

The Snowballing Penalty Effect: Multiple Disadvantage and Pay

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This paper makes the case that the current single-axis approach to the diagnosis and remedy of pay discrimination is inadequate in the case of multiple disadvantage. While a good deal is known about pay gaps, particularly those affecting women, less is known about those affecting people in other disadvantaged groups and those in more than one such group. This analysis of multiple years of pay data, $n = 513,000$, from a large UK-based company shows that people with more than one disadvantaged identity suffer a significantly greater pay penalty than those with a single disadvantage. The data also suggest that penalties associated with multiple disadvantage exponentially increase. In other words, disadvantages seem to interact to the detriment of people at ‘intersections’. The paper considers the implications for policies aimed at reducing pay inequalities. These currently take a single-axis approach and may be misdirected.

Introduction

This paper is concerned with the impact on pay of multiple labour market disadvantages – specifically those related to gender, ethnicity, disability and age. While the gender pay gap has been extensively researched and its causes debated (Blau and Kahn, 2007; Dex, Ward and Joshi, 2008; Hakim, 2004; Manning and Swaffield, 2008; Metcalf, 2009; O’Neill, 2003; Wass and McNabb, 2006), rather less attention has been given to the pay penalties experienced by other subordinate or minority groups. Although there is a long-standing literature on ethnicity and pay in the US (Green and Ferber, 2005), much less is known about this in other national contexts, and little has been written on the impact of disability and age on remuneration. Still less is known about intersectionality (McCall, 2005; Walby, Armstrong and Strid, 2012) and reward, i.e. how dual or multiple sources of labour market disadvantage combine to affect pay (Browne and Misra, 2003). These gaps in our knowledge inhibit the develop-

ment of a sound understanding of the impact of multiple disadvantage in employment, and of appropriate policy responses.

The paper contributes in the following ways. Drawing on an analysis of payroll data using more than 500,000 observations within a single UK organization, we are able to show how people’s pay is affected by having two or more disadvantaged identities. We go further than existing studies of this type (e.g. Greenman and Xie, 2008) by including more sources of disadvantage and assessing their impact on pay gaps. We also contribute to the current policy debates about whether or not, and to what extent, disadvantaged identities combine to affect people’s employment experiences. The issue at stake here is whether disadvantages are additive or intersectional (Lewis, 2010, p. 8) in their effects. Put simply, by way of illustration, does the pay penalty experienced by an employee with two (or more) strands of identity disadvantage equate to the sum of the penalty of each separate strand as per the additive model, or is there an intersec-

tional effect that magnifies negative outcomes? The balance of existing evidence (Berthoud, 2003, Browne and Misra, 2003) favours what Greenman and Xie (2008, p. 1218) call the ‘additivity assumption’, but like the latter authors we are able to subject that view to systematic scrutiny. Finally, we consider whether, in the light of our findings, existing policy and practice remedies are adequate in addressing the reality of multiple disadvantage.

The contribution here lies in identifying systematic patterns in the relationship between disadvantage and employment outcomes in order to inform theoretical and policy development and further research. To our knowledge, an investigation of the extent and nature of the impact of four strands of disadvantage on pay has not been attempted before. We recognize that it would also be important, at a theoretical and practical level, to examine in detail whether particular combinations of difference have a greater or lesser impact on pay, as well as how and why. This is more than can be achieved here, but we set out an agenda to do this. The paper starts by analysing current policy approaches and their theoretical foundation, suggesting that their development is limited by a lack of robust evidence as to the nature of the problem to be addressed. We then identify gaps in the existing empirical work on difference and pay, and explain how our analysis can address these. Finally, in the light of our findings, we reflect on the implications for academics and policy-makers.

Equalities policy and practice in response to multiple disadvantage

Most western employment law frameworks traditionally approach and protect people on the basis of single identities (Hannett, 2003). As a matter of policy, the promotion of equality and equal pay at work is designed to ameliorate disadvantage on the grounds of single, well-demarcated identity groups (Fredman, 2011), using categories such as ‘race’, ‘religion’, ‘disabled’, and so on. There is a list of ten protected characteristics identified in this way within the UK Equality Act 2010 and the European Union’s Equal Treatment Directives. Complainants are required to prove each strand of discrimination separately (see *Kamlesh Bahl v The Law Society* [2004]) and are therefore advised to choose the single strand of redress that is most

likely to be successful. This approach is broadly mirrored in the US (Crenshaw, 1989), where judges and lawmakers were wary of opening a ‘Pandora’s box’ of claims by multiple sub-groups (Fredman, 2012). It is now accepted by US courts that black women constitute a distinct sub-group, but cumulative discrimination is restricted to a combination of only two of the grounds (the ‘sex plus’ approach).

The single-axis approach also informs organizational policy and practice. Western organizations take a liberal approach (Jewson and Mason, 1986) to equality by offering a detailed list of identities that are immaterial to decision-making and are protected against unfair treatment for that reason (Cheung-Judge and Henley, 1994). Equality action takes the form of anti-discriminatory regulation combined with positive action to benefit groups nominated by any single characteristic. The Public Sector Equality duty in the UK is an example of a supposed proactive and advanced equalities practice that illustrates this point. The guidance that accompanies this requirement encourages organizations to ‘profile’ staff using workforce monitoring data that are ‘appropriately disaggregated’, i.e. separated into mono-focused groups associated with protected characteristics (EHRC, 2011, p. 9), to uncover patterns of potential discrimination, including in pay. The assumption is that, if no significant differences are found in the circumstances between one group and their binary pairing, there is no evidence for discrimination. This might be an effective approach for cases of single-axis identity. However, this approach has weaknesses in dealing with cases of multiple disadvantage. For example, if pay distributions are mapped first on the grounds of gender and second on the grounds of ethnicity, overlapping gender distributions will not reveal that ethnic minority employees may be placed in the lowest centiles, and overlapping ethnicity distributions will not show that female employees may be found in the lowest centiles. Thus, the situation of the ethnic minority female passes unnoticed.

