Tax Credits, Income Support and Partnership Decisions

Dan Anderberg

Royal Holloway University of London, CEPR, CESifo and IFS

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Abstract

This paper considers the potential impact of welfare benefits on partnership status in the UK. A model is estimated where the probability that a women has a partner depends on individual characteristics, regional effects, year effects and the benefit consequences of having a partner. The benefit consequences of having a partner is modelled for each individual. This involves assigning to each female a likely partner and then comparing the benefits available with and without a partner of that specific type. We find that a £100/week welfare benefit "partnership penalty" reduces the probability of having a partner by about seven percentage points. However, we also show that the average partnership penalty in the aggregate population is small. Finally, we use the model to explore the potential effect of the 1999 WFTC reform on partnership rates. We find that the reform may have had a modest but positive effect on the probability of having a partner among low- and medium educated women.

Keywords: Welfare Benefits, Tax Credits, Family Structure

JEL Classification: H31, I38, J12

I Introduction

The fraction of household headed by single women with dependent children has increased rapidly in many countries in the recent decades. The UK is no exception in this case. At the same time the employment rate of lone mothers was low relative to that of other women. (See e.g. Gregg and Harkness, 2003) The combination of these trends contributed to a steady rise in the poverty rate among children.

As a way of combatting these trends, several countries have initiated or expanded a range of policies aimed at supporting working families on low income. An important forerunner in this context was the US Earned Income Tax Credit (EITC). Up until the mid-1980s the EITC had been a relatively small programme. However, through a sequence of expansions the EITC has emerged as one of the main welfare programmes offering support to low-income families. The EITC is fundamentally different to more traditional welfare programmes in that it only offers benefits to households with at least one working adult. The design of the EITC is such that it is considered by many as promoting both "family and work". As such it can be viewed as a key part of a wider strategy to combat poverty by encouraging labour supply as well as the formation of two-parent households.

The UK has long had a policy of in-work benefits but like the EITC the UK family tax credits had been overshadowed by more traditional welfare programmes like Income Support (IS). In October 1999 the existing Family Credit (FC) systems was, however, replaced by the considerably more generous Working Families' Tax Credits.[1] The WFTC has been one the Labour government's flagship policies for combating poverty among children. Since the WFTC reform there have been a number of studies that have estimated its effect on labour supplies.[2] However, little is known about it's impact on family structure.

Indeed, the potential impact of welfare programmes on family structure is a highly contentious issue. A large US literature have concluded that more generous welfare programs are associated with higher rates of female household headship.[3] Much of this literature has exploited variation across US states to identify the effect of welfare. In contrast there is very little work available on the effect of welfare benefits on partnership status in the UK context. A

[1] See Blundell (2002) for a survey and discussion of both the WFTC and other "Welfare-to-Work" policies.

[2] Blundell et al. (2000), Brewer et al. (2003), Blundell and Hoynes (2004), Gregg and Harkness (2003), Francesconi and Van der Klaauw (2004).

[3] See e.g. Moffitt (1994), Hoynes (1997), Moffitt (2000) and the references therein.

noteworthy recent exception is Francesconi and Van der Klaauw (2004) who explore the effect of the 1999 Working Families Tax Credit (WFTC) reform (see below) on a variety of outcomes. One outcome that they consider is the rate of entry into partnerships. Their use an extended difference-in-difference approach. Identification of the effect of the WFTC reform is achieved by the fact that WFTC eligibility requires the presence of at least one child in the household. By effectively contrasting the rate of entry into partnership for single mothers to that of single women without children (who will not be eligible for WFTC either with or without partners) they conclude that the WFTC reform has had a small but significant negative effect on the rate of entry into partnerships for single mothers.

The empirical strategy followed in the current paper is very different. We examine the effect of the system of family tax credits (WFTC from October 1999 and Family Credit (FC) before it) and the Income Support system on the propensity to have a partner. We estimate a simple model where the probability of having a partner is a function of individual characteristics, region of residence, year and, importantly, the benefit consequences of having a partner. The benefit consequences of having a partner is modelled for each individual. This involves assigning to each female a likely partner and then computing the benefit consequences associated with having a partner of that type.

The empirical strategy we use follow that of Eissa and Hoynes (2003). However, there are a differences both in the focus and in implementation. In contrast to Eissa and Hoynes who focus on *marriage* we consider as outcome variable whether or not a woman *has a partner* (whether married or cohabiting). Also, in contrast to Eissa and Hoynes we focus only on welfare benefits, not income taxes. This is simply because the UK tax system is individually-based and hence does not generate any particular incentive for or against partnership formation. The main difference in implementation is that we allow female labour supplies to respond to partnership status. This feature is shown to have a large impact on the estimated distribution of partnership bonuses and penalties generated by the benefit systems. Also, in order to allow for non-linearities in the assignment of likely partners (and labour supplies) to the women in the data we adopt a matching approach instead of a linear regression approach.

- **More related literature to follow**.

The rest of the paper is outlined as follows. Section II outlines the two main benefits considered: the family tax credits (FC/WFTC) and Income Support (IS) and provides examples

of how these systems can provide financial incentives either for or against partnership formation. Section III discusses the data used and provides a descriptive analysis of the distribution of partnership bonuses and penalties facing the women in the data. Section IV outlines the empirical framework and how it is implemented while Section V presents the regression results. Section VI then takes a closer look at the likely impact of the WFTC reform on partnership rates using the results obtained. Finally, Section VII concludes.

II The Benefit System

Our analysis will focus on two main benefit systems: the family tax credits (FC/WFTC) and Income Support (IS). Both benefits are available to low-income households. The two benefit systems connect naturally: while FC/WFTC is an "in-work benefit" in that it requires that there is some adult in the household working at least 16 hours per week, IS is only available to individuals who work less than 16 hours. In this section we briefly describe the two benefit systems and how they can generate partnership bonuses and penalties.[4]

Working Families' Tax Credit

The Working Families' Tax Credit (WFTC) replaced Family Credit (FC) from 5 October 1999.[5] The WFTC (and FC before it) provides in-work support for low-paid working adults and is administered by the Inland Revenue. Families with children are eligible for WTC provided at least one adult works 16 or more hours a week and that family income is sufficiently low. The maximum weekly rate of WFTC is made up of an adult credit, credits for each child, childcare credits (if applicable) and a bonus for working for 30 hours or more per week. Unlike the U.S. counterpart – the Earned Income Tax Credit (EITC) - the WFTC is not phased in at low incomes. Instead there is a threshold income below which the maximum WFTC will be paid in full. At incomes above the threshold the benefit is, on the other hand, tapered off at a fixed

[4]Other benefits not considered in the analysis include Housing Benefit (HB) and the Council Tax Benefit (CTB). HB is available to people with low incomes who are liable to pay rent on their property. The maximum level of HB is the 'eligible rent'. Similarly, CTB is available to people with low incomes who are liable to pay council tax. HB and CTB are closely tied to IS in that people on IS (or income-based Jobseeker's Allowance) are automatically entitled to the full levels of HB and CTB. We choose not to model HB and CTB since it would require making detailed assumptions about the accommodation choices in the counterfactual partnership state.

[5]The WFTC has been further reformed and relaunched as the Working Tax Credit in April 2003.

rate (55 percent). In 2002 around 1.3 million families were receiving WFTC at a total annual expenditure of about £5.5 billion.

Income Support

Income support (IS) is a benefit provided to people on low incomes. IS is mainly claimed by lone parents, people who are incapable of work, and carers.[6] Recipients of IS cannot be working more than 16 hours per week. The calculation of IS entitlement is based on the notion of a personal allowance which depends on age and household composition. To be eligible the claimant's income must be less than their basic personal allowance (plus any premiums and some housing costs). The level of IS payable is the amount needed to top up their income to the relevant amount. In 2002 around 3.9 million people were receiving WFTC at a total annual expenditure of about £14 billion.

Reforms

In October 1999 the UK government replaced the FC system by launching the WFTC. The WFTC reform was crucial to the government's anti-poverty strategy and was designed to improve work incentives for families with low incomes. The reform entailed a number of changes to the parameters of the tax credit system that implied that the WFTC was more generous than the FC system that it replaced. First, the income threshold above which the benefit is tapered away grew (from £79 to £90). Second, the benefit withdrawal rate (or "taper") was reduced from 70 percent to 55 percent. Third, the credits for younger children grew (especially for children under 11 and less for those age 11-15). These increases effectively eliminated the variation in credits by age that existed under the FC system.[7]

At the same time as the WFTC reform there was also one significant change to the IS system: a restructuring of the premiums for children. Prior to 1999 the IS system, just like the FC system, exhibited significant variation by age in the child premiums: children under the age of 11 would be associated with the lowest premiums, while there would be higher premiums for children age 11-15 and 16 - 18. Between 1998 and 2001 this age variation was gradually removed

[6]Households with an unemployed adult can claim Job-Seekers Allowance which can be either "contribution-based" or "income-based". The income-based JSA is very similar to IS.

[7]Two further changes that came with the reform implies increased generosity. Any child maintenance received became fully disregarded (while the disregard was only £15/week under FC). Also, the generosity with respect to eligible childcare costs increased.

by increases in the premiums for younger children. Indeed, the increase in the IS premium for children under the age of 11 (and also those aged 11-15) was in line with the increase in the child credit component in the FC/WFTC system that occurred between 1998 and 2000.

Examples of Partnership Bonuses and Penalties

The FC/WFTC system can generate both partnership bonuses and penalties; the IS system on the other hand will almost exclusively generate partnership penalties. In order to illustrate how partnership bonuses and penalties can come about through the benefit systems it is useful to construct some hypethetical families.

