Proximity of Couples to each Partner's Parents:

Influences of Gender, Labour Market and Family

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Abstract

The analysis uses data from a large national representative household survey from the United Kingdom to study how close each 'middle-aged' (aged 31-54) partner in couples lives to their own and their partner's parents and what factors influence proximity to each set of parents. We find a slight tendency for couples to live closer to the woman's parents than the man's. The tendency is more pronounced for couples in which neither partner has a degree and in which there is a child. In other respects, proximity to parents is gender neutral. In particular, each partner's education has an equal influence on proximity to parents, with better educated couples living farther from their parents. Certain family circumstances tip the balance toward location nearer to one set of parents than the other. The presence of children shifts location nearer to the woman's parent, while being an only-child favours location nearer to that partner's own parents. We conclude that proximity to parents is primarily driven by factors that affect mobility over long distances, which are mainly associated with the labour market, as opposed to gender or family circumstances.

1. Introduction

An important influence on the provision of in-kind help by adult children to parents, or vice versa, is how close the two generations live to one another. For people with a live-in partner, either married or cohabiting, residential location reflects decisions by a couple. Individual circumstances and attributes of each partner feed into these decisions. Analysis of couples has at least two advantages over study of individuals in the study of the proximity of adult children to parents: first, the impacts of the characteristics of both partners on the couple's location can be taken into account, potentially providing better estimates of how each individual's circumstances affect proximity to parents; second, we may be able to make inferences about the relative influences of each partner in location decisions affecting proximity. The proximity literature has, however, mainly been individual-based (e.g. Hank 2007, Shelton and Grundy 2000). The important exceptions are Blaauboer et al. (2011), Løken et al. (2013) and Compton and Pollak (2013).

Features of residential location other than proximity to parents are of course important in location decisions, and these are in turn influenced by partners' individual and household circumstances, each partner's preferences and bargaining power. In particular, analysis of individuals has consistently found that education has a strong influence on geographic mobility, with better educated people being more mobile (e.g. Belot and Ermisch 2009 for a recent British study). For instance, in the data we analyse below, 6.6 per cent of couples in which both have a university degree moved in the following year compared with 3.9 per cent among couples in which neither has a degree. Movement tends to increase distance from parents (Rogerson et al. 1993), leading us to expect that when the partners in the couple have the same level of education, more educated couples would live farther from their parents.[1] This may be because they operate in a geographically wider labour market, or because they left home to study and partnered with someone whose parental home is far from theirs, or for other reasons. These homogamous couples can serve as a reference point for the analysis of the impacts of education of the individual partners when their educational levels differ.

Each partner's influence on residential location is the subject of a literature in economics and geography, much of which stemmed from a seminal paper on 'family migration' by Mincer (1978). One view, based on the assumption that the man's career is

[1] The associations between distance from parents and an individual's education are consistently positive; e.g. Shelton and Grundy (2000), Hank (2007), Compton and Pollak (2013), Blaauboer et al. (2011), Løken et al. (2013) and Chan and Ermisch (2013).

more important for the couple's resources, is that the man is dominant in location decisions that involve comparing different labour markets, and perhaps also in decisions about different residential locations in the same labour market. If each partner desires to live closer to their own parents, then male dominance would produce locations that were, on average, closer to his parents. Such a tendency might be tempered by the fact that most residential moves are short-distance, making it possible that woman's preferences are given more weight when considering different locations within the same labour market. Because daughters usually have more contact with and give more help and care to parents than sons, women may have a stronger preference to live close to parents than men. As argued by Blaauboer et al. (2011), the net effect of the impacts of gender differences in power and in the strength of family ties on migration decisions could favour closeness to either the man's or woman's parents.

An alternative view is that the relative bargaining power of the two partners is influenced by the earning power of each partner or the resources that they bring into the partnership, in which case the weight given to the woman in location decisions (local as well as longer distance moves) would be increasing in her earning power relative to her partner's.[2] Løken et al. (2013) discuss bargaining power effects in the context of proximity to parents. Because it is relatively persistent differences in earning power that should be important, we might distinguish couples by their relative levels of education. The expectation would be that, provided that each partner prefers to live closer to their own parents, the couple would, for given employment opportunities, live closer to the parents of the partner with the higher level of education when their educational attainments differ.

Our first main research question is whether men's or women's education has more influence on where the couple locates in relation to their parents and in which direction. In addition to its intrinsic interest, an answer to the question sheds light on the relative bargaining power of men and women in location decisions and on the role of labour market influences on proximity to parents. Second, we address the question of what individual and couple attributes other than gender and education affect proximity to each partner's parents.

Overall, we find a slight tendency for couples to live closer to the woman's parents than the man's. Each partner's education has an equal influence on proximity to parents, with better educated couples living farther from their parents, and in particular we find no evidence of bargaining effects working through relative education levels. Certain family

[2] For example, see Ermisch and Pronzato (2008) for such effects on men's child support payments in Britain, and more generally on bargaining power effects, see Basu (2006), Chiappori et al. (2002), Couprie (2007), Lundberg and Pollak (1996), Lundberg et al. (1997) and Rangel (2006).

circumstances do, however, tip the balance toward location nearer to one set of parents than the other. The presence of children shifts location nearer to the woman's parent, while being an only-child favours location nearer to that partner's own parents. Also, a person experiencing parental divorce as a child lives farther from their parents. We conclude that proximity to parents is primarily driven by factors that affect mobility over long distances, which are mainly associated with the labour market, as opposed to gender or family circumstances.

2. Data

We analyse data on co-resident married or cohabiting couples sampled in a very large national representative household survey from the United Kingdom: *Understanding Society*. Ethnic minority groups are over-sampled. Each person aged 16 or older answers the individual adult interview and self-completion questionnaires, each of which asks many questions that may be salient for studying intergenerational proximity. It thereby provides self-reported information for each member of the couple. Questions relevant to proximity were asked in the first (2009-2010) wave of the study, which interviewed nearly 51,000 people. In the present study we focus on 'middle-aged' adult children (aged 31-54) in heterosexual couples in which both partners have a living parent, providing information on 3,881 couples.

We combine information on household composition with the questions about which relatives 'you have alive at the moment' to ascertain whether a person has a living mother or father and if so whether or not they live together. People with a mother (father) living outside the household are asked 'About how long would it take you to get to where your mother (father) lives? Think of the time it usually takes door to door.' Among all people aged 31-54, 17 per cent do not have a living parent, 49 per cent have both parents alive, 26 per cent only have a living mother and 8 per cent only have a living father. Among those with both parents alive, 87 per cent are in the same proximity category, in large part because the parents live together; in 10 per cent of the cases the mother lives closer to the child than the father, while the opposite is the case in the remaining 3 per cent of cases. We will focus on proximity to the parent who lives closer to the child.

Table 1 illustrates the proximity data used in the analysis, in which both partners have a living parent, distinguishing between male and female partners.[3] The first two columns are for the full sample, while the last two are for a sample in which both partners are white and UK-born, which excludes about one-third of couples. There is a slight tendency for the couple to live closer to the woman's parents (or the parent who lives closer) than to the man's. In the full sample, a little over one-half of adult children aged 31-54 live within one-half hour of their closer parent, but the proportion is higher among white, UK-born couples (63 per cent of women and 57 per cent of men). In the full sample, one-quarter live more than two hours away, including those living abroad. The proportion is much smaller for the white UK-born sample because it is much less common to have their closer parent living abroad.

