The relationship between women's work histories and incomes in later life in the UK, US and West Germany

Tom Sefton, Jane Falkingham and Maria Evandrou

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Centre for Analysis of Social Exclusion
London School of Economics
Houghton Street
London WC2A 2AE
CASE enquiries – tel: 020 7955 6679

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Editorial Note and Acknowledgments

Tom Sefton currently works for the Church Urban Fund and was previously a Research Fellow at the Centre for Analysis of Social Exclusion (CASE) at the London School of Economics. Jane Falkingham is Professor of Demography and International Social Policy within the School of Social Sciences at the University of Southampton and Director of the ESRC Centre for Population Change. Maria Evandrou is Professor of Gerontology and Director of the Centre for Research on Ageing (CRA) at the University of Southampton. The authors would like to thank the Nuffield Foundation who funded this research (grant number AGE/00056/6). We are also grateful to colleagues at LSE and Southampton for helpful comments on earlier versions of this paper presented at various seminars. This paper will also appear as Centre for Research on Ageing Discussion Paper No.0706.

Abstract

Using data from several large scale longitudinal surveys, this paper investigates the relationship between older women's personal incomes and their work histories in the UK, US and West Germany. By comparing three countries with very different welfare regimes, we seek to gain a better understanding of the interaction between the life course, pension system and women's incomes in later life. The association between older women's incomes and work histories is strongest in West Germany and weakest in the UK, where there is evidence of a pensions' poverty trap and where only predominantly full-time employment is associated with significantly higher incomes in later life, after controlling for other socio-economic characteristics. Work history matters less for widows (in all three countries) and more for younger birth cohorts and more educated women (UK only). We conclude with a brief discussion of the 'women-friendliness' of different pension regimes in the light of our analysis.

Key words: comparative; older women; pensions; work history; life course.
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Corresponding author:
Jane Falkingham, School of Social Sciences, University of Southampton, Southampton, SO17 1BJ
E-mail: J.C.Falkingham@soton.ac.uk

Introduction

It is well-documented that women typically fare worse than men in retirement on measures of economic well-being. Cross-national comparisons of retirement outcomes by gender and other socio-economic characteristics have found that poverty rates are consistently higher among older women, in particular older women living alone, and that this pattern is evident in all countries to varying degrees (OECD, 2001; Smeeding and Williamson, 2001; Smeeding and Sandstrom, 2004; Williamson and Smeeding, 2004). The lower incomes of women are linked to their assumed role as primary carers and the impact this has on their engagement in the labour market and consequently their ability to build up an adequate income for their retirement (Ginn and Arber, 1999).

This paper investigates the relationship between older women's work histories and their personal incomes in later life in the UK, US and West Germany, using data from several large scale longitudinal surveys. By comparing three countries with very different welfare regimes, we seek to gain a better understanding of the interaction between the life course, pension system and women's incomes in later life. This is, to our knowledge, the first study to employ retrospective employment data to examine these issues within a comparative framework.

Most women in these countries are dependent on their husbands to support them financially in old age – and indeed this dependence is deeply embedded within many pension systems through the linking of married women's benefits to their current or former husband's contributions. However, it is now increasingly recognised that an effective pension system for the future must be one in which the vast majority of women accrue pension entitlements, both state and private, in their own right (UK Pensions Commission, 2004). Women's need to earn and build their own pension entitlements is greater than in the past, because of social changes, in particular the decline in marriage as a lifelong contract and the rise in lone parenthood (Ginn and Arber, 1999; UK Pensions Commission, 2004). There is also widespread acceptance of the need for welfare systems to recognise unpaid work for equity reasons, even though policies have often lagged behind public attitudes.

Some have argued that the dramatic increase in women's employment rates since the 1950s will mean that future cohorts will retire with higher state and private pensions (e.g. DWP, 2005) and that current inequalities in the pension incomes of men and women will narrow as their employment rates converge. Other commentators are more sceptical that changes in women's employment rates will enable the majority of women to achieve pension incomes comparable with men's (e.g. Ginn, Street and Arber, 2001a). From this latter perspective, the pension problem for women stems from their different life course experiences in combination with a pension system that is not designed to meet women's needs (Falkingham and Rake, 2001). The extent to which periods of caring for children or older relatives disadvantages women in acquiring their own pension entitlements depends on the structure of the pension

system, including redistributive features of state pension schemes and the balance between public and private provision (Ginn, 2003).

This study considers the impact of different pension systems, by examining the relationship between women's work histories and later life incomes in three countries with different welfare regimes. The key research question is: how do the welfare regimes in the UK, US and West Germany compensate for, or penalise, certain life course trajectories, in this case the shorter and more interrupted work histories experienced by many women? A separate paper examines the association between women's family histories – marriage, divorce, widowhood and child-rearing – on older women's incomes using the same data and conceptual framework (Evandrou, Falkingham and Sefton, 2009).

Using retrospective employment data, it is possible to observe directly the association between women's work histories and their incomes in later life, rather than having to infer this from an understanding of the structure of different countries' pension systems (e.g. as in Ginn, 2003); and rather than having to simulate their likely impact on hypothetical individuals with stylised biographies (e.g. as in Rake, 2000; Evans, Rake, and Falkingham, 2000; Meyer, Bridgen, and Riedmuller, 2007), useful as such studies can be. The advantage of using actual data on 'real' people is that our results reflect the complexities of people's lives and of the evolving pension systems which they have lived through, rather than a (necessarily) simplified biography in a 'policy constant' world. The disadvantage with this approach is that we can only observe outcomes for the current generation of older people, who will have lived their lives in a very different social, economic, and policy environment to future cohorts of pensioners. The relevance of our findings to subsequent generations of older people will, therefore, need to be considered carefully in light of changes in women's employment patterns and recent pension reforms in these countries.

