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Lessons from a Randomized Experiment

Thiemann, Petra; Lechner, Michael ; Bütler, Monika; Staubli, Stefan; Deuchert, Eva

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PO Box 117
221 00 Lund
+46 46-222 00 00

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Financial work incentives for disability benefit recipients: lessons from a randomised field experiment

Monika Bütler[1†], Eva Deuchert[2†], Michael Lechner[1†], Stefan Staubli[3*†] and Petra Thiemann[4†]

* Correspondence: stefan.staubli@gmail.com
[1]Equal contributors
[3]Department of Economics, University of Calgary, 2500 University Dr. N.W., Calgary, AB, T2N 1N4, Canada
Full list of author information is available at the end of the article

Abstract

Disability insurance (DI) beneficiaries lose part or all of their benefits if earnings exceed certain thresholds ("cash-cliffs"). This implicit taxation is considered the prime reason for the low number of beneficiaries who expand work and reduce benefit receipt. We analyse a conditional cash programme that incentivises work related reductions of disability benefits in Switzerland. Four thousand DI beneficiaries received an offer to claim up to CHF 72,000 (USD 77,000) if they expand work and reduce benefits. Initial reactions to the programme announcement, measured by call-back rates, are modest. By the end of the field phase, the take-up rate is only 0.5 %.

Keywords: Disability insurance; Field experiment; Financial incentive; Return-to-work

JEL classification: H55; J14; C93; D04

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. Only 1-2 % of DI recipients exit from DI receipt into employment per year (OECD, 2003; 2009; 2010). Work disincentives are frequently cited as a reason for low exit rates from DI receipt into employment (OECD, 2010): In most countries, DI recipients lose either all or part of their benefits if their earnings exceed certain thresholds ("cash-cliffs"). Many countries thus plan to reform their DI systems to remove these work disincentives.

However, there is little empirical evidence on the effectiveness of DI reforms that provide stronger work incentives for DI recipients.[1] 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

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individuals who exit from DI receipt into employment. While some of these policies increased employment, none of them affected exit rates from DI receipt into employment. To our knowledge, no study so far examines conditional cash incentives that are paid out if DI beneficiaries extend their labour supply and thus reduce their benefit receipt.

This paper complements the literature on results of a field experiment in Switzerland. To stimulate employment and benefit reduction, the DI system offered a conditional cash transfer ("seed capital") to 4,000 randomly selected DI beneficiaries. The cash-transfer is a lump-sum payment, which is granted to individuals who extend their labour supply and reduce benefit receipt by a specified amount. Individuals in this setting have to solve a dynamic optimisation problem. They have to consider a trade off between a flow of DI benefits against a flow of earnings and a fixed one-time cash transfer.

The seed capital programme differs in two ways from previous programmes: 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 DI benefits decrease by at least one quarter.[2] Second, the financial incentive is large compared to incentives in previously studied programmes. Individuals receive a 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 DI benefits by one quarter. The maximum payment to an individual with a full DI pension who completely terminates DI receipt amounts to CHF 72,000 (about USD 77,000 at the time of the introduction of the programme in September 2010). This amount is comparable to the average disposable yearly income of Swiss households (FSO, 2007). In addition, the lump-sum payment enjoys preferential tax treatment.

We use a simple labour supply model to simulate expected responses to seed capital. For a majority of individuals, extending labour supply for a period of more than two years would not have been beneficial. Significantly increased take-up rates of 50 % and higher can be expected for individuals with work disincentives. These are individuals who would lose a substantial amount of their benefits if they increased work hours and thus earnings by a small amount ("cash-cliff constrained" individuals).

What can we conclude from this experiment on the role of financial work incentives and cash-cliff constraints? In the aggregate, the programme did not succeed: By the end of the experiment (September 2010–August 2013), only 20 individuals or 0.5 % of the experimental sample took up seed capital.[3] We investigate the short-term responses to the announcement of seed capital using data on call-backs of DI beneficiaries who asked for further information about seed capital. We find that the size of the financial incentives does not affect response rates. Both in the high and the low treatment group, only about 4 % of individuals contacted their case worker for more information. We find that cash-cliffs play a role, but the reactions of cash-cliff constrained individuals fall far behind the model predictions. More specifically, call-back rates of cash-cliff constrained individuals are only 3 to 4 percentage points higher, compared to the call-back rates of individuals who are not cash-cliff constrained.

