The Role of Employee Stock Purchase Plans - Gift and Incentive? Evidence from a Multinational Corporation

Alex Bryson, UCL, NIESR, and IZA

Richard B. Freeman, Harvard, NBER and CEP

Acknowledgement: We thank ShareCo (a pseudonym) for their collaboration with this survey and participants at the 2014 Royal Economic Society in Manchester, the 2013 Beyster Fellows Conference at Rutgers, the 2012 American Economic Association Annual Conference in Chicago, the 2012 Society of Labor Economists Conference in Chicago, the 2012 POEK Conference in Paderborn, Germany, the LSE Labour Workshop and the 2011 Work and Pensions Economic Group (WPEG) Conference in Sheffield for comments. Alex Bryson acknowledges the financial support from the British Academy Research Development Award (grant number BR100020) and the Norwegian Research Council (grant number grant number 202647). Corresponding author: Alex Bryson, e-mail: a.bryson@ucl.ac.uk.

Abstract

Employee share purchase plans (ESPPs) give free or discounted shares of stock to workers who buy shares in the hope that the greater share ownership will retain workers, build loyalty and raise productivity, as in gift exchange models. Using measures of workers' organisational loyalty and sense of ownership in a multinational firm that puts ESPP at the heart of its compensation policy, we find that workers who join the ESPP have lower turnover intentions and do less on-the-job search than others, motivated in part by gift exchange reciprocity, and also respond to the group incentive of ownership with greater work effort, longer hours, and lower absence rates. Workers in workplaces with high perceived rates of ESPP participation are more likely to intervene against shirkers. The results appear robust to the selectivity of who joins the ESPP. The mix of gifting shares to workers who buy shares and the group incentive of ownership makes ESPPs a unique dual form of compensation.

Key words: share ownership; effort; incentives; gift exchange; job search; quits; sickness absence.

JEL-codes: J24; J33; J54; J63; M52

Many listed firms have employee share purchase plans (ESPPs) that offer free shares to workers who purchase and hold shares for a specified period. From the perspective of gift exchange models (Akerlof, 2002, 2004; Stiglitz, 2002) the matching share is a gift designed to elicit reciprocal effort from the employee. It pays off for the firm via greater effort and productivity. From the perspective of group incentive pay, workers who hold shares have a monetary incentive to work better irrespective of reciprocation. Both gift exchange and group incentive modes of pay are economically viable if the firm and workers overcome the free rider problem and raise firm productivity, as is found in most studies of group incentives.[1]

This paper examines the dual role of gift exchange reciprocity and group incentive pay responses to an ESPP using evidence from ShareCo (a pseudonym), a multinational firm that places its ESPP at the heart of its compensation system. We find that employees who purchase shares at subsidized prices work harder, for longer hours, and have lower quit intentions and absence rates than observationally equivalent workers who do not join the plan. Using responses to questions about the attitudes and sentiments through which a gift exchange presumptively works, we find that the loyalty and co-ownership associated with the gift exchange contribute to the lower turnover intentions and lower job search of workers who join the ESPP, and that ESPP members press co-workers to work hard in workplaces with high membership rat**es**. Taking account of the gift exchange, ESPP members also work harder and longer in response to the group incentives induced by shared ownership.

The paper analyzes the dual role of an ESPP as gift exchange and group incentive system and the features of ShareCo's ESPP that make it a representative case for analysis. We use questions about worker attitudes to the firm and work behaviour to differentiate the gift exchange and incentive effects of ShareCo's ESPP on work outcomes; and use a large array of measures of individual characteristics and dummy variables for workplace unit to match ESPP members with observationally equivalent non-members in our analysis. We conclude with a summary of findings and the questions they raise for further research.

The Dual Attributes of an ESPP

[INSERT TABLE 1]

Table 1 highlights what differentiates an ESPP from other forms of compensation. First, an ESPP is a *contingent* policy which workers must accept and invest some of their own money to be covered. The requirement that workers put up some of their own money presumably acts as a commitment device in the gift exchange (Bryan et al., 2010). That workers agree to this contract differentiates it from standard group incentive pay, which management chooses for the work force. In an ESPP, the worker who rejects the plan remains a fixed wage employee at the firm. In standard group incentive schemes, the worker who prefers a fixed wage must find another employer.

Giving workers the choice of participating in a group incentive scheme creates a dual labour market in a firm. Workers who join the ESPP tie part of their income to the

[1] The preponderance of literature finds that group incentives overcome free rider temptations to produce higher productivity, which justifies the dominance of these plans in compensation packages. See, for example, Blasi et al. (2010) and Weltmann et al. (2015) and the reviews therein.

stock market valuation of the firm, and accept the psychological reciprocity relation that governs gift exchanges. Workers who reject the gift are paid fixed wages with no extra financial incentive to work hard or to remain with the firm. The existence of two groups of workers paid differently in the same firm/workplace allows us to compare the attributes and behaviour of workers with different preferences for mode of pay in the same economic situation. Since the firm offers the same contract to all workers differences in worker behaviours between members and non-members solely reflect their acceptance or rejection of the ESPP gift.

To assess workers' response to an ESPP, we surveyed employees of ShareCo, a multinational business services corporation, in the UK and Ireland. The company's ESPP is the only incentive scheme open to all employees.[2] It matches employees purchase of shares up to £125 per month on a one-for-one basis – thus effectively giving one free share for every share the worker buys up to the limit.

Under UK government rules ShareCo's ESPP is a Shareholder Incentive Plan (SIP) that qualifies for tax exemptions[3] so that workers benefit from tax breaks as well as matching shares.[4] The tax advantages go to employees who purchase shares from a minimum of £10 each month up to £125 or 10 per cent of their monthly pre-tax earnings, whichever is the lower amount.[5] The money spent on shares is exempt from income tax and national insurance contributions as long as the employee retains the shares for at least five years and obtains a smaller exemption for shares retained for three years before selling them.[6] Employees can invest dividends in dividend shares.[7]

The ShareCo ESPP offers the chance for substantial gains as long as the share price does not fall massively. The matched share effectively doubles the worker's investment, so that excluding dividend and the tax advantages, it would take a fall of over 50% in the share price over the five-year period for a worker to come out in the red. In the past five years, while fluctuating, ShareCo prices never declined at this rate. In the five-year period since December 2012, the price has almost doubled.

Even with the free share buffer to market fluctuations, however, only half of ShareCo workers joined the ESPP in our data. Some workers presumably have economically rational reasons to reject the plan, say because they intend to leave the firm shortly or are cash-strapped. But others are likely to reject the gift for reasons aligned with behavioural economics findings about hyperbolic discount rates, procrastination, and the influence of peers on decision-making.[8]

---

[2]ShareCo has a commission payments scheme for 18% of staff and an executive share plan for top executives.

