Financial work incentives for disability benefit recipients: Lessons from a randomized field experiment

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Abstract: The high implicit taxation of employment income (i.e. disabled lose benefits if labor incomes exceed a certain threshold) is considered one of the prime reasons for the low outflow from disability insurance. This paper presents the short-term results of a conditional cash program that financially incentivizes work related reduction of disability benefits. A randomized group of disability insurance beneficiaries receive the offer to claim a payment ("seed capital") of up to CHF 72,000 (USD 71,000) if they take up or expand employment and reduce disability insurance claims. Despite the large financial incentive, the results show that interest in taking-up the financial incentive is low at only 3%. This finding is consistent with the literature from other settings: financial incentives – even if they directly incentivize outflow and are rather generous – tend to be ineffective in stimulating outflow from the disability insurance.

Keywords: Disability insurance, social field experiment, financial incentives

JEL classification: C93, D04, H55, J14,

1 Introduction

The high number of disability insurance (DI) beneficiaries – about 6% of the OECD working-age population 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, almost 2.5 times as much as what was spent on unemployment benefits. Outflow from DI programs other than into old-age pension is relatively low at 1-2% per year (OECD, 2003; 2009; 2010). Reforms of DI programs typically have two goals: decrease new DI benefit claims and raise outflow from disability insurance into employment. A number of successful reforms have reduced DI inflow by either reducing benefit generosity, altering eligibility criteria, or implementing stricter screening (see for example in de Jong, et al., 2011; Staubli, 2011; van Vuren & van Vuuren, 2007). Less is known about ways to effectively increase DI outflow.

The OECD (2010) identifies two main approaches to increase outflow: (1) provide access to vocational rehabilitation and employment integration measures, and (2) set financial return-to-work incentives. Evaluations of special rehabilitation and integration measures, however, showed disappointing results: Take-up rates are low and the effect on outflow is small or even zero (Adam, et al., 2010; Stapleton, et al., 2008; Thornton, et al., 2004; Kornfeld & Rupp, 2000). A number of papers evaluated return-to-work incentives, such as increasing the amount disability insurance beneficiaries are allowed to earn without losing their benefits (Campolieti & Riddell, 2012), allowing to keep some of the benefits even if the income exceeds the substantial gainful activity threshold that determines DI eligibility (Kostøl & Mogstad, 2012), or expanding health insurance coverage to persons with disabilities at higher income levels (Gettens, 2009)[1]. All these programs had some impact on employment but no

[1] In the US, people who receive Social Security Disability Insurance benefits enjoy also health insurance coverage from public health insurance programs. Leaving DI means that individuals lose their health insurance coverage. Regulatory reforms from 1997/1999 gave states the authority to expand Medicaid coverage to include

effect on outflow from disability insurance. Why they failed remains an open question: Were the financial incentives not generous enough? Or did they fail because they reward taking-up or expanding employment but do not directly incentivize DI outflow?

This paper analyzes the effectiveness of a financial return-to-work incentive program ("seed capital") targeted at stimulating outflow from disability insurance. Seed capital differs in three distinct ways from programs discussed in the literature: First, seed capital is a conditional cash program that is specifically designed not only to incentivize return-to-work but also to leave the disability insurance or at least to reduce the benefit level. Seed capital can only be claimed when the individual takes up or expands employment and reduces the disability pension by at least one quarter. Second, the financial incentive is rather large in absolute terms. For a reduction of 25 percentage points in disability benefits, the payment is either CHF 9,000 or CHF 18,000. The maximum payment for somebody who foregoes a full pension is thus CHF 72,000 (about USD 71,000 at the time of the introduction of the program in September 2010), which corresponds roughly to the average disposable yearly income of Swiss households (FSO, 2007). And finally, the payment is lump-sum, does not depend on the benefit level and enjoys preferential tax treatment.

Seed capital was implemented as a social field experiment where a randomized group of individuals could claim the payment. This paper presents the results of a short-term evaluation, where contacts with the local disability office to ask for more information on the program are used as prime outcome variable. Our results document that the interest in taking up seed capital is rather low. Only 3% of the treated individuals contacted their local insurance office to get more information. The amount of seed capital offered does not have a statistically significant impact on the fraction of interested beneficiaries. Our results confirm

persons with disabilities whose individual labor incomes exceed the gainful activity threshold defining DI eligibility.

the previous findings mentioned above: financial incentives are ineffective in stimulating outflow from the disability insurance, even if they are large and directly incentivize taking up or expanding employment.

The paper proceeds as follows: Section 2 provides a detailed description of the disability insurance system in the Switzerland, and discusses the design of the pilot project and its expected impact on disability insurance beneficiaries. Section 3 describes the data. Section 4 presents the results of the short-term evaluation. We discuss potential explanations why seed capital was not taken up in section 5. Section 6 concludes.

2 Swiss disability insurance system and the experiment

2.1 An overview of the institutional setting

In Switzerland, individuals who partially or fully lose the ability to take up employment due to impaired health can claim disability benefits. Benefits can also be claimed by individuals who are not able to carry out day-to-day activities (such as housework or child rearing). Payments in case of disability come from three different social security programs:[2] The mandatory public disability insurance covers all persons living or working in Switzerland (first pillar). Moderate payroll-taxes on labor income (0.7% from employees and employers each; 0.754% to 1.4% for self-employed) only cover approximately 50% of disability insurance expenditures, the rest is financed out of general government revenues. In 2011, approximately 278,000 individuals received public DI benefits (BSV, 2012).

As a second program the occupational pension scheme (second pillar) provides disability benefits for individuals who had contributed to the scheme before. The scheme is employer-

[2] It is also possible that pensions are paid from the accident insurance which insures individuals against the consequences of accidents and occupational diseases. This insurance type, however, is not focus of this paper and is thus not further considered.

based, fully funded and is mandatory for all employees whose annual earnings exceed CHF 20,000. In 2010, approximately 133,000 individuals received disability pension from this source (BSV, 2012). The third program is the supplementary benefit scheme financed out of general government revenues. Supplementary benefits are means-tested and granted on demand in case disability benefits and other incomes are not sufficient to meet minimal costs of living. In 2011, approximately 109,000 individuals received supplementary benefits in addition to first pillar disability benefits (BSV, 2012).

The assessment whether or not a person is eligible for DI benefits is made by the local DI insurance office (first pillar). Eligibility is conditional on health impairments (which can be congenital, illness-related or accident-related). After all rehabilitation options have been exhausted such impairment must lead to a permanent or long-lasting earnings loss of at least 40% compared to earnings without the disability. Individuals accepted for the first pillar are automatically eligible to claim occupational pension benefits (provided they are covered) and means-tested supplementary benefits.

The decision of the DI office is permanent, i.e., an individual can claim disability benefits as long as the condition accountable for the initial decision is unchanged. The DI office, however, conducts reviews to assess the reintegration potential of the disabled person. These reviews very rarely identify potential for successful reintegration. DI outflow for reasons other than death or transition to the old age pension system is relatively low (1-2% of the existing stock of DI pensioners, BSV, 2012).