Consequently, factors that are unrelated to incentives may have prevented individuals from contacting their DI office and from taking up the programme. One potential explanation is that the complexity of the Swiss DI system made it difficult for DI beneficiaries to understand the incentives involved and, as a consequence, many beneficiaries decided not to participate in the programme. Another explanation is that the seed capital offer was not very attractive for risk-averse beneficiaries because it required them to weigh giving up guaranteed DI benefits against a possibly higher, but uncertain labour income. Consistent with this latter explanation, we find that DI beneficiaries whose benefits would have been terminated by taking up seed capital (and with it the possibility of receiving means-tested benefits) were significantly less likely to call back and to schedule a meeting with their case worker.

The paper proceeds as follows: Section 2 provides a description of the disability insurance system in 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 programme 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

The Swiss DI programme provides disability coverage to all individuals below the full retirement age who have accumulated at least three contribution years. The programme is part of the broader social insurance system and is mainly financed through a payroll tax on earned income. A disability award is made if an individual's disability degree exceeds 40 % due to health impairment. The disability degree corresponds to the percentage loss in earnings potential relative to the earnings potential prior to disability onset.

If a disability award is made, an individual receives a disability pension from the first pillar, which is a pay-as-you-go system aimed at guaranteeing a basic standard of living. The level of the first pillar pension is an increasing function in the number of contribution years, average lifetime earnings, and the number of dependent children. Individuals who contributed to the second pillar prior to disability onset automatically receive a disability pension from the second pillar if they have been awarded a disability pension from the first pillar. The second pillar is an employer-based, fully funded occupational pension scheme, which is mandatory for all employees whose annual earnings exceed CHF 20,000. The net replacement rate of the first two pillars amounts to 60-80 % and can reach 100 % for beneficiaries with dependent children. DI beneficiaries may claim means-tested supplemental benefits if the combined income from the two pillars is not sufficient to cover basic needs. These benefits guarantee an income of CHF 3,000 per month for singles and CHF 4,500 per month for couples.

The Swiss DI programme allows for partial DI pensions, which are a nonlinear function of the disability degree.[4] Specifically, an individual with a disability degree of 70 % or higher qualifies for a total disability pension. Recipients with a disability degree of 60-69 % receive a three-quarter pension equal to 75 % of a total pension, recipients with a disability degree of 50-59 % receive a semi pension equal to 50 %

of a total pension, and recipients with a disability degree of 40-49 % receive a quarter pension equal to 25 % of a total pension.

In contrast, the amount a recipient is allowed to earn while still receiving benefits is a linear function of the disability degree. Specifically, an individual with a disability degree of X % is allowed to earn (100-X) % of his/her pre-disability earnings. DI beneficiaries are required to inform the DI office if their employment status or earnings change. If the new earnings are above the allowed threshold, examiners at the local DI office re-examine the health status of the claimant and determine a new disability degree. First and second pillar pensions are then adjusted according to the new disability degree. Benefits are terminated if the new disability degree is below 40 %.

Figure 1 shows the total income, i.e., the sum of earnings and first and second pillar DI pensions, as a function of earnings for a representative (single) DI beneficiary with pre-disability earnings of CHF 70,000. As the Figure illustrates, there are discontinuous drops in total income at earnings thresholds where DI pensions are reduced or terminated entirely. These notches in the budget constraint induce a high implicit tax on work and create an incentive to keep earnings below the threshold level in order to retain benefits.[5] The field experiment, described in detail in the next section, tests one potential avenue to reduce these work disincentives.

2.2 Experiment "Pilot Project Seed Capital"

To measure the effect of financial work incentives, 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, the earnings increase has to be large enough to trigger a reduction in DI