[3] Matching shares must remain in the plan for at least three years. What happens to the shares when an employee leaves depends on the reason for leaving. For example, if the employee leaves due to redundancy or retirement shares are transferred to the individual without tax or national insurance liability.

[4] Firms following these tax guidelines have discretion as to the nature and generosity of the plan, including offering free shares. ShareCo's matching scheme is typical of SIP plans in the UK. We thank Michael Landon for discussion of this point.

[5] Following the passage of legislation these maximum thresholds were raised in 2014.

[6] Employees who sell their shares in the first two years after purchase pay income tax and national insurance on the full value of the shares at the time they are sold. Shares sold in years 3 or 4 are taxed on the value of the shares when the employee bought them or at the current market value, whichever is lower.

[7]ShareCo's shareholding employees have the right to vote at shareholder meetings.

[8]For similar findings in another firm see Degeorge et al. (2004). Other studies find that many workers turn down the gift of subsidized shares (Engelhardt and Madrian, 2004; Babenko and Sen, 2015).

Hypotheses and Structure of Analysis

The logic of gift exchange and group incentives in an ESPP suggests that workers who buy shares under the ESPP will behave differently from observationally equivalent workers in the same workplace who do not join. To the extent that gift exchange reciprocity and ownership-associated incentives overcome the temptation to free ride, workers who choose the plan should produce more than non-members (hypothesis 1). ESPPs that succeed do so because workers raise output enough to justify the extra compensation from the gift exchange and group incentive plan.

Given that gift exchange increases organisational loyalty, and that loyalty is associated with improved performance (Mowday, Porter and Steers, 1982; Brown et al., 2011), the gift exchange should operate in part through a pathway that includes organisational loyalty. Similarly, since workers who join the plan become owners, the gift exchange should also produce greater worker effort via ownership.[9] These considerations underlie our effort to differentiate the psychology component from the group incentive component of the ESPP.

Under gift exchange, workers acquire what Akerlof (1982: 543-544) called a "sentiment for the firm" that leads them to respond to the firm gifting them greater compensation than necessary by reciprocating with a gift of "work in excess of the minimum work standard" (op. cit.). This sentiment does not feature in standard models of economic incentives. The ownership component to the ESPP gift is likely to strengthen the reciprocation response but ownership is also likely to increase the person's identifying with the organization (Beggan, 1992).[10] Both the gift exchange and pure ownership channels begin with the firm gifting matched shares to employees through the ESPP.

To differentiate between the ownership and gift exchange channels of the ESPP we examine the conditional association between plan membership and measures of worker effort without measures of loyalty and ownership and then add loyalty and ownership variables. We attribute any reduction in the estimated effect of ESPP membership on outcomes as due to the ESPP effect on effort attributable to the firm's ownership gift.[11] We supplement this by examining responses to direct questions about workers' motivations.[12]

---

[9]Stiglitz (2002) defined the goal of share capitalism as "to increase each worker's involvement in and identification with the firm so that there will be some unification of agent and principal and a resulting tendency for higher effort....".

[10]Lange et al. (2015) suggest such mechanisms explain the link between CEO ownership stakes and their organizational identity.

[11] If ESPP membership operates solely through a group incentive the introduction of proxies for organizational loyalty and perceptions of co-ownership should not affect the ESPP membership coefficient. If financial incentives militate against organisational commitment and loyalty, as in the crowding out hypothesis (Frey and Jegen, 2001), the membership coefficient may even rise with the introduction of organisational loyalty.

[12]As noted earlier, another way in which ESPP membership might generate additional worker effort is by effectively guaranteeing higher wages (via the pay-off to share ownership). Laboratory experiments identify a causal relationship between efficiency wages and effort (Fehr et al., 2008) consistent with the "fair wage-effort" hypothesis (Fehr et al., 1993: 437). But Gneezy and List (2006)'s field experiment found the positive impact of the "gift" of higher wages on effort does not persist over time; and Hennig-Schmidt et al.'s field experiment (2010) finds no change in work effort associated with changes in one's own wage.

We analyze five outcome variables which studies of group-based incentive schemes have examined in other data sets: intentions to leave the firm, job search,[13] hours worked, self-perceived effort, and absence from work.[14] We use the same model to analyze these outcomes, which imposes a strong structure on the data and provides a robustness check on the effects of the ESPP. Results are more believable if they occur among all or most of the outcomes in the same model than if they occur for only some or if they occur with different models for each variable. We also examine whether workers monitor co-workers' efforts and act to minimize the free-rider effects that can undermine group-based incentive schemes. Because co-monitoring and acting to improve co-workers performance requires that workers can see what co-workers are doing we add the ease with which workers can monitor their work to the baseline model for those outcomes.

Survey Data and Analysis

To measure the behavior of workers who did or did not join the ShareCo ESPP we developed a web-based questionnaire for the firm's UK and Irish employees. With cooperation from ShareCo management we invited the company's 1,740 employees in the UK and Ireland to visit a password-protected survey website and fill out the questionnaire in November-December 2010.[15] Seventy-two percent of employees visited the website, 96% of whom answered the survey so that we have data on 69% of the workforce.

In addition to asking about workers' membership in the share plan, the survey gathered data on employee demographics (age, gender, household circumstances, education) and attitudes toward risk and sociability; the job (occupation, hours worked, wages and whether they are hourly paid or salaried, and whether they received commission); the business unit and office in which the employee worked; and on attitudes towards the job and the company, including reasons for joining or rejecting the ESPP. Finally, we gathered information on how hard employees think they work relative to others, hours worked above contractual hours, absences, job search, quit intention and whether they intervened when they saw other workers not working as they should that give us a distinct picture of work behaviour.[16]

Our baseline equation relates measures of work outcomes to plan membership, conditional on personal characteristics and the characteristics of their job:

$$E_i = \beta_1 Plan_i + \beta'_x X_i + \varepsilon_i$$

By contrast, Fehr and Götte (2008) find that higher wages increase overall labour supply in total and hours worked, but not the effort per hour. We condition on wage levels in what follows to net out any association between base wages and effort.

[13] Plan membership may affect job search via gift exchange where it creates an attachment or commitment to the firm, as proposed by Akerlof (1982).

[14] As Blasi et al. (2010: 143) note, the outcomes are related. For instance, looking harder for another job is likely to reduce one's discretionary effort in the current job.

[15] The 72 questions divided into subsets relevant to persons with different share plan membership and purchase histories. Respondents answered the appropriate subsets so no one answered the full 72 questions. We guaranteed anonymity by asking for no unique identifying information.

