The Evolvement of UK Pensions towards a Sustainable Future

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Background

The life expectancy of human-beings has radically increased over the past two centuries, and in the UK, it is currently at 81.77 years (MacroTrends, n.d.). This has "wideranging social implications" (Veit, 2012, p. 1026): Humans plan out their lives according to how long they expect to live, thus, with an increased life expectancy, marriages and reproduction have been delayed and education has been prolonged (Veit, 2012). Since people grow to an age where they can no longer work, the period of retirement was created, and governments have implemented structures to provide for older people (Gerstle & Fraser, 1989).

The Cambridge Dictionary (n.d.) defines retirement as "the period in someone's life after they have stopped working because of having reached a particular age". For people to have the freedom not to work after a certain age, money must be saved during the period in which they are in the labour force (Blake, 2003). This starts as soon as people enter the labour market and start paying into the pension system (Moneyhelper, n.d.). It is a legal requirement to be automatically enrolled in the pension scheme from the age of 22 onwards, however, employees have the right to be enrolled in the pension scheme from the age of 16 (GOV.UK, 2015; Nidirect, 2022). Investing into a pension scheme represents an opportunity for long-term investment, as the pension fund is only paid out at retirement age, which is currently the age of 65 on average in the UK (Green, 2022; Moneyfarm, 2022).

In the Defined Contribution scheme, employees convert a portion of their gross salary each month and pay it into a pension fund (see Appendix 8.1). The employer subsidises this with a certain percentage, thus the employer and employee jointly contribute to the pension pot of each employee (GOV.UK, 2015). Moreover, a fee is charged for defined contribution pension schemes. As most workplace pensions are defined contribution schemes, these fees are paid by the employer (The Telegraph, 2022). The pension contributions are invested by pension funds and the amount an employee receives at retirement depends on the monthly contributions, the risk profile, and how well the investment grows (Nest, n.d.). Both the employee and the employer benefit from tax advantages. Employees save tax by converting part of their gross salary, thus, reducing the tax rate. When employers contribute to a pension, this is treated as an allowable corporate tax expense - just like a salary payment. However, in contrast to salary payments, pension contributions are not subject to the employer's social security liability (AJBell, n.d.).

We are aware that different kinds of pension schemes exist within the UK in addition to the Defined Contribution Scheme, which was explained above. These include:

1) The State Pension, which you must apply for when you reach the statutory retirement age. There is an upper limit to the amount of the state pension you can receive.
2) The Defined Benefit Pension, which gives you a guaranteed annual pension of a certain amount on retirement. The value of your pension depends on your earnings, the length of time you have been employed, and the conditions of the pension scheme in question (Nest, n.d.).

However, for the scope of this essay, the will focus be on Defined Contribution Schemes. With a participation rate in occupational pensions in the UK of 79% (22.6 million employees) in April 2021 (Office for National Statistics, n.d.), the capital in pension funds presents a vital long-term investment component that may have a significant impact on economic life.

1. Introduction

Academics predict that without a transformation of our economy, the global system will inevitably collapse: Due to unsustainable economic growth and the facilitation of ecologically damaging business practices, huge carbon emissions are being generated and resources are being depleted (Meadows et al., 1982; Meadows & Randers, 2004). As our economic system is a capitalistic system, which is "directed towards making the greatest possible profits for private people and organizations" (Cambridge Dictionary, n.d.), it can be assumed that investors and funds have enormous power and influence over which companies do particularly well. Therefore, where one chooses to invest their money can have a major impact on environmental sustainability. For this reason, we will analyse the pension system - which is a form of investment - and its potential transformation in this essay.

Almost no other form of investment offers such a long-term investment opportunity as pension funds (Shen, 2005). As soon as people enter the labour market, they start saving for their retirement (Green, 2022; Moneyfarm, 2022). Despite that 79% of UK employees pay into pensions, many people are unaware of the impact their money has on the environment: In fact, a third of UK pensioners do not know that their pension is invested in the stock market, and many people don't know where their money is being invested (Fairfax, 2021; Timperley, 2022). A lot of savers are not aware that, in addition to their personal behaviour, the money they invest has its own ecological footprint. According to Make my money matter (2021), the industry is responsible for financing 330 million tonnes of carbon emissions each year, hence, has a critical impact on the environment. Furthermore, the UK pension funds hold high dominance in the investment market with a combined capital investment of £3 trillion (Make my money matter, 2022a).

The high market dominance as well as the amounts of CO2 that are financed indicate that a transformation of the system could have a positive impact on environmental sustainability (Eiopa, n.d.). According to a study conducted by Aviva (2021), moving the average UK pension of £30,000 to an equity-focused sustainable fund equals a total carbon saving of 19 tonnes of CO2. Switching the average pension to a sustainable fund is accordingly 21 times more effective than switching to renewable energy, giving up flying, and eating a vegetarian diet combined (Aviva, 2021). However, due to a lack of transparency and choice, people often have no means of influencing where their money goes and studies show that the money is often invested in tobacco, arms, fossil fuels, gambling, and deforestation (Make my money matter, 2022b). Investing in sustainable funds would mean that the pension savings are used to fund clean energy, human rights, green transport, and reforestation (Make my money matter, 2023).

In this paper, the focus will be exclusively on the impact of the pension system on environmental sustainability when sustainability is mentioned.

Research shows that sustainable and conventional funds do not vary in their performance, neither in the short nor in the long term (Owadally et al., 2021). Accordingly, financial security for retirees can still be ensured alongside sustainable investments (Owadally et al., 2021). Owadally et al. (2021) further demonstrate that issues such as climate change are a hazard to long-term cash flows and therefore achieving sustainable long-term returns, while managing the investment risk of a portfolio, is crucial for pension fund managers (Owadally et al., 2021).

Since the pertinence, pressure, and advantages from an economic and ecological point of view are evident, the question arises as to why the current pension system still works in favour of unsustainable funds. This paper is therefore guided by the following question:

How can the UK pension system be transformed to help create a sustainable future?

This essay argues that to enable a transformation of the pension system in the UK towards greater sustainability, an institutional approach is essential. Financial incentives and government regulation will be discussed. In the first part, the pension system will be analysed using Lahlou's (2018) Installation Theory, followed by a stakeholder analysis using Activity Theory (Nosulenko et al., 2005; Lahlou, 2018). In the third part, a possible solution to move pension funds' investments towards a sustainable alternative is proposed. We do so by introducing a financial incentive and educating fund managers on the profitability of a shift in their investment portfolio. Finally, limitations are identified, and alternative solutions are proposed.

2. The Pension Fund System: An Installation Theory Perspective

Installation Theory is used, as it provides a framework for understanding the specific, social setting, where the investment behaviour of pension funds takes place. Also, it assists in understanding how new sustainable behaviour can be created, which occurs where the three layers of the installation overlap. These three layers are: physical affordances, institutions, and embodied competences. The following section will analyse the layers in depth (Lahlou, 2018).

Material Context: Affordances

Physical affordances describe the physical environment in which people operate. These affordances can constrain and enable people to behave in a certain way (Lahlou, 2018). In the context of the pension system, this relates to the investment options, the criteria with which pension funds are assessed, and available information about funds. Sustainable investment opportunities need to be present to enable pension fund managers to invest sustainably. This connects the second key affordance that is constraining the current behaviour of employees, and it further connects to employers who by common practice in the UK automatically enrol their employees in a pension scheme (GOV.UK, 2015). For employees, the lack of choice due to automatic enrolment limits their options to consciously invest their contributions (GOV.UK, 2015). Here, however, the options are limited not only for employees but also for employers. Due to a lack of transparency regarding sustainability criteria (Erhart, 2022), employers cannot ascertain which pension funds are sustainable. Coherent criteria to assess pension funds' sustainability are currently lacking (Erhart, 2022), thus, an assessment of whether contributions are invested sustainably is hardly possible. Consequently, a variety of certified green investment opportunities and clear information about the sustainability of pension funds for depositors would need to be made prominent to make sustainable behaviour predictable at the level of physical affordances.