Consider first the tax credits. Whether a couple will face a FC/WFTC partnership bonus or penalty will depend crucially on (i) whether the woman works or not and (ii) family income. To illustrate this we construct four different families that differ in terms of the woman's labour force participation and in the wage.

Family 1: "Low wage family with inactive female". Consider a family, with two children aged 5-10, where the male works full time (40 hours/week) at the £3.60/hr (the national minimum wage at the beginning of 2000) and where the woman is inactive. The family pays £25 per week and child for childcare.[8]

Family 2: "Low wage family with active female. Same as family 1 only the woman also works full time at the minimum wage.

Family 3: "High wage family with inactive female". Same as family 1 except that the male earns two times the minimum wage per hours, i.e. £7.20/hour.

Family 2: "Low wage family with active female. Same as family 3 only the woman also works full time at two times the minimum wage.

In Figure 1 we illustrate the FC/WFTC partnership bonus (penalty if negative) of each family under each year's policy from 1995 to 2002. The families are assumed to be observed in April of every year, so the WFTC reform shows up for the first time in the year 2000 benefits.

FIGURE 1 HERE

[8]We also assume that the couple has no savings, no mortgage interest payments, and that there are no maintanance payments after separation.

Family 1 will be the family that faces the largest partnership bonus; living separate neither the male nor the female will qualify for tax credits. However, as a couple they will. Moreover, after the WFTC reform, which made the tax credits more generous, the tax credits they qualify for (and hence the FC/WFTC partnership bonus) increased substantially.

Family 2 will face a FC/WFTC partnership penalty; the woman will qualify for tax credits as single parent. As a couple they also qualify, but their joint income is high enough that they do not get the full amount. After the WFTC reform, both the amount that the woman would be entitled to on her own and the amount that they are entitled to as a couple increases by roughly the same amount, leaving the partnership penalty almost unaffected.

Family 3 is similar to family 1, only that under the old FC policy the male's income was too high for the couple to qualify for any tax credits; hence they would not be entitled to any tax credits neither as a couple nor separately. With the more generous WFTC policy they do qualify for some tax credits as couple and hence face a partnership bonus.

Family 4 is similar to family 2 except, as a couple their joint income is high enough that they do not qualify for any tax credits. The female on her own would qualify for some tax credits leading to a partnerhip penalty; moreover, the penalty increased following the WFTC reform.

For the purposes of the empirical analysis what is interesting to note is how the WFTC reform will facilitate identification. In particular, Figure 1 highlights how the effect of the reform on the net partnership bonus varies substantially across family types, indeed in some cases in opposite directions.

Consider next Income Support. Focusing on couples where the male works full time, the IS system will only generate partnership penalties. Indeed, it will do so for couples where the female is not working and hence will, when living alone, generally qualify for IS. Moreover, since the IS penalty is simply the IS that the female can obtain on her own, the male's income does not matter for the size of the penalty. The size of the penalty does on the other hand depend crucially on the number and ages of children. Figure 2 shows the IS partnership penalty for an inactive woman (above 25 years of age) who has zero, one or two children under the age of 11.[9] The partnership penalty has been stable for the childless woman, but has increased substantially for the cases where there are children. This increase stems from a gradual increase in the generosity of the child element in the IS system that took place from 1999 onwards.

[9]It also assumes that she has no savings, receives no maintenance income and has no mortgage interest costs.

FIGURE 2 HERE

Another thing to note is that the WFTC- and the IS-partnership net bonuses tend to be strongly negatively correlated. Consider e.g. the four families used above to illustrate the WFTC partnership net bonuses. The two families that face WFTC bonuses, i.e. family 1 and 3, will also face (even larger) IS partnership penalties. Conversely, the two families that face WFTC partnership penalties, i.e. family 2 and 4, face no IS penalties since the female is also working.

III Descriptive Analysis

Data and Summary Statistics

We use data from the Family Resources Survey (FRS) 1995-2002. The FRS has the advantage of large samples and the years used contain two important changes in the welfare system: the replacement of Family Credit (FC) with Working Family's Tax Credit (WFTC) and the expansion of the child element in the Income Support (IS) system.

The focus of our analysis is on the partnership status of the women in the sample. The sample includes all individuals between the ages of 20 and 50. Pooling across year and excluding retired, long-term sick/disabled, students, self-employed and individuals with incomplete information leaves 82,587 women, 57,194 of whom have partners, and 25,393 who are single.

Table 1 provides summary statistics for the sample of partnered and single women respectively. It shows that the women with partners left school at, on average, the same time as the women without partners. The women with partners are on average nearly four years older than the women without partners. The women with partners also have more children (in all age groups). Partnered and single women have about the same labour force participation rate.[10] Single women earn slightly more and more often live in a metropolitan area. The earnings of the predicted partners (see below) are slightly higher for the women with partners than for the single women.

[10]Single mothers work less frequently than mothers with partners; single non-parents on the other hand work more frequently than partnered non-parents.

The Distribution of Net Partnership Bonuses

The benefit (net) partnership bonus is defined as the difference between the value of the benefit to which a couple are entitled to when they are together and the sum of the benefits they are entitled to when living separately. More formally consider a couple i; let B_i^c be the benefit that the couple are entitled to when together; let B_i^f and B_i^m be the benefit that the woman and the man are entitled to as single respectively. The "partnership bonus" for couple i is then defined as

$$\Delta B_i = B_i^c - \left(B_i^f + B_i^m \right). \tag{1}$$

If ΔB_i is negative we refer to is as a "partnership penalty".

In this section we describe the benefit partnership bonuses and penalties for the existing couples in the FRS data due to the Income Support (IS) and the Famlily Tax Credits (FC/WFTC). In order to compute partnership bonuses/penalties facing each existing couple we need to calculate not only the benefits that the couple are actually entitled to, but also the benefits they would be entititled to if they were to separate. In simulating these separations we assume that all children reside with the women, that existing savings are divided equally between the partners and that there are no maintainance payments. We also have to make assumptions about what happens to labour supplies and earnings. In this descriptive analysis we assume that labour supplies and earnings are unaffected by separation, that is we compute B_i^f and B_i^m *at the observed labour supplies and earnings.*

It is useful to break the female population down by education. Hence label as "low educated" those women who left full-time education at age 16 or younger, as "medium educated" those women who left full-time education at age 17-19, and as "high educated" those women who left full-time education at age 20 or later.

The results are illustrated in Figures 3 - 4. Figure 3 illustrates the result for the tax credits (FC/WFTC). For each educational group it shows first, in a left panel, the fraction of couples facing a partnership bonuses/penalties respectively. It then shows the average bonus/penalty among those subsidized/penalized as well as the overall average net bonus within the group. In the bottom right panel it then does the same for the aggregate population.

FIGURE 3 HERE

The figure shows that, in all eductional categories, the tax credits more often penalize partnerships: in all groups 30-40 percent of couples face tax credit partnership penalties while

only 10-20 percent of couples face tax credit partnership bonuses.[11] Over time the fraction of couples that are facing partnership penalties has increased in all educational categories: these trends mainly reflect the underlying upward trends in female labour force participation. The figure suggests that the effect of the 1999 WFTC reform was to increase the fraction of couples facing partnership bonuses.

The effect of the 1999 reform is more visible in the average bonuses and penalties. For each group we observe a marked increase in both the average penalty and the average bonus after 1999. This suggests that the increased generosity of the tax credits that came with the reform has served to widen the distributions of net partnership bonus.

For each group there is an overall average net tax credit partnership penalty of a just a few pounds per week. However, as the figure shows, these small averages are the results of bonuses and penalties that are both frequent and large but that, on average, tend to cancel out.

The partnership penalties that obtain throught the IS system (not shown) are similar for all educational groups. The fraction of couples facing IS partnership penalties is somewhere between 35-50 percent, with the largest number occuring among the low educated. The fraction of couples that are penalized through the IS system has gone down over time reflecting the increased female labour force participation rate. The average penalty (among the penalized couples) is similar in all groups and has been increasing from around £55 at the beginning of the period to abour £70 towards the end.

FIGURE 2 HERE

Figure 4 shows the total benefits (IS + Tax Credits) partnership bonuses/penalties. The figure shows that the majority of couples, in all educational categories, face some form of benefit penalty or bonus. Partnership penalties are far more common than bonuses. Average penalties tend also to be larger than the average bonuses. The result is that there is an overall average net partnership penalty in all groups. The average net penalty is in the range of £30-40 in all groups. The most interesting change across time is the increase in the fraction of couples facing partnership bonuses through the tax credits system that came with the WFTC reform and the associated increase in the (conditional) average partnership bonuses.

[11] As we will see below, this crucially depends on the assumption that labour supplies are unaffected by separation.

Partnership Trends

Figure 5 shows partnership rates broken down by age group and by educational group. The figure show how the timing of partnership formation differ across educational groups. In the early 20s, the low-educated are the most likely to have partners while the high-educated are the least likely to have partners. In the age group 26-35, the partnership rates of the medium- and high-educated have overtaken that of the low-educated. By the late 30s and early 40s the high-educated the most likely to have partners.

FIGURE 2 HERE

The figure also indicates a graduale decline in partnership rates. Among the young this decline is most noticable for the least educated. In the upper 20s and early 30s, the decline appears in all educational groups while among the 36-45 years old the decline is most noticable among the high educated.