Table 1: Distance from closest parent, Full Sample and White, UK-born Sample

Distance to where parent lives	Female Partner, All	Male Partner, All	Female Partner, White, UK-born	Male Partner, White, UK-born
Co-residence	0.8%	0.8%	0.8%	0.3%
less than 15 minutes	36.5	33.6	41.6	38.7
between 15 and 30 minutes	17.9	16.7	20.8	18.2
between 30 minutes and 1 hour	9.4	11.0	10.3	12.1
between 1 and 2 hours	9.1	10.6	9.8	11.5
more than 2 hours	14.7	17.9	15.5	18.0
lives/works abroad (spontaneous)	11.7	9.4	1.2	1.2

Full Sample: Unweighted N=3,881; weighted N=3,815.
White UK-born Sample: Unweighted N=2,514; weighted N=2,509.

Taking the couple as the unit of analysis, we find that 33 per cent of the couples live closer to the woman's parent(s) than to the man's, and 30 per cent of couples live closer to

[3] All cross-tabular tables present data weighted to reflect the sampling design and non-response, using the weight variable a_indinus_xw.

his parent(s) than to hers. This pattern contrasts with findings from the Netherlands (Blaauboer et al. 2011) and Norway (Løken et al. 2013), but is qualitatively similar to American findings (Compton and Pollak 2013).[4] In our main analyses, we do not work with the detailed proximity data illustrated in Table 1 because there is considerable interest in whether or not a person lives close enough to parents to see them frequently and to provide and receive help.[5] We distinguish two states: co-resident or living outside the household but within 15 minutes travelling time ('near'), 15 minutes or more travelling time ('far'). We combine co-residence with 'less than 15 minutes' because less than 1 per cent of people in our sample live with a parent.[6]

Figure 1 illustrates the choices couples can make in this simple framework. The ovals indicate locations which are less than 15 minutes from parents. A couple could locate far from both parents (X1); or near to both parents (X2); or near to the woman's parents, but not the man's (X3); or near to the man's parents but not the woman's (X4). Table 2 shows the joint distribution of proximity using this near-far dichotomy, and it indicates a slightly higher proportion of couples in which the woman is near and the man is far (X3) than the opposite case (X4), with this tendency being more pronounced among couples in which neither partner has a degree and least pronounced when both have a degree. Overall nearly one-half of the couples live 15 minutes or farther from both parents (X1), but the proportion falls to one-third for the less educated couples. Our aim is to model this joint distribution with a view to studying how the attributes of each partner influence the outcome, particularly the joint distribution of their educational attainments.

[4] Comparisons with the American data are inexact because of different age ranges (25 and older in the USA sample cf. 31-54 for the UK sample) and different distant measures (miles in the USA sample cf. travelling time in the UK sample). In the USA data, the median distance to the woman's mother is 20 miles compared with 25 miles for distance to the man's mother (Compton and Pollak 2013, Table 3). Also see Appendix Table 1 for other USA-UK comparisons.

[5] Chan and Ermisch (2013, Figure 1) show that adult children aged 31-54 are much more likely to see their parent daily if they live within 15 minutes of each other (25% cf. 8% for the 15-30 minute distance category). There is a sharp decline in daily and weekly contact as proximity decreases beyond 30 minutes travelling distance. As in-kind help usually requires physical contact, we also expect such help to diminish with proximity.

[6] We acknowledge that co-residence is qualitatively different from living near in a separate household (Compton and Pollak 2013), and indeed demonstrate this to be the case with individual data from the same source as used here (Chan and Ermisch 2013). But co-residence is too rare among couples to distinguish it separately in our analyses. Compton and Pollak (2013) also find small numbers co-residing in their couples' sample.

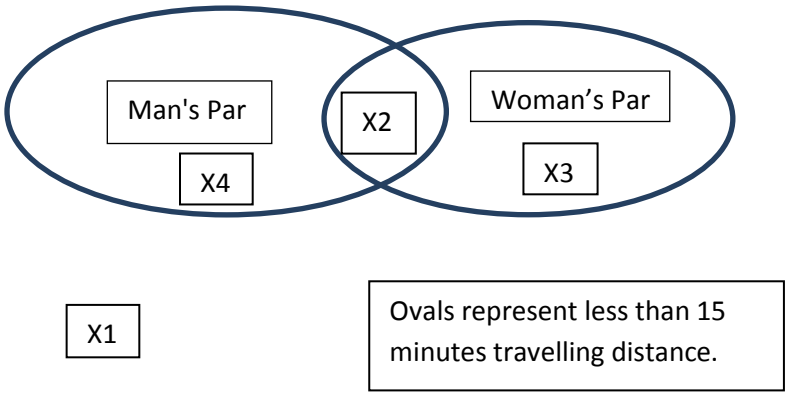

Figure 1: Couple's Location Relative to Man's and Woman's Parents

Table 2: Joint distribution of couple's proximity to parents, percentages

Relative Location	All	Type	At least one has degree	Neither has degree	Both have a degree
Woman near, man far	19.2	X3	15.2	22.2	11.6
Same-near	18.1	X2	9.0	25.1	4.1
Same-far	46.4	X1	62.1	34.3	74.4
Man near,woman far	16.3	X4	13.7	18.4	10.0
Weighted N (100%)	3,813		1,655	2,158	766

3. Main hypotheses

We are particularly interested in how each partner's education influences location in terms of proximity to parents. Better educated people are likely to face a distribution of earning opportunities with a larger variance, making them choosier in the jobs they accept and causing them to search longer and over a wider geographical area for jobs than less educated people. Job opportunities requiring a higher education may also be more dispersed geographically. The larger wealth among better educated could also lead them to search for housing opportunities over a broader area. These tendencies lead us to expect that, all else equal, better educated people live farther from their parents. There is a clear prediction when both partners have the same level of education: better educated couples would be more likely to live far from both parents than less educated ones.

When the partners' education levels differ, one partner's educational attainment may have a larger influence on the outcome than the other's (e.g. the man's or the higher of the two). For instance, if the man works more hours, he contributes more to household income, and so his education may attract more weight in location decisions. Another possibility is that the impact of each respective education level on distance from parents is proportional to the earnings return to job search over a wide area for that level of education. In this case, the combined impact of the two partners' education levels in proximity decisions may be an average of the impacts of the two education levels, with possibly different weights for male and female partners. For example, with equal weights, couples in which the partners have a combination of a high and middle level of education will tend to live farther from both sets of parents than one with a high and low level of education. Such an outcome would indicate the importance of labour market influences on proximity decisions.

But relative education may also affect bargaining power in location decisions. Of course, we know little about people's parental proximity preferences. It is often implicitly assumed that a person prefers to live closer to their own parents, but these preferences may differ by gender (e.g. women may favour nearness to parents more than men) and also vary among people of the same gender. The presence of bargaining power effects associated with relative education would produce countervailing effects of relative education levels compared with the labour market influences discussed in the previous two paragraphs. If preferences are to live closer to a person's own parents and bargaining effects related to relative education are important, then we would expect that when the woman has a higher education level than her partner the proportion of couples living closer to her parents than to his parents would be larger than when the same education differential favours the man. Suppose for example that there are two locations in relation to parents, near and far, and that there are two education levels, degree and non-degree. Then we would expect that comparing the situation when the woman has a degree and the man does not with one in which the man has a degree and the woman does not, a larger proportion of couples would live near to her parents and far from his parents in the former situation.

A more specific bargaining-oriented indicator is the share of the woman's income in the couple's joint income, which averages 39 per cent (SD=23 per cent) in our data. For given partners' education levels, a larger share may be expected to favour outcomes in line with her parental proximity preferences, but as the share depends on location it may be an endogenous variable.