The Subjects: Embodied Competences

Embodied competences describe the skills and competences that people have learned, which are necessary to be able to implement the corresponding behaviour. This means that for a certain behaviour, both knowledge about the context and the ability to demonstrate the behaviour is needed (Lahlou, 2018). In the context of the pension system, the embodied competences relate to the knowledge people have about the way their pension scheme works as well as where their investments go and the respective impact. As often a lack of information and training about pensions at employees' workplaces exists (Holzmann et al., 2003), embodied competences cannot be sufficiently developed. Therefore, employees are sticking to the status quo, i.e., the decision their employer has made on their behalf. It can therefore be assumed that training and the provision of information material would encourage people to engage with the topic and, possibly, to make green investment decisions. Furthermore, the lack of evaluation criteria for environmentally sustainable funds results in pension fund managers lacking the necessary competence to evaluate the sustainability of investments (Stillwell et al., 2019). To be able to

develop the latter, pension fund managers would have to receive training that provides them with the necessary competences, as well as criteria to evaluate the sustainability of stocks and thus invest the funds' capital in environment-friendly stocks. Stillwell et al., 2019). To be able to develop the latter, pension fund managers would have to receive training that provides them with the necessary competences, as well as criteria to evaluate the sustainability of stocks and thus invest the funds' capital in environment-friendly stocks.

Social Regulation: Institutions

Institutions represent the third layer of an installation, entailing social regulation. Institutions shape both physical affordances and embodied competences by creating social norms, regulations, and incentives (Lahlou, 2018). In the context of the pension system, institutions are highly influential, as they pose power over what investment opportunities exist, how incentives are set, and how they operate (Pfeifer & Sullivan, 2008). Institutions, such as governments, have decision-making power over the regulation and supervision of pension funds. They can thus regulate which metrics to include in the funds' performance sheets and what information employers must give to their employees. In addition to the government, the pension funds can also be seen as an institution that holds decision-making power over investment activities in the pension system. Since pension fund managers have influence over the allocation of capital in the funds, as well as decision-making power in the board of companies through their shareholdings, they represent an important body for regulation (Davis, 2005).

3. Stakeholder Analysis: Key Actors in The Pension Fund System

To analyse the behaviours and needs of stakeholders involved in the pension system, Activity Theory is used (Nosulenko et al., 2005; Lahlou, 2018). This framework is useful because it segments a stakeholder's activity and links their motives to their behaviour in the environment in which they are situated. It helps to understand how the subject strategically uses the environmental conditions to achieve its goals. In practice, each subject is driven by a motive. This motive is served by a goal, which illustrates the final desired state of the subject after the activity. The subject undertakes various tasks that serve subgoals along the way - to move from its initial state to the final goal, which serves the motive (Nosulenko et al., 2005; Lahlou, 2018).

Figure 1 portrays a brief illustration of the main stakeholder groups involved. Insurance companies are not listed here because they are not directly affected by the proposed intervention. The task of the insurance companies is to ensure the pension of the individual savers in case of insolvency of the employer (Moneyhelper, n.d.). The government, pension funds, and employers can be deemed as key players (Gumola, 2019), therefore we will focus on them for a more detailed analysis. Most modern nations have an established structure for their pension systems: Subsequently, it can be seen as an institutional framework that exists to generate income for the elderly (Góra, 2008). The government arguably holds the most power in shaping the pension system, as it can establish regulations, standards, and decide on public pension plans. Pension funds have a major influence on the sustainability of pension funds' investments, as pension fund managers are responsible for the investment of assets held in the funds, thus, influencing the allocation of capital. By investing in companies that operate sustainably, pension fund managers can contribute to a more sustainable economy. Additionally, pension funds may influence companies towards sustainable business practices, as many pension funds own a large share of stocks which leads to a seat in company boards (Wong, 2010). While they have less influence than governments and pension funds, it is still helpful to look at employers. As they have decision-making power over what pension plans are offered, employers too can set the course for more sustainable pension systems (Gumola, 2019).

To be able to propose realistic and effective solutions aimed at changing behaviour, we first need to understand the activities as well as the goals and motives of each stakeholder in relation to the pension system.

Governments

The government holds regulatory power and is therefore an important actor within the pension system. The government's main objective regarding the pension system is to achieve economic and social security, with the motive of stability and prosperity. To achieve this, several tasks must be fulfilled, whereby sub-goals are attained along the way.

First, governments must decide on the amount of state pension contribution. This means that each pension contribution of employees is subsidised by the government with a tax relief, which leads to achieving the sub-goal of supporting financial security for the old-age population (AJBell, n.d.). This can also be viewed as a way of allocation of the current gross domestic product (GDP) between the generation in the production era and the generation in the post-production era (Barr & Diamond, 2006). Second, governments hold the power to decide

which industries are being subsidised, which entitles them to preferential treatment. A subsidy is an incentive granted by the government to individuals or businesses in the form of cash, grants, or tax breaks to enhance the availability of particular types of products and services (CFI, 2022). Markets with favourable externalities, i.e., that add value to society, are usually politically favoured to create a more extensive supply of these products and services (CFI, 2022). This can be applied to pension funds, for instance, by governments granting tax breaks to funds that are considered green, thus promoting sustainable practices in the economy. Additionally, governments could set guidelines for metrics of performance sheets of funds, meaning they define the criteria on which funds are assessed on. Depending on the government's decision, this may, for instance, include exclusively financial key figures or also ESG metrics. Decisions on performance measurement and subsidisation control and influence the funds, thereby achieving the sub-goal of enabling a flourishing economy (CFI, 2022).

Pension Funds

Capital in pension funds is managed by pension fund managers, who are responsible for allocating this to different types of investments (Davis, 2005). The pension funds' main objective is profitability, with the motive of keeping the business flourishing. To achieve this, and to meet the overall goal and sub-goals, pension fund managers need to collaborate with other stakeholders.

In a first step, both employees and employers pay into the pension fund through deferred compensation and administration fees (Moneyhelper, n.d.). Assets held in pension funds are invested by the pension fund managers in various investment options (stocks, bond, debt, etc.) (European Commission, 2019). Here, the sub-goal is to make financially profitable investments, thereby generating high return on investment. To make profitable investment decisions, pension fund managers require up-to-date knowledge of the market to forecast which stocks will generate a high return (Clark, 2004). The capital in the fund is paid out by the pension funds to the individual depositors upon reaching retirement age (Antolin, 2008). Beyond this, pension fund managers need to be able to assess the longevity, operational, inflation, and investment risks, which can affect whether they'll be able to meet their financial obligations towards their stakeholders (The Pensions Authority, n.d.). Pension funds can also influence the companies in which they invest. Through the quantities of shares they hold, they become a relevant shareholder and part of the board of a company: Thus, in addition to investment decisions, they can also have a direct say in companies' business practices and

objectives due to stewardship (Alda, 2019; Melis & Nijhof, 2018). From the tasks and subgoals, it can be inferred that the evaluation of investments according to their ecological impact could have an influence on the investment process in addition to financial metrics.

Employers

Employers are responsible for enrolling their employees in pension schemes (GOV.UK, 2015). This allows them to decide which pension plans to offer and how they specifically inform their employees about this matter. Employer's main objective is to comply to existing laws and regulations, hereby serving the motive of ensuring the company's success. Additionally, it can be assumed that companies simultaneously fulfil their motive of portraying themselves as a desirable employer in the war for talents: According to Morgan Stanley, 93% of employees deem pension-plans that are sponsored by the employer as a priority when choosing where to work (Castrillon, 2022).