It is difficult to judge from the figures whether there is any support for the idea that individuals partnership decisions respond to the bonuses and penalties generated by the benefit systems. Note e.g. that the bonuses and penalties outlined above were computed only for existing couples, not for singles. Nevertheless, it is interesting to consider what happens around the 1999 WFTC reform. As noted above, the reform generally increased the fraction of couples facing partnership bonuses from the family tax credit system. Figure 5 does seems to suggest that the downward trends in partnership rates were at least temporary broken for the younger age groups (20 - 35 year olds).

IV The Empirical Framework

Our aim is to model the partnership status – single or partnered – of women. Partnership status is treated as an individual choice. Our main interest is in estimating how the propensity to have a partner is affected by the welfare benefit (IS and FC/WFTC) consequences of having a partner. The elements of the model are as follows. We consider a set of females I and let s_i denote the partnership status of female $i \in I$, $s_i = 0$ if she is single and $s_i = 1$ if she has a partner. Each female $i \in I$ has some *individual characteristics* denoted by the vector $\mathbf{x}_i \in X$. The vector $\mathbf{x}_i$ contains e.g. age, education, number of children, race, region etc.

Each female is also associated with a (potential) *partner* with male characteristics $\mathbf{z}_i \in Z$. The characteristics of the partner that we need are the ones that allow us to compute welfare

benefits; this includes hours of work, earnings, age, number and ages of children. In the analysis below we will assume that all men work (at least 16 hours/week), are above the age of 25 and that all children always reside with the females. The remaining characteristic in $\mathbf{z}_i$ is then earnings (see below). With respect to partner identity we assume that there is a well-defined "marriage-market" equilibrium which features some degree of equilibrium sorting. Specifically, female and male characteristics are not independent: $(\mathbf{x}, \mathbf{z})$ have some joint distribution which we take as exogenously given.

We also allow for the possibility that a woman's labour supply, and hence earnings, depends on her partnership status. To formalize this, let each female $i \in I$ be associated with two *potential labour supplies* $\mathbf{h}_i = \left(h_i^0, h_i^1\right)$ where h_i^0 is the labour supply as single and h_i^1 is the labour supply when partnered. Similarly, let $\mathbf{y}_i = \left(y_i^0, y_i^1\right)$ be the vector containing female i's earnings in the single and partnered state respectively.

Benefit entitlement depends on partnership status, labour supply, earnings, individual characteristics (e.g. number and ages of children), and the partner's characteristics. Consider female i. Let $B_i^c = B^c\left(h_i^1, y_i^1, \mathbf{x}_i, \mathbf{z}_i\right)$ be the total benefits (IS + WFTC) that female $i \in I$ and her partner are entitled to as a couple; let $B_i^f = B^f\left(h_i^0, y_i^0, \mathbf{x}_i\right)$ be the total benefits that the female is entitled to as single and let $B^m\left(\mathbf{z}_i\right)$ be the benefits that her partner is entitled to as single. Given that all men work at least 16 hours per week and that all children reside with the women the men will not be entitled to any benefits as single, $B_i^m = B^m\left(z_i\right) = 0$ for all $i \in I$. We further assume that a female, when with her partner, enjoys the full value of the total benefits obtained by the couple B_i^c. The net welfare benefit partnership bonus for female i can then be defined as

$$B_i \equiv B^c\left(h_i^1, y_i^1, \mathbf{x}_i, \mathbf{z}_i\right) - B^f\left(h_i^0, y_i^0, \mathbf{x}_i\right) - B^m\left(\mathbf{z}_i\right). \tag{2}$$

Define the utility to female i of being in state $s_i = 0, 1$ as

$$u_i^s = \begin{cases} \alpha B_i^f + \boldsymbol{\beta}^0 \mathbf{x}_i & \text{if } s_i = 0 \\ \alpha B_i^c + \boldsymbol{\beta}^1 \mathbf{x}_i & \text{if } s_i = 1 \end{cases}. \tag{3}$$

Female i will choose the partnered state if and only if $u_i^1 \geq u_i^0$. Taking the difference and adding an error term the utility difference can be written as

$$u_i^1 - u_i^0 = \alpha B_i + \boldsymbol{\beta}\mathbf{x}_i + \varepsilon_i, \tag{4}$$

where $\boldsymbol{\beta} \equiv \boldsymbol{\beta}^1 - \boldsymbol{\beta}^0$. Assuming that the error term ε_i is normally distributed the model can then be estimated as simple probit model (see Eissa and Hoynes, 2003).

Imputing Partners and Labour Supplies

In order to characterize the welfare benefit partnership bonus B_i for female i we need to know, in addition to the woman's own characteristics $\mathbf{x}_i$, her (potential) partner's characteristics $\mathbf{z}_i$ and her potential labour supplies and earnings, $\mathbf{h}_i$ and $\mathbf{y}_i$. Two complications then immediately arise: (i) we only observe $\mathbf{z}_i$ for those women who actually have partners, and similarly, (ii) for each woman we only only one of her two potential labour supplies, not both (and the same goes for earnings). Hence we need to impute these unobserved values, i.e. we need to predict partners for the single women and we need to predict, for all women, labour supplies and earnings in the counterfactual state.

The justification for assuming that each female is associated with two potential labour supplies, one of which needs to imputed, is two-fold: (i) to avoid bias, and, relatedly, (ii) to ensure that identification of the model comes from variation across groups and time, not from within groups of similar women at a given point in time.

The obvious alternative would be to assume that the labour supply of each individual is fixed across partnership states. Consider then a certain group of women – low-educted mothers with one child, say – in any given year. We know that, within this group, the single mothers work considerably less frequently than their partnered comparables. Under the assumption of fixed labour supplies, the single mothers would then, on average, be facing higher IS partnership penalties (since they would, as single, be entitled to IS more frequently). Hence if we were to use the assumption of fixed labour supplies, we would find an "IS effect" – IS partnership penalties would be found to discourage partnership formation *within the group of low-educated mothers of one child in the specific year*.[12] However, such an estimate would be strongly driven by the assumption of fixed labour supplies. A plausible stance is to suppose that single and partnered women with the same characteristics are "intrisically identical": had the currently single women had partners, they would have worked as frequently as their partnered counterparts. Conversely, had the currently partnered women been single they would have had the same work patterns as their single comparables. Similarly, had the currently single women had partners, their partners would have been no different from the partners of their partnered counterparts. In that case we should find no benefits effects within groups of women that share the same characteristics

[12] On the other hand we'd most likely find, within the same group, a negative effect of FC/WFTC partnership bonuses on the probability of having a partner since the single women would, under the assumption of fixed, labour supplies, have on average higher FC/WFTC partnership bonuses.

(and year). We formalize this approach by assuming that partnership status is purely random within groups of women that share the same characteristics observed at the same time.

In order to impute labour supplies and partners we adopt a simple "matching approach". The approach we consider impute the missing data by finding other individuals in the data set whose covariates are similar but who are observed in the opposite state. This section outlines the approach used.

Predicting Partners

The male characteristic z_i that we need to predict is earnings. In order to predict partner's earnings we adopt a matching approach: for woman $i \in I$, we impute z_i by averaging the incomes of the partners of women "similar" to i. The assumption on which the approach rests is that the partnership status be "purely random" for similar individuals. Specifically, we assume:

ASSUMPTION 1 . *Conditional on* $\mathbf{x}$*, partnership status* s *is independent of* z*.*

The assumption implies that the distribution of earnings among the would-be partners of single women with characteristis $\mathbf{x}$ is the same as the distribution of earnings among the actual partners of partnered women with characteristics $\mathbf{x}$. Hence for woman $i \in I$ let $\mathcal{I}(i)$ be the (partnered) women who are similar to i and let z_j be the observed earnings of the partner of female j. The earnings of female i's predicted partner is then

$$\widehat{z}_i = \frac{\sum_{j \in \mathcal{I}(i)} z_j}{\#\mathcal{I}(i)}. \tag{5}$$

It remains to specify which women are deemed to be similar to woman i. We use standard Mahalanobis metric matching with a maximum distance criterion; the distance between female i and j is defined as $d_{ij} \equiv \left[(\mathbf{x}_i - \mathbf{x}_j)' \mathbf{V} (\mathbf{x}_i - \mathbf{x}_j)\right]^{1/2}$ where $\mathbf{V}$ is the sample covariance matrix of the covariates. A number of covariates are, however, discrete. For these variables we insist on exact matching.[13] Moreover, we only match within years. Hence female j is deemed to be similar to female i if she is observed in the same year, has the same value of the discrete characteristics, and the distance d_{ij} is no greater than $d^{\max}$ (set equal to 2).

[13]The discrete covariates used in the matching are a parent dummy, a dummy for living in a metropolitan area, and the region of residence.

In the empirical analysis we use, in fact, predicted partners for *all* women.[14] One justification for this is that current earnings may reflect significant temporary shocks; the predicted earnings can then be thought of as a measure of the predicted partner's permanent income. The variables on which we match include age, age left full time education, number of dependent children, a parent dummy, living in a metropolitan area, and a set of regional dummies.[15] The median and average number of accepted matches was 87 and 110 respectively; for 10 percent of the single females there were less than 26 accepted matches while for 10 percent of the single females there were more than 226 matches. These numbers are broken down by partnership status in Table 2. Summary statistics for predicted earnings are presented in Table 1.

Predicting State-Specific Labour Supplies

For each woman we observe only one of her two potential labour supplies; if she is single then we observe h_i^0 while if she has a partner we observe h_i^1. For simplicity we assume that women respond to partnerships by adjusting labour supplies only on the *extensive margin* – i.e. we will focus exclusively on the participation decision. Moreover, due to the key significance of the 16 hours/week cut-off in both IS and FC/WFTC we define "participation" for our purposes as working at least 16 hours/week. This restriction in focus is motivated by two observations: (i) For some types of women **x,** the participation rate varies substantially with partnership status, but (ii) Conditional on any **x** and conditional on participating, the hours worked vary relatively little with partnership status.