While these policy and practice measures are laudable, they conform to an additive (Lewis, 2010) understanding of discrimination; in other words, either discrimination is seen as one-dimensional or, if on the basis of two or more characteristics, the view is that these can be separated and remedied within separate channels. The assumption within the additive pattern is that

addressing one source of disadvantage will be beneficial without the need to be concerned about how it connects or interacts with other disadvantages (Berthoud, 2003, p. 1).

There is increasing awareness that the singular and additive approach is insufficient in addressing the realities of discrimination. Social relations of discrimination are more complex and based in multiple, intersecting and interlaced interactions (Bagilhole, 2009) between and within disadvantaged groups. Scholars have long argued that, by reducing experiences to a forced alignment with one or more single identities of disadvantage, the additive approach to discrimination fails to capture the way in which identities may be transformed when interacting with another (Anthias and Yuval-Davis, 1993; Ruwanpura, 2008; Williams, 1989). The key concept here is that of 'intersectionality' (Bagilhole, 2009). This was first used by Crenshaw (1989, 1991) in relation to the marginalization of the experiences of black women, and offers a theoretical basis for understanding the multiple intersecting complex social relations between and within socially disadvantaged groups. However, it is a concept that is highly contested in its meaning and application (Browne and Misra, 2003; Denis, 2008; Nash, 2008). Choo and Ferree (2010) draw a distinction between 'inclusion-centred interpretations' (p. 133) and 'process-centred models' (p. 135). The former emphasizes the lived experience, and meanings, of people with multiple disadvantage. There is a focus on context and a tendency to de-emphasize pre-existing categories (e.g. 'woman', 'black') with a view to understanding how unique identities are produced and reproduced (Hofman, 2010; Purdie-Vaughn and Eibach, 2008; West and Fenstermaker, 1995). The emphasis here on the diversity and fluidity of experience at different intersections contrasts with process-centred approaches that understand intersectional effects and outcomes in terms of the interaction of underlying systems and social structures (McCall, 2005). The latter approach accepts the possibility of systematic patterns in the way that single categories combine to create effects at dual or multiple points of intersection. There is a further debate about whether such intersectional effects are seen as 'supplementary' to the primary single-category processes that underlie them, or indicative of the operation of complex multiple systems of disadvantage (Choo

and Ferree, 2010; Walby, Armstrong and Strid, 2012). As we explain later, our own approach falls broadly within the process-centred paradigm; however, we note here that none of these approaches to intersectionality suggests, even though their reasoning is fundamentally different, that the experience of multiple disadvantage can be understood or addressed in terms of a straightforward 'adding up' (or separating out) of the effects of single disadvantaged identities.

However, policy has been slow to respond to this point. While the term 'multiple disadvantage' makes a regular appearance in EU and UK policy documents,¹ it has not yet been used in any binding EU legislation or introduced into UK law. A proposal to allow for the special effects of dual discrimination introduced under the Equality Act was dropped in February 2010 prior to its implementation in April of that year. The UK Government, debating the inclusion of clauses about discrimination on the basis of multiple characteristics within the Equality Bill, stated: 'there is evidence of people experiencing discrimination because of a combination of two protected characteristics, but insufficient evidence of cases involving more than two to warrant further regulation' (Hansard, 2009).

Other key policy bodies have also identified a lack of evidence and empirical research as a weakness in advancing anti-discriminatory solutions on multiple disadvantage. For example, the European Commission (2007) suggests 'a lack of documentation and statistical data makes the phenomenon of Multiple Discrimination less visible' (p. 48), and the European Union Agency for Fundamental Rights (2010, p. 17) encourages researchers to collect data about 'the extent and nature of multiple discrimination', which can be used as evidence in the formulation of policies addressing discrimination. Later in the paper, we seek to address this issue using original empirical evidence. Before doing so, we review the existing evidence for pay differences in relation to single and multiple disadvantage.

¹See 2000/750/EC Council Decision of 27 November 2000, OJ L 303, 2.12.2000, pp. 0023–0028, Recitals 4 and 5 and Decision 771/2006/EC establishing the European Year of Equal Opportunity for all (2007) – Towards a Just Society [2006] OJ L 1462/1.

Multiple disadvantage and pay

Evidence of discrimination on the grounds of multiple disadvantage in the UK is piecemeal and non-systematic. Most of the trusted data on discrimination in pay are of the single-axis variety. The gender pay gap in the UK and elsewhere is well documented (Dex, Ward and Joshi, 2008; Smithson *et al.*, 2004; Warren, Rowlingson and Whyley, 2001; Wass and McNabb, 2006). The median hourly pay gap between men and women in the UK stands at 19.5% (ONS, 2011). The gap is smaller for women working full-time at 9.1% (ONS, 2011) and at an all-time low, but much higher (34.5%) (Perfect, 2011), for women working part-time.

Less has been written about pay differences between ethnic groups and on the basis of age, particularly outside the USA. It is clear that, in the UK, most ethnic minority groups suffer a pay difference in relation to the 'White British' category (Metcalf, 2009). For example, the hourly pay of Pakistani men is 22.9% lower than that of white British men, Bangladeshi 20.9% lower, and Black African 17.8% lower. Indian and Chinese men earn slightly more per hour on average than white men, though the difference is not statistically significant (Longhi and Platt, 2008). Pay differences in relation to age favour 'middle-aged' workers in the UK. Average hourly pay rises to a peak in the 40–49 age range. Younger workers (22–29) experience a pay gap of 29% in relation to workers in this age group, while those over 60 experience a detriment of 20% compared with 'prime' age workers (Metcalf, 2009). Disability is also associated with a pay detriment. Metcalf (2009) reports that this varies between 6% and 26% in different studies, depending on a range of factors, such as the definition of disability used and the severity of impairment.