Initially, employers need to select a pension plan for their employees and subsidise the contribution of their employees so that the share that employees convert is increased. The minimum amount that employers must contribute is 3% of the employees' pension contribution (The Pensions Regulator, n.d.). By doing so, employers achieve their sub-goal of benefitting from tax advantages. This feeds into their motive to ensure success of the company. In this way, they support their employees and gain a financial advantage themselves. Moreover, employers must pay a fee to the pension funds with which they cooperate (The Telegraph, 2021). These fees do not usually differ much between fund types.

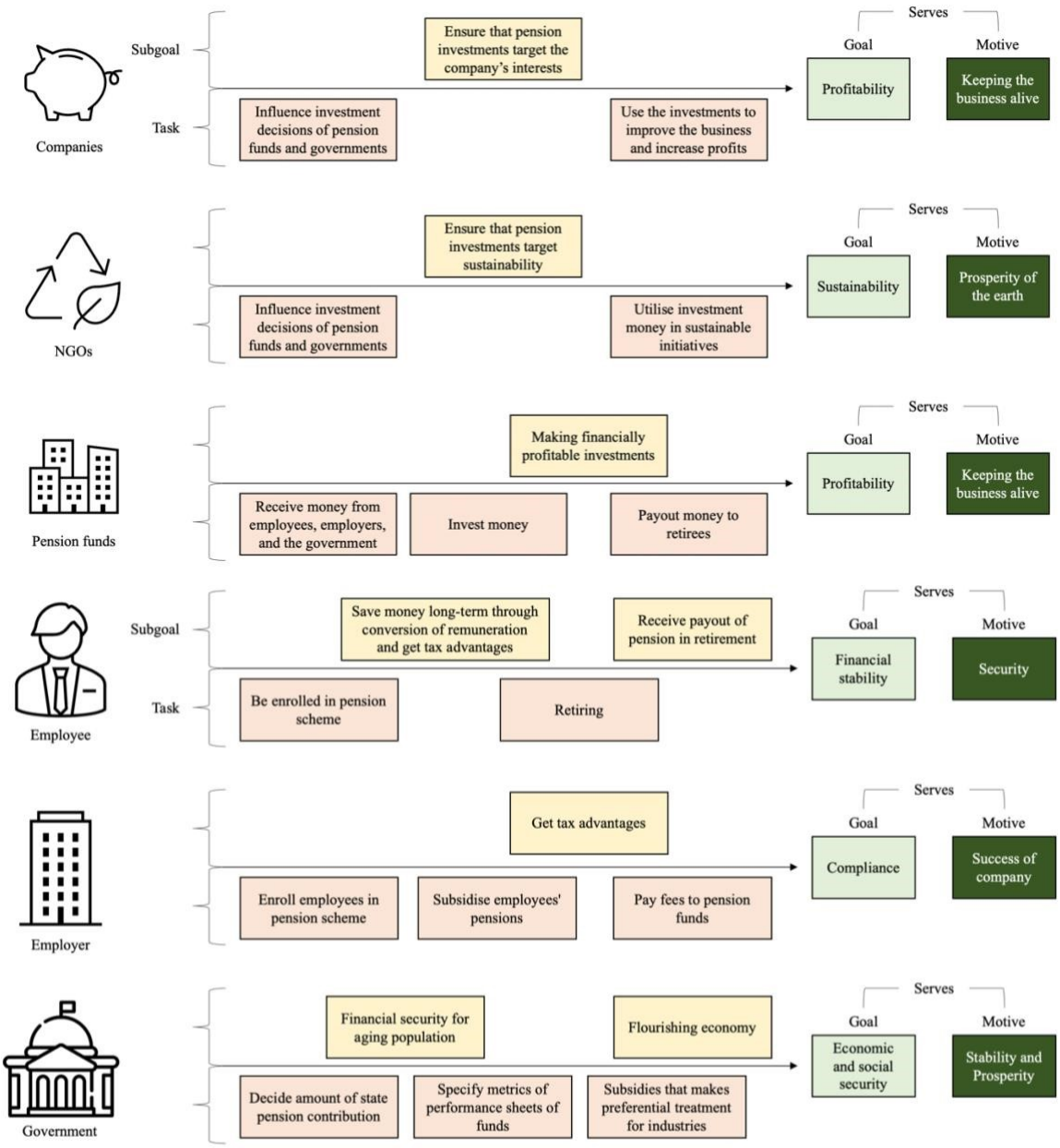

Figure 1. Stakeholder Analysis according to Activity Theory.

4. A Potential for Change: The Evolution of Installations

The stakeholder analysis has helped visualise and understand the behaviour of key actors in the installation around the pension system. The next step is to change the environment in which these key players operate to encourage new and sustainable behaviours, creating a solution for transforming pension fund investment portfolios to support a sustainable future. This raises the question of whether pension funds can move their portfolios towards supporting sustainability in the short term.

Can Pension Funds Move Towards Sustainability in the near Future?

To answer this question, the liquidity of assets and taxation need to be considered, which portray the two primary factors that determine whether a pension fund will convert its investments.

First, liquid assets are preferred, as they can be converted into cash, and thus different investments, easily. Only 4% of UK pension funds' assets are invested in real estate, which potentially constitutes a non-liquid asset if it's invested in annuity contracts (European Commission, 2019). Hence, in theory, pension funds can quickly change their portfolio of investments.

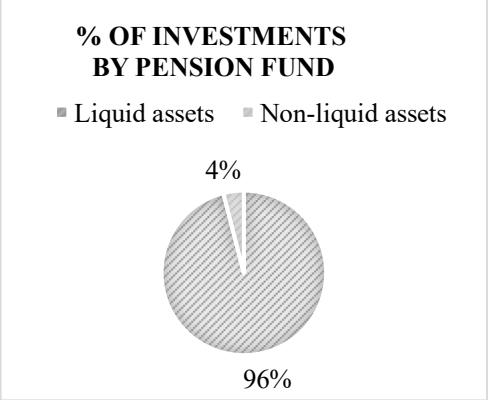

Figure 2. Illustration of UK pension funds investment portfolio

Second, pension funds want to avoid losing money in the process of changing their investment portfolio. Here, we need to look at taxation. The UK pension system follows the 'Exempt-Exempt-Taxed' taxation, connected to the three stages in the pension 'lifecycle': payment to the fund (contribution), generating capital (investment), and payout of benefits (withdrawals). Contribution and investment refer to 'Exempt-Exempt' and payout refers to 'Taxed' (GOV.UK, 2022). Here, investments are relevant, as pension funds are interested in investment growth from dividends and gains of selling stocks. Tax exemption is available for these capital gains. Thus, there is no monetary reason for a pension fund not to change its stocks, unless if they face a loss from selling a stock.

This raises the question of how the investment behaviour of pension funds can be transformed to deliver profitable returns for its members' retirement while supporting sustainability.

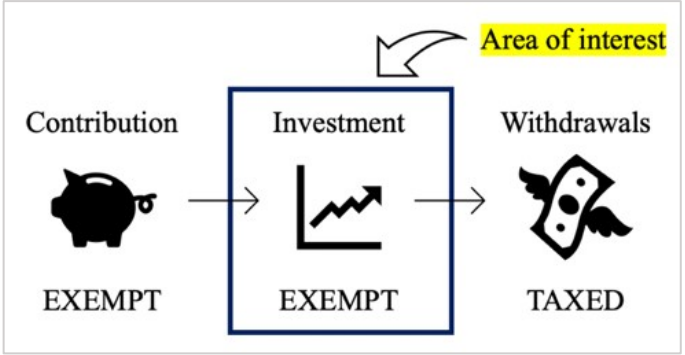

Figure 3. Illustration of the 'Exempt-Exempt-Taxed' taxation

A Change in Affordances: Standards to Measure Sustainable Investments

One of the major problems in the transformation of pension fund investments towards more sustainability, is that pension funds cannot be characterised as sustainable if a characterisation of what constitutes a sustainable investment is non-existent. Thus, if we want to redirect the UK pension funds' portfolios, the first step is to ensure that the affordance of sustainable investments, such as stocks and bonds, are available. Transparency across ESG (environmental, social, and governance) ratings of companies' impact has been recommended by policymakers and academics (Erhart, 2022).