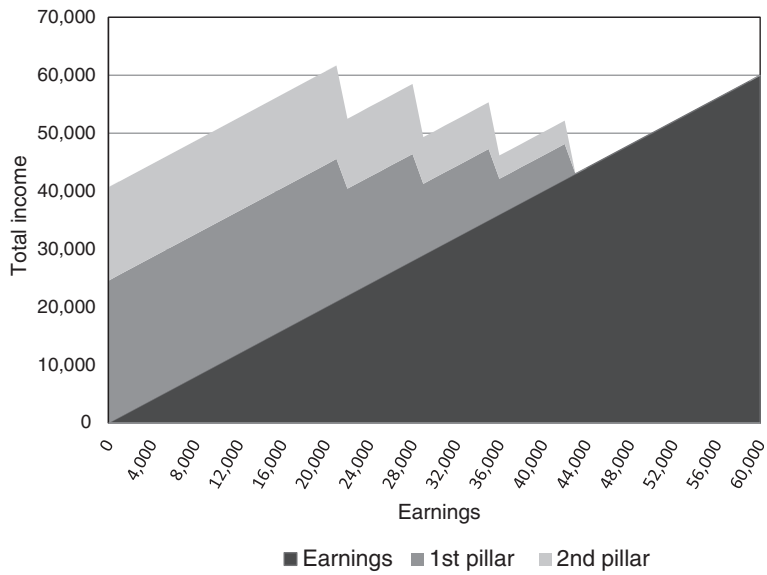

Fig. 1 Budget constraint of a representative DI beneficiary. *Note:* Figure 1 shows total income of a single DI beneficiary with an earnings potential prior to disability onset of CHF 70,000. The x-axis shows annual earnings in the first labour market in CHF. The y-axis shows total annual income (the sum of earnings, 1st pillar benefits, and 2nd pillar benefits) in CHF

benefits 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.

Two different treatments were implemented: DI beneficiaries in the "high" seed capital treatment receive CHF 18,000 for each pension reduction by one quarter, while beneficiaries in the "low" seed capital treatment receive CHF 9,000 for each pension reduction by one quarter. Thus, a DI beneficiary with a full pension who completely exits the DI programme receives CHF 72,000 in the high seed capital treatment and CHF 36,000 in the low seed capital treatment. The former amount is comparable to the average income of a Swiss household, while the latter amount corresponds to the minimum yearly income guaranteed by means-tested benefits. The lump-sum payment is split into four equal tranches, paid bi-annually over two years. Once an individual falls back to a higher pension, the DI system stops the payment of outstanding seed capital tranches. Already paid tranches do not have to be reimbursed.

Two cantons (these are the member states of Switzerland) 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 3 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 office 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 the letter is provided in the Additional file 1 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 the next steps.

3 Data

To choose programme participants and to simulate programme effects, we combine administrative data from the Swiss pension system (first pillar) with baseline survey data. Both datasets cover the pre-programme 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. However, information on further income sources such as second pillar and means-tested benefits is not recorded. To enrich the administrative database, we conducted a telephone survey among 8,000 randomly selected individuals prior to the programme announcement (response rate: 51 %). The survey data include current employment, detailed information on all possible sources of income (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 measure short-run programme responses, we match our data with case worker records on all interactions with DI beneficiaries in the treatment groups, starting at the time of the programme announcement. No data on the contact with control group members are available. From personal communication with the local DI offices, however, we learned that contact with DI beneficiaries outside the standard re-assessment process (which occurs every two or three years) is 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 programme announcement (i.e., between September 2010 and February 2011). About 8 % of all individuals in the treatment group contacted the local DI office.

As interest in take-up of 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 or 0.5 % of the treatment group took up seed capital during the field phase (September 2010—August 2013). However, with a take-up rate of only 0.5 %, studying long-term outcomes other than DI take-up is unlikely to be meaningful.

The low take-up seems surprising at first sight, as many individuals display considerable work capacity (see Table 4 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 programme 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. Hence, the model simplifies the Swiss scheme, which contains multiple notches (see Fig. 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 (τ). DI beneficiaries 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 ($s > 0$).[7] In the absence of seed capital, we expect three types of DI beneficiaries: 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 beneficiaries receive a lump-sum payment if they increase hours of work and lose DI benefits. Two different situations can occur (Fig. 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 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 other beneficiaries the optimal decision remains unchanged (compared to a situation without seed capital). In the second case, i.e., when seed capital overcompensates for the benefit loss, there would also be an increase in hours of work among beneficiaries who choose hours of work below the notch in a world without seed capital. These individuals, however, increase working hours only to the notch point so that they "just" meet the condition for receiving seed capital.

The simple model also demonstrates the limits of financial incentives: seed capital increases employment and reduces DI benefits for type 1 and type 3 beneficiaries 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.

