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Essays on wealth, health, and data collection

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1 | Introduction

One of the aims of social insurance programs is to provide a financial safety net to households when encountering adverse circumstances. However, apart from offering mere protection, a system of social insurance can also be designed with the aim to increase overall welfare. In order to make the appropriate design decisions one needs to understand how individuals react to both negative shocks, such as health and wealth shocks, and the system put in place to protect them from these shocks. For example, in order to determine appropriate levels of contributions and benefits in social insurance contracts, one needs to understand how individuals prefer to move resources between different potential life outcomes and how consumption patterns are affected by negative shocks such as illness. Moreover, one needs to understand which (negative) behavior can be provoked by income protection and how such moral hazard can be counteracted by complementary efforts to income support. To gain understanding on such behavioral effects, access to high quality microdata is crucial. Innovations in data collection methods are thus key to a better understanding of the workings of social insurance systems.

This thesis contains four essays. The first two essays are aimed at gaining a better understanding of optimal levels of old-age income protection, by first providing insight in how individuals spread negative wealth shocks over the life course and second estimating how consumption patterns are affected by health declines. The third essay aims to measure the effects of a complementary intervention to sickness benefits, aimed to avoid unnecessary inflow into disability insurance leading up to long-term income losses. The fourth essay evaluates alternative survey data

collection methods, aimed at generating high quality individual-level data for countries that do not have an up-to-date Personal Records Database to sample from. The essays can be read independently and all contain an extensive introduction. This introductory chapter aims to summarize the motivations, research questions, and outcomes of the four essays.

1.1 Spreading wealth shocks over the life course

In the recent years the pension system in the Netherlands has been subject to many changes. In order to counteract the rise in government debt due to an increasing dependency ratio, possibilities for tax-advanced pension savings have been decreased and the statutory retirement age has been increased. At the same time pension funds got into financial problems. Life expectancy increased faster than anticipated, leading to increases in liabilities, and interest rates decreased. Moreover, increases in the old-age dependency ratio limited the possibility of counteracting disappointing stock market returns with increases in pension contributions. In the recent financial crisis pension funds had no choice but to forgo on inflation corrections on pension benefits or even cut pension benefits in nominal terms. At the same time, house prices fell sharply. These developments have raised concerns about pension adequacy: Do households still have sufficient funds to finance their future retirement?

The adequacy of post-retirement income is often assessed in a rather pragmatic way, by holding post-retirement gross income against the benchmark of 70% of average pre-retirement gross income. The idea behind the 70%-benchmark is that retirees no longer need to save, no longer have work-related expenses, and have more time to engage in home-production, thereby reducing their expenses. However, optimal replacement rates may change over time. According to the optimal life cycle model unexpected wealth losses should reduce consumption today and in the future. In that sense, individuals may cushion the effects of a shock in future pension income by spreading the loss over several years, leading to lower optimal replacement rates.

Chapter 2 of this thesis aims to answer the question: *“What is the effect of declines in Dutch pension annuities over the period 2008 - 2014 on retirement expenditure goals?”* By answering this question we hope to provide insight into both the extent to which individuals spread wealth losses over the life cycle and how pension adequacy has been affected by the Great Recession. The Dutch institutional framework offers the ideal context to answer such a question, because individuals can exert no influence on how much they contribute to their pension plan, nor how the money is invested. Moreover, the declines in pension annuities came completely unexpected. We make use of linked survey and administrative data, providing us with information on wealth, income, and consumption goals on an individual level.

The results show that indeed individuals react to a drop in pension annuities by lowering their planned post-retirement consumption. However, they also react to a general change in sentiment. The young mainly react to drops in housing wealth, while older individuals react stronger to reductions in pension wealth. Moreover, individuals with high incomes tend to change their planned consumption more than individuals with low incomes. Simulations predict that if individuals would not have lowered their planned expenditures, pension adequacy would have dropped substantially. However, by adapting their goals, individuals counteracted this drop at large part. This implies that individuals did anticipate the future drops in pension income to some extent and are unlikely to encounter unexpected income losses at retirement. However, the drop in (pension) wealth has left them in a worse situation, thereby decreasing overall welfare.