Some circumstances other than the partners' education and relative resources, such as the presence of children, may favour location nearer to one set of parents than to the other. For example, daughters' stronger family ties may encourage couples with children to live closer to her parents than childless couples. We investigate such influences of family circumstances using the rich data on characteristics of the household and some aspects of each partners' history, such as whether they have siblings and whether they experienced parental separation as a child.

4. Modelling distance to parents: the Diagonal Reference Model

Our primary approach is to model the man's and woman's travelling time to parents in terms of jointly distributed latent variables which manifest themselves in the 'near' and 'far' dichotomy above. Of special interest is how the joint education of the couple affects these outcomes.

We break education down into three levels: degree, other higher and A-level, and GCSE or lower. The partners' education distribution is given in Table 3. The homogamous couples ('diagonal reference groups') have the largest cell counts, and these account for 53 per cent of the couples.

Table 3: Joint distribution of partners' education, cell percentages

	Man's Education			
Woman's education	Degree	Other higher or A-level	GCSE or lower	All, col. pct.
Degree	20.3	7.7	5.1	33.0
Other higher or A-level	6.9	13.4	12.1	32.4
GCSE or lower	3.6	11.4	19.7	34.6
All, row pct.	30.8	32.4	36.8	100

Weighted data, N=3,813 (100%).

Table 4 presents the joint distribution of distances to parents in terms of the near-far dichotomy. The last two columns show the proportions near for each partner. We seek a model of woman's and man's distance from their respective parents that accounts for this distribution in a parsimonious way.

Table 4: Joint distribution of Travelling Distances to Parents

		Distance to each Partner's Parents				Proportion near	
Woman's education	Man's education	Woman near, man far	same-near	same-far	Man near, woman far	Woman	Man
degree	degree	0.116	0.041	0.744	0.100	0.157	0.141
degree	oth hi/a-l	0.168	0.116	0.518	0.197	0.284	0.314
degree	<=gcse	0.163	0.189	0.526	0.121	0.352	0.310
oth hi/a-l	degree	0.197	0.112	0.525	0.167	0.308	0.279
oth hi/a-l	oth hi/a-l	0.228	0.195	0.413	0.164	0.423	0.359
oth hi/a-l	<=gcse	0.210	0.246	0.317	0.227	0.456	0.473
<=gcse	degree	0.226	0.130	0.465	0.178	0.356	0.309
<=gcse	oth hi/a-l	0.240	0.271	0.322	0.167	0.511	0.438
<=gcse	<=gcse	0.214	0.282	0.323	0.181	0.496	0.463

Weighted data, N=3,813.

The patterns in Table 4 cast immediate doubt on the importance of bargaining power effects working through relative education. Examining the three pairs of situations in which partners' education levels differ, in every case in which the woman has the higher education level, she is <u>less</u> likely to live near to her parents compared with couples in which the education differential is reversed, and she is <u>less</u> likely to live closer to her parents than to her partner's parents compared with couples in which the education differential is reversed.[7] In two of the three cases, she is actually more likely to live farther from her parents than to her partner's when she has the higher level of education.[8]

[7] The differences in Table 4, subtracting the probabilities when the woman has the higher education from the probabilities when the man has the higher education, are:

Education combination		Woman near, man far	same-near	same-far	Man near, woman far
degree	oth hi/a-l	-0.0288	0.0046	-0.0064	0.0305
degree	<=gcse	-0.0628	0.0588	0.0611	-0.057
oth hi/a-l	<=gcse	-0.0297	-0.0254	-0.0048	0.06

[8] In contrast to what we find here, in the National Survey of Families and Households data, Compton and Pollak (2013; Table 5) find that when the woman has a degree and the man does not, the percentage of couples who live 'near' to her mother is 5.8 percentage points higher compared to couples in which the education differential is reversed (in their data we define 'near' as the mother living within 30 miles). In the UK data, the corresponding difference is -5.6 percentage points for the 15 minute near-far threshold and 0.3 percentage points

We now present a model that places more structure on the influence of partners' education levels. It does not preclude the outcome that the couple lives closer to her parents than to his parents when the woman has a higher education level than her partner compared to the case in which the same education differential favours the man. Under certain configurations of parameters, this outcome, which we shall call the 'bargaining-like' outcome, is possible.[9]

Let y_{ijrc} represent the latent travelling distance variable for partner i (i=m,f) in couple j in which the woman has education level R, with categories $r=1,...,L$ and the man has education level C with categories $c=1,...,L$. A parsimonious representation of the relative influences of partners' education is the so called 'diagonal reference model' (e.g. Sobel et al 2004):

$$y_{fjrc} = w_f \mu^f_{rr} + (1- w_f)\mu^f_{cc} + e_{fj} \quad (1a)$$

$$y_{mjrc} = w_m \mu^m_{rr} + (1- w_m)\mu^m_{cc} + e_{mj} \quad (1b)$$

where μ^i_{rr} and μ^i_{cc} are diagonal regression functions: $\mu^i_{kk} = \alpha_{ki} + \beta_0{}^i + \mathbf{x}_{ij}'\boldsymbol{\beta}^{ki}$, k=r,c; i=f,m; w_i is the weight given to the woman's education in partner i's latent distance equation; and $\mathbf{x}_{ij}$ is a vector of attributes of the person and couple that influence μ^i_{kk}. That is, the mean of the latent distance variable for couples in partners' education cell r,c is a weighted average of the diagonal regression functions μ^i_{rr} and μ^i_{cc}. The intuition is that partners with the same education are the 'pure types' that may serve as a reference for couples with different levels of education. Conditional on r,c and $\mathbf{x}_{ij}$, e_{fj} and e_{mj} are assumed to be distributed as standard normal variates. We could use all 7 distance categories in Table 1 as the observed variables associated with the latent one, but we shall focus on the dichotomous ones of 'near' and 'far' as defined earlier in terms of the 15 minutes travelling time threshold (see section 4.3 below for comparison). Initially, we fit a model in which there are no covariates other than education pairs (i.e. $\boldsymbol{\beta}^{ki}$**=0,** k=r,c**;** i=f,m**).**

Our comparison model for the diagonal reference model is fully flexible concerning the impacts of partners' education pairs:

$$y_{fjrc} = \gamma^f_0 + \gamma^f_{rc} + \varepsilon_{fj} \quad (2a)$$

$$y_{mjrc} = \gamma^m_0 + \gamma^m_{rc} + \varepsilon_{mj} \quad (2b)$$

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for a 30 minute near far threshold. See Appendix Table 1 for the USA-UK comparison of all degree-non-degree cells analogous to Table 4, using both a 15 and 30 minute threshold for near-far for the UK.

[9] See the Appendix for a discussion of the conditions on the parameters in the model of equations (1a) and (1b) for the 'bargaining-like' outcome to occur.

where $\gamma^i_0 + \gamma^i_{rc}$ is the mean of the latent variable for educational pair *r,c* (*i*=*m,f*), and γ^i_0 could be a constant or a regression function of $\mathbf{x_{ij}}$. The degree-degree combination (*r*=*c*=1) is omitted as the reference category in each equation of each model. In the comparison model there are 16 education parameters, compared with 6 in the diagonal reference model (4 means plus 2 weight parameters).

4.1 Education Parameter Estimates

We have seen in Table 1 that about one-third of the sample of couples have at least one partner who is either foreign born or non-white. Among this group, 44 per cent of the couples have at least one partner's closer parent living abroad. For them, the choice of proximity to at least one set of parents is severely constrained. It is also possible that there are ethnic differences in the relative influence of partners' education and education group means, which may affect our estimates.[10] Thus, we estimated the parameters using a sample of 2,513 couples in which both partners were born in the UK and are white.