[16] A copy of the web questionnaire is available from the authors on request. The full question wording on which the dependent variables are based is presented in footnote 4 to Table 2.

where E_i measures worker behaviour of individual i, and $Plan_i$ is the worker's plan status. The X_i is are a vector of individual-level demographic and job characteristics that enable us to compare observationally similar workers. These include measures of employees' risk preferences and sociability that are rarely gathered in worker surveys but may be important in explaining the propensity to join an ESPP and in worker effort.[17] To control for unobservable fixed elements of the working environment we add dummy variables for the employee's work unit.[18] To reflect the reciprocal psychology of the gift exchange effect we use measures of organizational loyalty[19] and perceptions of employee ownership in the firm.[20]

The β1 parameter measures the differences in behaviour between workers in ShareCo's ESPP and observationally equivalent workers outside the plan. The extent to which these differences reflect the causal impact of the ESPP on behaviour and selectivity is difficult to entangle since workers' decision to join the stock purchase plan arguably reflects their willingness to change their behaviour, that our inclusion of an extensive list of measures of attitudinal and workplace factors only partially deals with.

Accordingly, we use additional methods to try to pin down further the comparability of workers who do and do not join the plan. We compare workers through propensity score matching (PSM). PSM examines the effects of observables on membership in a different way and with a different functional form than regression models. Matching makes the member and non-member subsamples balanced on conditioning X's, as one would obtain if membership was randomly assigned. It leads us to drop members whose estimated propensity for membership is too far from non-members' for the non-members to be credible counterfactuals. As pointed out in Appendix A that gives the details of the probit model in our propensity matching, we found that nineteen ESPP members had such high propensity scores that we could not recover counterfactuals for them, and dropped them from the model.
Going further, we used the estimated impact of observables on the work outcomes to assess the robustness of the results to assumptions on the size of omitted variables bias per Altonji et al. (2005) and Oster (2017).

---

[17]The risk scale is based on the question "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" where 1="unwilling to take risks" and 10="fully prepared to take risks". The sociability scale counts the number of times employees ticked a box in response to the following question: "Do you take part in the following activities, either as part of your job or outside work? Please select as many as apply to you...Member of a trade/professional body or association; work in schools, colleges, universities; involved in charities or voluntary bodies; member of a social, sports or arts club; active member of a political party; active member of a religious group; socialising with co-workers outside of work".

[18]We use the intersection of ShareCo's 18 business unit and 16 office locations to measure "work groups" where employees may interact regularly, producing 46 work units with more than one respondent.

[19]The measure of organizational loyalty is an additive scale capturing employees' sense of loyalty and attachment to the firm. Employees code themselves along a five-point Likert scale running from "strongly agree" to "strongly disagree" in response to the statements "I feel very loyal to this organization", " I find that my values and the company's values are very similar" and "Overall this company is a good place to work". The scale is scored from 3 (low attachment) to 15 (high attachment) and a scale reliability coefficient of 0.84.

[20]Feelings of ownership are measured as responses to the question "How much do you feel like a co-owner of this company?", with responses running from 1 ("not at all") to 10 ("very much").

Finally, we draw on direct reports from employees regarding their perceptions of ESPP effects. If members of the ESPP say they work harder because they are in the plan and are motivated by loyalty to the firm or the incentives of ownership, the effects are more likely to be causal than if members said they work harder than others because they always work harder than others or to gain a promotion or give some other reason unrelated to the plan.

Results

Table 2 presents estimates of β1 for our six worker outcomes. Column 1 shows the raw difference in mean scores between ESPP members and non-members in the sample. Column 2 estimates the difference between members compared with matched non-members using kernel density matching with common support with estimates weighted using the kernel matching weights.[21] Column 3 gives the β1 coefficients from OLS estimates of the baseline equation for the sample with common support weighted with the kernel matching weights. Column 4 includes dummy variables for work units so that the β1 coefficients reflect differences between members and observationally equivalent non-members in the same work unit.

[INSERT TABLE 2]

In all but one area of work behaviour the estimates show that ESPP members perform better than those who do not join the share plan. The exception is in worker responses to observing a worker who is not doing a very good job, where there is no raw mean difference when matching plan members to non-members.

The work effort relative to others measure in line 1 is derived from answers to two survey questions about work effort: "How hard would you say you work?" scored on a 1 to 10 scale where 10 is "very hard" and 1 is the opposite; and "At your workplace, how hard would you say that people work?" with responses coded on the same scale. Average effort for plan members is 8.92 compared to 8.76 for non-members– a statistically significant difference at a 99% confidence level. By contrast, members and non-members rated the effort of other workers similarly: a mean score of the effort level of others of 7.67 for members and a mean score of 7.70 for non-members. Differences in working harder *relative* to others between members and non-members thus reflect differences in own work effort. The membership coefficient rises after matching (compare column 2 with column 1) and remains statistically significant in the OLS and work unit fixed effects models run with matching weights (columns 3 and 4 respectively).

The second dependent variable in Table 2 relates to hours worked relative to contractual hours worked. In the unmatched sample plan members averaged 2.7 hours per week more above their contractual hours than non-members. The differential falls to 0.7 hours after matching in column 2 and narrows further in the column 3 OLS estimate but then it rises in magnitude and statistical significance in the work unit fixed effects model. Since most ShareCo workers do not receive overtime pay[22], the long-hours for plan members cannot be attributed to an overtime premium.

---

[21]See Appendix A and footnote 3 of Table 2 for details of the matching procedure.

[22]Eighty-six percent of employees receive no paid overtime in any given month (personal communication from the company).

The third measure of workplace behaviour in the table come from the question "how many days have you been absent from work in the last six months (excluding vacation)?". Forty-three percent of plan members took some absence compared with 58 percent of non-members. The dependent variable in the regressions is a categorical variable for the number of days absent excluding vacation in the last six months. It is significantly less for ESPP members compared to non-members.

The measure of quit intention in the fourth line of Table 2 comes from a question about the worker expecting to leave the firm voluntarily within 12 months. Since firms introduce ESPPs in part to improve retention, the negative coefficients in this line are consistent with that goal. Two percent of plan members compared to 8 percent of non-members said they intended to leave. However, the negative relation could reflect reverse causality as some workers do not join the plan because they anticipate quitting in the near future. Our survey question about the reasons for workers not joining a plan provides a way to assess reverse causality. Of the 474 non-members in the matched estimation sample 54 stated that they did not join because they intended to leave. We dropped these cases and reran the equation. The negative correlation between membership and the probability of quitting remained but lost statistical significance, implying that part of the association in the table is due to reverse causation.[23] That we detected this using the question about reasons for joining or not joining the plan supports our using this question to interpret the regression results.