Figure 6 illustrates the first statement by showing how the participation rates differ for single and partnered women within various subgroups of the population. It shows how the partnership-effect on participation is, for some subgroups, large, sometimes exceeding 50 percent. Moreover it varies intricately with educational attainment and parental status. Note also that, while some gaps have been permanently small, in the groups where substantial gaps exist, these gaps have also diminished over time. The gap in hours (conditional on participation) is, on the other hand, relatively small; we find no group for whom the hours gap exceeds 10 percent. Indeed, in

[14] By Assumption 1, there is, for each value of the female characteristics $\mathbf{x}$, a distribution of partner earnings z from which all observed earnings are drawn. We thus assign as predicted partner earnings for female i the expected value $E[z|\mathbf{x} = \mathbf{x}_i]$ which we estimate using matching.

[15] Region refers to "Government Office Region" and include North East, North West and Merseyside, Yorkshire and Humber, East Midlands, West Midlands, Eastern, London, South East, South West, Wales, Scotland and Northern Ireland.

several groups the hours gap is effectively zero.[16]

FIGURE 6 HERE

Hence, from now we take h_i^0 and h_i^1 to be dummy variables indicating the participation decision in the single and partnered state respectively. The participation decision in the actual state, denoted h_i^i, is observed while the participation decision in the counterfactual state, denoted h_i^{-i}, is not. Hence we need to predict h_i^{-i} for all $i \in I$.

The approach we use again rests on the assumption that partnership status be "purely random" for women that share the same characteristics. Specifically, we assume:

ASSUMPTION 2 . *Conditional on* $\mathbf{x}$*, partnership status* s *is independent of* $\left(h^0, h^1\right)$.

The algorithm we use for predicting h_i^{-i} makes use of both observed labour supplies and estimated participation probabilities. The details of the algorithm is outlined in an Appendix. In brief, we first estimate individual participation probabilities for the counterfactual state using matching: Recalling that $\mathcal{I}(i)$ is the set of matches for $i \in I$ we take $\sum_{j \in \mathcal{I}(i)} h_j^{-i} / \#\mathcal{I}(i)$ as estimate of $\Pr\left(h_i^{-i} = 1\right)$.

Second, we partition the population into subgroups, splitting by education, number of dependent children, and year and compute group-specific participation rates by partnership status. The aim is to generate predicted participation decisions such that currently single and currently partnered women with the same characteristics have the same participation rates (in either state). E.g. the algorithm ensures that the predicted participation rate of the *currently single* low-educated non-parents (in 1995) in the *partnered* state will be equal to that of their partnered counterparts.

Third, we assign the individually predicted participation decisions. By assuming that all women sharing the same characteristics respond in terms of labour supply in the same direction the predicted participation decisions we can identify a large group of women whose participation decisions are assumed not to vary with partnership status. Finally we determine a set of

[16]Defining the hours gap (conditional on participation) as the average hours worked by single participating women minus the average hours worked by partnered participating women, and pooling across years we have that the gap is 3.1hrs (8.8 percent) for low-educated non-parents, 1 hr (2.7 percent) for medium-educated non-parents, -0.2 hrs (0.5 percent) for high-educated non-parents, -2 hrs (6.6 percent) for low-educated parents, 0.8 hrs (2.6 percent) for low-educated parents, 2 hrs (5.8 percent) for low-educated parents.

women, using the estimated participation probabilities, for whom the participation decisions are predicted to vary with partnership status.

The distribution of actual- and predicted participation decisions is shown in Table 3. The table shows that 92 percent of all single women are predicted not to vary participation with partnership status. For some 7 percent of currently single women it is predicted that they would join the labour force had they had partners, while less than 1 percent would leave the labour force in response to having a partner. Similarly, 88 percent of all partnered women are predicted to make the same participation decision in both partnership states. Less than 3 percent of currently partnered women are predicted to join the labour force if the were to lose their partners while some 9 percent are predicted to stop working if they were to lose their partners.

In order to verify that our imputations are in line with the assumption that partnership status is purely random among women that share the same characteristics we split the population by education (low-, medium-, and high), number of children (0,1,2+), and year (a total of 72 subgroups). We then verify that, within each of the resulting 72 subgroups, the correlation between partnership status and the partnership benefit bonus (for IS, FC/WFTC and total benefits respectively) is effectively zero.[17]

Further Issues

- Discuss the treatment of children as exogenous.
- Discuss the use of states versus flows (cross-sectional data v. panel data).
- Other potential biases. Anticipation effects, dynamic optimization etc.

V Results

Main Results

We consider first the effect of the total (IS + FC/WFTC) partnership bonus on the probability of having a partner. Table 4 (Column 1) presents the results from regressing partnership status on the partnership bonus B_i (rescaled here as £100/week), a set of demographic variables, year dummies and regional dummies. In order to allow for unrestricted interactions between

[17] Only 11 our of 192 correlations are statistically significant at the 5 percent level.

education and number of children, we generate nine "type" dummies by interacting educational group (low-, medium-, and high) with number of children (0,1,2+).[18] Moreover, in order to allow partnership trends to vary across these demographic groups, we interact the nine type dummies with time to generate "type-specific" additional linear trends.

The results suggest that high-educated mothers of two+ children are the most likely to have partners: all included type-dummies are negative and all but one highly statistically significant. The effect of education on the probability of having a partner varies with parental status: among non-parents, there is no additional significant effect of education. On the other hand, for mothers with one we see that education is positively associated with having partners. The same holds for mothers of two+ children. There is also some evidence of type-specific additional trends.

Women living in metropolitan areas are less likely to have partners. The probability of having a partner increases in age (at a diminishing rate) over nearly the entire age range considered; moreover, the interaction between education and age is negligable.[19] In interpreting the coefficient on the number of children, it should be kept in mind that we already have dummies for having 0 or 1 child. Hence the coefficient is identified only from mothers of at least two children; among this group we then see that more children are actually negatively associated with having a partner. We also observe that mothers of young children are more likely to have partners than mothers with only older children. Blacks are, in the data, much less likely to have partners than whites while asians are slightly more likely to have partners.

The results also suggest that women are more likely to have partners when there is benefit bonus from doing so. The coefficient on the total benefit partnership bonus suggests that a total partnership bonus of £100/week increases the probability of having a partner by little over 7 percentage points.

Recalling from Figure 4 that the average net partnership bonus in the population has been a fairly constant weekly penalty of about £25/week, the result would suggest that the welfare benefits have been reducing the aggregate partnership rate by less than two percentage points. Below we also present calculations of the likely effect of the WFTC reform.

Next we consider whether IS and the tax credits generate the same responses. In other words,

[18] High educated mothers of 2+ children are left out as reference group.

[19] The coefficient on "age*age left ft education" is -.00008 which is just statistically significant. The maximum of the quadratic function with respect to age is reached at about the age of 47 for all education levels.

does it matter which benefit generates the partnership bonus/penalty? There are reasons to believe that it shouldn't. The two benefits share are least one important feature: they are both time unlimited.[20]

In Column 2 of Table 4 we present the results when we include IS and FC/WFTC separately. The result suggests that it doesn't matter whether a partnership bonus/penalty is generated by the IS system or by the tax credits – the coefficients are nearly identical. (As we will see, this only holds for this full specification.)

Table 5 reports on alternative specifications in order to examine the sensitivity of the basic result to the choice of control variables. In Specification 1 controls only for a parent dummy. Adding controls for education (Low, Medium, or High) in Specification 2 has little effect on the estimate. Specification 3 generalizes Specification 2 by splitting parents up according to whether they have one or two+ children and interacting with education to generate nine "types" (see Table 4). Specification 4 adds year dummies while Specification 5 add "types-specific" linear trends. The main difference comes with controlling for additional demographics, mainly age and the presence of young children. Age and the presence of young children increases the probability of having a partner; both variables are also correlated with labour supply and hence with benefit entitlement. Omitting them therefore leads to an omitted variable bias.

Benefit Responses in Subgroups of the Population

It is quite possible that the differ among subgroups of the population. E.g. we noted above that partnership rates vary across educational groups. Indeed, we saw that the ranking of the groups also varied over the lifecycle; e.g. low educated women were the most likely to have partners at low ages but the least likely to have partners in their late 30s/early 40s. Given that partnership patterns differ across educational groups we might suspect that the responses to benefit partnership bonuses and penalties might vary across educational groups. We might also suspect that the responsiveness might the partnership responses to benefits might be smaller among women with children than among women with out children. E.g. a woman may see a larger benefit to have a male around if she has children.

In order to explore this we re-run our main regression within subgroups of the population. The results are presented in Table 6. The table suggests that the responsiveness of partnership

[20] On the other hand, it should be pointed out that IS passports the recipient to a range of other benefits, including Housing Benefit and Council Tax Benefit.

status with respect to benefit partnership bonus decreases with education.[21] Parents and non-parents can only be compared on the IS effect since non-parents are simply not affected by FC/WFTC. Comparing only the IS responses we find that parents indeed respond in their partnership decision to non-parents.

Note that the confidence intervals for the IS effect and the FC/WFTC effect overlap for all groups except for high educated women. For this groups we find a smaller (and not statistically significant) FC/WFCT effect than for IS.

