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Targets missed: Three case studies exploiting the linked SHARE-RV data

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Abstract:

Targeting is an important aim for social policy. Three case studies in this paper reflect typical shortcomings in the targeting design of pension reforms. The first case study examines how well work disability and receipt of disability insurance match in Germany. We show that the 2001 reform has not systematically improved target quality. The second case study examines whether the 2014 introduction of a new pathway of early retirement without actuarial adjustments has reached individuals who are less healthy because they have worked a long time in an arduous job. We find that the target population is actually healthier than the comparison group. Third, a much discussed supplemental pension benefit for households in risk of poverty would miss its target population by far; less than 40% of individuals eligible for the benefit supplement have a per-capita net household income in the lowest third of the income distribution. Since similar reforms are currently debated in many European countries, the three German case studies may serve as examples how to better target public pension policies.

Zusammenfassung:

Die Zielgenauigkeit ihrer Maßnahmen ist ein wichtiges Anliegen der Sozialpolitik. In diesem Papier zeigen drei Fallstudien typische Defizite bei der Zielgenauigkeit von Rentenreformen. Die erste Fallstudie untersucht, wie gut Erwerbsunfähigkeit und der Bezug von Erwerbsminderungsrenten in Deutschland übereinstimmen und zeigt, dass die Reform von 2001 die Zielgenauigkeit nicht systematisch verbessert hat. In der zweiten Fallstudie wird untersucht, ob die Einführung der Altersrente für besonders langjährig Versicherte im Jahr 2014 diejenigen Personen erreicht hat, die aufgrund von körperlich belastenden Berufen während ihrer Erwerbskarriere am Ende weniger gesund sind. Wir stellen fest, dass die Zielgruppe tatsächlich aber gesünder ist als die Vergleichsgruppe. Als drittes Beispiel dient die viel diskutierte Grundrente für armutsgefährdete Haushalte, welche die Zielgruppe deutlich verfehlen würde. Weniger als 40% der anspruchsberechtigten Personen haben ein pro-Kopf Haushaltsnettoeinkommen im untersten Drittel der Einkommensverteilung. Da derzeit in vielen europäischen Ländern ähnliche Reformen diskutiert werden, können die drei deutschen Fallstudien als Beispiele für eine zielgenauere Ausrichtung der Rentenpolitik dienen.

Keywords:

Social security and public pensions, retirement, old-age poverty, work disability, disability insurance

JEL Classification:

H55, J21, J26

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Keywords: Social security and public pensions; retirement; old-age poverty; work disability; disability insurance (H55, J21, J26).

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1. Introduction

Targeting is an important aim for social policy. Since tax money is a precious resource, social expenditures need to be carefully targeted to those who are in need as defined by the policy makers. Social policy can err on both sides: by giving too little to those who need help, and too much to those who are not in need of help. This paper has two aims. It examines the targeting success of three public pension policies in Germany, and it demonstrates the usefulness of linked survey-administrative data for this purpose. We define targeting success by the aims that policy makers have set, i.e., we do not apply general welfare criteria but simply compare the outcome of certain pension policies with what the policy makers have claimed to be their aims.

We choose pension policies since in almost all developed countries public pensions are the largest social policy area in terms of individuals covered and resources involved. The most important pension policy instruments are the eligibility for retirement pathways (e.g., various types of old-age pensions, disability insurance), the full pensionable age, and the replacement rate of pension benefits. Reforms of these key parameters have been made in Germany in 2001 when the eligibility criteria for disability benefits have been changed; in 2014 when earlier retirement without actuarial adjustments was introduced for those whose health may have suffered from an exceptionally long work history. A third reform is currently being discussed. Its intention is to provide pension supplements for individuals who have pension incomes that are above the eligibility threshold for social assistance but below the threshold defined by being at risk of poverty.

All three case studies use the German subsample of the Survey of Health, Ageing and Retirement in Europe (SHARE) with its linkage to the administrative records of the German public pension system. The SHARE survey data contain a rich array of policy outcome variables such as household income and health after retirement while the administrative data measure precisely who was eligible for benefits and who was affected by the three reforms.

The paper begins with a very brief sketch of the German public pension system and a description of our data. The three case studies then form the core of the paper which finishes with a short overall conclusion. As the paper's title suggests, this conclusion is somewhat muted. The international SHARE data show that health is not the main driver for international differences in disability benefit uptake, and the 2001 reform in Germany has not systematically improved target quality. Second, early retirement without actuarial adjustments has reached individuals who are healthier and have earned more than the average earnings, contrary to what was claimed to be the aim of the reform. In addition, the actual length of the beneficiaries' employment histories are on average much shorter than the intended threshold. Third, the much discussed supplemental pension benefit reform for households at risk of poverty would miss its target population by far; less than 40% of individuals eligible for the benefit supplement have a per-capita net household income in the lowest third of the income distribution. Since similar reforms are currently debated in many European countries, the three German case studies may serve as examples how to better target public pension policies.

2. Retirement pathways and public pension benefits in Germany

The German public pension system is by far the largest pillar of old-age provision and delivers about 80% of retirement income in Germany.¹ It features four main pathways to receiving old-age pensions: (a) Disability insurance (DI) benefits are given to workers with a documented work disability. The reform of these rules in 2001 is subject to the first case study. DI benefits correspond to the level of old-age pension benefits that

¹ See Börsch-Supan, Rausch, and Goll (2018) and OECD (2017) for detailed descriptions of the German pension system. Further details are given in each of the three case studies.

would have been achieved if the individual had worked until the normal retirement age. Actuarial adjustments apply but are capped at 10.8 percent. (b) Workers are vested for normal retirement benefits once they have contributed five years to the system. This includes contributions on behalf of the worker during times of unemployment and child care. Eligibility starts at age 65 which is being gradually increased to age 67. (c) Workers with at least 35 insurance years can retire up to two years earlier but their benefits are reduced by 3.6 percent for each year of earlier retirement. (d) The reform in 2014, subject of the second case study, introduced a third pathway which is substantially more generous: Workers with at least 45 service years can receive full pension benefits at age 63 without actuarial deductions. The new pathway's eligibility age of 63 will increase gradually to 65 in parallel to the increase of the normal retirement age.

Contributions to the pension system are proportional to earnings. Similarly, benefits are proportional to earnings points which play a central role in the German public pension system. In every year of the individuals' contribution histories, the individuals earn one point if they receive average earnings. For lesser or higher amounts, earnings points change in proportion.² The German public pension system thus does not redistribute between richer and poorer workers. There is, however, social assistance which effectively serves as a minimum pension. Social assistance is financed by general taxes. Since social assistance benefits are substantially below the EU-defined threshold for being at risk of poverty, currently discussed reform proposals intend to make parts of the German public pension system more redistributive. This is subject of the third case study.

3. Main data sources: SHARE, SHARE-RV and SHARELIFE

The Survey of Health, Ageing and Retirement in Europe (SHARE) includes a wide range of micro-data on socio-economic status, social and family networks as well as health across European countries. SHARE Release 7.0.0 provides a multidisciplinary and cross-national database with currently about 140,000 individuals aged 50 or older in 28 countries. A detailed description can be found in Börsch-Supan et al. (2013).

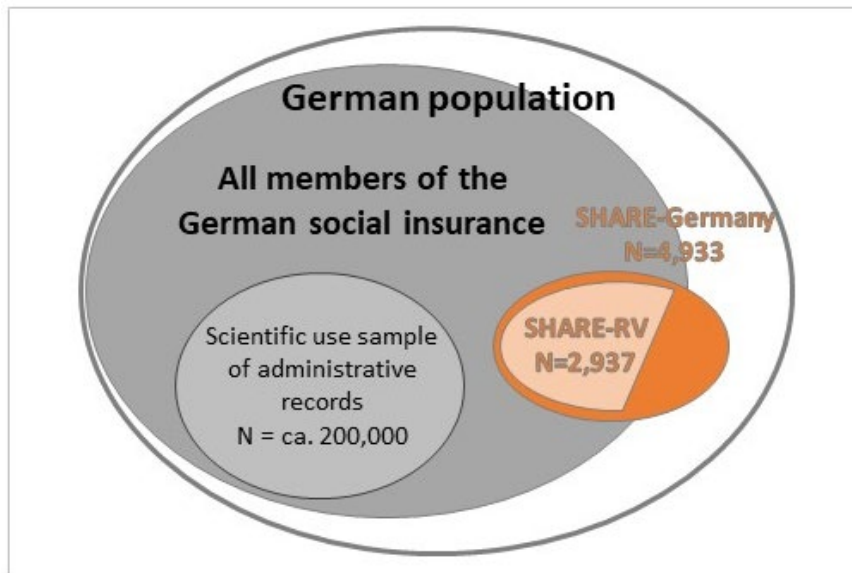
The German SHARE subsample has been linked with the official employment history records of the German public pension system. The resulting data set is called SHARE-RV. SHARE-RV stands for the German subsample of SHARE that is linked to administrative records (Börsch-Supan, Czaplicki, Friedel, Herold, Korbmacher, and Mika 2018). The combination of accurate administrative data and rich information about different aspects of the respondents' lives in SHARE-RV provide a wide range of research possibilities. SHARE-RV is based on direct linkage, meaning that the records of exactly the same SHARE respondents were linked using the respondents' Social Security Number (SSN) as a unique identifier. Respondents are asked for written consent during the interview on a form, which also collects the respondent's SSN and some basic demographics to identify persons if the SSN is erroneous. Since not all respondents give consent and not all Germans are enrolled in the public pension system, SHARE-RV is a subset of the German SHARE data, see Figure 1. One limitation of the data is therefore that the sample size is relatively small. On the other side, however, SHARE-RV has a much richer data set than the larger data set of administrative records of the German Social Security system. In particular, SHARE offers data on socio-demographics not available in administrative data. For retirement analyses, for instance, SHARE obtains information about the household context, rich socio-economic characteristics, education, and very detailed health measures. In turn, the administrative data part of SHARE-RV carries very precise information on employment and contribution histories. This permits the identification of eligibility for different retirement pathways and information on benefit entitlements.