The relationship between health and consumption 1.2

The optimal life cycle framework is a useful tool for evaluating welfare effects of programs such as health insurance and pensions. According to the life cycle model an individual’s lifetime utility is maximized if the expected marginal utility of consumption is kept constant over the life cycle, while taking into account factors such as impatience and risk aversion.

The expected marginal utility depends on the likelihood of life events such as job loss or family formation, which either affect future income streams (in the case of job loss) or the utility received from spending an extra euro (in the case of family formation), both altering the optimal level of contributions and benefits in social insurance schemes.

Also one's health status may be included in the model, not only because a health decline affects one's potential earnings capacity, but also because the marginal utility of consumption may depend on health. For example, the utility gained from spending on adventurous holidays may decrease in bad health, whereas the utility gained from spending money on a cleaner may increase. Whether this on average results in an increase or decrease of marginal utility cannot be theoretically determined and may depend on factors such as age, country of residence, and type of health problems. The body of empirical work on this subject has to date not led to conclusive results and is solely focused on the US context. Therefore, chapter 3 of this thesis aims to answer the following question: *"What is the effect of health on the marginal utility of consumption for elderly in Europe?"*

In order to answer this question we develop a methodological framework which relates subjective statements on income adequacy to an intertemporal utility model. The question that we use is common in many different household surveys. The advantage of this framework over closely related methods, is that precise results can be achieved even with relatively short panel data sets. This is especially relevant in the European context, where harmonized panel data sets can still be considered a novelty.

The empirical results indicate that a decrease in physical health positively affects the marginal utility of consumption for the average European. This implies that welfare can be increased by transferring income from periods in good health to periods in bad health. However, a worsening of cognitive health leads to a decrease in the marginal utility of consumption, possibly due to a decrease in the ability to plan and take initiative.

Counteracting moral hazard problems

1.3

Up to 2004 all employees in the Netherlands were covered by Disability Insurance (DI), which would compensate for 70% of the income foregone due to disability. That systems of income protection can be prone to moral hazard was demonstrated by the incredibly high DI enrollment rates in the Netherlands during the 1980s and 1990s, also known as ‘the Dutch disease’. The system turned out to offer an attractive alternative for regular dismissals, so that many of the DI beneficiaries actually did not have a work impairment. The trend of increasing DI enrollment rates has been curbed by a system of gate keeping and increased employer responsibilities. Employers are now obliged to continue wage payments during the first two years of sickness. At the same time, both employer and employee are obliged to make efforts towards reintegrating the employee into the workplace. If an employee cannot return to work within two years, he or she enters a DI program with lower levels of income protection.

An example of the efforts undertaken by employer and employee to prevent long term dependency on DI is graded return-to-work. Engaging in (adapted) work during a fraction of the regular working hours may prevent loss of human capital and may even facilitate a quicker recovery of injuries. However, there is also the risk of working too much, leading to stress and strain on the body and thereby slowing down the rehabilitation process. The overall picture derived from the academic literature is that graded return-to-work is an effective measure for shortening sick spells and avoiding permanent work disabilities. However, little is known about how these graded return-to-work trajectories should be set up. Therefore, chapter 4 of this thesis aims to answer the question: *“Does the effectiveness of graded return-to-work depend on (1) weeks waited until start of graded return-to-work; (2) intensity of graded return-to-work; (3) type of work disability?”*

We aim to answer this question using registry data from a Dutch private workplace reintegration provider. This provider helps firms with executing the obligations of the gatekeeper protocol and setting up return-to-work plans for their sick employees. Whether and when sick employees start a graded return-to-work trajectory partly depends on their probability

of recovery, so that ordinary regression results are likely to be biased. The case managers have ample freedom in setting up their treatment plans and some may be more in favor of starting graded return-to-work early, while others prefer to wait. We construct instrumental variables measuring the preference of case managers to start graded return-to-work, to start graded return-to-work early, or to start graded return-to-work at a high intensity and use these to correct for the selection bias.