Table 1: Generosity of the Swiss DI benefit system

Payment type	**Size of the payment**
First pillar: state pension	
Disability pension	Depends on the contribution history and average lifetime earnings. The minimum and maximum full disability pensions are CHF 1,160 and CHF 2,320 per month, respectively; the average disability pension is CHF 1,471 per month (BSV, 2012).
Disabled person's child's pension (paid for depending children)	40% of the relevant disability pension.
Helpless allowances	Depends on the level of helplessness:[3] 234 CHF per month for slight helplessness, 585 CHF for moderate helplessness and 936 CHF for severe helplessness.
Second pillar: occupational pension system	
Disability pension	Calculated by extrapolating the final old age assets, assuming that the individual contributes at the same level with an interest rate of 0. In 2013, the annual full disability pension is 6.85% of the extrapolated old age assets for men and 6.80% for women. In 2010, average second pillar disability benefits conditional on coverage were CHF 1’369 per month (BSV, 2012).[4]
Disabled person's child's pension	20% of the relevant disability pension per child; percentage is somewhat lower for high wage earners.
Supplementary benefits	Covers the difference between basic living expenses (i.e. rent, health insurance, nursing or other care, and other essential needs) and the sum of disability pensions and other income. Means-tested benefits guarantee an income of roughly CHF 3,000 per month for singles and CHF 4,500 for married couples. In 2011, the average means-tested benefits were CHF 1,103 per month for people living at home and CHF 3,503 for people living in a nursing home (BSV, 2012).

[3] A person is deemed helpless when he/she has permanent need of the help of a third party or personal supervision to carry out basic everyday activities because of health impairment.

[4] Some pension funds are based on defined benefits and provide a disability pension equal to roughly 50% of the last wage.

The generosity of the different DI programs depend on various factors (see Table 1), such as contribution years, average lifetime earnings, the number of dependent children, or the degree of helplessness. The different income sources often result in sizeable replacement rates of 70-80% for high-income earners and can reach 100% for low-income beneficiaries with dependent children (Bütler & Staubli, 2011).

Unlike the US DI system, the Swiss DI systems allows for partial disability. DI beneficiaries can claim 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 60and 69% or a full pension with a disability degree of 70% and higher. The disability degree denotes the presumed loss in earnings due to the disability and is determined by the DI office.

Relevant income measures for determining the degree of disability are imputed and not realized incomes. DI case workers asses the functionality loss due to disability as well as the monetary value of this functionality loss, independent of the labor market status of the applicant. In other words, the case worker has to determine the income that a disabled person can achieve as well as the income that the same person could achieve if he were not disabled. In practice, this assessment is likely to be incomplete due to the asymmetric information problem. DI beneficiaries can signal a low earning capacity by not taking up a job or working only a small number of hours. They may thus be able to influence their disability degree, at least to some extent.

The stepwise benefit structure together with the asymmetric information problem may lead to a situation where people do not take up or expand work because they want to maintain higher benefits (see the stylized economic model in Section 2.3). Reducing this negative work incentive was the prime reason for the Swiss government to implement the pilot project seed capital.

1.2 *Pilot project "Seed Capital"*

To reduce financial losses resulting from taking up or expanding work, the Federal Social Insurance Office (FSIO) launched a pilot project "Seed Capital".[5] This project was implemented and financed in the first pillar. Seed capital is a lump-sum payment designed to incentivize employment. A DI beneficiary can receive this payment if (s)he takes up or expands work, if the employment lasts for at least three months, and if first pillar DI payments can be reduced by at least one quarter as a result of the employment. The seed capital is paid out on a half-yearly basis within two years after the reduction or abolition of the pension (four tranches). Payments last as long as the DI benefits are reduced or abolished. Taking-up or expanding work is only a prerequisite for the first tranche. Already paid-out tranches do not have to be repaid in case the conditions for disbursement are no longer satisfied. The trial phase for this payment has been restricted from September 2010 to August 2013.

It is unclear from the existing literature how generous financial incentives need to be in order to stimulate DI outflow. To the best of our knowledge, only the *Pathway to Work Program* in the UK provided a payment for dropping out from the disability insurance. However, the DI systems in Switzerland and UK differ starkly, and a financial incentive of CHF 3,240 (the equivalent to the £ 2,080 from *Pathway to Work Program*) was considered to be too low in the light of the sizeable replacement rates in the Swiss setting. We thus experimented with two different amounts of seed capital: Depending to which group a DI beneficiaries was assigned to, the nonrecurring seed capital was either CHF 9,000 or CHF 18,000 per reduced quarter pension. The maximum seed capital for a person with a full pension who drops out of the disability insurance is thus CHF 36'000 or CHF 72,000, respectively.

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

The pilot project was implemented in two different Swiss cantons (St. Gallen, a German speaking canton and Vaud, a French speaking canton). From in total 37,853 DI beneficiaries in these two cantons, 6,020 individuals were chosen for participation based on a stratified randomization device. Details on the randomization can be found in the appendix (Appendix A1). These 6,020 individuals were randomized into one control group not eligible to for seed capital (N=2,020) and two treatment groups that can claim a seed capital of CHF 9,000/18,000 per reduced quarter pension (N=2,000 each). In the appendix we demonstrate that the randomization design was successful in the sense that the experimental sample is representative in all relevant characteristics for the full sample of DI recipients (Table A.4).

The pilot project was announced to members of the treatment groups by a written notification from their local DI office in September 2010. This letter explained the conditions for the seed capital and invited participants to contact their local disability office to ask for further information and assistance. The control group was not contacted.

For the following six months, the local DI offices noted all contacts with the participants of the treatment groups to document potential interest in the program. Since documented interest has fallen far behind the official expectations (see also section 4), the FSIO refrained from a medium and long-term evaluation. This paper therefore provides a short-term evaluation by focusing on these immediate reactions (which can however be expected to be good predictors of the long-term reactions).

2.2 A stylized model for the effect of seed capital

We illustrate the basic economic forces at work using a simple two-period model of the consumption-leisure tradeoff. Individuals maximize utility over consumption (c) and leisure (l). There are no savings in both periods so people decide either to work or to enjoy leisure. The time restriction for the maximum number of hours available is denoted by T. The second type decision made by individuals concerns the DI benefits. In the first period, individuals decide whether they apply for DI benefits. In the second period, DI beneficiaries receive the seed capital offer. Since the announcement for seed capital was unexpected, the first period can be modeled independently from the second period.

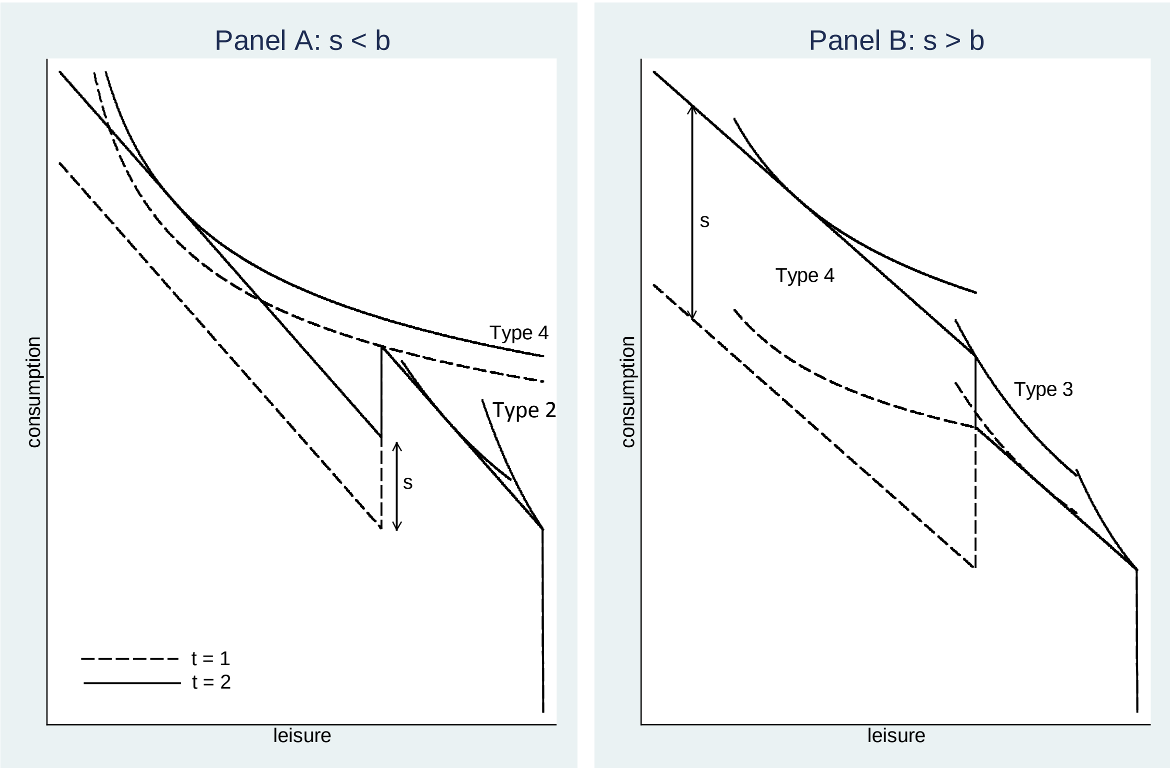
To make the model tractable we use a number of simplifying assumptions: Work hours and wages are public knowledge, but individuals can fully mimic work (in-)capacity by choosing the number of working hours. Furthermore we assume a single level of pension benefits and thus a single notch point: individuals receive disability insurance benefits (b) if working hours are below a certain threshold (τ). The budget constraint in the first period is thus