² Contributions and benefits are capped at about two earnings points per year.

In Waves 3 and 7, SHARE fielded a life-history questionnaire (SHARELIFE). Retrospect questions included the family, health, employment, and earnings history, childhood conditions and parental information.

Since the data requirements for each case study are slightly different, we give in each section detailed information on our analytical samples and describe the specific variables used.

Figure 1: Samples drawn from administrative records and SHARE



Source: Updated from Börsch-Supan, Czaplicki, Friedel, Herold, Korbmacher, and Mika (2018).

4. Targeting disability insurance

This first case study investigates the targeting quality of the disability insurance system in Germany. The purpose of disability insurance is to protect people with functional impairments that limit their ability to work. On the one hand, disability insurance is a welcome and necessary part of the social safety net as it prevents income losses for those who lose their ability to work before eligible to ordinary old-age pension benefits. On the other hand, disability insurance may be misused as an early retirement route even if the normal ability to work is not affected at all. Proper targeting is therefore an important issue.

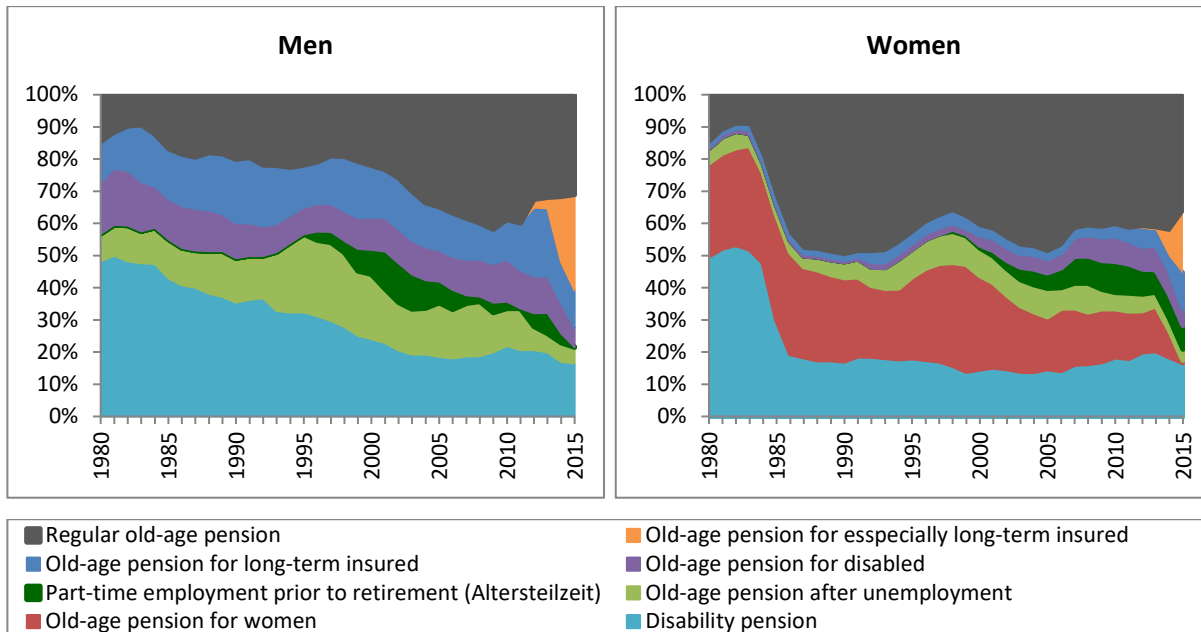
Earlier research on work disability in an international perspective showed that the targeting quality is very different across countries (Börsch-Supan, Bucher-Koenen, and Hanemann 2017). In many countries, the rates of self-reported work disability and DI benefit receipt match each other more or less. In some countries, DI benefit rates are much higher than the rates of self-reported disability (e.g. Sweden and the Czech Republic) while in other countries fraction of persons with self-reported disabilities is much higher than those receiving DI benefits (e.g. France and Germany).³ Counterfactual simulations showed that most of the variation between countries is explained by differences in DI policies.

In Germany, the disability pathway provided a frequently used option into early retirement before the age of 65, at which disability benefits are converted into old age pensions. Figure 2 shows that the proportion of individuals who have entered the German public pension system via the disability pathway was very high in

³ The paper reports the percentage of respondents for which work disability and DI receipt coincide, similar to Table 2 below: Austria 79.7%, Germany 77.3%, Sweden 88.4%, Netherlands 83.9%, Spain 87.0%, Italy 90.4%, France 79.9%, Denmark 82.0%, Switzerland 91.2%, Belgium 83.2%, Czech Republic 88.2%, UK 84.1%, USA 81.3%.

the 1980s but then shrank considerably. This may suggest that targeting was initially poor and has improved. Since the early 1980s, there was a string of technical reforms, mainly in the way medical exams were administrated, how medical criteria were defined, and when workers became vested. The latter produced the sharp decline in DI receipt among women after 1982.

Figure 2: Pathways to retirement (percentage of newly claimed pensions in each year)



Source: Deutsche Rentenversicherung Bund, Rentenzugang (see DRV, 2018a).

Our first case study exploits the fact that the disability insurance system became less generous after the reform of the German disability insurance system in 2001. We follow Hanel (2012) and use administrative records of DI receipt and can therefore reliably assign the persons into two groups depending on whether their first DI receipt was before or after the year 2001. In addition, we employ the German SHARE data to better describe the characteristics of those who receive DI benefits and those who do not. We then compare these two groups to evaluate the impact of the reform on the DI receipt and the matching quality.

The reform in 2001 fundamentally changed the nature of the German disability insurance (Table 1) with the aim to “better target work disabled individuals and to terminate insuring labor market risks” (Deutscher Bundestag 2000). Before 2001, DI distinguished between occupational disability (Berufsunfähigkeitsrente) and general disability (Erwerbsunfähigkeitsrente). Persons who were not able to work in their former job or a job requiring a similar degree of qualification received occupational disability pensions amounting to two-thirds of full old-age pension entitlements. Persons, who were not able to perform any kind of job, received general disability benefits amounting to the full old-age pension entitlements.

After 2001, the two different types of disability pensions were replaced by a unified disability pension (Erwerbsminderungsrente), which no longer considers the work qualification of the person concerned, but solely considers the number of hours the person is still able to work (six or three hours a day). In addition, all disability benefits are reduced by 10.8% if claiming takes place prior to age 60. Most importantly, after 2001 disability benefits are granted only up to a maximum of three years, requiring a re-examination every three years. Unlike before the reform, unlimited allowances are only possible if the earnings incapacity is deemed irrevocable. The reform applies to individuals who enter disability retirement after January 1, 2001. The benefits of individuals entering prior to that date remain unchanged.

