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Evaluating Alternative Policy Reforms for Germany**

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Making Work Pay for the Elderly Unemployed - Evaluating alternative policy reforms for Germany

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Abstract: We evaluate three policy reforms targeted at older unemployed people: (i) an hourly wage subsidy, (ii) an in-work credit, and (iii) a subsidy of social security contributions on low wages. The work incentive, labour supply and welfare effects of these hypothetical reforms are analysed on the basis a detailed micro-simulation model for Germany which includes a structural household labour supply model. We find that the simulated labour supply effects of the three policy reforms would be rather similar and of moderate size, ranging between 20,000 and 30,000 older women and between 10,000 and 20,000 older men. Our results also suggest that the hourly wage subsidy yields the highest welfare gains.

JEL: J21, J48, H21

Keywords: in-work support, wage subsidies, unemployment, elderly workers

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1 Introduction

In several OECD countries, employment rates of older workers are low relative to average rates, and the incidence of long-term unemployment is relatively high among them. For example, in Germany almost two thirds of all unemployed people aged 55 – 64 years have been unemployed for more than a year, compared to roughly 40 percent in the total population. Only a few countries have comparable high long-term unemployment rates among older workers (OECD 2005a). Empirical analysis has shown that old-age is the single most important factor for long-term unemployment in Germany (Steiner 2001). Furthermore, employment rates of elderly men and women in Germany are also quite low, both in absolute terms and compared to most other OECD countries.

Several reasons for the high level of long-term unemployment and low employment rates among elderly workers have been proposed both in the economics literature and the public policy debate (OECD 2005b). These include: age differences in employment protection regulations, contract wages set by collective bargaining agreements, negative work incentives related to high income replacement ratios and long entitlement periods to out-of-work benefits, or a combination of these factors. One important effect of age-related employment protection regulations and collective bargaining agreements may be on age-earnings profiles. In the presence of relatively steep age-earnings profiles, financial incentives to take up a low-paying job for older unemployed people may be weak if the level of unemployment benefits is closely related to net earnings in the previous job. This is likely to be reinforced in the presence of extended unemployment-benefit entitlement periods which may be used as a bridge to early retirement by older workers.

The mentioned reasons for the strong concentration of long-term unemployment among older workers may be of particular importance for Germany, since there are special regulations for elderly workers in the employment protection law, relatively steep age-earnings profiles, and high income replacement ratios in the unemployment compensation and public pension systems. Recently there has been a change in policy perspective in Germany, following examples in other European countries, to reduce financial incentives for early retirement and to foster re-employment of elderly unemployed workers by various forms of wage subsidies targeted at this group. However, empirical evidence seems to show that participation in these programs is very limited, and their labour market effects are rather uncertain (see, e.g., OECD 2005a: chapter 5). This may be related to certain features of these programs, such as time limits and their interaction with the tax-benefit system. Therefore, it is of great interest to design and implement policies with the aim to increase incentives for this

group to participate in the labour market and thereby raise the level of employment among older workers.

In this paper, we evaluate three policy reforms targeted at older unemployed people: (i) an hourly wage subsidy, (ii) an in-work credit, and (iii) a subsidy of social security contributions on low wages. The first reform proposal is similar to the Earnings Insurance scheme (*Entgeltsicherung*) recently introduced in Germany, the second and third are structured similarly as programs already existing in, respectively, Britain and Belgium (see Blundell et al. 2000; Bargain et al. 2005). The work incentive, labour supply and welfare effects of these hypothetical reforms are analysed on the basis of a detailed micro-simulation model for Germany which includes a structural household labour supply model. We find that the simulated employment effects of the three policy reforms would be rather similar and of moderate size, ranging between 20,000 and 30,000 additionally employed older women and between 10,000 and 20,000 older men. Our results also suggest that the hourly wage subsidy yields the highest welfare gains. However, all three reforms would yield positive income and welfare effects for the eligible population and would be 'self-financing' in the sense that induced increases in taxes and social security contributions would outweigh the fiscal costs of the reform under the assumption that the eligible population can be restricted to previously unemployed people.

In the next section we provide important facts on labour market outcomes and some institutional background on the tax-benefit system and public policies targeted at elderly people in Germany which motivate the three policy reform proposals presented in section 3. The empirical methodology on the basis of which we analyse the work incentive, labour supply and welfare effects of the three policy reforms is set out in section 4. Simulation results of these effects are summarized and discussed in section 4, welfare implications of the reforms are analysed in section 5, and section 6 concludes with some policy implications of these results.

2 Empirical and Institutional Background

We start with some stylised facts on labour market outcomes across age groups based on the German Socioeconomic Panel (SOEP).¹ The data refer to the year 2003. The sample is restricted to individuals aged 25-64 to avoid distortions related to educational transitions and regular retirement, which are not analysed in this paper.

¹ The SOEP is a representative sample of about 12,000 private households living in Germany with detailed information on household incomes, hours worked and household structure; for a detailed description, see Haisken-DeNew and Frick (2005).

As already mentioned in the introduction, the incidence of long-term unemployment among older people is very high in Germany. Table 1 shows this is especially true for older women of whom more than two thirds have already been unemployed for at least one year at the date of the interview. The share of long-term unemployed people among older men amounts to more than 50 percent, where there is little difference between those aged above 55 years and unemployed people in the age group 45 to 54 years. Within this latter age group, there is also little difference in the share of long-term unemployment between men and women.

Table 1. Labour market outcomes by age and gender, 2003

Age groups	Share in %		Share of long-term unemployed (in %)		Employment rate (in %)		Working hours (whole population)		Working hours (employed population)	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
25-34	20.68	18.54	31.53	31.06	59.37	73.45	20.92	34.52	31.75	41.75
35-44	29.42	31.83	45.29	39.07	71.38	84.08	22.37	37.00	29.83	42.53
45-54	26.32	25.53	52.27	53.09	71.91	84.32	22.86	36.81	30.85	42.56
55-64	23.65	24.13	69.72	51.68	38.07	50.93	12.04	22.26	30.52	41.88
Total	100.00	100.00	50.09	44.22	61.16	74.17	19.76	32.94	30.63	42.29

Notes:

- Numbers in the table are grossed-up figures calculated using the cross-section SOEP weighting factors.
- Long-term unemployment refers to an interrupted duration of more than 12 months in May 2003.
- Working hours are hours per week, referring to either the whole population (unconditional) or to the working population (conditional).

Source: SOEP (2003), own calculations.

Table 1 also reveals large differences in employment rates between age groups. For both men and women, employment rates of people (including the self-employed) aged between 55 and 64 years are low compared to other age groups. In particular, there is a huge difference in employment rates between the oldest age group and those aged between 45 and 54 years, both for men and women. These age differences in employment rates might be related to the widespread use of early retirement schemes in conjunction with the unemployment insurance system, as described below.

For both men and women, the unconditional average working hours (including zero hours of non-employed people in the respective age group) also show a marked decline for the highest age group, which is mainly related to the low employment rates in this age group. Turning to the distribution of hours of workers only, Table 1 shows that conditional hours are relatively constant across age groups, both for women and men, and that employed men work substantially more hours than women in each age group.

Since employment rates for older workers are relatively low, looking only at the observed wages could bias the age profile of wages due to well-known selection-effects (Heckman 1979, Blundell et al., 2003). In Table 2, we therefore not only report observed wages of dependently employed workers but also for the total population; that is, the observed wages for the working and the expected wages for the non working population, where the latter are derived from selectivity-corrected wage regressions summarized in Table A1 in the appendix.

Table 2. Distribution of gross hourly wages by age and gender

	Men			Women		
Age group	Mean	Median	25%-tile	Mean	Median	25%-tile
	<i>Employed workers only</i>					
25-34	15.02	13.96	11.13	12.86	12.33	9.52
35-44	19.08	17.14	13.48	14.43	13.33	10.20
45-54	20.89	18.40	13.39	15.99	14.60	11.16
55-64	21.83	18.65	13.28	15.69	13.60	9.92
Total	19.16	16.71	12.78	14.74	13.41	10.20
	<i>All workers</i>					
25-34	15.02	14.70	12.41	12.14	11.75	10.20
35-44	18.01	17.87	14.63	13.76	13.35	11.52
45-54	19.01	18.72	14.64	14.36	13.71	11.43
55-64	16.80	15.66	12.36	12.91	12.29	10.39
Total	17.37	16.84	13.46	13.32	12.86	10.87

Notes:

- Wages are gross hourly wages, calculated by dividing monthly earnings by the number of monthly hours including over time; wages are grossed up figures using the cross-section SOEP weighting factors.
- Unconditional wages are derived on the basis of selectivity-corrected wage regressions, as described in the text.