There is still less evidence of how two axes of disadvantage combine to affect pay. The pairing of gender and ethnicity has received most attention. The consistent finding has been that a person's gender plays a stronger role in determining pay than does their ethnicity (Blackwell, 2003; Blau and Kahn, 2007; Corcoran and Duncan, 1979; Longhi and Platt, 2008; Metcalf, 2009; Sharpe and Abdel-Ghany, 1996). Research in the US suggests that gender and ethnicity operate independently, rather than interacting, to affect pay outcomes (Browne and Misra, 2003);

however, one recent US study (Greenman and Xie, 2008) has identified an (ameliorating) interaction effect, with women's pay suffering less than a simple addition of their gender and ethnicity 'penalties' would suggest.

The relationship between age and gender reveals a consistent pattern (Barnum, Liden and Ditomaso, 1995). The gender pay gap is narrow in early career (indeed, marginally in women's favour in the 16–17 age group), but swings rapidly in men's favour (Manning and Swaffield, 2008), peaking at 27% in the 40–49 age group, before declining again slightly towards retirement (Longhi and Platt, 2008). Research on disability pay gaps in the UK generally indicates the existence of larger gaps for men than for women (Metcalf, 2009). Longhi and Platt (2008) report that disabled men have a 7.9% pay penalty in relation to non-disabled men, non-disabled women suffer a 25.9% pay penalty in relation to this group, and for disabled women the penalty is 30.6%.

In conclusion, while we know something about the effect of a combination of gender and other identities on pay, there has been little analysis of other pairs in combination, or indeed multiple combinations (Longhi and Platt, 2008). We do not have a clear answer to the question as to whether people with more than one disadvantage suffer a pay penalty that reflects the sum of their disadvantages or, as suggested by Lewis (2010), whether these intersect to create a worsening penalty. As demonstrated above, this is an important policy question, and we are able to address it in the research presented below.

Research questions

In this paper, we address the limitations of existing research on multiple discrimination. Drawing on an analysis of several years² payroll data from a single organization with over 500,000 observations, we are able to show how people's pay is affected by having combinations of two or more disadvantaged identities. We refer to these combinations as 'levels' corresponding to the number of disadvantaged identity characteristics in each.

²We do not state how many years of data collection make up the total sample because of the need to disguise the size of the workforce.

Then, through analysis of the average pay associated with each level of disadvantage, we are able to shed light on the way that combined or multiple disadvantage either adds or intersects (Lewis, 2010) to create pay gaps. By this, we mean: are the pay penalties arising from multiple disadvantage equal to the sum of the individual penalties, or is there evidence of an interaction effect operating at intersections that makes them larger (or smaller) than a simple addition would suggest? In short, we aim to show whether or not a single-axis approach to anti-discrimination policy is adequate. To do so, we pose three research questions:

1. What is the average pay penalty associated with having two or more levels of disadvantage? And specifically, how does it differ from a single-axis group average?
2. Do assumptions of additive penalties hold true in cases of multiple disadvantage?
3. What are the policy implications of our findings in relation to the above?

Methodology

The approach to the study is informed by the debates around intersectionality introduced earlier in the paper. McCall (2005) draws a distinction between ‘anti-categorical’ and ‘intercategorical’ approaches to studying multiple disadvantage. The former draws (often) on a post-modern ontology of intersectionality and rejects the use of fixed categories of disadvantage as a foundation for analysis, instead seeking to capture – through qualitative studies – the unique ways in which (multiple) identities are constructed and re-constructed in specific contexts (Denis, 2008; Hofman, 2008; Purdie-Vaughn and Eibach, 2008). The methodology here sits squarely within the latter, intercategorical tradition. We take the view that there can be considerable value in undertaking comparative and quantitative analysis to identify broader patterns and inter-relationships, which can expose the nature and magnitude of pay penalties and the way in which individual different sources of disadvantage interact to cause them. As McCall (2005) notes, the opportunity to conduct such analyses is rare, as sample sizes (even in larger data sets) are often too small to provide robust data at each of the multiple intersections. As we explain below, this is not a restriction that we face here.

We recognize that this approach is limited in capturing the fine detail of how multiple disadvantage is experienced and reproduced and in offering a nuanced explanation of its causes and effects (see Bagum, cited in Bagilhole, 2009, p. 51), and suggest that it can usefully be supplemented by studies that explore the detailed processes by which identities and employment disadvantage relate in particular contexts. There are many rich studies that contribute significantly by doing this (Brah, 1992; Denis, 2008; Harvey Wingfield, 2009; Hofman, 2010; Jyrkinen and McKie, 2012; Tatli and Özbilgin, 2012). In short, while we are supportive of methodological pluralism in studies of intersectionality (Bagilhole, 2009), we recognize that our approach in this study belongs to a tradition that not all readers will share. We trust that the results of this analysis, and the conclusions that we are able to draw, will provide an additional, pragmatic, justification for this approach.

Data collection and methods

Data collection was undertaken in a private sector organization with a very large workforce. The data set represents multiple years of employee data from the previous decade. The sample is limited to the UK workforce of this company. The total sample is 513,741. The need to protect the identity of the organization limits the details we can give, including its sector; however, there are no aspects of structure and governance, human resource (HR) processes, or regulatory environment that cause us to consider it an outlier. It has a typical range of good practice HR policies and procedures and had recently undertaken an equal pay audit. Its occupational profile is varied and includes managerial, technical, professional, skilled and non-skilled employees. Although every organization is unique, we believe there is nothing about this organization that is exceptional or anomalous.

The advantage of using single-company data in uncovering pay inequalities is that we are able to limit the influence of sectoral, industrial and some occupational effects that have been shown to interfere with the effects of disadvantage in determining reward (e.g. Charlwood, 2007; Hirst *et al.*, 2004; Mumford and Smith, 2011). In addition, by using internal pay data at the individual employee

Table 1. Salary comparisons by single-axis group

Variable	Variants	n	Mean pay (£)	SD	ANOVA
Sex	Men	385,327	24,451	11,636	6669.1***
	Women	128,414	21,531	9297	
Race	White	446,121	23,915	11,563	519.7***
	Ethnic Minority	29,983	22,449	9306	
Disability	Non-disabled	503,387	23,777	11,241	627.8***
	Disabled	10,354	21,000	6190	
Age	18–30	143,696	20,951	8141	6381.9***
	31–45	195,772	25,018	11,738	
	46 and over	174,000	24,552	12,229	

*** $p < 0.001$.

level and linking it to their personal employment history, we are able to control for the influence of career breaks, age, length of service, distinction between part- and full-time workers, grade, to a limited extent vertical segregation, and geographical region (Henley and Thomas, 2001). Finally, because of the large size of the sample, we are able to test for the outcomes of multiple-group membership and perform multi-level regression analyses that can delineate and test the impact of many of the profile variables that are key to intersectional analysis.

Data for this study were obtained from the organization's management information system via a third-party outsourced HR agency with express permission from senior managers of the case study organization. The employee data in the information system are gathered on entry to the organization and followed up in regular monitoring exercises. The organization released all available variables that are of interest to our research questions. However, the analysis is constrained by the limits of the original data set. Some variables that would have been useful in the analysis, e.g. sexuality, social class or educational achievement, were unavailable.

Variables that are used in this study are:

- ethnicity
- disability status
- length of service
- age
- sex
- geographic location
- grade
- mode of work (full-time/part-time)
- year of data collection
- pay

Some of these require further explanation.

In the original data set, ethnicity was represented by five categories; White, Black, Asian (including Indian), Asian Oriental (including Chinese) and 'Other ethnicity'. Category membership is self-nominated according to 'country/region of origin'. Because of the need to populate our multi-tiered disadvantage model with numbers that are viable sample sizes, categories were collapsed into 'White' and 'Ethnic minority'. Numbers and proportions of broad ethnic categories are given in Table 1. In limiting the categories to two variants of ethnicity, we recognize that we lose the potential to produce analysis of different ethnic categories (Wrench and Modood, 2000). Missing and 'other ethnicity' responses to this question were excluded.

Disabled status was also self-determined. Disabled workers comprise approximately 2% of the workforce. Guidance at the point of data collection suggested that employees should assess their status using the standard definition within the Disability Discrimination Act 1995. Because disabled workers sometimes choose not to declare their disability on monitoring forms, our figures are likely to under-represent the 'real' proportion of workers with disabilities. It is not possible to know the extent to which the two measures vary. Grade is represented in the organization by five broad and hierarchical bands. Geographic region is shown in 11 areas, including Scotland, Northern Ireland and Wales. A considerable majority of the employees live in England.

Data representing length of service, age and sex are largely self-explanatory. For the purposes of analysis, scale data (age and length of service) were categorized. For the same reasons as stated above pertaining to ethnic origin, age data were reclassified into three categories, 18–30, 31–45 and 46+, to represent three stages of career: early,

mid and late. Data on proportions in each age category are given in Table 1. The average length of service is in the 16–20-year category.

The analysis uses salary data from multiple consecutive years from 2000. We incorporate time period (year) dummy variables to capture time-varying aspects that might affect pay over the sample period. Base salary in the case study organization is determined in a multi-grade job-family structure linked to tenure and grade and based on job evaluation. Further pay variations are the outcome of merit and performance-based awards. The organization stated that differences in human capital (experience and qualifications) are used as criteria in selecting for posts, but are not significantly influential in determining entry-level pay decisions. The organization stated that the prime consideration for determining salary was ensuring the consistency and fairness of internal relativities. All part-time pay rates are expressed as an equivalent full-time salary.

There are over ten job grade families. Over a quarter of employees are in unskilled or semi-skilled grades, a third in skilled technical and supervisory grades and a quarter in middle managerial grades. The remainder are senior managers.

Methods of analysis

As previously explained, the objective in this paper is to explain and consider the policy implications of multiple-disadvantaged identity groups. We wish to determine whether the pay of employees with two disadvantages differs from employees with three or even four. Furthermore, and more importantly, we want to ascertain whether a worker with two disadvantages receives a double (as in additive) or greater penalty for their disadvantages, and so on for three and four disadvantages. To determine this, we have one descriptive and three analytical components to the data analysis. We undertook data analysis within the STATA analytical programme.

The first research question is addressed through descriptive data analysis, comparing the means and medians in pay across different groups to establish the extent of pay disparity and pay gaps; first, on the basis of single characteristics and, second, as they are found within multiple-identity groups. Next, in order to diagnose the link

between levels of disadvantage and pay under controlled conditions, we include three further sets of analytical statistics, details of which are reported in the findings section.

We are using multiple years of pay data, so we adjust the pay data to account for general increases in prices (inflation). This is done by adjusting actual pay figures using the Consumer Price Index (the UK Government's preferred inflation measure), so that all pay is now expressed in the prices of the final sample year. As we are also pooling the pay of individual workers from year to year, we adjust for this by specifying robust standard errors, which cluster around each individual worker. Other than these additional model specifications, we use OLS regressions to estimate average (real) pay.

Findings

Pay penalties and levels of disadvantage

The first research question requires us to determine the pay penalties for being a member of each single-axis disadvantaged category and compare it with members of associated groups who have multiple disadvantages. Headline findings at the single-axis level are given in Table 1. They are unadjusted for the influence of other variables. Binary comparisons demonstrate familiar patterns.