Table 1: Reform of the disability insurance system in Germany

	<i>Before reform in 2001</i>	
	<i>Occupational disability</i>	<i>General disability</i>
<i>Recipients</i>	Persons who are not able to work in their former job or a job requiring a similar degree of qualification	Persons who are not able to perform any kind of job, regardless of his/her qualifications
<i>Amount</i>	Two-thirds of full old-age pension entitlements	Full old-age pension entitlements
<i>Duration</i>	No defined limitation	
	<i>After reform in 2001</i>	
	<i>Partial disability</i>	<i>Full disability</i>
<i>Recipients</i>	Persons who are not able to work at least six hours per day in the general job market and whose disabilities are unlikely to change in the future	Persons who are not able to work at least three hours per day in the general job market and whose disabilities are unlikely to change in the future
<i>Amount</i>	Disability benefits depend on old-age pension entitlements, which are reduced by 10.8% if claiming takes place prior to age 63	
<i>Duration</i>	Up to a maximum of three years; can be extended if the requirements are fulfilled based on the medical assessment. Unlimited allowances only possible if the earnings incapacity is irrevocable (e.g. after nine years of temporary pensions)	

In a first step, we use the framework of Börsch-Supan, Bucher-Koenen, and Hanemann (2017) and measure target quality by comparing self-reported work disability (WD) and receipt of disability insurance benefits (DI) for each year in SHARE Waves 2-6. Our sample unit are therefore person-years and comprises all person-years in SHARE which have been merged with the administrative data of the German public pension system. It includes 5,125 person-wave observations.

We define WD by using information from the question “Do you have any health problem or disability that limits the kind or amount of paid work you can do?” in the SHARE data.

Based on the exact date of the interview, we merge the corresponding employment status from the administrative data which is available on a monthly basis. We therefore have reliable information on DI receipt at the time of the SHARE interview. This is important since benefit receipt data is subject to considerable measurement error because respondents are often ill-informed about the pathway to retirement they have taken.

Table 2 shows the match between the two binary variables WD and DI:

Table 2: Matching self-reported work disability (WD) and disability insurance receipt (DI)

	WD=0	WD=1
DI=0	3,495	1,205
	71.36%	24.60%
	(“Matched”)	(“WD without DI”)
DI=1	37	161
	0.76%	3.29%
	(“DI without WD”)	(“Matched”)

If the DI system would work perfectly and there would be no reporting errors or bias we should see a perfect match between the fraction of people with a work disability and the fraction of people with disability receipt. I.e. everyone with a limitation should receive benefits and nobody without a limitation should receive benefits (assuming that there are no reporting errors in WD and DI receipt). In our sample 74.65% are correctly matched in the sense that they have a WD and receive DI or have no WD and do not receive DI. 1,182 individuals (24.60%), however, have a self-reported WD but receive no DI benefits. In turn, 37 individuals (0.76%) receive DI but do not report any WD.

Table 3 examines whether the matching quality between WD and DI receipt has improved after the 2001 reform. We split the sample by the beginning of DI receipt.

Table 3: Matching self-reported work disability (WD) and disability insurance receipt (DI) by DI benefit begin

	DI begin before 2001		DI begin after 2001	
	WD=0	WD=1	WD=0	WD=1
DI=0	3,495	1,205	3,495	1,205
	73.66%	25.40%	72.02%	24.83%
	("Matched")	("WD without DI")	("Matched")	("WD without DI")
DI=1	6	39	31	122
	0.13%	0.82%	0.64%	2.54%
	("DI without WD")	("Matched")	("DI without WD")	("Matched")

The number of matches is virtually identical in both subsamples (74.48 vs. 74.56). Given DI receipt, the percentage of individuals with a work disability is slightly smaller for those who began receiving DI benefits after 2001 (79.7% vs. 86.7%); however, this difference in match quality is not statistically significant.

It is not correct to interpret this difference as a (negative) causal effect of the 2001 reform. Since the SHARE data collection began only in 2004, we observe the match between WD and DI receipt only in the years after the reform. We do not have information on the initial match quality. Moreover, the subsample of individuals who began receiving DI benefits before 2001 are older and have a longer DI benefit duration. This is seen in Table 4. The unit of observation are now individuals, and the study sample includes all DI recipients in SHARE Wave 6 who have been merged with the administrative data and where additional life-course data from SHARELIFE is available. This sample contains N=512 individuals.

Table 4: DI recipients' characteristics by DI benefit begin

	First DI before 2001		First DI after 2001		Difference	
Variable (source)	mean	sd	mean	sd	b	t
Gender (Wave 6)	0.50	0.50	0.43	0.50	0.07	(1.65)
Age at first DI receipt (VSKT)	55.89	8.25	59.08	5.02	-3.19***	(-5.01)
Age at interview (Wave 6)	76.02	7.97	66.90	6.30	9.13***	(13.87)
Duration of DI receipt in years (VSKT)	7.03	6.91	2.42	3.14	4.61***	(9.05)
Self-reported health (Wave 6)	1.18	0.82	1.27	0.92	-0.10*	(2.38)
Grip strength (Wave 6)	31.24	10.30	36.13	11.34	-4.89***	(-4.87)
Number of ADL limitations (Wave 6)	0.63	1.33	0.26	0.79	0.37***	(3.59)
Number of IADL limitations (Wave 6)	1.14	2.06	0.36	0.99	0.78***	(5.12)
Number of chronic diseases (Wave 6)	2.87	1.93	2.60	1.83	0.27	(1.60)
EURO-D (Wave 6)	2.56	1.87	2.55	2.14	0.02	(0.09)
Number of sickness days (VSKT)	13.05	13.27	12.50	16.20	0.55	(0.42)
Self-reported child health (SHARELIFE)	2.81	1.17	2.65	1.06	0.16	(1.54)
Ever had physical injury (SHARELIFE)	0.16	0.36	0.14	0.35	0.02	(0.53)
Number of illness periods >1 year (SHARELIFE)	0.58	1.17	0.42	0.91	0.16	(1.66)
Observations	211		301		512	

Standard errors in parentheses.

Source: Own calculation.

In spite of the small sample size, there are many economically important and statistically significant differences between the two subsamples. While gender does not differ much, age at the time of the first DI receipt is by 3 years lower for those who receive DI for the first time before 2001 while they are around 10 years older in Wave 6 than those who received DI only after 2001. The duration of DI receipt differs significantly between the two groups by 4.5 years. This is explained by the fact that DI benefits before 2001 were granted for an indefinite period, whereas after 2001 the allowances were restricted to 3 years and an extension requires a medical re-assessment.

All six health variables are worse for those who began receiving DI benefits earlier. First, we employ the interviewee's self-reported health status which is a categorical variable on a five-point scale from poor (1) to excellent (5). The self-reported health status is one of the most commonly used measures in public health surveys; it captures various physical, emotional, and social aspects of health and has been found to predict mortality (e.g. Idler and Benyamini 1997, Jylhä 2009). Self-reported health may, however, suffer from justification bias (Bound 1991, Sen 2002). Justification bias exists if retired pensioners report a worsening of the individual health status to justify retirement. Therefore, we additionally include further objective health measures. Grip strength (in kg) is our most objective measure of health. The test is performed during the interview. It reflects the overall muscle status of the respondent and has been linked to mortality in previous research (e.g. Gale et al. 2007). Functional health is measured by the number of limitations to perform (instrumental) activities of daily living (ADL and IADL). We also include the number of chronic diseases. Finally, EURO-D measures signs of depression (Prince et al. 1999).

In addition, we measure lifetime health status in four dimensions: number of sickness days as reported in the administrative data, self-reported childhood health status, physical injuries and number of illness periods that lasted more than one year as reported by SHARELIFE.

While there are no significant differences in the lifetime health measures, all physical health measures in Wave 6 indicate a worse health status for those who received DI benefits before 2001: Self-reported health is worse, grip strength is significantly lower and the number of ADL and IADL are significantly higher. There is no significant difference in the number of chronic diseases and the number of depressive symptoms.

One obvious explanation for the worse health of the individuals in the first group is the 10-years of age difference between the two groups. However, more interesting is the question whether the health status is worse once we condition on that age difference and other competing explanations. We therefore perform linear regressions with different health variables as dependent variables and control for the age in Wave 6.

Results are shown in Table 5. Our main result is that the dummy variable indicating whether someone received DI benefits for the first time before or after 2001 has insignificant, ambiguous effects on the health status in Wave 6. We therefore do not find evidence for a better targeting quality, i.e., for the hypothesis that DI benefits after 2001 were granted to persons with worse health and thus more of a need for DI benefits.

Gender has a significant effect only on grip strength. Females have less grip strength than males and the later in life the first DI benefits are received, the higher is the grip strength in Wave 6. As expected from the summary statistics, age at Wave 6 plays an important role for the health status. The higher the age in wave 6, the higher are the number of chronic diseases, ADL and IADL. Grip strength is significantly lower with increasing age while self-reported health is not significantly affected. Duration has no significant effects on the health status in Wave 6. Lifetime health measures like childhood health, the number of sickness days and injuries significantly influence the number of chronic diseases and self-reported health.