The dependent variable in the fifth line of the table comes from the question: "how likely is it that you will actively look for a job with another organization in the next 12 months?" with the likelihood recorded on a scale from 1 ("not at all likely") to 5 ("very likely"). The regressions show that plan members were significantly less likely than non-members to expect to seek work elsewhere in the coming 12 months, a result that holds up across all estimates (and when removing those who said they had not joined because they intended to leave).[24]

The last dependent variable in Table 2 captures worker responses to seeing another employee not working as they should. The question, taken from Freeman et al. (2010) is: "If you were to see a fellow employee not working as hard or as well as he or she should, how likely would you be to...discuss this with the employee; speak to your supervisor or manager; talk about it in a work group or team; do nothing", with possible responses from "not at all likely" through to "very likely". We summed the three responses to an index from 0 to 9, giving 0 to each response of "not very likely" so that someone who responded not very likely to all three would get a 0 and someone who responded very likely to all three was given a 9. Because workers are more likely to take action the easier it is to observe how co-workers are working and are less likely to intervene when they are closely supervised we include these variables in the regression.

In contrast to Freeman et al. (2010) who found that workers paid through group incentive systems were far more likely to monitor fellow workers and intervene when

---

[23]All other results in the table were robust to the exclusion of this group.

[24]Our results with the retention and working hard variables show stronger relations between an ESSP and worker behavior than Blasi et al. (2010: 150-151) found in their study of US ESSP. Their ESPP variable, ESPP stock value/pay, was negatively related to looking for a new job, but unrelated to working hard, absenteeism and making improvement suggestions. One likely reason for our stronger results is that ShareCo's ESPP like other UK ESPPs offers a one-to-one match whereas US ESPPs offer a much smaller gift of a 15 percent discount on the share price, creating much weaker incentives.

they find other workers performing poorly, our comparisons find *no association* between plan membership and greater co-worker monitoring. We interpret this as resulting from differences in the work environment in an ESPP - which divides the workforce between workers who have joined the plan and those who have not - from that in a workplace where all workers are covered by the same group incentive system. If the income of only some workers improve with firm performance, it is more difficult for members to intervene than in a firm where all workers are in the same situation. In an ESPP environment member co-monitoring should be greater at workplaces where most workers are members than in workplaces where most are non-members. Using the survey question that asked workers to estimate the proportion of members in *their* work unit who were plan members as an independent variable, the degree of co-monitoring should rise with the perceived proportion (hypothesis 3).

Table 3 tests this hypothesis by including the perceived membership rates in a co-monitoring equation that treats members and non-members separately.[25] The estimated coefficient on perceived membership rates is significantly positive for members but not for non-members. The implication is that members seek to minimize free-riding when they believe their colleagues are in the plan but realize that pressuring workers who are not members is unlikely to have much effect. Saying "work harder or better so I can make more while you get nothing from this" is unlikely to pay off. Non-members have no incentive to co-monitor regardless of the perceived percentage of members. That members who believe most of their work mates are in the plan behave as do workers in a group incentive system while members who believe that few of their work mates are in the plan behave as do workers outside the plan fits the group incentive logic part of the ESPP.

[INSERT TABLE 3]

Gift exchange motivation vs incentive pay motivation

We sought to distinguish the reciprocity and response to group incentives motivation that makes the ESPP a distinct mode of compensation by analysing two psychological attitude variables from the survey of ShareCo workers: organizational loyalty and a sense of co-ownership. If ESPP membership is, in part, a gift exchange, it will generate feelings of organizational loyalty and co-ownership which will serve as channels for its relation to worker effort.

[INSERT TABLE 4]

Table 4 shows that the dichotomous ESPP membership variable has a positive statistically significant impact on feelings of co-ownership and organizational loyalty in regressions that include many covariates, which is necessary for co-ownership and organizational loyalty to be an important mediator of the association between ESSP and worker behaviour in the Table 2 models.

---

[25]Employees are asked "what percentage of workers in your business unit do you think are members of the Employee Share Purchase Plan?" and asked to code one of seven options between zero percent and 100 per cent. These perceptions are highly correlated (0.47) with actual membership rates in business units based on responses to the survey membership status question.

[INSERT TABLE 5]

Table 5 reports the results of adding the organizational loyalty and feelings of co-ownership variables to the Table 2 work behaviour regressions.[26] If they are gift exchange channels for the estimated ESPP membership effect, the estimates on membership should decline in magnitude. Indeed, organizational loyalty reduces the probability of voluntary quits and job search[27] and lowers the impact of ESPP on those retention variables, though ESSP membership coefficients remain significant in the job search models and marginally so in the match-weighted OLS estimates of voluntary quits. Part though not all of the membership association with retention is mediated by the gift exchange channel of influence.

But the membership coefficients for working hard relative to others are unexpectedly larger in Table 5 than in Table 2. Exploring this result, we found that although organizational loyalty is positively and significantly associated with respondents rating themselves high on the hard work scale, it has a greater impact on the likelihood of thinking others are working hard, producing a *negative* association between organizational loyalty and the perception that one is working harder than one's colleagues, so that introducing the loyalty variable strengthens rather than weakens the membership effect on working hard relative to others. Neither organizational loyalty nor co-ownership were related to absenteeism or working longer hours.

In sum, the positive associations between ESPP membership and working harder than others, working longer than others, and absenteeism are accounted for by group incentive effects, whereas both gift exchange and incentives play a role in terms of worker retention; while the greater effect of organizational loyalty on the perception of others working hard than on oneself working hard produces the unexpected impact on working hard relative to others.

Unobservables and causal interpetation

[INSERT TABLE 6]

In Table 6 we use econometric methods from Altonji et al. (2005) and Oster (2017) to assess the likely robustness of the ESPP membership coefficient to omitted variables bias. The method extrapolates from the effect of observed data on the raw difference in worker behaviour between plan members and non-members (moving from the raw difference in column 1 to the difference conditional on observed data in column 2) to what the differential might be if one accounts for potential bias associated with unobserved variables. Columns 3 to 5 show the sensitivity of the membership coefficient to rescaling the explanatory power of the model assuming throughout, as Oster (2017) does, that observed and unobserved variables play an equal role in selection into

[26] Since we found no relation between ESPP membership and the co-worker monitoring variable, we exclude that from Table 5 and focus on the relations for the other five outcomes and ESPP.

[27] The organizational loyalty index is statistically significant in both the job search models (-.240, t=8.79 in the OLS and -.242, t=13.10 with fixed effects) and quits models (-.032, t=3.10 in the OLS and -.034, t=4.32 in fixed effects).

membership (δ=1). The estimated membership coefficients on hours worked (where the membership coefficient turns negative) and absence (where it turns positive) change markedly. But the analysis still shows a substantial negative link between ESPP membership and quits and job search while increasing the impact of ESPP membership on working harder (column 1 to 2). Membership has the same negligible effect on co-worker monitoring as in Table 2. In sum, this sensitivity check suggests that the estimated ESSP membership effects on working harder, quits and job search are robust while the association working longer hours and absence is not robust if unobservables impacted the equations much as do the observables.