$$c_1 = \begin{cases} w(T - l_1) + b & if\ l_1 > T - \tau \\ w(T - l_1) & else \end{cases}$$

There are four types of individuals: Those with either high wage rates w or high preferences for consumption choose to work above the threshold and never apply for disability benefits (type 1). Individuals with very low wages or very high preferences for leisure chose not to work at all and apply for full disability benefits (type 2). The remaining individuals apply for disability benefits, but still choose to work. For some of them there is an interior solution with the optimal consumption-leisure trade-off on the lower end of the budget constraint (type 3), for others the corner solution is relevant and they bunch exactly at the threshold (type 4). The latter group would choose less leisure and thus more work if they did not lose disability benefits ("cash cliff"). These individuals reduce their working hours due to a negative work incentive originating in the DI system, which can also be seen as an implicit taxation on labor.

In the second period, seed capital is offered to DI pensioners (type 2 to 4). People receive a lump-sum payment (s) if they increase hours of work and therefore lose DI benefits. The budget constraint for those individuals who would chose to drop out from the DI insurance (i.e. $l_2 \leq T - \tau$) thus becomes $c_2 = w(T - l_1) + s$. Two different situations can now occur: (1) the seed capital does not fully or just compensate for the benefit loss, i.e. $s \leq b$ (Figure 1, panel A) and (2) the seed capital overcompensates for the benefit loss, i.e. $s > b$ (Figure 1, panel B). In the first case, only individuals who would choose labor effort exactly at the notch point without the seed capital (type 4) react on the announcement. They can yield higher utility when expanding work and taking up seed capital. For all others, the optimal point remains unchanged (compared to the first period). In case the seed capital overcompensates for the benefit loss, also individuals who choose labor effort below the benefit notch may react to the seed capital offer if the offer is sufficiently high (type 3 and potentially also type 2 if the incentive is high enough). These people, however, would increase working hours only to the next notch point so that they would "just" meet the condition for receiving the seed capital but would not increase work beyond that point.

Figure 1: Consumption-leisure tradeoff



From this simple theoretical framework, four hypotheses can be derived that will guide our empirical analysis: First, we expect individuals to react more to the high seed capital compared to the low seed capital (*H1*). The higher the seed capital, the more likely the seed capital overcompensates for the benefit loss so that also individuals of type 2 and 3 react to the announcement. Second, we expect heterogeneities with respect to type (*H2*): individuals who select themselves exactly at the benefit notch (type 4) should be more likely to react to the announcement than people of type 2 and 3. This is because for individuals of type 4, seed capital does not need to overcompensate for the benefit loss. The return-to-work condition is thus much laxer than for people of type 2 and 3. Third, we expect heterogeneities with respect to the benefit level (*H3*). The total benefit level can vary across individuals (depending on the years of contributions and average lifetime earnings, see Table 1). Since the seed capital is lump-sum, the relative generosity varies across individuals. If the total benefit level is low, there is a higher chance that the seed capital overcompensates for the benefit loss ($s > b$), which would lead individuals of type 2 and 3 to react to the seed capital. Forth, we expect heterogeneities with respect to the wage rate (*H4*): For individuals of type 4, the necessary condition for returning to work is that seed capital and the additionally earned income compensates for drop in benefits. With lump-sum seed-capital, this is more likely when wages are high.

3 Data

We use data from three different sources: (1) records on individuals' short-term interest in the program from the local DI offices, (2) administrative records from the FSIO, and (3) survey data. Both administrative records and survey data are from time periods prior the implementation of the experiment. This data is used to select the study participants (section

2), to study heterogeneities with respect to relevant background variables (section 4), and to simulate the return-to-work incentives (section 5).[6]

Table 2: Outcome variables

Main specification	Individual contacted local DI office to ask for more information on the program (N=135)
Stricter definition	Individual contacted the local DI office and made an appointment with the case worker (N=121)
Laxer definition	Individual contacted the local DI office for any reason (N=319)

The main outcome variable is the documented short-term interest in the program (see Table 2). This information is provided by the local DI offices, which recorded all contacts with DI recipients.[7] Short-term indicators for interest in seed capital are available only for participants in the two treatment groups. We therefore restrict the following analysis to the two treatment groups that differ with respect to the randomly chosen size of the seed capital (CHF 9'000 vs. 18'000 CHF).

Individuals may search a job without the help of the local DI office and then apply for seed capital. There is requirement to contact the local DI office. Nonetheless, short-term interest is a good predictor of the long term impact of the availability of the cash bonus for two reasons: First, the administrative details of social insurance programs are very complex and people often seek advice at the DI office. Second, the notification letter offered job coaching services

[6] Descriptive statistics for all variables used in our analysis is provided in the appendix (Table A.5).

[7] The local DI offices recorded all contacts that took place in the following 21 weeks (Sept 13, 2010 to January 31, 2011). Even though the data is right censored, we do not expect that many reactions occurred after that date (in January 2011, the last month of recorded contacts, only eight persons contacted the local DI office).

in case the person seeks reintegration into the labor market.[8] It is thus likely that individuals would contact the DI office to ask for these services.

Administrative records from the first pillar of the Swiss pension system include the full labor market history, as well as DI pension from the first pillar (but not occupational pensions or supplementary means-tested benefits). Labor market information from administrative records is accurate with a time-lag of two years.[9] DI receipt is accurate with a time-lag of one year since the review process to reduce the pension takes approximately one year.

A telephone survey took place prior to the experiment to learn more about the motivation of potential recipients to apply for seed capital. Of the randomly selected 8,000 individuals, 51% responded. The survey had been designed to capture current employment, work incentives and preferences, income sources other than first pillar DI pension (i.e. labor incomes, second pillar DI pensions, and supplementary benefits), health status and individual background variables such as marital status, children, and education.

Administrative records and survey information are used to study effect heterogeneities particularly with respect to the leisure-consumption trade-off (*H2*, see section 2.3). We do not observe this trade-off directly but we can distinguish between different types based on their current labor status (taken from the survey) and the exact disability degree (from administrative records): Type 2 are individual who are currently not working (irrespective of their disability degree), type 3 are working individuals with disability degree which is not at a notch point, and finally type 4 are working individuals with a disability degrees exactly at a notch point (40%, 50%, 60% and 70%). Furthermore, the data provides information to study effect heterogeneities with respect to total benefit level (*H3*) and wages (*H4*).

