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Taking a Lifecycle Approach: Redefining Women Returners to Science, Engineering and Technology

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ABSTRACT

Measures to support women to return to the science, engineering and technology (SET) labour market have been implemented over the past three decades in response to the overall shortage of SET skills, as well as with the aim of (re)empowering individual women through their improved financial independence and labour market participation. Yet their needs remain poorly analysed and the impact of labour market reintegration measures appears to have been patchy.

This paper examines the experiences of women re-entering the SET labour market after a break from employment in the light of assumptions made about them in UK public policy, particularly related to labour market and employment. Drawing on evidence from surveys and interview data from two groups of women returners to SET we conclude that their needs are more diverse and complex than is recognised in much policy thinking and practice, and that these differ at specific points within the lifecycle. These differences include their relationships to the labour market, patterns of employment, reasons for leaving SET and obstacles to re-entry. Our conclusion is that, to respond effectively to the needs and requirements of women returners to SET, UK public policy therefore needs to be considerably more nuanced than it currently appears to be. In particular, policy needs to reflect the diversity and changing situations of women returners over the lifecycle, and needs to provide for a range of interventions that tackle different obstacles to women's return throughout their working lives. It may also be that the very term 'returners' - which tends to evoke a single episode of exit from and re-entry to the labour market - will need to be revisited in future scholarly and policy frameworks on women in SET.

KEYWORDS

Women returners; science; engineering; technology; policy



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INTRODUCTION

Women are massively under-represented in science, engineering and technology (SET) professions, making up 19% of the workforce in these areas overall (UK Resource Centre for Women in SET (UKRC), 2009). They do not enter or participate in SET professions on the same basis as men. Many of those who do qualify in SET education do not enter SET work. According to the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) report *Science, Technology and Gender: an International Report*, (UNESCO, 2007) only 25% of women SET graduates get jobs in SET. Once there, they do not enjoy the same positions, pay and conditions as their male counterparts, and have far-from-smooth career trajectories over their lifetimes.

There are several aspects of SET work that pose problems for women. First, the 'masculine culture' of SET work has been identified as excluding and discouraging women (Wajcman, 1991; Sáinz and Lopéz Sáez, 2010). While overt harassment and sexist behaviour are perhaps not as prevalent as they were some decades ago, there are still entrenched behaviours which make it difficult for women to feel they really belong. Faulkner's (2009) study of engineering workplaces, for example, shows that women face an in/visibility paradox whereby they are simultaneously visible as women and yet invisible as engineers. They thus experience contradictory pressures to become part of the dominant culture and yet not to lose their own gendered identities (Faulkner, 2009). Second, the working time patterns in some SET sectors are enormously demanding, and these pose problems for people with domestic responsibilities. Total availability and increasingly long working hours are requirements of some forms of SET work. For example, in 2009, 35% of UK ICT staff worked more than 48 hours a week, an increase from 2008 of 2% and 7.3% worked 60-75 hours per week, an increase of 33% on 2008 (Thomson 2009).

Career progression in SET usually depends on a 'masculine' career trajectory: uninterrupted engagement with the labour market, the ability to be geographically mobile to work on client premises or to follow job opportunities (including abroad), and in science, regular publication in scholarly journals. Progression can depend on personal contacts and on membership of informal networks. There is evidence that because of their lack of access to these networks and to the strategic information that often flows from them, women are promoted through SET careers more slowly than men (UNESCO, 2007).

Women often experience difficulties in returning to SET work after maternity. Career interruptions can be very harmful to the maintenance of current skills and to the production of a continual flow of scientific research publications. The working hours and workplace requirements demanded of many SET professionals are very difficult to manage when taking prime responsibility for children, and it has been argued that the 'care ceiling', rather than the 'glass ceiling' is the main reason why women's progression at work is blocked (Network of Experts in Social Sciences of Education and Training, 2009). Many women express the wish to switch from full-time to part-time, or flexible, work after maternity, but this option is not offered by

many SET employers, and where available the penalties in terms of career progression are perceived to be high (Valenduc et. al., 2004; Pantelli, 2006).

Consequently, women leave their SET careers in significant numbers at several points in their lives. Maternity is one of the key points at which women drop out of SET work, but it has also been suggested that mid-career is another point at which women's attrition rates rise due to powerful "antigens" in SET cultures such as isolation, mysterious career paths, hostile macho cultures, systems of risk and reward and extreme work pressures (Hewlett et. al. 2008). Those who try to return to SET face a host of problems in doing so, some of which are very specific to the SET labour market, as we shall see later in this paper.

This paper examines the experiences of women re-entering the SET labour market after a break from employment. After an initial overview of the situation of women returners in the UK, we consider the ways in which women returners generally, and returners to SET in particular, are treated especially in labour market and employment policy. We then draw upon evidence from surveys and interviews that highlight the diversity of the experiences of women aiming to return to SET employment, and the challenges they face in doing so. Our concluding discussion focuses on how UK public policy should adopt a lifecycle approach in addressing these issues, drawing on similar approaches that have already become established within EU policy.

WHO ARE WOMEN RETURNERS?

The term 'women returners' has been used in the UK, certainly since the 1970s, to describe women coming back into paid work after spending a significant number of years raising children [see for example National Advisory Centre on Careers for Women, 1975]. In general, subsequent usage of this term has been to describe those women who have been absent from the labour market for a period of time and not those who take maternity leave and return to their previous jobs.ⁱ These are the women returners with whom this paper is principally concerned. Women who have taken maternity leave and come back to the same employer have different, although associated, issues. For them getting back into the labour market is not the primary problem, but their career progression can often be hampered by even short periods of leave and subsequent part-time working. This may result in them leaving employment at a later stage, and not only immediately after the birth of their first child (Department of Trade and Industry (DTI), 2004; Hewlett, 2007; Herman, 2009).

In the UK, women's participation in the labour market has increased dramatically in the past four decades. At the start of 1971, the employment rate for women was 56%; in the three months to December 2008 it was 70% (Office for National Statistics (ONS), 2009). There has also been a dramatic increase in women with very young children returning to work. In 1975, only 25% of women with a child under 5 years old were in employment, while in 2005, this had risen to 56%. Women returners now form one-quarter of the labour force in the UK (Women and Work

Commission, 2006). This can be attributed to a number of factors, including both social and political changes during this period.

As patterns of women's employment have changed, so the notion of the woman returner has also 'evolved'. The average length of career break has reduced from 14 years in the 1950s to 5 years by the early 1990s, and is likely to have decreased further since then (Truman, 1992). It is also becoming clear that women are no longer returning just once after a long period of absence, but are likely to move in and out of the labour market over a number of years. This, of course, can have a detrimental effect on their career progression and lifetime earnings, an effect which has been both well documented and costed (Rake, 2000). In the UK, the majority of women seek part-time work on returning to employment after a break, but when this is not available in their existing occupation, they often take up jobs for which they are over-qualified (Shaw et. al., 1999; Tomlinson et. al., 2005; Connolly and Gregory, 2008). Thus the issues facing women at the point of returning to the labour market cannot easily be isolated from those facing them throughout the rest of their working lives.

As well as these more general issues facing women returners, there are specific factors that those in SET professions frequently encounter. The culture of work in SET sectors means that career progression is often incompatible with taking extended breaks. Traditionally, those entering a professional career as an engineer, scientist or technologist are expected to have a linear career trajectory with a clear progression route. Even though many women who leave SET and fail to return to their original profession are subsequently employed in an alternative job, this is still sometimes considered as a career break and these women are still regarded as returners. For example, the Institute of Physics (IOP) defines a career break as also including time working in another job.

... a career break is a period of absence from one's main career.. it may include periods of paid work which the person on the break does not consider to be on their main career track (IOP, 2004, p.5).

Geographical mobility is another particularly relevant issue for those in SET careers. There is an expectation of mobility for most scientific careers, particularly academic careers – evidence suggests that young single women are just as likely to take up these opportunities abroad as their male colleagues, but once women have partners and children they are less likely to do this (Ackers, 2004). Moreover women scientists are more likely than men to be in relationships with other scientists whose careers will also require mobility. In such cases it is more often the women in these so called "dual career" relationships who decide not to take up opportunities that require moving abroad, especially when there are children involved. These women are thus more likely to follow their male partners in 'tied migration' than vice versa.

The issues facing returners are thus not straightforward and cannot be treated in isolation. Most returners face a combination of barriers and this intersection of different, yet related, factors makes it particularly difficult for

them to return to their careers. We now turn to an examination of how the UK government has responded to these issues over the past three decades.

UK POLICY APPROACHES TO WOMEN RETURNERS

From the mid 1970s onwards, there was policy concern about women who had left the labour market and wanted to return. European and UK public funding enabled initiatives to be set up to support women's re-training and entry into employment, these being located mostly in educational institutions or within the community/voluntary sector (Shaw et. al., 1999; Doorewaard et. al., 2004; Jenkins, 2006; Panteli, 2006; Phipps, 2008). Early programmes were closely linked with a wider growth in women's education that had roots in the women's movement and an overt empowerment agenda (Coats, 1996).

Women returners were subject to increasing public policy attention during the 1980s, when concern grew about the changing demographic profile. Predicted shortages of school leavers meant that the economic imperative to bring more women into the labour market became more widely expressed (Truman, 1992; Shaw et. al., 1999). At the same time, the expectation that women would work outside the home had become widespread. Indeed, the notion of 'superwoman' combining family with a high-flying career became an iconic image of the 1980s.

Since the 1980s, social policy for women returners has primarily been economically-driven and employment-led, increasingly explicitly so over the past decade. A range of initiatives have been designed to increase women's participation in the labour market. In the UK, the care of dependents has always been treated as a private, family responsibility, even if it is provided through the market (Pfau-Effinger, 2010). Since 1997, however, the Government's overall policy approach has been to increase maternity entitlements and spending on childcare provision, at the same time offering incentives to parents to work (Lewis and Campbell, 2007). The focus has been on supporting those with low skills, or with few or no qualifications, into work, on the grounds that women who drop out of the labour market completely are more likely to be poorly qualified (Elliott, Dale and Edgerton, 2001). These measures have been closely allied with other anti-poverty and social inclusion measures. So, for example, lone parents have been targeted by the New Dealⁱⁱ, the low-paid have been supported by tax credits, and the expansion of public childcare has been managed through the expansion of schools and establishment of Children's Centres. These policies have deliberately been gender neutral, supporting both male and female parents rather than women returners per se. This gender neutral approach means that very little attention has been paid to the specific needs faced by women returners and especially those who are professional and highly-qualified.

Government departments tasked with training provision and skills development, have also provided little by way of targeted support for women returners during this period. Where responsibilities for training and education have been devolved to national governments in Scotland and Wales and to regional development agencies, there have been significant local initiatives to support women into work.

The Leitch Review of Skills (2006) outlined a strategy for moving lower-skilled people into higher skill groups, but did not specifically address the retraining needs of those already qualified at higher levels. Women returners were not identified as a distinct category with distinct skills support needs. The only explicit reference to women reiterated the wider social and economic benefits of returning women, suggesting that

... moving 50 per cent of women currently without qualifications to Level 1 would have benefits of between £300 million and £1.9 billion per annum in terms of reduced obesity and depression (Leitch Review of Skills, 2006, p.36)

Equally, the UK Commission for Employment and Skills, which was established on the recommendation of the Leitch Review, has a general mission to contribute to 'the transformation of the UK into a world-class leader in employment and skills' (UKCES website: <http://www.ukces.org.uk/about-ukces/about-the-uk-commission/our-remit/>). Its strategic priorities in pursuit of this mission include maximising individual opportunity for skills and sustainable employment. Among other things, these involve identifying barriers to employment and skills for individuals and increasing individual access to skills and work-related learning. At a strategic level, however, there is no particular reference to the place or needs of returners in the transformation of the UK employment environment. In their review of the Department for Education and Skills (DfES) White Papers and Sector Skills Council's agreements, Tomlinson and her colleagues (2009) also found no mention of women returners in relation to skills and training, and nothing specifically addressing returners to SET. They conclude that this

... reveals that the dual agenda of dealing with problem of the underutilization of women returners' skills and raising these women's education and skill profiles so that they are better equipped to work in SET occupations has been sidelined in recent years. (Tomlinson, Olsen et. al., 2009, p358).

Sector Skills Councils, which are tasked with trying to fill skills gaps, have looked to increase the available labour pool through up-skilling under-represented groups, including women in non-traditional roles. However, while policies to attract more girls into these areas of work are beginning to be more widely adopted, there is a lack of specific attention to the needs of women returners. Training support is primarily targeted at those with low qualifications, and is often inaccessible for returners because of time and travel constraints; so, for example, modern apprenticeships are only available on a full-time basis, and thus are difficult for women with childcare commitments to take up (Department for Communities and Local Government (DCLG), 2006; Women and Work Commission, 2006). The recent Women and Work Sector Pathways initiative has begun to redress this by seeking to support 5000 women per year to progress in skills shortage areas where women are under represented. There has also been an acknowledgement of the need for flexible and part time work at managerial and professional level indicated by the Women and Work

Commission's recommendation for the allocation of £5 million of funding to the creation of quality part-time jobs (DCLG 2006). This has been taken forward into the latest Framework for Action which makes a commitment to 'stimulate the supply of quality part-time work' (Government Equalities Office (GEO), 2010, p63).

The lack of attention to the specific situation of women returners in English education and training policy was further evidenced in 2008, when the Government announced that it would not continue to provide statutory funding for returning students, i.e., those who already have a higher level qualification. While it is too soon to evaluate the impact of this measure, it is clearly likely to affect a significant proportion of women returners who wish to re-qualify after a period out of labour market either to update their skills or to change career course.

It will affect the lives of many individuals who wish to re-skill in order to enhance their employability and who will be prevented from doing so. It will particularly discriminate against specific groups who need to re-skill to return to the workforce including women returners (Latchman, 2008, p.1).