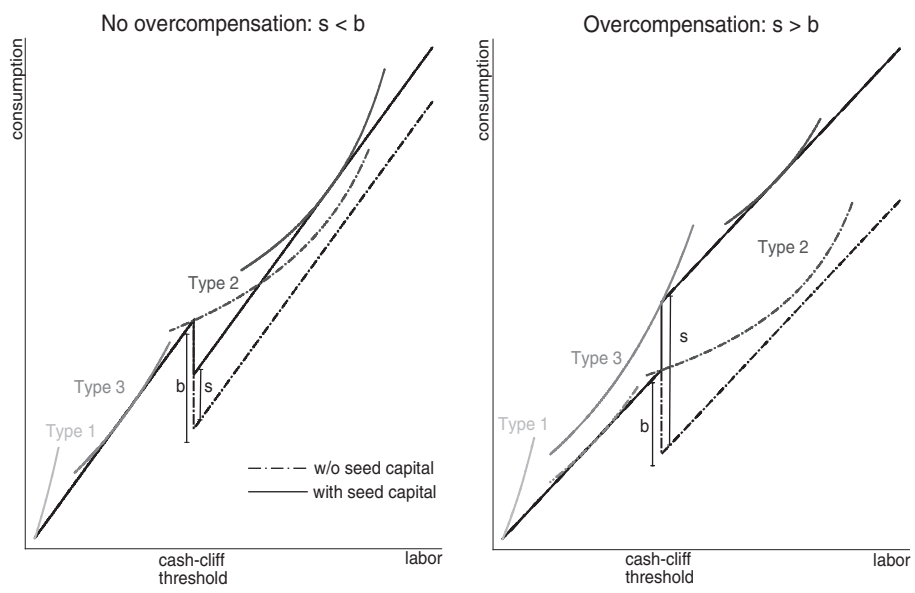

Fig. 2 Labor-consumption trade-off. *Note:* The two panels show labor supply choices in a stylized model under two conditions, for three types of individuals. Left panel: Seed capital does not compensate benefit losses. Right panel: Seed capital overcompensates benefit losses. Notation: *s*: amount of 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

4.2 Simulating the financial implication of seed capital

This section presents micro-simulation results on the predicted effect of seed capital 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: Type 1 and 3 beneficiaries will only react to seed capital if they are overcompensated for the benefit loss. Type 2 beneficiaries 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 receive the last payment tranche. (DI beneficiaries 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.) Yet, at the time of the experiment, a lively political debate on future reforms of the Swiss DI system took place, particularly on how to enforce reintegration of current DI beneficiaries. 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 thereafter (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 disability 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 beneficiary 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 Additional file 1 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 re-calculate means-tested benefits, as these depend on earnings and on first and second pillar benefits. In the scenario of return-to-work, for two years beneficiaries fall back into their old DI contract after the return-to-work period ends. Hence, compared to the status quo, DI benefits decline during the return-to-work period, but afterwards they 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 re-calculates benefits even if individuals fall

back into their old disability degree. Moreover, return-to-work has implications for old-age benefits. We provide a detailed description of the simulation in the Additional file 1 to this paper.

Based on the micro-simulation, we estimate necessary return-to-work conditions for different types of individuals. We cannot directly observe types, but we assess types based on observed disability degrees and labour market behaviour prior to programme 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. We estimate that in the return-to-work (RTW) for 2 years scenario 14 % of beneficiaries would react to low seed capital (CHF 9,000) and almost 49 % of beneficiaries would respond to high seed capital. The share of beneficiaries who would respond to seed capital is much lower for longer return-to-work periods. For example, we find that only 6 % (8 %) of beneficiaries would respond to low (high) seed capital in the return-to-work until retirement scenario. In all scenarios, cash-cliff constrained beneficiaries (type 2) are more responsive to seed capital than non-cash-cliff constrained beneficiaries (types 1 and 3). In sum, based on the simulation results, we expect that seed capital is likely to trigger a short-run response but is unlikely to have a long-run impact. However, even the short-run response may be small if beneficiaries fear that they cannot return to their old DI contracts after two years. Such fears may have been reinforced by the intense debates about reforming the DI system that took place at the time of the experiment.

5 Results of the pilot project

Overall, our results document a low interest in the programme. Only 20 treated individuals (0.5 %) took up seed capital within three years after sending out the offer. The take-up rate corresponds approximately to the overall rate of pension reductions due to increased earnings in previous years.[8] It is thus very likely that

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 had never worked before DI entry were excluded because wage predictions are based on work history prior to DI entry. *R*TW: Return-to-work. RTW also includes individuals who are already working, but extend their work hours. Details on the simulation can be found in the Additional file 1 to this paper

seed capital generated wind-fall profits for a few recipients who would have increased employment and reduced their DI benefits anyway. Yet, seed capital does not seem to incentivise take-up or expansion of employment among marginal recipients.