Bardasi and Jenkins (2002) and Bardasi and Jenkins (2004) use British work history data to examine their association with household incomes and with private pension receipt in the UK, respectively. We carry out a similar analysis within a comparative framework, using comparable data for the US and West Germany. Our analysis focuses on women's personal incomes, because this will be most closely related to their own employment histories. Whilst equivalised household income is arguably a better measure of people's material well-being, the inclusion of partner's incomes will in many cases obscure the financial impact of married women's own employment histories, which our analysis is designed to uncover. There are also valid conceptual arguments for examining individual incomes in their own right. Conventional measures of household income implicitly assume that resources are shared equally between all household members, which may not be the case in practice. Nor does pooling householders' incomes take into account the benefits that command over one's own resources can confer on individuals in terms of greater autonomy and independence.

Background

This section describes the main features of the UK, US and German pensions systems with a particular focus on their treatment of women and on differences in this respect between the three study countries. Pensions systems are peculiarly complex, because changes to these systems can take many decades to feed through into retirement outcomes, as new rules do not always apply retrospectively and often involve complex transitional arrangements for existing contributors. Fortunately, the core structure of each system has remained broadly stable over the working lives of the older women in our sample, most of whom were born between 1910 and 1940.

The UK and Germany broadly represent the two main traditions in pension provision. The UK system is based on the 'Beveridge' model with its emphasis on providing a certain minimum level of protection in old age, which individuals can top up if they choose to through private provision. The German system follows the 'Bismarckian' or Continental Europe social insurance model with a close correspondence between contributions and expected benefits. The differences between these two traditions have become more blurred over time with, for example, the addition of an earnings-related tier to the public pensions system in the UK towards the end of the 1970s and, more recently, a stronger emphasis on private pension provision in Germany (Pederson, 2004). The US system combines elements of both pension models with an important role for private pensions, as in the UK, and a less generous, but more redistributive, earnings-related social insurance scheme than in Germany.

The UK system consists of a contributory flat-rate state pension at a relatively low level and a relatively small public earnings-related scheme, topped up by means-tested benefits for those on low incomes and by private pensions for those with middle- and high-incomes (PPI, 2004). To receive the full-rate Basic State Pension (BSP) requires 39 years of contributions (at or above the lower earnings threshold). Married women are entitled to a pension equal to 60% of their husband's BSP if this is more than they would receive on the basis of their own contributions. In the late 1990s, only a quarter of married women were receiving a BSP based solely on their own contributions. Married women could choose to pay a lower rate of national insurance and forego their rights to a state pension in their own right, though this option was removed in 1978 for all new contributors when Home Responsibilities Protection (HRP) was introduced. The State Earnings Related Pension Scheme (SERPS), which was also introduced in 1978, was originally based on the best 20 years of earnings, which favoured women with shorter work histories, but the rules were subsequently changed and the generosity of the scheme substantially reduced in the 1980s. Benefits from SERPS peaked for those retiring around 2000 (i.e. the youngest pensioners in our sample) (Disney and Emerson, 2004), whilst older cohorts who retired before 1980 will not have benefited.

Membership of private pensions grew rapidly from the 1960s and was encouraged by favourable tax treatment and options to contract out of the public earnings-related

scheme into private pension schemes. Coverage of occupational pensions, which are the most prevalent type of private pensions, is very variable, being substantially lower in the types of jobs typically undertaken by women: part-time jobs and jobs in lower status occupation, small firms and the service sector (e.g. McKay, Heaver, and Walker, 1999). Furthermore, benefits are heavily skewed in favour of employees who are already advantaged in the labour market: white collar men with stable and continuous full-time careers and a rising earnings profile (Behrendt, 1999; Ginn, 2000). Regulatory changes from the late 1970s onwards have sought to improve the pension rights of early leavers and part-time employees, but the impact will be gradual and these changes were introduced too late to benefit most of the women in our sample.

Means-tested benefits play a much more important role in the UK than in the US or Germany, particularly for older single women (averaging 18% of their total incomes, compared with less than 5% in the US and West Germany) (Behrendt, 2000; Eardley et al, 1996). The means-tested minimum is now considerably higher than the Basic State Pension – and any additional income (e.g. private pensions) up to this minimum is deducted from benefits, although Pension Credit, which was introduced in 2003, allows family units to keep a portion of this income.

The US operates an earnings-related Social Security retirement programme, which is mandatory and nearly universal. The benefit formula is quite strongly redistributive, though in practice most women receive spouse benefits or survivor benefits equivalent to 50% or 100%, respectively, of their current or former husband's entitlement if, as in most cases, this exceeds their own entitlement (SSA, 2005a; SSA, 2005b), which favours the spouses and widows of higher earners. The Social Security Administration reports that nearly two thirds of women beneficiaries currently receive no marginal benefit from their own earnings. As in the UK, private pensions have played an important and growing role in the incomes of older people. Occupational pension coverage is skewed in ways similar to Britain (Street and Wilmouth, 2001). Supplementary Security Income (SSI) provides social assistance for older and disabled people on very low incomes, but the amounts are low (leaving most families below the official US poverty line level), up-rated only in line with inflation and subject to a stringent means-test (Eardley et al, 1996).

The German social insurance scheme is the most generous of the three countries and the main source of income for most retirees. Up to a ceiling of approximately 170 per cent of average earnings, the pension payable is more or less proportional to average lifetime earnings with few redistributive elements. There was no minimum pension until 2001. Occupational pensions in Germany are generally modest and largely restricted to those near the top of the income distribution (c10% of older women), though private pensions are becoming much more prevalent among younger workers. Social assistance plays a subordinate role in the German welfare system – less than 2% of older people were in receipt of Sozialhilfe at the end of 2000 (Eardley et al, 1996).

All three pension systems offer some protection against the adverse financial effects of specific life events, such as the birth of a child, the onset of disability, divorce and widowhood, but there are differences in the design, generosity and completeness of these provisions. In the US and the UK, widows are entitled to 100% of their deceased spouse's state pension if this exceeds their own and typically around half of any occupational pension entitlement(s), though this depends on the rules of each scheme. In Germany, widows receive 60% of their former spouse's pension in addition to their own state pension (with tapered offset for a minority of women with larger personal entitlements. Divorced women in these countries have some pension rights based on their former partner's contributions, but these are less generous and less watertight than those offered to widows, especially in the case of private pensions. State pensions in the UK (starting in 1978) and Germany (from the mid 1980s) offer some protection for years spent out of the labour market looking after dependent children, but most of these changes are not retrospective and will only substantially benefit future pensioners who had children following the reforms. The US Social Security system still makes no specific allowance for caring responsibilities, most of which are borne by women.