We first consider what restrictions are consistent with the data. In the first row of panel A of Table 5 we test the hypothesis that the 5 restrictions entailed by the diagonal reference model (DRM) for women's distance from parents in equation (1a) are valid when compared with the fully flexible education model of equation (2a). Analogously, panel B tests the 5 restrictions of the DRM associated with the men's distance equation, comparing equations (1b) and (2b). In both cases, we cannot reject the restrictions of the DRM.

The estimates (std. error) of the weights w_f and w_m are 0.535 (0.066) and 0.446 (0.072), respectively. In the second row of panels A and B we test whether the weights w_f and w_m, respectively, are equal to one-half. We can also accept this restriction. Finally, the third rows of panels A and B test the 6 restrictions entailed by the DRM with equal weights (w_f= w_m=0.5 in (1a) and (1b)) compared to the fully flexible education model, and again we cannot reject the restrictions.

[10] In Chan and Ermisch (2013), the probability of living near to parents varied significantly among ethnic groups, even after controlling for an individual's education.

Table 5: Models without covariates

A. Woman's distance equation

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	5.76	5	0.330
2. Test of Equal Weights DRM cf. DRM	0.27	1	0.600
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	6.04	6	0.419

B. Man's distance equation

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	4.47	5	0.484
2. Test of Equal Weights DRM cf. DRM	0.56	1	0.456
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	5.02	6	0.541

There are efficiency gains from estimating the women's and men's distance equations jointly if e_{fj} and e_{mj} are correlated. We assume that conditional on r,c and $\mathbf{x}_{ij}$, e_{fj} and e_{mj} are jointly distributed standard normal variates with correlation coefficient ρ. The DRM with equal weights for the man and woman ($w_f = w_m = 0.5$ in (1a) and (1b)) entails 12 restrictions compared with the model of (2a) and (2b). In our data, the chi-square statistic is 10.59, which has a p-value of 0.564. Thus, we cannot reject the restrictions of the DRM with equal weights.[11] With equal weights, the 'bargaining-like' outcome is impossible, causing us to reject the importance of bargaining effects related to relative education on proximity to parents. The correlation between the error terms in the two equations is estimated to be 0.26, indicating a positive sorting of partners in terms of residual influences on distance from parents. The parameter estimates are given in Table 6.

[11] When we do not restrict the sample to couples in which both partners were born in the UK and are white, the chi-square statistic is 17.15, which has a p-value of 0.144.

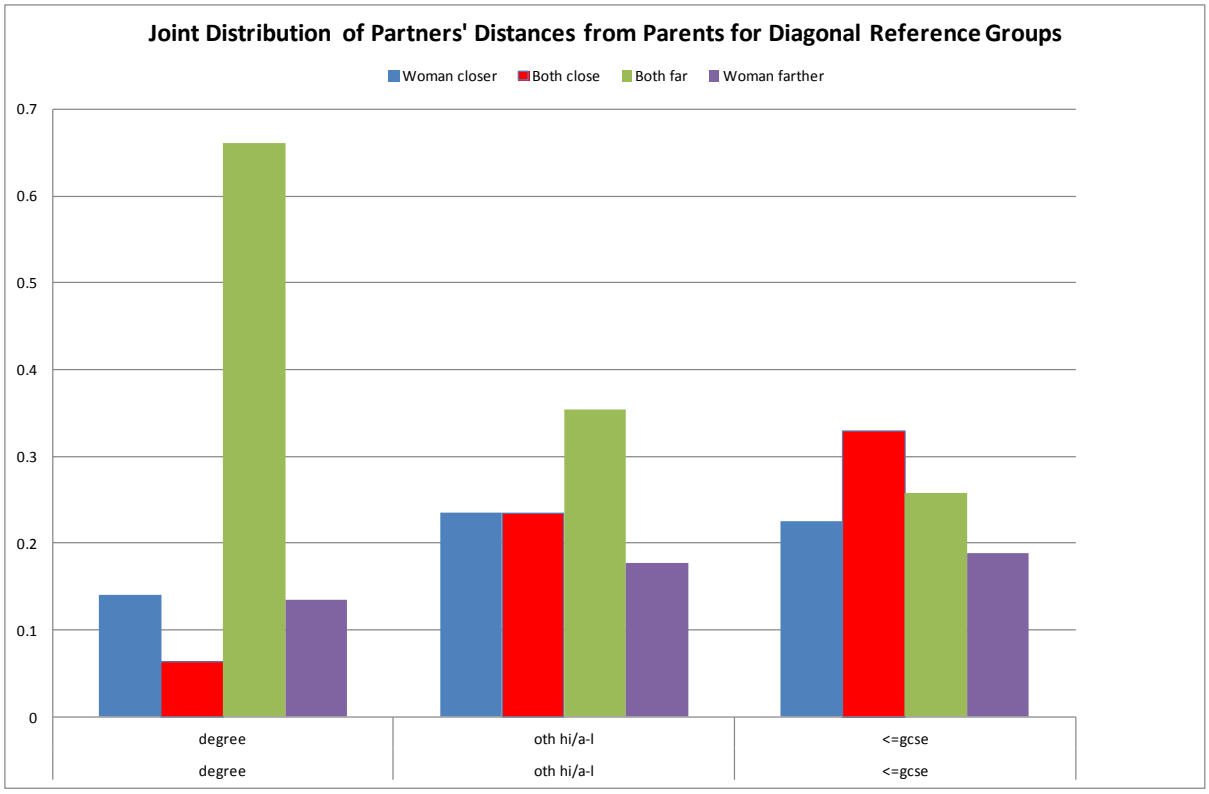
Table 6: Parameter estimates (std. error) for 'equal weights' model

	female	male
α_{2i} (other higher, A-level)	-0.748 (0.086)	-0.622 (0.087)
α_{3i} (GCSE or lower)	-0.960 (0.079)	-0.888 (0.080)
β_0^i (constant)	0.825 (0.061)	0.846 (0.062)
ρ (correlation)	0.266 (0.031)	
Implied means	*female*	*male*
μ^i_{11}	0.825	0.846
μ^i_{22}	0.077	0.224
μ^i_{33}	-0.135	-0.042

The means of the diagonal reference groups provide an idea of the 'pure effect' of education on proximity to parents. The parameter estimates imply that the probability of living 15 minutes or more from parents increases moderately when moving from both partners having GCSE qualifications or lower to both having an 'other higher or A-level' qualification, but there is a big jump when both have a degree ('power couples' in the terminology of Compton and Pollak 2013, who borrow it from Costa and Kahn 2000). For instance, the predicted probability of living far from the woman's parents increases from 0.45 to 0.53 to 0.80 across these three education categories (for men's parents the corresponding figures are 0.48, 0.59 and 0.80). Figure 2 shows the joint distribution of partners' location relative to parents predicted by the model for the three diagonal reference groups. Comparing the two lower education categories, there is little difference by education in the probabilities that one or the other partner is closer to their parents. Within each of the two lower education groups, it is more likely that that the couple lives closer to her parents than to his, but this is not the case within the degree group.[12] The steepest education gradient is with respect to both partners living 15 minutes or more from their parents.

[12] In Norway, patri-locality is only evident among the non-degree group (Løken et al. 2013), and there are echoes of this here, except that it is (mild) matri-locality that is only found for the non-degree group.