Since we cannot link final take-up rates to administrative data sources, all 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 programme announcement. However, only 4 % of individuals asked for information about the programme (see Table 4 in the appendix). Table 2 investigates the factors that predict whether individuals called their case worker to ask for information about the programme or whether they even scheduled a meeting to discuss further steps to take up seed capital. Call-back rates and scheduled meetings positively correlate with work capacity: Individuals who were never employed, as well as older individuals, react less frequently. Moreover, work disincentives play a role: individuals with quarter pensions, who would in many cases lose their means tested benefits in addition to their disability pension, react less frequently as well. In addition, foreigners tend to call or schedule a meeting more frequently. These individuals may seek additional information as they may be less familiar with the Swiss system or with the language of the announcement letter (French or German). The size of the seed capital payment, however, does not play a role. The coefficient on high seed capital is close to zero for call-back rates and insignificant for scheduled meetings.

Figure 3 further investigates the role of cash-cliffs. The upper two panels present histograms of disability degrees prior to the experiment. We include only survey participants with information on work status, as this allows us to distinguish between beneficiaries who are working at the time of the experiment (N = 760, upper left panel) and beneficiaries who are not working (N = 1,442, upper right panel). There is clear bunching at disability degrees where DI benefits discontinuously increase (40 %, 50 %, 60 %, and 70 %), both for individuals who are working at the time of the experiment and, to a lesser extent, for individuals who have never worked before the experiment. Bunching not only occurs at cash-cliffs, but also at decimal numbers that are unrelated to cash-cliffs (e.g., 80 % and 90 %). While bunching at cash-cliffs for DI recipients who are working may result from work disincentives, bunching for DI recipients who are not working may rather emerge from rule-of-thumb assessments of case workers.

The lower two panels display reactions to the seed capital announcement, measured as call-back rates at the DI offices. For individuals who are currently working, we observe higher call-back rates at the cash-cliffs, or just above the cash-cliffs; this pattern is in line with work disincentives at cash-cliffs. For individuals who are not working, we do not observe such a clear pattern. On the contrary, individuals just below the cut-off react more frequently. This pattern is consistent with the absence of work disincentives at the cash-cliff among this group.

6 Why the low take-up rates?

Our results show that seed capital was not successful in increasing return-to-work among DI beneficiaries, and a natural question is why the interest in seed capital was so low. We discuss three possible explanations for this finding. First, we discuss whether our

Table 2 Predictors of call-back rate and scheduled meeting

	(1) Call-back		(2) Call-back		(3) Meeting	
	Coeff.	(S.E.)	Coeff.	(S.E.)	Coeff.	(S.E.)
Treatment (=1 if seed capital: high)	−0.002	0.012	−0.002	0.013	0.013	0.013
Age	−0.007*	0.004	−0.004	0.004	−0.009*	0.005
Age squared	0.000	0.000	0.000	0.000	0.000	0.000
Sex (=1 if male)	0.007	0.011	0.007	0.012	0.025*	0.014
Foreign (= 1 if foreign)	0.027*	0.015	0.046**	0.022	0.058**	0.027
Civil status (ref.: married)						
Single or widow	0.024	0.016	0.013	0.019	0.009	0.015
Separated or divorced	0.017	0.017	0.013	0.020	0.041	0.028
Child (= 1 if at least 1 child)	0.024	0.017	0.013	0.017	0.016	0.022
Disease (ref.: Mental)						
Nervous system	−0.031	0.019	−0.020	0.013	−0.008	0.013
Back disorders	−0.003	0.022	0.016	0.022	0.005	0.023
Other musculoskeletal diseases	−0.024	0.019	0.011	0.024	0.012	0.025
Injuries	−0.005	0.023	0.021	0.026	0.015	0.039
Other	0.006	0.020	0.007	0.020	−0.007	0.020
Pension (ref.: half)						
Full	0.017	0.016	−0.003	0.021	0.017	0.023
Three quarters	−0.029	0.018	−0.030	0.022	−0.003	0.026
One quarter	−0.044***	0.015	−0.055***	0.018	−0.018	0.018
Start of pension receipt (ref.: 2001 - 2006)						
Before 1996	0.008	0.015	−0.015	0.015	0.003	0.019
1996 – 2000	0.023	0.016	0.006	0.018	0.009	0.021
After 2006	0.013	0.017	0.011	0.022	−0.012	0.023
Education (ref.: high school/vocational)						
Compulsory education or less			−0.011	0.015	−0.015	0.017
Higher vocational degree			0.013	0.023	0.022	0.026
Self-reported health (ref.: not so good)						
Good/very good			0.013	0.016	0.007	0.016
Bad			−0.002	0.015	0.022	0.021
Employment (ref.: previously employed)						
Currently employed			0.004	0.016	0.031	0.019
Never employed			−0.038***	0.010	−0.032**	0.014
Job search (ref.: difficult)						
Easy			0.008	0.038	0.040	0.049
Almost impossible			−0.024	0.016	−0.004	0.015
Missing			−0.017	0.029	0.011	0.033
Survey participation (= 1 if participates)	−0.016	0.012				
Adjusted R2	0.013		0.016		0.047	
Number of observations	4,000		2,297		1,260	