Given the complexity of these different pensions systems, including the interaction between their different components and special rules for specific groups, the overall impact on women's retirement incomes is an empirical question, which our data sets are ideally placed to address. The next section describes the data and methodology and the following section presents the key findings of our empirical analysis. Wherever possible, we seek to relate our results back to the main features of these pensions systems, as described above. We conclude with a brief discussion of their implications for our understanding of the 'women-friendliness' of different welfare regimes.

Methodology

The analysis in this paper is based on data from independent longitudinal surveys conducted in each of the three study countries: the British Household Panel Survey (BHPS) in the UK, the Panel Study of Income Dynamics (PSID) in the US and the German Socio-Economic Panel (GSOEP) in West Germany. Data for East German residents is excluded from the latter sample, because the work histories of older women are markedly different in East and West Germany and cannot sensibly be analysed together. The reason for using these surveys is that they have all collected retrospective employment data, including information on full- and part-time work undertaken prior to the survey period, so that it is possible to construct variables summarising older people's employment patterns over their entire working lives. Another advantage of using these particular data sets is that they are part of the Cross-National Equivalent File (CNEF), which makes available a core subset of consistently-defined variables, some of which are used in this analysis.

Our sample consists of women aged over 65 who have complete data on their employment history between the ages of 18 and 60 and on their personal income in

one or more survey years post-1991 (the first year of the BHPS), as well as data on a range of socio-economic variables. Multiple observations are weighted in inverse proportion to the number of times that individual is observed. Although the employment history is constant across observations of the same individual, other variables may change over time, including individuals' marital status and employment status, as well as income. Standard errors in the regression analysis are adjusted to allow for multiple observations of the same individual, using the cluster option within Stata.

The sample sizes are as follows: 11,136 observations on 1,418 individuals (UK); 2,638 observations on 1,127 individuals (US); and 12,105 observations on 2,270 individuals (West Germany). The number of observations is considerably smaller for the US, because detailed income data in the form required (in particular a detailed breakdown of social security income and other income sources between household heads and spouses) is only available in 1991-93 and 2005, so the US sample is restricted to observations in these years.

We discuss the derivation of the income and work history variables in more detail below, because these are, respectively, the main dependent and independent variables in our regression analysis. In addition, we include the following control variables: level of education, birth cohort, race (US only), current marital status, current employment status, the number of years since reaching 65, and the survey year.

In the PSID, individuals were asked how many years they have worked for money since they were 18 and how many of these years they worked full time for most or all of the year. The whole sample was asked these questions in 1976 and in subsequent waves only 'new' spouses and heads were asked. Most older women were already heads or spouses in 1976, so this is the base year for most of our retrospective data. We use panel data on employment status in other waves to work backwards or forwards from the base year in order to estimate the total number of years employed up to age 60, including a breakdown between mostly full-time employment and other part-time or irregular employment.[1]

The level of detail in the retrospective employment data is considerably greater in the BHPS and the GSOEP, so it is possible to derive broadly equivalent variables summarising older individuals' work histories up to age 60. The retrospective data in the BHPS comprises monthly data on employment status, including a split between self-employment, part-time employment, full-time employment and various 'economically inactive' categories. Anyone who was full-time employed for at least eight months of a particular year is counted as having worked full-time for most or all

[1] As recommended in PSID documentation, we use a variable denoting the total annual hours worked by the individual in the preceding year. If this variable is positive, then individuals are counted as having worked in that year and if it is greater than 1500, then they are counted as having worked mostly full-time in that year. To have a complete work history, therefore, we need both retrospective work history data and panel data on annual hours worked for each year up to or since reaching 60.

of that year and anyone else who was employed for at least one month in any year is counted as having worked part-time or irregularly in that year.[2] GSOEP respondents are asked to report their employment status for each year of their working lives, distinguishing between full-time employment, part-time employment and various economically inactive categories. Respondents can tick more than one status for any given year. Anyone who reports being full-time employed (and records no other employment status in that year) is counted as having worked mostly full-time and anyone else who reports being either part-time or full-time employed in any year (possibly in addition to one or more of the inactive categories) is counted as having worked part-time or irregularly in that year.

The two main work history variables used in our analysis are the total number of years spent in mostly full-time employment and the total number of years spent in either part-time or irregular full-time employment (from now on referred to as 'mixed' employment). These are combined in another variable summarising women's career pattern based on a five-fold classification: predominantly full-time employment for 30+ years; 'mixed' employment for 30+ years; predominantly full-time employment for 15-30 years; 'mixed' employment for 15-30 years; and employed for less than 15 years.

The main income measure is total personal income from all sources, comprising state and private pensions (including survivor benefits), other public transfers, and other private income (including earnings and investment income). Assets that are reported to be jointly held and benefits that are jointly received are split equally between partners, wherever possible using existing derived variables in these data sets. This includes means-tested benefits, which are usually calculated on the basis of the combined income and assets of the family (or household) unit. PSID only provides disaggregated income data on heads and spouses, so the US sample excludes older women who are living in multi-adult households (e.g. with relatives) and who are not identified as the household head or spouse.

As individuals are observed at multiple points in time, up to fourteen years apart, incomes in earlier years are adjusted upwards in line with the growth in average earnings over the intervening period. The index used is the OECD's hourly earnings index for the manufacturing sector; we also use the OECD's historical purchasing power parity series to convert incomes into a common currency to facilitate cross-national comparisons of older women's incomes. A small number of observations with very low or very high incomes are trimmed from each sample to prevent the results being unduly influenced by outliers, some of which are almost certainly due to reporting or recording errors.[3] Incomes are logged in our multivariate analysis,

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2 We tried slight variations on the definition of mostly full-time employed and this made little difference. Self-employment is not counted as full-time employment, though some of it may be full-time; again, this has very little impact on the results, because self-employment is rare among women.

3 Observations with negative or zero reported incomes are dropped as are the top 1% of (earnings-adjusted) incomes.

because it makes more intuitive sense for the regressors to have a proportionate, as opposed to an absolute, effect on incomes.