Currently, the literature suggests that divergence between rating agencies exists and existing standards are highly debated in the literature (Erhart, 2022). Mazzacurati (2021) also pinpoints that a "lack of a common definition and of comparability, together with transparency issues, could be ultimately detrimental to the transition towards a more sustainable financial system" (Mazzacurati, 2021, p. 105). Figure 4 highlights issues of current ESG ratings and potential solutions derived from the literature (Diez-Cañamero et al., 2020; Erhart, 2022; Inderst et al., 2012). Current ESG rating models are not included as reference points, as they are not publicly available due to confidentiality. In this paper, green investments, following Della Croce et al. (2011), refers to investments in low-carbon and climate-resilient organisations that ultimately benefit markets for e.g., renewable energy, clean technology, environmental technology, and sustainability.

ISSUES OF CURRENT ESG RATINGS	POTENTIAL SOLUTIONS
Assumptions and subjectivity Assumptions and decision subjectivity	Develop descriptions in rating reports
Convergence of measurement ESG ratings are subject to a convergence of measurement (meast indicators)	Develop descriptions for indicator measurements
Free to chose data provider ESG investors are free to choose a data provider, which impacts t	Having governmental standards ensures that ESG investors can choose data provider freely, without it impacting the stock evaluation.
Comparison across industries Some agencies use scores that are comparable across different ind specific scores	Use scores that allow comparison across different industries
Risk or performance oriented Some measure risk while some measure good performance.	Have performance-oriented measurement
Different classifications Comparison between agencies faces the obstacles of different cla whether a high or low score is considered good.	Ensure that either high or low is considered good
Additive aggregation ESG rating also presents the problem of substitution, as many ag calculate the ESG score. Consequently, poor performance in one performance in another area e.g., harm to the environment (E) ca This is an issue, as Erhart (2022) shows that environmental, socia necessarily strongly correlated.	Ban additive aggregation to ensure that poor performance in one area cannot be compensated by good performance in another area. Give E, S, and G distinct scales

Figure 4. Issues of current ESG ratings and potential solutions (own illustration based on the literature, 2023)

In 2017, the Taskforce on Climate-related Financial Disclosure (TCFD) put forth eleven recommendations for climate reporting – a response to the demand for transparency around disclosure of climate related information by organisations (see Appendix 8.2) (Task Force on Climate-related Financial Disclosures, 2017). This framework has until recently been voluntary (Ding et al., 2023). Bingler et al. (2022) contend that making TCFD reporting mandatory by regulation provides one solution to the question of why companies do not disclose their information.

Since October 2022, a regulation (proposed by the Department for Works and Pensions and approved by the UK Government) has ensured that trustees of occupational pension schemes need to disclose TCFD publicly in the UK (Bingler et al., 2022; Task Force on Climate-related Financial Disclosures, 2017).

The literature on this effect is limited. However, Becker et al. (2022) have investigated the effect of a similar regulation enforced in the EU, the new Sustainable Finance Disclosure Regulation (SFDR). This regulation also targets fund investors, and it came into force in March 2021. They compare funds in EU (affected) with funds in US (unaffected) and show that funds in the EU, affected by the SFDR policy intervention, significantly increased their sustainability rating compared to non-affected funds (based on the Morningstar Sustainability Rating) (Becker et al., 2022). This indicates that a governmental top-down approach can work to change the investment portfolio of funds and mobilise more capital into sustainable investments. Currently, the EU is working towards a standard sustainability label (Appendix 8.3) (J.P. Morgan Asset Management, n.d.). We suggest that UK collaborates with the EU to develop and enforce such certification. Such label should integrate with the mandatory reporting, sticking to TCFD or implementing SFDR. This could be an addition to the UK Companies Act (414CB), which the UK government amended with TCFD disclosure as a part of the annual required strategic report (Department for Business, Energy & Industrial Strategy, 2022; UK Government, 2006). Such classification can be used by data providers, making sure that they provide comparable ratings and live up to sustainable investing, hence reducing greenwashing.

The development of such label for sustainable investing is vital to transforming the pension funds' portfolio, as suggested solution of this paper relies on the classification of investments as 'yellow' or 'green' (cf. the section: 'Accelerate Transition and Support Sustainability within Companies'). However, the development of such label is out of scope for this paper.

This development constitutes a change in the affordance of the installation of sustainable investing and institutional control, which can be explained by the generation mechanism in evolution of installations, *crossed impact,* where "a change occurred somewhere else in the system, and which induces a major change in one of the components of the installation. These may for example come from new institutional rules, reflecting a change in balance of power" (Lahlou, 2018, p. 301).

This corresponds to our solution, which is illustrated in figure 5. It outlines how UK Government is urged to enforce a certification system for sustainable investing, regulating a domain that impacts multiple installations. Thus, a change to the installation of pension funds is initiated outside the installation, as the installation needs to account and conform to the change.

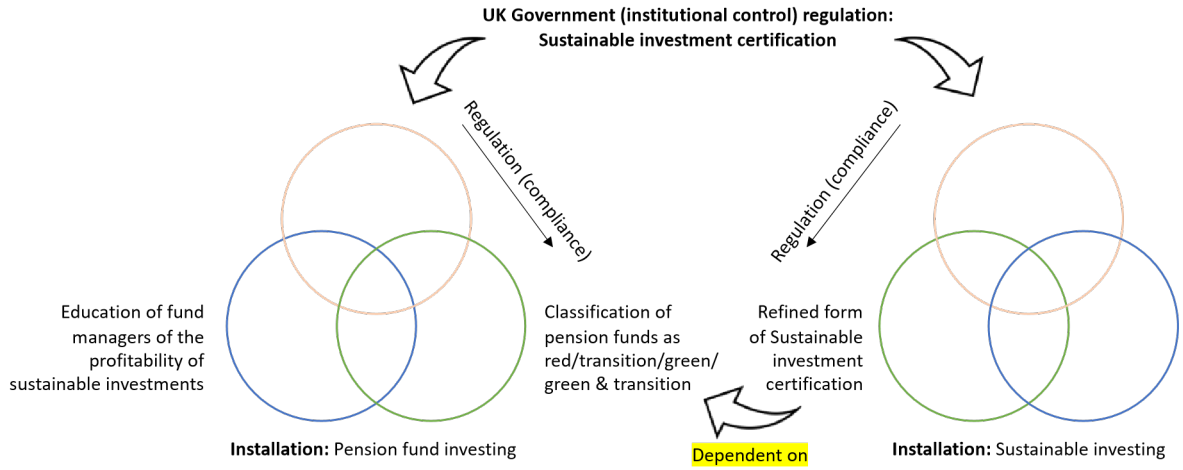

Figure 5. Illustration of how institutional control and the installation of sustainable investing pension fund investing (inspired Lahlou (2018))

It is a necessity to set a threshold of how what percentage of a pension fund's investment should be tied in sustainable investment for them to be characterised as 'yellow', 'green', or 'yellow and green'. This is dependent on a refined form of sustainable investment certification, from the installation of sustainable investing. This affordance will not cause the behaviour of sustainable pension investing, but it will enable it. The reason is that a classification of pension funds in relation to sustainability in the physical affordance layer are a necessity to facilitate a shift in behaviour and ensure a new sustainable behaviour in the installation of pension funds.

5. Solution: Transforming Pension Funds' Investment Portfolios

Accelerate Transition and Support Sustainability Within Companies

Supporting sustainability via investments raises the question of which companies pension funds should invest in. We suggest that pension funds' portfolios should support 'yellow' companies in transition and 'green' companies, already employing sustainable business practices.