What the workers say

A more intuitive way to assess causality is to ask employees about whether or not their joining the ESPP affected their behaviour. If members of the share plan said that it did not affect their behaviour, we would find it hard to argue that it did. If they say it has affected them, and the direction of effects is consistent with the observed differences in behaviour between workers who join the plan and those who do not, we would take this as supporting a causal relationship. There is no incentive for workers to "game" the survey, which is anonymous and presumptively incentive compatible.

As a first step in bringing what workers say into the analysis, we compared the frequency with which ESPP members and non-members checked ShareCo's share price. Thirty-eight percent of ESPP members said they checked the price daily compared to 13% of non-members who said they checked the plan daily. This difference is consistent with the notion that they believed their behaviours might affect the share price, as well as that the price affected their income.

Second, we contrast responses to employees reports on how the ESPP affected their quit behaviour and work motivation. Sixty-six percent of plan members said that the plan "reduces the chance that you will leave the firm" "to some extent" or "to a great extent" while by contrast, just 24% of non-members said so.[28] We probed the 42 percentage-point difference between plan members and non-members by regressing the dichotomous variable of whether or not workers who said the plan reduced their chances of leaving by a lot or to a great extent on plan membership in a multivariate regression alongside controls used in Table 2. The addition of the worker characteristics left a regression-adjusted differential of 32 percentage points, indicating that only a modest part of the difference was due to differences in characteristics between plan members and non-members.

Our survey also asked workers if the ShareCo share plan "increases your motivation". Sixty percent of members said "to some extent" or "to a great extent", compared to 21% of non-members - a 39 percentage-point difference, a difference that remains large and significant in regression analyses.

That workers believe that plan membership affects the types of work behaviour where our statistical analysis finds differences between plan members and non-members in work behaviour raises the likelihood that the statistical effects are causal.

---

[28] That 24% of non-members reported that the plan reduced the likelihood they would quit could be interpreted in different ways. It could be that they plan to join the plan in the future. Or it could be that they take the plan as an indicator that ShareCo is and will remain a good employer and are more willing to stay for that reason.

Conclusion

The ShareCo data shows that employees belonging to an Employee Share Purchase Plan (ESPP) work harder and longer, take less sickness absence and are less likely to express a desire to quit or to seek employment elsewhere than non-members. The differences hold up to different statistical models that control for worker attributes, dummy variables for work units, and to matching members with non-members based on their probabilities of joining the plan. Some, though not all, of the results are robust to assumptions about bias induced by omitted variables. Employee responses to questions about motivation and behaviour support a conclusion that the ESPP has some causal impact on behaviour. The results are quantitatively quite sizeable. The ESPP coefficients in Table 2 column 3 on working harder and sickness absence are around 0.13 of a standard deviation in those outcomes. The associations with the desire to quit and job search are larger (0.23 and 0.37 of a standard deviation respectively) while the coefficient for working more hours is equivalent to a 0.06 standard deviation.

Our analysis also provides insight into the relative importance of the group incentive impact compared to the gift exchange impact of an ESPP on behaviour. That ESPP members monitor co-workers' efforts when they perceive high membership rates among their co-workers is consistent with members bearing down on free-riding in a group incentive compensation system. Controls for organizational loyalty and perceptions of co-ownership accounted for some of the difference between members and non-members in their job search and quit propensities but were not associated with absence or longer hours working.

The most sensible interpretation of our results is that ESPP effects derive from both group incentives and gift exchange within the same workplace. The gift exchange part of the ESPP ideally equilibrates the level of gifts that balances the marginal costs and benefits to the worker and firm. The group incentive system part of the ESPP presumably does the same for workers who accept the ESPP gift. By allowing workers the choice of accepting the gift, the ESPP is presumptively socially more efficient than gift exchange or incentive systems that treat all workers the same.

References

Akerlof, G. A. (1982) "Labour Contracts as Partial Gift Exchange", *The Quarterly Journal of Economics*, 97, 4: 453-569

Akerlof, G. A. (1984) 'Gift Exchange and Efficiency-Wage Theory: Four Views', *American Economic Review* 74: 79 – 83

Altonji, J., Elder, T., and Taber, C. (2005) "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools", *Journal of Political Economy*, 113, 1: 151-184

Babenko, I. and Sen, R. (2015) "Do non-executive employees have information? Evidence from employee stock purchase plans", *Management Science*, 62(7), 1878–1898

Beggan, J. K. (1992) "On the social nature of non-social perception: the mere ownership effect", *Journal of Personality and Social Psychology*, 62, 2: 229-237

Blasi, J. R., Freeman, R. B., Mackin, C. and Kruse, D. (2010) 'Creating a Bigger Pie? The Effects of Employee Ownership, Profit Sharing and Stock Options on Workplace Performance', Chapter 4 in D. Kruse, R. Freeman and J. Blasi (eds.) Shared Capitalism at Work: Employee Ownership, Profit and Gain Sharing, and Broad-based Stock Options, pp. 139-166, University of Chicago Press

Brown, S., McHardy, J., McNabb, R. and Taylor, K. (2011) "Workplace Performance, Worker Commitment and Loyalty", *Journal of Economics and Management Strategy*, 20, 3: 925-955

Bryan, G., Karlan, D. and Nelson, S. (2010) "Commitment Devices", *Annual Review of Economics*, 2: 671-98

Bryson, A., Clark, A. E., Freeman, R.B., and Green, C. P. (2016) "Share Capitalism and Worker Wellbeing", *Labour Economics*, 42: 151-158

Bryson, A. and Freeman, R. B. (2010) 'To join or not to join? Factors influencing employee share plan membership in a multinational corporation', in T. Kato (ed.) *Advances in the Economic Analysis of Participatory & Labour-Managed Firms*, Volume 11, pp.1-22, Emerald Group Publishing Limited

Degeorge, F., Jenter, D., Moel, A. and Tufano, P. (2004) "Selling company shares to reluctant employees: France Telecom's experience", *Journal of Financial Economics*, 71, 169-202

Dittrich, M. (2015) "Gender differences in trust and reciprocity: evidence from a large-scale experiment with heterogeneous subjects", *Applied Economics*, 47, 36: 3825-3838

Engelhardt, Gary V.and Brigitte C. Madrian (2004) "Employee Stock Purchase Plans", *National Tax Journal*, 57(2): 385-406

Fehr, E., Gächter, S. and Kirchsteiger, G. (1997), "Reciprocity as a contract enforcement device: experimental evidence," *Econometrica*, 65: 833 – 860.