Part of the analysis in this paper is descriptive; for example, we compare the work histories of older women in the three study countries and the average incomes of older women with different types of employment histories. Descriptive statistics are weighted using the cross-sectional weights provided with each data set. We also carry out multivariate analysis to examine the association between incomes in later life (the dependent variable) and women's work histories, controlling for a range of socio-economic variables that may also be associated with differences in later life incomes, such as level of education and current employment status.

One potential confounding factor is that married women's employment choices may be influenced by their spouse's expected future income. Women who were married to high earners may have chosen to work fewer years and be more financially dependent on their husbands. If so, our regression analyses will tend to under-estimate the impact of women's own work histories on their incomes in later life. Whilst we do not have information on the incomes of deceased spouses, we can observe spouses' incomes for older married women. Analysis of this data (not presented here) shows that in West Germany and the US, married women with richer spouses have, on average, worked fewer years than those with less well-off spouses, but that no such relationship is evident in the UK. This suggests that our results may under-estimate the impact of older women's work histories on later life incomes in West Germany and the US, but not in the UK.

Results

Women's employment histories are much more heterogeneous than men's. Whereas the vast majority of older men were full-time employed for most of their working lives, only around a quarter of older women fall into this category – slightly lower in the UK and slightly higher in the US. British women typically spent more time in part-time employment; nearly two in every five older British women had a 'mixed' employment career (where less than two-thirds of their employed years were spent in mostly full-time employment), compared with around one in five older women in the US and West Germany. Older American women are more likely to have had predominantly full-time careers, whilst West German women are more likely to have been inactive for most of their working lives (see Table 1).

Table 1: Older persons' work histories in the UK, US, and West Germany, 65+*

	Women			Men		
	UK	**US**	**West Germany**	**UK**	**US**	**West Germany**
No. of yrs in employment (between ages 18-60)						
Full-time employed	15.1	17.0	15.0	32.9	37.6	34.4
Non full-time employed	9.4	5.4	6.1	5.2	1.7	1.4
Not employed	17.4	19.6	20.9	4.0	2.7	6.2
	42.0	**42.0**	**42.0**	**42.0**	**42.0**	**42.0**
Type of career[#]	*%*	*%*	*%*	*%*	*%*	*%*
<15 yrs in employment	26.1	29.1	39.2	1.0	0.5	1.5
15-30 yrs mixed employment	17.7	14.1	11.6	<0.5	<0.5	<0.5
15-30 yrs, mainly full-time	13.3	23.1	14.3	13.4	1.4	1.6
30+ yrs, mixed employment	20.2	6.7	10.6	4.6	2.3	7.8
30+ yrs, mainly full-time	22.8	27.0	24.3	80.8	95.8	88.9
	100.0	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Individuals	*1,418*	*1100*	*2270*	*1,018*	*766*	*1,819*

Source: own analysis using BHPS, PSID, GSOEP

* Sample includes women with complete work histories who were aged over 65 at some point between 1991 and 2005. Uses cross-sectional weights provided in CNEF data set. See methodology section for a description of how these variables were derived.

Where individuals were employed full-time for more than two thirds of their employed years, their career is classified as "mainly full-time". Other careers that combined full-time, part-time and self-employment (UK only) are classified as "mixed employment".

There are also many similarities in employment patterns across the three countries. In each case, successive birth cohorts have increased their participation in the labour market. Comparing women born pre-1920 with those born post-1928, the average number of years spent economically inactive fell from 20 to 15 years in the UK, 22 to 16 years in the US, and 23 to 19 years in West Germany, most of this increase being in part-time employment. And, in each case, predominantly full-time careers are more prevalent among more educated women and never married and childless women.

As we would expect, personal incomes in later life are higher, on average, for women with more complete employment histories. These work-history differentials in incomes appear to be greater in the US and West Germany than in the UK. Average incomes are considerably higher among older single women, but work history-related differentials are smaller (see Table 2).

Table 2: Older women's personal incomes by work history and marital status in the UK, US and West Germany, 65+

Mean income in $PPP, 2005 prices	UK	US	West Germany
All older women	**11,700**	**16,500**	**13,000**
<15 yrs in employment	10,500	12,400	10,400
15-30 yrs mixed employment	10,800	16,300	12,400
15-30 yrs, mainly full-time	12,200	17,400	13,100
30+ yrs, mixed employment	11,200	16,100	13,600
30+ yrs, mainly full-time	14,100	20,100	17,000
Older married women	**8,700**	**12,300**	**7,700**
<15 yrs in employment	7,300	8,400	4,400
15-30 yrs mixed employment	7,400	10,300	7,800
15-30 yrs, mainly full-time	9,500	13,200	8,500
30+ yrs, mixed employment	8,100	12,700	9,300
30+ yrs, mainly full-time	12,200	17,400	13,100
Older single women	**13,700**	**20,100**	**16,000**
<15 yrs in employment	12,400	16,400	14,100
15-30 yrs mixed employment	13,300	22,000	16,300
15-30 yrs, mainly full-time	13,800	21,000	15,400
30+ yrs, mixed employment	14,100	19,000	17,200
30+ yrs, mainly full-time	14,900	22,200	18,600

Source: own analysis using BHPS, PSID, GSOEP

Multivariate analysis

The remainder of this section explores the relationship between older women's incomes and work histories in more depth using multivariate analysis to control for socio-economic characteristics that may also be associated with incomes in later life, including education, marital status, and current employment status. Separate regressions are run for each way of categorising women's work histories. For example, the top panel in Table 3 shows the results of the regression with a single work history variable denoting the total number of years in any form of employment.