We deem 'yellow' companies as great investment opportunities, as they are working towards environment-friendly practices and are therefore in transition, which is a source of long-term profit. 'Transition investing' focuses on investment and engagement with companies that are shifting from business practices that harm the environment towards more environmentally friendly practices, supporting a sustainable economy (Jones, 2022; Yang et al., 2021). It is argued that focusing solely on already green companies is not moving the needle, as investors need to push currently 'red' companies in a 'green' direction. We need more than new or current green companies – we must target existing companies, causing environmental harm, to transition into a more sustainable direction. A limitation to investing solely in green companies is that companies looking to transform their business practices are not getting a push or necessary capital support, which ultimately can hinder the transition. Further, these companies present a great investment opportunity, as the literature shows that investing in sustainability can be profitable for companies, and thus a good investment for pension fund investors (Jones, 2022; Owadally et al., 2021). Exemplified, investments could go to a traditional gas/oil company working towards renewable power generation. Ørsted (formerly known as Dong Energy) is a prime example: A decade ago, Ørsted was a traditional gas/oil company. Today, the company is a world leader in renewable power generation, generating around 25% of the world's offshore wind power. This has resulted in a reduction of their carbon emission of over 72%. In a similar vein, transition investing could target the shift in the car manufacturing industry towards electrical vehicle production or green fuels (Jones, 2022).

However, green companies should not be penalised for being front-runners and using their own investment to accelerate their green transition. Also, we advise a policy to push 'yellow' companies towards 'green' companies. We need to support 'green' companies, so 'yellow' companies do not stay within a transition phase but realise their green vision. From the perspective of pension funds, it is sensible to support both 'yellow' and 'green' companies, as both present a vital and profitable investment.

Research shows, however, that most investments by pension funds are not in 'yellow' or 'green' companies, even though the business case supports this form of investment (Make My Money Matter, 2021). This could be due to the status quo bias, reliance on sustainable investment and the legitimisation - and even promotion - of unsustainable business practices by governments (Boiral et al., 2022; Jean-Francois et al., 2022). Thus, we suggest an institutional and educational intervention to incentivise a behavioural change in pension fund investments.

Suggested Solutions

The aim of this paper is to propose an intervention that changes UK pension funds' investment portfolio in support of a sustainable future. In the following, the focus will be primarily on institutional entities. This focus was chosen, as it targets most of the key stakeholders identified in the stakeholder analysis. The solution has additionally been discussed with three different experts working in the fields of pensions and sustainable investments, thereby verifying the legitimacy and effectiveness.

The solution seeks to alter the conditions of the environment in which the subjects strategically try to achieve their goals. Thus, changing the installation (Lahlou, 2018). It rests on two pillars, as it introduces a government subsidy (layer: institutions) and education of pension fund managers on the profitability of sustainability (layer: embodied competences). Further, it relies on a standard certification of sustainable investments to characterise whether pension funds support sustainability (layer: affordance). The development of a standardised certification is already in the interest of scholars and practitioners, but as mentioned, out of the scope of this paper.

Government Subsidy

We propose a government subsidy for the annual pension fund fee, which currently is at the expense of the employer (The Telegraph, 2021). This section illustrates how this solution benefits the key stakeholders defined in the stakeholder analysis. Further information, calculations and examples used in this section can be found in appendix 8.4. Illustrations are based on:

- The UK government's annual pension fee charge cap of 0.75% (Department for work and pensions, 2022).
- The average pension pot of employees based on age in the UK (Occam Investing, 2022).
- Years people pay into the pension pot, which legally is from the age of 22 to 65 in the

UK (UK Government, 2023).

Targeting The Pension Funds

Pension funds benefit from government subsidies, as they become more competitive by focusing on sustainable investments. A pension funds' annual fee will indirectly decrease for their clients (employers), as the government is partly subsidising it. Pension funds will, however, still earn the same – even though they are perceived as cheaper by the clients, compared to non-sustainable pension funds. Illustrated, we add the government subsidy to the equation, partly funding the fee.

$$\begin{aligned} &Fee\ earned\ by\ pension\ fund\ (income) \\ &\quad = Fee\ paid\ by\ employer\ (expense) \\ &\quad + Subsidy\ paid\ by\ government (expense) \end{aligned}$$

As shown in Figure 6, pension funds will benefit from changing their investment portfolio towards sustainable investments to be perceived as cheaper by the employer (an example of age-group 45 to 54 years).

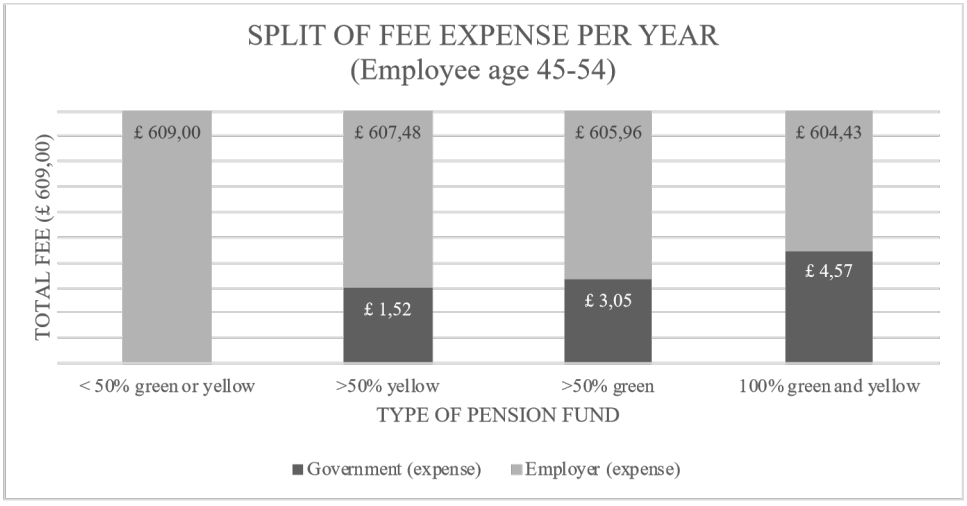

Figure 6. Illustration of the fee earned by a pension fund, split by the government and employer (the y-axis's proportional percentage is removed to illustrate the governments contribution).

Targeting The Employers

Employers benefit from the government subsidy, as their expense of annual pension fee may decrease with their choice of a pension fund. Employers face a yearly fee, which grows as the pension pot of an employee increases with age. This fee is restricted by a cap of 0.75%, set

by the UK Government, which is used as a base to showcase how a government subsidy can benefit employers (Department for work and pensions, 2022). Figure 7 illustrates how the fee paid by employers for a given employee incurs different costs depending on the investment portfolio of the chosen pension fund (an example of age-group 45 to 54 years). Therefore, it becomes cheaper to employ a pension fund that invests sustainably.

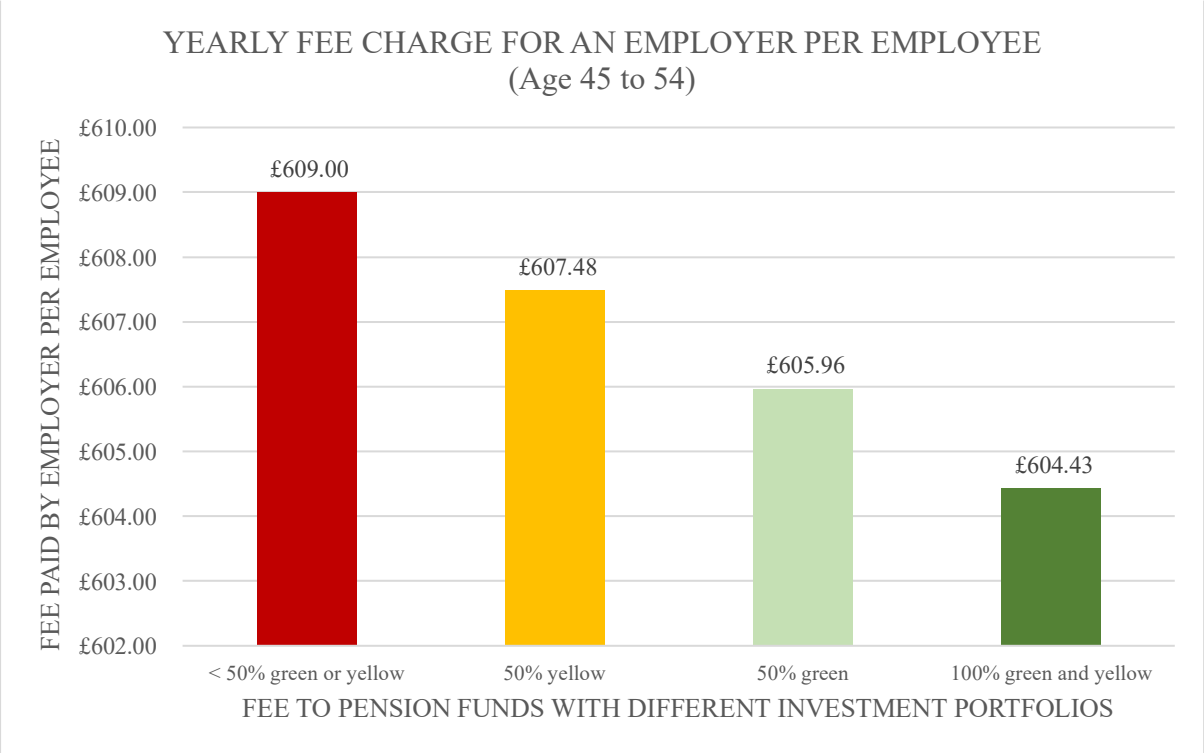

Figure 7. Illustration of the yearly fee charge for an employer per employee (age 45 to 54).

Targeting The Employees

Employers benefit from the government subsidy, as half of the government subsidy is invested into the employees' pension fund pot. Figure 8 illustrates the added capital each year, by age group. This benefits the employee over time, as the yearly capital increase is added to the pension pot, which is subject to a growth rate of approximately 7% over 35 to 40 years (Mannion, 2021). We suggest that employees receive a notice on this benefit each year, together with the annual tax summary.

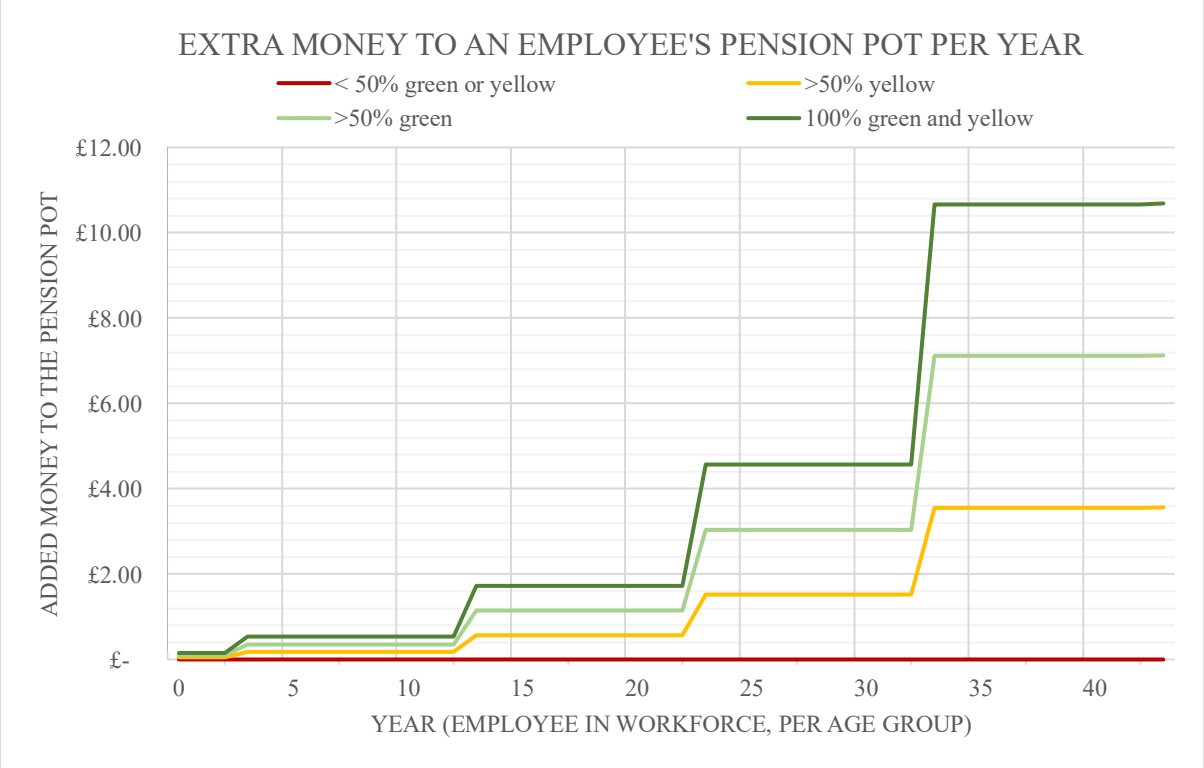

Figure 8. Illustration of added money to an employees' pension pot per year.

Targeting the government

The participation rate in pension funds was 79% in 2021, equivalent to 22.6 million depositors (Office for National Statistics, 2022). A state subsidy for each employee would therefore lead to state expenditure that depends on this number of people. As shown (ct. Appendix 8.4 and Figure 9), the expense per employee depends on the pension pot, which varies according to age. Data shows that the participation within each age group is approximately 80%, except for age group 16 to 21, where the participation is only around 20% (Office for National Statistics, 2022). To illustrate the size of the government expense to subsidise the annual pension fee, we have calculated the cost for the government if every pension fund became 'green', focusing on age 22 to 65 (state pension age) (Appendix 8.4). This would incur a cost of around £170 million. This would support a green transition, as the government would push for a mobilisation of capital towards a more sustainable economy. As the UK government allocated £534 million to climate and biodiversity in 2021/22 (Loft & Brien, 2021), the calculated costs seem to be a reasonable allocation of capital. Cf. the introduction, moving the average pension of UK citizens towards a sustainable alternative could save 19 tonnes of CO2, matching the government's target of reducing emission with 78% before 2035. It is argued that as the government subsidises fees of sustainable pension funds,

they will become more attractive for employers and employees. With their preference for sustainability, pension funds will be compelled to shift their investment towards companies with more sustainable business practices. Also, as companies need capital investments, they may adapt their business practices in the interest of the pension funds. Pension funds may in addition hold seats in company boards due to their large share of stocks. Here, they can further shape sustainable decisions within companies, as they aim to push unsustainable companies towards greener business practices.

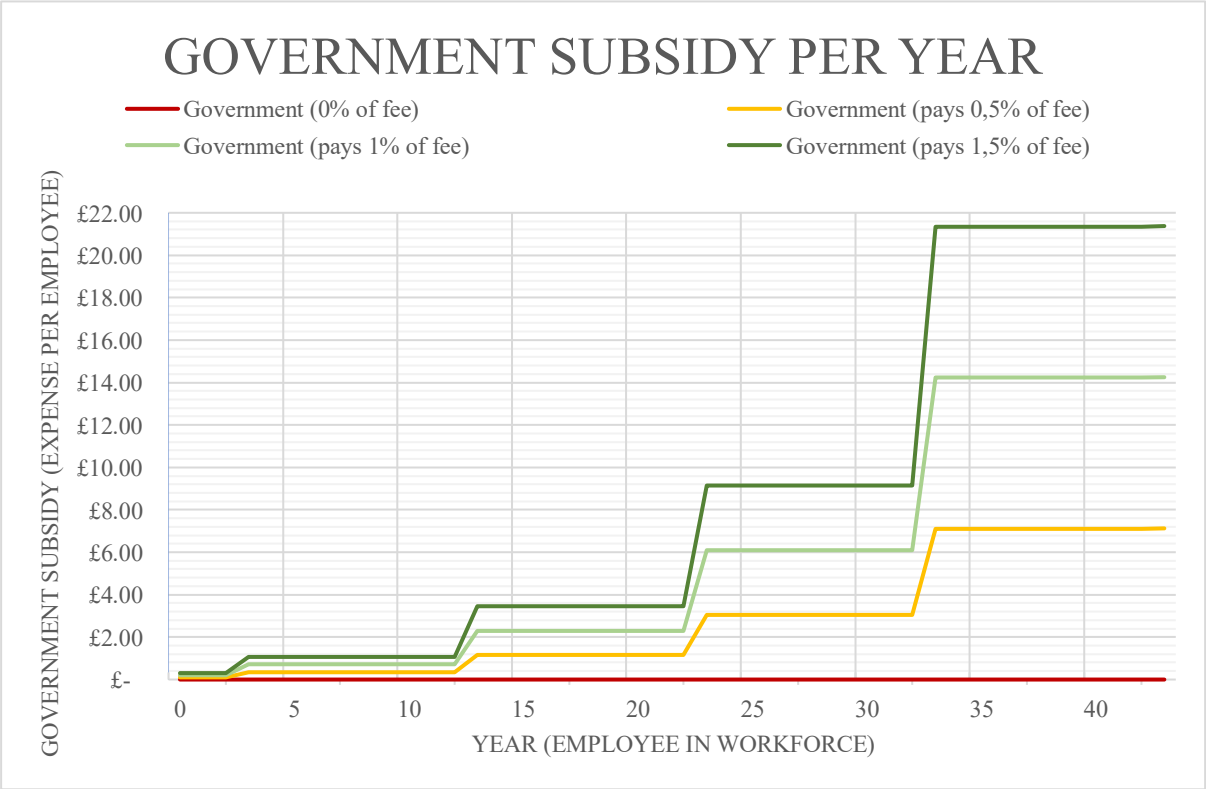

Figure 9. Illustration of government subsidy per year (for each employee depending on age-group)

Education of Pension Fund Managers

In the UK, the Law Commission published the report '*Pension Funds and Social Investment'* in 2017, outlining the degree to which pension funds should consider their investment decisions in relation to social impact. It was made clear that the main objective of pension funds is to "secure the best realistic return over the long term, given the need to control for risks" (UK Government, 2018, p. 7). However, they also concluded that social impact investments are not subject to a sacrifice of profitable returns (UK Government, 2018). This is also confirmed by the literature, which suggests that sustainable investments do not sacrifice profitable return (Owadally et al., 2021). This indicates that the objective of maximising profits does not contradict sustainable investing. Thus, educating pension fund managers about shifting their investments towards a sustainable alternative is suggested. The aim of this is to

ensure that fund managers do not choose to invest in unsustainable companies, because of a potential belief that the profitability of these investments outweighs a potential profitable competitive advantage of a fee reduction with the government subsidy. This addresses the main limitation of our proposed government subsidy solution, which is based on the notion that pension fund managers' main objective is profit, based on profit maximisation theory and legal requirements (UK Government, 2018).

6. Limitations and alternative solutions

Our proposed model to move pensions towards a more sustainable alternative involves introducing a government subsidy and education of pension fund managers. This poses a few limitations given this approach centers around four main stakeholders: pension funds, employers, employees, and the government. We recognise that there might be a need for further interventions, which address more stakeholders, or address the stakeholders differently, for this issue to be adequately tackled.

Firstly, the solution is limited to focusing on one type of pension and only including companies that manage their pensions externally, as companies that manage their pensions internally are not considered. Pension providers such as the Pension Protection Fund (PPF) could also have been explored in more detail as they play an important role in protecting individuals with a defined benefit pension in the event of their employer's insolvency (Pension Protection Fund, n.d.). As these savers are exposed to market risk in the event of an economic downturn (Boyce & Ippolito, 2002), it could be further investigated how the implementation of our proposed solution would affect the insurance companies which cover the funds' financial obligations to individual savers.

Additionally, we recognise that further government support in the form of tax reliefs can also be used to subsidise pensions. As investors will be motivated by financial returns, providing tax benefits can help yield transformation of the whole system towards more green investments. Currently, savers do not have to be concerned about where their money is invested, as they receive a considerable return no matter which fund they are investing in (AJBell, n.d.). This could also explain why pensioners rely on the default settings recommended by their employers instead of actively selecting investment options (Katelazou
& Micheler, 2022). Thus, bringing about sustainable business practices could potentially also be targeted with higher tax reliefs for sustainable funds connected to the institutional layer of the installation.

On the other hand, the implementation of a harder approach using taxations for nongreen organisations and unsustainable methods may be effective as the concept of positive punishment can justify the theory behind taxations. Skinner (1938) developed the concept of operant conditioning, specifically the notion of positive punishment, which involves adding a negative consequence after an unwanted action. This can theorise the effectivity of taxations on reducing a carbon footprint, amongst other unsustainable actions as it enforces organisations to remodel themselves to be sustainable to prevent reducing their profit margins. The use of environmental taxes has been effective in reducing carbon footprint, as the tax increases the price of the product in order to reflect the price of the environmental harm the transaction will cause (OECD, 2011). With an estimated 13% of pension funds being invested in fossil fuels, the concept of taxing pension scheme providers that invest in unsustainable systems may impact the rate of investment (Egli et al., 2022). The use of environmental taxes has been significantly effective economically and environmentally, raising €299.9 billion, accounting for 5.4% of the total tax revenue (European Commission, 2021). To summarise, enforcing a harder approach through increasing the price of unsustainable commodities can intervene to remodel organisations with unsustainable business practices.

An alternative solution to resolve the issue of a transparency deficit within the pension fund scheme would be through the concept of an all-inclusive multi-brand app. This would allow for autonomy in choosing a fund for employees. Appendix 8.5 reveals a prototype of the conceptualised app that resolves the issue of transparency through including a variety of pension funds available to the user, rating the scheme in terms of sustainability through red, yellow, and green stickers and listing pros and cons of each fund. It also provides the convenience of facilitating the option to switch the users current fund to another fund without the hassle of having to physically contact both pension providers to switch. The absence of convenience can hinder the progression towards change as the current pension system lacks the facilities for users to access information about sustainable pension efficiently and be able to change their pension scheme (Hinde et al., 2009). The convenience of being able to change your current pension scheme through an app can limit the hesitation users may have to partake in change (Fung, 2013). Auger (2014) argued that increasing transparency can evoke feelings of trust, but the prototype also allows users to be informed on which pension is most effective to invest in.

