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# **Optimal In-work Support and Employment in Ageing Societies – Britain and Germany Compared**

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2007



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# Contents

<b>List of tables and figures</b>	<b>iii</b>
<b>Executive summary</b>	<b>iv</b>
<b>1 Overview</b>	<b>1</b>
<b>2 Labour market outcomes and institutional differences between Britain and Germany</b>	<b>4</b>
2.1 Employment patterns	4
2.2 Wage distributions	7
2.3 Labour market institutions, tax-benefit systems and recent labour market reforms	8
<b>3 Introducing British-style in-work support to Germany</b>	<b>14</b>
3.1 Empirical methodology	14
3.2 Labour supply effects	15
3.3 Summary	17
<b>4 Optimality of in-work support in Britain and Germany</b>	<b>19</b>
4.1 The optimal design of in-work support	19
4.2 Empirical methodology	21
4.3 Welfare implications of the current British and German in-work support systems	22
4.4 Optimal tax-benefit schedules for Britain and Germany	25
4.5 Summary	27
<b>5 Making work pay for older unemployed people</b>	<b>28</b>
5.1 Making work pay: Three policy reforms	28
5.2 Work incentive effects of the reforms	30
5.3 Labour supply effects	30
5.4 Welfare implications	33

<b>6 Main findings and policy conclusions</b>	<b>36</b>
<b>References</b>	<b>39</b>
<b>Appendices</b>	
<b>A Estimation and simulation of labour supply effects</b>	<b>42</b>
<b>B Derivation of labour supply elasticities required for the optimal tax formula</b>	<b>43</b>
<b>Appendix C</b>	<b>44</b>
<b>Glossary</b>	<b>46</b>

# List of tables and figures

## Tables

<b>Table 1</b>	<b>Employment rates and hours worked by gender and age</b>	<b>5</b>
<b>Table 2</b>	<b>Employment rates by household type (%)</b>	<b>6</b>
<b>Table 3</b>	<b>Distribution of couple household by employment status, shares in %</b>	<b>6</b>
<b>Table 4</b>	<b>Mean wages by age and gender</b>	<b>7</b>
<b>Table 5</b>	<b>Labour supply effects – singles</b>	<b>15</b>
<b>Table 6</b>	<b>Labour supply effects – couples</b>	<b>16</b>
<b>Table 7</b>	<b>Optimal welfare weights for the taxation of lone mothers: Britain versus Germany (averages within income groups)</b>	<b>23</b>
<b>Table 8</b>	<b>Optimal tax rates in Britain and Germany</b>	<b>26</b>
<b>Table 9</b>	<b>Labour supply effects of the policy reforms (absolute numbers in 1,000 persons)</b>	<b>32</b>
<b>Table 10</b>	<b>Average income and welfare effects of the reforms</b>	<b>34</b>
<b>Table A1</b>	<b>Labour supply elasticities in Germany and Britain</b>	<b>43</b>
<b>Table A2</b>	<b>Hourly wage subsidy and market wages by tenure in previous employment</b>	<b>44</b>
<b>Table A3</b>	<b>Relative labour supply effects (in %) of the three policy reforms</b>	<b>45</b>

## Figures

<b>Figure 1</b>	<b>Generosity of the British New Tax Credits in April 2005</b>	<b>11</b>
<b>Figure 2</b>	<b>Budget constraints for lone mothers and one-earner couple households in Britain and Germany</b>	<b>13</b>
<b>Figure 3</b>	<b>Budget constraints under the status quo and alternative reforms</b>	<b>31</b>

## Executive summary

How would the current tax-benefit systems in Britain and Germany have to be reconstructed in order to allow the labour market to cope with ageing societies in these two countries? How could tax-benefit systems help to raise the level of employment by alleviating long-term unemployment, discouraging early retirement and raising the labour market participation of women? These vital policy questions are analysed in this comparative Anglo-German study, with the following empirical starting points:

- Contrary to what is often assumed in public discussions, out-of-work benefits are similar in both countries; however, in Britain in-work credits make labour market participation for the target groups more attractive.
- Wages of older workers are much less flexible in Germany than in Britain, due to the pronounced wage-tenure profile prevailing in Germany, and this affects the employment rates of older people in the two countries differently.

Basing our country-specific micro-simulation models accounting for labour supply responses on these observations, we have analysed the potential labour market effects of introducing British-style in-work tax credits in Germany and find mixed results:

- While labour force participation of single individuals would increase by approximately 100,000 people, labour supply of men and women living in couple households would fall by about 70,000. Further to these ambiguous distributional effects, such a reform would cause substantial net fiscal costs of about €11 billion (£7.2 billion) per year.
- Simply ‘importing’ the in-work support system from Britain to Germany without further changes to the tax-benefit system would therefore have no overall positive effect.

We then investigate the optimal design of the tax-benefit system in Britain and Germany with regard to its inherent trade-off between equity and efficiency. Public in-work support, which aims at improving financial work incentives for low-income groups by providing a sufficient income for those who take up work, has not only the wished-for positive labour market effects but potentially also unintended welfare effects. If public support of low incomes induces a part of the working population to reduce their labour supply, this causes extra public costs and jeopardises the success of the tax-benefit reforms. In our analysis of this trade-off, focused on lone mothers as one of the main target groups of in-work support, we obtain two main results:

- Currently existing tax-benefit systems in both countries, which do not feature *negative marginal tax rates*, are only optimal if the government puts a relatively high *welfare weight on the well-being of non-working lone mothers* and has a relatively low preference for *redistribution* towards working lone mothers.
- In-work credits with negative marginal tax rates would be optimal from a social welfare perspective in both Britain and Germany given relatively modest or medium preference for redistribution.

Regarding policies to increase work incentives of older unemployed people, we analyse three policy reforms: an hourly wage subsidy, an in-work tax credit and a subsidy of social security contributions ('employment bonus'). We find that:

- The 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 men.
- The hourly wage subsidy would yield the highest income and welfare gains, especially for people living in couple households and for single women, whereas for single men these effects are largest for the in-work tax credit.
- We conclude that for older unemployed workers targeted wage subsidies of the type investigated in this report could be an efficient alternative to just relying on the British model of flexible market wages.



# 1 Overview

How tax and transfer programmes should be structured to tackle the challenges of an ageing society is one of the most important and controversial topics in the economic policy debate. In several European countries, including Germany and Britain, long-term unemployment and early retirement are widespread, in particular among older male workers (Naegele and Walker, 2002; Lyttenburgh and Smeaton, 2003; OECD, 2005). Therefore, it is of central interest to design and implement policies that would increase incentives for this group to participate in the labour market and thereby raise the level of employment among older workers. However, given future demographic developments and the ageing of the workforce in Britain and Germany, increasing the employability of the workforce in general, and not just older workers, is considered by policy makers to be one of the main economic and social problems. This report is therefore not restricted to the elderly population, but studies the impact and efficiency of the current tax and benefit systems in Britain and Germany and of potential reforms on the whole working population. Moreover, in line with the current political debate, we will consider labour supply and welfare effects of in-work support programmes targeted in particular at women with young children, as the participation rate of this group is the lowest in both countries.

Various approaches have been suggested in the economic literature and in the social policy debate to make work financially more attractive relative to non-work and, at the same time, to provide a universally accessible level of income support for those households whose earnings fall short of the subsistence level. These reforms range from limiting entitlement periods for social assistance, combined with strict work requirements, to in-work earnings-related subsidies for people with low earnings potential, such as the Working Tax Credit (WTC) in Britain<sup>1</sup> and the Earned Income Tax Credit (EITC) in the US. In Germany, the government's 'Agenda 2010' and the so-called 'Hartz reforms' aim to increase work incentives and employment in low-wage labour markets by combining cuts in unemployment assistance with introducing earnings-related subsidies. In view of the low employment rate of older men in Germany, there have also been reforms of the public pension system to make early retirement a financially less attractive option, leading to withdrawal from the labour market, as well as active labour market programmes targeted at elderly unemployed people.

In-work income support programmes, which aim to subsidise low-paid employment, have been operational in several countries (Immervoll et al., 2007) for some time, and there have been suggestions that in-work support could be used to make employment more attractive in Germany as well.<sup>2</sup> In-work transfer programmes are typically meant to fulfil two aims: to improve financial work incentives for people with low earnings potential, and to provide a socially defined level of income support for them. To provide more

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<sup>1</sup> In this report, we are referring to 'Britain' throughout as the data refer not to the whole UK but to Britain only.

<sup>2</sup> In this report, by 'in-work' support we refer to government transfers which are conditional on employment. In Germany, people can receive government transfers while working but there exist no transfers which are strictly conditional on being employed (the only minor exception to this is the so-called child-supplement (*Kinderzuschlag*), see previous section).

generous income support for these people may, however, induce negative work incentive effects among those already working. Hence, from a social welfare perspective, there exists a trade-off between equity and efficiency inherent in such programmes. One important issue concerns the question as to whether in-work support schemes should feature negative marginal tax rates, as in the case of the phase-in region of the EITC in the US. Under this scheme, for each dollar earned there is a subsidy (negative tax) of 40 cents (depending on household type) within the phase-in region. This also implies that the tax system redistributes more to people with positive earnings than it does to those who do not work, who are typically considered to be living in poor households.

In this report, labour market and welfare effects of the current tax-benefit systems in Britain and Germany, as well as various policy reforms, are analysed on the basis of behavioural micro-simulation models, TAXBEN for Britain and STSM for Germany (see Brewer et al., 2005; Steiner et al., 2005). These models account for the details of the tax-benefit systems in both countries and can be used to perform ex-ante analyses of the labour market and welfare effects of specific policy reforms allowing us to evaluate policies not yet implemented in any one country. For example, we can thus analyse how the introduction of British-style in-work support in Germany or the implementation of new employment subsidies for older unemployed workers, currently under discussion in Germany, would affect labour supply and economic welfare.

To provide an empirical perspective for these analyses, we summarise in Chapter 2 the most important institutional regulations affecting work incentives, labour market structures and the distribution of incomes in the two countries. We identify two key differences regarding work incentives and labour market outcomes:

1. Due to the British in-work credits, financial incentives to take up low-wage jobs are stronger in Britain than in Germany.
2. Wages, especially for older workers, are more flexible in Britain than in Germany, which may be related to institutional differences in the provision of out-of-work income support in the two countries.

These differences motivate the empirical analyses of the tax-benefit systems in both countries, upon which we will draw conclusions, in the subsequent chapters of this report, about the employment and welfare effects of hypothetical reforms.

In Chapter 3, we analyse the labour supply effects of the hypothetical introduction in Germany of in-work support similar to the current British system. Our simulation results show that labour force participation of single mothers in Germany would increase, but labour force participation and hours worked of men and women living in couple households would be reduced, and these negative effects would nearly outweigh the positive effects on lone parents. Overall, the net employment effect of introducing British-style in-work support in Germany would be positive but small (in the range of about 35,000 individuals), and the fiscal cost of the reform would be relatively high amounting to approximately €11 billion (£7.2 billion) per year.

From a social welfare perspective, the interaction of the incentive effects of social reforms with the level of social welfare is of great importance for the evaluation of economic policy reforms. In Chapter 4, we go beyond the positive analysis of labour supply effects and assess the optimality of currently existing in-work support programmes, such as the British New Tax Credits or the US EITC, relative to means-tested out-of-work benefits as

currently implemented in Germany. We provide empirical evidence about the optimal design of tax-benefit systems in both Britain and Germany, where we make two contributions. First, we derive the welfare weights assigned by society to the different groups along the income distribution that would make the actual tax and transfer system in both countries optimal. Second, assuming a specific social welfare function, we analyse how the tax-benefit systems in Germany and Britain would look in terms of in-work tax credits and income support for the non-working poor. Here, we focus on lone mothers, who have been the main target group for recent in-work support reforms in Britain and elsewhere.

We show that the British and German tax-benefit systems, which do not exhibit negative marginal tax rates, are only optimal from a social welfare perspective if relatively high welfare weights are given to non-working lone mothers. Furthermore, our simulation results imply that in-work credits with negative marginal tax rates for lone mothers may be optimal from a social welfare perspective with relatively low and medium taste for redistribution in both Germany and Britain. Even with a high taste for distribution, it would be optimal in Britain to tax the non-working and the poorest working women at the same rate. We also find that optimal tax rates at the top of the distribution markedly differ between the two countries. These results are driven by the relatively high empirical elasticities of labour force participation relative to the elasticity of working hours of those in Britain who are already employed.