Fehr, E. and F. Götte (2008), "Do Workers Work More if Wages are High? Evidence From a Randomized Field Experiment", *American Economics Review*, 97, 298 – 317

Fehr, E., E. Kirchler, A. Weichbold, and S. Gächter (1998), "When Social Norms Overpower Competition. Gift Exchange in Experimental Markets," *Journal of Labor Economics*, 16,312–354.

Fehr, E., Kirchsteiger, G. and Riedl, A. (1993) "Does Fairness Prevent Market Clearing? An Experimental Investigation", *Quarterly Journal of Economics*, 108, 437–460

Freeman, R. B., Kruse, D. and Blasi, J. R. (2010) 'Worker Responses to Shirking Under Shared Capitalism', Chapter 2 in D. Kruse, R. Freeman and J. Blasi (eds.) "Shared Capitalism at Work: Employee Ownership, Profit and Gain Sharing, and Broad-based Stock Options", pp. 77-104, University of Chicago Press

Frey, B. S. and Jegen, R. (2001) "Motivation Crowding Theory: A Survey of Empirical Evidence", *Journal of Economic* Surveys, 15, 1: 589–611

Gneezy, U. and J. A. List (2006) 'Putting behavioural economics to work: testing for gift exchange in labour markets using field experiments', *Econometrica*, Vol. 74, 5: 1365-1384

Hennig-Schmidt, H., Rockenbach, B. and Sadrieh, A. (2010) "In Search of Workers' Real Effort Reciprocity - A Field and A Laboratory Experiment", *Journal of the European Economic Association*, 8 (4): 817-837

Lange, D., Boivie, S. and Westphal, J. D. (2015) "Predicting organizational identification at the CEO level", Strategic Management Journal, 36: 1224-1244

Lazear, E. (2000) 'Performance pay and productivity', *American Economic Review,* 90, 1346-1361

Leuven, E. and Sianesi, B. (2003) "PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing", http://ideas.repec.org/c/boc/bocode/s432001.html.

Mowday, R. T., Porter, L. W. and Steers, R. M. (1982) *Employee-Organization Linkages: The Psychology of Commitment, Absenteeism and Turnover*, Academic Press, New York

Niederle, M. and Vesterlund, L. (2007) "Do Women Shy Away from Competition? Do Men Compete Too Much?", *The Quarterly Journal of Economics*, 122, 3: 1067-1101

Oster, E. (2017) "Unobservables Selection and Coefficient Stability: Theory and Evidence", *Journal of Business and Economic Statistics*, DOI: 10.1080/07350015.2016.1227711

Stiglitz, J. E. (2002) "Democratic developments as the fruits of labor", Keynote Address, Industrial Relations Research Association, Boston

Weltmann, D. (2015) "Does employee ownership affect attitudes and behaviors? The role of selection, status and size of stake", *Advances in the Economic Analysis of Participatory and Labor-Managed Firms*, 16: 249-275

Table 1: Typology of Incentive Schemes

	Performance metric	**Reliant on individual performance?**	**Choice over joining**	**Own Money**	**Residual right to firm surplus**
Individual PRP eg. piece rate	Individual output/sales	Yes	No	No	No
Merit pay	Employer evaluation of worker	Yes	No	No	No
Team or group PRP	Group output/sales	Not directly	No	No	No
Profit-related pay	Firm profits	Not directly	No	No	Yes
Gain sharing	Firm performance (other than profits)	Not directly	No	No	Yes
Share options	Individual and/or firm performance	Sometimes	No	No	Yes
ESPP	Firm performance	No	Yes	Yes	Yes

Table 2: Estimated Coefficients and T-statistics for ESPP Members and Non-members for six outcomes

	Mean Raw diffferences	**Differences between ESPP members and non-members, kernel density matching**	**OLS, with detailed personal attributes, with match weights**	**OLS, with detailed personal attributes within workplaces, with match weights**
1) How hard workers work relative to how hard other employees work (-10,10)				
	.194 (1.97)**	.227 (2.28)**	.218 (1.91)*	.263 (1.87)*
2) Hours worked relative to contractual hours (0,45)				
	2.685 (8.06)***	0.670 (1.80)*	0.323 (1.07)	0.715 (2.00)**
3) Days absent, categorical (0,6)				
	-.698 (6.16)***	-.251(2.28)**	-.233 (2.54)***	-.282 (2.11)**
4) Voluntary quits (0,1)				
	-.062 (4.77)***	-.051 (2.35)**	-.048 (2.67)***	-.047 (2.48)**
5) Job search, categorical (1,5)				
	-.551 (8.30)***	-.441 (4.52)***	-.407 (7.11)***	-.428 (5.28)***
6) Intervening with another worker who is not doing good job, additive scale (0,9)				
	.263 (2.03)**	-.026 (0.15)	-.043 (0.37)	.006 (0.04)

Notes:
1) Sample sizes: 1,063 column 1; 1044, column 2-4, after removal of 19 members without common support among members. Stars show significance of differences with * for 90% confidence level; ** for 95% confidence level; *** for 99% confidence level.
2) Estimating techniques: Column 1: differences in raw means between members and non-members of the ESPP. Column 2: mean differences using kernel density matching. Bootstrapped estimates with 50 repetitions. Column 3: OLS weighted with pweights from the matching estimator. Standard errors clustered by office/business unit. Column 4: as column 3 but fixed effects estimator including 37 office/business unit categories.
3) Covariates in matching: age and age squared; male; white; degree; married or living as married; risk scale; occupation (7 dummies); supervisory status; hours worked (4 dummies); tenure and tenure squared; log annual wages. The monitoring estimates in row 6) also control for how easy it is to see how hard your co-workers are working and how closely supervised you are in your job, both of which are coded on a (1,10) scale.
4) Dependent variables are as follows: a) Working harder = workers' assessment of how hard they work relative to their perception of how hard co-workers work, as described in the text. It runs from (-10,10). b) Hours worked relative to standard, determined from hours question as "typical hours, including overtime, working at home and weekend work" minus "standard hours, excluding additional time worked" c) Days absent constructed as categorical variable which splits the continuous days measure into six categories: none, >0<=1, >1<=2, >2<=3, >3<=4, >4<=5, >5 based on question "how many days have you been absent from work in the last six months (excluding vacation)?" d) Quit dummy equals 1 where the respondent expects to work at ShareCo for less than a year and says they are "not very/not at all likely" to be laid off. e) Job search is the likelihood of looking for a job with another organization in next 12 months using an ordinal scale where 1="not at all likely" to 5="very likely". f) Co-worker monitoring derived from: "If you were to see a fellow employee not working as hard or as well as he or she should, how likely would you be to...discuss this with the employee; speak to your supervisor or manager; talk about it in a work group or team; do nothing?". Responses coded from "not at all likely" to "very likely". Co-monitoring scale sums responses to the first three questions with "not very likely" scoring 1, through to "very likely" scoring 3. We subtract 3 from the scale so that it runs from zero to nine.