Graded return-to-work turns out to be even more effective when it is started early on in a sick spell and when it encompasses a substantial amount of hours. Possibly this provides more opportunities for the employee to engage in work processes and to be treated as a 'regular' employee. Graded return-to-work is a less effective tool for individuals who suffer from psychological or psychiatric problems. In those cases it is better to wait a bit longer with starting the graded return-to-work trajectory. In these types of circumstances a presence at the workplace may induce stress, thereby hampering the recovery process. Contrary to earlier literature the results show that even though graded return-to-work is an effective tool to speed up the rehabilitation of sick-listed workers, it does not improve the long-run probability to return to work. This may be because the circumstances for the 'control group' are quite different in the Netherlands than in other countries. Regardless of their participation in graded return-to-work arrangements employees and employers need to stay in contact and agree on ways to return to the workplace. If there is a possibility of recovery this is also likely to be achieved in absence of graded return-to-work.

1.4 Innovations in data collection methods

To evaluate or compare the effectiveness of social insurance programs, comparable and statistically accurate information on unemployment, income inequality, poverty, and health is necessary. Preferably this information is updated on a regular basis. Although in the Netherlands there is a substantial amount of administrative data and large scale surveys, it is harder to obtain such data in low and (some) middle income countries. In these

contexts one is dependent on information from face-to-face household surveys executed once every couple of years. Fielding such surveys is a time-consuming and costly task, such that innovations in data collection methods are essential to facilitate the analysis of social policy in these countries.

The most commonly used method for face-to-face household surveys at this moment is two-stage cluster sampling. When using this method first a number of random geographical areas are selected and next a number of random households within these areas are selected. This second step is necessary, because the defined regions are often too large to canvas the whole area within a day. By using two-stage cluster sampling field work can be concentrated in relatively small regions, however it requires several revisits to the region, thereby increasing both the costs of fieldwork and the risk of missing mobile and non-standard populations. Novel sampling methods such as gridded sampling allow for the definition of smaller geographical areas, such that it becomes possible to enroll all households within the selected areas in the sample. This method, called one-stage cluster sampling, may lead to substantial cost savings, since listing and survey phases can be combined in one day and the region to cover is much smaller. Moreover, non-standard and mobile households are less likely to be excluded from the sample. However, if households with similar characteristics tend to live close together, it may require increasing the total sample size, thereby increasing costs.

In chapter 5 of this thesis we aim to answer the question: *"How many more clusters should be sampled when using one-stage cluster sampling compared to two-stage cluster sampling?"* To answer this question we first develop a synthetic geo-coded micro-dataset covering all households in Oshikoto (Namibia), based on information from recent surveys, census, and spatial covariates. This information is combined using both model-based population generation methods, and clustering and prediction methods. The resulting data have the same statistical properties as the real population, however, real-world geo-coded datasets are rarely publicly released because of the risks of disclosing personal information of households. Based on simulated outcomes of the two survey sampling methods ap-

plied to these data, we determine the required number of clusters for both one-stage and two-stage cluster sampling under different scenario's for clustering of characteristics in the population.

Based on the results of the analysis we conclude that one-stage cluster sampling does not necessarily require increased sample sizes, unless we are in a situation where there is complete socio-spatial segregation for one of the characteristics of interest to the survey. When we do encounter this type of situation, sample sizes may increase by up to thirteen times. However, in most cases the increases are only moderate, with increases of about 1.3 times compared to two-stage cluster sampling, so that one-stage cluster sampling can be a viable alternative to two-stage cluster sampling.