[8] All disability benefit recipients, including the control group, have access to reintegration measures.

[9] These are based on reports from employers. It takes approximately two years until these reports are accurate and updated.

4 Short-term results of the pilot project

Table 3 presents the results from the short-term evaluation. The documented interest in the pilot project is relatively low at only 3% of all potential cash recipients. To evaluate if a higher seed capital (CHF 18,000 per reduced quarter pension compared to CHF 9,000) results in more interest (*H1*), we use a standard OLS model (column 1). The results demonstrate that doubling the financial incentive does not lead to more short-term reactions. The estimated coefficient is very small and insignificant. Table A.6 column (2) and (3) in the appendix demonstrates that the results are robust to using alternative (stricter or laxer) definition for short-term interest in the program (i.e., if individual contacted the local DI office and made an appointment with the case worker or if individual contacted the local DI office for any reason).

We furthermore test for effect heterogeneities which have been suggested by our theoretical considerations (*H2-H4*): Columns 2 and 3 show how much the type w.r.t. consumption-leisure tradeoff affects the interest in seed capital (*H2*). The results demonstrate that individuals classified as type 3 and 4 are not more likely to express interest in seed capital than individuals classified as type 2. If anything, individuals classified as type 3 are more likely to react to the high seed capital, but the effect is not significant at any standard significance level. This is unlikely to be driven by sample selection (we observe the type only if the individual responded to the survey), since the main result remains unchanged if estimated on the subsample of individuals who participate in the survey (see Table A.6 column 4). The result is furthermore consistent to alternative specification, where type 4 is defined as disability degree exactly at the notch point or +1 percentage points (see Table A.6 column 5 and 6). We observe some effect heterogeneities with respect to the different notches (see Table A.6 column 7), where individuals classified as type 4 with a disability degree of exactly 40% or 60% are less likely to ask for more information (significant main effects). The interaction effect with the high seed capital offer is, however, insignificant.

Column (4) and (5) test for effect heterogeneities with respect to the benefit level (*H3*), where we interact the treatment variable with an indicator for total benefit level higher than the median: There is a small negative association between the benefit level and interest, as well as a positive interaction effect, but again, the effects are not significant. Thus, interest in seed capital is low even if people would lose much when taking-up or expanding employment.

Finally we explore if higher wages are associated with a higher interest in seed capital (*H4*), where we interact the treatment variable with an indicator for labor incomes higher than the median: Neither the main nor the interaction effects are significant.[10] Thus, interest in seed capital is low even if people can gain much when taking-up or expanding employment.

Our results are robust with respect to including a set of control variables (see Table A.7). To sum up: The interest in taking-up a seed capital is relatively low, and does not depend on the size of the financial incentive, the benefits forgone in case of seed capital take-up, or the wage rate. Offering a financial incentive to take-up work will not stimulate DI outflow.

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[10] The coefficient for high seed capital changes sign indicating that a doubling the seed capital leads to slightly higher response rates. This is driven by the sample selection (see Table A.6 column 8). The effect is, however, still insignificant.

Table 3: Results of the short-term evaluation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Seed capital (SC): high	-0.002	-0.004	-0.015	-0.008	-0.004	0.016	0.024
	(0.009)	(0.013)	(0.016)	(0.015)	(0.023)	(0.017)	(0.028)
Type 3: working not at notch		0.004	-0.019				
		(0.015)	(0.016)				
Type 4: working at notch		0.003	0.001				
		(0.020)	(0.033)				
SC high x type 3			0.048				
			(0.031)				
SC high x type 4			0.004				
			(0.038)				
Benefits > CHF 26.7K				-0.009	-0.005		
				(0.015)	(0.022)		
SC high x benefits					-0.007		
					(0.029)		
Income > CHF 18K						-0.009	-0.001
						(0.016)	(0.016)
SC high x income							-0.018
							(0.033)
_cons	0.037	0.043	0.048	0.052	0.050	0.031	0.027
	(0.006)***	(0.011)***	(0.013)***	(0.014)***	(0.017)***	(0.011)***	(0.011)**
R^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	4,000	2,297	2,297	1,813	1,813	760	760
Hypothesis	*H1*	*H2*		*H3*		*H4*	
Sample	*Treatment*	*Treatment*		*Treatment*		*Treatment*	
		Particpated in survey		*Particpated in survey*		*Particpated in survey*	
				No missing in benefits			

Note: The regression coefficients are from fully interacted OLS regressions with survey weights. Omitted categories are Seed capital: low, type 2 (not working), benefits below CHF 26.7 K and income belown CHF 18K.Standard errors are shown in parentheses. Significance levels: * p<0.1; ** p<0.05; *** p<0.01

5 Why was interest in seed capital so low?

The key idea guiding the implementation of seed capital is that some individuals might have the capacity to work more but face negative financial incentives to do so. The most important question is why the pilot project failed to raise interest in labor market (re-) integration despite the large financial incentive provided by seed capital.

5.1 Simulating the return-to-work incentives

The most obvious reason why the pilot project failed may be that the disincentives imposed by the Swiss DI system are so high so that seed capital is not high enough to offset the financial losses from return-to-work. We thus assess the size of the disincentive by simulating the net present discounted values 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. This micro-simulation considers lifetime incomes from the following sources: labor incomes (assuming that individuals extend labor effort to the next threshold), disability pensions from the first and second pillars, old age pensions from the first and second pillars, and supplementary means tested benefits.[11]

Calculating the lifetime income in the case DI recipients return to work requires projecting the number of years that recipients will be working after labor market re-entry. We consider three different scenarios:

Return to work for 2 years (scenario I): DI recipients reduce benefits and return-to-work for two years (exactly the time period of seed capital payments). After the two year period DI benefits prior to labor market re-entry are reinstated.[12] Hence, return-to-work affects the net

[11] For specific details and assumptions of this comparison in lifetime incomes see Appendix A2 and A3.

[12] The Swiss DI program allows beneficiaries who leave the disability rolls for employment to have their benefits reinstated without a new application should they return to the rolls within three years.

present discounted value of lifetime income only during the two years of reduced DI benefits. Expected lifetime income increases if additional earnings offset the loss in benefits from the different social insurance programs and decreases otherwise.

Return to work for 5 years (scenario II): DI recipients reduce benefits and return to work for a period of 5 years. Here, return-to-work affects the net present discounted value of lifetime income via two channels. First, as before, during the period of rejoining the workforce DI recipients have higher earnings but receive less transfer payments from the different social insurance programs, although in some case the loss is attenuated due to an increase in means-tested benefits. Second, there is a recalculation of first and second pillar benefits after the return-to-work period ends. DI recipients with low earnings during the return-to-work period, compared to the average earnings prior to DI entry, are likely to receive lower first and second pillar benefits in the after return-to-work period. Compensating the change in second pillar benefits to some degree, means-tested benefits automatically adjust as a response to the recalculated first and second pillar benefits.

Return to work until retirement age (scenario III): DI recipients reduce benefits and take-up or expand employment from the current age up to the full retirement age. As in the previous case, return-to-work affects lifetime income not only through the change in earnings and benefits during return-to-work but also through the recalculation of transfer payments in the period after return-to-work. For DI recipients with high earnings during return-to-work the recalculated second pillar benefits tend to be higher than in scenario II because DI recipients contribute for a longer time. DI recipients with low earnings during return-to-work, on the other hand, tend to receive less second pillar benefits in the after return-to-work period compared to scenario II.