Table 3: The Role of Perceived Plan Membership in One's Work Unit For Co-Worker Monitoring

	OLS	**Fixed Effects**
Members	.141 (2.79)***	.230 (2.79)***
Non-members	.025 (0.21)	.143 (1.22)

Notes:
(1) OLS and office/business unit fixed effects models for members and non-members separately. Model specifications identical to Table 1 except we replace individual Plan membership with employee perceptions of the percentage of employees in the business unit who are members of the Plan. The categorical responses to percent membership are entered as a linear term.
(2) Members with no common support are dropped from estimates (N=19). Estimation sample N=575 for members and 472 for non-members. The fixed effects models absorb 33 office/business units in the case of members and 24 in the case of non-members.
(3) See Table 2 for notation and model details.

Table 4: Association Between ESPP Membership, Perceptions of Co-ownership and Organizational Loyalty

	Co-ownership		**Loyalty**	
	OLS	**Fixed Effects**	**OLS**	**Fixed Effects**
ESPP Membership	1.155 (6.54)***	1.108 (7.24)***	0.492 (2.54)**	0.537 (3.09)***
Adjusted R-sq	0.25	0.27	0.09	0.13

Notes:

1) Sample sizes: n=1063

2). Stars show significance of differences with * for 90% confidence level; ** for 95% confidence level; *** for 99% confidence level.

3) Estimating techniques: Columns 1 and 3 are OLS. Columns 2 and 4 are workplace fixed effects models.

4) Controls: age and age squared; male; white; degree; married or living as married; risk scale; occupation (7 dummies); supervisory status; hours worked (4 dummies); tenure and tenure squared; log annual wages.

5) Dependent variables: Perceptions of co-ownership measured as responses to the question "How much do you feel like a co-owner of this company?", with responses running from 1 ("not at all") to 10 ("very much"). Loyalty is an additive scale. Employees code themselves along a five-point Likert scale running from "strongly agree" to "strongly disagree" in response to the statements "I feel very loyal to this organization", " I find that my values and the company's values are very similar" and "Overall this company is a good place to work". The scale is scored from 3 (low attachment) to 15 (high attachment) and has a scale reliability coefficient of 0.84.

Table 5: ESPP Member Coefficients and T-statistics Conditioning on Perceptions of Co-ownership and Organizational Loyalty

	With co-ownership and loyalty		**Without co-ownership and loyalty**	
	OLS	**OLS within workplaces**	**OLS**	**OLS within workplaces**
Hard work	.381 (2.68)**	.400 (2.86)***	.218 (1.91)*	.263 (1.87)*
Long hours	.256 (0.56)	.791 (2.18)**	0.323 (1.07)	0.715 (2.00)**
Days absent	-.236 (2.64)**	-.244 (1.74)*	-.233 (2.54)***	-.282 (2.11)**
Voluntary quits	-.031 (1.83)*	-.025 (1.68)	-.048 (2.67)***	-.047 (2.48)**
Job search	-.210 (2.55)**	-.231 (3.28)***	-.407 (7.11)***	-.428 (5.28)***

Notes:

1) Sample sizes: columns 1 and 2: 1,002 after removal of 61 members without common support; columns 3 and 4: 1,044 after after removal of 19 members without common support among members.

2). Stars show significance of differences with * for 90% confidence level; ** for 95% confidence level; *** for 99% confidence level.

3) Estimating techniques: Column 1: OLS weighted with pweights from the matching estimator. Standard errors clustered by office/business unit. Column 2: as column 1 but fixed effects estimator including 34 office/business unit categories. Columns 3 and 4: as columns 1 and 2 respectively but do not condition on co-ownership and loyalty.

4) Covariates in matching: as per Table 2 plus two additional variables. The first is perceptions of co-ownership measured as responses to the question "How much do you feel like a co-owner of this company?", with responses running from 1 ("not at all") to 10 ("very much"). The second is an additive scale capturing employees' sense of loyalty and attachment to the firm. Employees code themselves along a five-point Likert scale running from "strongly agree" to "strongly disagree" in response to the statements "I feel very loyal to this organization", " I find that my values and the company's values are very similar" and "Overall this company is a good place to work". The scale is scored from 3 (low attachment) to 15 (high attachment) and has a scale reliability coefficient of 0.84.

5) Dependent variables are those described in note 4 to Table 2.

Table 6: Sensitivity of Member Treatment Effect to Variations in Explanatory Power of the Model When Delta is Set to 1

Dep Var.	Uncontrolled Effect [R^2]	Controlled Effect[R^2]	R_{max}=e(R^2)	R_{max}=1.25*e(R^2)	R_{max}=1.5*e(R^2)
Harder	.187 [.003]	.218 [.064]	.218	.226	.234
More hours	2.457 [.051]	.323 [.459]	.321	-.237	-.782
Absence	-.679 [.003]	-.233 [.104]	-.233	-.098	.028
Quits	-.062 [.020]	-.048 [.068]	-.048	-.043	-.038
Job search	-.540 [.058]	-.407 [.183]	-.407	-.358	-.308
Monitoring	.255 [.004]	-.043 [.216]	-.043	-.119	-.197

Notes:
(1) The left-hand column contains short-hand labels for the dependent variables appearing in Table 2.
(2) Column 1 entitled "Uncontrolled effect" shows the raw difference between members and non-members in the whole sample prior to matching with the model r-squared in brackets. Column 2 entitled "Controlled effect" shows the membership differential having conditioned on the variables described in footnote 3 to Table 2, replicating the estimates in column 3 of Table 2. The remaining 3 columns show the sensitivity of the membership coefficient to rescaling of the explanatory power of the model assuming throughout that observed and unobserved variables play an equal role in selection into membership (δ=1).
(3) All estimates are based on models that are weighted using the propensity score weights. N=1044 except for monitoring where N=1047.

Appendix A -- Propensity Score Matching

The equation for determining the propensity of worker to joiin the ESPP is a logistic form where the dependent variable is the (0,1) dummy for membership and the independent variables, which are thought to affect both membership and worker effort, are: age, age squared; male; white; degree; married or living as married; risk scale; occupation (7 dummies); supervisory status; hours worked (4 dummies); tenure and tenure squared; log annual wages. Table A1 shows the coefficients and statistical properties of the model.