Table 3: The relationship between older women's work histories and (logged) personal incomes in the UK, US and Germany, aged 65+*

	No controls			*With controls*[#]		
	UK	**US**	**WG**	**UK**	**US**	**WG**
No. of years employed						
Any employment	0.006***	0.015***	0.028***	0.004***	0.009***	0.024***
Mostly FT employment	0.010***	0.016***	0.030***	0.007***	0.010***	0.025***
Mixed employment	-0.001	0.011***	0.022***	0.000	0.004*	0.023***
Type of career: (reference group: <15 yrs in employment)						
15-30 yrs mixed employment	0.030	0.338***	0.493***	0.018	0.150**	0.550***
15-30 yrs, mainly FT	0.185***	0.346***	0.604***	0.105***	0.182***	0.522***
30+ yrs, mixed employment	0.062	0.306***	0.693***	0.042	0.145**	0.678***
30+ yrs mainly FT	0.333***	0.482***	0.967***	0.219***	0.321***	0.776***
Yrs in FT employment: (reference group: < 5 yrs)						
5-15 yrs	-0.063*	0.222***	0.311***	-0.043	0.068	0.279***
15-25 yrs	0.109**	0.424***	0.587***	0.087**	0.183***	0.494***
25-35 yrs	0.257***	0.422***	0.857***	0.181***	0.242***	0.687***
35+ yrs	0.308***	0.482***	0.930***	0.191***	0.308***	0.677***
Yrs in any employment: (reference group: < 5 yrs)						
5-15 yrs	-0.064	0.311***	0.320***	-0.038	0.157**	0.282***
15-25 yrs	0.045	0.541***	0.692***	0.014	0.278***	0.651***
25-35 yrs	0.111***	0.522***	0.944***	0.082**	0.302***	0.865***
35+ yrs	0.163***	0.662***	1.060***	0.106***	0.385***	0.897***
Observations	*11,136*	*2638*	*12105*	*11,136*	*2638*	*12105*

Statistical significance: *10%; ** 5%; *** 1%

Source: own analysis using BHPS, PSID and GSOEP.

* Sample includes women with complete work histories and income data and who were aged over 65 at some point between 1991 and 2005.

Control variables are: birth cohort, highest level of education, race (US only), marital status, current employment status, years since reaching 65, and survey year.

Only the coefficients on the work history variables are presented here; the results are shown before and after the inclusion of control variables, though we focus on the latter in the discussion that follows. The dependent variable is the natural log of income, so the coefficients can be interpreted roughly as the percentage increase in income associated with an additional year in employment (in the first two regressions in Table 3) or with being in a particular work history category relative to being in the specified reference category (in all other regressions).

The association between the number of years in employment and later life incomes is significant and positive in all three countries, but the strength of this relationship is by far the strongest in West Germany and weakest in the UK (the top panel in Table 3). If we distinguish between mostly full-time employment and other 'mixed' employment (the second panel in Table 3), then we see that only full-time employment is associated with significantly higher retirement incomes in the UK, whereas both forms of employment have a strong association with retirement incomes in West Germany. The US results are closer to the UK, but the coefficient on 'mixed' employment is (just) statistically significant; a long 'mixed' career is roughly equivalent to a short predominantly full-time career, but is associated with higher incomes than being predominantly inactive.

In both the UK and the US, married women are entitled to at least 60% and 50%, respectively, of their husband's state pension, irrespective of their own contributions. Spouse benefits were introduced when a bread-winner model of society was prevalent. Women were expected to leave the labour market upon marriage and look after the family home whilst their husbands provided for them financially; spouse benefits simply continued married women's assumed dependence on their husband into retirement. This ensures that married women with little or no work history receive at least a small pension from the state, but it also weakens the link between past employment and incomes later in life. According to Liebman (2002), around two thirds of women beneficiaries currently receive no marginal benefit from their own Social Security contributions, because the value of spouse benefits exceeds the value of the retirement benefits they would be entitled to on the basis of their own earnings history.

In the US, spouse benefits raise concerns around equity, because the value of these benefits is proportional to the spouse's earnings-related state pension, favouring those women who are married to higher earners. In the UK, spouse benefits only apply to the flat-rate state pension and not the earnings-related component. However, the influence of spouse benefits in the UK was compounded by the married woman's stamp, which created an additional disincentive to married women to build up their own entitlement to a state pension (see above). This meant that for many older women of this generation, even those with extended full-time careers were no better off in pension terms than if they had never worked.

Another similarity between the UK and the US is in the more prominent role played by private pensions than in Germany. Work history-related income differentials in the

UK and the US are primarily driven by differences in private pension incomes, which are more closely linked to women's own employment histories than state pension income in these countries.[4] However, private pension incomes are still relatively small in relation to public transfers and their impact on the distribution of older women's incomes is diluted by spouse benefits (for married women) and by survivor benefits (for widows).

One important difference between the UK and the US system is the differential impact of means-tested benefits and other non-pension state benefits. This mostly affects older single women, because means-tested benefits are based on the income and assets of the whole benefit unit. In both countries, these benefits compress work history-related income differentials at the bottom end of the income distribution, by providing a floor on incomes. The main difference between the US and the UK seems to be that this floor on incomes is set at a higher level in the UK (relative to other incomes), so the compression effect is stronger in the UK. The US social security system is more strongly earnings-related and social assistance levels are lower, leaving larger income differentials between women who have been economically inactive most of their working lives and other women with more complete work histories.

Another way of looking at these results is that British women are more likely than women in other countries to fall into a 'pensions poverty trap', because the means-tested minimum for older people is significantly higher than the basic state pension (BSP); this is particularly the case for women who are much less likely to be entitled to the full-rate BSP. As a result, many women with shorter or interrupted work histories will not benefit from their contributions to second-tier pensions if their entitlement is insufficient to lift them above the means-tested minimum (Ginn, Street and Arber, 2001b). Our analysis seems to confirm the existence of a deeper poverty trap in the UK. Older women who have worked up to 15 years in mostly full-time employment or 30 years or more in predominantly non-full-time employment do not have significantly higher incomes in later life than women who have been economically inactive for nearly all of their working lives. Arguably, this is more to do with women's state pension entitlements being relatively low by international standards than the means-tested minimum being too high.