Table 4 summarizes the impact of return-to-work on lifetime benefits and earnings for the three scenarios. As Panel A illustrates, returning to work for 2 years (scenario I) would reduce first pillar DI benefits during the return-to-work period by CHF 13,332 on average. The average reduction in first-pillar DI benefits is much larger if recipients return to work for 5 years (scenario II) or until they reach the retirement age (scenario III). Panel A also shows that the average losses in second pillar DI benefits and means-tested benefits are much smaller (around one third) then the corresponding losses in first pillar DI benefits. The reason is that most DI recipients do not receive second pillar DI benefits or means-tested benefits prior to labor market re-entry. On average, the losses in transfer payments during return-to-work are outweighed by the additional earnings.

Table 4: Impact of return-to-work on lifetime benefits and earnings

	Scenario I		Scenario II		Scenario III	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
A. During return-to-work						
1st pillar DI benefits	-13,332	5,568	-32,134	13,695	-106,540	55,534
2nd pillar DI benefits	-4,457	9,066	-10,730	21,819	-33,558	71,048
Means-tested benefits	-3,471	10,334	-8,504	25,113	-37,084	97,780
Earnings	46,074	25,974	111,357	63,334	398,908	276,588
B. After return-to-work						
1st pillar DI benefits	0	0	-6,679	35,185	-15,722	45,651
2nd pillar DI benefits	0	0	-8,600	167,951	13,650	146,432
Means-tested benefits	0	0	2,271	79,002	15,281	65,168
Total	24,814	26,347	46,981	208,305	234,935	334,754

Panel B of Table 4 shows the impact of return-to-work on benefits and earning in the period after return-to-work. In scenario I return-to-work has no impact on benefits and earnings in the period after return-to-work, because benefits prior to labor market re-entry are automatically reinstated if recipients return to work for less than three years. In scenario II DI recipients would lose on average CHF 6,679 and CHF 8,600 in first- and second pillar benefits, respectively, but part of this loss is compensated by an increase in means-tested benefits. Similarly, in scenario III there is a reduction in average first pillar DI benefits and an increase in average means-tested benefits in the period after return-to-work. However, unlike in scenario II, there is also an increase in second pillar DI benefits of CHF 13,650 in the after return-to-work period.

Overall, our calculations suggest that return-to-work increases lifetime income for the average DI recipient in all scenarios (see last row of Table 4). Even though individuals would lose quite a substantial amount of benefits, particularly during return-to-work, higher labor incomes compensate for this loss. On average, people would thus gain from taking up or expanding work even without seed capital. However, this is not true for everybody given that there is enormous heterogeneity in both benefits and earnings, as illustrated by the high standard deviation. We calculate that return-to-work for two years, five years, and until the NRA would reduce lifetime income for 13.9%, 19.5%, and 13.5% of DI recipients in our sample, respectively. A seed capital of CHF 9,000 (CHF 18,000) would reduce the fraction of DI recipients who lose from returning to work for 2 years, 5 years, and until the NRA by 5.9% (9%), 2.3% (3.8%), and 1% (1.8%), respectively.

To conclude that the majority of the population gains from taking up or expanding work (either because labor incomes already compensates and seed capital would be just a bonus, or because additional labor incomes and seed capital compensate for the benefit loss) is, however, too simplistic to assess the overall effect of seed capital. Our theoretical framework (see section 2.3) documents that the necessary return-to-work condition depends on the consumption-leisure-tradeoff type: Individuals who are not working (type 2) or whose employment choice is at an interior solution (i.e. disability degree is not at the notch, type 3) are not constrained by the cash cliff. These individuals would only react on the offer if seed capital overcompensates for the loss in benefits. For individuals who bunch at the threshold (i.e. disability degree is at the notch, Type 4), the return-to-work condition is laxer. For them it is only necessary that seed capital and additional labor incomes compensate for benefit loss.

Table 5: Necessary return-to-work condition

	Type 2	Type 3	Type 4	**Total**
Labor 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 RTW		Seed capital > total income change	
Percentage where return-to-work condition is fulfilled (9,000/18,000 CHF)				
Scenario I	7%/41%	11%/58%	61%/75%	**14%/49%**
Scenario II	0%/5%	2%/7%	53%/58%	**7%/12%**
Scenario III	0%/2%	2%/2%	47%/51%	**6%/8%**

As one can see in Table 5, the fulfillment of this necessary condition depends on the scenario. In the most likely scenario where individuals return to work only for the required two years and then fall back into DI without long-term consequences for DI and old-age benefits (scenario I), the necessary return-to-work condition is fulfilled for about 14% of the considered population when a low seed capital is offered, and for 49% when the offered seed capital is CHF 18,000. This result is driven by the relatively high share of individuals of type 2 and 3, who are overcompensated for the loss of benefits during the return-to-work period. For individuals of type 4, many of them would anyway experience positive gains from return from work. Seed capital is only an additional bonus. This explains the high share of individuals for whom the laxer return-to-work condition is fulfilled. The results for scenarios II and III demonstrate, however, that the expected long-term effects are much lower: the necessary condition for returning to work for five years (in case individuals would have to repay seed capital in case they reenter DI earlier) is fulfilled only for 7% (low seed capital) or 11% (high seed capital), the necessary condition for returning to work until retirement age is fulfilled for 6-8% of the population. These are mainly individuals of type 4, who would gain from return-to-work even without seed capital.

Our results, however, should be treated as an upper bound for the population that should have reacted on seed capital for two reasons: First, we simulate the necessary but not the sufficient conditions for taking-up seed capital. Thus, even though an individual of type 4 (disability degree is at the notch) may be financially better-off when expanding work, high risk-aversion or preferences for leisure could prevent them from taking-up seed capital. Second, the DI recipients who are most likely to react to seed capital are those that we classify as type 4. However, the individual classification is not directly observed but based on the work status and the disability degree. This implicitly assumes that individuals self-select their disability degree, which may not be the case in reality. DI case workers assess the DI degree and may choose a disability degree directly at the notch either because rules-of-thumb are used (where 40%, 50%, 60%, or 70% are prominent numbers), or because case workers have an incentive to lift an application over the next hurdle in order to avoid potential court appeals. This is consistent with the observation that disability degrees at threshold values are also common for people who are not working.[13] It is thus possible that at least a part of the population that we classified as being of type 4 did not self-select to be at the notch and have thus no incentive to take-up seed capital.

Despite these limitations, the micro-simulation demonstrates that a sizeable share of the population would have benefitted from seed capital at least in the short term. Furthermore, one should have expected that a higher share of the population reacts on the high seed capital offer. It is thus unlikely that the low short-term reactions are caused by seed capital offers that are too low in comparison to the generous Swiss DI system.

[13] In our sample, 14% of DI beneficiaries who are not working have disability degrees directly at the notch. Among the population who are working, 31% have disability degrees at the notch.

5.2 Capacity to return to work

An alternative explanation for the low interest in seed capital may be the low work capacity so that individuals simply cannot return to work. Three main lines of arguments support this view: First, unlike in other social insurance programs, health limitation is a necessary precondition for DI benefits. Many empirical applications demonstrate that bad health is strongly associated with labor market outcomes (see for example Dano, 2005; Crichton, et al., 2011). It is thus possible that people are simply too sick to work and thus, cannot take-up seed capital. Second, disability insurance provides long-term insurance. Human capital, as well as the motivation for re-entering the labor market may have severely eroded after DI beneficiaries have been out of the workforce and receiving benefits for several years.[14] Third, various studies demonstrate that people with disabilities face discrimination on the labor market (an overview can be found in Riach & Rich, 2002). Individuals may thus be discouraged to actively search for employment.

Table A.8 provides a test if these factors explain the low short-term interest in taking-up seed capital. Information on individual health (i.e. self-assessed health, pains, and limitations in activities of daily living), and whether or not individuals find it easy to search for employment on the labor market is available from the survey. Note that all these variables are recorded before individuals received the offer for seed capital. Our analysis is thus not affected by justification bias (for a discussion see Kapteyn, et al., 2009). The length of time in DI is provided by administrative records. The marginal effects for health, number of years in DI, and difficulty to find new employment have the expected sign (the exception is only the coefficient for the variable indicating that a person has problems with self-care), but they are small and insignificant. Only the variable indicating that a person has difficulties to do basic

[14] This is the prime reason to call for early intervention policies such as workplace accommodation and rehabilitation services (OECD, 2010; Autor & Duggan, 2010).

household chores is significantly associated with a lower interest in taking-up seed capital. The result is robust to controlling for variables that shape the budget constraint and background characteristics.

Overall, these factors play only a small role explaining the low interest in seed capital. Those with higher work capacity do not have more interest in taking-up the financial incentive.

5.3 External validity

There is a lively debate in the economic literature if the results from randomized controlled trials can be generalized (Deaton, 2010). Common obstacles are heterogeneous treatment response (the pilot project was implemented in only two of 26 cantons), strategic behavior (people behave differently in a Pilot project because they want to influence the political discussion making process), or treatment effects being affected by the way the intervention is implemented.

Particularly the later could be a problem in the current setting. The pilot project was announced to the participants in 2010 via a single letter. Unlike a nationwide implemented pension reform, where DI recipients receive the same information several times through different channels (media, mouth-to-mouth, support groups, etc.), this was the only source of information. Furthermore, the announcement took place in a time period, where the recent disability pension reform package was controversially discussed in the media. This package also included measures to expand a reintegration-oriented pension review process, aimed at bringing 12,500 DI pensioners out of the DI insurance.

The way the pilot project was implemented and announced may have several unintended consequences: First, we know from other pilot projects that the initial interest in new measures that requires voluntary participation is very low (Balthasar & Müller, 2007). It may need a longer time and a consistent reminder for these measures to penetrate the market. And second, DI recipients may have been alienated by the discussion on future reforms of the Swiss Disability Insurance Act. Participants may have feared that any (unsuccessful) action to take-up seed capital could signal in a future pension review process that the initial preconditions for DI benefits no longer exists. Participants may have simply feared to lose DI benefits even if they do not meet the prerequisites (i.e. taking up or expanding employment).

However, our results are consistent with previous studies in very different settings that find also no or only a small impact of financial incentives on labor supply and program outflow (Thornton, et al., 2004; Stapleton, et al., 2008; Adam, et al., 2010). We thus have very little reason to believe that reactions to a similar nationwide implemented reform would be dramatically different.

5.4 Bounded rationality

The key idea for implementing seed capital is that individuals are able to make rational decisions. With bounded rationality, in contrast, individuals are limited by the information they have, cognitive abilities, and the finite amount of time they have to make a decision. Several studies in behavioral economics show that agents who are faced with complex decisions tend to avoid making an active choice in order not to incur large up-front problem-solving costs (see for example in Samuelson & Zeckhauser, 1998; Frank & 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 DI recipients do not fully understand the lifetime implications of the return to work decision und therefore avoid making active steps. If this is the primary reason for the low interest in seed capital, the efficiency of other policy reforms aimed at promoting work incentives for people on disability benefits (such as tax credits, earnings supplements, or earnings disregards) is questionable. These types of policies are, however, the cornerstone of many DI reforms (OECD, 2010).

6 Conclusion

In this paper, we present the short-term results of a pilot project in the Swiss disability insurance system that provides financial incentive for return-to-work. The program is specifically designed to overcome financial disincentive of taking up employment (i.e. the loss of disability insurance benefits in case a person expands or takes-up employment). A lump-sum payment is offered to DI recipients who reduce DI payments by at least one quarter and expand or take-up employment.

We find that the overall interest in participating in the program is very low. In the first six months of the program only 3% of the 4,000 DI recipients in the treatment group contacted the local DI office and expressed some interest in participating in the program. We also find that doubling the amount of the lump-sum payment has not significant impact on the response rate.

As a response to long-term financing problem of DI programs, many countries are considering (or have already implemented) policies to increase DI outflow by providing financial incentives for DI recipients to return to work. Consistent with the previous literature, this study finds that such policies are not an effective tool to restore the financial solvency of DI programs, even if the offered amounts are rather substantial. One potential reason that explains this finding is bounded rationality: DI recipients may not fully understand the lifetime implications und therefore avoid making active steps to return to work. An alternative interpretation would be that individuals are rational, but assign a large utility value to a relatively safe payment in comparison to a potentially higher, but more volatile income. It remains an open issue whether other programs (such as early intervention programs or vocational rehabilitation) are more successful in stimulating employment and reducing the number of DI recipients.

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Appendix

A.1 Stratification Design

The initial sample consists of all 37,853 disability insurance recipients from the cantons of St. Gallen and Vaud, as observed in the administrative records in June 2009 (see "Full sample" in Table A.1). Selection for participation in the survey took place in two steps. First, 2,814 individuals have been excluded, primarily as their current residence was outside of the cantons of St. Gallen and Vaud. Second, 8,000 individuals have been randomly chosen from the remaining 35,039 individuals. Random sampling was stratified by three age groups; individuals age 18-44 are overrepresented among the sample invited for survey participation as the pilot projects targets mostly younger individuals with better labor market prospects (66% of the survey sample compared to 27% in the full sample). Individuals age 45-54 represent 24% in the survey sample and 29% in the full sample, and finally, individuals age 55+ are underrepresented (10% in the survey sample compared to 44% in the full sample). As a consequence, sampling weights need to be used throughout further analysis. Of all individuals who were selected for the survey, 4,049 participated, which corresponds to a response rate of 51%. The sample used for the experiment has been constructed as a subsample of all individuals invited for survey participation in two steps. In order to rule out spillover effects, individuals who are likely to live in a nursing home, or individuals with a disabled partner have been excluded. Additional individuals have been excluded due to age restrictions or because they were excluded by the local disability offices. The final experimental sample consists of 6,020 individuals. 2,000 individuals each were randomly chosen for the high and low treatment group, respectively. The Sample used for simulations of seed capital effects consist of 2,273 individuals. Appendix A.3 discusses the criteria for selecting individuals into the simulation sample.

Table A.1: 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: Table A.1 gives an overview over the different samples used in this paper.

A.2 Simulation

This appendix describes 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 A1).

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, π 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.[15] 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. Because, as described in deteail in the next section, we have 1,000 draws of w_t^{dur} for each individual, we calculate 1,000 values of $\Delta\ income$ per individual and then take the average.

Equation (A1) highlights that return-to-work can affect lifetime income through two channels: First, during the period of rejoining 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 three years, there is a recalculation of first and second pillar disability and retirement benefits in the period after return-to-work. We now describe our methodology to compute earnings, first pillar disability benefits, second pillar disability benefits, and means-tested benefits under the status quo, during return-to-work, and after return-to-work.

[15] The results presented in section 5.1 of the paper are based on 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).

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 (65 for men and 64 for women) when they permanently leave the labor 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 A3 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 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 administrative records and adjust over time based on the earnings growth rate g.[16] First disability benefits during the return-to-work period are reduced by one quarter of full disability 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 $x_t^{dur} = x_t^{quo} - 0.25$.

According to the law, disability benefits are automatically reinstated if DI recipients return to the rolls within three years. Hence, in scenario I 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 exceeds three years, 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

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

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 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.

[16] 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.

Return-to-work affects first pillar disability benefits through two channels: First, each month of additional work counts as contribution months, increasing benefits for individuals with gaps in their contribution history. Second, earnings during the return-to-work period affect disability benefits through the assessment basis. Benefits increase if earnings are above the pre return-to-work assessment basis and decrease otherwise.

Second pillar benefits

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. Individuals who contributed to the second pillar prior to disability onset automatically receive disability benefits from the second pillar if they have been awarded disability benefits from the first pillar. Around 39% of DI beneficiaries in the sample receive second pillar disability benefits.

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.[17] During the return-to-work period the second pillar disability pension is reduced by one quarter of a full second pillar disability 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 disability 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 three years. If the return-to-work period exceeds three years, p_t^{post} is re-calculated using the following formula:

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

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

If benefits from the first and second pillars do not cover basic needs, supplemental benefits may be claimed as part of the first pillar. These benefits are means-tested so that only DI recipients whose income and assets are below a certain threshold are eligible. In our sample, around 32% of DI beneficiaries claim means-tested benefits.

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

[17] By law pension plans are required to adjust benefits for inflation prior to the retirement age, but there is no obligation to adjust benefits for inflation after the retirement age. In our simulations we assume that pension plans also adjust benefits for inflation during retirement.

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:

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

where l_t is a cost-of-living allowance (CHF 18,720 for single recipients and CHF 28,080 for married recipients), h_t denotes the health insurance premium (CHF 4,500 for single recipients and CHF 9,000 for married recipients), s_t denotes expenditure for housing (CHF 13,200 for single recipients and CHF 15,000 for married recipients), 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 (CHF 1,000 for single recipients and CHF 1,500 for married recipients) 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:

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

A.3 Imputation of earnings

Potential earnings when taking up seed capital (w_t^{dur}) are unobserved (see Appendix A.2). To predict these earnings for all DI recipients, we implement a regression-based imputation procedure. In this procedure, we use earnings information from DI recipients who are currently working, as well as background information for all DI recipients. We proceed in three steps:

Step 1: Predicting potential earnings

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

$$(A7)\ DI\ degree = 1 - \frac{potential\ earnings\ w/\ disability}{potential\ earnings\ w/o\ disability}$$

Rewriting equation (A7) gives the hypothetical income of an individual if the individual was not disabled.

$$(A8)\ potential\ earnings\ w/o\ disability = \frac{potential\ earnings\ w/\ disability}{(1 - DI\ degree)}$$

We assume that individuals can fully mimic their DI degree by signalling their *potential earnings with disability*. Furthermore, assume that individuals signal their *potential earnings* *with disability* by making their *current wage* equal to their targeted *potential earnings with disability*. Then, *potential earnings with disability* equal their *current earnings*, i.e.

$$(A9)\ potential\ earnings\ w/o\ disability = \frac{current\ earnings}{(1 - DI\ degree)}$$

If individuals take up seed capital, their DI degree has to decrease, and their *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* $earnings_{sc}$, and the new DI degree as *DI* $degree_{sc}$.

Rewriting equation (A9) gives an expression for *current* $earnings_{sc}$ under seed capital take-up.

$$(A10)\ current\ earnings_{sc}\ = potential\ earnings\ w/o\ disability * (1 - DI\ degree_{sc})$$

Computation of *current* $earnings_{sc}$ would be straightforward for individuals who are currently working, i.e. whose *current earnings* are nonzero: We can compute *potential earnings w/o disability* from equation (A9) and plug them into equation (A10).[18] We can then compute *current* $earnings_{sc}$ for different levels of DI $degree_{sc}$.

Yet, for individuals who are not working prior to the experiment, *current earnings* are zero, but *potential earnings w/o disability* are not. We therefore impute *potential earnings w/o disability* for the full simulation sample. We start by estimating the following model in a sample of all DI recipients who are currently working.

$$(A11)\ \ln(potential\ earnings\ w/o\ disability_{i}) = \alpha + \beta X_i + \varepsilon_i$$

where *potential earnings w/o disability* are computed according to equation (A9), 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 labor 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). Table A.2 presents the results of the earnings regression.

[18] *Potential earnings w/o disability* are thus undefined for individuals with a DI degree of 100%.

Table A.2 OLS regression for potential earnings w/o disability (in logs)

	Coeff.	S.E.
Gender (male vs. female)	0.053	0.05
Nationality (foreign vs. Swiss)	0.04	0.066
Civil status (omitted: married)		
Single/widow	0.042	0.068
Divorced/separated	-0.062	0.071
Children (yes vs. no)	0.118**	0.059
Disease (omitted: Mental)		
Nervous system	0.125	0.091
Back disorders	0.027	0.091
Other musculoskeletal diseases	0.07	0.077
Injuries	0.012	0.084
Other	0.047	0.063
Pension (omitted: half pension)		
Full	-0.258**	0.126
Three quarters	-0.109	0.091
One quarter	0.078	0.081
DI degree	0.026***	0.004
Start of pension receipt (omitted: 2001-2006)		
Before 1996	0.199***	0.07
1996 – 2000	0.012	0.064
After 2006	-0.082	0.064
Pension contribution (years)	0.009***	0.003
Average incomes before DI	0.106**	0.047
Workload in logs	0.645***	0.043
Education (omitted: High school/vocational)		
Compulsory or less	-0.222***	0.064
Higher vocational education or college	0.307***	0.066
Health (omitted: not so good)		
Good	-0.044	0.053
Bad	-0.029	0.078
Constant	6.007***	0.57
Adjusted R-squared		0.386
Observations		561

Notes: Earnings are monthly earnings in CHF. *** p<0.01, ** p<0.05, * p<0.1

Step 2: Predicting workload

The coefficients from the above regression (Table A.2) are used to to *predict potential earnings w/o 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

$$(A11)\ \ln(workload_{\,i}) = \alpha + \beta \mathrm{X_i} + \varepsilon_i,$$

where $\mathrm{X_i}$ is a vector of explanatory variables that is identical to the vector of variables used in equation (A10), except for log(workload), which is now the dependent variable.

Table A.3:OLS regression for workload (in logs)

	Coeff.	S.E.
Gender (male vs. female)	0.306***	0.051
Nationality (foreign vs. Swiss)	-0.183***	0.068
Civil status (omitted: married)		
Single/widow	0.172**	0.071
Divorced/separated	0.093	0.075
Children (yes vs. no)	-0.073	0.063
Disease (omitted: Mental)		
Nervous system	-0.083	0.099
Back disorders	-0.104	0.098
Other musculoskeletal diseases	-0.032	0.082
Injuries	-0.124	0.088
Other	0.032	0.067
Pension (omitted: half pension)		
Full	-0.147	0.119
Three quarters	0.044	0.093
One quarter	-0.04	0.086
DI degree	-0.016***	0.003
Start of pension receipt (omitted: 2001-2006)		
Before 1996	-0.068	0.074
1996 – 2000	0.095	0.066
After 2006	0.103	0.068
Pension contribution (years)	-0.010***	0.003
Average incomes before DI	0.013	0.049
Education (omitted: High school/vocational)		
Compulsory or less	0.032	0.067
Higher vocational education or college	-0.059	0.069
Health (omitted: not so good)		
Good	0.185***	0.056
Bad	-0.065	0.081
Constant	-0.17	0.565

Adjusted R-squared	0.276
Observations	648

Notes: Workload per week is measured as hours of work per week divided by 42 hours (42 hours correspond to a full-time job in Switzerland). *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The above model (A11) for workload and the corresponding regression are used to compute fitted values for log(workload) for all individuals who are not working, i.e. for whom workload is 0 in the data.

Step 3: Imputing potential earnings without disability

In order to impute potential wages without disability, we compute fitted values from regression (A10) 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. I.e., for each individual, we randomly draw 1,000 error terms derived from regression (A11) and add them to their fitted values in order to obtain 1,000 values for *potential earnings w/o disability*.

These 1,000 observations for each individual are then used to compute *current earnings$_{sc}$* for different levels of the DI degree under seed capital take-up (*DI degree$_{sc}$),* according to euqation A9. *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 according to appendix A.2.

A.4 Additional tables

Table A.4: Validity of the randomization

	Full sample	Seed capital High	Seed capital Low	Seed capital Control
Male	0.53	0.5	0.49	0.5
Swiss	0.7	0.69	0.66	0.68
Age	50	49	49	49
(S.E.)	(-11)	(-10)	(-10)	(-10)
Married	0.45	0.44	0.43	0.43
Children (at least 1 child)	0.24	0.29	0.31	0.28
Disease				
Mental	0.43	0.5	0.47	0.48
Nervous system	0.07	0.08	0.07	0.08
Back disorders	0.09	0.08	0.08	0.07
Musculoskeletal diseases	0.12	0.12	0.13	0.12
Injuries	0.08	0.08	0.1	0.08
Other	0.23	0.15	0.16	0.17
Pension				
Full	0.76	0.75	0.74	0.73
Three quarters	0.05	0.05	0.05	0.05
Half	0.15	0.16	0.16	0.16
One quarter	0.04	0.04	0.05	0.05
Disability degree (%)	82	82	81	81
(S.E.)	(20)	(20)	(21)	(20)
Monthly DI benefit (CHF)	1'465	1'456	1'428	1'427
(S.E.)	(508)	532	546	556
Yearly income (CHF)	46'581	47'726	47'810	48'031
(S.E.)	(35'257)	(26'641)	(26'643)	(28'178)
Observations	37'853	2'000	2'000	2'020

Note: Means for experimental groups are weighted by sampling weights. No difference in means between the seed capital groups and the control group was tested to be significantly different to zero.

Table A.5: Descriptive statistics

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

Table A.6: Robustness checks with respect to different samples and definitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SC: high	-0.002	-0.002	-0.005	-0.004	-0.004	-0.015	-0.015	0.016
	(0.009)	(0.012)	(0.008)	(0.013)	(0.013)	(0.016)	(0.016)	(0.017)
Type 3: working not at notch					0.007	-0.017	-0.019	
					(0.016)	(0.016)	(0.016)	
Type 4: working at notch					-0.001	-0.003		
					(0.019)	(0.031)		
Type 4: 40%							-0.048	
							(0.013)***	
Type 4: 50%							0.024	
							(0.049)	
Type 4: 60%							-0.048	
							(0.013)***	
Type 4: 70%							-0.022	
							(0.030)	
Type 3 x seed capital						0.050	0.048	
						(0.032)	(0.031)	
Type 4 x seed capital						0.004		
						(0.036)		
Type 4 (40%) x seed capital							0.015	
							(0.016)	
Type 4 (50%) x seed capital							-0.010	
							(0.056)	
Type 4 (60%) x seed capital							0.081	
							(0.069)	
Type 4 (70%) x seed capital							0.025	
							(0.049)	
_cons	0.037	0.073	0.033	0.044	0.043	0.048	0.048	0.026
	(0.006)***	(0.008)***	(0.006)***	(0.009)***	(0.011)***	(0.013)***	(0.013)***	(0.008)***

Sample	Treatment groups	Treatment groups	Treatment groups	Treatment groups & survey response	Treatment groups & survey response	Treatment groups & survey response	Treatment groups & survey response	Treatment groups & survey response & employed
Outcome variable	Main	Lax	Strict	Main	Main	Main	Main	Main
R^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	4,000	4,000	4,000	2,297	2,297	2,297	2,297	760

Note: The regression coefficients are from a standard OLS regression with survey weights. Omitted categories are Seed capital: low and Type 2 (not working). Standard errors are shown in parentheses. Significance levels: * p<0.1; ** p<0.05; *** p<0.01

Table A.7: Robustness checks with respect to control variables

	(1)	(2)	(3)	(4)	(5)	(6)
Seed capital (SC): high	-0.003	-0.014	-0.006	-0.006	0.013	0.021
	(0.013)	(0.016)	(0.015)	(0.023)	(0.016)	(0.027)
Type 3: working not at notch	0.010	-0.012				
	(0.015)	(0.015)				
Type 4: working at notch	0.004	0.001				
	(0.020)	(0.031)				
SC high x type 3		0.047				
		(0.030)				
SC high x type 4		0.007				
		(0.037)				
Benefits > CHF 26.7K			-0.015	-0.014		
			(0.017)	(0.023)		
SC high x benefits				-0.001		
				(0.029)		
Income > CHF 18K					-0.009	-0.001
					(0.019)	(0.017)
SC high x income						-0.017
						(0.033)
_cons	0.087	0.100	0.122	0.122	0.048	0.042
	(0.085)	(0.085)	(0.097)	(0.095)	(0.100)	(0.095)
R^2	0.02	0.02	0.02	0.02	0.06	0.06
N	2,297	2,297	1,813	1,813	760	760

Note: The regression coefficients are from a standard OLS regression with survey weights. Omitted categories are Seed capital: low and Type 2 (not working). Included control variables are age and the square of age, dummy variable for foreign nationals, civil status, whether or not the person has children, the health reason for pension, education, and the time since the individual receives the pension. The results are not presented but available from the authors upon request Standard errors are shown in parentheses. Significance levels: * p<0.1; ** p<0.05; *** p<0.01

Table A.8: Capacity to return to work

	(1)	(2)	(3)
Good health	0.001	-0.002	0.004
	(0.014)	(0.016)	(0.016)
Any pain	-0.009	-0.015	-0.017
	(0.016)	(0.019)	(0.018)
Difficulty with activity of daily living			
Mobility	-0.017	-0.022	-0.016
	(0.013)	(0.016)	(0.015)
Household	-0.027	-0.032	-0.036
	(0.015)*	(0.017)*	(0.016)**
Self care	0.023	0.029	0.017
	(0.018)	(0.021)	(0.018)
Years in DI	0.017	0.020	0.017
	(0.016)	(0.018)	(0.017)
No difficulty to find	0.011	0.011	0.013
new employment	(0.023)	(0.024)	(0.021)
SC: high		-0.012	-0.009
		(0.015)	(0.013)
Type 3		-0.012	-0.011
		(0.015)	(0.014)
Type 4		-0.018	-0.023
		(0.021)	(0.016)
Total benefit		-0.001	-0.001
		(0.000)	(0.000)*
Age			-0.004
			(0.004)
Age, sq.			0.000
			(0.000)
Male			0.002
			(0.014)
Foreign			0.035
			(0.016)**
Single/widow			0.010
			(0.021)
Divorced/separated			0.016
			(0.018)
Dependent children			0.026
			(0.016)
Nervous system			-0.022
			(0.020)
Back disorders			0.017
			(0.021)
Other musculoskeletal			0.026
			(0.025)
Injuries			0.039
			(0.021)*
Other injuries			-0.003
			(0.020)
Compulsory education or less			-0.009

			(0.014)
Higher vocational education or college			0.018
			(0.017)
Pseudo R2	0.03	0.05	0.11
N	2,179	1,727	1,727

Note: The table presents marginal effects from standard Probit models with survey weights. Standard errors are shown in parentheses. Significance levels: * p<0.1; ** p<0.05; *** p<0.01