Figure 2:



The statistical acceptance of the equal weights hypothesis implies that when the man's education differs from the woman's the probabilities of living more than 15 minutes from parents merely reflect the combination of the different education reference categories. For instance, when both partners have a degree the probability that they both live 15 minutes or farther from parents is 0.66, but if one of them has degree and the other has only a GCSE or lower qualification, that probability falls to 0.45 (0.51 when one has a degree and the other has an 'other higher or A-level' qualification). There is no additional influence on the joint distribution of location of who has the higher qualification; i.e. no additional 'bargaining power' effects.

We now allow for other influences on each partner's proximity to parents (i.e. $\boldsymbol{\beta^{ki}\neq 0}$, $\boldsymbol{k=r,c}$). In earlier research on individuals (Chan and Ermisch 2013), we found that the following variables were associated with proximity to parents among people aged 31-54: whether an only child or not, whether or not parents separated before the person's 16th birthday, whether or not he/she has a child, housing tenure and whether they moved in the past 5 years or not. Thus, in equations (1a) and (1b) we include <u>both</u> partners' variables

related to these attributes in $\mathbf{x_{ij}}$, and in addition we include the woman's age, the difference in age between the partners, the difference in age between the parent and the child for each partner, whether or not there is a child aged under 5 in the household and the share of the female partner's income in joint couple income.[13] As there may be concern that the effects of education may be affected by the tendency for more educated partners to live in dynamic urban areas, we also include indicator variables for living in London, in the South East of England and in a rural area (thus the reference group is living in an urban area outside London or the South East). Descriptive statistics for these variables are shown in the Appendix Table 2. We assume that $\boldsymbol{\beta}^{ri}=\boldsymbol{\beta}^{ci}$ ($i=f,m$).

Table 7: Models with Covariates

A. Woman's distance equation

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	9.32	5	0.097
2. Test of Equal Weights DRM cf. DRM	0.64	1	0.425
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	9.96	6	0.126

B. Man's distance equation

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	3.88	5	0.566
2. Test of Equal Weights DRM cf. DRM	0.31	1	0.578
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	4.19	6	0.651

In Table 7, we report a series of tests of restrictions similar to those in Table 5. At the 0.05 level, we cannot reject the restrictions entailed by the DRM. The estimates (std. error) of the weights w_f and w_m are 0.557 (0.070) and 0.458 (0.076), respectively, but these are not significantly different from 0.5. The third row of Table 7 indicates that we also cannot reject the model in which both weights are 0.5.

Again we estimate the two distance equations jointly to improve the efficiency of our estimates. Compared with a fully flexible specification of the impacts of partners' education pairs in this augmented model (with $\boldsymbol{\beta}^{ri}=\boldsymbol{\beta}^{ci}$), we again cannot reject the 12 restrictions of the DRM model with equal weights (chi-square=13.47; p-value=0.336) for whites born in the

[13] The movement variable used here is whether either of the partners moved in the past 5 years.

UK.[14] The parameter estimates for the equal weights model are shown in Table 8. As in the model without other covariates, unobserved factors affecting distance from parents are correlated across partners: the correlation between the error terms in the two equations is estimated to be 0.25.

Thus, contrary to the finding of Blaubooer et al. (2011) for the Netherlands, we do not find that men's education has a larger impact on relative proximity to each partner's parents. Our equal weights diagonal reference model is consistent with the idea that the impact of each respective education level on distance from parents is proportional to the earnings return to wide geographic job search for that level of education, and that the combined impact of the two partners' education levels in proximity decisions is a simple average of the impacts of the two education levels. Thus, the results point to the importance of labour market considerations in choosing where to live relative to parents and the absence of bargaining effects related to relative education.

[14] When we allow the weights to differ, estimates of both women's weights are within one standard error of 0.5: the estimates are w_f=0.56 and w_m=0.42.

Table 8: Parameter estimates (std. error) for 'equal weights' model with covariates, standard errors in parentheses (N=2,373)

	female	male
α_{2i} (other higher, A-level)	-0.744 (0.092)	-0.651 (0.093)
α_{3i} (GCSE or lower)	-0.983 (0.090)	-0.934 (0.090)
$\boldsymbol{\beta^{ri}=\beta^{ci}}$		
Woman Only-child	-0.089 (0.094)	-0.04 (0.094)
Man only-child	0.040 (0.098)	-0.207 (0.097)
Woman Parental separation	0.173 (0.076)	-0.044 (0.076)
Man parental Separation	-0.043 (0.077)	0.164 (0.078)
Woman has child	-0.249 (0.113)	0.030 (0.113)
Man has child	-0.213 (0.109)	-0.103 (0.109)
Woman: age difference with closest parent	0.005 (0.005)	0.005 (0.005)
Man: age difference with closest parent	0.004 (0.005)	-0.013 (0.005)
Woman's age	0.020 (0.006)	0.019 (0.005)
Difference in age (Woman-man)	-0.009 (0.006)	-0.004 (0.006)
Child aged 0-4 in hshld.	0.092 (0.075)	-0.067 (0.075)
Couple moved <=5 yr.	0.116 (0.063)	0.316 (0.064)
Rural resident	0.298 (0.064)	0.309 (0.064)
Great London resident	0.471 (0.140)	0.566 (0.144)
South East resident	0.308 (0.077)	0.240 (0.077)
Income share	-0.013 (0.122)	-0.093 (0.122)
Housing tenure:		
Owns with mortgage	0.148 (0.092)	0.173 (0.093)
Social tenant	0.316 (0.124)	0.212 (0.125)
Private tenant	0.467 (0.140)	0.159 (0.139)

β_0^i	-0.187	0.003
ρ (correlation)	0.253 (0.033)	

Reference groups: has siblings, no parental separation, childless, no child aged 0-4 in household, no move in past 5 years, urban residence other than South East or London, household owns house outright.

4.2 Other parameter estimates

Parents can benefit from help from grandparents in childcare when they live near, and their own parents may have a strong interest in seeing their grandchildren often. Our estimates in Table 8 indicate that having a child (either the woman or her partner) reduces the probability of living 15 minutes or more from the woman's parents, but there is no impact of these variables on distance from the man's parents.[15] This finding is broadly in line with Blaauboer et al. (2011) who find that the couple lives closer to the woman's parents when they have a young child, while there is no association with distance from the man's parents. The joint probabilities predicted by the model are shown in Table 9. These indicate that the probability that both partners live 15 minutes or more from their parents declines when either the woman or the man has a child, as does the probability that the man lives near while the woman lives far.[16] These results are different to those from Norway, for which it was found that the probability of living closer to the man's parents than the woman's increases when there is a child; while the probability of living closer to the woman's parents than the man's also increases, it increases by less (Løken et al. 2013).

When parents stop living together, at least one parent moves from the parental home, and separation and re-partnering may also strain relations with the children from the first marriage. Consistent with this view, experiencing parental separation or divorce as a child increases the chances of living far from a partner's own parents. In terms of the joint probabilities, the probability that both partners live 15 minutes or more from their parents increases when one partner has experienced parental separation, as does the probability of living far while their partner lives near; the other two joint probabilities fall (Table 9).

[15] For 81% of the couples, they both have at least one child, probably a child that they had together in most cases. For 11% of the couples, neither has a child.

[16] The predicted probabilities should be interpreted in the following way: for the group of women who have a child, they are the mean sample proportions in each of the four 'near-far' combinations when every observation is treated as if the woman had a child. All other covariates take on their actual values for the particular couple (i.e. the predicted proportions are the mean of the couple predictions, not the predicted proportions evaluated at the mean of the covariates).