VI The WFTC Reform

In this section we consider in some more detail the potential effect of the 1999 WFTC reform on partnership rates. Famile credits are generally perceived to encourage both work and family formation. As such, it could be that the 1999 reform, which significantly increased the generosity of the policy enhanced the incentives for partnership formation. On the other hand, as seen in Section III the tax credits system does not only generate partnership bonuses, it can generate equally large partnership penalties. Given that, it is conceivable that the increased benefit generosity in fact contributed to eroding partnership incentives.

In order to explore the potential effects of the WFTC reform we want to get a handle on how exactly the reform affected the distribution of partnership penalties and bonuses. Figure 3 provides some insights into this by showing how the distributions of FC/WFTC partnership bonuses and penalties have changed over time within various subgroups of the population, stratified by education. However, the figure has three specific shortcomings for the current purposes. First, it contains only existing couples, not single women. Second, it assumes fixed labour supplies, in particular it doesn't allow women's labour supplies to vary with partnership status. Third, the figure confounds the effect of time-variation in policy with trends in the distribution of demographic characteristics.

Hence we want to reconsider how the distribution of FC/WFTC partnership bonuses and penalties has varied due to policy changes while (i) including the entire population, also the single women, (ii) allowing for partnership state-specific labour supplies, and (iii) holding the distribution of demographic characteristics fixed. To do this we take the population observed in one specific year and expose them to the policy of all years while computing benefit partner-

[21] This finding is in line with Eissa and Hoynes (2003) who find that the marriage responsiveness to transfers is lower among higher educated women.

ship bonuses and penalties using the predicted state-specific labour supplies and the predicted partners. Since our main interest is the 1999 reform it is appropriate to use the last cohort observed before the reform. Hence we take as our fixed population the 1998 cohort and expose it to the policy of each year, 1995 to 2002. The result is shown in Figure 7.

The figure shows some important differences from Figure 3. Most notably, while 3 indicated that FC/WFTC partnership penalties were more common than FC/WFTC partnership bonuses in all educational groups, Figure 7 suggests quite a different pattern. For low educated women, FC/WFTC partnership bonuses are now *more* common than penalties, not less; for medium educated women bonuses and penalties are equally common, while for high educated women partnership penalties are still more common than bonuses.

What accounts for this difference? The answer is the state-specific labour supplies. Consider e.g. low educated mothers (recall that non-parents will never be eligible for the tax credits). Figure 6 shows that their labour supplies is highly responsive to partnership status. In particular, they work much less frequently when are single mothers than when they have partners. When we then compute FC/WFTC partnership bonuses/penalties focusing on existing couples and assuming fixed labour supplies we will tend to overestimate the amount of tax credits they would obtain if they were single. Consequently we will tend to underestimate the fraction of women who would gain tax credit benefits by having a partner and overestimate the fraction of women who would lose tax credit benefit from having a working partner. In contrast, consider the high educated mothers. As Figure 6 shows these women tend to work equally frequently with and without partners. As a consequence accounting for endogenous labour supplies does not alter the fact that these women more frequently face FC/WFTC partnership penalties.

Figure 7 shows a number of interesting things.[22] First, the WFTC reform increased the fraction of couples facing FC/WFTC partnership bonuses among the groups of low- and medium educated women while it left the fraction of couples facing partnership penalties virtually unaffected; among high educated women the reform changed neither the fraction of couples facing FC/WFTC partnership bonuses nor the fraction of couples facing penalties. The reform increased both the average bonus and the average penalty in all educational groups. As such the reform made the partnership bonuses and penalties more pronounced. In terms of the overall

[22]Note that we assume that everyone is observed in each year in the same month that they were actually observed in the 1998 survey. Hence for 1999 some individuals face the new WFTC system while some individuals face the old FC system. Hence the full effect of the reform is visible from 2000 onwards.

average net partnership bonus, the reform increased the average net bonus among low educated women by little over £8/week and by about £5/week among medium educated women; the effect on the average net bonus for high educated women was negligable.

FIGURE 7 HERE

To obtain model responses to the WFTC reform we can combine the estimated impacts of the reform on the group-specific average FC/WFTC net partnership bonuses. Applying the point estimate for each group the model would then suggest that the WFTC reform may have increased the partnership rate among low-educated women by about 0.7 - 0.8 percentage points and by about 0.3 percentage points among medium educated women. This result is comparable to Eissa and Hoynes (2003). They explore the effect of the EITC on marriage using the same approach. They conclude that the EITC system increases marriage rates among the lowest income households by about 1 percentage point while the effect is smaller as one moves up the income distribution.

VII Conclusions

The welfare system is commonly thought to affect important dimensions of individuals behaviour, including when and how much to work, how much education to acquire, how much to save and maybe even if and when to form partnership and have children. However, little concrete evidence on the effect of benefit systems on family structure is available for the UK. In this paper we have considered specifically the incentives generated by the system of Income Support (IS) and the family tax credits (FC/WFTC) for partnership formation.

The method used involved estimate, for each woman, the likely IS and FC/WFTC partnership bonus or penalty that she may face. Once we these variables we were able to use them to estimate a model where women's partnership status depends on individual characteristics, year- and regional effect, and the benefit consequences of having a partner. Our results indicate that a £100/week partnership penalty reduces the probability of a woman having a partner by about 7 percentage points; moreover, the effect was the same if the benefit in question was IS for FC/WFTC. We also found that the responsiveness to benefits decreases with income and that parents are less responsive than non-parents.

Finally we considered, in light of the estimates, what effect the 1999 WFTC reform may have had. We found that, while the reform by increasing the generosity of benefits may have

increased both average partnership bonuses and penalties, the net effect on partnership rates is likely to have been a modest positive effect of less than 1 percentage point in all educational groups and zero among highly educated women.

Appendix

This appendix outlines the algorithm used to predicted individual participation decision for the counterfactual partnership state. Let h_i^0 and h_i^1 be woman i's participation decision (dummy) in the single and partnered state, respectively. The participation decision in the actual state, denoted h_i^i, is observed while the participation decision in the counterfactual state, denoted h_i^{-i}, is not. Hence the task is to predict h_i^{-i} for all women $i \in I$. In order to do this we proceed in several steps.

First we estimate, for each woman, a predicted probability that the woman participates in the counterfactual state, denoted $\widehat{\pi}_i$. $\widehat{\pi}_i$ is estimated using matching. Recall that $\mathcal{I}(i)$ is the set of matches for $i \in I$; then $\widehat{\pi}_i = \sum_{j\in} h_j^{-i}/\#\mathcal{I}(i)$ (where the superscrip $-i$ indicates that $j \in \mathcal{I}(i)$ is the opposite state to i).

Second we split the population into a number of discrete subgroups, $\mathbf{x} \in \mathbf{X}$. Here we use a relatively coarse partitioning, splitting the population by educational group (low-, medium, high), by number of children (0, 1, 2+), and by year. For each subgroup $\mathbf{x}_j$ (and year) we compute the participation rate by partnership status. The reason for using the relatively coarse partitioning is to avoid cells becoming too small: with three educational groups, three categories with respect to the number of children, and eight years (and two partnership states) we estimate 144 participation rates.

Third we generate predicted *individual* participation decisions, denoted $\widehat{h}_i^{-i}$, so as to ensure that the participation rates correspond in the sense that

$$E[\widehat{h}^j|\mathbf{x}, s=k] = E\left[h^j|\mathbf{x}, s=j\right], \tag{A1}$$

for $j,k=0,1$, $j \neq k$ and for all $\mathbf{x} \in \mathbf{X}$. Thus the predicted participation rate (in the partnered state) of low educated non-parents *without partners* observed in 1995 will be the same as the actual participation rate of low educated non-parents *with partners* observed in 1995 etc. In generating predictions at the *individual* level we make the following monotonicity assumption:

ASSUMPTION A.1 . *For all* $\mathbf{x} \in \mathbf{X}$ *and for* $j,k=0,1$*: If* $E\left[h^j|\mathbf{x}, s=j\right] \geq E\left[h^k|\mathbf{x}, s=k\right]$*, then* $h_i^j \geq h_i^k$ *for all* $i \in I$ *such that* $\mathbf{x}_i = \mathbf{x}$.

Thus e.g. low-educated single mothers (of 1 child) participate less than low-educated mothers (of 1 child) with partners. By Assumption A.1, any such single woman who is observed to work will then be assumed to continue to work should she gain a partner. Conversely, any such

partnered woman observed not to be working, will be assumed to continue not working in the absence of a partner. This monotonicity assumption allows us to pin down a predicted participation decision $\widehat{h}_i^{-i}$ for the vast majority of women: for the vast majority of women the participation decision is simply predicted not to vary with partnership status. Finally, in order to make (A1) hold for a given $\underline{\mathbf{x}}$ (and year) and j, k we randomly draw women (from the set of women whose participation is not determined by Assumption A.1), for whom we set $\widehat{h}_i^{-i} = 1 - h_i^i$. Specifically, women are drawn sequentially and without relay based on the estimated probabilities $\widehat{\pi}_i$ until (A1) holds. Hence e.g. we draw from the set of single low-educated mothers (of 1 child) observed not to be working in 1995 women for whom we set $\widehat{h}_i^{-i} = 1$. We continue drawing (using the estimated probabilities $\widehat{\pi}_i$) until (A1) holds for this specific group.