Table 5: Health status in Wave 6 for DI recipients

	Number of chronic diseases	Number of ADL	Number of IADL	Grip strength	Self-reported health
First DI after 2001	0.104 (0.263)	-0.170 (0.151)	-0.251 (0.220)	1.953 (1.089)	-0.160 (0.123)
Gender	0.165 (0.165)	-0.039 (0.095)	0.087 (0.138)	-16.263 (0.688)**	0.091 (0.077)
Age first DI receipt	0.018 (0.020)	0.003 (0.011)	-0.011 (0.016)	-0.035 (0.083)	0.001 (0.009)
Age Wave 6	0.020 (0.016)	0.011 (0.009)	0.042 (0.014)**	-0.225 (0.068)**	-0.007 (0.008)
Duration	0.038 (0.022)	0.022 (0.013)	0.022 (0.018)	0.069 (0.092)	0.014 (0.010)
Child Health	0.224 (0.074)**	-0.033 (0.042)	-0.002 (0.062)	-0.813 (0.309)**	0.030 (0.034)
Sickness days	0.020 (0.006)**	0.008 (0.003)*	0.005 (0.005)	-0.005 (0.023)	0.010 (0.003)**
Ever had injury	0.603 (0.233)**	-0.062 (0.134)	-0.085 (0.195)	-0.782 (0.971)	0.257 (0.109)*
Illness periods	0.025 (0.084)	0.041 (0.048)	0.029 (0.070)	-0.326 (0.350)	0.038 (0.039)
_cons	-0.980 (1.269)	-0.525 (0.727)	-1.689 (1.062)	60.319 (5.227)**	3.829 (0.594)**
R^2	0.08	0.05	0.08	0.59	0.10
N	512	512	512	475	512

* $p < 0.05$; ** $p < 0.01$; Standard errors in parentheses.

Source: Own calculation.

Finally, we examine whether the duration of DI receipt has changed after the 2001 reform. We use information from the administrative records of SHARE-RV. We keep only those individuals who have at least

one spell of disability insurance receipt and who have spells in the data for at least 4 years after the first time of DI receipt.⁴ This leads to a study sample of N=720 individuals. We divide our sample into two groups depending on whether the first time of DI receipt is before (N=362) or after the year 2001 (N=358). Figure 1 displays a sequence analysis for the employment status after the first DI receipt.

Figure 3: Sequence analysis for employment status after first DI receipt



Source: SHARE-RV.

Figure 3 shows that those persons receiving DI benefits for the first time before 2001 are granted benefits much longer than those receiving benefits for the first time after 2001. Most of the persons from the second group transfer into old-age pension even before the first year of DI benefit receipt is over. This means that DI benefit receipt is still a pathway into retirement, but it seems that this happens at a later age than before the reform.

We draw the following conclusions: Matching quality in Germany is low (24.60% report a WD, but do not receive DI benefits), so the target of protecting people with functional impairments is partly missed. The match quality has not improved after the 2001 reform. While the individuals who have received DI benefits after the reform, are healthier, this effect is not significantly related to the 2001 reform. In general, individuals are receiving DI benefits later after the 2001 reform but not with worse health than before the reform. Finally, the duration of DI benefits is shorter after the reform. However, this only reflects a quicker transition into old-age pensions rather than an uptake of employment.

⁴ The SHARE-RV data is cut at the age of 65. For those individuals who receive regular old-age pension at the age of 65, we continue the data up to four years and fill in the information of old-age pension receipt.

5. Targeting early retirement without actuarial adjustments

One of the main insights of the economics of aging is that longer life times need to be accompanied by longer working lives in order to keep pension systems sustainable and to maintain living standards for the entire aging economy. Indeed, in most aging countries, reforms have increased the normal retirement age, closed early retirement pathways, and/or reduced other incentives to retire early (Börsch-Supan 2013). In Germany, the 2007 reform increased the normal retirement age from 65 gradually to 67. Only workers with a long insurance history (35 years including various non-employment spells, see Table 6) can receive pension benefits up to two years earlier with an actuarial adjustment of 0.3% per month of earlier retirement.

Table 6: Service, contribution and insurance years in the pathways to retirement

		Service years for retirement at 63	Service years for pension supplement	Contribution years	Insurance years
Full & partial contribution periods (<i>vollwertige und beitragsgeminderte Zeiten</i>)	Employment	X	X	X	X
	Self-employment	X	X	X	X
	Military service	X	X	X	X
	Education (Up to 8 years)	X	X	X	X
	Upbringing of children	X	X	X	X
	Care of family members	X	X	X	X
	Sickness, rehabilitation	X	X	X	X
	Short-term unemployment	(X) except two years before claiming		X	X
	Other (e.g. voluntary contributions)			X	X
Non-contributory supplementary periods (<i>Zurechnungszeiten</i> , e.g. in case of disability before reaching normal retirement age)					X
Creditable periods (<i>Anrechnungszeiten</i> , e.g. long-term unemployment)					X
Credited substitute periods (<i>Ersatzzeiten</i> , e.g. war captivity)		X			X

Source: German Social Security Code VI, DRV (2018b), Börsch-Supan, Coppola, and Rausch (2015).

Recently, however, several countries have experienced backlashes to such reforms – among others Germany. In 2014, Germany re-introduced early retirement at age 63 without actuarial adjustments for workers with 45 service years in the pension system (Deutscher Bundestag 2014). The main motivation was “to honor the achievement of especially hard working individuals who have modest earnings, are burned out and often in bad health”. The implicit assumption is that these workers suffer from a lower than average life expectancy, and the 2014 reform would give them “a better deal” in the pension system. The subject of this section is whether the reform achieved the aim of targeting less healthy workers with modest earnings and long careers.

The new retirement pathway (called “retirement at 63”) is generous since workers with at least 45 service years can claim full pension benefits without actuarial deductions at age 63. This effectively raises benefits by 7.2%. The 45 service years are broadly defined and include periods of child raising, education and short-term unemployment, among others, see Table 6. The intention to introduce this new pathway was to compensate individuals with especially long and hard working lives who consequently suffered from extra burdens. Accordingly, times of long-term unemployment were not counted toward the 45 years as these do not reflect burdensome employment. The new pathway’s eligibility age of 63 will increase gradually to 65 in

parallel to the increase of the normal retirement age (65 to 67 until 2029). Hence, the main advantages of this new pathway apply to the cohorts born between 1952 and 1964, with decreasing attractiveness.

Börsch-Supan, Coppola, and Rausch (2015) provided a first analysis of the planned reform during the design phase of the reform. They showed that the employees who are eligible for the new retirement pathway have, on average, higher pension entitlements as well as more continuous and stable working histories, higher incomes, but shorter periods of employment with social insurance contributions than those not eligible. Moreover, they found no evidence that eligible employees are more likely to be unhealthy at the end of their working life – at least when measured by the days reported as sick leave. Rather, the contrary is the case.

A first drawback of their analysis is that it is based solely on administrative data and no direct information on health and the household context is available to evaluate the overall effectiveness of the reform. A second drawback is that it is based on hypothetical eligibility only, since it was written during the design phase.

In this paper, we fill this gap by analyzing the group of individuals who actually chose the new early retirement pathway since its introduction on July 1, 2014. Moreover, by using the linked SHARE-RV data, we have detailed health information and information on the household context. The combined data set can thus more comprehensively answer the question whether the eligible workers are indeed underprivileged and in worse health.

Our study sample of 1,519 individuals is based on the SHARE-RV data with the regular SHARE waves 5, 6 and 7. The administrative data allow identifying eligibility for and/or take-up of the new early retirement pathway. In turn, SHARE data admit assessing the health and socio-economic status. Our study sample includes pensioners, employed or self-employed individuals, unemployed, permanently sick or disabled, homemakers, and others. The pension information is based on administrative data only. We restrict the group of pensioners in our sample to those pensioners who started to claim pension benefits for the first time between July 2014 and 2017. Since the new early retirement pathway was introduced on July 1, 2014, we keep only those pensioners who had the same options regarding pathways to retirement. We use monthly information on the individual employment history between age 14 to 65 to determine eligibility for drawing pension benefits. We restrict the sample to individuals who are at least 55 years old. The average age is 60.6 years and equal for males (43%) and females (57%). 80% of the sample individuals live in the same household with a partner. 31% claim public pension benefits.

We split the sample in five groups according to the chosen pathway to retirement and employment status:

1. *Long insurance history and still working*: The first group includes employees with 35-44 insurance years who are still working. We exclude individuals who report being self-employed or civil servants in their main job since they have special old-age provisions.
2. *Long insurance history and retired*: The second group includes pensioners with at least 35 insurance years who already claim pension benefits. Individuals in this group have claimed old-age pension benefits for long-term insured pensioners with actuarial deductions.
3. *Very long service history and still working*: The third group includes employees who feature at least 45 service years, have already reached the eligibility age for the new “retirement at 63” pathway with full pension benefits but are still working.
4. *Very long service history and retired*: The fourth group includes pensioners with at least 45 service years who have actually chosen the new pathway for especially long-term insured since July 2014.
5. *Short employment history and others*: The fifth group is included for completeness and consists of all sample members who are not in groups 1 through 4. This heterogeneous group includes pensioners who use pathways to retirement which require less than 35 insurance years, self-employed individuals, unemployed, permanently sick or disabled individuals, homemakers, and others.