If the experience of parental separation weakens ties to parents, our estimated impacts may be interpreted as reducing the influence of the location of that partner's parents on the couple's location decisions, making it more likely that the couple locates more than 15 minutes from that partner's parents. For example, Table 9 shows that when the woman's parents separated when she was a child, the probability that the couple lives far from both sets of parents increases from 0.402 to 0.428 and the probability that she lives far while her partner lives near increases from 0.168 to 0.203.

Table 9: Predicted Joint Probabilities from Equal Weights Model, Selected Attributes

	Distance to each Partner's Parents			
	Woman near, man far	Both near	Both far	Woman far, man near
Woman no child	0.155	0.189	0.444	0.212
Woman has child	0.209	0.223	0.400	0.168
Man no child	0.177	0.178	0.461	0.183
Man has child	0.205	0.225	0.397	0.172
Woman's parents not sep.	0.208	0.222	0.402	0.168
Woman's parents separated	0.167	0.203	0.428	0.203
Man's parents not separated	0.196	0.223	0.403	0.179
Man's parents separated	0.232	0.201	0.424	0.143
Man not only-child	0.204	0.217	0.409	0.169
Man only-child	0.164	0.243	0.375	0.218
Woman not only-child	0.200	0.218	0.408	0.174
Woman only-child	0.216	0.233	0.387	0.164

Probabilities predicted using parameters in Table 8.

Rainer and Siedler (2009, 2012) argue theoretically and find empirically (in a large number of countries) that children with a sibling are significantly more likely to live farther from their parents than only-children. Also, van der Pers and Mulder (2012) find that parents of an only-child are more likely to have a child living nearby than parents of two or more children. In our analysis, men who are an only-child are less likely to live far from their parents. While there is an analogous effect of being an only-child for women, it is not statistically significant (but see section 4.3). The probability that both partners live near and

the probability that the man lives near and the woman lives far increase when the man is an only-child.

These associations between family circumstances and distance to parents suggest that in certain circumstances the location preferences of one of the partners are given more weight. For instance, the fact that the man being an only-child shifts location toward his parents suggests that his preferences dominate in this situation, while the presence of children (either the woman's, the man's or both) favours location nearer to the woman's parents.

Geographic mobility of both the parent and child generations accumulates over time, particularly the younger generation being analysed here. Thus, we would expect that distance between them increases with age (Rogerson et al. 1993), and we indeed see that, controlling for the difference in the partners' ages, older children live farther from their parents. Men with an older parent live closer to their parents, but this is not true for women.

A couple's underlying propensity to move is likely to be positively correlated with the chances that they moved in the recent past. Indeed, we find that couples who have moved in the past five years are more likely to live 15 minutes or more away from their parents, which is consistent with the view that mobility tends to move the generations farther apart. The impact of recent mobility on the latent distance variable is nearly three times stronger for distance from the man's parents than for distance from the woman's parents.

Among the characteristics of the household affecting distance from parents, people who do not own their home outright, are more likely to live 15 minutes or more from parents. Distance from the woman's parents exhibits a gradient with respect to housing tenure: mortgagees, social tenants and private tenants are progressively more likely to live far from the woman's parents. Couples residing in London or South East England live farther from parents than couples living in urban areas elsewhere, while couples residing in rural areas live farther from parents than couples living in urban areas other than London and South East England.

There is no evidence that the woman's share of income has a significant effect on closeness to parents. When taken together with the evidence that the equal weights assumption is consistent with the data, this result suggests that partners' relative bargaining power in decisions affecting proximity to parents is not associated with relative income or relative education levels and only mildly associated with gender, favouring women.

4.3 Expanding the number of distance categories

Despite its intrinsic interest, our near-far dichotomy does not fully exploit the data on proximity in estimating relative education and share of income effects on proximity, thereby sacrificing some efficiency. In consequence, we re-estimated the model using all seven distance categories in Table 1; that is, we estimated an ordered probit model for each partner's distance from parents.[17] Again, we cannot reject the equal weights hypothesis (i.e. $w_f = w_m = 0.5$ in (1a) and (1b)) at the 0.05 level. Key parameter estimates for the model with covariates are shown in Table 10. The education parameter estimates are similar to those for the dichotomous model in Table 8. While there is a stronger suggestion than previously that couples in which the woman contributes relatively more income live closer to the man's parents, the estimated impact is not statistically significant at the 0.05 level or less.

There is one interesting difference in the impacts of other variables on proximity compared with Table 8. We now find evidence that the woman being an only-child reduces distance from her parents (coefficient=-0.172, SE=0.080), an impact similar to that of the man being an only-child on distance to his parents (coefficient=-0.155, SE=0.083).

Table 10: Key parameter estimates (std. error) for 'equal weights' ordered probit model with covariates, white UK-born couples

	female	male
α_{2i} (other higher, A-level)	-0.710 (0.074)	-0.692 (0.074)
α_{3i} (GCSE or lower)	-0.950 (0.074)	-0.967 (0.074)
Female partner's share of joint income	-0.101 (0.103)	-0.128 (0.102)

4.4 Allowing the weights to vary with covariates

Rather than constant weights for each partner, we can allow for variation in weights with covariates, including those contained in $\mathbf{x_{ij}}$. In particular, we express the weight $w_i = \exp(b_i Z_{ij})/(1+ \exp(b_i Z_{ij}))$ to assure that it lies between 0 and 1. In light of the bargaining arguments, the weight might be a function of whether the man or woman has the higher education level or of the female's share of income. We did not find estimates of b_i associated with these variable in the weight function that even approached statistical significance. Similarly, when we allowed the weight to differ between childless couples and those with a child, there was no significant difference in weights.

[17] We did not allow for correlation between the error terms in the partners' distance equations, but this should only affect the efficiency of our estimates.

5. An alternative modelling approach

A second approach to the diagonal reference model considers the four location patterns (X1 to X4 in Figure 1) as the objects of the couple's choice. Let the utility from choosing location type n (n=1,..,4) be given by:

$$V_{njrc} = w\lambda^{n}_{rr} + (1- w)\lambda^{n}_{cc} + \varepsilon_{nj} \quad (3)$$

where λ^{n}_{rr} and λ^{n}_{cc} are diagonal regression functions: $\lambda^{n}_{kk} = \boldsymbol{\pi}_{kn} + \delta_0{}^{n} + \mathbf{x}_j'\boldsymbol{\delta}^{\boldsymbol{kn}}$, k=r,c; w is the weight given to the woman's education in the utility associated with each choice; and $\mathbf{x}_j$ is a vector of attributes of the person and couple that influence λ^{n}_{kk}. That is, analogous to the model in equations (1a) and (1b), the mean utility for couples in partners' education cell r,c is a weighted average of the diagonal regression functions λ^{n}_{rr} and λ^{n}_{cc}. For a given couple j, the residuals ε_{nj} are assumed to be identically and independently distributed with a type I extreme value distribution. The couple chooses the location type that produces the maximum utility, $max\{V_{1jrc}\ V_{2jrc}\ V_{3jrc}\ V_{4jrc}\}$. As is well known (e.g. Maddala 1983, pp.59-61), the solution to the problem produces probabilities of choice n that are represented by a multinomial logit model.[18] We shall normalise such that the parameters of the diagonal regression functions for the type 1 location (X1: both living more than 15 minutes from parents) are zero (i.e. $\lambda^{1}_{rr} = \lambda^{1}_{cc} = 0$).