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Table 1: Descriptive Statistics

Variable	**Women with Partners**	**Women without Partners**
	(Std. Err.)	(Std. Err.)
Age	36.44 (7.78)	32.70 (8.61)
Age left FT education	17.43 (2.47)	17.41 (2.56)
Number dep. children	1.25 (1.14)	.85 (1.11)
No. children aged 0-4	.38 (.65)	.27 (.52)
No. children aged 5-10	.44 (.72)	.33 (.64)
No. children aged 11-15	.33 (.62)	.23 (.55)
No. children aged 16-18	.10 (.33)	.06 (.26)
Weekly earnings	55.27 (64.04)	60.99 (72.37)
Working (16hr+)	.69 (.46)	.69 (.46)
White	.93 (.25)	.92 (.28)
Black	.01 (.11)	.04 (.20)
Asian	.05 (.23)	.04 (.20)
Metro	.55 (.50)	.60 (.49)
Partner weekly earnings	158.76† (134.63)	
Predicted partner earnings	159.38 (24.54)	156.46 (26.75)

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... table 1 continued

Variable	**Women with Partners**	**Women without Partners**
	(Std. Err.)	(Std. Err.)
Observations	57,194	25,393

† Average for employed partners.

Table 2: Distribution of Matches

Moment	**Women with Partners**	**Women without Partners**
10th Percentile	21	50
Median	74	161
Mean	79	179
90th Percentile	147	332
Observations	57,194	25,393

Table 3: Distribution of actual and predicted labour supplies.

Single		
Case	Number	Frequency
$h_i^0 = 1$ and $\widehat{h}_i^1 = 1$	17,399	68.52
$h_i^0 = 0$ and $\widehat{h}_i^1 = 0$	5,994	23.60
$h_i^0 = 0$ and $\widehat{h}_i^1 = 1$	1,843	7.26
$h_i^0 = 1$ and $\widehat{h}_i^1 = 0$	157	0.62

Partnered		
Case	Number	Frequency
$h_i^1 = 1$ and $\widehat{h}_i^0 = 1$	34,153	59.71
$h_i^1 = 0$ and $\widehat{h}_i^0 = 0$	16,376	28.63
$h_i^1 = 0$ and $\widehat{h}_i^0 = 1$	1,514	2.65
$h_i^1 = 1$ and $\widehat{h}_i^0 = 0$	5,151	9.01

Table 4: Estimates of Linear Probability Model of Partnership Status

Variable	**Coefficient** (Std. Err.)	**Coefficient** (Std. Err.)
Partnership Bonus: Total Benefits	0.073 (0.006)**	
Partnership Bonus: Income Support		0.073 (0.009)**
Partnership Bonus: FC/WFTC		0.073 (0.006)**
Low-education, zero child	-0.296 (0.020)**	-0.296 (0.020)**
Medium-education, zero child	-0.320 (0.020)**	-0.320 (0.020)**
High-education, zero child	-0.326 (0.020)**	-0.326 (0.020)**
Low-education, one child	-0.203 (0.019)**	-0.203 (0.019)**
Medium-education, one child	-0.131 (0.020)**	-0.131 (0.020)**
High-education, one child	-0.095 (0.024)**	-0.095 (0.024)**
Low-education, two+ child	-0.103 (0.017)**	-0.103 (0.018)**
Medium-education, two+ child	-0.014 (0.018)	-0.014 (0.018)
Trend: Low-ed, zero child	-0.002 (0.001)	-0.002 (0.001)
Trend: Medium-ed, zero child	0.000 (0.002)	0.000 (0.002)
Trend: High-ed, zero child	0.001 (0.002)	0.001 (0.002)
Trend: Low-ed, one child	-0.009	-0.009

Continued on next page...

... table 4 continued

Variable	**Coefficient** (Std. Err.)	**Coefficient** (Std. Err.)
	(0.002)**	(0.002)**
Trend: Medium-ed, one child	-0.007 (0.002)**	-0.007 (0.002)**
Trend: High-ed, one child	0.001 (0.004)	0.001 (0.004)
Trend: Low-ed, two+ child	-0.008 (0.002)**	-0.008 (0.002)**
Trend: Medium-ed, two+ child	-0.005 (0.002)**	-0.005 (0.002)**
Trend: High-ed, two+ child	0.002 (0.003)	0.002 (0.003)
Living in metropolitan area	-0.024 (0.004)**	-0.024 (0.004)**
Age	0.054 (0.001)**	0.054 (0.001)**
Age squared	-0.001 (0.000)**	-0.001 (0.000)**
Age * Age left FT educ.	-0.000 (0.000)**	-0.000 (0.000)**
Number of dep. children	-0.045 (0.004)**	-0.045 (0.004)**
Young child (0-4) present	0.134 (0.004)**	0.134 (0.004)**
Black	-0.287 (0.010)**	-0.287 (0.010)**
Asian	0.056 (0.007)**	0.056 (0.007)**
Observations	98,106	98,106

Significance levels: * : 5% ** : 1%

Remark: Explanatory variables not shown are year dummies and regional dummies.

Table 5: Estimates of effect of Partnership Benefit Bonus on the probability of having a partner: Alternative Specifications

Specification	**Net IS Bonus** (Std. Err.)	**Net FC/WFTC Bonus** (Std. Err.)
Specification 1: Parent dummy	0.057 (0.008)**	0.043 (0.006)**
Specification 2: Parent dummy, Ed grp (low, medium, high)	0.054 (0.008)**	0.041 (0.006)**
Specification 3: Ed grp*Kids cat.(0,1,2+)	0.039 (0.008)**	0.033 (0.006)**
Specification 4: As Spec 3 plus year dummies	0.045 (0.009)**	0.037 (0.006)**
Specification 5: As Spec 4 plus type-spec. trends	0.050 (0.009)**	0.040 (0.006)**
Specification 6: As Spec 5 plus more demographics	0.081 (0.009)**	0.076 (0.006)**
Specification 7: As Spec 6 plus region and metro	0.073 (0.009)**	0.073 (0.006)**

Significance levels: $*$: 5% $**$: 1%

Table 6: Estimates of effect of Partnership Benefit Bonus on the probability of having a partner in subgroups of the population.

Subgroup	**IS Bonus** (Std. Err.)	**FC/WFTC Bonus** (Std. Err.)	**Observations**
Low Educations	0.076 (0.011)**	0.099 (0.008)**	54424
Medium Education	0.077 (0.019)**	0.061 (0.013)**	26966
High Education	0.051 (0.023)*	0.024 (0.016)	16716
Parents	0.059 (0.013)**	0.066 (0.008)**	51159
Non-Parents	0.088 (0.012)**		46947

Significance levels: * : 5% ** : 1%

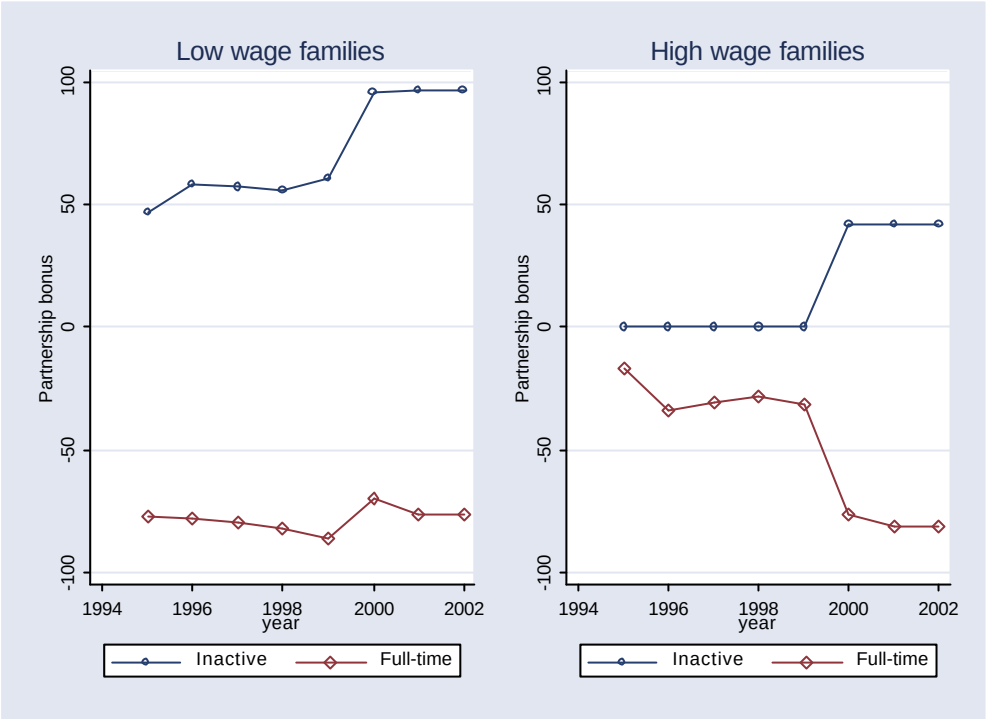

Figure 1: Net FC/WFTC partnership bonuses for four typical families (in 2000 prices). See text for details.