Note: The table shows OLS estimates for the experimental sample (column 1), for survey participants (column 2), and for individuals in the canton of Vaud who participated in the survey (column 3). The outcome variables are an indicator for interest in seed capital, measured as case-worker contact with request for more information (columns 1 and 2) and an indicator for whether a meeting with the case worker was scheduled to discuss further steps (column 3). The regression coefficients are computed using sampling weights. Standard errors in parentheses. Significance: *p < 0.1; **p < 0.05; ***p < 0.01

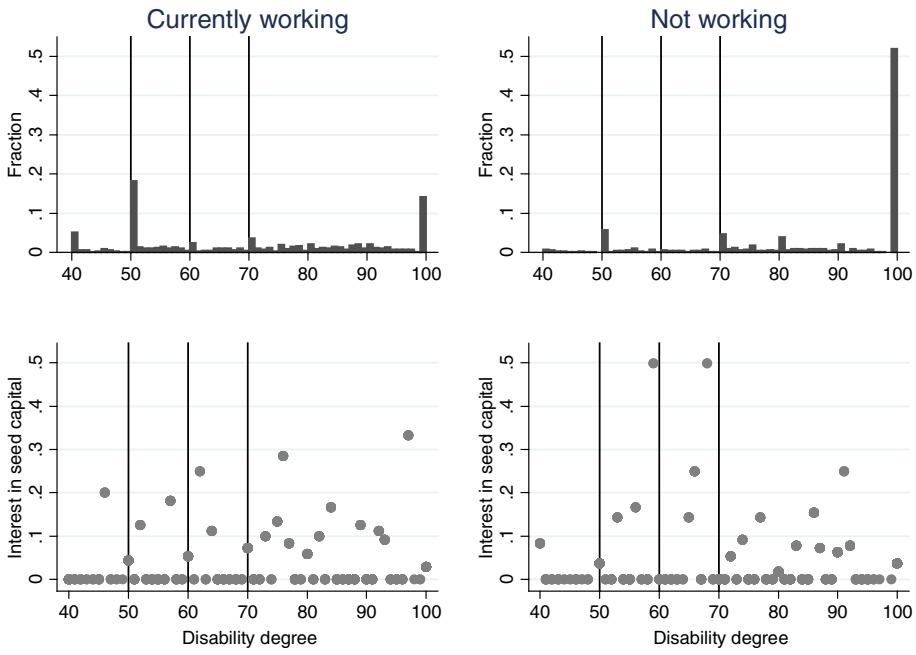

Fig. 3 Bunching behavior and responses to seed capital at the cash-cliff. *Note:* Figure 3 is based on information from respondents who participated in a survey prior to the pilot project. The left two panels show results for individuals who were employed prior to the experiment, who provided survey information on earnings, and who were randomized into one of the treatment groups (N=760). The right panels show results for individuals who were not employed at the time of the experiment (N=1,442). The upper panels present histograms of disability degrees with a bin width of one percentage point. The lower panels present interest in seed capital (binary variable: individual contacts the local disability office and expresses interest). Dots are averages per disability degree. Source: Own calculations based on administrative and survey data and case worker records, provided by the Federal Social Insurance Office, Switzerland

simulations overestimated the impact of seed capital due to misclassifications of beneficiary types. Second, we ask whether the complexity of the DI system and information frictions precluded beneficiaries from understanding the incentives. Third, we discuss whether beneficiaries did not respond to the incentives because of risk aversion and the way the seed capital programme was designed.