Chapter 5 shifts the focus of the analysis to older unemployed people and to policies aimed at increasing employment within this group. More specifically, we analyse and compare the labour market effects and welfare implications of three reforms: an hourly wage subsidy, an in-work credit and an employment bonus in the form of a subsidy of social security contributions for low-wage people. All three reforms are explicitly targeted at older unemployed people. 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 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 could be restricted to previously unemployed people.

In the concluding chapter of this report, we summarise the main results of the study and, on this basis, derive some policy conclusions and recommendations on how to tackle the challenges of an ageing society for the labour markets in Britain and Germany.

## 2 Labour market outcomes and institutional differences between Britain and Germany

In this chapter, we describe differences in employment patterns and the distribution of wages between Britain and Germany, and provide a comparative perspective on the structure of labour market institutions and the tax-benefit systems in the two countries. Based on this analysis, we identify the key differences between Germany and Britain with respect to work incentives and working behaviour.

### 2.1 Employment patterns

As the focus of the study is on employment in ageing societies, we start with a description of employment patterns by age groups. This analysis, like all the following, is based on the Family Resources Survey (FRS) for Britain and the Socio-Economic Panel (SOEP) for Germany. The FRS is an annual cross-sectional survey which contains information on about 25,000 households. The SOEP is a representative sample of about 12,000 private households in Germany, with detailed information on their household incomes, hours worked and household structure (Haisken-DeNew and Frick, 2005). We compare data for the two countries for the year 2002/03. Our sample includes individuals aged 25–64 in order to minimise the differences due to education requirements, military/social service obligations and different retirement patterns. Table 1 compares employment rates (including the self-employed) by age between the two countries.

For women, the overall employment rate in Britain exceeds the German rate by more than 5 percentage points. In both countries, female employment rates first increase with age but decline in the highest age group. The employment rate of women aged 25–34 in Germany is lower than in Britain; this is mainly related to the low employment rate of mothers with young children and more of this age group being in higher education in Germany. Employment rates of middle-aged women are comparable between the two countries. In the highest age group, there is again a significant difference between Britain and Germany, although in both countries the participation rate is very low at around 40%. This is mainly due to retirement or disability. As Frerichs and Taylor (2005) show, in Germany more than 28% of the inactive in this age group are in retirement (12.8% in Britain), whereas in Britain the largest share of the non-participants is due to illness or disability (4.1% in Germany)<sup>3</sup>.

The average number of working hours including the non-employed with zero hours ('unconditional working hours') shows the same pattern as the employment rate: women

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<sup>3</sup> See Table 5, Frerichs and Taylor (2005).

**Table 1**  
**Employment rates and hours worked by gender and age**

Age	Share (%)		Employment rate (%)		Working hours (unconditional)		Working hours (conditional)	
	Germany	Britain	Germany	Britain	Germany	Britain	Germany	Britain
<b>Women</b>								
25–34	20.68	24.75	59.37	68.77	20.92	23.44	31.75	34.09
35–44	29.42	29.29	71.38	72.68	22.37	23.23	29.83	31.95
45–54	26.32	24.54	71.91	73.71	22.86	24.98	30.85	33.89
55–64	23.65	21.41	38.07	42.99	12.04	12.50	30.52	29.08
All			61.16	65.61	19.76	21.42	30.63	32.64
<b>Men</b>								
25–34	18.54	22.74	73.45	87.31	34.52	39.36	41.75	45.09
35–44	31.83	29.66	84.08	88.51	37.00	40.96	42.53	46.28
45–54	25.53	24.64	84.32	83.86	36.81	38.85	42.56	46.32
55–64	24.13	22.96	50.93	61.36	22.26	26.10	41.88	42.54
All			74.17	80.86	32.94	36.66	42.29	45.34

Source: SOEP (2003), FRS (2002); own calculations.

Note: Working hours are hours per week.

in Britain work, on average, more hours, and the average number of hours worked declines markedly in the highest age group in both countries. The average number of working hours of employed people ('conditional working hours') indicates that in Germany more women work part time than in Britain. For employed women, the average number of working hours shows little variation across age groups, especially in Germany.

For men, the overall employment rate is also higher in Britain than in Germany, where this difference is mainly driven by the youngest and the oldest age groups. Again, early retirement is the main reason for the decline in the last age group and this is more prevalent in Germany. The average number of working hours is also lower in Germany, irrespective of whether or not non-employed men are included (with zero hours) in the calculation.

As Table 2 shows, employment rates in the two countries also differ markedly by household type. For single people, the overall employment rate in Germany is slightly higher than in Britain. This difference results from much higher employment rates of single women in Germany (4.3 percentage point difference).<sup>4</sup> Employment rates of singles with children (below 17 years old) are much higher in Germany than in Britain, despite the existence of relatively generous in-work support for lone parents in Britain (see section 2.3).<sup>5</sup>

<sup>4</sup> This is mainly due to the higher labour market participation of women in east Germany. As documented in previous literature, because of the different history, the labour market behaviour of women between east and west Germany is still quite dissimilar (see, for example, Haan and Steiner, 2006).

<sup>5</sup> Note, however, the employment rate of this group has increased substantially from a rather low level of 38.7% in 1996 (see Haan and Myck, 2006).

**Table 2**  
**Employment rates by household type (%)**

	<b>Britain</b>		<b>Germany</b>	
All singles	67.91		68.17	
Male singles	71.69		68.20	
Female singles	63.84		68.14	
Singles without children <17	71.48		69.11	
Singles with children <17	52.43		62.74	
	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>
All couples	87.90	72.36	83.32	66.60
Couples without children <17	85.35	77.99	79.73	72.83
Couples with children <17	90.32	67.03	86.83	60.51

Source: FRS (2002/03) and SOEP (2003); own calculations.

Employment rates for people living in couple households are higher in Britain for both men and women, and this is the case for couples with and without children. An interesting similarity between the two countries is that the difference in employment rates between those with and without children is the same for both countries: about 5–6% for men and 11-12% for women.

Table 3 breaks down the population of couple households into two-earner, one-earner (where either the woman or the man works) and no-earner couples. Thereby, it becomes apparent that the proportion of two-earner couples is lower in Germany for all couples, regardless of whether they have children or not. The overall proportion of no-earner couples amounting to approximately 7% is very similar, whereas the proportion of couples with only the woman working is almost twice as high in Germany as it is in Britain.

**Table 3**  
**Distribution of couple household by employment status, shares in %**

	<b>All couples</b>	<b>No child &lt;17 in family</b>	<b>Child &lt;17 in family</b>
<b>Britain</b>			
Two-earner	67.17	71.08	63.46
Single earner – man employed	20.73	14.27	26.86
Single earner – woman employed	5.20	6.91	3.57
No-earner	6.90	7.74	6.11
<b>Germany</b>			
Two-earner	56.80	59.75	53.91
Single earner – man employed	26.52	19.99	32.91
Single earner – woman employed	9.81	13.08	6.60
No-earner	6.88	7.19	6.57

Source: FRS (2002/03) and SOEP (2003).

We suggest that a consistent explanation of these country differences in employment patterns between family types has to focus on the supply side of the labour market. It would be difficult to explain these differences in terms of labour demand factors which should either be the same for all individuals regardless of their marital and family status, or at least to be the same for specific types of families. One could argue, for example, that employers would be less willing to employ individuals with parental obligations (for example, because of the cost of child-related leave). However, this should apply equally strongly to lone parents and parents living in couple households, but it is not borne out by the patterns of employment rates described earlier. Differences in employment rates between the two countries and, within countries, between types of households are therefore more likely to be related to individual preferences for leisure or institutional country differences – in particular, financial incentives to work.

## 2.2 Wage distributions

One reason for low employment rates may be related to a mismatch between wage offers of employers and wage expectations of people. This might be especially important for older workers, given that wages tend to increase with age. However, this needs not be revealed by the empirically observed relationship between wages and workers' age because people with low market wages may drop out of the labour force earlier. In this case, the working population consists of an increasing share of people with high market wages increasing the mean (and variance) of the observed wage distribution. In fact, as shown by Blundell et al. (2003), the increase in real wages over the last 20 years in Britain can be partially explained by such selection effects.

In Table 4, we summarise average mean wages both for employed people (wages conditional on employment) and for the whole labour force (unconditional wages) by gender and age for both countries, where the latter are estimated on the basis of selectivity-corrected wage equations. In general, gross hourly wages in Germany are higher than in Britain. One reason might be different qualifications and skills but we

**Table 4**  
**Mean wages by age and gender**

Age	Germany				Britain			
	Employed people		Whole labour force		Employed people		Whole labour force	
	Men	Women	Men	Women	Men	Women	Men	Women
25–34	15.02	12.86	15.02	12.14	16.07	12.84	15.21	10.88
35–44	19.08	14.43	18.01	13.76	18.71	13.29	17.67	11.24
45–54	20.89	15.99	19.01	14.36	18.21	12.47	16.88	11.00
55–64	21.83	15.69	16.80	12.91	16.10	11.58	12.84	7.40
all	18.84	14.45	16.66	12.85	17.58	12.74	15.99	10.44

Source: SOEP (2003), FRS (2002); own calculations.

Note: Wages are gross hourly wages in Euros.

suggest that institutional reasons, as we will describe later, are far more important. For our analysis, though, the differences in the wage distribution are key. Comparing the average observed wages conditional on employment and the unconditional wages for the whole labour force, we find evidence of the selection effect mentioned previously. This is particularly true for individuals aged between 55 and 64 years; depending on the country and gender, the wage difference within this group varies, on average, from about €3 to €5 (£1.96 to £3.28) per hour.

Regarding age differences in average wages, the striking difference between Germany and Britain is that in Germany wages for the working population are on average constant or increasing with age. In contrast, in Britain, conditional wages are decreasing. Wages for the oldest age group are far below the mean of the whole population, while in Germany they clearly exceed the mean, both for men and women. This difference in the observed wages is likely to be related to the institutional regulations in the two countries, as discussed later. Controlling for selection, the same difference between the countries remains but becomes smaller. This implies that selection effects for older workers are more important in Germany than in Britain.

This difference in the wage distribution between the two countries is critical for the employability of older people. Employment protection, unemployment insurance and early retirement schemes affect age groups in different ways; this in turn affects the distribution of wages by age.

### **2.3 Labour market institutions, tax-benefit systems and recent labour market reforms**

In this section, we summarise the most important (for our purpose) institutional regulations in Germany and in Britain. The reference year is 2005, but we also briefly refer to reforms which have either become effective recently, or are set to become effective in the near future. The main institutional regulations affecting the labour market situation of elderly people in both countries concern social security contributions, unemployment benefits and social assistance, and early retirement programmes. In addition, in Germany, employment protection legislation may have an effect on the employment of older workers, and Britain has recently introduced anti-age discrimination legislation. In Britain, the existence of the WTC is important in that it improves work incentives. Here, we focus in particular on reforms and regulations that directly affect net disposable household income. Other related programmes, such as active labour market policies or the organisation of institutions in both countries, are only of minor importance for the analysis in the following sections and are therefore not covered here.

#### **Employment protection**

Protection against dismissal is one factor that helps explain the age structure of employment in Germany. Companies regularly employing more than 10 employees are subject to the Protection Against Dismissal Act (*Kündigungsschutzgesetz*), which provides general rules for the termination of employment contracts by the employer. For particular groups of employees, there are specific regulations providing for social selection according to the criteria of age, length of service at a company, health status and care

obligations for members of the family. Special regulations concerning employment protection are also included in union contracts.

The labour-market effects of this legislation largely depend on the degree of wage flexibility. If wages are fully flexible under competitive conditions, employment protection costs are likely to be compensated by lower market wages. If market wages are not fully flexible owing to statutory (as in Britain) or collectively bargained minimum wages (as in Germany), the protection against the termination of employment is likely to have effects on the level and structure of unemployment. The net effect on the level of unemployment is unclear, however. On the one hand, the legislation reduces the risk of dismissal for those who have a job and thus lowers the inflow rate into unemployment. On the other hand, employment protection reduces the probability that unemployed persons will be hired. Thus, this protection is likely to be one of the reasons for long-term unemployment in Germany, particularly with regard to persons protected by the social selection mentioned earlier. This may explain the relatively high share of older long-term unemployed people in Germany.