Source: SOEP (2003), own calculations.

Comparing the average observed wages conditional on employment and the unconditional wages for the whole population, we find evidence for selection effects in the distribution of wages. For both men and women, mean hourly wages conditional on working exceed mean wages estimated for the whole population by more than 2 Euro, on average. Regarding age effects, the striking difference is that average wages for the working population are on average increasing with age, with hourly wages in the oldest age group exceeding the mean by roughly 3 Euro for men and about 1 Euro for women. Controlling selection effects, estimated hourly wages for both older men and women are very close to the average wage in the male and female population, although there is a significant wage reduction relative to the

hourly wage estimated for the age group 45 – 54 years. Regarding the low-wage sector (25%-tile), the hourly wage in the oldest age group is only slightly above the average wage in the total population, and there is also only a relatively small wage reduction relative to the age group 45 – 54 years.

How can age differences in labour market outcomes described above be related to institutional regulations concerning elderly people? One important factor contributing to long-term unemployment among older people might be employment protection regulation. In Germany, the Protection Against Dismissal Act (*‘Kündigungsschutzgesetz’*) provides general rules for the termination of employment contracts by the employer as well as special regulations for particular groups of employees, especially elderly workers. The impact of employment protection regulations depends on the degree of wage flexibility. If wages are fully flexible under competitive conditions, higher employment protection costs for older workers would be compensated for by lower market wages. However, downward wage flexibility seems to be rather limited for older workers in Germany, as shown above. One reason for this stylised fact may be the widespread existence of collective bargaining agreements setting both entry wages as well as wage increases.

Another reason for long-term unemployment and insufficient wage flexibility among older workers in Germany may be related to the unemployment compensation system which consists of a short-term contributory benefit (*Unemployment Benefit I, UB I*) and a longer term means-tested benefit (*Unemployment Benefit II, UB II*). UB I is an insurance payment set at 60% of previous net earned income for childless recipients and 67% for those with at least one child. It is granted for a limited period of time. Until recently, the entitlement period for UB I ranged from 12 up to 32 months, depending on an individual’s age and social security contribution record. Recent legislation, which has become effective at the beginning of 2006, has shortened the entitlement period to 12 months generally and to 18 months for all unemployed persons aged 55 or older. Since the reform of the unemployment compensation and social assistance systems in 2005, UB II is available to those who are considered employable by the labour office or community welfare office and who are not eligible for UB I. It also contains additions for dependents, as well as contributions to statutory health insurance, long-term-care insurance and pension insurance. Those entitled to UB II also have access to advice and job placement. UB II is set somewhat above the level of *Social Assistance (SA)* available to people deemed not employable. As both UB I and UB II as well as SA are means tested with transfer-withdrawal rates close to 100% even at very low earnings, work incentives hardly changed due to this reform.

One important institutional reason for the low employment rate among older workers is the prevalence of early retirement in Germany.² While the official retirement age is currently set at 65, the effective retirement age is substantially below this age. Until the year 1996 insured persons were eligible for an old age pension without any specific deductions at the age of 60 if they were unemployed, had a minimum insurance record of at least 15 years and made contributions to the public pension scheme for at least 8 out of the last 10 years prior to retirement. Starting from 1997, the retirement age without deductions was gradually increased to age 65 by the year 2001. However, there still exists the opportunity to retire early, though the pension received is reduced by 3.6% for each year before the age of 65 the pension is taken. The age threshold for eligibility for an old age pension with deductions after being unemployed was age 60 until the end of the year 2005. It was raised to age 61 in 2006, 62 in 2007, and 63 in 2008. After the year 2011, the specific regulations for the retirement age of the unemployed will be abolished completely. In the past, the attractiveness of early retirement following a period of unemployment was also due to a long entitlement period to unemployment benefits for the older unemployed. As described above, this has recently been changed, however. Moreover, persons at age 58 were allowed to receive unemployment benefits even if they stated that they did not want to take up a job. The specific regulation for unemployment benefits for those of age 58 and older will be abolished in 2008.

In addition to these passive measures of labour market policy, there also exists a number of active policies targeted at elderly unemployed people. Of special importance for our analysis are two such measures:

The first is a wage subsidy named '*Eingliederungszuschuss*' (EGZ) which is paid to firms employing elderly people (initially defined as 55 years or older, but subsequently reduced to the age of 50) covering both a share of the employees gross wage and the employers' share of social security contributions (see OECD 2005a: 144). The duration and the amount of the subsidy are the highest for elderly people, amounting to a maximum of 70% of standardized wage costs for a period of up to 70 months (with reductions in the amount of the subsidy after 24 months). Neither the employer nor the employee is legally entitled to this subsidy, though, and part of it might have to be repaid if the employment relationship is terminated within a pre-specified period.. The EGZ, which was initially introduced at a temporary basis until the end of 2005 has meanwhile been extended until the end of 2007. The number of elderly people subsidised by EGZ has increased substantially over the last couple of years (see Ammermüller et al. 2006).

² For a more detailed description, see OECD (2005a, Chapter 3, pp. 87ff.)

In 2003 a wage subsidy called *Earnings Insurance* ('Entgeltsicherung') was introduced. This subsidy, which was initially planned to expire at the end of 2005 but has subsequently been prolonged until the end of 2007, is intended to provide financial incentives for unemployed workers older than 50 to take up jobs with a wage below the level of the previously held job by way of a wage subsidy. The amount of this subsidy is 50% of the differential between the former salary and the net remuneration in the new job, the subsidy period depends on the previous entitlement period to UB I. Only a few people have participated in this programme so far (see Ammermüller et al., 2006).

Although not explicitly targeted at older people, special regulations regarding subsidies to social security contributions paid on 'marginal' jobs may also be relevant for the employment of older workers. The so-called 'Mini Jobs' reform made already existing special regulations somewhat more generous: the maximum hours restriction (15 hours per week) was abolished, the range of earnings completely exempted from employees' social security contributions was expanded up to 400 Euro, with earnings between 401 and 800 Euro subject to a reduced contribution rate starting at 4 percent and increasing linearly up to the normal rate of 21 percent at the end of the bracket. However, for persons receiving unemployment or social assistance benefits, work incentives hardly changed due to this reform since earnings from mini-jobs are almost completely offset by benefit withdrawal due to the means tests applied to these transfers (see Steiner and Wrohlich 2005).

3 Making Work Pay: Three Policy Reforms

The preceding analysis suggests that specific regulations concerning elderly people and age-related difference in labour market outcomes and the wage distribution are key for the employability of older people. These differences motivate policies targeted at elderly people aimed at improving their employability, as have already been implemented in various countries of the European Union. Here, we focus on three policy reforms:

- (i) an hourly wage subsidy,
- (ii) an in-work credit, and
- (iii) a subsidy of social security contributions on low earnings in a full-time job.

The first reform proposal is similar to the Earnings Insurance scheme recently introduced in Germany (see section 2), the second and third are structured similarly as programs already existing in, respectively, Britain and Belgium (see Blundell et al. 2000; Bargain and Orsini 2006). The main difference to these already existing programs is that all three proposals analysed here are targeted at unemployed older people. The main characteristics of these reforms are summarized in the following table.

Table 3. Three making-work-pay policy reforms

	Reform 1 <i>Hourly Wage Subsidy</i>	Reform 2 <i>In-Work Credit</i>	Reform 3 <i>Employment Bonus</i>
Target group	unemployed, 55 – 64 years	unemployed, 55 – 64 years	unemployed, 55 – 64 years
Subsidy base	hourly wage	household income	individual earnings (full-time equivalents)
Amount of the subsidy	difference between hourly wage in previous job and hypothetical market wage in new job	7,100 Euro/year maximum; below household income of 6,750 Euro/year benefit withdrawal rate = 0, above this threshold the withdrawal rate = 37%; extra bonus of 990 Euro/year for working hours > 30/week, also withdrawn at a rate of 37%	maximum monthly bonus of 215 Euro withdrawn at a rate of 15%
Earnings/income threshold	no	income < 6,750 Euro/year	1,500 Euro/month
Minimum hours restriction	no	16 hours 30 hours (bonus)	full-time, 40 hours
Time limit	no, 65 years	no, 65 years	no, 65 years

Source: Own description.

(i) Hourly Wage Subsidy (HWS)

The idea of the HWS is to provide financial incentives to unemployed elderly people to take up a low-paying job, relative to the wage earned in the previous job. This subsidy is meant to close the gap between the reservation wage and the market wage of older unemployed people. In contrast to the already existing Earnings Insurance mentioned above, the HWS is a subsidy on low hourly wages rather than earnings. Furthermore, the HWS is to be paid permanently (until retirement) rather than temporarily as in case of the already existing Earnings Insurance. The reason is that we would neither expect long-run employment effects from the latter, nor would it be possible to analyse the long-term effects of a time-limited programme on the basis of the empirical framework employed here.³

One fundamental problem in analysing such a programme is that the amount of the subsidy is not known a priori, because it would depend on the unobserved reservation wage of

³ If there are no long-term productivity effects from participating in the programme, for which there is no empirical evidence, there would be no long-term employment effect after the subsidy has expired because, assuming it was actually required to employ the eligible worker in the first place, the potential market wage would again fall short of the worker's reservation wage.

the potential participant in the programme. In order to determine the wage subsidy we derive for each non-working individual in our sample two ‘counterfactual’ wages, the individual’s reservation wages and her or his expected market wage at the start of a new job. As described in section 2, these counterfactual wages are estimated on the basis of selectivity-corrected wage equations. Since marked differences between men and women as well as between east and west Germany persist, we have estimated the wage equations separately by gender and region (see Table A1 in the appendix).

The explanatory variable in the wage equation of main interest for our analysis is firm tenure.⁴ For the calculation of the wage subsidy we assume that an individual’s reservation wage depends on her or his last wage, and thus tenure in the previous job, whereas the market wage is set equal to the expected individual wage at zero tenure. The difference between these two wages measures an individual’s earnings gap and determines the size of the HWS.⁵ In order to close the gap between the market and the reservation wage the market wage needs to be increased by about 15%, on average. As shown in Table A2 in the appendix, the average earnings gap varies between 5% for east German men and almost 25% for east German women, and also varies substantial with tenure within each group.

(ii) In-Work Credit (IWC)

In several OECD countries in-work credits have been introduced both as an anti-poverty policy and as a measure to make work pay (OECD 2005b, Bargain and Orsini 2006). Most prominent examples are the Earned Income Tax Credit in the USA and the Working (Family) Tax Credit in the UK (see, e.g., Hotz and Scholz 2003, Blundell et al. 2000, Haan and Myck 2006). Whereas these in-work credits are typically targeted at poor families with children, the In-Work Credit (IWC) proposed here is conditioned on age and employment status. The target group of the IWC is the same as for the HWS, namely individuals aged between 55 and 64 currently not working. The requirement for this group is to take up work for at least 16 hours per week. As eligibility to the IWC is based on household income, for couples it is sufficient that one spouse fulfils the relevant criteria.

The proposed IWC is designed as follows: Up to a yearly gross household income of 6,750 Euro households receive the maximum credit of 7,100 Euro, above this level the

⁴ For the working population this information is explicitly collected in the data. For the non-working population we had to construct this information from their job histories available in the SOEP. Since we do not observe job-to- job changes in the data, our estimate of the tenure variable has to be interpreted as an upper bound.

⁵ The wage subsidy differs between individuals not only due to the distribution of the assumed tenure, but also due to the impact of other individual specific factors on the reservation and market wage, such as human capital, gender, region or nationality.

credit is withdrawn at a rate of 37%. Gross income includes income from dependent work, self employment and pensions. For full time work, more than 30 hour per week, households receive an extra annual bonus of 990 Euro, which is also withdrawn at a rate of 37%. As we show in section 4.1 below, the IWC is particularly attractive for single households with low earnings potential, whereas the modest income threshold makes this programme less relevant for couple households when at least one of the spouses is already working.

(iii) Employment Bonus (EB)

The design of this programme follows a similar one existing in Belgium under the name Employment Bonus (see Bargain et al. 2005), with the main difference being that here eligibility again is conditioned on age and an individual's employment status. The EB differs from the IWC as it is based on individual wages rather than household income and subsidises the employee's social security contributions which amount to roughly 20% in Germany. The EB also differs from the existing subsidy of so-called 'mini-jobs' which are completely or partly exempted from employees' social security contributions, as described in section 2.2 above. On the top of this subsidy, the EB introduces a maximum bonus of 215 Euro per month for eligible persons working full time with an earnings threshold of 1,500 Euro per month. This guarantees that only low-wage people receive the subsidy and distinguishes the EB from the HWS for which all currently non-working individuals in the relevant age group are eligible regardless of their hourly wage. Hence, the EB provides stronger incentives for low-skilled older unemployed people.

4 Empirical Methodology

To analyse the effects of the three reform proposals described in the previous section on work incentives and household labour supply we use our behavioural micro-simulation model STSM.⁶ The model is based on the SOEP and basically consists of two parts: a tax-benefit calculator that computes net household incomes for each sample household on the basis of information on gross incomes, and for different (hypothetical) legislations and different working hours of individuals; and an empirical labour supply model with household utility depending on net household income and leisure of both spouses (in case of couple households). On the basis of this model we can analyse changes in work incentives and labour supply effects under different reform scenarios and perform welfare analyses of these reforms.

⁶ For a detailed description of the Tax-Benefit Microsimulation Model STSM, see Steiner et al. (2005).

The household labour supply model is specified as a discrete choice model on the assumption that a household can choose among a finite number $J+1$ of working hours categories (J positive hours categories and non-employment); each hour category, $j=0, \dots, J$, corresponds to a given level of disposable income C_{ij} and each discrete bundle of leisure and income provides a different level of utility (see, e.g., van Soest 1995). The utility V_{ij} derived by household i from making choice j is assumed to depend on a utility function U of the wife's leisure, Lf_{ij} , the husband's leisure, Lm_{ij} , the household's disposable income, C_{ij} , household characteristics Z_i , and on a random term ε_{ij} :

$$V_{ij} = U(Lf_{ij}, Lm_{ij}, C_{ij}, Z_i) + \varepsilon_{ij}$$

If the error term ε_{ij} is assumed to be identically and independently distributed across alternatives and households according to the Extreme-Value type I (EVI) distribution, the probability that alternative k is chosen by household i is given by the Multinomial Logit model (McFadden 1974):

$$P_{ik} = \Pr(V_{ik} \geq V_{ij}, \forall j = 0, \dots, J) = \frac{\exp(U_{ik})}{\sum_{j=0}^J \exp(U_{ij})}, \quad k \in J$$

The likelihood for a sample of observed choices can be derived from that expression and maximised to estimate the parameters of the utility function U . We assume a quadratic specification of the utility function, as in Blundell et al. (2000). For a couples household, the systematic part of the utility function is thus given by:

$$U_{ij} = \beta_1^c C_{ij} + \beta_2^c C_{ij}^2 + \beta_3^{lf} Lf_{ij} + \beta_4^{lm} Lm_{ij} + \beta_5^{lf} Lf_{ij}^2 + \beta_6^{lf} Lm_{ij}^2 \\ + \beta_7^{clf} C_{ij} \times Lf_{ij} + \beta_8^{clm} C_{ij} \times Lm_{ij} + \beta_9^{lflm} Lf_{ij} \times Lm_{ij}$$

Preferences are allowed to vary across households through taste shifters on linear income and leisure coefficients:

$$\beta_1^c = \alpha_0^c + X_1' \alpha_1^c \\ \beta_3^{lf} = \alpha_0^{lf} + X_2' \alpha_1^{lf} \\ \beta_4^{lm} = \alpha_0^{lm} + X_3' \alpha_1^{lm}$$

where X_1, X_2, X_3 are column vectors including age, number and age of children, disability indicators, and region of residence., and the α 's are (vectors of) coefficients to be estimated jointly with the remaining β coefficients given in the utility function above. In the estimation we do not consider potential effects of unobserved heterogeneity, which implies that the independence of irrelevant alternatives (IIA) property is assumed to hold. However, Haan

(2006) has shown that labour supply elasticities, estimated on the same data as in the present study, do not differ significantly when unobserved heterogeneity is introduced.

The model is estimated separately for couple households with both spouses' labour supply assumed to be flexible (3931 households), for couples with only one spouse's labour supply flexible (1609), and for single households (1043 single women and 796 single men). The utility function and the derivation of the choice probabilities of single household are analogous to the case of a couples household, except that the utility function contains only one leisure term for the respective individual. We estimate the model separately for single men, single women and couple households on a restricted sample of households with at least one adult is aged between 20 and 64, not in education and not self-employed. We specify 6 hours categories according to the actual distribution of hours in the sample: non-employment, three part-time categories, full-time and overtime work. The distribution of hours for the various groups of households is given in Table A3 in the appendix.

The dataset used for estimating the labour supply model is the SOEP 2003 with information on household incomes for fiscal year 2002. We use the estimated empirical household labour supply model to simulate the probabilities of choosing each hours category for every household under the fiscal system 2005 (status quo scenario simulated under the assumption that the preferences for leisure and disposable income have not changed between 2002 and 2005) and the policy reform of interest. The difference in the simulated distributions of hours categories between the status quo scenario and a particular policy reform yields the labour supply effects of the respective reform.

In our non-linear model labour supply effects need to be derived numerically. Instead of the 'aggregated frequencies' technique, that is aggregating the expected individual hour supply over the whole sample, we follow the calibration method which is consistent with the probabilistic nature of the model at the individual level (Creedy and Duncan 2002). It consists of drawing for each household a set of $J+1$ random terms from the EVI distribution until a vector of random terms is found that generates a perfect match between predicted and observed hour supply. In a second step, the draws are used for predicting labour supply responses to a tax reform, and averaging them over a large number of draws provides robust transition matrices.

5 How Would the Reforms Affect Work Incentives and Labour Supply?

5.1 Work incentives: effects of the reforms on household budget constraints

To assess the work incentive effects of the three policy reforms, in the following we present their impacts on the budget constraints of several stylised households which qualify for the transfer programmes derived on the basis of the tax-benefit micro-simulation model STSM for fiscal year 2005.

Figure 1a shows the effects of the three reforms on the budget constraint of a single person with a relatively low expected hourly wage, which we have set equal to the 25%-tile of the wage observed for men in our sample; this person is assumed to be eligible to means-tested income support, such as unemployment compensation (see section 2). For employment exceeding 16 hours per week the IWC would lead to a relatively strong increase in net household income (by roughly 280 Euro). Although withdrawn at a rate of 37%, the amount of the IWC is still significant even when working full-time, which is partly due to the full time bonus at 30 hours. Comparing the EB and the HWS, there is very little difference in their effects on net household incomes. In both cases, net household incomes would only differ from the status quo at higher levels of working hours, i.e. beyond the subsidy range for ‘Mini-Jobs’. Looking at the same type of household but assuming that he or she is not eligible to means tested income support, Figure 1b shows basically the same picture regarding the financial incentives induced by the three reforms as described above, except for the obvious difference that taking up a low-wage job may become financially attractive even at low hours.

For couple households the effects of the reforms on budget constraints are different as the household context needs to be considered. This is particularly important for the IWC. Figure 1c illustrates the case with one spouse working at a modest wage of 12.9 Euro (25th percentile male wage) per hour. Again, we observe relative high out of work benefits and therefore a modest impact of the reforms. At assumed hourly wages (see note to the figure), both HWS and EB affect net household incomes in case of more than 30 working hours per week. In contrast, the IWC increases net household income substantially after the 16 hours weekly minimum working requirement is met and further increases after 30 hours due to extra bonus.

For two-earner couples households with one spouse working full time the amount of the tax credit is very small (Figure 1d). However, both individual based subsidies significantly affect the household budget constraint. For this household we have assumed that both spouses are eligible for the HWS and the EB. Therefore, the non working income of the second spouse is higher in the reform scenarios than in the actual 2005 system.

Figure 1. Budget constraints under the status quo and alternative reforms

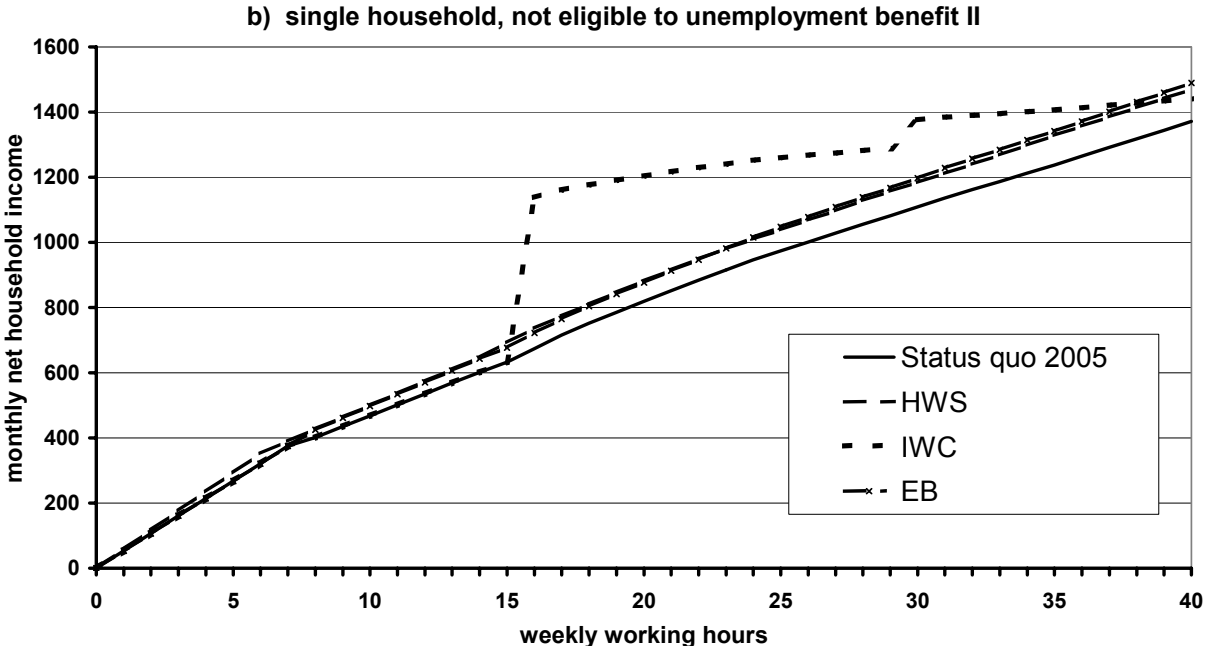
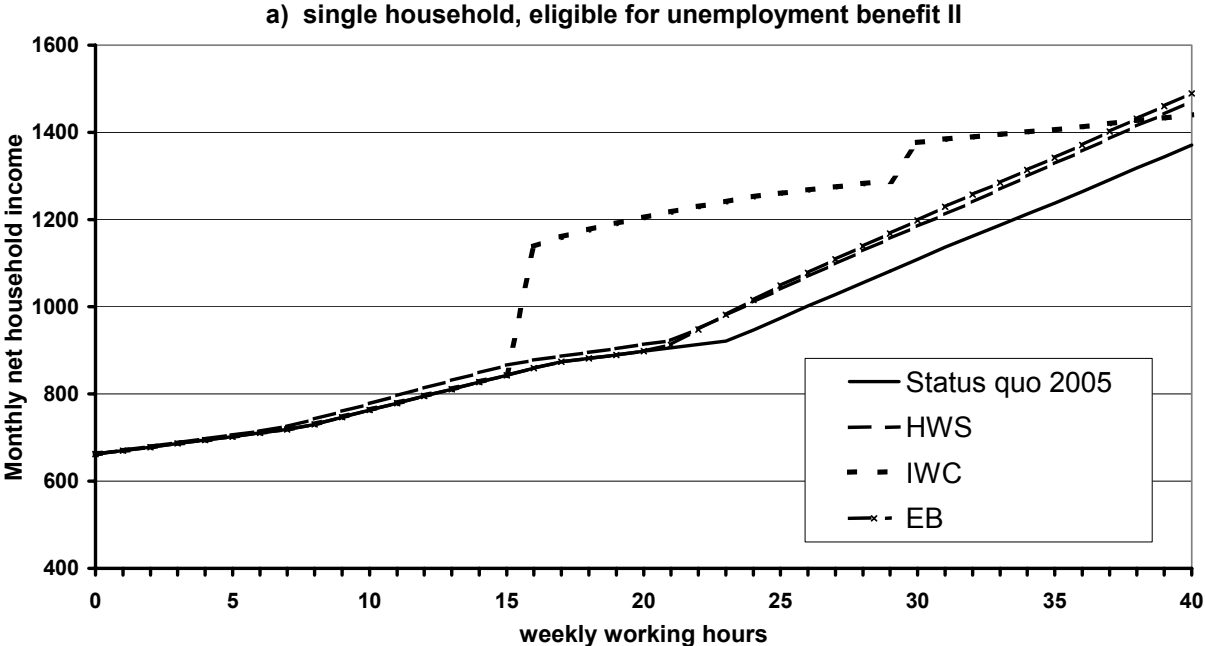
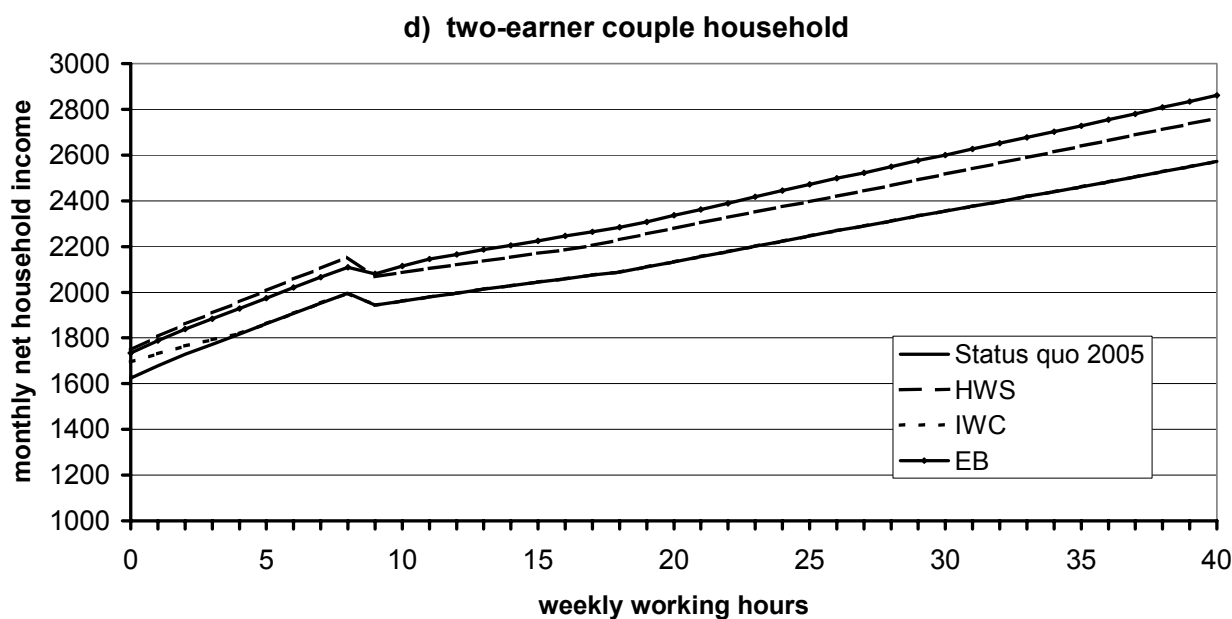
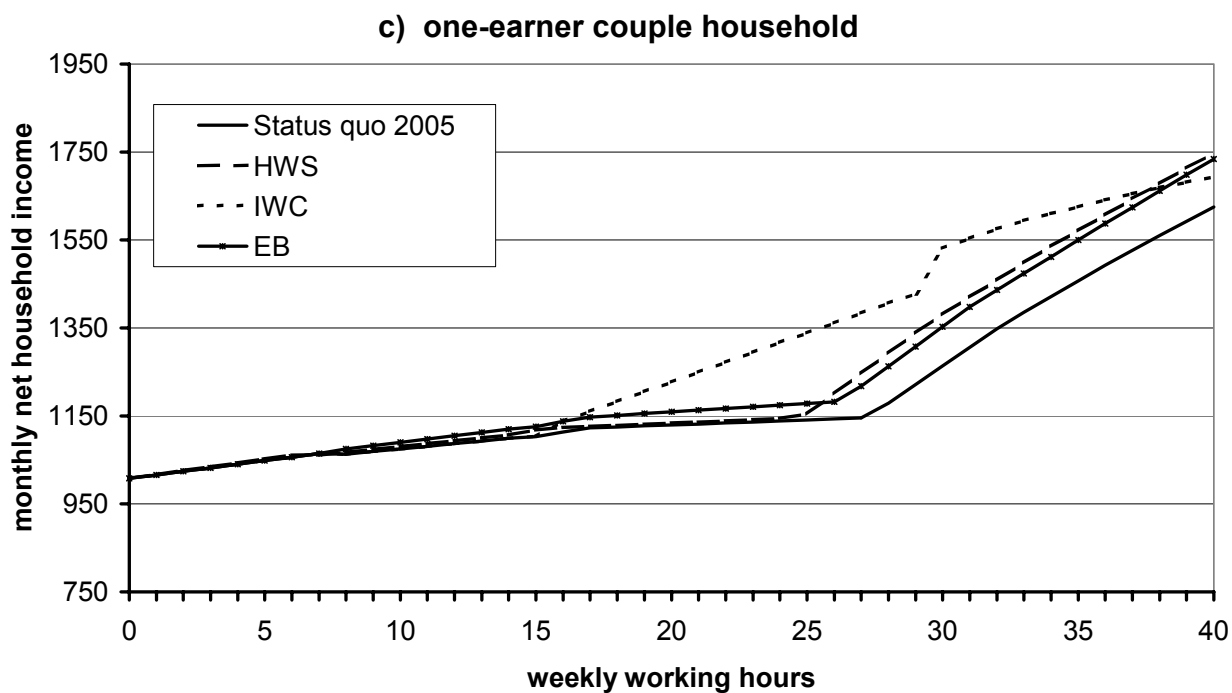


Figure 1. Continued



Notes:

- Single household working at 25th percentile hourly wage of men aged 55-64 (12.36 Euro), no children.
- Couple household, one spouse working at 25th percentile hourly wage of men, no children.
- Couple household, both spouse working, the husband works 40 hours at 25th percentile hourly wage of men aged 55-64 (12.36 Euro), the wife works full-time at the respective 25th percentile hourly wage (10,39 Euro).

Source: authors' calculations using STSM

5.2 Labour supply effects

In order to evaluate the labour supply effects of the three policy reforms we simulate for each household in our sample the change in the level of net household incomes implied by each of the three reforms based on STSM, and then estimate the labour supply effects induced by these income changes, as described section 4.

In Table 4 we summarize grossed-up simulation results for the three policy reforms. In addition to the effects of the reforms on labour force participation, we also calculate their impact on working hours. The hours effects are decomposed by previous labour market status into changes for the new participants and for the working population, calculated as full-time equivalents assuming 40 weekly working hours. Table A2 in the appendix summarizes the labour force participation and hours effects of the three reforms relative to, respectively, the non-working and working population aged between 55 and 64 years.

The overall labour supply effects of the three scenarios are moderate and of similar size. Note, however, that the reform only affects households with at least one unemployed adult aged between 55 and 64. For women the effects range between roughly 20,000 and 30,000 new participants. For men, the effects are smaller, about 13,000 for the IWC, slightly higher for the EB, and about 24,000 for the HWS. Relative to the non working population the labour supply effects for men range between 1.7% and 3.4%. These numbers outweigh the relative effects for women as the non working female population is larger. By definition the contrary is true for the effects relative to the working population (see Table A4).

Labour supply effects differ by gender and between singles and couples households due to the design of the programmes. As mentioned above, both the EB and the HWS are conditioned on individual rather than household incomes. Therefore, for these programs we do not find the small or even negative participation effects for couple households as in the case of the IWC. Whereas the latter provides negative disincentives for the second earner in couple households, for couples with both spouses working there are positive incentive for labour supply behaviour. We estimate an overall small positive participation effect of the IWC for women living in couples households.

For single households, the IWC has a stronger positive effect than the HWS and the EB. This is due to the above mentioned generosity of the IWC for single households over a large part of the hours distribution. Comparing the labour supply effect of the HWS with the EB, we find slightly higher effects for the wage subsidy. This is not surprising as the HWS is not conditioned on household income or dependent on some income threshold, as the other two programmes are.

Table 4. Labour supply effects of the policy reforms (absolute numbers in 1,000 persons)

	Women				Men			
	New Participation	Working hours as full time equivalents			New Participation	Working hours as full time equivalents		
		Total	New Participants	Working Population		Total	New Participants	Working Population
HWS								
Couples	21 (11 - 31)	19 (9 - 27)	18 (10 - 26)	1 (-1 - 2)	18 (15 - 22)	20 (16 - 24)	20 (16 - 24)	0 (0)
Singles	6 (2 - 10)	6 (2 - 9)	6 (2 - 9)	0	6 (4 - 8)	6 (4 - 8)	6 (4 - 8)	0 (0)
Total	27 (13 - 41)	25 (11 - 36)	24 (12 - 35)	1 (-1 - 2)	24 (18 - 29)	26 (20 - 32)	26 (21 - 32)	0 (0)
IWC								
Couples	10 (6 - 13)	5 (3 - 7)	6 (4 - 8)	-1 (-1 - -1)	-1 (-3 - 0)	-2 (-4 - -1)	0 (-1 - 1)	-2 (-3 - -2)
Singles	12 (7 - 17)	8 (4 - 11)	8 (4 - 11)	0	14 (9 - 17)	12 (8 - 15)	12 (8 - 15)	0 (0)
Total	22 (12 - 30)	13 (7 - 19)	14 (8 - 18)	-1 (-2 - -1)	13 (6 - 17)	10 (5 - 15)	12 (8 - 17)	-2 (-3 - -2)
EB								
Couples	16 (10 - 21)	14 (8 - 19)	13 (8 - 17)	1 (1 - 2)	9 (7 - 11)	10 (8 - 13)	9 (8 - 11)	1 (1 - 2)
Singles	5 (2 - 7)	5 (2 - 6)	5 (2 - 6)	0	7 (4 - 8)	7 (5 - 9)	7 (5 - 9)	0 (0)
Total	21 (12 - 28)	19 (10 - 25)	18 (9 - 23)	1 (1 - 2)	16 (12 - 19)	17 (13 - 22)	16 (12 - 20)	1 (1)

Notes:

- For definition of HWS, IWC and EB, see text;
- Full time equivalents are defined as 40 weekly working hours.
- Numbers are rounded to the nearest thousand; numbers in parentheses are bootstrapped 95% confidence bands based on 100 repetitions.

Source: SOEP 2003; calculations based on empirical household labour supply model as described in the text.

The increase in working hours mainly results from previously unemployed people participating in the labour market due to the reforms. However, in couple households hours worked slightly decrease as the partner of the eligible spouse is also affected by the reform. In line with the design of the reforms, we find that new participants induced to enter the labour market by the HWS or the EB want to work full-time. The participation effects and the corresponding full time equivalents are of similar size. For the IWC, however, the results imply that the new participants tend to work part-time which is due to the withdrawal of the IWC with increasing gross earnings.

6 Welfare Implications

In addition to the labour supply effects of the alternative policy reforms analysed in the previous section, their welfare implications are of interest for policy evaluation. In practical policy discussions, the welfare measure typically used simply is the average income gain (or loss) induced by the reform. A theoretically more appropriate welfare measure is based on the monetary equivalent of the average change in the level of utility induced by some reform. Following King (1981), we calculate the compensating variation (CV) as a monetary measure of the average change in welfare. CV is defined as the minimum amount by which a consumer (worker) would have to be compensated after a price (wage) change in order to be as well off as before. In the present context, the policy reforms analysed raise the relative wage for unemployed workers taking up a job. In this case, the compensating variation thus measures the average monetary amount eligible people would have to be given to make them equally well off if the policy reform had not been implemented. This measure has the advantage that, instead of simply comparing households gaining and losing in terms of household income, the utility loss associated with the reduced leisure of people induced to participate in the labour market due to the reform is accounted for in the calculation of the overall welfare gain of the reform.

Table 5. Average income and welfare effects of the reforms

	HWS		IWC		EB	
	Income Effect	Welfare Effect	Income Effect	Welfare Effect	Income Effect	Welfare Effect
	<i>Average effects for eligible households (in Euro per months)</i>					
Couples	510	391	237	121	354	266
Single Women	534	333	359	202	279	129
Single Men	251	43	514	231	297	66
	<i>Aggregate effects (in 1000 Euro per year)</i>					
Couples	189,832	145,340	17,042	8,712	80,712	60,648
Single Women	38,412	23,976	51,696	29,030	16,710	7,740
Single Men	18,072	3,082	86,419	38,875	24,931	5,502
Total	246,316	172,398	155,158	76,618	122,353	73,890

Notes:

- Average income and welfare effects are rounded to the nearest Euro, aggregate effects to the nearest 1,000 Euro.
- The welfare effect is measured as compensating variation.

Source: Simulation results based on STSM.

Income and welfare effects of the three reforms for household directly affected by the reform are summarised in Table 5. In the upper part of the table we report these effects for eligible

households, i.e. those with at least one previously unemployed household member between 55 and 64 years of age taking up a job. Average monthly income of eligible unemployed people increases substantially, on average, where income effects vary substantially both between the three reforms and by household type. For couples, the HWS is estimated to lead to an average monthly income gain of 510 Euro of previously unemployed older people living in couples households, compared to about 240 Euro for the IWC and 350 Euro for the EB, respectively. For single women, too, the largest average income gain is obtained for the HWS, whereas the IWC would result in a somewhat larger gain than the EB. In contrast, for single men the IWC would lead to the highest income gains, whereas the lowest gains would result for the HWS.

In general, we find that the income effect exceeds the welfare effects.⁷ This is because only previously unemployed older people who take up work become eligible to a subsidy under each of the three reforms and, given that leisure is a normal good, need to be compensated for their loss of leisure. As indicated by the relatively large difference in estimated income gains and welfare effects, this is particular true for single households, and single men in particular.

The lower part of Table 5 summarizes aggregate income and welfare effects for the eligible population as a whole. Overall, the HWS would result in the strongest increase in both income and welfare amounting to roughly 250 and 170 million Euro per year, respectively. Aggregate income and welfare effects for the other two policy reforms would be substantially smaller, but still substantial. Net budgetary costs would be negative for all three reforms analysed here ranging from about 40 million Euro per year for the IWC to almost 200 million Euro for the HWS. Depending on the way these induced tax receipts are distributed in the population, there could be second-order effects modifying simulated income and welfare gains for the three reforms. However, assuming that these additional funds are distributed as a lump-sum to all households, these effects would be minimal.

⁷ Welfare effects are usually analysed under the assumption of budgetary balance, where the net costs of a specific programme are financed by a lump sum tax. Accounting for behavioural effects, net costs turned out to differ between the three policies analysed but are *negative* in each case. Since a lump sum transfer distributing the resulting surplus would amount to less than 1 Euro per month, and thus not make any difference to the numbers shown in table, we neglect this issue here.

7 Summary and Policy Conclusions

The employment rate and the incidence of long-term unemployment are very high among older people in Germany, both in absolute terms and compared to most other OECD countries. We have shown that hourly wages of older workers still employed exceed the average wage in the working population by a large margin, especially in case of men, and that the age distribution of wages is strongly affected by selection effects regarding individual employment decisions. Controlling these effects, estimated hourly wages for both older men and women are very close to the average wage in the male and female population, although there is a significant wage reduction relative to the hourly wage estimated for the age group 45 – 54 years. These estimates indicate that the relatively high wage level of older workers is supported by their low employment rate which, in turn, is the result of older workers with relatively low earnings potential dropping out of the labour force.

These age differences in labour market outcomes are likely to be related to institutional factors, such as the widespread use of early retirement schemes in conjunction with the unemployment insurance system. Recent reforms have, on the one hand, attempted to reduce financial incentives for long-term unemployment and early retirement, and implemented various wage subsidies targeted at long-term unemployed workers, on the other hand. These wage subsidies seem to have been not very success so far, which may be related to the insufficient coordination with other means-tested income support and the way they have been implemented, in particular insufficient targeting and relatively short time limits.

In contrast to existing wage subsidies in Germany, the three policy reforms we have analysed in this paper – an hourly wage subsidy, an in-work tax credit, and the employment bonus – are not time limited, targeted at unemployed people above the age of 55 years, and restricted to regular employment. We find that the simulated employment effects of the three policy reforms would be rather similar and of moderate size, ranging between 20,000 and 30,000 additionally employed older women and between 10,000 and 20,000 older men. Average monthly incomes of eligible previously unemployed people who take up work increase substantially, on average, where income effects vary substantially both between the three reforms and by household type. Our results also suggest that the hourly wage subsidy yields the highest welfare gains if measured at the individual (household) level using the compensating variation as monetary welfare measure. Since empirical labour supply elasticities differ between elderly men and women, and between single and couple households, the relative size of income and welfare effects varies between these groups as well as between programmes.

All three reforms analysed here would be self-financing in the sense that net budgetary costs are estimated to be negative, ranging from about 40 million Euro per year for the in-work credit to almost 200 million Euro for the hourly wage subsidy. This optimistic scenario depends on the possibility to restrict eligibility to any of the three subsidies to currently unemployed older people. Thus, we have to assume that the actual implementation of such a policy measure would not induce currently employed older people to become unemployed and thereby eligible to the subsidy. It should be stressed that for the policy reforms analysed here such an entitlement effect seems more likely than under the already existing wage subsidies targeted at older unemployed people. The reason is that the subsidies analysed here are permanent rather than limited to a relatively brief time period. However, the time-limit of existing wage subsidies to older workers may also explain their very limited success: If there are no long-term productivity effects from participating in the programme, there would be no long-term employment effect after the subsidy has expired. One possibility would perhaps be to combine a time-limited wage subsidy and subsidized vocational training programmes, but there is little empirical evidence, both for Germany and in international comparison, that such programmes are effective for older workers.

References

- Ammermüller, A., Boockmann B., Maier, M., Zwick, T. (2006), Eingliederungszuschüsse und Entgeltsicherung für Ältere - Analysen auf der Basis von natürlichen Experimenten, forthcoming in: Vierteljahreshefte zur Wirtschaftsforschung, DIW Berlin.
- Bargain, O. and Orisini, K. (2006): In-Work Policies in Europe: Killing Two Birds with One Stone?, forthcoming in Labour Economics.
- Bargain, O., M. Caliendo, P. Haan and Orsini, K. (2005), 'Making work pay in a rationed labour market. The Mini-Job reform in Germany', DIW Discussion Papers No. 536, DIW – Berlin.
- Blundell, R. H. Reed and T. Stoker (2003), Interpreting Aggregate Wage Growth: The Role of Labour Market Participation. *The American Economic Review*, 93:4, 1114-1131.
- Blundell, R., A. Duncan, J. McCrae and C. Meghir (2000), The labour market impact of the Working Families' Tax Credit, *Fiscal Studies*, 21:1, 75-104.
- Creedy, J. and Duncan, A. (2002), Behavioural Microsimulation with Labour Supply Responses, *Journal of Economic Surveys*, vol. 16.
- Haan P. and M. Myck (2006), Apply with Caution: Introducing UK-Style In-work Support in Germany. Discussion Paper No. 555, DIW Berlin.
- Haan, P. (2006) 'Much Ado About Nothing: Conditional Logit versus Random Coefficient Models for Estimating Labor Supply Elasticities', forthcoming in: *Applied Economics Letters*.
- Haisken-DeNew, J. and J. Frick (2005), Desktop Compendium to The German Socio-Economic Panel Study (GSOEP), DIW Berlin.
- Heckman, J. (1979), Sample Selection as a Specification Error, *Econometrica*, 47, 153-161.
- Hotz, V. and J.K. Scholz (2003), The Earned Income Tax Credit, in R. Moffitt (ed.), *Means-Tested Transfer Programs in the United States*, Chapter 3, University of Chicago Press.
- King M. (1981), Welfare effects of tax reforms using household data, *Journal of Public Economics*, Vol 21, 2, 183 - 214.
- McFadden, D. (1974), 'Conditional Logit Analysis of Qualitative Choice Behavior', in: Zarembka, P. (ed.), *Frontiers in Econometrics*, Academic Press.
- OECD (2005a), *Aging and Employment Policies – Germany*, OECD.
- OECD (2005b), *Employment Outlook; Chapter 3: Increasing financial incentives to work: the role of in-work benefits*, 125-171.
- Steiner, V. (2001), "Unemployment Persistence in the West German Labour Market: Negative Duration Dependence or Sorting?," *Oxford Bulletin of Economics and Statistics*, 63:1, 91-113.
- Steiner, V., Haan P. and Wrohlich, K. (2005), *Dokumentation des Steuer-Transfer Mikrosimulationsmodells STSM – Version 1999- 2002*, DIW Data Documentatin 2005-09, DIW – Berlin.
- Steiner, V., Wrohlich K. (2005), Work Incentives and Labor Supply Effects of the 'Mini-Jobs Reform' in Germany, *Empirica*, 32, 91-116
- van Soest, A. (1995), Structural models of family labor supply: a discrete choice approach, *Journal of Human Resources*, 30, 63-88.

Appendix

Table A1. Selectivity-corrected wage regressions

	Women west		Women east		Men west		Men east	
Wage equation								
Years of education	0.061	34.01	0.020	8.22	0.055	44.52	0.034	14.91
Years of full time work	0.008	3.22	-0.005	-2.31				
Years of full time work squared	-0.011	-1.62	-0.019	-3.99				
Years of part time work	-0.006	-2.01	-0.021	-9.04				
Years of part time work squared	0.022	1.71	0.026	2.70				
Age 25-34	-0.110	-5.58	-0.610	-14.06	-0.352	-27.12	-0.287	-12.57
Age 35-44	0.026	1.55	-0.378	-9.84	-0.145	-17.71	-0.092	-6.46
Age 45-54	0.085	6.36	-0.220	-7.31	-0.041	-5.31	-0.022	-1.58
Age 55-64	0.057	5.27	-0.104	-4.82	-0.011	-1.49	0.004	0.30
Tenure	0.004	1.43	0.017	10.65	0.010	5.71	0.003	2.31
Tenure squared	0.002	0.19	-0.023	-4.77	-0.025	-4.28	-0.004	-1.07
Human capital depreciation	-0.052	-7.19	-0.097	-13.36	-0.064	-6.98	-0.159	-18.49
Years of education × German	0.000	0.16			0.005	5.24		
Years of full time work × German	0.004	1.61			-0.001	-0.58		
Yrs. full time work sq. × German	-0.015	-2.11			0.013	2.18		
Years of part time work × German	0.002	0.84			-0.083	-7.83		
Yrs. of part time work sq. × German	-0.016	-1.16						
Tenure × German	0.010	3.46						
Tenure squared × German	-0.019	-1.89						
Human capital depreciation × German	0.009	1.13						
Civil servant	0.028	8.29	0.007	0.91	-0.010	-3.93	0.018	2.72
Selection equation								
Age 25-34	1.983	45.20	3.354	29.80	-0.252	-7.63	0.057	1.02
Age 35-44	2.317	63.27	3.494	37.29	0.773	28.27	0.993	21.87
Age 45-54	1.859	56.65	2.746	37.13	1.051	35.00	1.132	23.90
Age 55-64	1.239	44.63	1.690	32.13	1.047	37.48	1.061	25.86
Medium education degree	0.190	5.97	1.071	14.24	0.207	5.46	1.013	11.13
High education degree	0.513	16.54	1.422	20.27	0.234	6.89	1.245	16.35
Vocational training	0.481	21.18	0.897	14.47	0.657	25.20	1.066	15.40
Academic Education	1.082	34.96	1.979	25.37	1.093	31.85	1.832	21.64
Years of full time work	0.116	41.41	0.150	24.64				
Years of full time work squared	-0.141	-18.84	-0.150	-11.10				
Years of part time work	0.146	40.20	0.130	17.97				
Years of part time work squared	-0.274	-19.52	-0.161	-5.58				
German	0.027	1.19			0.202	8.43		
Bad health (medium)	-0.004	-2.28	-0.011	-3.46	-0.012	-7.98	-0.015	-4.84
Bad health (high)	-0.011	-4.85	-0.003	-0.74	-0.005	-2.65	-0.001	-0.26
Married	-0.116	-6.09	0.302	9.55	0.330	15.32	0.715	20.61
Child younger 3	-1.413	-43.22	-1.136	-17.80	0.023	0.61	-0.128	-1.84
Child between 3-6	-0.612	-23.32	-0.303	-5.30	-0.019	-0.54	0.001	0.01
Child between 7-16	-0.335	-17.10	-0.124	-3.54	0.027	1.12	0.039	1.02
Child older 17	-0.061	-1.68	-0.111	-1.87	-0.072	-1.63	-0.096	-1.48
Other household income/1000	-0.152	-27.80	-0.328	-22.02	-0.398	-65.55	-0.608	-36.14
Mills ratio	0.055	5.81	-0.040	-2.59	0.003	0.57	-0.024	-1.81
Number of observations								
Censored	19287		6125		9890		4494	
Uncensored	17816		6990		24462		7556	

Notes:

- Two-stage estimation of selection model (Heckman 1979) on pooled data for the period 1995-2003.
- The variable human capital depreciation is a weighted sum of years of previous unemployment; a constant, time and regional dummies (at the state level) as well as dummies for industry and firm size are included in both equations. The sign “×” indicates an interaction term.
- For all groups the joint tenure effect is highly significant according to an *F* test of joint significance.

Source: SOEP, waves 1995 – 2003.

Table A2. Hourly wage subsidy and market wages

		Women		Men	
		East	West	East	West
Eligible population	subsidy (Euro / hour)	1.86	1.54	0.38	1.63
	in %	24.46	17.39	4.78	13.91
	market wage (Euro / hour)	7.61	8.87	7.91	11.75
By tenure					
tenure = 0	market wage	8.01	8.10	7.91	13.89
0 < tenure ≤ 10 years	subsidy (Euro / hour)	0.50	0.54	0.10	0.40
	in %	6.11	6.20	1.08	3.40
	market wage (Euro / hour)	8.14	8.78	9.07	11.73
10 < tenure ≤ 20 years	subsidy (Euro / hour)	1.73	1.49	0.35	1.25
	in %	21.99	16.45	3.72	10.91
	market wage (Euro / hour)	7.86	9.08	9.29	11.51
tenure > 20 years	subsidy (Euro / hour)	2.72	2.76	0.49	1.95
	in %	37.35	30.32	6.45	16.77
	market wage (Euro / hour)	7.28	9.10	7.55	11.62
Tenure	(in months)	20.71	17.03	25.66	26.78

Note: The relative wage subsidy is calculated as ratio (in %) of the amount of the subsidy relative to the expected market wage.

Source: SOEP 2003; own calculations based on wage regressions in Table A1.

Table A3. Hours categories by household type

Couple household - both partners flexible			
	Share	Male Working Hours	Female Working Hours
1	3.84	0	0
2	0.66	0	7.42
3	0.79	0	17.71
4	0.94	0	26.72
5	2.72	0	34.88
6	0.74	0	41.47
7	0.25	5.47	0
8	0.08	6.71	8.33
9	0.05	5.52	17.00
10	0.23	4.65	27.36
11	0.20	5.22	32.12
12	0.15	6.48	37.66
13	0.20	15.94	0
14	0.08	14.58	2.30
15	0.10	11.63	16.50
16	0.08	17.50	26.69
17	0.31	15.54	38.78
18	0.03	18.41	45.00
19	0.46	29.51	0
20	0.20	24.49	6.09
21	0.36	25.19	17.14
22	0.43	29.38	25.40
23	0.56	28.03	34.58
24	0.25	28.07	35.34
25	12.69	36.79	0
26	4.98	37.88	8.21
27	6.56	38.37	17.75
28	8.49	38.29	26.70
29	14.39	38.06	34.31
30	3.43	38.35	40.97
31	9.26	47.52	0
32	3.69	47.90	7.44
33	4.68	46.60	17.81
34	5.80	47.16	27.23
35	8.44	45.98	35.58
36	3.87	46.69	43.76

Single households - women		
	Share	Female Working Hours
1	19.8	0
2	4.1	7.7
3	5.9	18.5
4	14.4	28.3
5	41.0	37.3
6	14.8	44.7

Single households - men		
	Share	Male Working Hours
1	16.3	0
2	1.1	6.6
3	1.4	17.5
4	3.3	27.3
5	50.5	38.1
6	27.4	46.2

Couple household - women flexible		
	Share	Female Working Hours
1	35.5	0
2	7.5	8.0
3	11.9	17.8
4	13.1	27.0
5	23.2	33.9
6	8.8	43.0

Couple household - men flexible		
	Share	Male Working Hours
1	12.7	0
2	2.2	5.0
3	1.5	17.3
4	1.8	28.1
5	41.2	37.3
6	40.5	47.1

Notes: The following hours classifications are used: 0, [0 - 12],]12-20], ,]20-34] ,]34-40] , >40

Source: SOEP 2003.

Table A4. Relative labour supply effects (in%)

	Women				Men			
	New Participation	Working hours as full time equivalents			New Participation	Working hours as full time equivalents		
		Total	New Participants	Working Population		Total	New Participants	Working Population
	<i>Relative to the non working population between 55-64</i>							
HWS								
Couples	1.80	1.63	1.54	0.09	3.41	3.79	3.79	0.00
Singles	2.17	2.17	2.17	0.00	3.40	3.40	3.40	0.00
Total	1.87	1.73	1.66	0.07	3.40	3.69	3.69	0.00
IWC								
Couples	0.86	0.43	0.51	-0.09	-0.19	-0.38	0.00	-0.38
Singles	4.34	2.89	2.89	0.00	7.92	6.79	6.79	0.00
Total	1.53	0.90	0.97	-0.07	1.84	1.42	1.70	-0.28
EB								
Couples	1.37	1.20	1.11	0.09	1.70	1.89	1.70	0.19
Singles	1.81	1.81	1.81	0.00	3.96	3.96	3.96	0.00
Total	1.46	1.32	1.25	0.07	2.27	2.41	2.27	0.14
	<i>Relative to the working population between 55-64</i>							
HWS								
Couples	1.82	1.65	1.56	0.09	1.11	1.24	1.24	0.00
Singles	0.90	0.90	0.90	0.00	1.58	1.58	1.58	0.00
Total	1.48	1.37	1.32	0.05	1.20	1.30	1.30	0.00
IWC								
Couples	0.87	0.43	0.52	-0.09	-0.06	-0.12	0.00	-0.12
Singles	1.80	1.20	1.20	0.00	3.68	3.15	3.15	0.00
Total	1.21	0.71	0.77	-0.05	0.65	0.50	0.60	-0.10
EB								
Couples	1.39	1.22	1.13	0.09	0.56	0.62	0.56	0.06
Singles	0.75	0.75	0.75	0.00	1.84	1.84	1.84	0.00
Total	1.15	1.04	0.99	0.05	0.80	0.85	0.80	0.05

Notes:

- Full time equivalents are defined as 40 weekly working hours.
- Eligible population are all individuals aged between 55-64 and not working (0.7 million men, and 1.4 million women). Working population are all individuals aged between 55-64 working (2 million men, and 1.8 million women).

Source: SOEP 2003; calculations based on empirical household labour supply model as described in the text.