As before, we test the restrictions of the equal weights model (w=0.5), which has six education parameters, by comparing it with a fully flexible joint partners' education specification with 24 education parameters. We cannot reject the 18 restrictions of the equal weights model, neither when there are no other covariates (chi-square=20.23, p-value=0.32), or when there are other covariates (chi-square=27.45, p-value=0.21). The parameter estimates for the equal weights model without covariates are shown in Table 11. It also shows the choice-specific utility means for homogamous couples (utility from living far from both sets of parents is normalised to zero) and the implied choice probabilities.

[18] Thus, this approach makes the 'independence of irrelevant alternatives' assumption: the odds ratio for the choice between any two choices is the same irrespective of the total number of choices considered.

Table11: Parameter estimates (std. error) for multinomial logit 'equal weights' model without covariates

	Woman near, man far	Both near	Both far	Woman far, man near
π_{2n} (other higher, A-level)	1.305 (0.181)	1.799 (0.207)	0	1.086 (0.190)
π_{3in}(GCSE or lower)	1.404 (0.171)	2.483 (0.191)	0	1.267 (0.178)
δ_0^n (constant)	-1.601 (0.128)	-2.238 (0.158)	0	-1.649 (0.131)
Implied utility means, type n				
λ^n_{11}	-1.601	-2.238	0	-1.649
λ^n_{22}	-0.296	-0.439	0	-0.563
λ^n_{33}	-0.197	0.245	0	-0.382
Implied probabilities				
P^n_{11}	0.134	0.071	0.666	0.128
P^n_{22}	0.251	0.218	0.338	0.193
P^n_{33}	0.217	0.338	0.264	0.180

Living far from both sets of parents is the most likely outcome for couples with education above the GCSE level, while living near to both partners' parents is the modal outcome for low-educated couples. Utility decreases as the couple's education level increases for location types other than living far from both parents (which is normalised to be constant), and particularly for living close to both sets of parents. That need not imply, however, that the probability of choosing each of these other location types exhibits a monotonic decline as the couple's education level increases. Indeed these parameter estimates imply that the chances of having one partner living within 15 minutes of parents and the other farther away is highest for the middle education group (other higher or A-level), although the lowest group has only a marginally smaller probability. In all education groups, but particularly the lower two, the chances of living near to the woman's parents and far from the man's are higher than those for living near to the man's parents and far from the woman's. The predicted probabilities are similar to those from the bivariate probit model with equal weights, illustrated in Figure 2.

The pattern of predicted probabilities for the diagonal reference groups from the model with equal weights and covariates is similar to that in Table 9.[19] With this model, we

[19] Predicted probabilities for diagonal education groups from the multinomial logit 'equal weights' model with covariates

undertook an exercise identical to that in Table 7 and came up with a pattern of predicted probabilities similar to those shown there. Overall we obtain similar results to those from our bivariate probit model with equal weights. We prefer the bivariate probit model approach because it has fewer parameters and it does not make the 'independence of irrelevant alternatives' assumption.

6. Conclusions

There is a slight tendency for couples to live closer to the woman's parents than the man's. The tendency is more pronounced for couples in which neither partner has a degree and in which there is a child. In other respects, proximity to parents is gender neutral.

Educational attainment has a large influence on geographic mobility and in consequence on the proximity of couples to their respective sets of parents, with better educated homogamous couples tending to live farther from their parents. We find that each partner's educational level contributes equally to the proximity outcome, in the context of a model in which homogamous couples serve as the educational reference group and heterogamous couples merely reflect the combination of the influence of different education reference categories. Our results are consistent with the idea that the impact of each respective education level on distance from parents is proportional to the earnings return to wide geographic job search for that level of education, and that the combined impact of the two partners' education levels in proximity decisions is a simple average of the impacts of the two education levels. There is no additional influence on location of who has the higher qualification; i.e. no additional 'bargaining power' effects associated with relative education levels. A partner's income share also does not affect proximity to parents.

Circumstances related to family history and childbearing do, however, shift location nearer to one set of parents than the other. In particular, the presence of children favours location nearer to the woman's parent, while being an only-child favours location nearer that

	Woman near, man far	Both near	Both far	Woman far, man near
Degree	0.127	0.069	0.680	0.124
Other higher, A-level	0.246	0.218	0.338	0.198
GCSE or lower	0.217	0.333	0.266	0.185

The predicted proportions should be interpreted in the following way: for example, for the degree-degree education group they are the sample mean proportions in each of the four 'close-far' combinations when every observation is treated as if both partners had a degree; thus those observations that in fact do represent degree-degree couples are included, as well as those observations that represent other education groups. All other covariates take on their actual values for the particular couple (i.e. the predicted proportions are the mean of the couple predictions, not the predicted proportions evaluated at the mean of the covariates).

partner's parents. Also, a partner who has experienced separation of his parents while a child tends to live farther from their parents.

Overall these family influences are less important for proximity to parents than the labour market influences captured in the education parameters. For example, the probability that the couples lives far from both parents is 0.66 for a couple in which both partners have a degree compared with 0.26 for a couple in which both have GCSEs qualification or lower. In contrast, the largest change in the same probability for differences in family circumstances is 0.06, which comes about when comparing childless couples with those with a child. We conclude that proximity to parents is primarily driven by factors that affect mobility over long distances, which are mainly those associated with the labour market.

References

Belot, M. and Ermisch, J. 2009. "Friendship ties and geographic mobility: evidence from Great Britain," *Journal of the Royal Statistical Society, Series A*, 172: 427-444.

Basu, K. 2006. Gender and say: a model of household behaviour with endogenously determined balance of power, *Economic Journal*, 116: 558–80.

Blaauboer, M., Mulder, C.H. and Zorlu, A. 2011. Distances between couples and the man's and woman's parents. *Population, Space and Place*. 17:597-610.

Chan, T.W. and Ermisch, J. 2013. Family geography and demography. University of Oxford.

Chiappori, P-A., Fortin, B. and Lacroix, G. 2002. Marriage market, divorce legislation, and household labor supply, *Journal of Political Economy*, 110:37–72.

Couprie, H. 2007. Time allocation within the family: welfare implications of life in a couple, *Economic Journal*, 117:287–305.

Compton, J. and Pollak, R.A. 2013. Proximity and coresidence of adult children and parents in the United States: description and correlates. Bonn: IZA DP 7431.

Costa, D. L. and Kahn, M.E. 2000. Power couples: changes in the locational choice of the college educated, 1940-1990. *Quarterly Journal of Economics*. 115:1287-1315.

Ermisch, J. and Pronzato, C. 2008. Intra-household allocation of resources: inferences from non-resident fathers' child support payments. *The Economic Journal*, 118: 347-362.

Hank, K. 2007. Proximity and contacts between older parents and their children: a European comparison. *Journal of Marriage and Family*. 69:157-173.

Løken, Katrine Vellesen , Lommerud, Kjell Erik and Lundberg, Shelley. 2013. Your place or mine? On the residence choice of young couples in Norway. *Demography,* 50 (1): 285-310.

Konrad, K. A., Kunemund, H., Lommerud, K. E. and Robledo, J. R. 2002. Geography of the family. *American Economic Review*, 92 (4), 981–998.

Lundberg, S., Pollak, R. and Wales, T. 1997. Do husbands and wives pool their resources? *Journal of Human Resources,* 32:461–80.

Lundberg, S., & Pollak, R. A. 1996. Bargaining and distribution in marriage. *Journal of Economic Perspectives*, 139–158.

Maddala, 1983. *Limited-dependent and Qualitative Variables in Econometrics*. Cambridge University Press.

Mincer, J. 1978. Family migration decisions. *Journal of Political Economy*. 86:749-773.