Such social selection procedures do not exist in Britain. Age discrimination was not covered by legislation prior to October 2006, so it was previously possible for firms to set an age at which all employees had to retire and to discriminate between job applicants on the grounds of age. However, this changed in October 2006 when new age discrimination legislation came into force. Discrimination in recruitment, promotion and training on the grounds of age is now illegal unless firms can show that they are pursuing a legitimate aim and that age discrimination is an appropriate and necessary way of pursuing that aim. In addition, it is illegal to set a mandatory retirement age lower than 65 and firms now have a 'duty to consider' any request from an employee wanting to work beyond any retirement age that is set. It is hoped that this will lead to an increase in labour market participation among older workers.

### **Early retirement schemes and incentives to increase the retirement age**

While the official retirement age is currently set at 65 (60 for the case of women in Britain until 2010) in both Britain and Germany, most people can effectively retire earlier than this. In Germany, until the year 1996, insured persons were eligible for an old age pension without any specific deductions at the age of 60, under certain conditions. Starting from 1997, the age at which a pension can be taken without deductions was gradually increased to 65 in the year 2001. However, it is still possible to retire early although the pension received is reduced by 3.6% for each year the pension is taken before the age of 65. The minimum age at which a pension can be taken with deductions was 60 until 2005, although it will increase to 61 in 2006, 62 in 2007 and 63 in 2008. After the year 2011, it will not be possible to take a pension before the age of 65. The attractiveness of early retirement following a period of unemployment was in the past also due to a long entitlement period to unemployment benefits for older people, although the entitlement period for this group has recently been reduced from 32 to 18 months. Furthermore, persons at age 58 are allowed to receive these unemployment benefits even if they state that they do not want to take up a job, although this will no longer be permitted from 2008.

The British system is slightly different in that, while it does not allow the Basic State Pension to be taken early, Pension Credit is available to all those over the age of 60. Pension Credit provides a minimum income that is greater than the Basic State Pension,

so those who do not have any occupational or private pensions are no worse off retiring at 60 compared to 65. While this anomaly is set to be phased out between 2010 and 2020 as the minimum age for claiming Pension Credit increases in line with women's state pension age, it provides substantial disincentives for men aged between 60 and 65 to work in the meantime. There is also some concern that those aged 50 and over are using Incapacity Benefit, which is more generous than Income Support and Job Seeker's Allowance, as a method of early retirement (see Banks et al., 2002) since the number of men over 50 claiming Incapacity Benefit doubled between 1980 and 1995, while the number of women aged over 50 claiming it quadrupled. As a result of this, there have been attempts to encourage those on Incapacity Benefit to return to work. These have consisted of compulsory work-focused interviews for new claimants and a 'Pathways to Work' programme in seven pilot areas.

In both countries, there have been recent attempts to encourage people to work beyond the normal retirement age by providing higher pensions to those who retire later. In Germany, delaying retirement by a year increases an individual's pension by 6% (up to the age of 67), while in Britain it increases by 1% for each five-week period that the pension is not claimed (so delaying retirement by a year increases pension entitlement by 10.4%).

### **In-work income support**

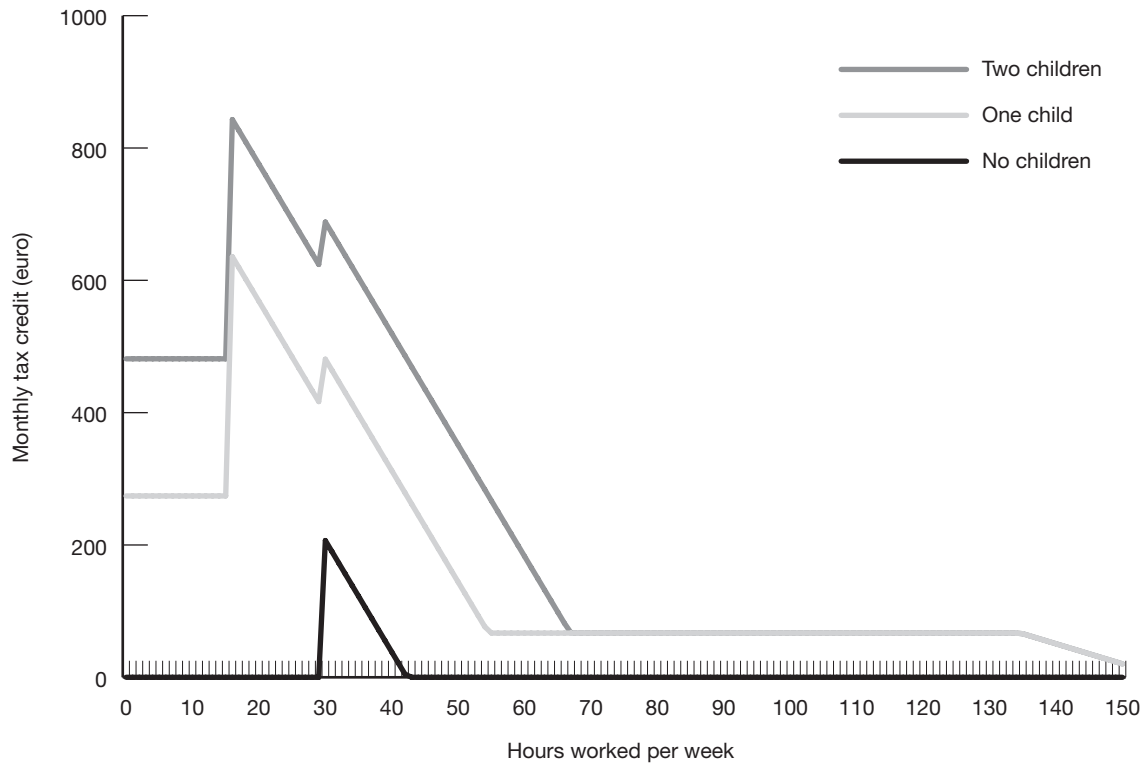
One feature of the British tax-benefit system that does not exist in Germany is that those who work for a low wage for more than 30 hours per week (16 for those with children) receive an extra payment, which used to be called the WTC. In April 2003, the Labour government implemented major changes to the structure of the tax and benefit system in Britain.<sup>6</sup> The reform (commonly known as New Tax Credits) consolidated several elements of support for families with children into the Child Tax Credit (CTC),<sup>7</sup> an instrument which specifically relates to having children and is independent of work status. The CTC is made up of a family premium (of about €60 [£39] per month) and credits for every child in the family. The child credits begin to be withdrawn when gross annual family income exceeds €20,400 (£13,391), while the withdrawal of the family premium starts when pre-tax income exceeds €73,300 (£48,114). To preserve financial incentives to work for low-income families, the government introduced the WTC, which retains the condition for the minimum number of hours worked characteristic of the Working Families' Tax Credit from the pre-reform system. To receive the WTC, one adult in a family with children has to work at least 16 hours per week, and there is a full-time 'premium' for those working more than 30 hours per week. The WTC is also available for families without children, for which the minimum hours condition is 30 hours per week, but it begins to be withdrawn once annual gross family income exceeds €7,650 (£5,021). The generosity of the British New Tax Credits is illustrated in Figure 1 for a one-earner couple with one child, two children and without children, respectively.

Before the recent reform, those returning to work having been on the New Deal for 50+ (a scheme for the older unemployed that involves assisted job search and advice on training) were entitled to a higher amount of WTC for the first year after their return to employment.

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<sup>6</sup> For a detailed discussion of the 2003 reforms, see Brewer (2003); for the labour market impacts of the Working Families' Tax Credit, see Brewer et al. (2005) and Brewer and Browne (2006).

<sup>7</sup> Specifically, the family and child premiums in Income Support, the child credits from the Working Families' Tax Credit and the Children's Tax Credit (which was part of the PAYE income tax system).



**Figure 1**  
**Generosity of the British New Tax Credits in April 2005**

Source: authors' calculations using TAXBEN.

Notes: Assumed hourly wage is €10.47 (£6.87; 25th percentile wage for men in Britain). The New Tax Credits also include a generous Childcare Credit, and additional premiums for families with newborn babies and working disabled people. These are not taken into account in the calculation of the benefit here

In Germany, there has also been a special wage subsidy programme targeted at elderly unemployed people since 2005. This subsidy, known as *earnings insurance* (*Entgeltssicherung*) is intended to provide incentives by way of a wage subsidy for unemployed workers older than 50 to take up jobs with a wage below the level of the previously held job. The amount of this subsidy is 50% of the differential between the former salary and the net remuneration in the new job. The subsidy is time-limited with a maximum duration of two years. Whether this new earnings insurance scheme provides incentives for unemployed persons to take up work mainly depends on the size of the differential between the subsidised net salary and the level of an individual's unemployment compensation. Preliminary evaluation of this programme suggests that only a few people have participated in this programme so far (see Ammermüller et al., 2006).

Another attempt to increase labour force participation and employment in the low-wage sector in Germany is the 'Mini-Jobs' reform which made already existing special regulations for 'marginal jobs' regarding social security contributions somewhat more generous (see Steiner and Wrohlich, 2005). 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 (£262.56), with earnings between €401 (£263.20) and €800 (£525.10) subject to a reduced contribution rate starting at 4% and increasing linearly up to the normal rate of 21% at the top end of the bracket. However, for persons receiving unemployment or social assistance benefits, work incentives hardly

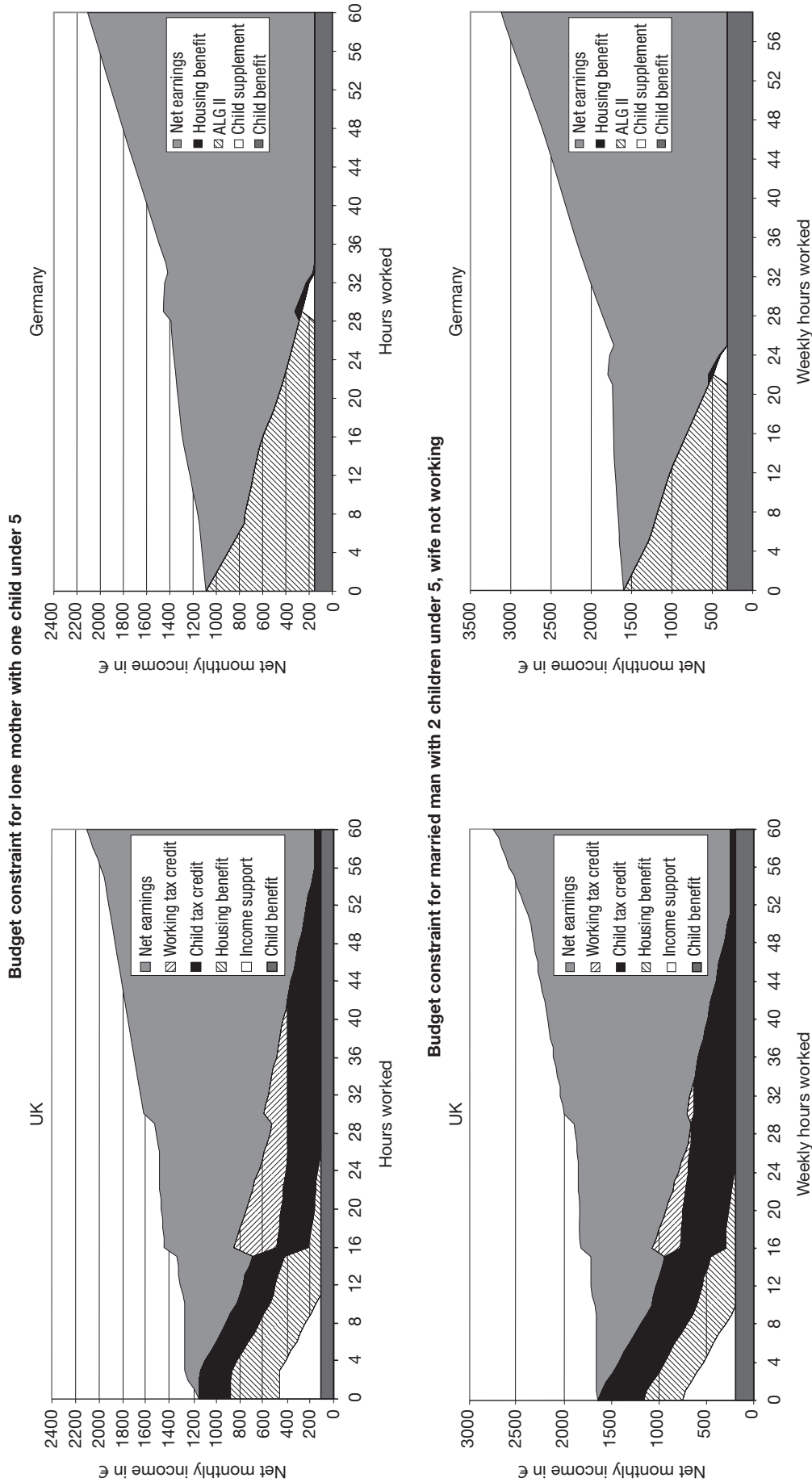
changed due to this reform because unemployment benefits or social assistance benefits remain means tested and earnings from mini-jobs are almost completely wiped out by benefit withdrawal. The majority of persons receiving unemployment benefits are therefore not affected by the reform at all, and there is little more incentive for them to work after the reform than there was before it was introduced (see Steiner and Wrohlich, 2005).