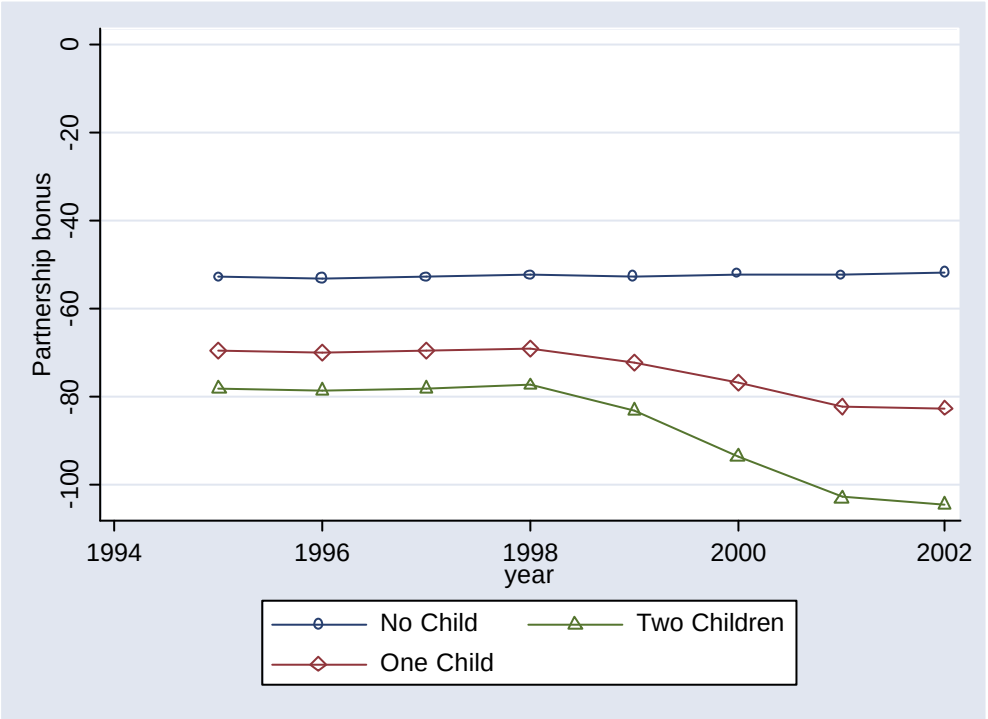

Figure 2: Net IS partnership bonus for a family with zero, one or two children (2000 prices). See text for details.

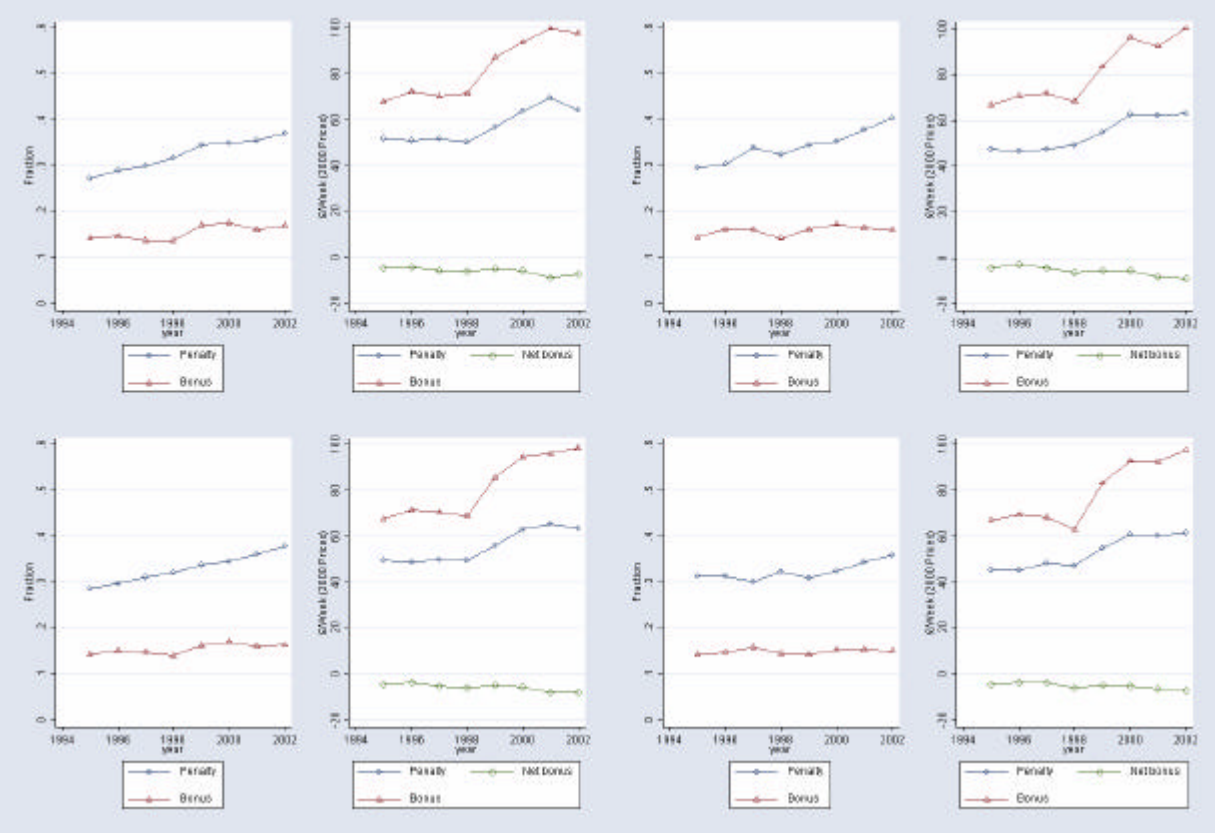

Figure 3: The distribution of FC/WFTC partnership bonuses and penalties among existing FRS couples (2000 prices).

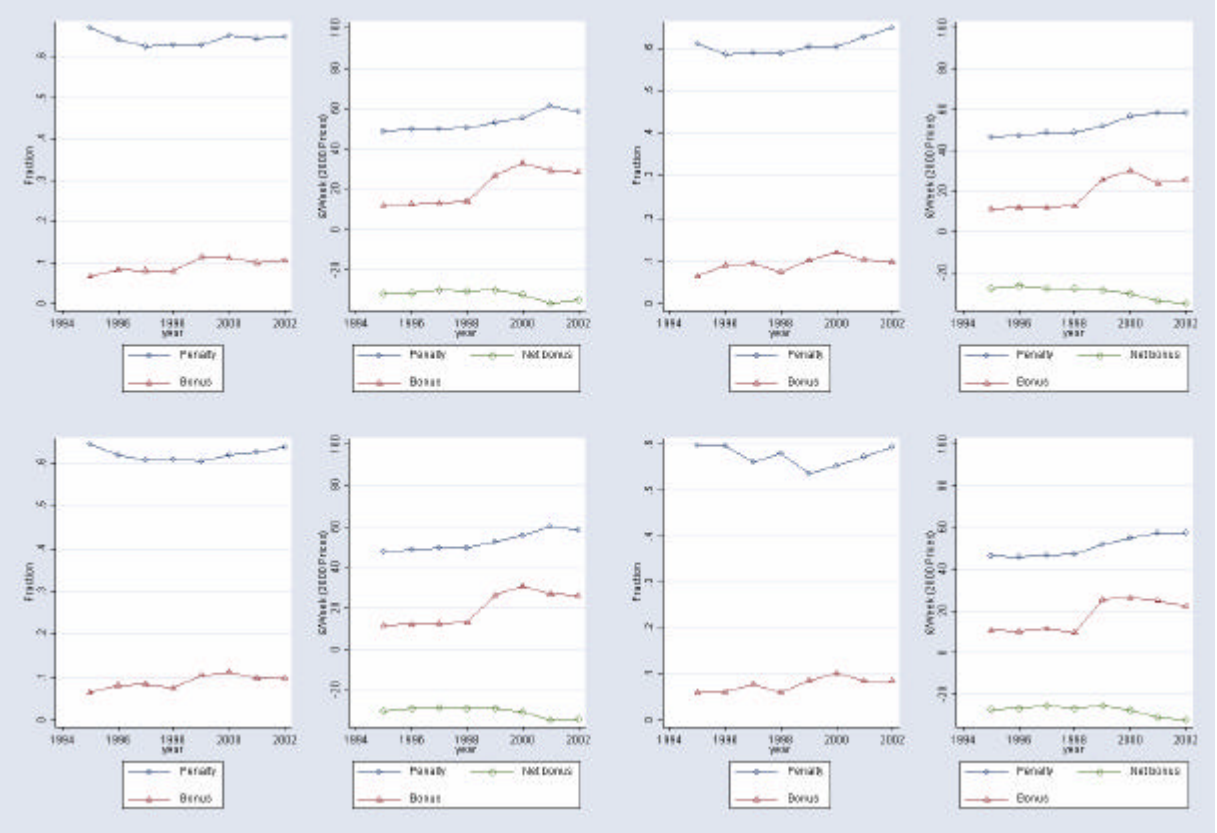

Figure 4: The distribution of total benefits (IS + FC/WFTC) partnership bonuses and penalties among existing FRS couples (2000 prices).