Provision for Women Returners to SET

One exception to this absence of policy concern for skilled and educated women returners has been the case of professionally qualified women returners to SET. This issue has been on the UK policy agenda for at least 17 years. In 1993, a Committee and Working Group on Women in Science, Engineering and Technology was established and tasked with preparing a report entitled *The Rising Tide*, which appeared the following year (Committee of Women in SET, 1994). The report offered advice to the UK Government on ways to enhance the skills, expertise and potential of women. It made recommendations aimed at improving education and training and encouraging more women and girls into SET study, but, most significantly, recognised that women required help to continue in SET or return after a career break. The focus was on the need for employers and government to develop equality policies, and family friendly working practices, as well as careers advice and help for women returners.

Two further reports were commissioned by the UK Government which created the environment for high level support for women in SET. These were the *SET Fair* Report (Greenfield, 2002) and the *Maximising Returns* report (People, Science & Policy Ltd., 2002) both of which focused specifically on women returners. The *Maximising Returns* report estimated that about 24,000 women who were SET graduates returned to employment in 2000, but only about a third of those returned to SET occupations. Women with SET degrees who had dependent children were less likely to be employed than women with children who were graduates in other disciplines. In particular women with SET degrees and older children were less economically active than their non-SET counterparts. Subsequent policy attention was then focused on this group of highly qualified professional women who were failing to return to the SET workforce

The *SET Fair* report was the first to focus on women at higher qualification levels. The Government's response to this in turn acknowledged the difficulties of returning to SET, stating that 'in SET disciplines knowledge moves on very quickly' (DTI, 2003,p13). It proposed solutions such as encouraging employers to keep in touch with women who are on maternity leave, or supporting returners by 'enhancing their attractiveness to a potential employer and easing their transition back to work' (DTI, 2003, p13). In 1994, the UK Resource Centre (UKRC) for Women in SET was created in part to respond to these issues. The UKRC RETURN campaign was developed specifically to support women returners to SET.

We have so far looked at the UK policy discourse about women returners and we have seen how women returners are often subsumed under wider policy programmes concerned with economic development or social inclusion. As a result, there is a danger that assumptions and stereotypes about returners can be perpetuated and their diversity and specific needs overlooked. This is particularly acute in relation to women returners to SET, who face very specific, yet at the same time diverse, issues in returning to the SET labour market. What are their circumstances and how might they be addressed?

WOMEN RETURNERS – INSIGHTS FROM THE SURVEY DATA

In order to better understand who women returners are, what their circumstances are, and what their needs and requirements are in terms of support interventions, we now want to consider the picture derived from social surveys of women returners to SET. In the following analysis we draw on two sets of unpublished survey data and 19 qualitative interviews carried out with participants on a national programme for women returning to SETⁱⁱⁱ.

The surveys covered the women's career trajectories before and after their career breaks and their return to the labour market, and interviews investigated the factors promoting or inhibiting their return to SET employment. The respondents had all been beneficiaries of one or more of the services offered under the auspices of the RETURN campaign run by the UK Resource Centre for Women in SET between 2005 and 2007, central to which was an online course delivered by the Open University.^{iv} Eligibility criteria for accessing the RETURN services were comparatively narrow, following the UK Government's criteria for funding and the restrictions of the European Social Fund (ESF) which provided additional support for the RETURN programme. Women returners were defined as having been out of SET work for at least two years, and having already attained a first degree in a SET discipline.

Occupations

Before their career breaks, the women surveyed had worked in a very wide range of SET areas, predominantly in the sciences. 21 different SET disciplinary areas were represented, with the main areas being the biological sciences, information technology and systems sciences. The occupations held by these women ranged across these disciplines, from senior to junior positions, and the women included both employed and self-

employed professionals. Some of the professional positions which they had held were:

Table 1: Examples of previous occupations of women returners to SET

Blade calculator (mechanical engineer) Software engineer Failure analysis engineer Design engineer	Molecular microbiologist Petroleum geoscientist Medical physicist Science teacher Clinical scientist Science technician Laboratory assistant Junior doctor	IT consultant Design company managing director Logistics consultant Technical clerk
Engineers	Scientists	Technologists

These examples demonstrate considerable diversity in the occupations held by these women returners. The job titles listed here also indicate the levels of education and the qualifications which these women achieved in the course of their careers. Most of these occupations required at least a first degree; some also involved a further degree or a doctorate. Several of the respondents to this survey reported having undertaken doctoral research.

Seniority and Professional Experience

Furthermore, though some of these women held junior positions, such as the laboratory technician and assistant roles, and technical clerical roles, many of these jobs involved high levels of seniority and accumulated years of professional experience. Figure 1 below shows the levels of seniority which these women occupied before they took their career breaks from SET. The number of survey respondents who had positions at each seniority level is shown in the figure.

As we might expect, these women were not strongly represented in the most senior positions in their SET professions (at Levels I and II of seniority). Other studies of women's representation, particularly in academic science jobs, also point to the absence of women in higher-level SET occupations, with women forming a very small minority of science senior lecturers, readers, professors and heads of department (European Commission, 2003).^v

However, neither were the women we surveyed clustered at the most junior levels of their occupations; they were most likely to be found at Levels III and IV, equating to senior scientists and engineers, managers, lecturers, or developer/analysts; or as post-doctoral level scientists and engineers. Nearly 60% of the survey respondents fell into one of these two groups. These, then, were women who were both well-qualified and with some years of experience in their SET professions. Some of the professional positions which they had held are shown in Table 1.

Figure 1: Seniority of SET women before their career break

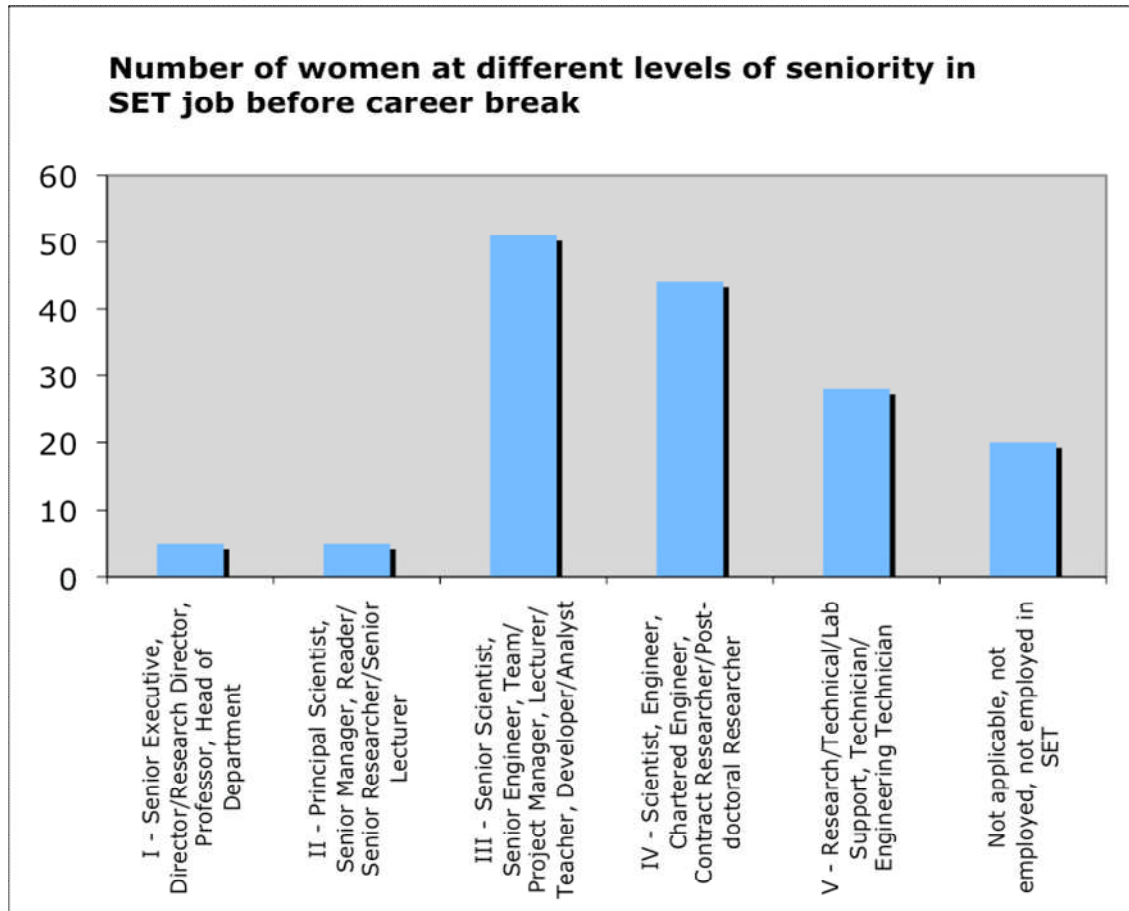
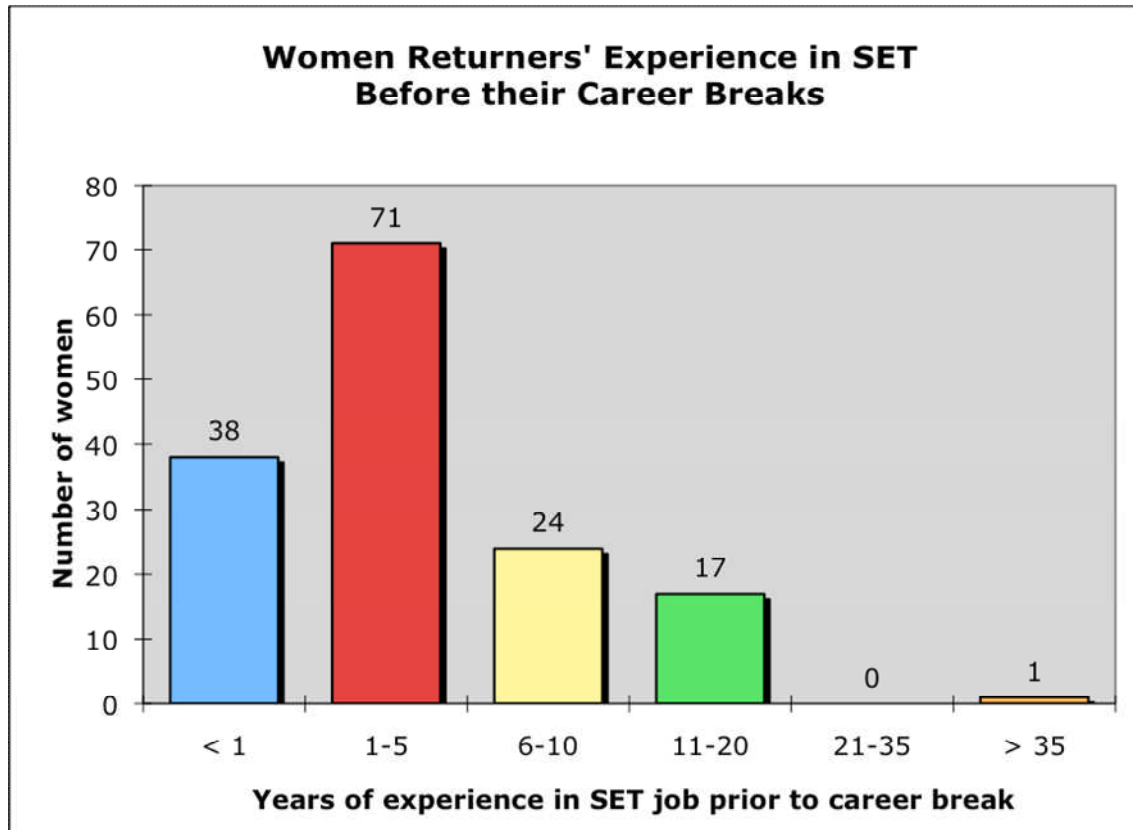


Figure 2 shows how much professional experience these women had accumulated *just in the job they occupied immediately before they took their career breaks*. The largest group, 47% of survey respondents, had between one and five years of experience in this job. 25% of respondents had less than a year of experience in their last SET role before their career break, but on the other hand, 36% of respondents had more than six years of experience in that last role alone. Assuming that at least some of these women will have held more than one job in their SET careers, those women's total professional years of experience are likely to be greater than those reported in this survey.

Figure 2: Experience acquired in job prior to career break



Even so, on the basis of these figures alone, the picture emerging here is not a simple one of novice SET professionals or workers in low-level occupations, but one in which a significant proportion of women returners to SET are people who have accumulated at least several years of professional experience in senior and well-qualified positions. In other words, women leave and return to SET at diverse, and sometimes relatively advanced, points in their careers.

Patterns of Entry and Exit from the Labour Market

While some survey respondents had been out of the labour market for 10 or 15 years, more than 50% had been unemployed for less than 3 years. Qualitative interviews revealed more nuanced work histories, with women entering and exiting employment over a number of years.

For example [Bella] described her varied career path including several breaks at different stages in her life, illustrating the cyclical nature of returning as she moves in and out of the labour market. She got a job in IT company immediately after graduating. She describes the working environment as very male dominated and she left when pregnant and went on to do a postgraduate certificate in primary teaching. She moved with her husband to the Middle East and taught there, but her career took second place to her husband's high level and demanding job. After returning to the UK they divorced when she was aged 46 and she updated her IT skills and got herself quite a high level IT job. She took further breaks while two sons were doing A levels. She is now unemployed again, this time with no

dependents and has been applying for jobs at a lower level than her previous employment.

Another example is [Caroline] a maths and engineering graduate, who had qualified as a civil engineer and then worked in IT as a programmer analyst for 6 years. She describes herself as having taken a 14 year career break to care for her disabled son, although qualifies this by saying " *I've done a few little jobs, nothing career oriented*" implying that although she has been employed during this period, she has not been following her SET career.

Considering the reasons why the respondents to this survey took their career breaks, we find that their points of exit from the SET labour market were extremely diverse, representing many different points in these women's career trajectories and life-cycle stages. These reasons are summarised in Figure 3, drawing again on data from survey B. The reasons given are not mutually exclusive; a number of women gave more than one reason for leaving, so that the total number of responses exceeds the total number of respondents to the survey.

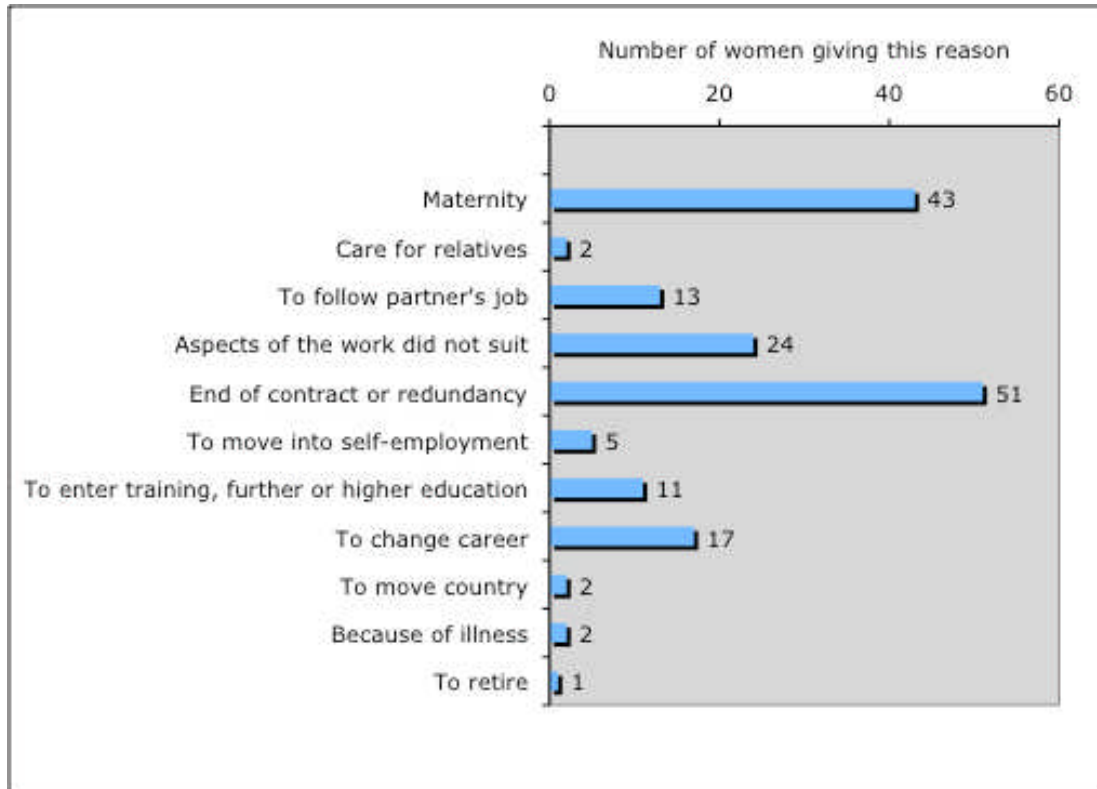
As the figure shows, the termination of a contract or redundancy was a major reason why the women who responded to this survey had left their SET jobs. Nearly one-third of survey respondents (51 out of 155) gave this reason. These women were either formally made redundant from their SET jobs, or were effectively made redundant because they reached the end of a temporary contract which was not renewed.

A large group left their SET jobs on maternity; a small number of these women also told us that they left their jobs because the working hours were unsuitable, or the place of work was too difficult for them to get to. Others took the opportunity to become self-employed, or to change career. Others still had to move with their husbands' jobs and decided not to re-enter the labour market when they became pregnant. So in several cases, maternity and other factors in combination prompted survey respondents to leave the labour market. For example:

"My husband got a good research post too far away to commute. Soon after which I became pregnant with twins, so I did not try to find work in our new location."

"I left work for maternity. The plant (...) closed before I could return."

Figure 3: Reasons for leaving SET employment



A substantial group of women told us that they left their SET jobs at least in part because aspects of the work did not suit them. Specifically, the hours of work were unsuitable; the place of work was too difficult to reach; there were no training or development opportunities in the job, particularly for those on temporary contracts; or the job was not stimulating enough. In other words, their SET jobs were organised in ways which made it difficult for these women either to manage their work in the context of the rest of their lives, or to develop as employees.

A further group of women left their jobs because of the need to move home in order to accommodate their partner's job. These are the sorts of women identified by Ackers (2004) and discussed in our introduction: they are in 'dual career relationships' (often with other scientists), and tend to follow their partners' careers, sometimes giving up their own in order to do so. A few, but by no means all, of the women in this group were also mothers. One woman who had been employed on a series of temporary contracts highlighted the difficulties of maintaining her own SET career when she told us that "*With every new contract, I was forced to relocate to a different city, away from my husband.*"

So there are usually complex and interlocking reasons why SET women leave the labour market. These are predominantly related to labour market 'demand push' factors such as redundancy or the termination of a temporary contract, which raises the question of whether SET women are particularly vulnerable to corporate redundancy programmes, and whether they are more likely than men to be employed on temporary contracts. However, maternity is also an important factor pulling women out of SET

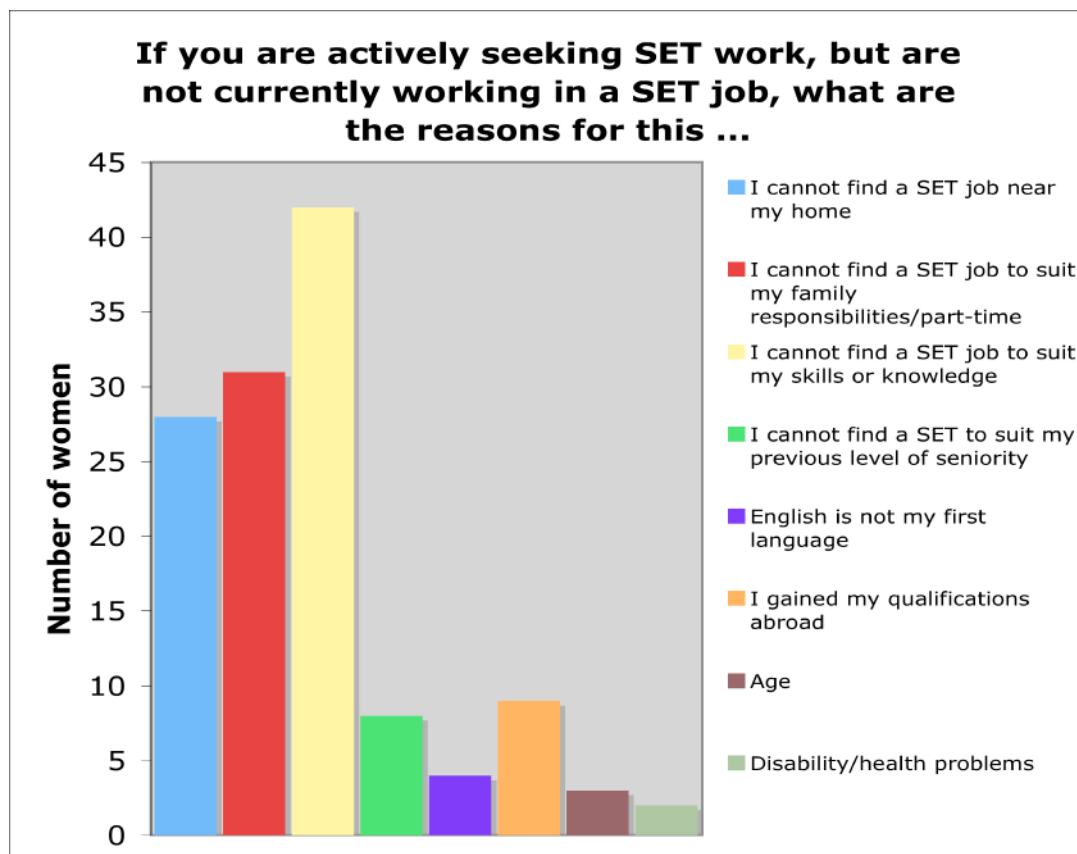
work, though it usually operates in combination with other issues related to the organisation of SET work which discourage them from staying.

Their comments, and our survey data on length of career break, also indicate that although some of these women left SET work for what they believed was a temporary break, others knew that they were leaving for a much longer time or permanently, particularly when they wanted to change careers or retire altogether. Ultimately, however, all the survey participants took the decision to return to this work, which is how they came to be participating in the UKRC's RETURN campaign.

Barriers to Women's Return to SET

Figure 4 shows why the women returners in Survey B felt that they did not succeed in returning to SET careers. A mismatch between their skills and the jobs available to them was the major reason given for their lack of return to SET. The figure also confirms that location of work and employers is a significant obstacle to women returners finding SET jobs. Finally, the lack of availability of jobs that are 'family-friendly' was also cited as a major obstacle to returning to SET.

Figure 4: Reasons for not returning to SET work



Data from Survey A confirms and elaborates the picture in relation to the mismatch of skills and knowledge to employment opportunities. When asked what they considered were the main difficulties they would face in returning to work most respondents to this survey focused on generic issues

– those that may well be common to anyone who has been out of work for a period of time. Issues such as lack of confidence (indicated by 66% of respondents), lack of recent work experience (64%), lack of contacts and networks (51%), and lack of interview practice (46%). A significant proportion (61%) also mentioned out-of-date skills as an obstacle to their return. This latter is an issue that is particularly problematic for returners to ICT employment, particularly in programming, where employers tend to recruit only applicants with the most current skills, and unless continually refreshed, skills can become obsolete very rapidly. Interestingly, finding suitable childcare was only perceived as a difficulty by a quarter of the women, despite this being one of the key areas of focus for policy intervention (alternatively perhaps childcare has improved in recent years indicating that this is no longer a key barrier). 11% mentioned other issues such as age or disability as potential difficulties, with age being seen as a particular barrier for re-entry into the IT professions.

It is significant that many of the respondents to these surveys gave more than one of the possible responses, indicating that there are often multiple reasons for their inability to return to SET work. As [Delia's] story illustrates, these issues occur over time and can exacerbate each other. Effectively a single parent, as her husband now lives and works abroad, Delia left employment after the birth of her third child.

“ What happened while I was getting my degree which was the last 5 years. I was working 4 days and 1 day going to college, and that all finished in 1983 and since then I've been working there full-time, but I went part-time when I had my children for awhile, and saved enough in maternity leave.[...] I gave up after the third child, .. so for the last 6 years I haven't worked at all in the industry ...went back to [Company X] I didn't get the job full-time. They only want full-time people, and when I talked to Human Resources the job I'd gone for was for full-time people not part-time.

I'm here on my own, my husband lives abroad. That makes life a bit more difficult. Before when he was here then obviously he used to pick the kids up and the other one would drop them so you could go to work long hours if you wanted. One of the big issues is trying to work full-time on my own. It's not very practical.”

The location of potential employment is a barrier to women with and without children, for different reasons. Women with children or other caring responsibilities may be unable or unwilling to consider wholesale family relocation in the pursuit of their employment. They may also need to limit their travel to work time. For these women, there is no question that they will continue taking primary responsibility for childcare and other caring commitments. Their careers are secondary to their partners' careers. The unavailability of part time work is therefore an additional barrier to their return to a SET professional position.

However, there is a further issue embedded in the responses of the women who reported that they could not find a SET job near their homes, and this relates to the scarcity of specialist science jobs. The location of SET work is

a barrier for women with particular scientific specialisms, regardless of whether or not they have children. Highly specialist jobs are very scarce, and women seeking these jobs are always faced with the issue that a job appropriate to their expertise may be located a long way from where they live. This then presents them with the dilemma of whether to move nearer to the job, or whether to seek other types of work near their homes. A number of the respondents to Survey B chose the latter option. This of course is likely to be as much a barrier for male scientific specialists as for female ones, but when combined with the imperatives of a dual career family, and possibly children as well, it seems that women scientists are particularly likely to drop out of their scientific careers in these circumstances.

DISCUSSION

Overall, these survey data indicate the mixed circumstances of women returners to SET. Women returners are diverse along many dimensions: in terms of their levels of education, they range from school leavers to post-doctoral researchers. In terms of their disciplinary expertise, they range from medical practitioners to petroleum geoscientists. Many are highly experienced and qualified when they leave work, others have been employed for less than a year before they take their breaks. They leave at various points in their careers and for quite varied reasons, from the early stages to do more study, to the point of maternity and caring for children, to the mid-career phase when some are made redundant or leave work because of ill-health. Some are disaffected with their jobs, others leave because their spouses' careers take precedence and they are obliged to relocate. Perhaps surprisingly, difficulty in managing childcare is not the most common reason for women leaving SET work.

Having left, most women are unemployed for less than three years, and experience interrupted careers rather than very long absences from work. Most find it difficult to return to SET principally because their skills are not well-matched, in their view, to current labour market requirements. Relatively few mention the absence of available childcare as the main obstacle to their return. In addition their decisions are affected by assumptions (either their own or those of others around them) about gendered divisions of domestic labour and family care which inform their assessment about whether they can manage to juggle work and family life (Herman, 2006).

We would argue that public policies on women returners tend, however, to over-simplify them and to treat them as a single group with uniform characteristics. On the basis of the survey data reported above, women returners are far from uniform in their skills and qualifications, reasons for leaving work, or in their prospects for re-entry. In our view, public policies do not, on the whole, satisfactorily reflect and respond to this diversity. This is particularly the case in the UK, where policies concerning women returners seem particularly to frame them as predominantly consisting of largely poorly-skilled and uneducated people whose labour market status derives principally from a combination of low-skill and motherhood. Certainly, the policy priority for this group has been to move them off benefits and into paid employment. On the other hand, for SET returners

specifically, government and ESF support for public interventions such as the UK Resource Centre has been contingent upon the use of a definition of returners which is restricted to those who are both SET graduates and are long-term unemployed. This does not nearly cover the range of circumstances of SET women returners^{vi}.

Employment and Social Policies in the EU: the Lifecycle Perspective

EU public policies are, in our view, more sensitive to the complex situations of women returners to SET. These are recognised and addressed in many areas of EU employment and social policy, as well in science and technology policies. Of major significance is the understanding that women's labour market circumstances, in all areas of work, are best addressed by using a policy framework based on a 'lifecycle approach', so that women's specific labour market participation patterns are not overlooked or elided with men's in employment policies.

For example, the Employment Guidelines of the European Employment Strategy provide recommendations to Member States on policy areas that should be developed to support employment growth, productivity growth, flexibility combined with employment security, and gender equality. Guideline 18 recommends that Member States should develop a lifecycle approach to employment policy formulation for gender equality:

The right conditions must be put in place to facilitate progress in employment, whether it is first-time entry, a move back to employment after a break or the wish to prolong working lives. The quality of jobs, including pay and benefits, working conditions, access to lifelong learning and career prospects, are crucial, as are support and incentives stemming from social protection systems. To enhance a lifecycle approach to work and to promote reconciliation between work and family life, policies regarding childcare provision are necessary. Securing coverage of at least 90 % of children between 3 years old and the mandatory school age and at least 33 % of children under 3 years of age by 2010 is a useful benchmark at national level (Council of the European Union, 2008, p.6).

Promote a lifecycle approach to work through ... resolute action to increase female participation and reduce gender gaps in employment, unemployment and pay, better reconciliation of work and private life and the provision of accessible and affordable childcare facilities and care for other dependants (Council of the European Union, 2008, p.7).

Guideline 21 similarly illustrates this approach. It promotes the take-up and support of flexible working, and provides for Member States to amend their employment legislation in order to support new forms of working time arrangements. 'Support for transitions in occupational status' applies to, among others, women SET returners who move into self-employment or become entrepreneurs.

Promote flexibility combined with employment security and reduce labour market segmentation ... through ... the adaptation of employment legislation, reviewing where necessary the different contractual and working time arrangements, better anticipation and positive management of change, including economic restructuring, ..., the promotion and dissemination of innovative and adaptable forms of work organisation, support for transitions in occupational status, including training, self-employment, business creation and geographic mobility (Council of the European Union, 2008, p.12-13).

In the current European Social Fund (ESF) programming period (2007-2013), there are several proposed types of measures which respond to the particular circumstances of women returners to SET. These include measures to:

- Improve participation of women in IT training courses, particularly at higher levels,
- Promote women as employees and managers in research and development, technology and innovation,
- Provide special support to women to establish and develop businesses in telecommunications and high technology fields, and
- Provide support to employers who offer their employees career breaks, childcare and other family support services

As this list indicates, in addition to training and vocational training measures, there is considerable emphasis on training and education to high skill levels, including technical work at professional levels. Women returners are also to be supported as entrepreneurs and business owners. Childcare support is to be improved. In this framework, women returners are treated as more than IT literate, able to engage with technology at a high level, and of professional status, both as employees and entrepreneurs. Support for them therefore involves not only improvements in their own 'employability', but also practical changes in employing organisations and in public services.

In EU science and technology policies, too, there is an understanding that women returners to SET are not the same as women returners to unskilled work, and that the support measures needed to improve their position need to be very specific, tailored to their particular circumstances. A report by the European Technology Assessment Network (ETAN) Expert Working Group on Women and Science offered detailed policy recommendations for the support of women returners to SET, which included mentoring and role model support, provision of special fellowships, and positive action initiatives such as re-entry stipends and work contracts (ETAN Expert Working Group on Women and Science, 2000).

Similarly, the European Commission's *Code of Best Practices for Women in ICT* (European Commission, 2009) included a series of provisions for women returners to ICT employment, aimed at encouraging companies to develop and implement HR practices that facilitate return to work. A broad range of potential measures was advocated, as much addressed to employers and the need for them to improve their management of returners

as to returners themselves: support for flexible or part-time workers, and support for mentoring activities by and for women, for example.

These examples suggest that EU employment and social policies are more clearly geared than UK policies to the diverse support needs of women returners to the labour market, particularly the SET labour market. The European Employment Strategy (EES) incorporates a comprehensive approach to the labour market situation of all women returners, emphasising as it does the need for a lifecycle perspective in the formulation of support measures for women: at the stages of their entry and re-entry to work, through access to lifelong learning and career development support; at and after maternity, through the provision of childcare; and also in late career, through social protection support and support for care of adult dependants. The lifecycle policy framework caters for interrupted careers and key points of transition between phases of labour market participation. Women's interrupted labour market participation, due to their unequal responsibility for domestic and care work, is seen as a key factor shaping and reinforcing their secondary labour market status, unequal access to employment, and inequality in pay, progression and access to careers, including in science, engineering and technology. The EES thus promotes measures which would operate at several points in the lifecycle. Similarly, policies on women in science and women in technology are firmly geared to the support of women returners with varying levels of qualification and career advancement, in diverse scientific disciplines and in both private and public sector working environments.

Given that the competence of the European institutions is mainly in providing a framework for policy development by the Member States, we may ask why UK policies on women returners do not appear to have been more strongly influenced by the approaches taken in European employment and social, science and technology policies. We believe that translation of the policy framework does indeed take place, but at the level of discrete interventions rather than at the level of national policy formulation. So, for example, in the 1990s, the ESF EMPLOYMENT initiative (1995-1999) and under its auspices, the NOW (New Opportunities for Women) programme, were used to resource support actions for women, including women returners, at Member State level. More recently, ESF funds have been widely used as levers to fund training schemes, workshops and networks. ESF Objective 3 and EQUAL funding were major sources of support for a series of UK projects and initiatives to support women in science, engineering, construction and technology, including the JIVE (Joining Policy Joining Practice) project which in turn provided resources for the UKRC. Many of these initiatives, including the UKRC, take a holistic approach to the issue of women's representation in SET, and attempt to address the issue on many fronts simultaneously, and as it affects women throughout their studies and working lives. National-level UK policy approaches to women returners, to SET and otherwise, have not really taken on board the need for a 'lifecycle approach' to women's labour market participation, by establishing interventions to address varied forms of exclusion or to support women at different career stages. They remain predominantly oriented to improving the employability of mothers.

Framing UK Public Policies Around the Lifecycle of Women's Under-representation

If public policy is to be geared more closely to the diverse circumstances of women returners, and to generate effective practice in supporting them, then several issues need to be recognised and incorporated in it. As Figure 3 shows, maternity is not the only or even the main reason why women leave SET employment, and, as Figure 4 shows, nor is it the major reason why they are unable to return. Public policies need to respond to all the obstacles that women report. The data in Figures 3 and 4 indicate that these are related mainly to contractual termination, to skills mismatches, and to the lack of availability of work in the right location and with the right working time patterns, as well as to maternity. Consequently, public policies could focus on the promotion or support of more secure employment contracts in both the private and public sectors. At the very least, it should ensure that women returners are not disproportionately affected by any future reduction in contractual security in public sector scientific research employment. A strong emphasis on the provision of retraining, skill and confidence development seems to be vital for women returners; the data from survey A reveals that these are likely to be particularly important forms of support. Promotion and support for patterns of work that are flexible in terms of location and timing would also address some of the reported obstacles to women's return to SET. Certainly, public policies can help to challenge the enduring employer mindset which favours presenteeism and inflexible working hours, particularly in sectors like ICT.

This suggests that close collaboration with SET employers is needed, so that some of the factors which 'push' women out of SET employment can be addressed. Many of these are work organisation issues which can only be tackled at workplace level and at the initiative of employers, but there is a great deal that public policy can do to support this. Most obviously, existing public policy support for flexible working across the economy needs to be particularly forcefully implemented in relation to SET work, so that there are more opportunities for varying working time arrangements, or to work from different locations. This might increase the retention rates of many SET women who currently leave work on maternity, or who give up their jobs to move home for their partners' work. It might also increase the retention rate of those at more advanced stages in their careers who need flexibility to manage other forms of caring.

Employers could also be encouraged to provide in-service training and employee development for women, perhaps in partnership with public agencies, to reduce the chances of SET women leaving their jobs because of lack of development and progression opportunities. Certainly, public support for women's continuing ICT training and learning is vital, if their skills are not to become outdated during periods away from work. Employers often need help with redesigning their appraisal and progression systems to reflect the circumstances of SET women, so that these systems fully reward the experiences and achievements of the latter. Public policy can play a role in supporting this process. Employers could also be encouraged to develop positive action initiatives to retain SET women in redundancy situations or when temporary contracts are reviewed.

Finally, public policy could play a much stronger role in supporting women who still withdraw from SET employment and become self-employed entrepreneurs. The results of the surveys presented here confirm other anecdotal evidence concerning the tendency of women in mid-career to leave organisations and establish themselves in self-employment, largely because of the conditions of work in SET, particularly ICT, organisations. Support programmes for female entrepreneurs do exist, particularly in the form of micro-financing initiatives and networking support in the EU, and through Business Link and Business Gateway advice services in the UK. However, more could be done to support women SET entrepreneurs specifically, including through transition support and public sector procurement.

In general, the effectiveness of any type of equality policy or initiative rests to a very great degree on the extent to which it is part and parcel of a wider and more integrated policy approach that aims to tackle inequality in several interconnected areas. So, for example, public policies aimed at reflecting and supporting the needs of women returners are likely to be more effective if they involve several intersecting interventions addressing different but related problems (Olgiati and Shapiro, 2002). Equally, policy analysts argue that for public policy on the under-representation of women to be effective requires action to increase men's contribution to the domestic sphere, including caring work (Ackers, 2003; Gerhard, Knijn and Weckwert, 2005).

Reframing public policies to reflect the diversity of women returners certainly implies, as the foregoing discussion suggests, considerable levels of support and collaboration between public authorities and SET employers. Employers increasingly recognise the need to recruit and retain female employees, and many are making major efforts to do so. A group of major international companies has developed a 'Hidden Brain Drain Task Force'. This is designed to support employers' initiatives to attract back 'talented' women who have taken a career break and want to find a way back into their career (Hewlett, 2007). These returners are seen as valuable assets in whom employers have made a significant investment, and their disappearance is regarded as a financial loss. However, evidence suggests that, even within companies that are committed to supporting women after their return to work, most returners, especially those returning to part-time work, risk losing career momentum and becoming marginalised in their organisations (Herman, 2009; Lewis, 2009). This is why the role of public policy is vital in supporting and underlining the actions of individual employers.

Rethinking 'Returners'

If public policies and private sector practices need to reflect the diversity of women returners and their circumstances, in the process they perhaps also need to revisit the very term 'returners'. The word implies a single episode of exit and re-entry to the labour market, which over-simplifies the cyclical participation patterns of many women. The emphasis in EU labour market policy on the 'lifecycle approach to work' is important, as it acknowledges that the uninterrupted linear model of careers is a poor way of describing

not only women's, but increasingly men's, employment trajectories. EU policies in relation to returners are more sensitive to the importance of domestic divisions of labour and the double burden which women carry in shaping their labour market participation patterns, and the lifecycle approach to policy-making seems to us to be appropriate in this context. As far as SET women returners specifically are concerned, it is clear from its published reports that the European Commission clearly recognises the need for policies which respond to the very particular nature of SET labour processes and career patterns, including some of the peculiarities of academic careers. However, in this, as in its interventions on women in ICT, the European Commission's competence is very limited, and its principal option is in the field of 'soft law': the promotion of good practice through example. The UK government's most recent policy publication on women and employment indicates a shift in thinking towards this life-cycle approach: "*we need to support women at key stages in the life cycle if we want to ensure that they have an equal chance of success in the labour market*" (GEO, 2010, p66). If this view is sustained, together with the growing awareness of the diversity of women's experiences that is also evident in this document, then there is perhaps room for optimism about future policy intervention in this area.

Women returners have been an issue of concern for educators and activists, companies and policy makers for at least 30 years and while the profile of returners may have changed somewhat in the intervening years, their needs are often still fundamentally the same. Structured intervention and support for returners in the form of training, advice and advocacy has persisted at grass roots level during this time. These interventions have been either spurred on by enabling policies or hindered due to lack of public funding when competing priorities have taken resources away and returners are no longer seen as economically important. The persistence of efforts to support women returners in all of their diversity is indicative of the lack of change in working cultures and the continued dominance of the full time, uninterrupted career model, which marginalises women returners as an aberration from the 'norm'. Until such cultures, especially in SET workplaces, are changed significantly, women who take breaks from their working lives to raise children or care for elders will continue to need interventions to help them return, and governments will have to continue to create policies and programmes to help them in the transition back to work.

ENDNOTES

ⁱ In some discussions, returners are those who had been out of the labour market but have actually returned while those who are still seeking employment are called potential returners (cf Tomlinson 2009).

ⁱⁱ New Deal is a UK government scheme introduced in 1998 to support unemployed people into work by providing training, subsidised employed and voluntary work. Specific schemes for targeted groups have included schemes targeted at young people, disabled people as well as New Deal for Lone Parents.

ⁱⁱⁱ The first survey, Survey A, was conducted in 2006 and had 160 respondents (Dale et al 2007). It was supplemented with qualitative interviews. The second survey, Survey B, was conducted in 2007 and had 155 respondents (Webster 2007).

^{iv} This course was developed for women returners to SET in 2005 by the Open University, in partnership with the UKRC, in response to the recommendations of the Maximising Returns report (People, Science & Policy, et al. (2002). The course, which has since been taken by 900 returners from across the UK, was integrated with other support services in the UKRC's RETURN campaign. As described elsewhere, the course was 'aimed at professional women graduates who had prior experience of scientific, engineering or technology careers, the integrated programme .. was set up to help these women re-assess and recognise their transferable skills as well as identify where they needed to update skills and explore possibilities for doing this'.

^v Women's representation in academic science careers is more marked in some science disciplines than others. They are better represented at the top of the biological sciences than they are at the top of physical sciences or chemistry, for example (European Commission 2006).

^{vi} Since 2007 the UKRC has widened its brief with regard to the services it offers women in SET, so returners constitute one category within a framework that supports women at all stages of their SET careers – see <http://www.theukrc.org/> for more details.

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