### **Budget constraints of stylised households**

The overall impact of the tax-benefit system on household incomes and work incentives in Britain and Germany is best illustrated by way of budget constraints for certain household types. In Figure 2, we present budget constraints for lone mothers and one-earner couple households in Germany on the basis of our tax-benefit micro-simulation models TAXBEN for Britain (Giles and McCrae, 1995) and STSM for Germany (Steiner et al., 2005), appropriately modified and updated.

For lone mothers with one child under 5 years, the transfer systems in Britain and Germany provide different incentives to start work. This is mainly due to the WTC in Britain. In Germany, the household receives a child supplement in addition to a child benefit, means-tested income benefits (ALG II) and housing benefits. Although this supplement is an in-work benefit, it does not provide strong incentives to take up work as for most households the credit is fairly low and quickly withdrawn. In Britain, however, the existence of the WTC means that there is a discontinuity in the budget constraint at 16 and 30 hours, leading to a clear increase in net income for those who participate in part-time or full-time work. For lone mothers with more than one child, the German system offers even fewer work incentives, whereas in Britain the WTC still ensures that there is a clear incentive to work.

For couple households with children, too, the transfer system in the two countries affects households very differently. In Germany, for a household with two children and a non-working wife, there is an incentive for the man on a median wage to work full time. Again, for this family, the child supplement does not markedly affect net household income and implies a marginal effective tax rate exceeding 100% within some income ranges. In Britain, the tax credits do significantly improve work incentives and, while there are fairly high marginal rates throughout the distribution, they are always less than 100% above income support levels.



**Figure 2**

**Budget constraints for lone mothers and one-earner couple households in Britain and Germany**

Source: STSM and TAXBEN.

Notes: Germany, wage: female median wage (€12.6 [£8.26] per hour), household in rented accommodation (average price for rent and heating, see Ministry of Labour). Britain, wage: female median wage (£7.07 [€10.77] per hour), house rented from local authority (average London council rent and council tax).

### 3 Introducing British-style in-work support to Germany

As described in the previous chapter, one important institutional difference between Britain and Germany is the relatively generous in-work transfers in Britain. In this section we assess the potential labour market effects of the introduction in Germany of a hypothetical in-work support programme similar to the British New Tax Credits system, as discussed earlier.

#### 3.1 Empirical methodology

The British New Tax Credits system (henceforth simply 'Tax Credits' or TCs) is used as a baseline for the following analysis. The system is implemented maintaining the rules which concern the interaction of TCs with other means-tested benefits. Specifically, we assume that income from TCs is included in the means test for income support, which is withdrawn at the rate of 100% above a fairly small allowance. As far as the generosity of the TC is concerned, we exclude the family premium element of Britain's CTC. The reason for this is that the extension of child-related support rather far up the income distribution in a system with an already high level of universal support (for the first three children, €154 [£101] per child per month) would be very costly and therefore unlikely to be implemented.<sup>8</sup>

Disregarding behavioural effects of such a reform, the overall net cost of introducing TCs in Germany is about €11 billion [£7.2 billion]. The government would need to spend about €19 billion (£12.4 billion) on the TCs, but the cost of the ALG II would fall by about €8 billion (£5.2 billion). The reforms would have a rather clear distributional effect – with families in the second and third decile gaining most (€52.10 [£34.18; 4.0%] and €60.00 [£39.36; 3.7%] per month on average, respectively). Families in the first decile would gain only about €25.80 (£16.92; 3.4%), on average because, first, there are fewer families with children in the first decile and, secondly, many of the poorest families do not meet the hours condition to be eligible for TCs.

In order to evaluate the behavioural effects of introducing TCs in Germany, we simulate labour supply responses on the basis of the behavioural micro-simulation model STSM (see Steiner et al., 2005). The empirical labour supply model embedded in STSM accounts for the complexity of household budget constraints induced by the tax-benefit system (see Figure 2) and joint labour supply decisions of partners. The model, which is briefly described in Appendix A (also see Steiner and Wrohlich, 2005; Haan and Steiner, 2006), is estimated on a sample of households where both partners are aged between 25 and 59,

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<sup>8</sup> For more detail, see Haan and Myck (2006).

not in education and not self-employed; the database is the SOEP 2003.<sup>9</sup> For the simulation of the hypothetical policy reform, we have to assume that individual preferences for work and disposable income have remained constant since then.

Using STSM, we simulate net household incomes for (i) the actual fiscal system of the year 2005, and ii) a hypothetical scenario in which we introduce the TCs into the system of 2005. For each household, we simulate the probability of labour force participation and the choice of hours under each of the two scenarios. The difference between the two, averaged over all households, yields the simulated labour supply effects of the hypothetical reform.

## 3.2 Labour supply effects

### Single households

The introduction of TCs would have relatively strong labour supply effects for single adult households, in particular for lone parents, as TCs are the most generous for this group. According to our simulations summarised in Table 5, labour force participation of single

**Table 5**  
**Labour supply effects – singles**

	Change in participation		Change in number of hours (unconditional)	
	Absolute numbers	in %	Absolute (in 000s)	in %
<b>Women</b>				
West				
– no children	400	0.02	28.6	0.04
– with children	59,400	6.47	1676.4	5.95
East				
– no children	1,000	0.36	63.2	0.59
– with children	34,500	15.00	1244.8	15.17
All	95,300	2.91	3013.0	2.59
<b>Men</b>				
– with children	2,400	1.73	92.1	1.63
– no children	7,200	0.27	279.4	0.26
West	3,900	0.17	132.5	0.14
East	5,700	1.24	222.7	1.21
All	9,600	0.34	355.2	0.31

Source: Simulations based on STSM and SOEP (2003).

Notes: Simulation built by drawing 100 times from the distribution of the unobserved heterogeneity and allocating each observation to the alternative that yields maximum utility (see Blundell et al., 2000). Absolute change in employment rounded to nearest 100.

<sup>9</sup> We have estimated the effect of TCs on couples where one partner is either self-employed, in education or retired, or older than 59. We find that the effects for both men and women are negligible. Simulation results for these groups can be obtained from the authors.

women would increase by more than 95,000, or about 2.9%. This effect is almost exclusively borne by lone mothers. Single women without children living in west Germany hardly change their labour supply behaviour, the same group living in the east reacts slightly more. This is due to the higher income gains from the reform for east Germans, as their average earnings are markedly lower than those of people in the western part of the country. The same holds true for lone mothers. The relative change in employment in east Germany amounting to 15% is more than twice as high as the change for west German lone mothers (6.5%). A similar picture emerges regarding changes in weekly working hours.

For single men, the effects of the reform are rather small, which is not surprising given the small number of lone fathers in Germany. The overall employment effect amounts to about 10,000 which translates to a relative increase of 0.34%. Again, effects in east Germany are higher, in terms of both relative and absolute numbers. The impact on the working hours of single men is moderate as well. Weekly working hours increase by about 0.30%.

### Couple households

The overall effect of the reform on the labour supply of men and women living in couple households is negative, as shown in Table 6. The reason is that TCs introduced by the reform are based on household rather than on individual earnings, and only one partner

**Table 6**  
**Labour supply effects – couples**

	Change in employment		Change in number of hours (unconditional)	
	Absolute numbers	in %	Absolute (in 000s)	in %
<b>Women</b>				
West				
– no children	100	0.01	4.9	0.01
– with children	–43000	–1.33	–1033.3	–1.41
East				
– no children	0	–0.00	1.1	0.01
– with children	–12600	–1.50	–635.7	–2.17
Total	–55500	–0.81	–1663.0	–0.85
<b>Men</b>				
West				
– no children	–100	–0.00	–5.0	–0.01
– with children	–2000	–0.04	–956.7	–0.49
East				
– no children	–100	–0.02	–3.7	–0.02
– with children	–11300	–1.27	–656.9	–1.71
Total	–13400	–0.16	–1622.2	–0.46

Source: Simulations based on STSM and SOEP (2003).

Notes: Simulation built by drawing 100 times from the distribution of the unobserved heterogeneity and allocating each observation to the alternative that yields maximum utility (see Blundell et al., 2000). Absolute change in employment rounded to nearest 100.

needs to fulfil the working requirements for the household to become eligible to in-work support. Total labour force participation of women living in couple households decreases by more than 55,000, or about 0.8%. Again, the effect is mainly borne by women with children. The effect on women in couple households without children is basically zero. As for single women, the effects on labour force participation and the relative change in working hours for women in east Germany are higher. For men living in couples, we find smaller negative effects of the Tax Credits. Employment among men in couple households decreases by about 13,000, or 0.16%. The reduction in working hours of almost .5% is substantial, given the large share of men working full time or overtime in the baseline scenario.

As described in section 2.1, in Germany, the share of couple households with both partners working is relatively low in comparison to Britain, whereas the share of one-earner households is relatively high. Our findings indicate that the introduction of British-style in-work support further increases country differences in this respect. As a result of the hypothetical reform, we observe a positive employment effect for no-earner couples. However, this positive employment effect of the reform would clearly be outweighed by its negative effect on the other groups. In particular, the number of couples with both partners initially working markedly decreases by more than 50,000 women and nearly 30,000 men, respectively (see Haan and Myck, 2006).

### **3.3 Summary**

Our analysis of the labour market effects of introducing British-style in-work support in Germany shows that this hypothetical policy reform would increase employment of single individuals by over 100,000, but it would result in a reduction of labour supply among individuals in couples by about 70,000. In terms of working hours, the increased labour supply of singles would just compensate for the reduction estimated for one-earner or no-earner couples. The overall labour supply effects on men and women living in couple households would be negative. The result found for men is especially important as it is markedly different from all results found for Britain, where the overall response among men has always been found positive (see Brewer et al., 2005; Blundell et al., 2005; Myck and Reed, 2005; Bargain and Orsini, 2006).

These estimated effects call for a high degree of caution as far as introducing British-style in-work support to Germany is concerned since this would lead to a further decrease of the share of two-earner couples in Germany, thereby widening the gap between Britain and Germany. It would increase the proportion of one-earner couples and reduce employment levels of both men and women living in couples. Furthermore, there would be substantial net fiscal costs of such a reform, amounting to about €11 billion [£7.2 billion] without accounting for any behavioural effects, and ambiguous distributional effects.

While British-style in-work support may not be the best solution for Germany from the point of view of increasing employment rates of individuals living in couple households, this does not mean that every form of in-work support would fail. In fact, our simulation results for singles are encouraging and, if combined with childcare support, could result in even higher employment effects than those estimated in this report. Implementing in-

work support for couples, however, would need to take into account the interaction of labour supplies of both partners, and so perhaps be based on individual, rather than joint family income. As Steiner and Wrohlich (2004) demonstrated, the system of joint taxation of couples is to some extent responsible for the employment patterns we observe in Germany. A careful combination of a move away from joint taxation with a cautious design of in-work support could perhaps 'do the trick'.

Whether in-work credits are not only effective in increasing employment but also efficient in terms of increasing economic welfare, and how efficient in-work support programmes should be designed given economic conditions in the two countries, will be analysed in the next chapter.