Rainer , H. and Thomas Siedler, 2009. O Brother, Where Art Thou? The Effects of Having a Sibling on Geographic Mobility and Labour Market Outcomes. *Economica*, 76(303): 528-556.

Rainer, H. and Thomas Siedler, 2012. Family Location and Caregiving Patterns from an International Perspective. *Population and Development Review*, 38(2):337-351.

Rangel, M.A. 2006. Alimony rights and intrahousehold allocation of resources: evidence from Brazil, *Economic Journal*, 116:627–58.

Rogerson, P.A. Weng, R.H. and Lin, G. 1993. The spatial separation of parents and their adult children. *Annals of the Association of American Geographers*. 83:656-671.

Shelton, .N. and E. Grundy. 2000. Proximity of adult children to their parents in Great Britain. *International Journal of Population Geography*. 6:181-195.

Sobel, M.E., De Graaf, N.D., Heath, A. and Zou, Y. 2004. Men matter more: the social class identity of married British women, 1985–1991. *Journal of the Royal Statistical Society A*. 167:37-52.

Van der Pers, M. and C.H. Mulder, 2012. The regional dimension of intergenerational proximity in the Netherlands. *Population, Space and Place*. DOI 10.1002/psp. 1729.

Appendix Table 1: Joint distribution of Travelling Distances to Parents, percentages

USA (near=within 30 miles; far=30 miles or farther)

		Woman's Distance to Parent Relative to Man's			
Woman's education	Man's education	closer	same-near	same-far	farther
degree	degree	15.9	18.4	49.4	16.3
degree	no degree	23.2	34.8	25.5	16.4
no degree	degree	13.6	35.3	35.8	15.3
no degree	no degree	17.4	49.9	18.9	13.9
All		16.9	38.9	29.3	14.9

Source: 1992-1994 *NSFH* Data, Compton and Pollak 2013, Table 5.

UK (near=less than 15 minutes; far=15 minutes or more)

		Woman's Distance to Parent Relative to Man's			
Woman's education	Man's education	closer	same-near	same-far	farther
degree	degree	11.6	4.1	74.4	10.0
degree	no degree	16.6	14.5	52.2	16.7
no degree	degree	20.7	11.8	50.5	17.1
no degree	no degree	22.2	25.1	34.3	18.4
All		19.2	18.1	46.4	16.4

Understanding Society, full sample.

UK (near=less than 30 minutes; far=30 minutes or more)

		Woman's Distance to Parent Relative to Man's			
Woman's education	Man's education	closer	same-near	same-far	farther
degree	degree	17.4	10.0	60.9	11.8
degree	no degree	18.1	31.4	30.5	19.9
no degree	degree	19.9	29.4	34.8	15.9
no degree	no degree	19.4	48.0	17.8	14.7
All		18.9	36.3	30.0	14.9

Understanding Society, full sample.

Appendix Table 2: Descriptive Statistics, White UK-born couples aged 31-54

	Mean	SD
Woman's parent 15 min. or farther	0.583	
Man's parent, 15 min. or farther	0.611	
Education combinations: Woman, man		
degree-degree	0.163	
degree-other high	0.073	
degree-gcse	0.047	
other high-degree	0.065	
other high-other high	0.150	
other high-gcse	0.127	
gcse-degree	0.033	
gcse-other high	0.130	
gcse-gcse	0.211	
Woman only-child	0.092	
Man only-child	0.085	
Woman parental separation	0.157	
Man parental separation	0.148	
Woman has child	0.860	
Man has child	0.845	
Woman's age	40.90	6.19
Difference in age, Woman-Man	-1.61	4.73
Difference in parent's age, Woman	26.72	5.27
Difference in parent's age, Man	26.66	5.28
Child aged 0-4 in hshld.	0.272	
couple moved <=5 yr.	0.358	
Rural residence	0.254	
London resident	0.048	
South East resident	0.155	
Income share	0.388	0.228
Housing tenure:		
Owns outright	0.104	
Owns with mortgage	0.725	
Social tenant	0.097	
Private tenant	0.074	

Appendix: Bargaining-like effects in Diagonal Reference Model

Suppose for simplicity that there are two levels of education, degree=*d* and non-degree=*n*. Then, from (1a) and (1b), the expected differences between latent distances comparing the '*dn*' and '*nd*' education combinations for each sex are:

$$E(y_{fjdn} - y_{fjnd}) = (2w_f - 1)(\mu^f_{dd} - \mu^f_{nn}) \quad \text{(A1)}$$

$$E(y_{mjdn} - y_{mjnd}) = (2w_m - 1)(\mu^m_{dd} - \mu^m_{nn}) \quad \text{(A2)}$$

A necessary condition for the latent distance to the parents of partner *k* to be smaller for the '*dn*' education combination than the '*nd*' combination is that $w_k<0.5$, *k=f,m*. Clearly if $w_k=0.5$, *k=f,m*, then $E(y_{fjdn} - y_{fjnd}) = E(y_{mjdn} - y_{mjnd}) = 0$.

The corresponding expected difference between female and male partners in the differences in the distance to parents comparing couples with different education levels is given by

$$D_{fm} = E[(y_{fjdn} - y_{fjnd}) - E(y_{mjdn} - y_{mjnd})] = (2w_f - 1)(\mu^f_{dd} - \mu^f_{nn}) - (2w_m - 1)(\mu^m_{dd} - \mu^m_{nn})$$

Suppose for instance that $\mu^f_{dd} - \mu^f_{nn} = \mu^m_{dd} - \mu^m_{nn} = \mu_{dd} - \mu_{nn}$. Then

$$D_{fm} = 2(\mu_{dd} - \mu_{nn})(w_f - w_m)$$

In these circumstances, a necessary condition for the '*dn*' education combination to be closer to the woman's parents relative to the man's than the '*nd*' combination ($D_{fm}<0$) is $w_f < w_m$.

More generally, a sufficient condition for $D_{fm}>0$ is that $w_f > w_m$ and $\mu^f_{dd} - \mu^f_{nn} > \mu^m_{dd} - \mu^m_{nn}$. If we use are white, UK-born sample to estimate these parameters, we find that

	Estimate	SE
$\mu^f_{dd} - \mu^f_{nn}$	0.867	0.080
$\mu^m_{dd} - \mu^m_{nn}$	0.771	0.080
w_f	0.502	0.064
w_m	0.473	0.074

The sufficient condition for $D_{fm}>0$ is clearly satisfied in these data, and in fact $D_{fm}=0.046$. That is, when comparing couples in which one partner has a degree and the other does not, the couples lives *farther* from the woman's parents relative to the man's when the educational advantage is in her favour. But as the weights are insignificantly different from 0.5, we cannot reject the hypothesis that $D_{fm}=0$. When we employ the trichotomous educational split used in the main part of the paper, the same finding (i.e. $D_{fm}>0$, but not significantly different

from zero) holds for every educational pair. The estimates (std. error) of the weights w_f and w_m are 0.535 (0.066) and 0.446 (0.072), respectively.

Joint tests under assumption errors are not correlated.

No covariates

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	10.23	10	0.42
2. Test of Equal Weights DRM cf. DRM	0.83	2	0.76
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	11.06	12	0.52

Covariates (with parent age differences, London, rural and SE)

Nature of Test	Chi-sq.	df	p-value
1. Test of DRM cf. Fully Flexible Education Model	13.21	10	0.21
2. Test of Equal Weights DRM cf. DRM	0.95	2	0.86
3. Test of Equal Weight DRM cf. Fully Flexible Education Model	14.15	12	0.29