One possibility for our findings could relate to misclassification of beneficiaries into types. The correct classification of beneficiaries into types is crucial when estimating the overall response to seed capital because our simulations suggest that type 2 beneficiaries should be much more responsive to seed capital than type 1 and type 3 beneficiaries. We classify all beneficiaries who were employed prior to seed capital and who had disability degrees close to a cash-cliff as type 2. Observed bunching at cash-cliffs prior to seed capital announcement is consistent with labour supply responses to a non-linear budget set, but Fig. 3 also displays bunching at disability degrees that are not associated with higher DI benefits (for example, 80 % and 100 %). Clustering of disability degrees at decimal numbers may therefore also reflect rules of thumb that case workers use in the assessment of disability degrees. Consequently, the true proportion of type 2 beneficiaries may be much smaller than predicted.

Another potential explanation for the low interest in seed capital may be the complexity of the Swiss DI system. As discussed above, DI beneficiaries typically receive benefits from several programmes (1st pillar, 2nd pillar, and means-tested benefits), and determining the

consequences of return-to-work on each type of benefit is difficult. Moreover, some effects of return-to-work on benefits only materialise far in the future when individuals reach the retirement age. Hence, it is likely that DI beneficiaries were not more responsive to seed capital because they did not fully understand the incentives involved. Support for this claim is provided by several behavioural economics studies which show that agents tend to avoid making an active choice when faced with complex decisions in order not to incur large up-front problem-solving costs (e.g., Samuelson and Zeckhauser, 1998; Beshears et al., 2008; Frank and Lamiraud, 2009). The impact of complexity is likely to be compounded by the limited information available to DI recipients about the seed capital programme. In particular, the announcement letter 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). In contrast, when a nationwide pension reform is announced, DI recipients receive the same information several times through different channels (e.g., media, word of mouth, support groups).

A third possible explanation for the low take-up rate is the way that the seed capital programme was designed. More specifically, the programme tried to achieve two objectives: (1) increase employment and (2) reduce (guaranteed) DI benefits. It is very likely that many risk averse beneficiaries did not perceive the programme as advantageous as they would have faced a trade-off of certain DI benefits 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. Consistent with this explanation, we find that beneficiaries who would have lost DI benefits (and the possibility to receive means-tested benefits) by taking up seed capital are significantly less likely to call back and to schedule a meeting with their case worker.

7 Conclusion

This paper presents the results of a field experiment on financial work incentives for DI recipients in Switzerland. The programme aimed at reducing the loss of DI benefits if earnings exceeded certain thresholds ("cash-cliffs"). The programme granted a lump-sum payment of up to CHF 72,000 (USD 77,000) if individuals expanded employment and reduced their DI benefits.

Using a micro-simulation model, we demonstrate that the amount of money offered, though large in comparison with other cash programmes, is unlikely to increase employment in the long-run. Our simulations predict that for most beneficiaries, returning to the labour market for a period of more than two years would not have been beneficial, even after accounting for the seed capital offset. However, our simulations suggest that seed capital should have increased employment at least in the short-run, i.e., in the case of DI beneficiaries returning to the labour market for two years or less.

Yet, we find that the interest in participating in the programme is very low. The overall take-up rate of seed capital was just 0.5 %. Only 4 % of DI beneficiaries contacted their case worker within five months after the programme announcement to request more information. Doubling the amount of the lump-sum payment made no difference. We find slightly higher reactions to seed capital for beneficiaries with disability degrees at "cash-cliffs", who, according to our model, should be particularly attracted to take up seed capital.

Why was interest in the take-up of seed capital so low? One possibility is that the complexity of the Swiss DI system made it very difficult for beneficiaries to

understand the incentives involved, and, as a consequence, many beneficiaries decided not to participate in the programme. Thus, simplifying the DI system may increase the responsiveness of beneficiaries to financial incentives. Another possibility is that the programme was designed poorly. More specifically, to qualify for seed capital, beneficiaries had to give up certain DI benefits in return for a possibly higher, but uncertain labour income. It is very likely that risk-averse beneficiaries did not perceive this offer as advantageous. A programme that would allow beneficiaries to keep their benefits while making a work attempt would probably be more successful in increasing return-to-work.