## 4 Optimality of in-work support in Britain and Germany

### 4.1 The optimal design of in-work support

In-work income support programmes, which aim to subsidise low-paid employment, have been operational in several countries (Immervoll et al., 2007) for some time, and there have been suggestions that in-work support could be used to make employment more attractive in Germany as well.<sup>10</sup> In-work transfer programmes are typically meant to fulfil two aims: to improve financial work incentives for people with low earnings potential, and to provide a socially defined level of income support for them. To provide more generous income support for these people may, however, induce negative work incentive effects among those already working. Hence, from a social welfare perspective, there exists a trade-off between equity and efficiency inherent in such programmes. One important issue concerns the question as to whether in-work support schemes should feature negative marginal tax rates, as in the case of the phase-in region of the EITC in the US. Under this scheme, for each dollar earned there is a subsidy (negative tax) of 40 cents (depending on household type) within the phase-in region. This also implies that the tax system redistributes more to people with positive earnings than it does to those who do not work, who are typically considered to be living in poor households.

Public in-work support has two basic aims: first, to improve financial work incentives for people with low earnings potential and, second, to provide a socially defined level of income support for them. However, there may be a trade-off between these two aims, or between efficiency and equity.

The design of in-work transfer programmes, and the related trade-off between equity and efficiency, has been intensively analysed in the economic literature. In particular, the EITC in the US, which implies negative marginal tax rates in its phase-in region, has attracted substantial interest both among economists and in public policy. This type of in-work tax credit also implies that the tax system redistributes more to people with positive earnings than it does to those who do not work – those who are typically considered to be living in poor households.

The seminal theoretical contribution to this literature is Mirrlees (1971). In his model of optimal taxation, a social planner (the government) maximises a social welfare function subject to a budget constraint. The social welfare function is a transformed function of individual utilities, which themselves depend on net household income (consumption)

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<sup>10</sup> In this report, by 'in-work' support we refer to government transfers which are conditional on employment. In Germany, people can receive government transfers while working but there exist no transfers which are strictly conditional on being employed (the only minor exception to this is the so-called child-supplement (*Kinderzuschlag*), see previous section).

and leisure. A first-best solution of this optimal income tax problem would be based on measures of skill or productivity. Since these measures cannot be directly observed in practice, the theory of optimal taxation assumes that the income tax has to be a function of gross (weekly or annual) earnings instead.<sup>11</sup> The social welfare function has to be based on some normative assumption. This may range from the assumption that the government only cares about the worst-off individual (Rawlsian welfare function) to the one that each individual's utility is given, irrespective of their income level, the same weight in the social (Utilitarian) welfare function.

In the framework of optimal income taxation, the margin along which individuals can adjust their behaviour is their labour supply. This leads to the trade-off between equity and efficiency. Whereas transfer programmes (or negative tax payments) can increase the disposable income of the disadvantaged, and thus increase their economic well-being, financing these programmes by taxation of incomes introduces disincentives to work and reduce labour supply. In the Mirrlees model, it is assumed that agents only choose how many hours to work – i.e. adjust their labour supply along the so-called intensive margin – but do not decide whether or not to participate in the labour market at all (extensive labour supply margin).

In this framework, it can be shown that negative marginal tax rates can never be optimal. Hence, the EITC mentioned earlier, with its implied negative marginal tax rate over the phase-in region, would not be an efficient in-work support programme. However, Diamond (1980) showed that, if the only relevant decision for the individual is to work or not to work rather than the number of hours to work, optimal marginal taxes may become negative for some income ranges. Saez (2002) integrated both the extensive and intensive labour supply margin in a model of optimal taxation and showed that negative tax rates are the more likely, the larger the extensive relative to the intensive labour supply elasticity. Homburg (2003) showed that this result may depend on the assumed form of the social welfare function.

In this chapter, we apply the theoretical model presented in Saez (2002) to analyse empirically the design of income taxation, and to discuss its optimality. More specifically, we want to assess and compare the design of the tax and transfer system for lone mothers in Britain and Germany and derive conclusions about the optimality of in-work credits. Instead of focusing on the whole population, we decided to concentrate our analysis on lone parents for a number of reasons.<sup>12</sup> As emphasised in the last section, the in-work credits in Britain are in particular targeted at this group. Furthermore, as our analysis has highlighted, in both countries lone mothers are eligible for generous transfer programmes, and the interaction of transfer programmes and the income tax system can generate budget constraints with high and variable effective marginal tax rates. Third, there is also a (partly emotional) debate in both countries about the extent to which lone mothers should be supported by the state, even when they do not work. Lastly, in practical terms, focusing on lone adult households allows us to avoid the substantial complexity to both models of labour supply as well as optimal tax theory.

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<sup>11</sup> Income tax legislation in Britain and Germany discriminates between households with and without children, and by marital status. The empirical analysis focuses on lone parents.

<sup>12</sup> At first glance, it might seem problematic to derive an optimal tax schedule for a sub-population. However, the government can distinguish lone mothers and explicitly target transfers towards this group. In other words, in this analysis, we derive a tax schedule for singles taking taxation of the rest of the population as exogenous and constant.

## 4.2 Empirical methodology

We base our analysis on the framework outlined in Saez (2002), slightly modified for our purpose. There are  $l+1$  groups in the labour market:  $l$  groups of working individuals, plus one group consisting of those who do not work. Individuals choose whether or not to work (the extensive margin), and how much to work (the intensive margin). The derivation of the optimal tax-benefit structure is based on the following expression:

$$\frac{T_i - T_{i-1}}{C_i - C_{i-1}} = \frac{1}{\mu_i h_i} \sum_{j \geq i}^l h_j \left[ 1 - g_j - \eta_j \frac{T_j - T_0}{C_j - C_0} \right].$$

In this expression,  $T_i$  is net tax paid by group  $i$  and  $C_i$  is the net household income of this group. The term on the left-hand side is thus the extra tax paid when moving from group  $i-1$  to  $i$  divided by the gain in net income. Non-workers receive benefits  $-T_0$  (a negative tax), by definition identical to  $C_0$ . Gross earnings of group  $i$ , equal to  $C_i + T_i$ , are exogenously fixed.  $h_i$  measures the share of group  $i$  in the population. The social welfare function is summarised by  $g_i$ , the weight the government assigns to group  $i$ .

The intensive elasticity,  $\mu_i$ , is defined as:

$$\mu_i = \frac{C_i - C_{i-1}}{h_i} \frac{dh_i}{d(C_i - C_{i-1})},$$

which captures the percentage increase in supply of group  $i$  when  $C_i - C_{i-1}$  is increased by 1%; it is defined under the assumption that individuals are restricted to adjust their labour supply to the neighbouring choice.

The extensive elasticity,  $\eta_i$ , is defined as the percentage of individuals in group  $i$  who stop working when the difference between the net household income out-of-work and at hours category  $i$  is reduced by 1%:

$$\eta_i = \frac{C_i - C_0}{h_i} \frac{dh_i}{d(C_i - C_0)}.^{13}$$

If the extensive elasticity is assumed to be zero, Saez' model gives results similar to Mirrlees', where negative marginal tax rates are never optimal. However, the greater the extensive elasticity compared to the intensive elasticity, the more likely it is that the optimal schedule will feature relative smaller guaranteed income for non-workers, and negative marginal taxes at low levels of earnings.

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<sup>13</sup> This elasticity is different from the conventional extensive elasticity, or elasticity of labour force participation, which is (usually) defined as the proportional increase in the number of people participating in the labour market when the (net) wage is increased by 1%. In Appendix B, the relationship between the elasticities used here and the conventional ones is described.

One key innovation of our analysis is that, rather than calibrating the labour supply elasticities of various groups, we make use of empirical labour supply elasticities estimated on the basis of structural household labour supply models embedded in country-specific tax-benefit models, TAXBEN for Britain and STSM for Germany (see Chapter 3). Elasticities are estimated from a sample of lone mothers observed in 2002/03 for Britain and in 2002–2004 for Germany.<sup>14</sup> Appendix B describes how these elasticities are used to derive extensive and intensive labour supply elasticities defined by the formulae given earlier; these latter elasticities are summarised in Table A1 in Appendix B.

Given these derived elasticities and the defined discrete earnings points, we use the formula given earlier subject to two constraints:

$$\sum_0^I h_i T_i = H \quad := \text{the government's budget constraint, and}$$

$$\sum_0^I h_i g_i = 1 \quad := \text{normalisation of welfare weights, } g_i.$$

In the following two sections, we use this framework to analyse two questions. First, we follow Bourguignon and Spadaro (2005) and derive the welfare weights assigned to the different groups along the income distribution that would make the actual tax structure in both countries optimal in the sense defined earlier. Second, assuming a specific welfare function, we design the optimal structure of taxes and transfers to mothers in Britain and Germany.

### 4.3 Welfare implications of the current British and German in-work support systems

Table 7 summarises our simulation results for 10 income groups with positive earnings and the group of non-workers with zero earnings. For comparative reasons, we have defined the same income classes for Germany and Britain with a common set of cut-off points (see table note).<sup>15</sup> The classes are defined along the hypothetical earnings distribution in Germany – i.e. the distribution of hypothetical earnings of all individuals at each hours point. In addition to the derived weights,  $g_i$ , Table 7 shows, for each group, mean net tax, mean net income, mean elasticities and the actual share of the population in each income band.

First, the distribution across income groups differs markedly between Britain and Germany. In line with the employment statistics provided in section 2.1, almost half of lone mothers in Britain belong to the group with zero gross earnings. The distribution of lone mothers with positive earnings is fairly evenly distributed across the 10 income groups. In contrast, in Germany about one-third of lone mothers are non-working, and the majority of working lone mothers belong to the top three income groups. For the

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<sup>14</sup> Given this information, we estimate the elasticities for the fiscal years 2001–03. The tax and benefit system in Germany hardly changed during that time and the panel dimension provides more information and variation for the analysis.

<sup>15</sup> The exchange rate between £ and € is 1.466.

**Table 7**  
**Optimal welfare weights for the taxation of lone mothers: Britain versus Germany (averages within income groups)**

	Gross earnings in €/wk	Net income in €/wk	Net tax in €/wk	Marginal tax rate	Share	Intensive elasticity	Extensive elasticity	Optimal weights	Relative optimal weights
<b>Britain</b>									
0	0.00	274.78	-274.78		0.48	0.00	0.00	1.64	1.00
1	76.25	305.75	-229.49	0.59	0.05	0.20	0.26	0.40	0.24
2	130.81	335.38	-204.58	0.46	0.07	0.06	0.40	0.51	0.31
3	173.26	359.64	-186.38	0.43	0.06	0.03	0.50	0.47	0.29
4	210.55	377.80	-167.25	0.51	0.05	0.02	0.61	0.37	0.23
5	245.79	392.23	-146.44	0.59	0.05	0.02	0.66	0.27	0.17
6	281.73	409.01	-127.28	0.53	0.04	0.03	0.62	0.33	0.20
7	320.46	425.26	-104.80	0.58	0.04	0.02	0.63	0.29	0.18
8	371.33	448.56	-77.23	0.54	0.05	0.03	0.58	0.36	0.22
9	446.10	477.30	-31.20	0.62	0.05	0.03	0.52	0.37	0.23
10	642.02	583.40	58.62	0.46	0.05	0.05	0.36	0.57	0.35
<b>Germany</b>									
0	0.00	244.54	-244.54		0.29	0.00	0.00	1.69	1.00
1	86.00	294.98	-208.98	0.41	0.05	0.12	0.12	1.36	0.80
2	129.84	299.09	-169.25	0.91	0.03	0.08	0.14	0.03	0.02
3	173.68	320.02	-146.34	0.52	0.02	0.05	0.13	0.79	0.47
4	211.04	336.52	-125.48	0.56	0.04	0.01	0.20	0.81	0.48
5	246.44	343.98	-97.53	0.79	0.05	0.01	0.20	0.67	0.40
6	282.22	358.27	-76.05	0.60	0.07	0.01	0.24	0.66	0.39
7	321.93	380.23	-58.31	0.45	0.06	0.04	0.31	0.65	0.39
8	373.03	391.70	-18.67	0.78	0.08	0.03	0.22	0.61	0.36
9	447.39	430.04	17.35	0.48	0.11	0.04	0.29	0.60	0.35
10	659.19	546.76	112.44	0.45	0.20	0.03	0.13	0.83	0.49

Source: Own simulations based on TAXBEN and STSM.

Notes: Cut-off points for the positive earnings points (in €): 107, 153, 193, 228, 264, 300, 344, 405 and 502. All income and tax amounts are averages within income groups and are given as Euros per week. Marginal tax rate is calculated as change in net tax over change in gross earnings between adjacent groups.

group of lone mothers, the higher rate of labour force participation, longer hours of work given employment, and higher hourly wages together lead to considerably higher average gross earnings in Germany than in Britain (not shown in the table).

Second, in both Britain and Germany, net taxes are the higher, the higher net income is. In particular, net taxes of non-working lone mothers are significantly lower (i.e. transfers

to them are higher) than for working mothers at the first (and any higher) earnings point. Thus, the government distributes more to the non-working poor than to the poor, which is a feature of most welfare states. This corresponds to the absence of negative marginal tax rates in the British as well as the German tax-benefit system (in contrast to the EITC in the US).

Third, net transfers are higher (net taxes are lower) for lone mothers in Britain than in Germany at every earnings point, showing that Britain has a more generous transfer system for lone mothers. This fact, combined with the fact that lone mothers in Germany have higher gross earnings, means that, on average, net transfers received by lone mothers in Britain are around €200 (£131.25) per week, but only €85 (£55.78) a week in Germany (not shown in the table).

Fourth, estimated labour supply elasticities differ markedly between Britain and Germany. Most importantly, the extensive elasticities in Britain are high, relative to both estimated intensive elasticities in Britain and extensive elasticities estimated for Germany. These differences have important implications for optimal welfare weights implied by the tax-benefit systems currently in existence in the two countries.

As shown in Table 7, the implied optimal welfare weights for non-working women are relatively high for both Britain and Germany, whereas those for working women are low and decline only little as earnings rise. From the perspective of optimal taxation, this implies that both countries' tax and transfer systems would be optimal only if the government had a strong concern for redistributing incomes to non-workers.

There is one striking feature regarding the weights calculated for Germany: a sharp drop in the weight for the third group. This drop coincides with a part of the budget constraint where there are very high marginal tax rates (due to a high withdrawal rate of means-tested benefits). Given extremely high marginal tax rates along this budget segment, there is no financial incentive for lone mothers to earn market income, and the only way the optimal tax model can rationalise this is if the government wants to prevent lone mothers from choosing to work for low earnings (and therefore selects a small social weight for this group).

The second constraint mentioned earlier requires that the sum of weights, weighted by the share of the population that choose each band of earnings, is equal to one. This scaling, though, makes it difficult to compare weights for two countries with greatly differing patterns of work. To ease cross-country comparison, the last column in Table 7 gives the derived optimal weights relative to the weight for non-workers. These reveal that in Germany the government seems to assign higher relative welfare weights to working lone mothers than the government in Britain: compared to the weight for non-workers, the welfare weight for working lone mothers is on average about 0.4 in Germany, but only 0.2 in Britain. From this, we conclude that the government in Britain has stronger preferences for redistribution to non-workers than the one in Germany.

This result may be explained by the relatively high extensive labour supply elasticities in Britain. Loosely speaking, a shift in the tax burden from the working poor to the non-workers (i.e. a reduction in net taxes for the working poor, and an increase in net taxes for non-workers) in Britain would induce relatively large numbers of lone parents to work (because extensive elasticities are high) but would not have a large negative impact on

the labour supply of those already in work (because intensive elasticities are low).<sup>16</sup> The only way that the expression for optimal taxes can rationalise the British government's choosing not to do this is by assigning a much higher weight to the incomes of non-workers than the incomes of the working poor.

#### 4.4 Optimal tax-benefit schedules for Britain and Germany

Although negative marginal tax rates may be optimal when extensive elasticities are large relative to intensive elasticities, neither in Britain nor in Germany does the tax and transfer system exhibit such rates. As shown in the previous section, rationalising the current transfer system existing in both countries in terms of the theory of optimal taxation requires the government to have a relatively strong preference towards redistribution to non-working lone mothers. It is therefore of interest to find out under which social welfare functions negative marginal tax rates facing working lone mothers would become optimal.

To answer this question, we derive the optimal tax schedule under a class of social welfare weights,  $g_i$ , which are assumed to decrease with gross earnings in the following way:

$$g_i = \frac{1}{\exp(\tilde{y}_i)^\nu - 0.25},$$

where  $\tilde{y}$  denotes gross earnings at point  $i$  relative to the highest earnings point. The redistributive taste of the government is expressed by  $\nu$ : the higher  $\nu$ , the higher the redistributive taste. This specification of social welfare weights includes as special cases the Utilitarian (for  $\nu=0$ ) and the Rawlsian (for  $\nu \rightarrow \infty$ ) social welfare functions; these two special cases imply that each individual is given the same welfare weight (Utilitarian case) and that the government only cares about the poorest individual (Rawls).

Here, we analyse three scenarios with varying taste for redistribution: low redistributive taste,  $\nu=0.5$ , medium taste  $\nu=1$ , and high redistributive taste  $\nu=1.5$ . As before, we present the weights in absolute and in relative terms (i.e. scaled to the weight given to the non-workers) to ease country comparison. Simulation results for these three scenarios are summarised in Table 8.

Assuming low preferences for redistribution, negative marginal tax rates become optimal in both countries, whereas they are always positive under the current tax-benefit systems existing in both Britain and Germany, as shown in Table 7. This can be seen by comparing

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<sup>16</sup> Although the current British tax system conditions some transfers on working (16 or more hours a week), the transfer system on average (i.e. across all lone mothers) does not generally give larger transfers to the working poor than to non-workers (i.e. marginal tax rates are generally non-negative). In the 2002–03 transfer system, low-wage part-time workers could receive higher net transfers in work than if they did not work, but only if they had two or more children, and – crucially – only if they would not receive Housing Benefit or Council Tax Benefit if they did not work. In practice, the vast majority of non-working lone parents receive at least one of these.

**Table 8**  
**Optimal tax rates in Britain and Germany**

Gross earnings €/wk.	Absolute weights	Relative weight	Optimal net tax €/wk.	Absolute weights	Relative weight	Optimal net tax €/wk.	Absolute weights	Relative weight	Optimal net tax €/wk.
<b>Britain</b>									
0	0.00	274.78	-274.78		0.48	0.00	0.00	1.64	1.00
0.00	1.33	1.00	-148.13	1.33	1.00	-245.63	1.33	1.00	-262.97
76.25	1.28	0.92	-287.73	1.14	0.86	-268.34	1.06	0.79	-262.25
130.81	1.25	0.87	-301.50	1.02	0.77	-252.81	0.90	0.68	-239.61
173.26	1.22	0.84	-282.49	0.94	0.71	-230.78	0.80	0.60	-216.33
210.55	1.20	0.81	-261.36	0.88	0.66	-210.13	0.72	0.54	-195.92
245.79	1.18	0.78	-246.94	0.82	0.62	-189.72	0.66	0.49	-174.76
281.73	1.15	0.75	-240.80	0.77	0.58	-165.27	0.59	0.45	-148.86
320.46	1.13	0.73	-232.18	0.72	0.54	-136.76	0.54	0.40	-119.23
371.33	1.10	0.69	-222.41	0.65	0.49	-97.83	0.47	0.35	-78.76
446.10	1.06	0.64	-198.49	0.57	0.43	-37.30	0.39	0.29	-16.47
642.02	0.97	0.54	-133.44	0.41	0.30	109.26	0.24	0.18	135.44
<b>Germany</b>									
0	0.00	244.54	-244.54		0.29	0.00	0.00	1.69	1.00
0.00	1.33	1.00	-175.84	1.33	1.00	-266.60	1.33	1.00	-290.81
86.00	1.22	0.92	-310.51	1.12	0.84	-278.11	1.04	0.78	-268.37
129.84	1.17	0.88	-284.78	1.03	0.78	-250.11	0.91	0.69	-238.23
173.68	1.12	0.84	-246.76	0.95	0.71	-212.73	0.81	0.61	-201.12
211.04	1.08	0.81	-210.74	0.89	0.67	-177.16	0.73	0.55	-166.08
246.44	1.05	0.78	-177.56	0.83	0.62	-144.83	0.67	0.50	-134.76
282.22	1.01	0.76	-144.13	0.78	0.58	-112.35	0.61	0.45	-103.57
321.93	0.97	0.73	-109.81	0.72	0.54	-78.95	0.55	0.41	-71.26
373.03	0.93	0.70	-63.68	0.66	0.50	-32.03	0.48	0.36	-24.16
447.39	0.87	0.65	-0.76	0.58	0.44	32.90	0.40	0.30	41.11
659.19	0.71	0.54	174.89	0.41	0.30	221.41	0.24	0.18	232.79

Source: Own simulations based on TAXBEN and STSM.

Notes: Cut-off points for the positive earnings points (in €): 107, 153, 193, 228, 264, 300, 344, 405 and 502. All income and tax amounts are averages within income groups and are given as Euros per week.

optimal net taxes across the gross earnings distribution. Achieving such a tax and transfer system in Britain would mean increasing taxes for the poorest (i.e. the non-workers), and reducing them for all other groups compared to the current system (compare the 'net tax' columns in Tables 8 and 7). A similar result would hold for Germany: net taxes would be higher for non-working lone parents than for working lone parents until gross earnings

reached about €250 (£164) a week. However, optimal tax rates at the top of the distribution markedly differ between the two countries: whereas lone parents in the top income class would still receive a transfer almost as high as the non-working poor, in Germany a positive tax on the highest income group would be optimal.

In the case of medium redistributive tastes, optimum tax credits in Britain would be lower but still of substantial size. Households with workers earning up to about €150 (£98.42) per week receive higher benefits than when their household members are out of work. In contrast, in Germany, only small tax credits, about €12 (£7.87) per week, for the lowest paid working group would be optimal under this scenario.

The difference between Britain and Germany again becomes evident in the scenario with relatively high redistribution taste. For Germany, the optimal tax schedule does not contain a negative marginal tax rate. For Britain, in this welfare scenario, it is optimal for the government to tax the non-working and the working in the poorest group identically.

## 4.5 Summary

In this chapter, we have investigated two important policy questions on the basis of the theory of optimal income taxation allowing for both intensive and extensive labour supply responses. First, we have estimated the welfare weights, assigned to the different groups along the income distribution, that would make the tax-benefit systems in existence in Britain and Germany optimal from a social welfare perspective. Second, assuming a specific welfare function, we have derived, for various preferences of redistribution in society, optimal transfer systems for the two countries. We have focused on lone mothers because, as highlighted in the previous chapter, they are the main target group for in-work credits and the interaction of transfer programmes, and the income tax system can generate budget constraints with high and variable effective marginal tax rates for this group.

We have shown that net transfers are higher (net taxes are lower) for lone mothers in Britain than in Germany at every earnings point, showing that Britain has a more generous transfer system for lone mothers. Furthermore, net taxes of non-working lone mothers are significantly lower (i.e. transfers to them are higher) than for working mothers at higher levels of income in both countries. This implies positive marginal tax rates for non-working lone mothers, in contrast to the phase-in region of the EITC in the US, for example. From a social welfare perspective, the tax-benefit systems existing in both Britain and Germany are only optimal if relatively high welfare weights are given to non-working lone mothers in both countries.

Our simulation results imply also that in-work credits with negative marginal tax rates for lone mothers may be optimal from a social welfare perspective with relatively low and medium taste for redistribution in both Germany and Britain. Even with a high taste for distribution, it is optimal in Britain to tax the non-working and the poorest working women at the same rate. These results are driven by relatively high elasticities on the extensive margin, which imply a high positive participation response among the non-working. This is in line with results from the previous chapter where we found that for single households in-work credits have substantial positive labour supply effects.

## 5 Making work pay for older unemployed people

As described in Chapter 2, employment rates and the distribution of wages by age groups differ in important ways between Britain and Germany. In particular, the difference in the wage distribution between the two countries was identified to be an important factor for the employability of older people, and related to employment protection, unemployment insurance and early retirement schemes affecting age groups in dissimilar ways in the two countries. In this chapter, we evaluate the labour market, income and welfare effects of three policy reforms targeted at older unemployed people in Germany. As in the previous chapter, the empirical analysis is based on the behavioural micro-simulation model STSM.

### 5.1 Making work pay: Three policy reforms

In this chapter, we analyse three policy reforms:

1. an hourly wage subsidy;
2. an in-work tax credit; and
3. a subsidy of social security contributions on low earnings in a full-time job (employment bonus).

All three proposals are targeted at unemployed people aged between 55 and 64 years.

#### *1. Hourly Wage Subsidy*

The idea of the Hourly Wage Subsidy (HWS) is to provide financial incentives to unemployed older 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 lowest wage they expect in order to accept a job offer (reservation wage) and the market wage of older people who are not working. In contrast to the earnings Insurance already existing in Germany (see section 2.3), the HWS is a subsidy on low hourly wages rather than earnings. Furthermore, it is to be paid permanently (until retirement) rather than temporarily as in the case of the earnings insurance subsidy.

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 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 their expected market wage at the start of a new job. These counterfactual wages are estimated on the basis of selectivity-corrected wage equations, already introduced in section 2.2.<sup>17</sup> The explanatory variable

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<sup>17</sup> A detailed description and estimation results are available upon request.

in the wage equation of main interest for our analysis is firm tenure.<sup>18</sup> For the calculation of the wage subsidy, we assume that an individual's reservation wage depends on their 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. 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 summarised in Appendix C, the average earnings gap varies between 5% for east German men and almost 25% for east German women, and also varies substantially by tenure within each group.

## *2. In-Work Credit*

The In-Work Credit (IWC) we analyse here is similar to the British in-work tax credits described in section 2.3 and already analysed in Chapter 3 for lone mothers, but now the target group refers to older workers. The design of the IWC has the following form: up to a yearly gross household income of €6,750 (£4,429.24), households receive the maximum credit of €7,100 (£4,660.33); above this level, the 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 hours per week, households receive an extra annual bonus of €990 (£649.82). The bonus is also withdrawn at a rate of 37%. The IWC is designed in such a way that relatively poor households have strong incentives to take up work. Strong incentives are on the extensive margin (participation); incentives on the intensive margin (working hours) are relatively modest. As we will show later, this programme is particularly attractive for low-income single households. The modest threshold income makes it less relevant for couple households where both partners are working.

## *3. Employment Bonus*

The design of this programme follows a similar one existing in Belgium under the name Employment Bonus (EB) (see Bargain et al., 2006), with the main difference being that here eligibility depends on age and an individual's employment status. The EB differs from the IWC in that it is based on individual wages rather than household income, and it subsidises the employee's social security contributions, which amount to approximately 20% in Germany. The EB also differs from the existing subsidy of so-called 'mini-jobs', which are completely or partly exempted from social security contributions (see section 2.3). On top of this subsidy, the EB introduces a maximum bonus of €215 (£141.12) per month for eligible persons working full time with an earnings threshold of €1,500 (£984.57) 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.

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<sup>18</sup> 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.

## 5.2 Work incentive effects of the reforms

To assess the work incentive effects of the three policy reforms, we present their impacts on the budget constraints of several stylised households that qualify for the transfer programmes derived on the basis of the tax-benefit micro-simulation model STSM for the fiscal year 2005. The upper panel in Figure 3 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 25th percentile of the wage observed for men in our sample. For employment exceeding 16 hours per week, the IWC would lead to a relatively strong increase in net household income (by approximately €280 [£183.80]). 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’.

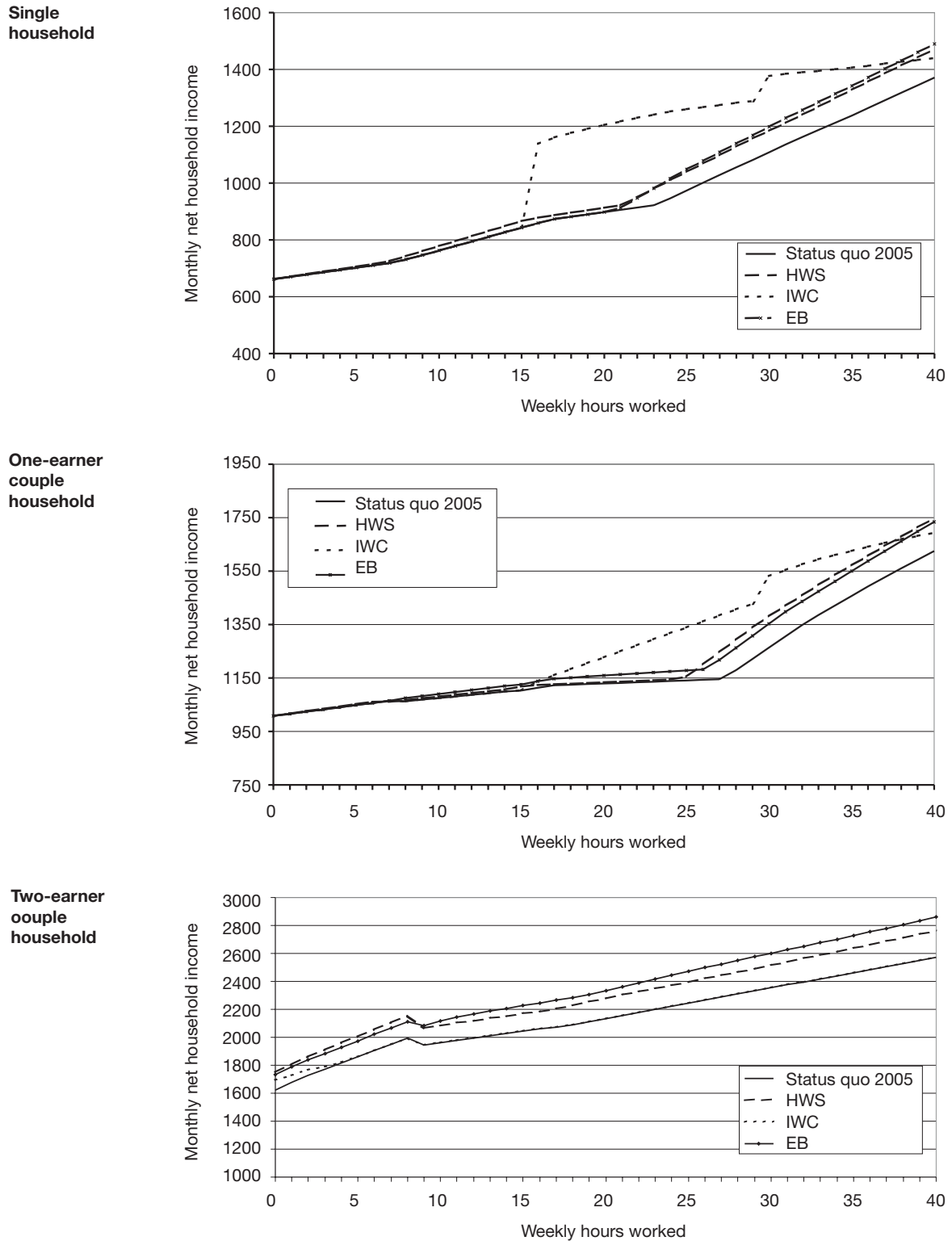
For couple households, the effects of the reforms on budget constraints are different as the household context needs to be considered. This is particularly important for the IWC. In the first example (middle part of Figure 3), we assume that only one partner is working at a modest wage of €12.90 (£8.46; 25th percentile male wage) per hour. Again, we observe relatively high out-of-work benefits and therefore a modest impact of the reforms. At assumed hourly wages (see figure note), both HWS and EB affect net household incomes in the 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 yet more so after 30 hours due to extra bonus.

For two-earner couple households with one partner working full time, the amount of the tax credit is very small (lower panel of Figure 3). However, both individual based subsidies significantly affect the household budget constraint. For this household, we have assumed that both partners are eligible for the HWS and the EB. Therefore, the non-working income of the second partner is higher in the reform scenarios than in the actual 2005 system.

## 5.3 Labour supply effects

In order to evaluate the labour supply effects of the three policy reforms, we draw on the same methodology as described in Chapter 3 (also see Appendix A) – i.e. 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 on the basis of the empirical household labour supply model embedded in STSM.

In Table 9, we summarise 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



**Figure 3**  
**Budget constraints under the status quo and alternative reforms**

Source: Authors' calculations using STSM.

Notes: Single household working at 25th percentile hourly wage of men aged 55–64 (€12.36 [£8.11]), no children. Couple household, one partner 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 [£8.11]), the wife works full time at the 25th percentile hourly wage of women aged 55–64 (€10.39 [£6.82]).

**Table 9**  
**Labour supply effects of the policy reforms (absolute numbers in 1,000 persons)**

	Women				Men			
	Working hours as full-time equivalents				Working hours as full-time equivalents			
	New participation	Total	New participants	Working population	New participation	Total	New participants	Working population
<b>HWS</b>								
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
Total	27 (13 – 41)	25 (11 – 36)	24 (12 – 35)	1 (–1 – 2)	24 (18 – 29)	26 (20 – 32)	26 (21 – 32)	0 (0)
<b>IWC</b>								
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
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)
<b>EB</b>								
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
Total	21 (12 – 28)	19 (10 – 25)	18 (9 – 23)	1 (1 – 2)	16 (12 – 19)	17 (13 – 22)	16 (12 – 20)	1 (1)

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

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.

as full-time equivalents assuming 40 weekly working hours. Table A3 in Appendix C summarises 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 relatively similar and of moderate 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 A3).

Labour supply effects differ by gender and between single and couple households due to the design of the programmes. As mentioned earlier, both the EB and the HWS are conditioned on individual rather than household incomes. Therefore, for these programmes, 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 partners working there are positive incentives for labour supply behaviour. We estimate an overall small positive participation effect of the IWC for women living in couple households.

For single households, the IWC has a stronger positive effect than the HWS and the EB. This is due to the earlier 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.

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 partner 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.

## 5.4 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 is simply 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 (see, for example, Deaton and Muellbauer, 1980: 7.4). In the present context, the policy reforms analysed raise the relative wage for unemployed workers taking up a job. In this case, the CV thus measures the average monetary amount eligible people would have to be given to make them as well off as 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 reform's overall welfare gain.

Income and welfare effects of the three reforms for households directly affected by the reform are summarised in Table 10. In the upper part of the table, we report these effects for eligible households – i.e. those with at least one previously unemployed household

**Table 10**  
**Average income and welfare effects of the reforms**

	HWS		IWC		EB	
	Income effect	Welfare effect	Income effect	Welfare effect	Income effect	Welfare effect
<b>Average effects for eligible households (in Euro per months)</b>						
Couples	510	391	237	121	354	266
Single women	534	333	359	202	279	129
Single men	251	43	514	231	297	66
<b>Aggregate effects (in 1,000 Euro per year)</b>						
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

Source: Simulation results based on STSM.

Notes: Average income and welfare effects are rounded to the nearest Euro, aggregate effects to the nearest 1,000 Euros. The welfare effect is measured as CV.

member between 55 and 64 years of age taking up a job. Average monthly income of eligible unemployed people increases substantially, on average, whereas 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 (£334.77) of previously unemployed older people living in couple households, compared to about €240 (£157.52) for the IWC and €350 (£229.73) 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 from the HWS.

In general, we find that the income effects exceed the welfare effects.<sup>19</sup> 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 10 reports 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 €250m (£164m) and €170m (£111.5m) per year,

<sup>19</sup> 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 (£0.65) per month, and thus not make any difference to the numbers shown in the table, we neglect this issue here.

respectively. Aggregate income and welfare effects for the other two policy reforms would be considerably smaller, but still substantial. Net budgetary costs would be negative for all three reforms analysed here, ranging from about €40m (£26.25) per year for the IWC to almost €200m (£131.27m) 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.

## 6 Main findings and policy conclusions

The aim of this study was to provide a comparative empirical analysis of how the tax-benefit systems in Britain and Germany affect work incentives and labour market behaviour of households, how these systems should be structured to tackle the challenges of an ageing society for the labour market, and what the two countries can learn from each other in this respect. To this end, we have described the institutional regulations affecting employment and wages in Britain and Germany, as well as differences in the incentive structure of their tax-benefit systems. We have shown that employment of older people is significantly below the average in both countries, but that in Britain labour market participation in general, and for the oldest age group in particular, exceeds participation in Germany.

We have highlighted several reasons for higher employment rates in Britain compared to Germany, especially a different age structure of wages in the two countries, a greater flexibility of British labour market institutions, and British in-work support such as the WTC and the New Tax Credits, which induce stronger financial incentives for most households in Britain, compared to Germany, to take up work. This not only affects labour supply behaviour of older workers, but also other vulnerable groups in the labour market, such as lone mothers. These major differences in labour market institutions and tax-benefit systems between the two countries motivate the policy analyses undertaken in this study.