Work history matters more for women in Germany because there are no spouse benefits, so women with short work histories receive little or no pension in their own right unless they are widowed. This finding is consistent with previous research by Forssell, Medelburg, and Stahlberg (2000), which concluded that Germany provides the most generous pensions for those with a long, well-paid working career, but has the worst safety net for those with a limited working career, including many women. As we would predict for a system with few redistributive features, women's incomes in later life are broadly proportional to the amount of time they have spent in

[4] If private pension income is deducted from older women's incomes, then there is no longer a significant association between the number of years employed and women's incomes in later life.

employment. Whilst this system rewards women with more complete work histories, and thereby incentivises work, the downside is that many older women have low personal incomes and are directly dependent on their husbands for their financial well-being in retirement.

What is also striking about the West German results is the high and strongly significant association between older women's incomes and 'mixed' employment, which is almost as strong as the association with full-time employment.[5] Perhaps the most plausible explanation is that a predominantly public pension system, as in West Germany, provides more complete coverage and more actuarially fair returns for part-time employees than do systems that place a much stronger emphasis on private pension provision, as in the UK. Until the early 1990s, part-time employment in the UK rarely involved membership of an occupational pension scheme and, even when they were covered, many women lost their benefits, because they left the scheme early (Pensions Commission, 2004). Even for the most highly qualified, working part-time severely reduces the chance of contributing to a private pension scheme. Regulatory changes have improved the treatment of part-time workers, but only partially and too late, in any case, to benefit most of the women in our sample. Given that private pension income accounts for most of the work-history related differentials in later life incomes in the UK, it follows that women who had predominantly part-time careers, however long, are likely to benefit little in retirement from their participation in the labour market. Even if they are in receipt of a private pension, the amounts are often too small to lift them significantly above the means-tested minimum, so in practice they may be no better off than if they had private pension income.

It is perhaps more surprising that the pension returns to part-time employment appear to be greater in the US than in the UK (and are statistically significant), given that private pensions also feature prominently in the US pensions system. There are several possible explanations. First, the redistributive formula within the US Social Security system may favour part-time employees more than in the UK where many part-time workers fall below the lower earnings threshold and are not covered by national insurance (although the majority of married women in the US receive spouse benefits that are not related to their own contributions, so the distributional effects are not clear-cut). Secondly, part-time jobs in the US may be of better quality; there is some evidence, for example, that part-time female employees in the US work longer hours, on average, than their UK counterparts. Also, protective regulation to bolster the pension rights of part-time employees may have impacted sooner or been more effective there. Finally, mixed employment careers may be associated with significantly higher incomes for older women, because the reference group (i.e. those

[5] A priori, we would have expected the coefficient on full-time employment to be significantly higher than that on mixed employment, because full-time employees have higher earnings and benefits are broadly proportional to earnings. Women's own state pension receipts follow the pattern we might expect, but work history-related differentials are obscured by other sources of income that are not directly related to women's own work histories, including survivor benefits.

who were economically inactive for all or most of their working lives) are less protected than in the UK (see above).

In summary, our findings provide some support for the argument that a shift away from public to private provision – evident in all three countries, though from a much lower base in Germany – is likely to disadvantage women. The more strongly public pensions system in Germany rewards all forms of employment, including the interrupted and/or predominantly part-time careers that are prevalent among women, whereas the British system, with its stronger emphasis on private pensions, only appears to reward predominantly full-time careers. However, there are other factors involved, too. The association between women's work histories and later life incomes is weakened by spouse benefits in the UK and the US and by the operation of the benefits system, especially in the UK. And the pension returns to part-time employment depend also on the design of the state pension system, the quality of part-time jobs and the regulatory environment for private pension schemes.

If the associations found in Table 3 persist, this has significant implications for the prospects of future cohorts of female pensioners, given current trends in women's labour market participation. Table 4 examines the early employment histories of women born up to the early 1960s, using the same data sets as in our main analysis. To the right of the dotted line are the next generation of older women, who will be entering old age over the next two decades. Nearly all the increase in employment among later birth cohorts in the UK and West Germany has been in part-time or irregular employment; in the US, there also appears to have been a dramatic rise in mostly full-time employment.[6] In view of the evidence presented above, we would expect to see diverging fortunes for the next generation of female pensioners in the study countries. In the UK, there is little reason to believe that the cohorts born in the 1940s and 1950s will be any better off in retirement on account of the additional years they have spent in employment (though they may well be better off for other reasons). In the US, these cohorts should benefit from having spent more time in full-time employment and in West Germany, they should benefit from the additional time in part-time employment. The outcome for future pensioners will also depend on the effectiveness of pension reforms in recent decades aimed at improving the treatment of women with these pension systems, including greater recognition of unpaid work.

[6] These cross-national differences in early work histories are striking, but seem to be consistent with cross-sectional data on women's employment. For example, according to OECD data for the mid 1980s, the proportion of women employees who were aged 35-39 and worked part-time was 18 per cent in the US, 34 per cent in West Germany, and 54 per cent in the UK.

Table 4: Women's early employment histories by birth cohort in the UK, US and West Germany, aged 18-42[*]

Average number of years in each employment status between the ages of 18-42

	Birth cohort					
	Born pre-1920	Born in 1920s	Born in 1930s	Born in 1940s	Born in 1950s	Born in early 1960s
UK						
Mostly FT employment	9.3	10.1	9.3	9.1	9.2	-
Mixed employment[#]	3.7	4.9	6.6	7.5	7.9	-
Economically inactive	12.0	10.0	9.1	8.3	7.9	-
Individuals	*445*	*539*	*499*	*630*	*316*	-
US						
Mostly FT employment	-	8.6	9.6	11.7	13.7	15.6
Mixed employment[2]	-	1.9	2.7	5.0	6.8	5.8
Economically inactive	-	14.6	12.8	8.3	4.5	3.7
Individuals	-	*349*	*742*	*771*	*822*	*204*
West Germany						
Mostly FT employment	8.7	10.1	10.2	10.3	10.0	9.4
Mixed employment[#]	3.1	2.6	3.8	4.8	6.2	7.6
Economically inactive	13.1	12.2	11.0	9.9	8.7	8.0
Individuals	*464*	*878*	*1298*	*1426*	*1556*	*430*

Source: own analysis using BHPS, PSID and GSOEP.

* Sample comprises women with a complete employment history between the ages of 18 and 42 (inclusive). The youngest women in these samples were born in 1962 and turned 43 in 2005. Figures are weighted using the cross-sectional weights provided in each data set.