Endnotes

[1]Other types of DI reforms include policies that reduce DI inflow by 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, & van der Klaauw, 2011; Staubli, 2011; van Vuren & 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, & Emmerson, 2010; Stapleton et al., 2008; Thornton et al., 2004; Kornfeld & Rupp, 2000).

[2]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 & Duggan, 2007; Marie & Vall Castello, 2012; Gruber, 2000; Campolieti, 2004).

[3]Because of low take-up, the Swiss Social Security Administration terminated the investigation into seed capital and irrevocably withdrew from further data collection and provision. Thus, it is not possible to examine outcomes other than take-up such as earnings, benefits, and disability degrees. However, given the low take-up rates, it is unlikely that these outcomes changed significantly in the treatment group relative to the control group.

[4]Partial DI systems exist in many countries (such as Norway, the Netherlands, Sweden, or Germany for example).

[5]The budget constraint of DI recipients who are eligible for means-tested benefits has fewer notches, as means-tested benefits offset the loss in DI benefits. Figure 4 in the Appendix illustrates the budget constraint of a representative DI beneficiary who is eligible for means-tested benefits.

[6]See http://www.bsv.admin.ch/themen/iv/00023/03205/03245/index.html?lang=de for a detailed description of the programme (in German).

[7]In the next section, we examine the financial impact of seed capital in a dynamic setting by comparing the stream of DI benefits, earnings, and total income over the lifespan with and without seed capital. The static model presented here is generalisable to this dynamic setting with the difference that in the dynamic case c captures the net present value of consumption over the remaining lifespan and T captures the length of the return-to-work period.

[8]In the year 2011, for example, about 0.4 % of all DI beneficiaries reduced their pension by at least one quarter in comparison to the previous year, but kept a pension of at least one quarter.

Appendix

Table 3 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 4 Descriptive statistics

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

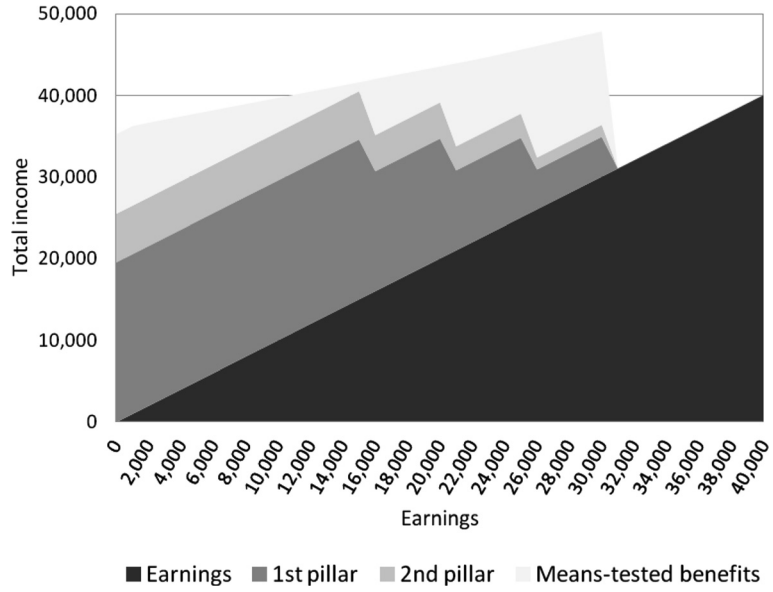

Fig. 4 Budget constraint of DI beneficiary with means-tested benefits. *Note:* Figure 4 shows total income of a single DI beneficiary with an earnings potential prior to disability onset of CHF 50,000. The x-axis shows annual earnings in the first labour market in CHF. The y-axis shows total annual income (the sum of earnings, 1st pillar benefits, 2nd pillar benefits, and means-tested benefits) in CHF

Additional file

Additional file 1: Description of simulation approach and seed capital offer letter.

Competing interests
The IZA Journal of Labor Policy is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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Author details
[1]Swiss Institute for Empirical Economic Research, University of St. Gallen, Varnbüelstrasse 14, 9000 St. Gallen, Switzerland. [2]Center for Disability and Integration, University of St. Gallen, Rosenbergstrasse 51, 9000 St. Gallen, Switzerland. [3]Department of Economics, University of Calgary, 2500 University Dr. N.W., Calgary, AB, T2N 1N4, Canada. [4]USC Dornsife INET and Department of Economics, University of Southern California, 3620 South Vermont Ave, KAP Hall, 300, Los Angeles, CA 90089-0253, California.

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