One important result of our analysis relates to differences in wage-age profiles between Britain and Germany. Whereas wages for the working population are on average constant or increasing with age in Germany and well above average for the oldest age group, wages conditional on working are decreasing with age in Britain and are below average for the oldest age group. Controlling for selection into employment, the same difference between the two countries remains but becomes smaller. This difference in the distribution of wages seems largely related to country differences in institutional regulations affecting individual employment probabilities, such as employment protection, early retirement and in-work support.

Another important finding of the comparative analysis of this report is the different incentives induced by the tax-benefit systems existing in both countries. We have shown that, contrary to what is often assumed in public discussions, the level of out-of-work benefits is similar in both countries, but in Britain in-work credits make labour market participation for the target groups more attractive. Furthermore, the German system of joint taxation with full income splitting leads to strong disincentives for secondary earners to take up work.

Turning to the policy analyses undertaken in this report, in Chapter 3 we have estimated the labour supply effects of introducing a British-style in-work tax credit into the German tax and benefit system. On the basis of a behavioural micro-simulation model (STSM), we find that introducing an in-work tax credit similar to the British New Tax Credits in

Germany would increase employment of single individuals by over 100,000 people, but would reduce labour supply of men and women living in couple households by about 70,000. In terms of working hours, the increased labour supply of singles would just compensate the reduction estimated for one-earner or no-earner couples. The overall labour supply effects of men and women living in couple households would be negative. The result found for men is especially important as it is markedly different from previous results found for Britain, where the overall response among men has always been found positive.

These estimated effects call for a high degree of caution as far as 'importing' British-style Tax Credits to Germany is concerned. Such a reform would further increase the share of one-earner families in Germany, which is already much higher than in Britain. Furthermore, there would be substantial net fiscal costs of such a reform, amounting to about €11 billion (£7.2 billion) disregarding behavioural effects, and ambiguous distributional effects. We therefore conclude that, unless there are some complementary measures, in-work support based on total family incomes would not be an effective way of encouraging employment in Germany. A solution could come in the form of an individual tax credit integrated with some form of childcare subsidy. Simply 'importing' the in-work support system from Britain will not 'do the trick'.

In-work transfer programmes are typically meant to fulfil two aims: to improve financial work incentives for people with low earnings potential, and to provide a socially defined level of income support for them. To provide more generous income support for these people may, however, induce negative work incentive effects on the part of the already working population. Hence, there may be a trade-off between equity and efficiency inherent in such programmes. In Chapter 4, we have investigated this trade-off and the optimal design of the tax-benefit system in Britain and Germany, where we focus on lone mothers as one of the main target groups of in-work support and address two important issues.

First, we have derived welfare weights the social planner would assign to different income groups so that the existing tax-benefit systems currently implemented in both countries are optimal. We find that current tax-benefit systems in both countries distribute more to the non-working poor than to the poor, which is a feature of most welfare states. Our welfare analysis shows that current tax-benefit systems of both countries would only be optimal if the government puts a relatively high welfare weight on the well-being of non-working lone mothers and has a relatively low preference for redistribution towards working lone mothers.

Second, we have derived the optimal tax-benefit system for Britain and Germany, given estimated labour supply elasticities and a convenient specification of a social welfare function. For the group of lone parents, we have shown that in-work credits with negative marginal tax rates would be optimal from a social welfare perspective given relatively modest and medium preference for redistribution in both Britain and Germany. In Britain, it seems optimal to tax the non-working and the poorest working women at the same rate even given a relatively strong preference for redistribution. However, optimal tax rates at the top of the distribution markedly differ between the two countries: Whereas lone parents in the top income class would still receive a transfer almost as high as the non-working poor, in Germany a positive tax on the highest income group would be optimal. These results are driven by relatively high labour supply elasticities at the extensive margin (labour force participation), which imply a high positive participation response of non-working women.

These results imply that, at least for the group of lone mothers analysed here, well-designed and targeted in-work credits would not only have positive labour supply effects but could also be optimal from a social welfare perspective under several normative welfare assumptions – in particular, a given taste for distribution in society. These findings, although derived for a particular group for whom in-work credits are of particular importance in Britain, may carry over to other groups, especially to older workers, or even to the whole population. In each case, the optimal tax-benefit system would not only depend on economic factors, such as the relative size of labour supply elasticities, but also on the taste for redistribution in society, which can only be decided politically.

The last chapter of this report focuses on policies to increase work incentives for older unemployed people accounting for the important age differences in the wage distribution described in Chapter 2. In particular, we have analysed three policy reforms targeted explicitly at older unemployed people – namely, an hourly wage subsidy, an in-work tax credit and the employment bonus, i.e. a subsidy of social security contributions.

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, whereas income effects vary considerably 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 CV as a 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.

From a comparative Anglo-German perspective, the main policy conclusions to be drawn from our study are the following. To increase employment and reduce unemployment of elderly workers in Germany may require more wage flexibility for this group, as we observe it in Britain. Therefore, changes in labour market institutions and/or the tax-benefit system might be necessary. Given the system of earnings-based social security and the majority's sceptical view about the merits of 'too much' labour market flexibility in Germany, it seems doubtful whether the more flexible British system could or should be a model for Germany, too. In the case of older workers, in particular, targeted wage subsidies of the type analysed in this report could well be an alternative to just relying on more flexible wages.

More generally, as our analysis of the potential labour market effects of introducing in-work credits has shown, policies which have proved reasonably successful in Britain need not be successful if transplanted to Germany due to differences in the structure of taxation and social security. Furthermore, existing social policies and the welfare effects of potential reforms also depend on the prevailing preference structure in society, and our empirical analyses suggest that these may differ between Britain and Germany. In general, although the two countries can certainly learn from each other's experience, there is no simple recipe which can be applied to either Britain or Germany without consideration of the major existing differences in the economic and institutional structures as well as normative value judgements.

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## Appendix A: Estimation and simulation of labour supply effects

Discrete choice models of labour supply are based on the assumption that a household can choose among a finite number  $J+1$  of working hours ( $J$  positive hours points and non-employment); each hour  $j=0, \dots, J$  corresponds to a given level of disposable income  $C_{ij}$  and each discrete bundle of leisure and income provides a different level of utility. The utility  $V_{ij}$  derived by household  $i$  from making choice  $j$  is assumed to depend on a utility function  $U$  of the woman's leisure term  $Lf_{ij}$ , her disposable income  $C_{ij}$  and household characteristics  $Z_i$ , and on a random term  $e_{ij}$ . If the error term  $e_{ij}$  is assumed to be identically and independently distributed across alternatives and households according to the Extreme Value distribution, McFadden (1974) proves that the probability that alternative  $k$  is chosen by household  $i$  is given by:

$$\Pr_{ik} = \frac{\exp(V_{ik})}{\sum_{j=0}^J \exp(V_{ij})}, k \in J$$

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). The dataset used for estimating the labour supply model is the SOEP 2003 with information on household incomes for the fiscal year 2002. We estimate the model separately for single men, single women and couple households on a restricted sample of households with at least one adult aged between 20 and 64, not in education and not self-employed.

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 – i.e. aggregating the expected individual hour supply over the whole sample – we follow the calibration method that 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 Extreme Value 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.

## Appendix B: Derivation of labour supply elasticities required for the optimal tax formula

Whereas our estimates of labour supply elasticities are based on discrete-choice models with a number of hours categories, the application of the Saez (2002) optimal taxation model requires extensive and intensive labour supply elasticities to be defined for different earnings categories rather than hours categories. We therefore translate estimated elasticities, denoted by  $\tilde{\mu}_{i,k}$  and  $\tilde{\eta}_{i,k}$ , where  $i=0,\dots,J$  indexes the hours choice and  $k$  indexes households, into elasticities in terms of gross weekly earnings by calculating:

$$\mu_i = \sum_{\forall k: H_i \times w_k \in Y_i} \overline{\tilde{\mu}_{i,k}}$$

(and equivalently for the extensive elasticity), where the bar denotes the mean,  $w_k$  is the (actual or predicted) hourly wage for each individual,  $H_i \times w_k$  measures gross (weekly) earnings for individual  $k$  at choice  $i$ , the set of  $Y_i$  defines intervals of gross earnings and  $i=1,\dots,J$  indexes the intervals of gross earnings. By definition, the intensive and extensive elasticity are identical for  $i=1$  (the first choice of positive hours worked).<sup>20</sup>

Table A1 shows that estimated elasticities in Britain are generally higher than in Germany. The intensive elasticities decline as weekly hours increase, but the extensive elasticities increase. That the overall labour market behaviour of lone mothers in Britain differs from those in Germany is confirmed by our estimates of the conventional elasticity of labour force participation, which stands at 1.36 for lone mothers in Britain, compared with just 0.4 for Germany.

**Table A1**  
**Labour supply elasticities in Germany and Britain**

	Britain		Germany	
	Extensive	Intensive	Extensive	Intensive
Hours choice 1	0.22	0.22	0.12	0.12
Hours choice 2	0.44	0.04	0.13	0.01
Hours choice 3	0.49	0.02	0.16	0.03
Hours choice 4	0.65	0.03	0.24	0.02
Hours choice 5	0.66	0.02	0.28	0.04
Elasticity of labour force participation	1.36		0.40	

Source: Own calculations, see text.

Notes: For Germany, the intervals for working hours were 0–5, 6–14, 15–21, 22–27, 28–33, 34+, with corresponding hours points 0,10,20,25,30,38. For Britain, the intervals were 0, 1–15, 16–22, 23–29, 30–36, 37+, with corresponding hours points 0,10,19,26,33,40 (the median of each band).

<sup>20</sup> One drawback from having to perform this translation from elasticities defined with respect to hours worked to elasticities defined with respect to gross earnings is that it is not the case that the estimated intensive elasticity is identical to the estimated extensive elasticity in the first gross earnings interval.

## Appendix C

**Table A2**  
**Hourly wage subsidy and market wages by tenure in previous employment**

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

Source: SOEP (2003); own calculations based on selectivity-corrected wage regressions, see text.

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

**Table A3**  
**Relative labour supply effects (in %) of the three policy reforms**

	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
<b>Relative to the non-working population aged 55–64</b>								
<b>HWS</b>								
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
<b>IWC</b>								
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
<b>EB</b>								
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
<b>Relative to the working population aged 55–64</b>								
<b>HWS</b>								
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
<b>IWC</b>								
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
<b>EB</b>								
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

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

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

# Glossary

British New Tax Credits	reform of the British system of in-work support introduced in April 2003 which substitutes for → the Working Tax Credit
conditional hours	number of hours worked by those who are currently observed to work
CTC	Child Tax Credit, part of the → New Tax Credits
EITC	Earned Income Tax Credit, in-work support programme in the US, which features → negative marginal tax rates
expected wages	mean wage of (group of) individuals with certain characteristics (age, education, etc.)
extensive elasticity	relative change in labour force participation with respect to a 1% wage change
extensive margin	refers to decision of people to work or not to work
intensive elasticity	relative change in offered working hours to a 1% wage change
in-work credits	specific income support programme with favourable tax rates within certain income ranges
in-work support	financial transfer paid to those working at low wages/earnings
Job Seeker's Allowance	British unemployment compensation
labour supply elasticities	percentage change in labour supply (participation or hours) to a change in the wage by 1%
market wage	observed wage which balances demand and supply in a specific labour market
reservation wage	lowest wage required to induce people to accept a job offer
negative marginal tax rates	feature of → the EITC, which subsidises low incomes
out-of-work benefits	public transfers only paid to non-employed people
Pension Credit	Minimum income for people older than 60 years

phase-in region	range of gross earnings with a negative marginal tax rate → the EITC
Rawlsian welfare function	social welfare calculated by giving weight only to the poorest members of society
social welfare function	function which aggregates individual welfare into a measure of social welfare
SSC	social security contributions
STSM	German tax-benefit micro-simulation model
TAXBEN	British tax-benefit micro-simulation model
TC	Tax Credit
unconditional wage	hypothetical wage calculated for both employed and currently non-employed people
Utilitarian	social welfare evaluation giving equal weight to each member in society
wages conditional on being employed	hypothetical number of working hours of the labour force
welfare weights	weights given individuals in a social welfare function
WTC	Working Tax Credit, British system of in-work support in existence before the introduction of a British New Tax Credits