Table 7 presents group sizes and some descriptive statistics. The first line shows a first result: Once eligible for the generous new early retirement pathway, workers take this pathway and do not work any longer. Since the group size is so small, we do not include this group in the deeper analysis below.

The group of main interest is the group who actually have used the new pathway for especially long-term insured since July 2014 and are not working. This is our target group. As control group, we choose pensioners with at least 35 insurance years. Both groups are homogenous in a sense that they already claim pension benefits (with/without actuarial adjustments) and are not employed any more. The main difference between the two groups is the number of years that count in calculating the retirement age: 35 insurance years versus 45 service years.

There are, however, differences in the main socio-demographic characteristics. 57% (38%) of the target group (control group) are males. 95% of males in the target group live together with a partner in the same household, while this number is with 76% for females clearly lower. Education is based on the ISCED-1997-classification. Low education corresponds to ISCED 0-2, medium education to ISCED 3-4 and high education to ISCED 5-6. For target and comparison group, the data show opposite proportions: While the proportion of medium-educated pensioners is higher in the target group (70%) compared to the control group (53%), the proportion of highly-educated pensioners in the comparison group is higher (36%) than in the target group (21%).

We conducted several tests to see whether these differences are statistically significant, and many are. In the target group are more males compared to the control group (p-value 0.0057). Moreover, more males in the target group live with a partner in the household compared to the comparison group (p-value 0.0054). For females, we do not find statistically significant results. Regarding education, the target group contains more medium-educated and less high-educated individuals compared to the comparison group (p-value 0.033). We will acknowledge these differences in the regression analysis further below.

Table 7: Subsample size and socio-demographic characteristics by group, percentages

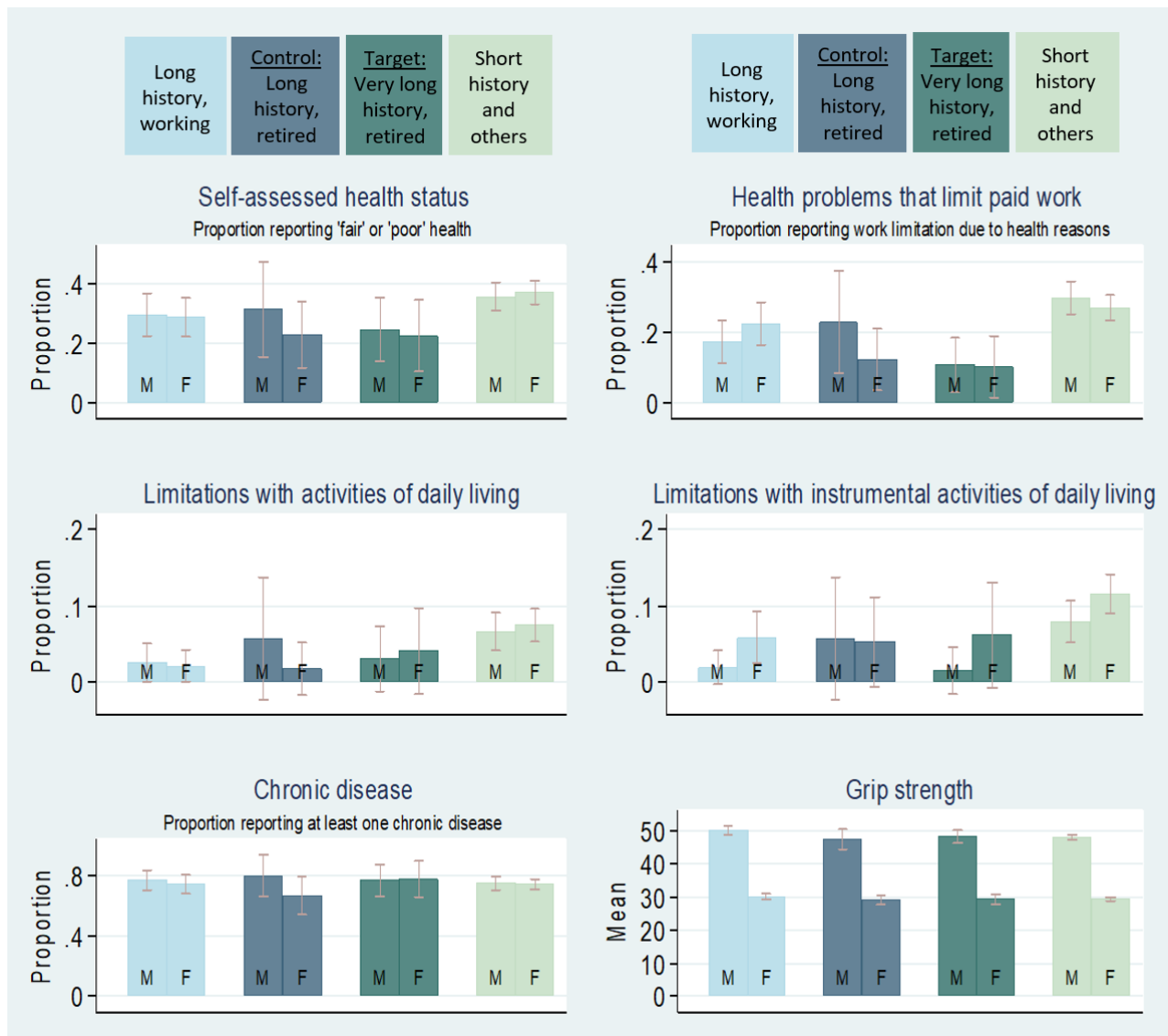
	<i>Long employment history</i>		<i>Very long employment history</i>		<i>Short employment history</i>
	<i>Still working</i>	<i>Retired Control group</i>	<i>Still working</i>	<i>Retired Target group</i>	<i>All</i>
Individuals	343	92	7	115	962
Proportion of males	0.45	0.38	..	0.57	0.39
With partner in household					
Males	0.91	0.77	..	0.95	0.77
Females	0.82	0.79	..	0.76	0.78
Education					
Low educated	0.05	0.11	..	0.09	0.10
Medium educated	0.68	0.53	..	0.70	0.54
High educated	0.27	0.36	..	0.21	0.36

Source: SHARE-RV.

Figure 4 addresses the first target of the policy, namely providing more generous pensions to those who are less healthy. We use the same health variables as in the previous section on disability insurance. There are some large differences in the six health measures but they are statistically insignificant as indicated by the error bars. Moreover, all differences point in the wrong direction for males, i.e., health of male pensioners in

the target group is better than in the control group. For female pensioners, the comparison is often reversed but remains insignificant in all cases.

Figure 4: Health status by group



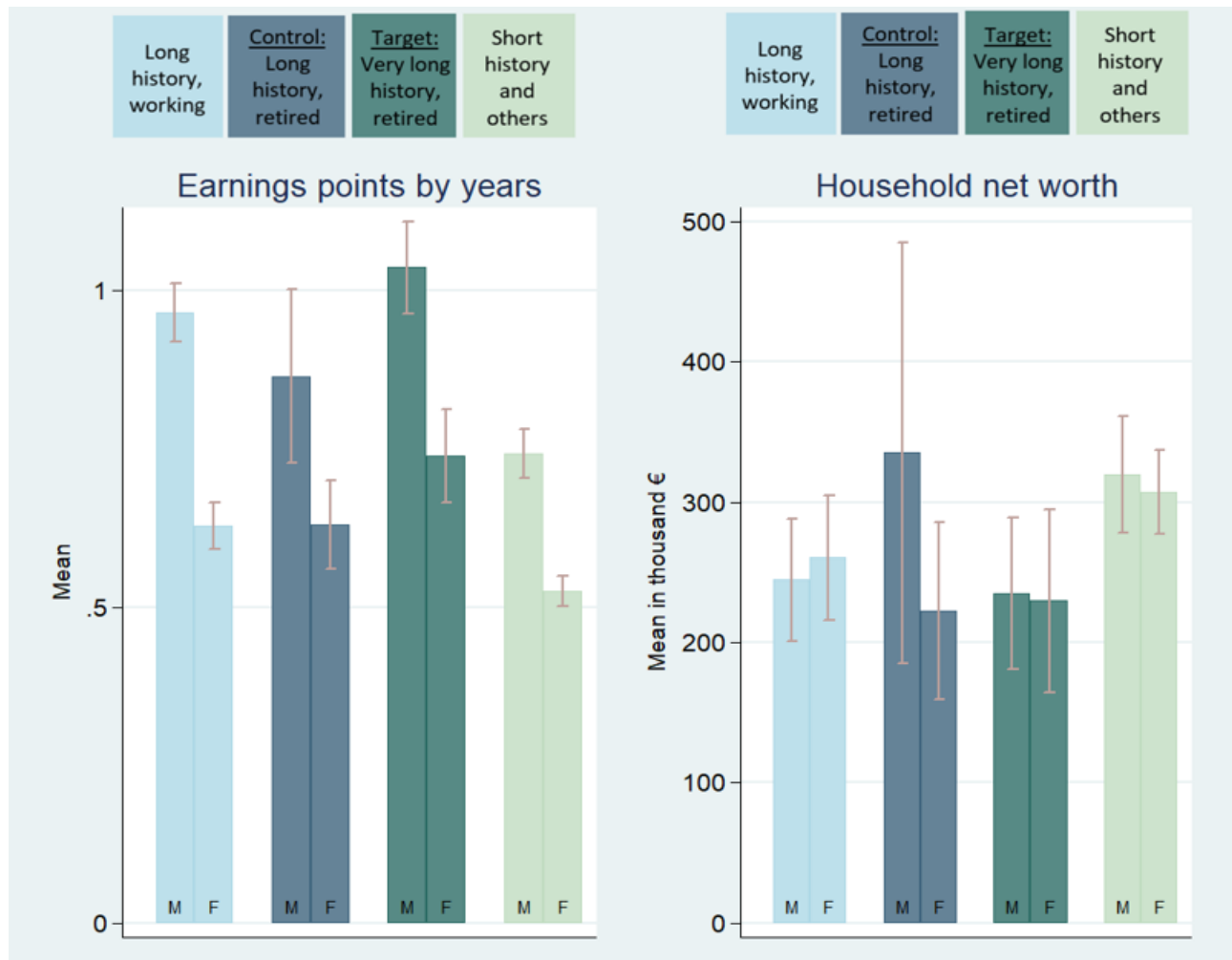
Note: Figure shows proportions and 95% confidence intervals.
Source: SHARE-RV.

Figure 5 addresses the second target of the policy, namely providing more generous pensions to those who have earned a more modest life-time income and less wealth. We measure lifetime earnings in terms of the average annual number of earnings points. It is calculated as the sum of earnings points an individual has accumulated from age 14 to 65, for the target group divided by the number of service years and for the other groups divided by the number of insurance years as defined in Table 6. Wealth is measured as the households' net worth. It is the sum of net financial assets (i.e. the sum of bank accounts, bonds, stocks, mutual funds, savings for long-term invests, minus financial liabilities) and household real assets. The latter is the total value of the household's main residence (adjusted for the percentage of house owned), value of the own business (adjusted for the share of own business), value of cars, value of other real estate minus

mortgage on main residence. The variable thus broadly captures the households' net worth.⁵

Figure 5 provides evidence suggesting that also the second target of the reform has not been achieved. The target group, on average, has earned a higher number of annual earning points. The difference is significant for both males (p-value 0.0159) and females (p-value 0.0332). This finding is in line with Börsch-Supan, Coppola, and Rausch (2015).

Figure 5: Earnings points by year and household net worth



Note: Figure shows proportions and 95% confidence intervals.
Source: SHARE-RV.

These descriptive comparisons provide suggestive evidence but ignore the statistically significant differences in the socio-demographic composition of target and control group. We therefore deepen our analysis with a multinomial logit model of the pathway choice which holds these socio-demographic characteristics constant (Table 8). The dependent variables are the three pathways. The main pathway of interest is the new pathway to retire at age 63 without actuarial adjustments. Reference category is the control group of individuals who accumulated at least 35 insurance years and choose early retirement with actuarial adjustments.

Control variables are age and age squared, gender, indicator variables for high and low education, various health variables (subjective and objective) and a variable approximating the individual earnings position. Education is based on the ISCED-1997-classification as described above. *Self-perceived health* is scaled from

⁵ We use the fully imputed data set.

poor (1) to excellent (5). We impute missing values for *grip strength* by setting them to zero. We add an additional dummy variable to control for these imputed values (*grip strength_missing*). *Chronic disease*, *adl* and *iadl* are dummy variables equaling one if an individual reports at least one chronic disease or at least one limitation with (instrumental) activities of daily living respectively. *Earnings points/year* is the sum of earnings points an individual has accumulated over her or his working life, for the target group divided by the number of service years, and for the reference and other categories divided by the number of insurance years (as defined in Table 6). *Wealth* is defined as household net worth as described above.

Table 8: Multinomial logit model of pathway choice

	(Reference category) Early retirement with actuarial adjustments	(1) New pathway “Retirement with 63”	(2) Other pathways
Age		0.548*** (0.149)	-1.827*** (0.255)
Age squared		-0.004*** (0.001)	0.014*** (0.002)
Female		0.004 (0.024)	-0.022 (0.029)
High education		-0.084*** (0.017)	0.072*** (0.019)
Low education		0.019 (0.023)	-0.032 (0.030)
Self-perceived health		0.004 (0.008)	-0.007 (0.010)
Grip strength		0.001 (0.001)	-0.001 (0.001)
Grip strength missing		0.384*** (0.065)	0.107 (0.094)
Chronic disease yes/no		-0.012 (0.015)	0.030 (0.020)
ADL yes/no		-0.011 (0.035)	0.033 (0.044)
IADL yes/no		-0.033 (0.035)	0.037 (0.040)
Earnings points/year		0.127*** (0.021)	-0.135*** (0.025)
Household net worth/10,000		-0.000** (0.000)	0.000** (0.000)
Observations	88	112	1,203

Note: Robust standard errors in parentheses. *** p<0.01 ** p<0.05 * p<0.1.

The coefficients in Table 8 are average marginal effects. We find that the probability of choosing the new pathway increases with age. As people get older, however, the effect of age is lessened (negative effect of age squared). Highly educated individuals are by 7.8% less likely to be in the target group. This might point into the same direction as in Börsch-Supan, Alt, and Bucher-Koenen (2015). The authors find that the proportion of specialists (highly qualified workers without a university education but in highly skilled occupation) is higher among the eligible for the new early retirement pathway (target group) compared to

the group of individuals eligible for early retirement after 35 contribution years (comparison group). Our sample size is, unfortunately, too low to replicate the approach to identify specialists as in Börsch-Supan, Alt, and Bucher-Koenen (2015). The earnings history has a statistically significant influence: the higher the number of earnings points by service years, the higher the probability of being in the target group.

Overall, the results from the multinomial logit model are largely in line with our descriptive results. They indicate that pensioners in the target group are highly educated and have higher lifetime earnings. Health does not play a role in the logit model. These results produce a clear picture. If the aim of the new German early retirement pathway was to target the underprivileged with bad health and modest earnings, then the SHARE-RV data provides no evidence that the policy achieved this aim – rather, the contrary appears to be the case.

6. Targeting supplemental pension benefits

Our third case study examines the potential target quality of a currently hotly debated reform which would change the strict proportionality between contributions and benefits in the German pension system. This re-reform would provide supplemental benefits for those who have earned more than the poverty threshold of social assistance but who only have “a modest income” (Bundesministerium 2019). The proposal does not specify precisely what “modest income” means; we will acknowledge this in the evaluation of target quality.

Eligibility for supplemental benefits requires at least 35 service years, see Table 6. Technically, the supplement will be implemented as an increase of earnings points. All annual earnings points between 0.24 and 0.8 in up to 35 service years will be doubled, capped at 0.8 earnings points. The lower threshold of 0.24 excludes part-time and mini jobs; the upper threshold of 80% of average earnings may be interpreted as an attempt to implement the “modest income” definition. There is no other means test.

There are two obvious shortcomings of this definition: earnings points only relate to earnings subject to social security contributions; the individual may also have other income sources. Moreover, earnings points are an individual concept; other household members may have substantially higher incomes. Our analysis of target quality will therefore focus on per-capita household net income and other characteristics in a household context. The key question is therefore whether the various household income sources are sufficiently highly correlated such that earnings points are a reasonable measure of per capita income.

We use SHARE-RV data with data from the regular SHARE waves 5, 6 and 7. From the administrative data, we obtain precise monthly information on the individual insurance career from age 14 to 65 which is necessary to determine eligibility for the supplement. Data from the regular SHARE interviews provide information on the household context and health information. The reform targets pensioners at the point in time when they claim pension benefits for the first time. Our study sample of 2,337 individuals therefore includes pensioners only. We restrict the sample to individuals who are at least 55 years old. Average age for males in the sample is 72.2 years and 71.9 years for females. 51% in the sample are females; 75% live with a partner in the same household.

In a first step, we evaluate who is eligible for the supplement following the above presented scheme currently under discussion. We find that 18.5% of our sample are eligible for the supplement. 90% of the eligible pensioners are women. About three-quarters live together with a partner in the same household.

The average number of earnings points is 22.9 in the group of eligible pensioners, while the number is clearly higher in the non-eligible group, see Table 9. In the latter, however, the standard deviation is much higher, indicating that the earnings points are spread over a wider range with comparably more low and high values.

The average supplement amounts to 4.6 earnings points. At current valuation, this is about 152 Euro per month.

Table 9 also shows monthly per-capita household net income and household net worth.⁶ Mean monthly per-capita household net income of eligible pensioners is only slightly lower (by 180€) as compared to non-eligible pensioners. Median per-capita household net income is 146€ lower. Average household net worth among eligible pensioners is also lower (by about 45,000€). However– at least on average – net worth is quite considerable with 201,110€.

Table 9: Economic situation: Eligible versus not-eligible pensioners

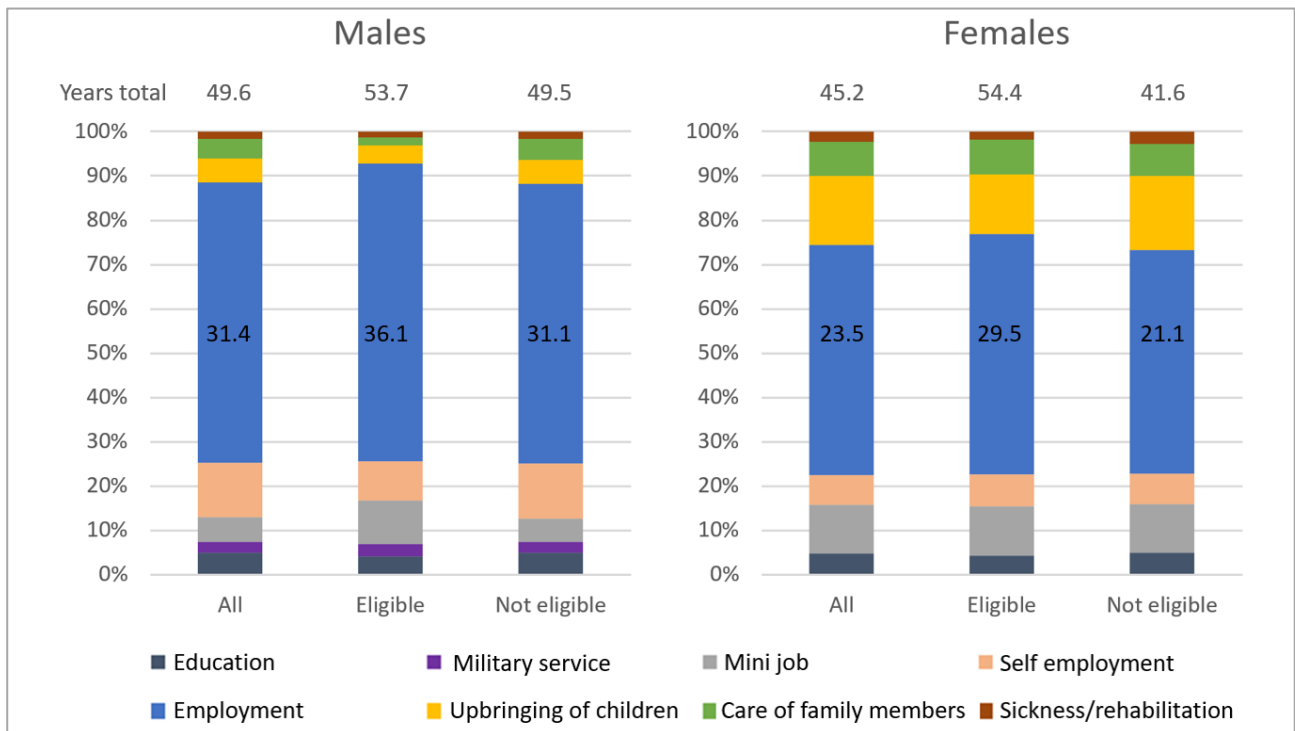
		Mean	Std. Dev.
Earnings points before supplement	Eligible	22.9	6.9
after supplement	Eligible	27.5	6.1
Earnings points	Not eligible	34.1	20.1
Mean monthly per-capita net household income (€)	Eligible	1,310	1,106
	Not eligible	1,490	1,205
Median monthly per-capita net household income (€)	Eligible	1,091	
	Not eligible	1,237	
Household net worth (in €)	Eligible	201,110	259,454
	Not eligible	246,094	367,145

Source: SHARE-RV.

In a second step, we analyze which periods are counted towards the required 35 years of service. Figure 6 shows how the service years are distributed when considering the periods relevant for supplement eligibility. Years with contributions from employment are only a part of the overall service time, for men 31.4 out of 49.6 years (63%); for women 23.5 out of 45.2 years (52%). For women contribution periods for the upbringing of children are a substantial part of the insurance history (16%). Together with periods devoted to care of family members (8%), this represents an important factor to determine eligibility. At the same time, however, only women with a high share of contributions from employment can benefit from the supplement: 54.3% compared to 50.6% of total service time for those non-eligible. For both men and women, employment periods are decisive for supplement eligibility.

⁶ Household net income is based on the “one shot” question in the SHARE module on household income. Household net worth is defined as in the previous sections.

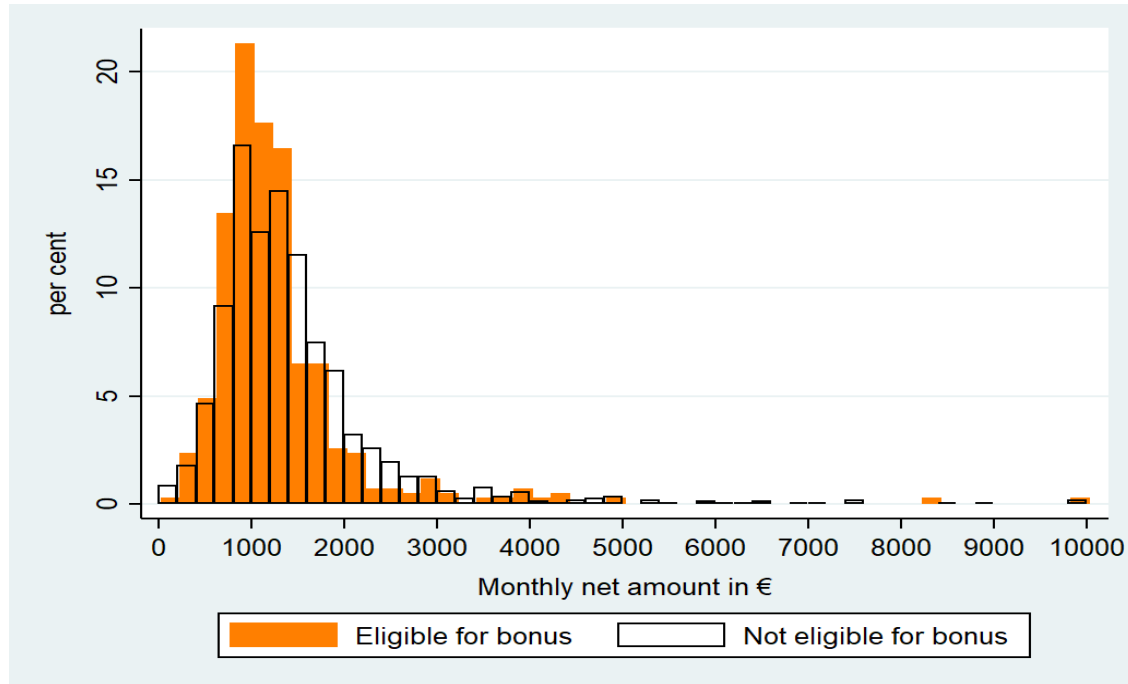
Figure 6: Composition of service years



Source: SHARE-RV.

Figure 7 depicts the per-capita household net income distributions of pensioners eligible for the supplement versus not-eligible pensioners. Both distributions are unimodal and right-skewed. While in the income groups around 1,000€ the proportions of eligible pensioners outweigh the proportions of not-eligible pensioners, it is the opposite in the income groups around 2,000€. We find pensioners from both groups even in the very high income classes. A Kolmogorov-Smirnov test rejects the equality of both distributions at any conventional significance level but cannot reject that the income distribution of the eligible pensioners has more mass on lower incomes ($p=0.804$).

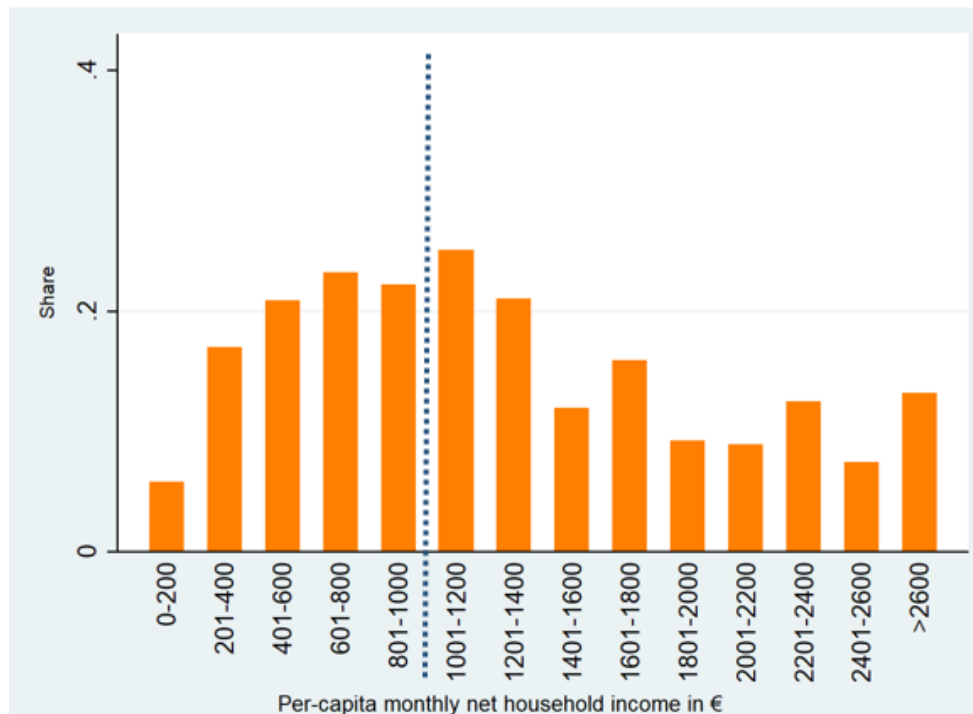
Figure 7: Distribution of per-capita household net income of pensioners



Source: SHARE-RV.

Figure 8 shows our main result. For each per-capita net household income class, it shows the share of eligible pensioners among all pensioners.

Figure 8: Share of eligible pensioners for the supplement by per-capita household net income



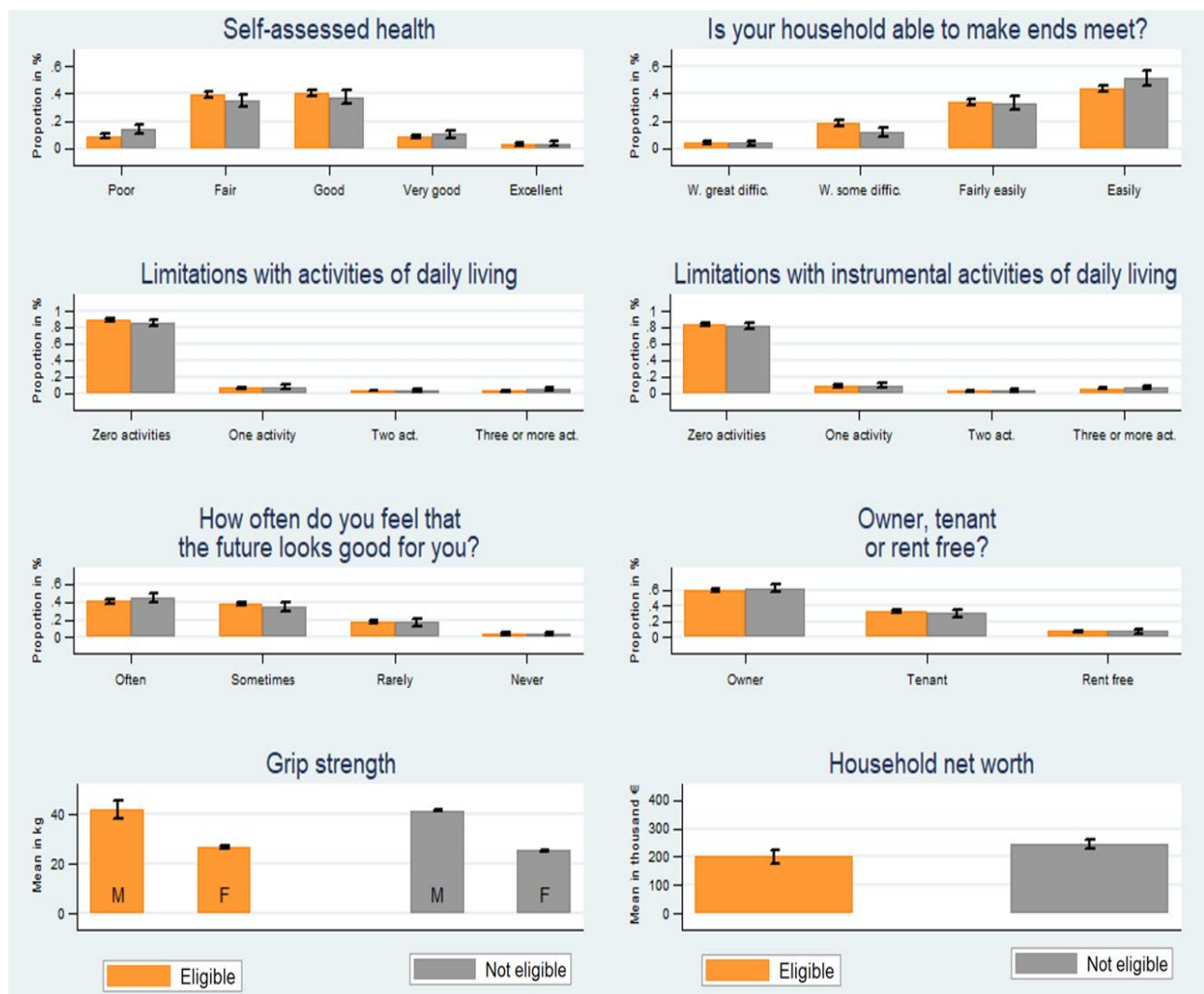
Source: SHARE-RV.

As intended by the proposed reform, this share is higher in lower income classes. The first tercile ends at about 990€ per month as indicated by the dotted line. However, the mass of the distribution is not concentrated at these low income classes as policy makers might have assumed; the mode of the distribution

is actually beyond the dotted line. The distribution is rather flat, meaning that in higher income groups a substantial share of pensioners are also eligible for the supplement. Income from other sources or earnings from other household members are therefore not at all tightly correlated with earnings from the individual who is eligible for the supplement. The new policy may target pensioners with low individual earnings but fails to target pensioners with low overall income.

Figure 9 provides further insights in the financial situation and the health status of the different groups, using the same variables as in the two previous case studies. In addition, we show the respondent's subjective assessment whether the household is able to make ends meet. This is a categorical four-point scale variable with possible answers (1) with great difficulty, (2) with some difficulty, (3) fairly easily, and (4) easily. Another categorical four-point scale variable is "How often do you feel that the future looks good for you?" with answers (1) often, (2) sometimes, (3) rarely, and (4) never. Figure 9 yields a mixed picture. Self-rated health, "make ends meet" and household net worth are significantly worse for eligible pensioners. For all other variables we fail to reject the null hypothesis.

Figure 9: Health status and financial situation of eligible versus non-eligible pensioners



Note: Figure shows proportions and 95% confidence intervals. Source: SHARE-RV.

7. Overall conclusions

As the title of the paper suggests, the three case studies in this paper have been chosen to reflect typical short-comings in the design of pension reforms in Germany. Since similar reforms are currently debated in many European countries, these case studies may serve as examples how to better target public pension policies.

Summarizing in reverse order, the case study on pension supplements shows how important it is to comprehensively measure income if policy makers want to target individuals with “modest income”. If the household context and income sources other than earnings are ignored in the process determining eligibility, many pensioners with comparably high income will be eligible for subsidies. Means testing may not have to be as comprehensive as for the German social assistance or the Australian base pension but if income is set as target then income needs to include all income sources available to the eligible individual.

The main lesson from the case study on early retirement without actuarial adjustments is that the three-way association between length of service life, average income and health (and therefore life expectancy) is more complex than often assumed. The beneficiaries of the 2014 reform in Germany had long service lives but were a selection of relatively healthy and well-to-do workers. We speculate that the less healthy and not so well-to-do workers have retired before the early eligibility age via the disability pathway or special agreements between the social partners.

Finally, while the matching quality between work disability and receipt of a DI benefit is particularly low in Germany (24.60% report a WD, but do not receive DI benefits) as compared to other countries (Börsch-Supan, Bucher-Koenen, and Hanemann 2017) and has not improved after the 2001 reform, earlier reforms which concentrated on the strictness of medical exams have effectively improved matching quality as could be seen in Figure 2. The lesson here is that DI systems require effective medical exams to achieve good targeting.

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