Table A1: Probit matching estimator for ESPP Membership

```
Probit regression                                 Number of obs   =       1063
                                                  LR chi2(20)     =     293.91
                                                  Prob > chi2     =     0.0000
Log likelihood = -583.18565                       Pseudo R2       =     0.2013

------------------------------------------------------------------------------
      member |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |  -.0494725   .0327722    -1.51   0.131    -.1137048    .0147599
       agesq |   .0008301   .0004134     2.01   0.045     .0000199    .0016403
        male |   .0602637   .0944774     0.64   0.524    -.1249085     .245436
       white |   .3163663   .1799207     1.76   0.079    -.0362719    .6690045
      degree |   .3007614   .1040676     2.89   0.004     .0967926    .5047302
     married|   .1475329   .0941969     1.57   0.117    -.0370895    .3321554
        risk |   .0192719   .0205093     0.94   0.347    -.0209257    .0594694
       djob1 |   .2283368   .3401387     0.67   0.502    -.4383227    .8949964
       djob2 |   .3193314   .2325658     1.37   0.170    -.1364893    .7751521
       djob3 |  -.2687497   .1817702    -1.48   0.139    -.6250128    .0875133
       djob5 |  -.0035179   .1484441    -0.02   0.981    -.2944629    .2874271
       djob6 |   .0518403   .1503384     0.34   0.730    -.2428176    .3464981
       djob7 |  -.1045033   .1565692    -0.67   0.504    -.4113733    .2023668
    supervis |  -.0372214   .0549729    -0.68   0.498    -.1449664    .0705235
    dhrscon1 |  -.0298652   .2405503    -0.12   0.901    -.5013351    .4416046
    dhrscon2 |   .0589078   .2020285     0.29   0.771    -.3370608    .4548764
    dhrscon3 |  -.0049955   .2137625    -0.02   0.981    -.4239623    .4139713
      tenure |   .0164067   .0015808    10.38   0.000     .0133084     .019505
       tensq |  -.0000368   5.44e-06    -6.77   0.000    -.0000475   -.0000262
     lannpay |   .4856989   .0992142     4.90   0.000     .2912426    .6801551
       _cons |  -5.411826   1.061948    -5.10   0.000    -7.493206   -3.330446
------------------------------------------------------------------------------
Note: variables are as follows: age; agesq=age squared; male; white; degree; married;
risk=risk scale; djob1=senior manager; djob2=middle manager; djob3=lower manager;
djob5=support; djob6=technical; djob7=sales; supervis=supervisory responsibilities;
dhrscon1=<35 hours;dhrscon2=35 hours; dhrscon3=>35, <40 hours; tenure=months working for
ShareCo; tensq=tenure squared; lannpay=log annual pay (£ sterling).
```

We use the estimated propensity scores to identify those treated cases for whom there is common support in the untreated (non-member) sample. To construct the comparison group we use a kernel density estimator with a normal distribution to obtain comparators for the ESPP members such that the weight attached to a particular comparator is proportional to the frequency of the distribution for the difference in scores observed.[29] Thus the size of the weight for comparators gets larger the more exact the match to the treated observation. The weights for the comparator group range between .075 and 6.73 with a mean of 1.10. As Figure A1 shows for most members there are a sufficient number of non-members with similar attributes to construct a comparison group. For 19

[29]Matching is undertaken using STATA's PSMATCH2 command (Leuven and Sianesi, 2003).

ESPP members, there were too few similar persons, so we dropped them from the sample.

The purpose of the matching is to balance characteristics across the treatment and matched comparison groups. In doing so we deploy bootstrapping with 50 replications to achieve reliable standard errors. Table A2 shows that the quality of the matching is very good, as indicated by the reduction in standardized percentage bias[30] for the covariate distributions for ESPP members and non-members pre- and post-matching.

Figure A1: Common Support on ESPP Membership

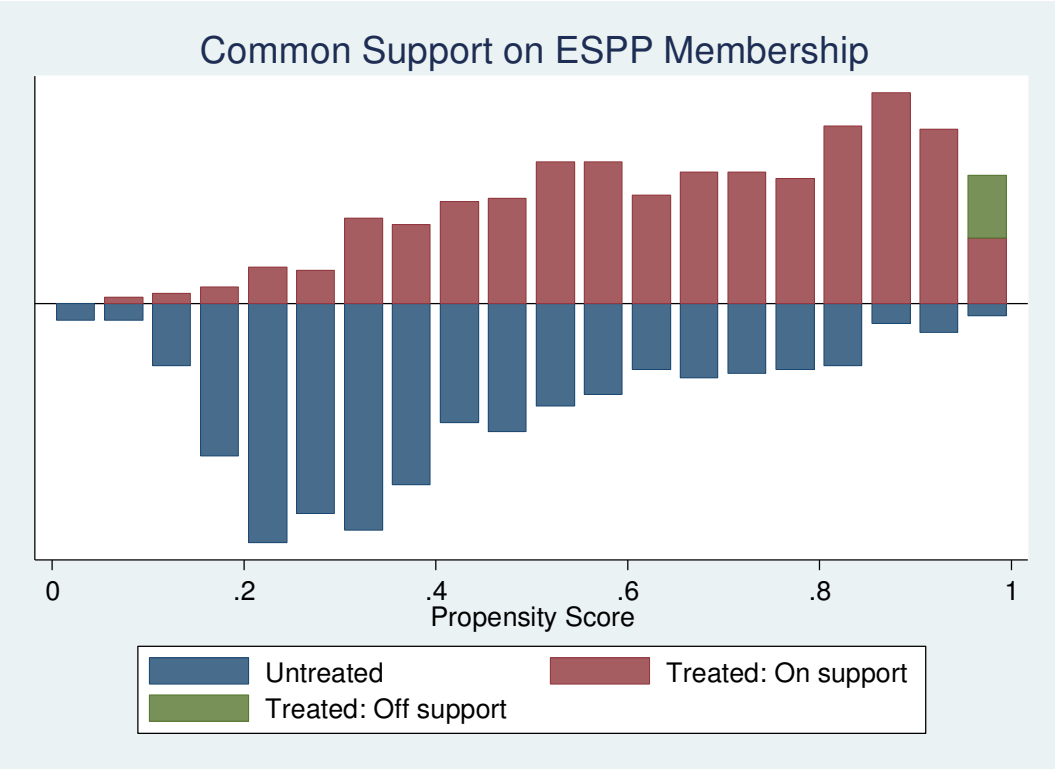

Table A2: Quality of the Match

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.201	293.91	0.000	24.1	21.2	114.5*	1.38	71
Matched	0.011	17.57	0.616	4.2	3.3	24.9	1.33	14

* if B>25%, R outside [0.5; 2]

[30]The standardized percentage bias is the percentage difference of the sample means in the treated and non-treated (full or matched) sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups.