



# Why walk away from an easy gain in wealth? Evidence from a UK stock option plan

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## ABSTRACT

The paper examines the extent and potential reasons for non-exercise of ‘in the money’ stock options, drawing on employee-level data from the UK Save-As-You-Earn stock option plan. 14 per cent of participants choose not to exercise, and failure to exercise in these circumstances can be costly in terms of foregone increases in wealth. Lesser experience of the option plan, perceived lack of financial knowledge, and greater reliance on friends for advice is associated with failure to exercise. These findings offer challenges to the use of sophisticated reward and benefit schemes by companies when potential participants lack financial capabilities, and add to the literature by showing that financial literacy can remain problematic even when employees have surmounted initial obstacles to joining plans.

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## 1. Introduction

Broad-based stock option and stock ownership plans are widespread in companies around the globe (Poutsma et al., 2012). Companies provide these plans to incentivise their workforces, align goals and interests, and encourage wealth accumulation (Blasi et al., 2018). Stock option plans are particularly appropriate instruments for all-employee plans due to their asymmetric risk profile. If options are ‘out of the money’ at maturity, option holders do not lose money as long as they do not exercise. When they are ‘in the money’, there is an immediate gain in wealth to be made by exercising and selling stock. In these latter circumstances, those not exercising forego a certain and immediate gain. But some option holders do precisely this: 14 per cent of holders of ‘in the money’ options in our study. On average, they miss out on an easy, certain, and immediate gain of over £2,000 (UK). This choice, which is an active one rather than a default, is particularly perplexing because participating employees have already surmounted barriers to plan participation such as risk aversion, liquidity constraints, and financial capability (Babenko and Sen, 2014; Englehardt and Madrian, 2004; Rapp and Aubert, 2011).

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Previous research on option exercises, dealing mainly with executive option plans, has focused primarily on timing (where there is typically a lengthy exercise ‘window’ after vesting). The primary finding has been that many option-holders exercise well before expiry due to insider information (Bartov and Mohanram, 2004) or risk aversion (Huddart and Lang, 1996); Hemmer et al. 1996). Recent stock price highs and lows act as reference points guiding the timing of the exercise decision (Heath et al., 1999; Huddart et al., 2009). To our knowledge, no studies have examined whether and why some option holders let ‘in the money’ options lapse or otherwise fail to exercise.

Starting from the standard economic model of the rational optimiser, the expectation is that participants in an option plan will always exercise in-the-money options (though timing may vary) since they can secure an immediate increase in liquid wealth at minimal cost (assuming liquidity of the underlying stock and that tax considerations are unimportant). Our explanation for the sub-optimal behavior observed in our study resides in shortcomings in financial literacy (defined by Lusardi and Mitchell as the “ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions” (2014: 6)). Drawing on employee survey data from the United Kingdom (UK) Save-As-You-Earn (SAYE) stock option plan, matched with market data and information on grants from a plan administrator, we find that those failing to take advantage of this easy gain are less financially knowledgeable, have less experience

of the option plan and option maturities, and make greater use of advice from friends outside the company (presumably with less direct knowledge of the stock and savings plan).

The primary contribution of the research is that it shows that sub-optimal financial decisions in company stock plans can be attributed to shortcomings in financial knowledge and capabilities, in a similar vein to the extensive findings in the pensions literature on this topic (Benartzi and Thaler, 2007). Hitherto, the stock plan literature has identified financial capability as an influence on decisions whether to join stock plans (Babenko and Sen, 2014; Englehardt and Madrian, 2004; Rapp and Aubert, 2011) but not decision-making once the plan has been entered. Thus, an important implication of our research is that financial literacy can continue to provide further barriers to optimisation even when initial barriers to entry to wealth accumulation instruments have been surmounted.

## 2. The save as you earn plan

The Save As You Earn stock option plan in the UK is a long-standing tax-advantaged plan (introduced in 1980) that is widely used by large, stock-market listed companies. Stock options were granted under SAYE arrangements to around 310,000 employees in 290 companies in 2018/19 (National Statistics, 2020). Those joining this plan are granted options for exercise in three or five years' time, usually at a 20 per cent discount (the maximum attracting a tax concession) on market price at grant. Simultaneously, they enroll in a monthly savings scheme to subscribe up to £500 per month (£250 at the time of the research) for the duration of the option life to accumulate funds so that they can, if desired, acquire and hold the stock at exercise without having to sell some stock to finance the acquisition. The plan is required to be open to all employees who meet the qualifying period of employment (up to five years in the legislation but in practice one year or less in nearly all companies using the plan). The options can be awarded linked to salary, tenure or other similar terms but in practice companies make an identical offer to all employees, with employees *de facto* choosing their option grants via their choice of monthly savings. Participation rates vary widely between companies but the weighted average participation rate was 33 per cent in 2019 (Proshare, 2020).

SAYE plans are used by companies to attract, motivate, and retain employees, especially non-managerial staff (HMRC, 2020). Companies highlight the potential of SAYE to increase employee interest in the company and, where options are converted into stock, to promote employee stock ownership. Due to the tax benefits on offer, coupled with the asymmetric risk profile of options, SAYE is widely seen as a valuable employee benefit.

SAYE provides several tax benefits, and SAYE options can therefore be viewed as qualified stock options. Options can be granted with a tax-free discount of up to 20 per cent on market price. There is no income tax at grant, exercise, or the sale of acquired stock. Instead, gains from the difference between sale and grant price can be liable for capital gains tax (levied separately from income tax in the UK) when the underlying stock is sold after exercise. The savings plan provides for tax-free interest in addition to the tax benefits of acquiring and selling stock, though in the period covered by the research the interest rate has been either zero or very close to it.

The key focus here is what participating employees do at plan maturity, and why some employees choose to take their savings cash without exercising the options when options are in the money. At maturity (when options vest) participants are presented with a three-way choice: exercise and sell, exercise and hold stock, and not to exercise. If they make the latter choice, they receive their accumulated savings plan contributions but do not benefit from the increase in stock price.

The key feature here is that it is a 'forced' decision in a short exercise window, unlike many option plans studied in the finance literature where there is a seven-year exercise window between option vesting and expiry. If options are 'out of the money' it makes sense not to exercise unless the option holder can bear the risk of acquiring stock that is worth less than its purchase price. If options are 'in the money', choosing not to exercise misses out on an immediate cash gain available through exercise and immediate sale.

The choices are clearly set-out and equally weighted in information provided to participants by the plan administrator at the start of the final month of the plan. SAYE administrators are usually a third-party company providing specialised registry and other services to the company operating the plan, and some are also the savings carrier. Whilst unable to provide direct advice (for legal reasons), plan administrators nevertheless attempt to 'spell-out' in straightforward language the consequences of each choice in both 'in the money' and 'out of the money' contexts. The administrator implements employees' decision at nil or minimal charge, and provides a brokerage service (usually a third party) to execute share dealing. Brokerage charges are nominal and fixed, where levied at all (£10-20 at the time of the exercises observed here). The decision is designed to be a frictionless as possible (often using web or phone-based instruments) and, other than the brokerage charge, there are no obvious direct transaction costs. There are no tax charges levied at maturity. There is no time difference in receiving the cash benefit between walking away without exercising and exercise and instantaneous sale of stock using the brokerage service. The latter, however, will provide an instant increase in wealth if options are 'in the money'.

When options are in the money, most option holders will either exercise and sell or exercise and hold, with not exercising concentrated amongst those holding 'out of the money' options. Nevertheless, 14 per cent of those with 'in the money' options choose to take their cash back without exercising, thereby missing out on an average immediate and easy wealth gain of over £2,000 on average. Why do they do this?

## 3. Data and methods

To answer this question, data were obtained from an employee-level questionnaire survey of participants in SAYE plans conducted amongst employees of client companies of a UK stock plan administrator in autumn 2015. These data are matched with information from the plan administrator on grant prices and with closing stock prices taken from Datastream on the date of maturity (so that the potential gain on the option can be calculated). Respondents were recruited via a notice about the research in annual savings statements issued to plan participants by the administrator. The questionnaire asked about savings in SAYE, other forms of saving, their decision at their last plan maturity, and their views on the plan and their company. 3301 SAYE participants responded from a population of around 170,000 with just under half of respondents (47 per cent) in the plan long enough to experience a maturity. Of these, we select those who have had a maturity since 2012 (to ensure reasonable recall), where the options were in the money (72 per cent of those experiencing a maturity in the period, where full stock price data is available), and for whom full employee data is available. This gives a final sample of 589. These employees are spread across 52 companies (an average of 11 respondents per company).

The dependent variable takes a categorical form, and is equal to 1 when participants did not exercise their 'in the money' options at plan maturity, 'walking away' with the accumulated cash from the savings plan instead (0 otherwise)

Turning to the independent variables, experience of plan maturities is judged to proxy for knowledge of the plan, and so

participants are asked how many option maturities they have had. Although this does not of itself indicate whether participants understood the information, it is based on findings that financial experience has a positive, causal effect on financial understanding (Frijns et al., 2014). We use a subjective evaluation of financial knowledge to assess financial literacy, whereby participants are asked to rate their financial knowledge on a scale from 'not knowledgeable at all' (1) to 'very knowledgeable indeed' (5). Although there are dangers that self-assessed financial knowledge overstates actual financial literacy (Lusardi and Mitchell, 2014), subjective knowledge has been shown to be a stronger predictor of behavior than objective knowledge (Lind et al., 2020), to nevertheless correlate broadly with objective knowledge (Van Rooij et al., 2011), and to predict higher returns from stock ownership and trading activity (Bellofatto et al., 2018). Participants were also asked to what extent they made use of various sources of advice at maturity: sources internal to the company are share scheme managers and workplace colleagues (a possible source of peer pressure) whilst external sources are family and friends. Overall, sources external to the company are more extensively used than internal sources, with family being the primary source of advice for all respondents. The literature shows that those with lower financial literacy are more likely to seek advice from informal sources such as friends and family (those with higher literacy tend to seek more formal forms of advice) but there is the danger that these sources are ill-equipped to provide suitable advice (Van Rooij et al., 2011).

Besides the potential of financial literacy and advice to affect behavior, participant actions may be influenced by their orientations and expectations of the plan (Klein and Hall, 1988). Those participants who are less concerned about securing wealth increases from exercising the options (perhaps because they are using the savings plan as a form of self-control — (Shefrin and Thaler, 1988)) may be less likely to exercise in-the-money options. To test this, we utilise a scale measuring financial orientation to the plan composed of two items (each on a 1–5 strongly disagree to strongly agree scale, summed, and then divided by 2): one asked whether respondents are seeking a good financial return and the other whether they are hoping to benefit from an increase in stock price. We also record the increase in the stock price over the option life by comparing the exercise price against the grant price, and calculate the total wealth gain available (by multiplying the total savings subscription by the increase in stock price between grant and exercise, minus the subscription). Finally, gender, age, and income are included as controls.

Variable construction and summary statistics are recorded in Table 1.

The potential influences on the likelihood of not exercising options are estimated with a set of logit regressions, followed by an examination of marginal effects and predicted probabilities of not exercising at various levels of option gain.

## 4. Results and discussion

### 4.1. The financial consequences of not exercising options

Table 2 shows 14 per cent of option-holders do not exercise when options are in the money and an easy wealth gain is available. This is costly for them: although average potential gains are lower than those secured by exercisers, they miss out on an easy average gain of over £2000 and the opportunity to almost double their money from a stock price increase between grant and exercise of per cent on average.

### 4.2. Likelihood of non-exercise

The logit regressions reported in Table 3 report influences on the likelihood of failing to exercise when 'in the money'. Model 1 includes all independent variables other than *Stock gain*; Model 2 adds *Stock gain*; Model 3 substitute *Total gain* for *Stock gain*, whilst Model 4 includes company fixed effects. Models 2–4 show that the likelihood of walking away without exercising is negatively related to the size of the option gain and to the alternative measure of total gain.

In all models, *Age* and *Gender* are not significant, but *Salary* is significant (–) at  $p < 0.01$  in Models 1, 2, and 4. Note that salary is not significant in Model 3 because total financial gain is linked to the size of savings contributions, which in turn is primarily determined by income (as has been found by all research in this area (see (Babenko and Sen, 2014; Englehardt and Madrian, 2004; Pendleton, 2010)).

Those not exercising are significantly more likely to take advice from friends outside the company (likely to be less familiar with the stock option plans than those in the company such as work colleagues or share scheme managers). Whilst never significant at  $p < 0.05$ , advice from company insiders (work colleagues and share plan managers) is always negatively related to the likelihood of not exercising. The marginal effects of the advice variables are directly comparable due to the same scalar construction, and those for the likelihood of taking advice from friends are substantially larger (at 4 per cent) than those for the other variables (where –1.7 per cent is the largest effect).

*Maturity Experience* is negatively related to not exercising at  $p < 0.05$  in Models 1–3, whilst financial *Knowledge* is significant in all but Model 3. Having greater financial knowledge is negatively related to walking away, as predicted.

Overall, these results indicate that those not exercising tend to be less knowledgeable about financial matters, and that they tend to be lower income earners. Whilst these results show that non-exercisers have lower information and knowledge resources than exercisers, it is also interesting to note that non-exercisers have a lower financial orientation to the option plan (Models 1 and 4): they are less likely to be seeking to benefit from increases in share price over the option life and to benefit from a good financial return.

Model 4 shows that many of these results become stronger (and model fit improves considerably) when company fixed effects are included.<sup>1</sup> Experience is an exception (becoming non-significant because some companies have had fewer schemes). The overall consistency of results is not surprising since scheme design is very similar across companies, and the plan administrator uses a standardised approach to communications about option maturities. We experimented (not shown) with inclusion of time dummies to account for generalised movements in stock prices but the contribution to model fit was negligible whilst making the *Option gain* variable unstable.

We experiment with substituting an objective measure of financial literacy (a scale derived from the number of correct answers to the Lusardi and Mitchell (2014) three item financial literacy questionnaire) for the subjective self-assessed financial knowledge reported in the regressions. This, however, has less predictive power than subjective financial knowledge (cf. Lind et al. (2020)), is not significant at  $p < 0.05$ , and is not reported in the regressions.

Conscious that the final sample does not include all those experiencing a maturity, we conducted various robustness tests

<sup>1</sup> Where maturities in a given company are concentrated in one year, the company dummy becomes redundant and knocks out the relevant cases. In these instances, company dummies are merged to sidestep this problem.

**Table 1**  
Summary of variables.

Variable name	Variable label	Mean (S.D.)	Minimum	Maximum
Walk away	Choose not to exercise options and to take accumulated savings plan cash instead (0, 1)	0.144 (0.352)	0	1
Experience	Number of option plan maturities experienced	4.151 (3.477)	1	11
Advice: colleagues	How important was this source of advice and information: work colleagues ('Unimportant' to 'Very important': 1–5 scale)	1.674 (1.081)	1	5
Advice: share plan managers	How important was this source of advice and information: share plan managers ('Unimportant' to 'Very important': 1–5 scale)	1.458 (0.944)	1	5
Advice: family	How important was this source of advice and information: family ('Unimportant' to 'Very important': 1–5 scale)	2.772 (1.663)	1	5
Advice: friends	How important was this source of advice and information: friends outside work ('Unimportant' to 'Very important': 1–5 scale)	1.413 (0.876)	1	5
Knowledge	Self-assessed financial knowledge ('Not knowledgeable at all' to 'Very knowledgeable indeed': 1–5 scale)	3.301 (0.944)	1	5
Orientation	Orientation to the plan. Two items: 'wanted to benefit from expected increase in stock price' and 'wanted to make a good financial return'. ('Strongly disagree' to 'Strongly agree': 1–5 scales)	4.647 (0.585)	1	5
Stock gain	Gain in stock price from option grant to maturity (including grant discounts)	2.291 (1.110)	1.006	10.975
Total gain	Total financial gain achieved from acquiring and selling stock at exercise (log of £)	7.7174 (1.256)	1.106	11.916
Age	Age in years	47.001 (9.128)	21	69
Gender	Gender (male = 1)	0.713 (0.453)	0	1
Salary	Salary (created from mid-points of salary categories) (log of £)	10.477 (0.754)	7.824	12.101

$n = 589$ .

**Table 2**  
Gains and losses in option maturities. Descriptive statistics.

	'In the money' maturities (%)	Average Total gain from option exercise (median) (£ UK)	Minimum potential gain (£ UK)	Maximum potential gain (£ UK)	Average gain in stock price: Stock gain (median)	Average monthly subscription (£ UK)
<i>Do not exercise</i>	14	2,118 (1,100)	41	11,290	1.99 (1.81)	69.29
<i>Exercise</i>	86	5,098 (25,22,641)	3	1,49,630	2.34 (2.04)	101.66
<i>Statistics</i>		$t = 2.51^*$			$t = 2.76^{**}$	$t = 3.52^{***}$

Notes: \* = significant at 0.05; \*\* = significant at 0.01; \*\*\* = significant at 0.001.  
 $n = 589$ .

including running the regressions without the demographic variables (where missing values are more pronounced, and sample size is thereby increased by 10 per cent) but the pattern, magnitude, and overall significance of results (at  $p < 0.05$ ) are broadly unchanged.

An obvious question is whether exercise choices are influenced by decision costs and tax considerations, given that previous research has shown the potential importance of tax considerations in exercise behavior (Cicero, 2009). The only direct decision cost other than any tax liability is the brokerage cost of selling stock. In SAYE plans administrators organise brokerage services at low cost, and in all cases here the lump sum brokerage fee is less than the gain available from selling stock. As for capital gains tax (CGT), only 3 per cent of those walking away would have secured gains from acquiring and selling stock that would exceed the CGT annual exemption (£10,600 in 2012 rising to £11,000 in 2015). We experimented with inserting a dummy for tax liability (where the gain exceeds the annual tax exemption) in the regressions in Table 1 (not shown) but this was negatively rather than positively associated with walking away. Of course, there could be unobserved CGT liabilities arising from other wealth gains but it is worth noting that the number of UK taxpayers incurring a CGT liability during the period is very small, ranging from 150,000 in 2012–13 to 225,000 in 2014–15 (less than 1 per cent of the employed population). As we know that those walking

away tend to be lower earners, it is judged to be very unlikely that CGT liabilities are an important influence on walking away. Of course, the presence of broker fees and potential tax liabilities could add to the perceived complexity of SAYE exercises, thereby discouraging less knowledgeable option holders from exercising and selling but this tends to reinforce the main findings relating to financial capability.

## 5. Conclusion

The analysis shows that some participants in a broad-based employee stock option plan clearly make a 'wrong' decision in the sense that they pass-up an immediate and easy increase in wealth where choice frictions appear to be very low. The decision influences are similar to those found in studies of participation in employee stock acquisition plans: employees who are less financially literate and experienced, along with being financially constrained, have a higher probability of not joining a plan offering almost assured benefits (Babenko and Sen, 2014; Englehardt and Madrian, 2004; Rapp and Aubert, 2011). The contribution of our study is that it shows these influences can carry-through into behavior within a plan even when initial barriers to entry to the scheme have been overcome. More broadly, our findings are consistent with well-established findings in the financial literacy literature that lack of financial knowledge has



**Table 3**  
Influences on the likelihood of non-exercise when 'in the money'. Logit regressions: coefficients (standard errors).

	Model 1	Model 2	Model 3	Model 4
Age	0.020 (0.014)	0.016 (0.014)	0.018 (0.014)	0.010 (0.015)
Gender	-0.112 (0.279)	-0.128 (0.284)	-0.179 (0.289)	-0.225 (0.331)
Salary	-0.441** (0.166)	-0.506** (0.169)	-0.235 (0.181)	-0.829*** (0.207)
Experience	-0.115* (0.046)	-0.115* (0.045)	-0.108* (0.046)	-0.064 (0.049)
Advice: colleagues	-0.151 (0.135)	-0.153 (0.138)	-0.187 (0.144)	-0.111 (0.160)
Advice: share plan managers	-0.062 (0.152)	-0.030 (0.157)	-0.026 (0.165)	-0.104 (0.172)
Advice: family	0.060 (0.080)	0.058 (0.081)	0.042 (0.082)	0.008 (0.088)
Advice: friends	0.390* (0.160)	0.378* (0.162)	0.433* (0.169)	0.479** (0.186)
Knowledge	-0.312* (0.133)	-0.306* (0.133)	-0.259 (0.137)	-0.344* (0.149)
Orientation	-0.454* (0.187)	-0.358 (0.191)	-0.266 (0.197)	-0.525* (0.210)
Stock gain	-	-0.447** (0.151)	-	-0.842** (0.267)
Total gain	-	-	-0.491*** (0.106)	-
Company fixed effects	-	-	-	Yes
Pseudo R2	0.100	0.121	0.147	0.216
n	589	589	588	589

Notes: \* = significant at 0.05; \*\* = significant at 0.01; \*\*\* = significant at 0.001.

adverse effects on financial decision-making and welfare (Lusardi and Mitchell, 2014). They raise questions about the use of sophisticated reward instruments when participants lack financial capabilities. This poses challenges for companies and plan administrators: how to communicate choices to employees to enhance the chances of wealth-optimising decisions whilst not infringing legal constraints on the provision of financial advice. One further possibility, suggested to us by the plan administrator, is that some of those walking away are using the option plan primarily as a workplace savings plan rather than as a means of benefiting from increases in stock price via option exercises. In other words, they use participation in the savings component of the plan as a form of self-control to achieve regular savings flows (Shefrin and Thaler, 1988). Our data precludes systematic testing of this though the negative association in the regressions between a financial orientation to the option plan and walking away without exercising is consistent with this possibility. We aim to test this more systematically in future research.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.jbef.2021.100539>.

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