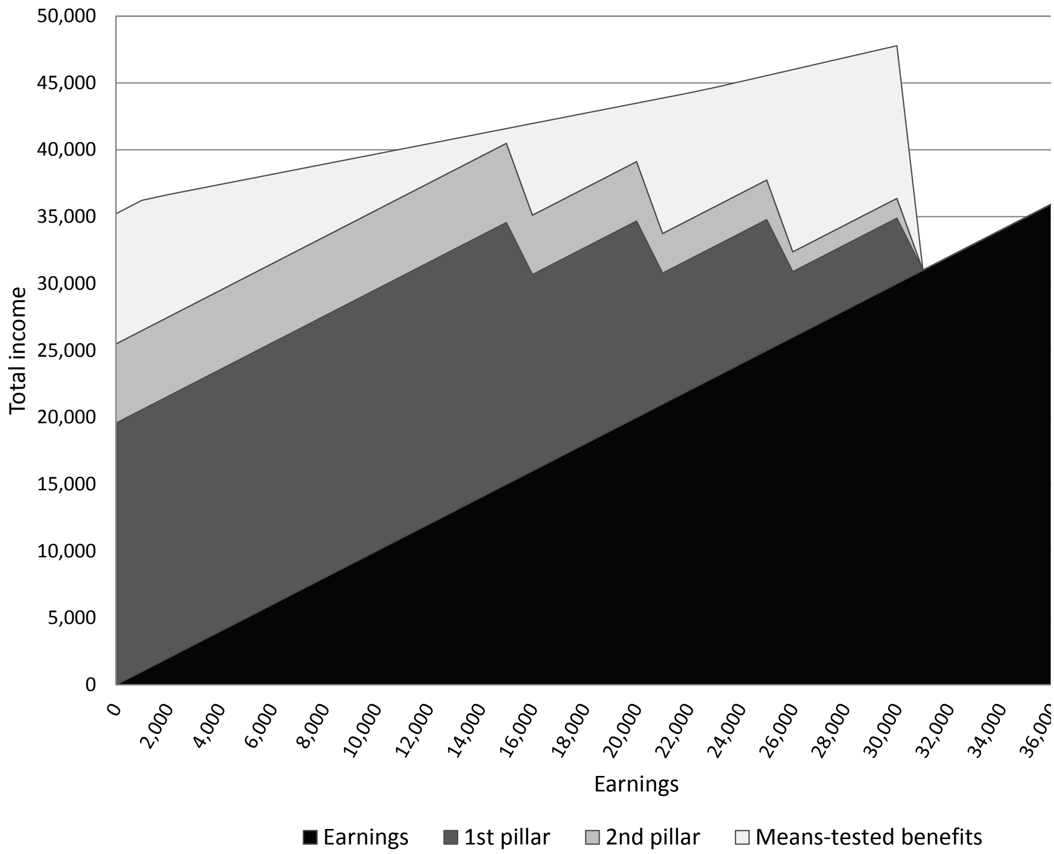
Individuals who only partially lose their ability to work are eligible for a "partial" pension (first and second pillar); many DI recipients thus work at least part-time (37%, see Table A2 in the appendix). The amount of the partial pension depends on an individual's DI degree, which is his/her hypothetical earnings loss due to disability.[5] DI recipients receive a quarter pension with a disability degree between 40% and 49%, a semi-pension with a disability degree between 50% and 59%, a three-quarter pension with a disability degree between 60% and 69%, and a full pension with a disability degree of 70% and higher. Thus, the disability

[4] If the disability is caused by an accident or an occupational disease, then it is likely that pensions are paid from the public accident insurance scheme. This insurance type, however, is not the focus of this paper and is thus not further considered.

[5] Partial DI systems are known in many countries (such as Norway, the Netherlands, Sweden, or Germany for example). The decision to award a full or a partial DI pension is, however, typically based on functional limitations or the number of hours a person can perform in a job rather than on potential earnings.

degree is a continuous function of the earnings loss, while the pension is a step-function of earnings loss.

**Figure 1: Budget constraint**




*Note:* Figure 1 shows the predicted household income of an example household (disability benefit recipient in a single household), depending on his/her earnings on the first labour market. Assumption: Potential earnings amount to 50,000 CHF if the individual worked fulltime. The x-axis states earnings on the first labour market in CHF per year. The y-axis states the total income, including 1st pillar benefits, 2nd pillar benefits, and means-tested benefits in CHF per year. Source: Bütler et al. (2012), p. 186.

To calculate the disability degree, DI case workers assess two types of potential earnings: “potential earnings without disability” and “potential earnings with disability”. They typically predict the former based on an individual’s earnings before disability, and the latter based on an individual’s earnings during disability. This procedure is valid only if the DI beneficiary exhausts his or her (remaining) work capacity. If the case worker concludes that this is not the case and that the person has idle work capacity, he can fix potential earnings based on assumed work capacity, and based on official wage indices.

In practice, this assessment procedure is likely to be imperfect because of the lack of objective information on work capacity. On the one hand, case workers might use rules of thumb and thus award certain salient disability degrees more often (e.g., 50%). On the other hand, DI recipients can signal low work capacity by not taking up a job or by working only a small number of hours. They might thus influence their disability degree and, consequently, the size of their disability pension. The stepwise benefit structure potentially reinforces this asymmetric information problem. In order to maintain higher benefit levels, individuals might choose low working hours, even if they recover from their disability. The field experiment described in this paper tests one potential avenue to reduce these work disincentives.

### 2.2 *Experiment "Pilot Project Seed Capital"*

To measure the effect of a reduction in financial work disincentives for DI recipients on DI outflow, the Swiss Federal Social Insurance Office (henceforth "FSIO") conducted a field experiment ("Pilot Project Seed Capital").[6] Seed capital is a conditional lump-sum payment for DI recipients who meet two requirements: first, they have to take up or expand work in the primary labour market. Second, this earnings increase has to be large enough to trigger a pension reduction by at least one quarter (e.g., from a semi pension to a quarter pension). A fall-back rule accommodates potential deterioration in health status: within five years after the pension reduction, individuals can fall back to their old DI contract if they cannot work for 30 consecutive days.

[6] See http://www.bsv.admin.ch/themen/iv/00023/02852/index.html?lang=de for a detailed description of the program (in German).

To test different amounts of the financial incentives, two different treatments were implemented, that is, “high” seed capital (CHF 18,000 per pension reduction by one quarter), and “low” seed capital (CHF 9,000 per pension reduction by one quarter). Thus, the maximally achievable seed capital, that is, the seed capital for a person with a full pension who completely exits from DI receipt into employment, amounts to either CHF 72,000 (high seed capital) or CHF 36,000 (low seed capital). Whereas the former amount compares to the average income of a Swiss household, the latter amount corresponds to a minimum yearly income, which is implicitly guaranteed by means-tested benefits. The DI splits the lump-sum payment in four equal tranches, paid bi-annually over two years. Once an individual falls back to a higher pension, the DI stops payment of outstanding seed capital tranches. Already paid tranches do not have to be reimbursed.

Two cantons participated in the field experiment, St. Gallen, a German-speaking canton, and Vaud, a French-speaking canton. Out of the 37,853 DI recipients in these two cantons, 6,020 individuals were randomly chosen for the two treatments (2,000 individuals each) and for the control group (2,020 individuals). Table A1 in the appendix provides details on the stratified assignment mechanism.

The field phase of the experiment took place between September 2010 and August 2013. In September 2010, a letter from the local DI offices informed the treated individuals about seed capital eligibility. This letter explained the eligibility rules as well as the fall-back rule mentioned above. Furthermore, the letter encouraged participants to contact their DI case worker for further information and assistance. The exact wording of this information is provided in the supplementary material to this paper. The control group did not receive any information. After contacting the DI office by phone, individuals could meet their DI case workers in person to discuss further integration steps.

## 3 Data

To choose program participants and to simulate program effects, we combine administrative data from the Swiss pension system (first pillar) with baseline survey data. Both datasets cover the pre-program period. The administrative data include all DI recipients in the participating cantons, and contain full labour market histories, demographic characteristics, and information on first-pillar pensions, but not, however, data on further income sources (such as second pillar and means-tested benefits). To enrich the administrative database, we conducted a telephone survey among 8,000 randomly selected individuals prior to program announcement (response rate: 51%). The survey data include current employment, detailed information on all possible income sources (i.e., wages, work hours, second pillar benefits, means-tested benefits, partner's income), further demographic characteristics (e.g., marital status, number of children, and education), and information on work capacity (e.g., health status, perceived difficulty to find a job).

To assess program response in the short-run, we match our data with case worker records on all interactions with individuals in the treatment groups, starting at the time of the program announcement. No data on the contacts with control group member are available. From personal communication with the local DI offices, however, we learned that contacts with DI beneficiaries outside the standard reassessment process (which occurs every two or three years) are typically rare. Case worker reports consist of the date, the frequency, and the content of all interactions that took place both over the phone and in person, for up to five months after the program announcement (i.e., between September 2010 and February 2011). About 8% of all individuals in the treatment group contacted the local DI offices.

As interest in taking up seed capital during the first five months of the experiment fell far behind the FSIO's expectations, the FSIO refrained from further data collection and delivery.

By contacting the local DI offices we learned that 20 individuals took up seed capital during the field phase (September 2010—August 2013). We cannot link these 20 cases to our data sources, but anyway the low take-up rate of 0.5% would prevent further quantitative investigation into long-term labour market outcomes.

The low take-up seems surprising at first sight, as many individuals display considerable work capacity (see Table A2 in the appendix). For example, 30% of individuals report good or very good health, and 18% report no difficulty in finding employment. Moreover, 52% of individuals suffer from mental diseases, which might only temporarily impair health, at least for some individuals. Section 4 presents a model for the financial incentives, and a simulation of expected program effects.

## 4 A stylised model and predicted effects of seed capital

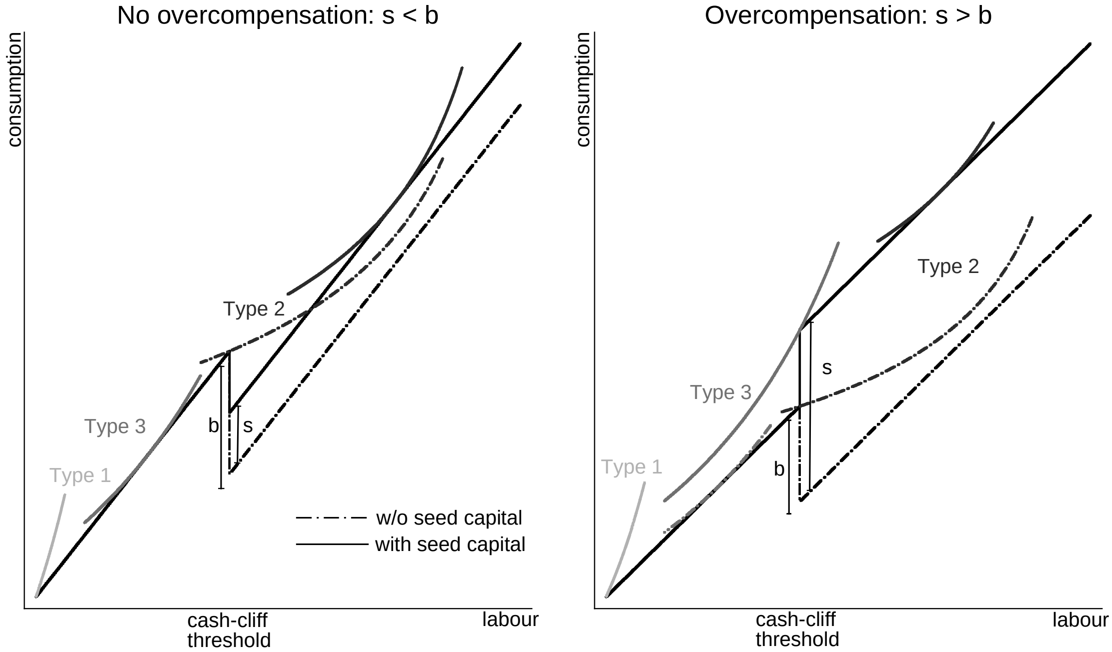
### 4.1 *A stylised model for the effect of seed capital*

We illustrate the basic economic forces at work in a simple static model where individuals maximise utility over consumption ($c$) and leisure ($l$). We assume that the relative value of "leisure" increases with an individual's health impairment. To create a tractable model, we introduce two short-cuts: first, the model assumes a single level of pension benefits and thus a single notch point. Hence, the model simplifies the Swiss scheme, which contains multiple notch points (see Figure 1). Second, we assume that individuals are able to work, and that they are able to perfectly mimic their preferred level of work capacity by choosing their number of work hours. This assumption creates a direct mapping from work hours into disability benefits: individuals receive disability insurance benefits ($b$) if hours of work ($L = T - l$, where $T$ denotes the maximum time available for either leisure activities or work) fall below a certain threshold ($\tau$). DI pensioners receive seed capital ($s$) if they expand work beyond the threshold and thus lose DI benefits.

Our model is static and compares a situation without seed capital ($s = 0$) to a situation with seed capital ($s > 0$). In the absence of seed capital, we expect three types of DI pensioners: the first two types choose boundary solutions, that is, they either choose not to work at all (type 1) or to work exactly at the "cash cliff" that determines the next lower benefit level (type 2). While individuals choosing the former may have either very high disutility of work or low wages (both may reflect the consequences of a disability) individuals choosing the latter would work more if they did not lose disability benefits. The remaining individuals choose employment at the interior solution with the optimal level of hours of work to the left of the cash-cliff (type 3).

In the seed capital scenario, DI pensioners receive a lump-sum payment if they increase hours of work and lose DI benefits. Two different situations can occur (Figure 2): (1) seed capital does not fully (or just) compensate for the benefit loss (left panel), or (2) seed capital overcompensates for the benefit loss (right panel). In the first case, only individuals who would have chosen their hours of work exactly at the notch point in the absence of seed capital (type 2) change their behaviour. However, they only change their behaviour if additional earnings and seed capital together compensate for the loss in benefits and for the higher disutility caused by employment. In other words, total income (earnings, seed capital, and DI benefits) after expanding employment must be strictly higher than total income in the status quo. For all others, the optimal decision remains unchanged (compared to a situation without seed capital). In the second case, that is, if the seed capital overcompensates for the benefit loss, also individuals who choose hours of work below the benefit notch in a world without seed capital react to seed capital. These individuals, however, increase working hours only to the next notch point so that they "just" meet the condition for receiving seed capital.

**Figure 2: Labour-consumption trade-off**




*Note:* The two panels show labour supply choices in a stylised model under two conditions, for three types of individuals. Left panel: Seed capital does not compensate benefit losses. Right panel: Seed capital overcompensates benefit losses. Notation: *s*: amount of seed capital, *b*: loss of benefits if an individual extends his/her earnings beyond a certain cash-cliff threshold. Wages are denoted *w*. The budget constraint is $C = wL + b$ if work hours $L$ are below the cash-cliff threshold ($L \leq \tau$) and $C = wL + s$ if individuals expand their work hours beyond the cash-cliff threshold and claim seed capital.

The simple model also demonstrates the limits of financial incentives: seed capital increases employment and reduces DI benefits for people of type 1 and type 3 only if they are overcompensated for the benefit loss. This implies that the savings in DI benefits due to the intervention are less than the seed capital payments, which cannot be a cost-effective intervention from the perspective of the insurance system. This finding is particularly relevant in the Swiss setting, where individuals receive DI benefits from several sources, while seed capital is paid from the first pillar only. Overcompensation would imply that the public pension system (first pillar) "subsidises" the private occupational pension system (second pillar). Seed capital should thus provide an incentive to expand employment for individuals who are cash-cliff constrained, but should not overcompensate forgone benefits from other sources.

## 4.2 *Simulating the financial implication of seed capital*

To establish a benchmark for the experimental results, this section presents micro-simulation results on the predicted effect of the seed capital offer, based on the simple labour supply model described in the previous section. Here we model the necessary return-to-work condition based on the budget constraint for different types, rather than fully specify the utility functions: individuals of types 1 and 3 will only react to seed capital if they are overcompensated for the benefit loss. Individuals of type 2 do not need to be overcompensated, but their additional earnings and seed capital together need to at least compensate for the loss in benefits. We use available survey and administrative data to determine the type, as well as their expected gains and losses from taking up seed capital.

We model three different "return-to-work" scenarios (henceforth, we use "return-to-work" as a collective term for both "extension of working hours" and "take-up of work"): first, we assume a return-to-work period of two years, where individuals fall back to their old DI contracts after they received the last payment tranche. Individuals had the legal possibility to return to their old DI contracts when they were unable to work for 30 consecutive days within the first five years after reintegration (see Section 2). Yet, a lively political debate on future reforms of the Swiss Disability Insurance Act took place at the time of the experiment, particularly on how to enforce reintegration of current DI pensioners. DI recipients may thus have feared that they could not easily fall back into their old contract after two years. Therefore, the second scenario assumes that individuals increase employment for a period of five years and fall back to their old disability degree afterwards (but not into their old DI contract, see further explanations below). The third scenario assumes that individuals increase employment until retirement and do not fall back to their old DI degree.

We assume that individuals increase employment exactly to the next cash-cliff threshold. Our data contain current earnings and the disability degree for all working individuals. Cash-cliff thresholds, however, are a function of unobserved potential earnings (see Section 2). To construct cash-cliff thresholds, we assume that an individual's current employment level corresponds exactly to his/her disability degree. In other words, if a person had an initial disability degree of 50% and takes up seed capital, his/her employment level increases to 60% and his/her disability degree declines to 40%. This implies that his/her current earnings increase by 20%. For individuals who are currently not working, we predict earnings when taking up employment, based on information for individuals who are comparable in terms of observable characteristics, but who are working (see the supplementary material to this paper for more details).

During the return-to-work period, increased earnings lead to a reduction in first and second pillar benefits by one quarter. We also recalculate means-tested benefits, as these depend on earnings and on first and second pillar benefits. We assume that those individuals who return to work for two years fall back into their old DI contract. Compared to the status quo, their DI benefits decline during the return-to-work period, but afterwards, their benefits pick up the status quo path again. This is not the case when the return-to-work period is five years and longer. Here, the DI recalculates benefits even if individuals fall back into their old disability degree. Furthermore, return-to-work has implications for old-age pensions, which also require recalculation. We provide a detailed description of the simulation in the supplementary material to this paper.

**Table 1: Necessary return-to-work condition for alternative scenarios**

| | Type 1 | Type 3 | Type 2 | **Total** |
|---|---|---|---|---|
| Labour market status | *Not working* | *Working* | *Working* | |
| Disability degree | *Any* | *Not at the notch* | *At the notch* | |
| % of population | *65%* | *23%* | *12%* | |
| Return-to-work condition | *Seed capital > benefit loss during return-to-work* | | *Seed capital > total income change* | |
| Percentage where return-to-work condition is fulfilled (9,000/18,000 CHF) | | | | |
| RTW for 2 years | *7%/41%* | *11%/58%* | *61%/75%* | ***14%/49%*** |
| RTW for 5 years | *0%/5%* | *2%/7%* | *53%/58%* | ***7%/12%*** |
| RTW until retirement | *0%/2%* | *2%/2%* | *47%/51%* | ***6%/8%*** |

*Note:* The simulation is based on information from 2,273 individuals in the treatment and control group who participated in the survey and have non-missing information on wages and benefit payments. Individuals who have never worked before DI entry were excluded because wage predictions are based on work history prior to DI entry. *RTW*: Return-to-work. RTW also includes individuals who are already working, but extend their work hours. Details on the simulation can be found in Appendix B. Source: Own calculations based on administrative and survey data, provided by the Federal Social Insurance Office of Switzerland for the purpose of this study.

Based on the micro-simulation, we estimate necessary return-to-work conditions for different types of individuals. We cannot directly observe types (this would mean that we estimated the utility parameters), but we assess types based on observed disability degrees and labour market behaviour prior to program announcement: type 1 are individuals who do not work at all, irrespective of their disability degree (65% of our sample); type 2 are cash-cliff constrained individuals, that is, individuals who work and have a disability degree exactly at the threshold (12% of our sample); and type 3 are individuals who work and have a disability degree not at the threshold (23% of our sample).

Table 1 presents the simulation results. If people perceived that they can fall back to their old DI contract after two years, 14% of the total population would react to low seed capital (CHF 9,000), and almost half of the population would respond to high seed capital (49%). In the low seed capital condition, those who are cash-cliff constrained would react to seed capital much more frequently (75%). Yet, seed capital rarely overcompensates individuals with longer return-to-work periods. Individuals who are not cash-cliff constrained would not respond to seed capital. The share of cash-cliff constrained individuals who would take up seed capital, however, is remarkably stable at around 50%, even in the long run. We thus expect overall small interest in the program if people fear that they cannot return to their old DI contract after two years. However, the interest should be considerably higher among individuals with disability degrees close to threshold values, as these individuals are likely to be cash-cliff constrained.

## 5 Results of the pilot project

Consistent with our simulation, our results document overall a low interest in the program. Within three years, only 20 treated individuals (0.5%) took up seed capital. The take-up rate corresponds approximately to the overall rate of pension reduction in previous years.[7] It is thus very likely that seed capital generated wind-fall profits for a few people who would have reduced their DI pensions anyway, but seed capital does not seem to incentivise take-up or expansion of employment.

Since we cannot link final take-up rates to administrative data sources, any further analysis will be based on short term reactions. In total about 8% of all individuals in the treated groups contacted their local DI offices within the first five months after the program announcement. However, only 4% of individuals asked for information on the program (see Table A2 in the appendix).

[7] In the year 2011, for example, about 0.4% of all pensioners reduced their pension payment in comparison to the previous year by at least one quarter, but kept a pension of at least one quarter. Most of these pension reductions, however, were not driven by higher incomes. The annual share of individuals who reduced pension level as a result of higher incomes is thus likely to be lower.

**Table 2: Short term interest in seed capital**

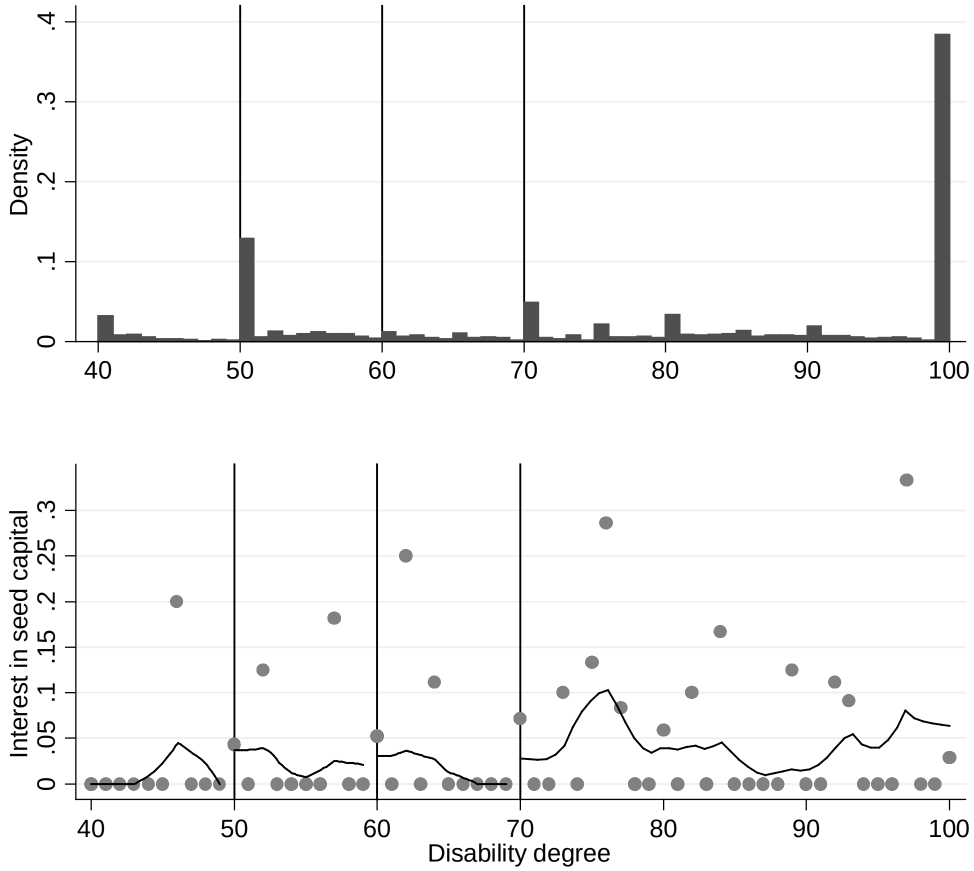
| | (1)<br>Any contact | (2)<br>Contact and expressed interest | (3)<br>Contact and made appointment |
|---|---|---|---|
| High seed capital | -0.002 | -0.002 | -0.005 |
| | (0.012) | (0.009) | (0.008) |
| Constant | 0.073*** | 0.037*** | 0.033*** |
| | (0.008) | (0.006) | (0.006) |
| $R^2$ | 0.00 | 0.00 | 0.00 |
| *N* | 4,000 | 4,000 | 4,000 |

*Note:* The table shows regression results for the 4,000 individuals who received a seed capital offer. Panels (1)–(3) contain different binary dependent variables. (1) individual contacted his/her case worker with positive or negative feedback on the letter; (2) individual asked for information about the program; (3) individual made an appointment to discuss next steps. The table presents coefficients from OLS regressions with sampling weights. High seed capital: indicator variable for the high treatment condition (see Section 2). The reference category is low seed capital. Standard errors are shown in parentheses. Significance levels: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Source: Own calculations based on case worker records, provided by the Federal Social Insurance Office, Switzerland.

Table 2 reveals that doubling the size of the incentives has no effect on call-back rates. We also find little evidence of heterogeneous treatment effects with respect to characteristics that mirror work capacity, such as health, perceived difficulty to find employment, and education (see Table A3 in the appendix).[8] Only individuals who report that they could easily find a job and individuals with a college degree are slightly more likely to react to seed capital.

[8] Health status and perceived labour market frictions are self-reported before the implementation of the field experiment and thus not confounded by justification bias (e.g., Kapteyn, Smith and van Soest 2009).

**Figure 3: Bunching behaviour and responses to seed capital at the cash-cliff**




*Note:* Figure 3 is based on information from respondents who participated in a survey prior to the pilot project, who were employed prior to the experiment, who provided survey information on earnings, and who were randomised into one of the treatment groups (N=760). The upper panel presents a histogram of disability degrees with a bin width of one percentage point. The lower panel presents interest in seed capital (binary variable: individual contacts the local disability office and expresses interest). Dots are averages per disability degree; lines represent the results of kernel-weighted local regression using a triangle kernel and a bandwidth of 3. Source: Own calculations based on administrative and survey data and case worker records, provided by the Federal Social Insurance Office, Switzerland.

The predictions in Section 4 encourage further investigation into the role of cash-cliffs. Prior to seed capital announcement, we observe strong bunching behaviour (upper panel of Figure 3), as an unusually high share of individuals has disability degrees close to a threshold (particularly 50% and 70%), and a low share of individuals has disability degrees just below these thresholds (i.e., 49% and 69%). This pattern is a first indicator that cash-cliffs are binding and that higher behavioural responses to the announcement of seed capital for these individuals can be expected. The lower panel of Figure 3 shows that interest in seed capital is higher for individuals just above the threshold, compared to individuals just below the threshold. For example, interest in seed capital significantly increases by 0.036 (SD 0.016) at the 50% threshold. The jumps at the other thresholds are smaller and statistically insignificant.[9]

## 6 Discussion

Consistent with our simulation, our results document overall a very low interest in taking up seed capital. We find higher call-back rates for individuals with disability degrees close to cash-cliffs, but these effects are far lower than predicted by our simulations. Note that our results are not biased by labour demand frictions. The low initial responses should not be biased by any unsuccessful attempts to find a job. The key question is thus: why the interest in taking up seed capital was so low, in particular among those individuals, for whom we initially expected a high potential for seed capital take-up.

One of the prime reasons for our findings could relate to a biased classification of individuals into types. In our simulation, we count all individuals to be cash-cliff constrained who were employed prior to seed capital and who had disability degrees close to a cash-cliff. Observed bunching prior to seed capital announcement is consistent with labour supply responses to a non-linear budget set, but Figure 3 also displays bunching at disability degrees

[9] Interest in low and high seed capital is combined due to sample size restrictions. Estimates are based on the regression discontinuity design routine developed by Nichols (2011). The estimates for the other two notch points are 0.029 (SD 0.032) for the 60% threshold and 0.032 (SD.0243) for the 70% threshold.

that are not associated with higher DI benefits (for example, 80% and 100%). Clustering of disability degrees at decimal numbers may also reflect rules of thumb that guide case workers' assessments of the disability degree. Consequently, the true proportion of individuals who are cash-cliff constrained could be much smaller than predicted. Similar problems have been observed in other studies that use bunching evidence. Saez (2010), for example, uses US tax data to analyse bunching at kink points imposed by the Earned Income Tax Credit. Some of the estimates for the intensive margin labour supply and earnings elasticities are implausibly high, which implies that bunching reflects reporting effects rather than true labour supply responses.

Moreover, we do no not fully specify the parameters of individuals' utility functions, but only simulate the necessary return-to-work conditions for different types. To take up seed capital, however, individuals need to trade off a relatively safe DI insurance payment against a potentially higher, but more uncertain, work income. Risk aversion could thus significantly harm the expansion of employment and the take-up of seed capital, particularly for longer return-to-work periods.

Low take up of social benefit schemes, however, has been observed in many other settings, even if benefits outweigh objective costs (an excellent review can be found in Currie 2006). This raises the question, which other indirect costs are relevant in explaining low take-up rates. Several studies in behavioural economics show that agents who are faced with complex decisions tend to avoid active choices in order not to incur large up-front problem-solving costs (e.g., Samuelson and Zeckhauser 1998, Frank and Lamiraud 2009). Beshears et al. (2008) argue that choices with consequences far in the future are especially complex. Taking up seed capital certainly falls into that category: determining the consequences of return-to-work on lifetime income requires projecting health, wage and job uncertainty, benefits from different social insurance programs, and capital market returns. It is thus very likely that many DI recipients do not fully understand the lifetime implications of the return-to-work decision, and therefore avoid taking active steps.

Finally, low take-up could also reflect information frictions. Individuals received the seed capital offer via an announcement letter that gave a precise description of the program. This was the only source of information available to DI recipients, unless they contacted their case worker to ask for additional information (which occurred in 4% of all cases). By contrast, when a nationwide pension reform is announced, DI recipients receive the same information several times through different channels (e.g., media, support groups). This information problem, however, even applies to well-established programs. For example, many individuals who are eligible for the Earned Income Tax Credit are unaware of the presence of the credit or have misconceptions of program incentives and eligibility (Bhargava and Manoli 2013).

## 7 Conclusion

This paper presents the results of a field experiment on financial work incentives for DI recipients in Switzerland. The program was aimed at reducing the loss of DI benefits if earnings exceeded certain thresholds ("cash-cliffs"). The program granted a substantial lump-sum payment of up to CHF 72,000 (USD 71,000) if individuals expanded employment and thus reduced their DI benefits.

Using a micro-simulation model, we demonstrate that the amount of money offered, though large in comparison with other cash programs, is still unlikely to fully compensate for the potential income loss of reducing DI benefits. Our simulations predict that for a majority of individuals, returning to the labour market for a period of more than two years would not have been beneficial in financial terms even after accounting for the seed capital offset.

Mostly, recipients who do not expand work because working more does not pay off ("cash-cliff" constrained individuals), should be attracted to take up seed capital.

Consistent with the predictions from our micro-simulation model, we find that the interest in participating in the program is very low. Overall take-up of the financial incentives was 0.5%. Only 4% contacted their case worker within five months after the program announcement to require more information. Doubling the amount of the lump-sum payment made no difference. We find slightly higher reactions to seed capital for individuals with disability degrees at cash-cliffs. However, these effects are relatively small, which suggests that the share of individuals that are truly cash-cliff constrained is much smaller than initially expected. Moreover, risk-aversion, bounded rationality, and information frictions might have reinforced the low interest in the conditional cash transfer program.

## References

Adam, Stuart, Antonine Bozio, and Carl Emmerson. 2010. *Reforming Disability Insurance in the UK: Evaluation of the Pathways to Work Programme.* Working paper, London: Insitute for Fiscal Studies.

Autor, David H., and Mark G. Duggan. 2007. "Distinguishing Income from Substitution Effects in Disability Insurance." *American Economic Review*, 119-124.

Beshears, John, James J. Choi, David Laibson, and Brigitte C. Madrian. 2008. "How Are Preferences Revealed?" *Journal of Public Economics*, 1787-1794.

Bhargava, Saurabh, and Dayanand Manoli. 2013. "Why are benefits left on the table? Assessing the Role of Information, Complexity, Stigma on Take-Up with an IRS Field Experiment." Mimeo.

Bütler, Monika, Lukas Inderbitzin, Jonathan Schulz, and Stefan Staubli. 2012. "Die Auswirkungen bedarfsabhängiger Leistungen: Ergänzungsleistungen in der Schweiz." *Perspektiven der Wirtschaftspolitik*, 137–265.

Campolieti, Michele. 2004. "Disability Insurance Benefits and Labor Supply: Some Additional Evidence." *Journal of Labor Economics*, 863-889.

Campolieti, Michele, and Chris Riddell. 2012. "Disability policy and the labor market: Evidence from a natural experiment in Canada, 1998-2006." *Journal of Public Economics*, 306-316.

Currie, Janet. 2006. "The Take-up of Social Benefits." In *Poverty, The Distribution of Income, and Public Policy*, edited by Alan Auerbach, David Card and John Quigley, 80-148. New York: Russel-Sage.

de Jong, Philip, Maarten Lindeboom, and Bas van der Klaauw. 2011. "Screening Disability Insurance Applications." *Journal of the European Economic Association*, 106-29.

Frank, Richard, and Katerine Lamiraud. 2009. "Choice, price competition and complexity in markets for health insurance." *Journal of Economic Behavior & Organization*, 550–562.

FSO. 2007. *Einkommens-und Verbrauchserhebung 2004.* Neuchâtel, Switzerland: Bundesamt für Statistik (Federal Statistical Office).

Gettens, John W. 2009. *Medicaid expansions: The work and program participation of people with disabilities.* PhD Dissertation DAI-A 70/01, Waltham/Boston: Brandais University.

Gruber, Jonathan. 2000. "Disability Insurance Benefits and Labor Supply." *Journal of Political Economy*, 1162-1183.

Kapteyn, Arie, James P. Smith, and Arthur van Soest. 2009. "Work Disability, Work, and Justification Bias in Europe and the U.S." NBER Working Paper No. 15245.

Kornfeld, Robert, and Kalman Rupp. 2000. "The net effects of the Project NetWork return-to-work case management experiment on participant earnings, benefit receipt, and other outcomes." *Social Security Bulletin*, 12-33.

Kostøl, Andreas Ravndal, and Magne Mogstad. 2014. "How Financial Incentives Induce Disability Insurance Recipients to Return to Work." *American Economic Review*, 624-55.

Marie, Olivier, and Judit Vall Castello. 2012. "Measuring the (Income) Effect of Disability Insurance Generosity on Labour Market Participation." *Journal of Public Economics*, 198-210.

Nichols, Austin. 2011. "rd 2.0: Revised Stata module for regression discontinuity estimation." http://econpapers.repec.org/software/bocbocode/s456888.htm.

OECD. 2010. *Sickness, Disability and Work: Breaking the Barriers - A Synthesis of Findings across OECD Countries* . Paris: OECD Publishing.

OECD. 2009. *Sickness, Disability and Work: Keeping on Track in the Economic Downturn.* High-Level Forum, Stockholm: OECD Publishing.

—. 2003. *Transforming Disability into Ability.* Paris: OECD Publishing.

Saez, Emmanuel. 2010. "Do Taxpayers Bunch at Kink Points?" *American Economic Journal: Economic Policy*, 180–212.

Samuelson, William, and Richard Zeckhauser. 1998. "Status Quo Bias in Decision Making." *Journal of Risk and Uncertainty*, 7-59.

Stapleton, David, Gina Livermore, Craig Thornton, Bonnie O'Day, Robert Weathers, Krista Harrison, So O'Neil, Emily Sama Martin, David Wittenburg, and Debra Wright. 2008. *Ticket to Work at the Crossroads: A Solid Foundation with an Uncertain Future.* Document No. PR08-55a, Princeton: Mathematica Policy Research.

Staubli, Stefan. 2011. "The Impact of Stricter Criteria for Disability Insurance on Labor Force Participation." *Journal of Public Economics*, 1223-35.

Thornton, Craig, Gina Livermore, David Stapleton, John Kregel, Tim Silva, Bonnie O'Day, Thomas Fraker, Jr., W. Grant Revell, Heather Schroeder, and Meredith Edwards. 2004. *Evaluation of the Ticket to Work Program Initial Evaluation Report.* Washington: Mathematica Policy Research.

van Vuren, Annemiek, and Daniel van Vuuren. 2007. "Financial Incentives in Disability Insurance in the Netherlands." *De Economist*, 73-98.

Weathers, Robert R., and Jeffrey Hemmeter. 2011. "The impact of changing financial work incentives on the earnings of Social Security Disability Insurance (SSDI) beneficiaries." *Journal of Policy Analysis and Management*, 708–728.

# Appendix: Additional Tables

**Table A1: Sampling structure**

| | Obs. | % full sample | Stratified |
|---|---|---|---|
| **1) Full sample** | 37,853 | 100% | No |
| **2) Invited for survey participation** | 8,000 | 21% | Yes |
| **3) Survey participants** | 4,049 | 11% | Yes |
| Nonparticipants | 3,951 | 10% | Yes |
| **4) Experimental sample** | 6,020 | 16% | Yes |
| Seed capital high | 2,000 | 5% | Yes |
| Seed capital low | 2,000 | 5% | Yes |
| Control group | 2,020 | 5% | Yes |
| **5) Simulation sample** | 2,273 | 6% | Yes |

*Note:* Selection for participation took place in two steps: From the total of 37,853 individuals who were observed in the administrative records in June 2009, 2,814 individuals have been excluded, primarily as their current residence was outside of the cantons of St. Gallen and Vaud. From the remaining 35,039 individuals, 8,000 individuals have been randomly selected to participate in a survey. Random sampling was stratified by three age groups. The experimental sample consists of all individuals who were invited to participate in the survey, but excluded individuals who are likely to live in a nursing home, and individuals with a disabled partner (to avoid spill-over effects if one person gets randomised into the low and the other person gets randomised into the high seed capital group). The simulation sample consists of all individuals in the treatment and comparison group who participated in the survey and have non-missing information on incomes and benefit payments. Individuals who have never worked before DI entry were excluded, because wage predictions are based on work history prior to disability. Source: Own calculations based on administrative and survey data, provided by the Federal Office for Social Insurance, Switzerland.

**Table A2: Descriptive statistics**

| | Observations | Mean |
|---|---|---|
| Phone call: Positive/neutral reaction[1] | 4,000 | 0.04 |
| Phone call: Any reaction[1] | 4,000 | 0.08 |
| Phone call: Only positive reaction[1] | 4,000 | 0.03 |
| Seed capital: low[1] | 4,000 | 0.50 |
| Seed capital: high[1] | 4,000 | 0.50 |
| Type 1: not working[2] | 2,297 | 0.63 |
| Type 2: working at notch[2] | 2,297 | 0.10 |
| Type 3: working not at notch[2] | 2,297 | 0.27 |
| Total yearly benefit level (in 1,000 CHF)[2] | 1,813 | 31.77 |
| Yearly wage (in 1,000 CHF)[2] | 2,202 | 6.24 |
| Self-reported health: good/very good[3] | 2,198 | 0.31 |
| Has any pains[3] | 2,200 | 0.77 |
| Difficulty: Mobility[3] | 2,206 | 0.40 |
| Difficulty: Household[3] | 2,214 | 0.60 |
| Difficulty: Self-care[3] | 2,214 | 0.20 |
| Years in DI[3] | 2,214 | 0.06 |
| No difficulty to find new employment[3] | 2,214 | 0.18 |
| Age[3] | 2,214 | 42.19 |
| Male[3] | 2,214 | 0.48 |
| Foreign[3] | 2,214 | 0.31 |
| Civil status: Single/widow[3] | 2,214 | 0.43 |
| Civil status: Married[3] | 2,214 | 0.41 |
| Civil status: Divorced/separated[3] | 2,214 | 0.16 |
| Dependent children[3] | 2,214 | 0.37 |
| Disease: Mental[3] | 2,214 | 0.52 |
| Disease: Nervous system[3] | 2,214 | 0.08 |
| Disease: Back disorders [3] | 2,214 | 0.06 |
| Disease: Other musculoskeletal diseases[3] | 2,214 | 0.09 |
| Disease: Injuries[3] | 2,214 | 0.09 |
| Disease: Other[3] | 2,214 | 0.16 |
| Start of pension receipt: Before 1996[3] | 2,214 | 0.22 |
| Start of pension receipt: 1996 - 2000[3] | 2,214 | 0.25 |
| Start of pension receipt: 2001 - 2006[3] | 2,214 | 0.36 |
| Start of pension receipt: After 2006[3] | 2,214 | 0.18 |
| Education: Compulsory education or less[3] | 2,214 | 0.35 |
| Education: Vocational degree[3] | 2,214 | 0.52 |
| Education: High school degree[3] | 2,214 | 0.04 |
| Education: Higher vocational or college[3] | 2,214 | 0.09 |

The table presents descriptive statistics for the sample of treated individuals, or for subgroups with non-missing information on the respective variables. Samples: (1) Individuals in both treatment groups; (2) Individuals in treatment groups with survey response; (3) Individuals in sample 2 with non-missing information on capacity-to-work variables (such as difficulty to find employment). Source: Own calculations based on Administrative data and survey data, provided by the Federal Social Insurance Office, Switzerland.

**Table A3: Effect heterogeneity**

| | (1)<br># Obs. | (2)<br>Constant | (3)<br>High seed capital |
|---|---|---|---|
| <u>Self-rated health</u> | | | |
| (1) good/very good | 708 | 0.049** (0.015) | 0.001 (0.024) |
| (2) fair/bad | 1,569 | 0.042*** (0.011) | -0.01 (0.015) |
| P-value (difference) | | 0.749 | 0.69 |
| | | | |
| <u>Difficulty to find employment</u> | | | |
| (3) Easy | 138 | 0.086 (0.064) | -0.052 (0.066) |
| (4) Difficult | 2,159 | 0.042*** (0.009) | -0.001 (0.013) |
| P-value (difference) | | 0.487 | 0.454 |
| | | | |
| <u>Education</u> | | | |
| (5) Higher education | 210 | 0.026 (0.013) | 0.065 (0.042) |
| (6) No higher education | 2,087 | 0.047*** (0.010) | -0.014 (0.013) |
| P-value (difference) | | 0.212 | 0.071 |

*Note:* This tables show results from OLS regressions in six different subsamples (rows 1-6). The outcome variable in each of the regressions is interest in seed capital, measured as case-worker contact with request for more information within the first five months after program announcement (binary variable). The first column indicates the variable on which the sample is selected. For example, the first sample contains only individuals with good or very good health. The independent variable in each of the regressions (see column 3) is a binary variable indicating the high treatment condition (see Section 2). The reference category is low seed capital. The samples contain only individuals in the treatment groups who answered to the respective survey questions. The regression coefficients are computed using OLS regressions with sampling weights. Standard errors are shown in parentheses. P-values for difference in estimators are based on fully interacted models. Significance levels: * p<0.1; ** p<0.05; *** p<0.01* *p*<0.1; ** *p*<0.05; *** *p*<0.01. Source: Own calculations using survey and administrative data and case worker records, provided by the Federal Office for Social Insurance, Switzerland.

## Supplementary material

## A: Simulation

This appendix outlines the assumptions and procedures used to simulate the return-to-work incentives described in the main text. Our sample for this analysis consists of all individuals in the treatment or the comparison groups who participated in the survey and have non-missing information on other sources of income (i.e. means-tested benefits, second pillar benefits, and spousal earnings). We also exclude recipients who have not been employed prior to DI entry, because we rely on the employment history prior to disability to predict earnings in case a DI recipient returns to work. With these restrictions, we have a final sample of 2,273 DI recipients (see Table 1 in Appendix C).

Return-to-work incentives are measured by comparing the net present discounted value of lifetime income under the status-quo with a situation in which DI recipients reduce their disability benefits by a quarter of a full disability pension and take up or expand employment. The difference in lifetime income is calculated as follows:

$$(A1)\ \Delta\, income = \sum_{t=0}^{T-a_0} \pi_{(t|0)} * \left(\frac{1}{1+r}\right)^{t} * \left[d * \left(w_t^{dur} + b_t^{dur} + p_t^{dur} + m_t^{dur}\right) + (1-d) * \left(w_t^{post} + b_t^{post} + p_t^{post} + m_t^{post}\right) - w_t^{quo} - b_t^{quo} - p_t^{quo} - m_t^{quo}\right],$$

where $a_0$ is the age today, $\pi$ is the probability for being alive at some future date *t* conditional on being alive today, *r* is the interest rate, and *d* is a dummy which is 1 during the return-to-work period and 0 otherwise.[10] The variables $w_t^{quo}$, $b_t^{quo}$, $p_t^{quo}$, and $m_t^{quo}$ measure earnings, first pillar benefits, second pillar benefits, and means-tested benefits in period *t* under the status quo. Similarly, the variables $w_t^{dur}$, $b_t^{dur}$, $p_t^{dur}$, $m_t^{dur}$ and $w_t^{post}$, $b_t^{post}$, $p_t^{post}$, $m_t^{post}$ measure earnings, first pillar benefits, second pillar benefits, and means-tested benefits during return-to-work (*d=1*) and after return-to-work (*d=0*), respectively.

Equation (A1) highlights that return-to-work can affect lifetime income through two channels: First, during the period of re-joining the workforce DI recipients have higher earnings but typically receive less transfer payments from the different social insurance programs. Second, if DI recipients return to work for at least five years, there is a recalculation of first and second pillar benefits in the period after return-to-work.

*Earnings*

Earnings of DI recipients under the status quo $w_t^{quo}$ can be observed directly in the data. We assume that DI recipients continue to work at the same level until they reach the full retirement age when they permanently leave the labour force. Earnings adjust over time with the growth rate *g*=1%, which corresponds roughly to the real wage growth rate in Switzerland during the past 20 years. Computing the earnings during the return-to-work period $w_t^{dur}$ requires projecting the DI recipient's potential earnings when rejoining the workforce. We use the earnings information from DI recipients who are currently working to estimate potential earnings for all DI recipients using a regression-based imputation procedure (see Appendix B for a detailed description). We assume that during the return-to-work period DI recipients work the maximum percent they are allowed to work before their benefits get cut. For

[10] We assume a real interest rate of 2.5% and a maximum life span T of 100 years. Survival probabilities are taken from the age and sex specific life tables published by the Swiss Federal Statistical Office. (http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/02/blank/ dos/la_mortalite_en_suisse/tabl01.html).

example, a DI recipient who during the return-to-work period receives a quarter of a full disability pension works 60 percent of full time job. Finally, earnings in each year after return-to-work $w_t^{post}$ are assumed to be equal to the earnings under the status quo in that year.

*First pillar benefits*

First pillar benefits under the status quo $b_t^{quo}$ can be observed directly in the administrative records and adjust over time based with the earnings growth rate $g$.[11] During the return-to-work period first pillar benefits are reduced by one quarter of a full DI pension $b_t^{dur}$=$b_t^{quo}/x_t^{quo} * x_t^{dur}$, where $x_t^i$ denotes the fraction of a full disability pension that a beneficiary receives in year *t* ($x_t^i$ = 0, 0.25, 0.5, 0.75, 1) and $x_t^{dur} = x_t^{quo0} - 0.25$.

In the case in which recipients return-to-work for two years disability benefits after return-to-work $b_t^{post}$ are equal to $b_t^{quo}$. If the return-to-work period lasts five years or more, disability benefits after return-to-work are re-calculated taking into account the earnings and contributions during the return-to-work period. More specifically, $b_t^{post}$ is calculated using the piecewise linear formula

$$\text{(A2)}\; b_t^{post} = x_t^{post} * f\left(q_t^{post}\right) * \begin{cases} \underline{b} \;\; if \; v_t^{post} \leq \underline{b} \\ \left(0.74 * \underline{b} + \frac{13 * v_t^{post}}{600}\right) \; if \; \underline{b} < v_t^{post} < 3 * \underline{b} \\ \left(1.04 * \underline{b} + \frac{8 * v_t^{post}}{600}\right) \; if \; 3 * \underline{b} \leq v_t^{post} \leq 6 * \underline{b} \\ 2 * \underline{b} \;\; if \; v_t^{post} > 6 * \underline{b} \end{cases},$$

where $\underline{b}$ is the minimum pension, $v_t^{post}$ is the assessment basis, and $f\left(q_t^{post}\right)$ is an adjustment factor, which is increasing in the number of contribution years $q_t^{post}$. The assessment basis is determined by the average earnings in all years (uncapped) after applying

[11] According to the law, wage growth and inflation have an equal weight in the indexation of first pillar pensions and means-tested benefits. Because the wage growth rate was approximately equal to the inflation rate in the past decades, ignoring the inflation rate in the indexation formula is not crucial.

revaluation factors to adjust for wage inflation. Prior to the statutory retirement age $x_t^{post}$ is equal to $x_t^{dur}$. After the statutory retirement age DI recipients qualify for a full pension, so that $x_t^{post}$ is equal to 1.

*Second pillar benefits*

Around 39% of DI recipients in our sample receive DI benefits from the occupational pension scheme (second pillar). Second pillar DI benefits under the status quo $p_t^{quo}$ can be observed in the data and are assumed to adjust over time with the earnings growth rate $g$. During the return-to-work period the second pillar DI pension is reduced by one quarter of a full second pillar DI pension $p_t^{dur} = p_t^{quo}/x_t^{quo} * x_t^{dur}$ where $x_t^{dur} = x_t^{quo} - 0.25$.

As for the first pillar, second pillar benefits in the after return-to-work period $p_t^{post}$ are equal to $p_t^{quo}$ if recipients return-to-work for less than five years. If the return-to-work period exceeds five years, $p_t^{post}$ is re-calculated using the following formula:

$$\text{(A3)} \quad p_t^{post} = p_t^{dur} + (x_t^{post} - x_t^{dur}) * cr * k_t^{post},$$

where $cr$ is the conversion rate (equal to 7%) at which accumulated capital $k_t^{post}$ during the return-to-work period is translated into a lifelong pension. The accumulated capital $k_t^{post}$ consists of all contributions made during the return-to-work period plus hypothetical contributions that the individual would have made until the statutory retirement age if his health status had not deteriorated. Because recipients only receive the fraction of a full disability pension that they have forgone during the return-to-work period in addition to $p_t^{dur}$, the full second pillar disability pension based on the contributions during the return-to-work period ($cr * k_t^{post}$) is adjusted by the factor ($x_t^{post} - x_t^{dur}$). After the statutory retirement age recipients receive a full disability pension, which is equal to $p_t^{dur} + cr * k_t^{post}$.

*Means-tested benefits*

In our sample, around 32% of DI recipients claim means-tested benefits which are awarded in case DI benefits from the first and second pillar are not sufficient to meet minimal costs of living. Means-tested benefits under the status quo $m_t^{quo}$ can be observed directly in the data and adjust over time with the earnings growth rate $g$. The calculation of means-tested benefits during and after the return-to-work period requires knowledge of a recipient's income, assets as well as total expenditures (cost-of-living allowance, rent or interest on mortgage, and heath care). We observe a recipient's income and cost-of-living allowance, but we have no information on assets, rent or mortgage payments, and health care expenditures that are not covered by the mandatory health insurance.

To surmount this problem, we use the following approach: First, we calculate the hypothetical annual means-tested benefits $\widehat{m}_t^{quo}$ ignoring potential asset holdings and health care expenditures that are not covered by the health insurance:

$$(A4)\ \widehat{m}_t^{quo} = max\begin{pmatrix} l_t + h_t + s_t - b_t^{quo} - p_t^{quo} - 0.66 * e_t \\ -max\big(0.66 * w_t^{quo} - z_t, n_t\big); 0 \end{pmatrix},$$

where $l_t$ is a cost-of-living allowance, $h_t$ denotes the health insurance premium, $s_t$ denotes expenditure for housing, and $e_t$ denotes spousal earnings. The calculation of means-tested benefit also includes hypothetical earnings $n_t$ or two thirds of a DI recipient's earnings $w_t^{quo}$ less an exemption $z_t$ whichever is higher. The level of hypothetical earnings $n_t$ depends on a DI recipient's remaining work capacity.

Second, we calculate an adjustment factor $adj_t$ by subtracting the actual annual means-tested benefits in the status quo $m_t^{quo}$ from the hypothetical annual means-tested benefits $\widehat{m}_t^{quo}$:

$$(A5)\ adj_t = \widehat{m}_t^{quo} - m_t^{quo}$$

The adjustment factor thus measures the bias in the amount of hypothetical means-tested benefits that is due to asset holdings and health care expenditures. Third, if we assume that asset holdings and health expenditures are unaffected by the return-to-work decision, then we can calculate means-tested benefits during and after return-to-work according to the following formula:

$$(A6)\ m_t^i = \widehat{m}_t^i - adj_t\ for\ i = dur, post$$

## B: Imputation of earnings

Potential earnings when taking up seed capital ($w_t^{dur}$) are unobserved. To predict earnings for all DI recipients, we implement a regression-based imputation procedure based on earnings information from DI recipients who are currently working. We proceed in three steps:

*Step 1: Predicting potential earnings*

The disability degree determines the percentage loss in earnings due to disability i.e. is computed by the DI office as

$$(B1)\ DI\ degree = 1 - \frac{potential\ earnings\ w/\ disability}{potential\ earnings\ w/o\ disability}$$

Rewriting equation (B1) gives the hypothetical income of an individual if the individual was not disabled.

$$(B2)\ potential\ earnings\ w/o\ disability = \frac{potential\ earnings\ w/\ disability}{(1 - DI\ degree)}$$

We assume that individuals can fully mimic their disability degree by signalling their potential earnings with disability. Then, potential earnings without disability equal their current earnings divided by 1 minus the disability degree:

$$(B3)\ potential\ earnings\ w/o\ disability = \frac{current\ earnings}{(1 - DI\ degree)}$$

If individuals take up seed capital, the disability degree has to decrease, and current earnings must increase accordingly (potential earnings w/o disability are assumed to remain constant over time). Denote the new level of current earnings in case of seed capital take-up as current $\text{earnings}_{sc}$, and the new disability degree as DI $\text{degree}_{sc}$.

Rewriting equation (B3) gives an expression for current $\text{earnings}_{sc}$ under seed capital take-up.

$$(B4)\ current\ earnings_{sc} = potential\ earnings\ w/o\ disability * (1 - DI\ degree_{sc})$$

Computation of current $\text{earnings}_{sc}$ would be straightforward for individuals who are currently working: We can compute potential earnings without disability from equation (B3) and plug them into equation (B4).[12] We can then compute current $\text{earnings}_{sc}$ for different levels of DI $\text{degree}_{sc}$.

Yet, for individuals who are not working prior to the experiment, current earnings are zero, but potential earnings without disability are not. We therefore impute potential earnings without disability for the full simulation sample. We start by estimating the following model for the sample of DI recipients who are currently working.

$$(B5)\ \ln(potential\ earnings\ w/o\ disability_i) = \alpha + \beta X_i + \varepsilon_i$$

[12] Hence, *potential earnings without disability* are not defined for individuals with a DI degree of 100%.

where potential earnings without disability are computed according to equation (B3), $X_i$ is a vector of explanatory variables often used to predict earnings such such as gender, nationality, civil status, children, disability, health, pension payment and start of pension, number of years contributed to the pension system before inflow into disability insurance, average labour income before inflow into disability, log workload per week (workload is measured in hours as a fraction of 42 hours), and education. We use all observations from individuals who were employed at time of the baseline interview, reported their wages, do not work in sheltered workshops (since their wage does not represent market wages), and report plausible hours of work (in total 561 individuals). Results are not reported but available from the authors upon request.

*Step 2: Predicting workload*

The coefficients from the above regression are used to predict potential earnings without disability. All explanatory variables are observed in the data. However, workload is unobserved (or zero) for those who are not working. Workload must therefore be predicted for those who are not working.

We use the following regression to predict workload

$$(B6)\ \ln(workload_i) = \alpha + \beta X_i + \varepsilon_i,$$

where $X_i$ is a vector of explanatory variables that is identical to the vector of variables used in equation (B5), except for log(workload), which is now the dependent variable. Results are not reported but available from the authors upon request.

*Step 3: Imputing potential earnings without disability*

In order to impute potential wages without disability, we compute fitted values from regression (B5) for all individuals in the sample. For individuals who are currently working, all regressors are taken from administrative and survey data, including workload. For those individuals who are not working, we plug in the fitted values obtained in *Step 2* for workload to replace missing values (or zeroes) for workload.

In order to capture the uncertainty associated with the computation of fitted values for potential earnings without disability, we compute a distribution of potential wages without disability for each individual. More specifically, for each individual we randomly draw 1,000 error terms derived from regression (B6) and add them to their fitted values in order to obtain 1,000 values for potential earnings without disability.

These 1,000 observations for each individual are then used to compute current earnings$_{sc}$ for different levels of the Disability degree under seed capital take-up (Disability degree$_{sc}$), according to equation B3. Current earnings$_{sc}$ are then used as earnings during the return-to-work period ($w_t^{dur}$) in order to simulate gains and losses from seed capital take-up.

## C: Annoucement of seed capital

### *Seed capital offer letter*

Dear Mr./Mrs. Miller,

Many disability insurance recipients wish to take up work or to extend their working hours. In many cases, however, starting a job or extending an existing work relationship is associated with financial losses. Therefore, the Swiss disability insurance wants to give some benefit recipients the possibility to receive a seed capital if they start a job and therefore manage to reduce their disability insurance benefit receipt. In this way, the Swiss disability insurance wants to ease the negative financial consequences of employment or extension of working hours.

You belong to the persons that are selected to participate in the project. If you feel able to take up a job or to extend your working hours, and if your pension decreases as a consequence, you will have the possibility to receive a payment. You will find more information on the amount of the payment and your eligibility in the attachment.

Participation in the project is voluntary. You will not incur any disadvantages if you cannot or do not want to accept the offer. In this case, please regard this letter as irrelevant. Your current rights and obligations will remain unchanged.

Are you interested in participating in the project, or do you have any questions? Please contact your disability insurance office directly. The office will help you in your efforts.

[Phone number of disability insurance case worker]

Kind regards,

*N.N., Director of the disability insurance office*

## *Information sheet*

Participation of Mr./Mrs. Miller in the Pilot Project Seed Capital

### *What is "seed capital"?*

In many cases, starting a job or extending an existing work relationship is associated with financial losses for disability insurance recipients. Means tested benefits ("Ergänzungsleistungen") as well as second pillar benefits („Leistungen der Beruflichen Vorsorge") might decrease. Therefore, your new income might be smaller than the combined benefits from your pension and from these other sources. Disability insurance benefit recipients who participate in the project are eligible for a payment. Two conditions have to be satisfied: First, the recipient has to take up a job in the regular labor market, or extend his job in the regular labor market. Second, as a result of taking up or extending a job, his pension has to be adjusted downwards in the course of an official revision.

*Who can participate in the pilot project?*

The aim of the project is to evaluate the seed capital program. Therefore, only those persons who received this letter are eligible to participate. You belong to this group.

*Am I obliged to participate in the pilot project?*

Participation is completely voluntary. If you are not able to participate due to your health status, or if you would like to abstain from participating for other reasons, you do not have to participate. If you decide not to participate in the pilot project, you do not need to do anything. Not participating does not have any disadvantages. Your rights and obligations will be unchanged.

*What do I have to do if I would like to participate in the pilot project?*

The pilot project lasts until July 31$^{st}$, 2013. If you would like to participate in the pilot project and if you have further questions, please contact your local disability insurance office.

[Phone number of disability insurance case worker]

If you would like to participate in the pilot project and you do not have any questions, please report your new employment status until December 31$^{st}$, 2012, to your disability insurance office. Please include a copy of this letter as well as a copy of your work contract in your report.

*Which support am I going to receive if I would like to take up employment or to increase my working hours?*

Participating in the project implies that you will take the initiative to find a job. Of course, you are eligible for support of your disability insurance office as usual. Please contact your disability insurance office for support and help.

*How and when will the seed capital payment be made?*

The seed capital will be paid after you take up employment or extend your working hours, and after the disability insurance office has confirmed your pension reduction. You will be eligible for payment if either employed or self-employed. The seed capital will be paid in tranches. In order to receive payment of the first tranche, the employment relationship has to be in place.

*Seed capital and regular reassessment of your pension*

Your eligibility for disability insurance benefits is revised regularly (every 3-5 years). If your regular revision falls into the time of the pilot project, and if your pension will be reduced during this revision or even cancelled, the following rules apply: A seed capital will always be paid if the above mentioned eligibility conditions are satisfied and the working contract has been signed prior to the regular revision.

*How large is the seed capital amount?*

The seed capital amount depends on the reduction in your pension.

If you currently receive a full pension and your pension is reduced to …

| | | |
|---|---|---|
| …a three-quarter pension, | you will receive a seed capital of | 9,000 (18,000) Swiss Francs. |
| …a semi pension, | you will receive a seed capital of | 18,000 (36,000) Swiss Francs. |
| …a quarter pension, | you will receive a seed capital of | 27,000 (54,000) Swiss Francs. |
| …no pension, | you will receive a seed capital of | 36,000 (72,000) Swiss Francs. |

*Note:* The amount stated in this table is the amount for individuals in the low (high) seed capital condition. Individuals are not aware of different treatment conditions. They will only see the amount that they are eligible for (see Section 2).

If you currently receive a three-quarter pension and your pension is reduced to …

| | | |
|---|---|---|
| …a semi pension, | you will receive a seed capital of | 9,000 (18,000) Swiss Francs. |
| …a quarter pension, | you will receive a seed capital of | 18,000 (36,000) Swiss Francs. |
| …no pension, | you will receive a seed capital of | 27,000 (54,000) Swiss Francs. |

If you currently receive a semi pension and your pension is reduced to …

| | | |
|---|---|---|
| …a quarter pension, | you will receive a seed capital of | 9,000 (18,000) Swiss Francs. |
| …no pension, | you will receive a seed capital of | 18,000 (36,000) Swiss Francs. |

If you currently receive a quarter pension and your pension is reduced to …

| | | |
|---|---|---|
| …no pension, | you will receive a seed capital of | 9,000 (18,000) Swiss Francs. |

The payment is due in four tranches, and each tranche is due after 6 months. The payment depends on whether the reduction in your pension is still in place. Regarding the computation of means tested benefits, the seed capital counts as asset and not as income. For more information on the effect of seed capital on means tested benefits, please contact your local disability insurance office.

*What happens if my health status decreases again?*

If you can proof that your health status has decreased again, you will be eligible for your old pension. This eligibility rule will apply within five years after the decrease in disability benefits. If your pension increases during the receipt of seed capital, no further tranches will be paid. In this case, however, you do not have to pay back the amount that you have already received. For means tested benefits and second pillar benefits, no general rules exist. For these cases, please contact your disability insurance office.

*What happens if I lose my job?*

If you lose your job for reasons other than your health status (e.g. for operational reasons), your eligibility for seed capital will continue. Your pension as well as your second pillar benefits will remain reduced. In this case, you will be treated like someone whose pension has been reduced in the course of a regular revision. Your advantage will be that you will still receive your seed capital after losing your job.

*What is the legal basis for seed capital?*

The disability insurance is obliged to bring their clients back into work. In order to test potential programs for the future, the insurance can conduct pilot projects: Art. $68^{quater}$ IVG. There are no rights impairments of the insured due to pilot projects.

*August 2010*