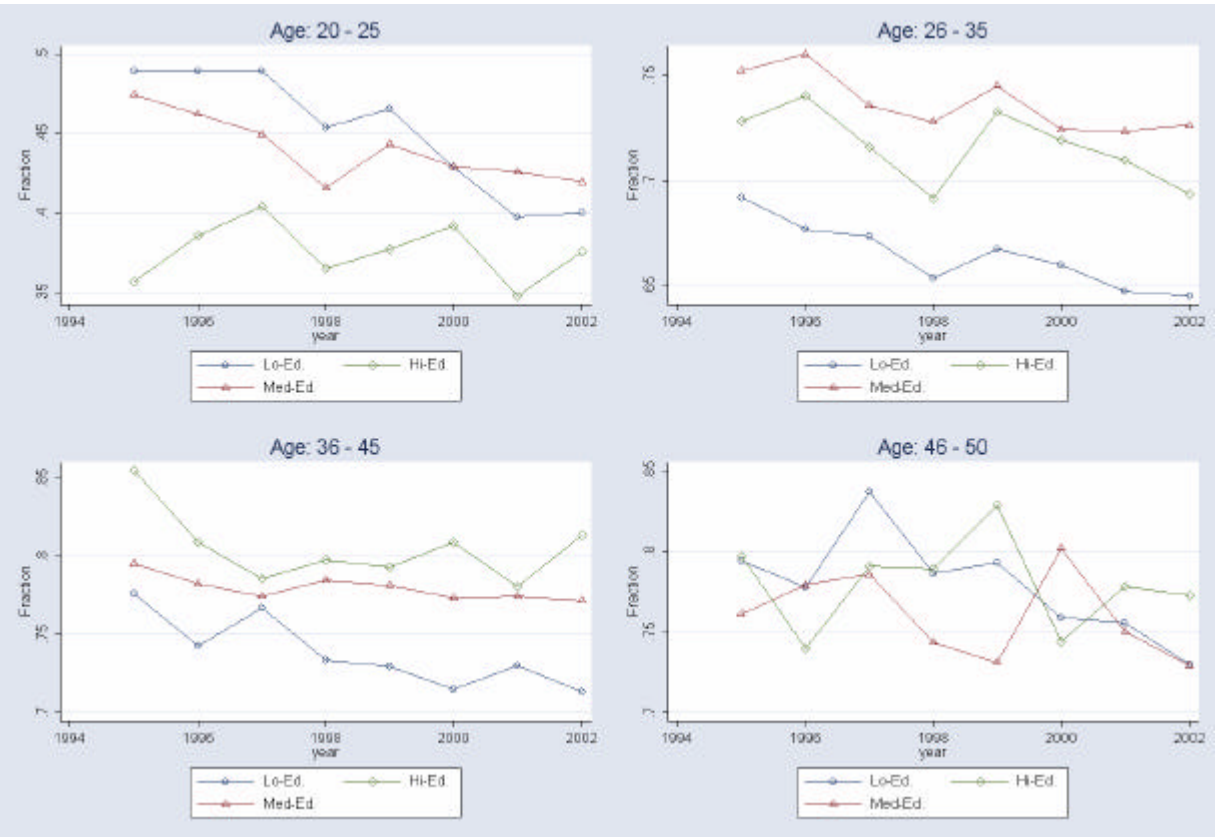

Figure 5: Partnership rates for women in the FRS 1995-2002 by age group.

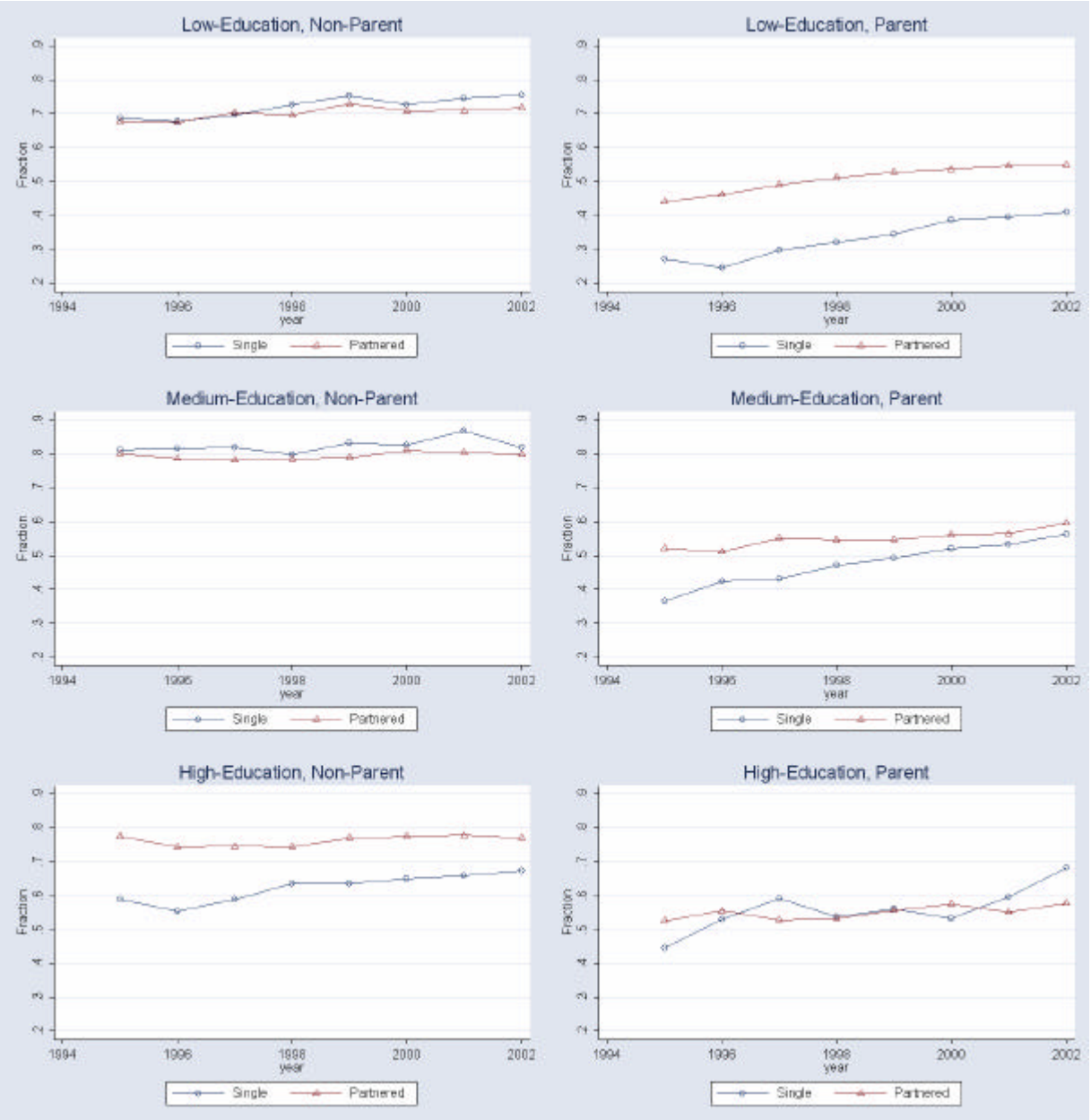

Figure 6: Participation rates (16hrs+/week) by partnership status among subgroups of women.

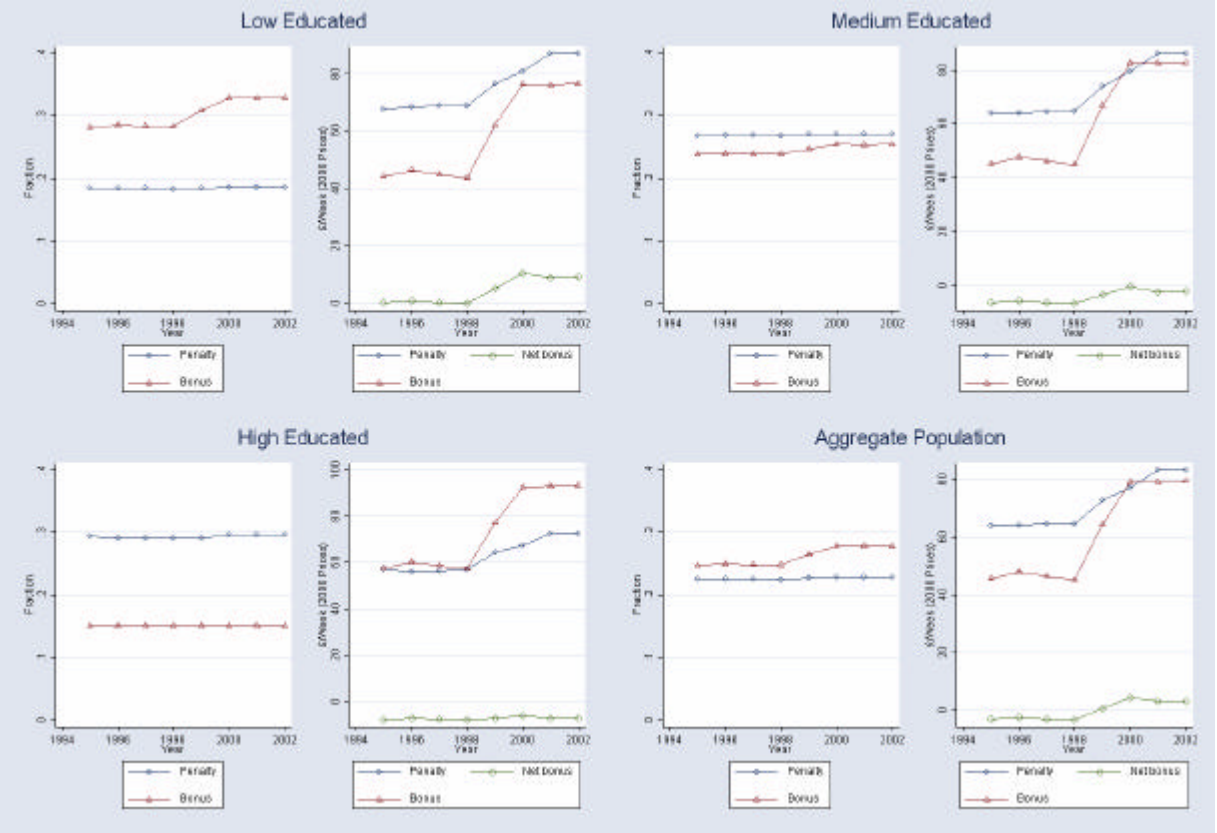

Figure 7: The distribution of FC/WFTC partnership bonuses and penalties for a fixed population with state-specific labour supplies and predicted partners.