The prominent findings are that there are pay penalties of 12% for women and disabled people and 6% for ethnic minorities. Older workers earn, on average, 2% less than workers aged 31–45. Employees aged 18–30 earn 84% of the pay of the highest earning group. All differences between groups are statistically significant. Standard deviations show that pay is more variable as workers age.

From this point on, we exclude the situation of younger workers from the data presentation and discussion. There are many legitimate explanations for their comparatively low pay, which are beyond the scope of this paper. Here, we focus on differences that may not be as easy to justify.

We then conducted an analysis of the effect on pay of being a member of two or more disadvantaged categories and how this varies in comparison with a single-axis analysis. Findings are given in Table 2. This table is sorted into descending

Table 2. Employee sub-groups and pay

Variant	n	Mean pay (£)	Median pay (£)	SD	Levels of disadvantage
Men White Non-disabled 31–45	129,079	25,693	22,650	11,634	0
Men White Non-disabled 46+	131,229	25,548	22,650	12,170	1
Men Ethnic Minority Non-disabled 31–45	9983	23,824	22,409	9820	1
Men Ethnic Minority Non-disabled 46+	5380	23,324	22,409	9829	2
Women White Non-disabled 31–45	39,264	23,428	21,527	10,756	1
Men Ethnic Minority Disabled 31–45	116	21,404	21,407	4011	2
Men Ethnic Minority Disabled 46+	194	21,883	21,162	6175	2
Men White Disabled 46+	4173	21,676	21,162	6422	2
Women Ethnic Minority Disabled 31–45	71	22,634	21,162	6620	3
Women Ethnic Minority Non-disabled 31–45	3420	22,351	21,015	7424	2
Men White Disabled 31–45	2436	21,324	20,937	6145	1
Women Ethnic Minority Non-disabled 46+	1156	20,125	18,017	6717	3
Women White Disabled 31–45	924	19,558	17,786	5513	2
Women White Non-disabled 46+	25,860	20,321	17,786	9120	2
Women White Disabled 46+	965	18,816	17,656	5778	3
Women Ethnic Minority Disabled 46+	29	17,474	17,479	3196	4

order of median pay³ and includes a column of levels of disadvantage, i.e. the total number of disadvantages associated with each group.

Table 2 shows a number of interesting findings. It shows that the group with the highest mean wage is male, white, non-disabled and 31–45 (hereafter nominated, in this context, as having zero disadvantages). Their unadjusted average pay is £25,693. The median of this group is the same as their older counterparts, who earn the second-highest average amount. It is notable that the median salaries for these two highest-earning groups are considerably lower than their corresponding mean salaries, indicating that very high salaries within these groups are distorting the mean. The group with the lowest mean and median wage is ethnic minority, disabled, female and 46+ (four levels of disadvantage). Their average salary is £17,474, with a median of £17,479. This equates to a range of £8,214 between the mean pay of highest and lowest earning groups and £5,171 in the range of medians. The highest earning group among women is 31–45, non-disabled and white (one level of disadvantage). Their median wage is £21,527, and their mean wage is £23,428.

An analysis of the 'levels of disadvantage column' in connection with pay is also interesting for three reasons. We note that the largest proportion of employees (56.63%) has one

disadvantaging characteristic, 36.43% of the sample have none, 11.31% have a combination of two disadvantaging characteristics, 0.62% have three disadvantaging characteristics, and only 0.01% have four disadvantaging characteristics.

We also note that there is considerable variability within each defined single-axis, once we look across the three levels of disadvantage that comprise each single-axis group. For example, the mean salary of the 'male' groups has a range of £4,369 between the top salary of £25,693 and the lowest mean salary of £21,324. This penalty equates to 18% of the average 'male' wage. This is considerable and, notably, is greater than the traditional male vs female wage gap. Variability within the 'female' group equates to 28%, and the same is true for the ethnic minority group; for 'white' employees, it is 29% of the average wage; for disabled employees, it is a comparatively small 19%; and for non-disabled employees, it is 23%. Employees aged 31–45 have a range of 25% of their average wage, but the greatest range is in the oldest age group, which demonstrates considerable variability at 33% of their average wage.

Finally, we can see a loose inverse relationship between 'levels of disadvantage' and salaries. Broadly speaking, as levels of disadvantage climb, median and mean pay descend. It is worth noting a couple of anomalies. The median pay rate of women in the ethnic minority, disabled, 31–45 group is equal to colleagues who have fewer disadvantages, and their mean pay is higher than some others with more disadvantages. However, the group has a comparatively large standard

³Where median pay levels are identical, those with a tighter standard deviation, as an indicator of consistency and reliability, have been prioritized.

Table 3. Levels of disadvantage: paired comparisons

Levels of disadvantage	Contrast (£)	Std Err.	t	p > t
0 vs 1	-700.7196	31.63984	-22.15	0.000
0 vs 2	-4658.351	49.7339	-93.67	0.000
0 vs 3	-5964.217	181.0526	-32.94	0.000
0 vs 4	-8217.15	1611.642	-5.10	0.000
1 vs 2	-3957.631	48.0339	-82.39	0.000
1 vs 3	-5263.498	180.593	-29.15	0.000
1 vs 4	-7516.431	1611.59	-4.66	0.000
2 vs 3	-1305.866	184.6245	-7.07	0.000
2 vs 4	-3558.799	1612.047	-2.21	0.177
3 vs 4	-2252.933	1621.42	-1.39	0.634

deviation for its size ($n = 71$) indicating the presence of a handful of unusually high-earning employees. Excluding the highest and lowest 5% of earners ($n = 64$) reduces mean pay to £21,131 with a median of £20,514 and drops the group two places down the table. It is also interesting that disability has such a major depressive impact on the pay of white men aged 31–45, taking them from the highest earning position to 11th in the table, below other groups with two or even three levels of disadvantage.

The relationship between pay penalties and levels of disadvantage

To check robustness and extend the detail of the findings, we performed a Tukey means comparison test on the between-levels pay differences. This identifies whether or not particular categories (levels) of disadvantaged workers are significantly different from one another.

The first point of interest arising from Table 3 is that it confirms our expectations of pay detriment as the number of disadvantaged identities increases. With the exception of the analysis that involves level 4, the paired comparisons result in statistically significant differences. Between levels 4 and 3, the pay penalty is a considerable £2252, but the difference is not statistically significant. This is because the number of observations in the level 4 group is comparatively small, and there is variance in pay that results in a large standard error and non-significance, but only in a statistical sense. The actual pay difference is still large.

Furthermore, the table confirms that detriment is compounded in a multiplicative manner. Mean difference in pay between levels 0 and 1 is a comparatively small £700. No other single incremental

steps or single elements of a composite step result in such a 'small' penalty. The difference between levels 2 and 3, for example, is £1305. The difference between levels 1 and 2 is a considerable £3968 and the largest of all of the steps between levels. The compound penalty between levels 1 and 4 is £7516 (a mean difference of £2505 per level). This is consistent with multiplicative effects; however, much of this penalty is explained by the difference between levels 1 and 2. Generally speaking, penalties 'bottom out' after the penalty suffered between levels 1 and 2, being about £1300–£2000 per step thereafter.

For our purposes, these sets of findings are useful. They indicate that there is considerable variability within any single-axis defined group and that there is likely to be an inverse correlation between levels of disadvantage and pay. However, both effects may also be a function of other variables. It could be the case, for example, that those without disadvantage may be more likely to have benefitted from a longer length of service and be found in privileged senior positions where they are justifiably paid more. Conversely, those with more disadvantages may be disproportionately located in low-paid geographic regions. This begs the question; how far will this relationship hold true when specifically investigated and isolated from other potentially intervening effects?

To investigate the size and the trajectory of the link between levels of disadvantage and pay with controls inserted, and specifically whether it is additive or intersectional in nature, we carried out the second stage of the analysis. We conducted a simple regression test. The model identifies whether the number of disadvantages makes a difference to pay penalties, regardless of what the disadvantages may be. The model, which is expressed in natural logs, can be expressed thus:

$$\ln \text{Pay} = \text{constant} + a \times \text{number of disadvantages} + e \times [\text{job characteristics}] \quad (1)$$

The coefficients from the initial regression equation can be translated into a cash equivalent approximation, which equates to $\text{Pay} = £23,821 - £458 \times \text{level of disadvantages}$, $R^2 = 65.22\%$. In other words, each level of disadvantage, once controlled for all intervening variables, is associated with an average pay penalty of -£458. The sum of the variables in the equation explains a considerable 65% of the variance.

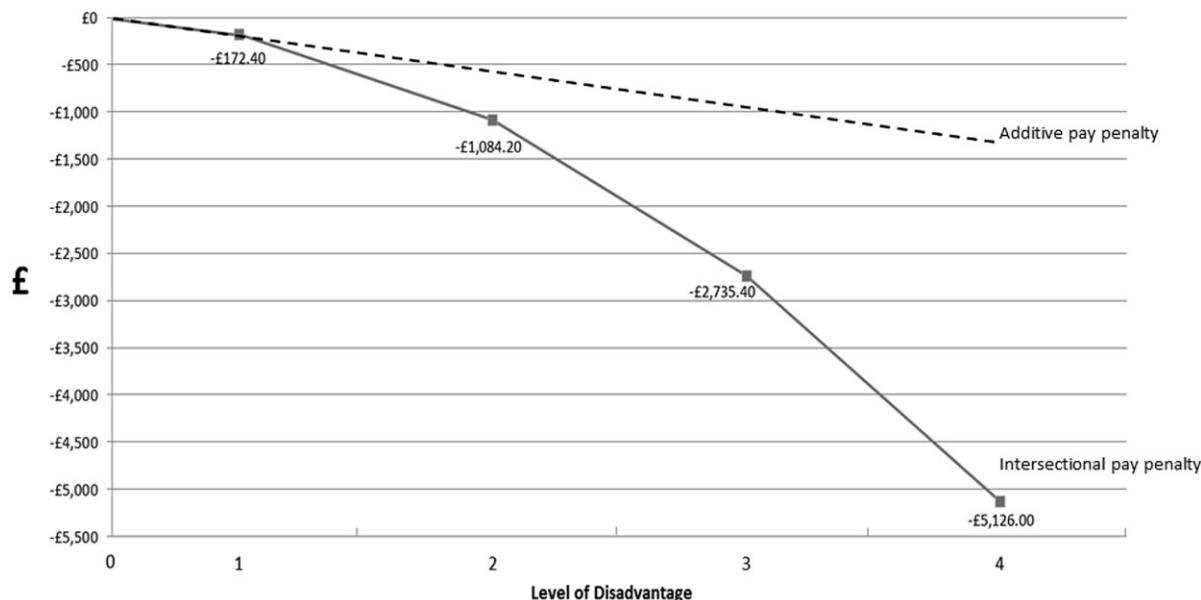


Figure 1. Line of association between pay penalty and levels of disadvantage

This is a first step in the demonstration of how pay penalties interact with levels of disadvantage. However, it only demonstrates an additive deterioration in pay. We need further analysis to determine whether there are differences in the size of pay penalties between levels of disadvantage and whether these continue to conform to an additive pattern or demonstrate intersectionality. To do this, we added a squared term to the initial pay model above:

$$\ln \text{ Pay} = \text{constant} + a \times \text{number of disadvantages} + b \times \text{number of disadvantages squared} + e \times [\text{job characteristics}] \quad (2)$$

The inclusion of the general and squared term on number of disadvantages acts as a robustness check in the sense that it is intended to address further the question of whether our key relationship between pay and multiple disadvantage is best explained by a logarithmic or exponential function. If the general and squared terms are both significant, the pay penalty is best approximated by an exponential function (i.e. the pay penalty increases at a faster rate as we add disadvantaging characteristics). Given this, if the squared term is positive, this implies that the pay penalty increases at a slower rate as we introduce levels of disadvantage. If the squared term is negative, this implies that the pay penalty increases at a faster rate as we input levels of disadvantage.

The results for this model show that the squared term is negative (the coefficient can be transformed into a cash pay penalty and equates to -£369.65) and highly significant. Findings are displayed in Figure 1.

Figure 1 gives rise to a number of interesting observations. First, we see an exponential relationship between pay penalty and number of disadvantages. Pay penalties increase at a significantly faster rate as we introduce disadvantaging characteristics. Furthermore, pay penalties increase faster than might be expected if one doubled/tripled/quadrupled the penalty for a single disadvantage. This finding confirms the second research question: with other factors accounted for, pay penalties associated with increasing levels of disadvantage are multiplicative, not additive.

There are two final points of interest to note from Figure 1. First, although there are considerable pay penalties attached to each level of disadvantage, the penalty associated with having a single level of disadvantage has reduced to -£152 with the introduction of variable controls. The implication here is that, once data are controlled for, say, grade (an indicator of level of seniority) or length of service, much of the pay penalty of having a single disadvantage (for example, a white non-disabled older man or a white non-disabled mid-career women) is explained. Only a residual

proportion is left unexplained and open to claims of pay discrimination.

Secondly, we note that the analysis in Figure 1 does not give an indication of variability within levels of disadvantage. For example the controlled pay penalties of white non-disabled older men and white non-disabled mid-career women might have very little or nothing in common. Nevertheless, the point that we make here is a theoretical one about the multiplicative nature of pay penalties, and this is not undermined by variability within each level.

Conclusions

The first conclusion is that the pay of people with more than one disadvantaged identity is lower than that of people with a single disadvantage. Further, we have been able to show that introducing more sources of disadvantage, i.e. having four rather than three, or three rather than two, results in an increased pay penalty, providing systematic support for the pattern suggested by Longhi and Platt (2008).

The second conclusion is that within-group pay penalties are larger than those between single-axis groups. In other words, there is more variability in women's pay (for example) on the basis of their other identities (ethnicity, disability) than there is between women and men. This finding adds weight to the suggestion that categories defined along single-axis lines have the potential to conceal an element of the disadvantage experienced by people in multiple categories. The policy implication that arises from this is that, unless equality diagnostics are disaggregated to expose finer-grained intersections, they are in danger of over-homogenizing diverse groups to the detriment of the most vulnerable.

The third conclusion relates to the way in which single identities combine to cause the multiple disadvantages reported above. We wanted to investigate whether the accumulation of disadvantage, in its impact on pay, can be explained by an additive trajectory, or whether the penalties from multiple disadvantages are intersectional (Lewis, 2010), i.e. less than or more than the sum of their parts. The conclusion from the analysis is that there appears to be an extra penalty that arises from being in more than one category. For example, individuals who have three levels of dis-

advantage, e.g. ethnic minority, non-disabled women aged 46+ and ethnic minority, disabled men aged 46+ are, on average, paid considerably less than a simple tripling of the penalty of a single level would predict. This result is in contrast to Berthoud's (2003) findings, which suggested that, in relation to employment disadvantage generally (but not pay), the effects of multiple disadvantage were generally additive. In some respects, the results are similar to those of Greenman and Xie (2008), who found an interaction (i.e. non-additive) effect in relation to pay between gender and ethnicity (only) in the USA. However, in that study non-white women earn more than predicted by additivity, whereas in the study they earn less. Further, when the results are controlled for other variables, the increased penalty rises exponentially as levels of disadvantage are added to the analysis. The results indicate, then, that for individuals with more than a single disadvantage, there is an intersectional effect on their pay. Like a snowball, it gathers weight exponentially as it descends.

Discussion

These conclusions have some interesting implications for both theory and practice. First, they are strongly supportive of the view that the detriments that people experience from disadvantaged or minority status should not be looked at in isolation. Certainly, the data reinforce the point that, in relation to pay, single-axis (level 1) identity penalties exist and are substantial. However, the analysis has shown that multiple levels of disadvantage are correlated with further deteriorations in pay. This study reinforces the need for researchers to continue to examine these intersections in relation to pay and in other areas of employment and society, and not to focus solely on individual sources of labour market disadvantage.

Secondly, our conclusions imply that, if researchers conceive of the experience of people at intersections in terms of the impact of their individual identities being 'stuck together', in an additive fashion, they may overlook an important element of their disadvantage. If, as we have shown here, the impact of multiple disadvantaged identities amounts to more than the sum of the penalties arising from the individual disadvan-

tages, it follows that there is a further disadvantage arising from having multiple identities per se.

This conclusion has interesting implications for theory and research in intersectionality. In identifying a general intersectional effect on pay that cannot be reduced to the sum of individual identity effects, it provides support for approaches to intersectionality (from various traditions) that seek to move beyond the additive (Hancock, 2007) and examine the nature of the interactions at intersections. It also points to a need to conceive of intersectional identities holistically rather than simply made up of component parts.⁴ It is also of interest that the intersectional effect is present regardless of the specifics of the individual identities that are in combination. This gives some support to the idea of intersectional interactions being regarded as emergent from main effects – grounded in underlying structures of disadvantage, but not reducible to them (Choo and Ferree, 2010; Walby, Armstrong and Strid, 2012), and existing as the effects of complex multiple and interacting systems.

However, we draw these conclusions cautiously for a number of reasons. First, while it is true that the intersectional interaction is present regardless of the specific combinations involved, it is also true that it varies in size, dependent both on the number of differences added into the analysis and also in relation to the specific combinations of identities involved. There are good reasons to expect that some combinations of disadvantaged identities would be more detrimental to pay than others, more detrimental in some settings than others and over time, and in some cases not detrimental at all (Harvey Wingfield, 2009; Stainback and Tomaskovic-Devey, 2009; Tatli and Özbilgin, 2012). We recognize that this needs to be investigated to flesh out the overarching pattern that we have uncovered and to determine the size and direction of particular effects, but it is not something that we have space to explore here. Secondly, as with most quantitative work on intersectionality, some detail has been lost as a result of limitations in the variables available or in the grouping of existing categories of data for statistical purposes. For the first reason, we are not able to say anything about the impact of dif-

ferent impairments, and for the second, we cannot say anything about the impact of particular minority ethnic identities on employment, which is known to vary in the UK (Longhi and Platt, 2008; Wrench and Modood, 2000). Finally, there is need for caution in generalizing from a single case. We make no claim that, because this pattern exists in this organization, it must therefore exist more widely, though we note that this is a very large organization in a major developed economy, and there is nothing to suggest that it is an outlier in terms of culture, policy and practices in this area. It may be the case that compounded structural or operational imperfections in base and merit pay determination give rise to the multiplier effect; however, without further investigation, we cannot be sure. Nor can we know whether the patterns observed in this organization necessarily result, wholly or in part, from discrimination. Our aim was to examine how multiple disadvantages might interact to affect employment prospects, specifically pay, and the case is intended to be illustrative and indicative.

This leads to some reflections on methodology and an agenda for research. In one sense, our findings lend some support to process-centred (Choo and Ferree, 2010) or intercategorical (McCall, 2005) approaches of the type adopted here. It seems to us that only such approaches are capable of revealing interesting general patterns of this kind (see, for example, Stainback and Tomaskovic-Devey, 2009). However, this type of analysis is limited in revealing more nuanced patterns, and more so in explaining how and why intersectional effects operate. We endorse Bagilhole's case for methodological pluralism (Bagilhole, 2009, p. 15) and would advocate qualitative research to examine the detailed process by which multiple disadvantage identities attract this penalty. There is also a need for more detailed quantitative work to gain a fuller understanding of the intersectional effect – a need to investigate, in depth and within our broad 'levels of disadvantage', the size/existence of intersectional effects for different groups and the existence of particularly problematic combinations. It would also be useful to establish whether our findings are replicated in different organizations and other sectors, for example the public sector, and across the labour market in general, nationally and internationally.

We finish with implications for policy and practice. We argued in the introduction that western

⁴There is a certain irony here, in that we have reached this conclusion on the basis of analysis that has 'component parts' as its basis.

liberal frameworks of employment law and organization equality good practice protect people on the basis of single identities (Fredman, 2012; Hannett, 2003) and are informed by assumptions of additive patterns of discrimination. If, as our research suggests, people are disadvantaged by the effects of more than one disadvantaged identity, and even further by the fact of having a range of disadvantaged identities, a very different conclusion follows. Laws and practices aimed at tackling employment disadvantage should be directed at the reality of the disadvantages that people experience. It is already bad enough that, in a world of complex multiple identities (privileged and otherwise), people who pursue a claim need to identify which identity is the source of the discrimination against them. This is even more unrealistic and damaging if, as our findings suggest, multiple disadvantage can in itself be a detriment.

In the UK, the creation (in October 2007) of a single equality body provides a foundation for 'intersectional' thinking in this area. The EEOC (US) also takes such an approach. However, in practice, the single-axis 'protected characteristics' approach means that the delivery of protection is still largely fractured into areas of specialism. Specific recognition of dual/multiple disadvantage in an amendment to legislative frameworks, and particularly the Equality Act, would take this forward considerably. The focus of the UK's equal pay legislation on gender seems particularly misplaced in the context of our findings. If women are underpaid on the grounds of both the effect and the fact of multiple disadvantaged identities, equal pay law should allow this to be tackled directly. The current approach results in a significant problem that arises for complainants when identifying an appropriate comparator (Hannett, 2003). Where multiple disadvantage is detrimental to an employee, the current method of drawing a comparison with an individual who differs in relation to a single identity will not allow the complainant to demonstrate the full extent of their detriment.

We also make some suggestions for organizational and advisory policy. To diagnose multiple inequalities in pay and other rewards, workforce data should be disaggregated using as many dual, triple and quadruple axis sub-groups as is practicable, using groups that are suited to the organization context (Tatli and Özbilgin, 2012). This

advice should be delivered through advisory channels such as the Equality and Human Rights Commission (EHRC) in the UK and equivalent institutions in the international context, such as the EEOC in the US. It should form part of advice on equal pay audits and the UK's public sector equality duty (EHRC, 2011). Should these findings prove to be generalizable, other changes to organization and managerial equality practices would be necessary. For example, equality targets and associated practices would need to be adjusted to recognize discrimination in multiple-level sub-groups; HR departments would need to ensure that managers are trained in awareness of how bias in decision-making on pay and other rewards is exacerbated by combinations of intersectional difference; and managerial performance against multiple discrimination indicators should be monitored. Internationally, HR practitioners need to adapt these examples to fit their contexts.

To conclude, our contribution here has been to show – we think for the first time and under controlled conditions – a systematic relationship between multiple disadvantage and pay. The general pattern is that people with more than one disadvantaged identity attract lower pay; the more disadvantages they have, the lower their pay. Moreover, the pay penalty rises exponentially (not additively) as more disadvantages are included. There is much for researchers to do to explore the detail and nuances underlying this pattern and to assess its wider application. In addition, there is much for organizations and policy-makers to do to respond to the implications of these findings. We trust that both groups will rise to these challenges.

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