'Mixed' employment includes part-time employment, self-employment (UK only) and irregular full-time employment (see methodology section).

Interaction effects

The preceding analysis implicitly assumes that the association between work histories and incomes in later life is the same for all sub-groups of older women. This assumption is now relaxed by introducing interaction effects, allowing the coefficients on the work history variables to vary by current marital status, birth cohort and level of education. Two sets of results are shown in Table 5: in the left-hand panel, work history is defined by the number of years in mostly full-time employment and in the right-hand panel, work history is defined by the number of years in any form of employment (i.e. including part-time employment). The former results are more relevant to the UK, where only full-time employment has a statistically significant relationship with incomes in later life. The latter results are more relevant to West Germany, where both full-time and 'mixed' employment are strongly associated with

later life incomes. The US results are similar, whichever measure is used. The first coefficient in each panel measures the strength of the association for the reference category (e.g. widows in the top panel) and the other coefficients represent the *additional* effect of being in one of the other categories relative to the reference group; thus, a significant and positive coefficient for a particular sub-group indicates that the association between work history and later life incomes is significantly greater for that group than for the reference group.

Table 5: Interaction effects between older women's work histories and socio-economic characteristics: UK, US and West Germany

	Mostly full-time employment			***Any type of employment***		
	UK	**US**	**WG**	**UK**	**US**	**WG**
Current marital status (reference: widowed)						
Yrs employed	0.001	0.002	0.005***	0.002*	0.002	0.006***
Yrs employed x divorced	0.004	-0.002	0.005	0.001	0.001	0.006
Yrs employed x never married	0.006**	0.017	0.009*	0.005	0.020	0.008
Yrs employed x married	0.014***	0.015***	0.030***	0.006***	0.015***	0.035***
Birth cohort (reference: born pre-1924)						
Yrs employed	0.003**	0.009***	0.015***	0.002*	0.008***	0.015***
Yrs employed x post-1924	0.009***	0.001	0.006***	0.006***	0.002	0.013***
Level of education (reference: low quals)*						
Yrs employed	0.005***	0.010***	0.021***	0.003***	0.009***	0.024***
Yrs employed x high quals	0.007***	0.000	-0.003	0.004*	0.005	0.001

Source: own analysis using BHPS, PSID and GSOEP.
Statistical significance: * 10%; ** 5%; *** 1%
* Low qualifications are defined as no qualifications (UK and West Germany); and 12 or less years of education (US).

Work history clearly matters more for older women who are still married than for older single women, especially widows (the reference group in Table 5). For widows, the relationship between work histories and incomes in later life is weak and statistically insignificant in the case of the US and the UK (for full-employment). In all three countries, widows receive survivor benefits linked to their deceased husband's contributions record. These derived pension rights are relatively large by comparison with women's own entitlements, as men generally have longer and more full-time employment histories at higher levels of earnings, diluting any work history-related differentials in older women's incomes. For divorced and never married women, the coefficients are generally larger than for widows, though the difference is not always statistically significant (in part because sample size is small for these sub-groups).

In the UK and the US, state pensions for widows are calculated as the higher of two amounts: their own entitlement or, as is more often the case, their former spouse's entitlement. This disproportionately favours those women with the weakest contributions record of their own; only women who have a better contributions record than their former husband gain any benefit from their own social insurance contributions once they are widowed. Some widows with more complete work histories may be better off as a result if they are entitled to their own private pension, but only if the amount is sufficient to lift them above the means-tested minimum. On average, older widows in the UK and the US are not significantly better off if they had an extended full-time career than if they were economically inactive for most of their working lives. In West Germany, widows receive 60% of their former spouse's entitlement *in addition to* any state pension entitlement of their own.[7] Survivor benefits substantially dilute, but do not automatically offset women's own pension entitlements, which would explain why the work history coefficients are positive and statistically significant even for widows, albeit considerably smaller than for married women.

Another interesting result is that the association between work histories and older women's incomes is substantially stronger among younger cohorts of pensioners in the UK (those born post-1924) – and that this cohort effect is present even among the sub-sample of "still married" women. There is no cohort effect in the US and no *independent* cohort effect in West Germany.[8] This cohort effect in the UK may be accounted for by one or more of the following factors:

(i) the expansion in private pensions, which are more closely tied to past employment than other income sources;
(ii) the introduction of an earnings-related component into the state pension system from the late 1970s, which had no effect on older women who retired prior to 1980 and most benefited those who retired around 2000 and
(iii) the removal (in 1978) of various disincentives for married women to contribute to social insurance pensions, encouraging more women to contribute to their own state pension, particularly younger cohorts who were further away from retirement when these reforms came into effect.

Alternatively, this may not be a cohort effect at all, but an ageing effect, whereby the distribution of older women's incomes becomes more compressed with age.[9]

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7 Widows in Germany retain all of their personal entitlement up to a specified threshold (currently at EUR 8,278 per annum) and 40% of their entitlement beyond that, in addition to 60% of their former spouse's prior entitlement.

8 Although the interaction term is significant and positive in West Germany, this is only because younger cohorts contain more married women and, as we have seen, work history-related income differentials are much greater among married women.

9 If, for example, private pension incomes were less well indexed to inflation or earnings than state pension income, then we might well expect an ageing effect of this kind as those sources of income that are most strongly related to women's work histories decline relative to other sources of income, although this effect is hard to quantify.

The first explanation, in so far as it holds, would support the predictions of some commentators that "greater private pension provision is likely to magnify the pension penalties arising from earlier domestic and caring roles, leading to increasing differentiation among older women according to their marital, fertility and employment history" (Ginn and Arber, 1999). As the rapid growth in occupational pension coverage from the 1960s feeds through into higher private pension receipts among the next generation of retirees (including a growing proportion of women), we might expect work history-related income differentials to widen further over the next two decades. On the other hand, the West German results show that a predominantly public pension system can involve much greater differentiation among older women by employment history than systems that leave a greater role for private pensions. And, the US results suggest that an expanding role for private pensions does not necessarily lead to greater differentiation by work history among younger cohorts of pensioners. This absence of a cohort effect is counter to prior expectations and we can only speculate on the reasons for this. One possibility is that the expansion in private pension coverage in the US may have been spread more evenly across women with varying employment histories than was the case in the UK – a widening, rather than a deepening in coverage - disproportionately benefiting women with shorter and/or more part-time careers.

Last but not least, work history matters more for more educated women in the UK, but not so in the US or Germany. The coefficient is significant and positive for older British women without qualifications, but the association is significantly stronger for women with at least some qualifications. Less educated women in the UK are much less likely to have a private pension even if they have worked most of their working lives, because coverage is concentrated among women in higher status occupations. Also, any work history-related income differentials among less educated women may be ironed out by the benefits system; women with lower earnings have less to gain from private pensions if part or all of any additional income is deducted from means-tested benefits.[10]

The predominance of public pensions in West Germany means that retirement incomes ought to be closely linked to previous earnings, irrespective of education or socio-economic status, so we would not expect a significant interaction term between level of education and years employed – and this is what we find. It is perhaps more surprising that this interaction term is not significant in the US, because private pensions play an important role in their pension system and coverage is skewed in similar ways to in the UK. Again, this could be that private pensions are distributed more equitably than in the UK and/or that social assistance in the US does less to compress work history-related income differentials among less educated women with lower potential lifetime earnings.

[10] These findings are consistent with Jenkins and Bardasi (2004) who found that the association between the amount of time spent economically active and the probability of receiving a private pension was significantly greater for women in higher status occupations.

Summary and discussion

The empirical analysis above has highlighted some significant cross-national differences in the relationship between women's work histories and incomes in later life, as well as some similarities. The association between work histories and older women's incomes is strongest in West Germany and weakest in the UK. In the UK, only predominantly full-time employment is associated with higher retirement incomes, whereas part-time and irregular full-time employment does have a significant and positive association with later life incomes in West Germany and, to a lesser extent, the US. There is evidence of a pensions poverty trap in the UK, whereby women who have worked up to 15 years in full-time employment or 30 years or more in predominantly non-full-time employment do not appear to benefit in pension terms from their participation in the labour market. From a different perspective, this also means that British women who have been economically inactive for most of their working lives are not substantially disadvantaged in old age as they are in West Germany.

In all three countries, the association between older women's incomes and employment histories is stronger for married women and weakest for widows. There is also some evidence that the association between older women's incomes and their own work histories is stronger among more educated women and younger birth cohorts in the UK, whereas no such differentiation is apparent in the US or West Germany. If the growth in private pension incomes is driving the cohort and education effects in the UK, as some commentators anticipated, then it is perhaps surprising that the same effects (i.e. widening work history-related differentials by birth cohort and by level of education) are not evident in the US, where there has also been a rapid expansion in private pension coverage over much the same period.

It is not possible to make judgments about the women-friendliness of different pension regimes without a set of criteria against which to make such an assessment. Brown and Prus (2003) suggest four possible criteria:

- adequacy: an adequate minimum should be provided for all retirees;
- proportionality: retirement benefits should be related in some way to prior contributions;
- vertical equity: in so far as the system is redistributive, it should be progressive;
- horizontal equity: similar benefits should be provided to individuals in similar circumstances.

Any assessment of these countries' pension systems will depend crucially on the emphasis given to each of these four criteria. The UK system, for example, scores well on vertical equity in that the income differential between women who have been inactive for most of their working lives and women with more complete work histories is much narrower than in other countries. However, it scores poorly against the first two criteria. The distribution of older women's incomes is more equal than elsewhere, but only because many women benefit little, if at all, from their participation in the labour market, especially women with predominantly part-time careers – a levelling down, rather than a levelling up. And, there is some evidence of

horizontal inequity by level of education due possibly to uneven private pension coverage. Previous research has shown that chance also plays a significant role in determining pension outcomes among women in the UK, whereby women with identical work histories can have widely different pension outcomes depending on the particular company they worked for (Meyer and Bridgen, 2008). West Germany, on the other hand, scores well on proportionality and horizontal equity, but is not very progressive and does not provide an adequate personal income for women with shorter work histories, many of whom are instead reliant on sharing their husband's income. The US system scores poorly on the first criteria, at least by comparison with average living standards in that country, and neither particularly well or badly on the other three criteria. On the one hand, pension benefits are more closely tied to women's own work histories and contributions than in the UK and there is no apparent differentiation by education; on the other hand, the incomes of many older women are proportional to their current or former husband's entitlement, rather their own contributions record, which is inconsistent with horizontal equity.

Critiques of the British welfare regime have generally argued for a much stronger role for state pensions on the basis that these are more women-friendly than private pension schemes, which provide little scope for redistribution and penalise the shorter and more part-time work histories that are characteristic of many women. Whilst this does appear to be the case, the kind of generous public earnings-related pension favoured by many social policy commentators would not, on the evidence of Germany at least, produce a more equal distribution of older women's incomes – indeed, quite possibly the opposite. It is too early to know how changes in women's employment patterns will affect the prospects for future pensioners, although our analysis of early work histories suggest that the benefits are likely to be greater in the US and West Germany than in the UK, at least over the next two decades.

There is a potential inconsistency in arguing, on the one hand, that women should be rewarded more strongly for their active participation in the labour market and, on the other hand, to argue that time spent out of the labour market (for example, to care for children or older relatives) should not disadvantage women in later life. The former implicitly attaches more value to women's paid work in the formal labour market, whilst the latter attaches equal weight to unpaid informal work in the home. In the end, it is up to each society to decide the relative value it attaches to these two roles and to ensure that this is reflected in the overall design of the pension system – both public and private. Here there is undoubted room for improvement, for example by more explicitly linking credited contributions to valued activities, such as caring for younger children (as is already beginning to happen in the UK and Germany), and by de-coupling spouse and survivor benefits from women's own entitlements in order to reward prior contributions (including a proper valuation of unpaid caring activities). The stronger the role of state pensions within the system, the easier it is to make these kinds of adjustments. The outcome of any such reforms should be a more adequate and more equitable distribution of older women's incomes, though not necessarily a more equal one.

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