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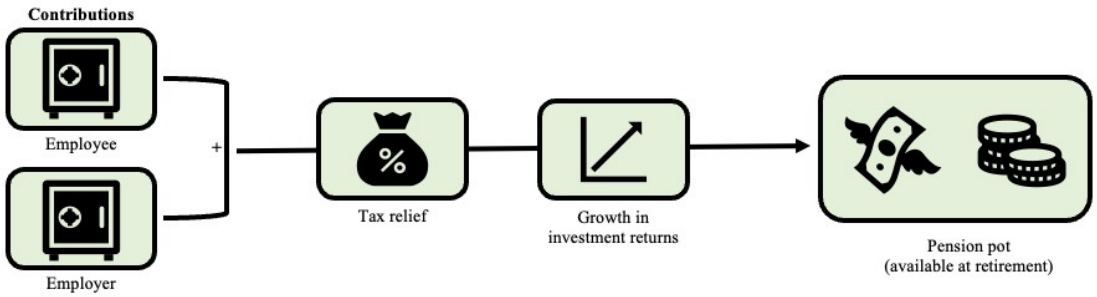
8. Appendices

8.1 Defined Contribution Scheme



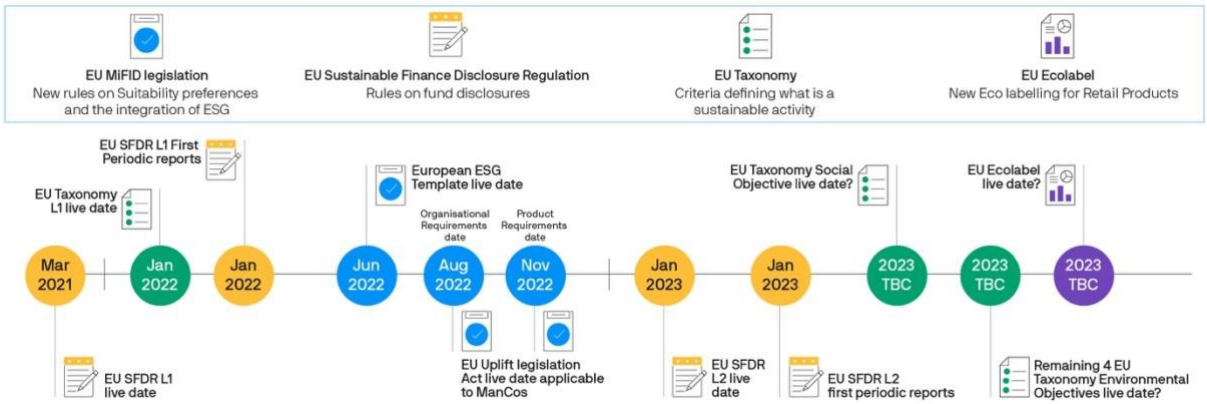
8.2 Recommendations by TCF

Recommendations and Supporting Recommended Disclosures

Governance	Strategy	Risk Management	Metrics and Targets
Disclose the organization's governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.
Recommended Disclosures	**Recommended Disclosures**	**Recommended Disclosures**	**Recommended Disclosures**
a) Describe the board's oversight of climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	a) Describe the organization's processes for identifying and assessing climate-related risks.	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
b) Describe management's role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	b) Describe the organization's processes for managing climate-related risks.	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

11 recommendations by TCF (Task Force on Climate-related Financial Disclosures, 2017).

8.3 EU development of regulation, taxonomy, and Ecolabel for SFDR



EU development of regulation, taxonomy, and Ecolabel for SFDR (J.P. Morgan Asset Management, n.d.)

8.4 Government Subsidy Information and Calculations

Pension fund current system / pension fund with less that 50% green or yellow (transition) stocks

Age group	Average pension pots per age	Fee of pension pot (0.75%)	Government subsidy of fee (pays 0% of fee)	Fee paid by employer	Benefit to Employer
16-24	£ 2,700.00	£ 20.25	£ -	£ 20.25	£ -
25-34	£ 9,500.00	£ 71.25	£ -	£ 71.25	£ -
35-44	£ 30,600.00	£ 229.50	£ -	£ 229.50	£ -
45-54	£ 81,200.00	£ 609.00	£ -	£ 609.00	£ -
55-64	£ 189,700.00	£ 1,422.75	£ -	£ 1,422.75	£ -
65-74	£ 190,000.00	£ 1,425.00	£ -	£ 1,425.00	£ -

Pension fund with min. 50% yellow (transition) stocks

Age group	Average pension pots per age	Fee of pension pot (0.75%)	Government subsidy of fee (pays 0,5% of fee)	Fee paid by employer	Benefit to Employer
16-24	£ 2,700.00	£ 20.25	£ 0.10	£ 20.20	£ 0.05
25-34	£ 9,500.00	£ 71.25	£ 0.36	£ 71.07	£ 0.18
35-44	£ 30,600.00	£ 229.50	£ 1.15	£ 228.93	£ 0.57
45-54	£ 81,200.00	£ 609.00	£ 3.05	£ 607.48	£ 1.52
55-64	£ 189,700.00	£ 1,422.75	£ 7.11	£ 1,419.19	£ 3.56
65-74	£ 190,000.00	£ 1,425.00	£ 7.13	£ 1,421.44	£ 3.56

Pension fund with min 50% green stocks

Age group	Average pension pots per age	Fee of pension pot (0.75%)	Government subsidy of fee (pays 1% of fee)	Fee paid by employer	Benefit to Employer
16-24	£ 2,700.00	£ 20.25	£ 0.20	£ 20.15	£ 0.10
25-34	£ 9,500.00	£ 71.25	£ 0.71	£ 70.89	£ 0.36
35-44	£ 30,600.00	£ 229.50	£ 2.30	£ 228.35	£ 1.15
45-54	£ 81,200.00	£ 609.00	£ 6.09	£ 605.96	£ 3.05
55-64	£ 189,700.00	£ 1,422.75	£ 14.23	£ 1,415.64	£ 7.11
65-74	£ 190,000.00	£ 1,425.00	£ 14.25	£ 1,417.88	£ 7.13

Pension fund with 100% yellow (transition) or green stocks

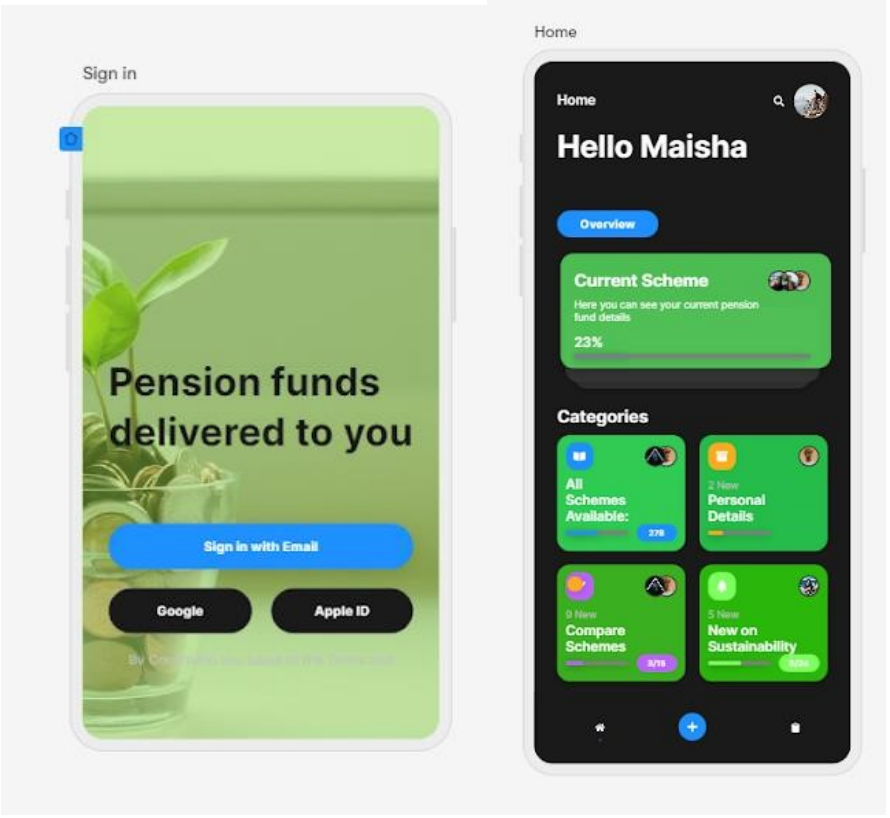
Age group	Average pension pots per age	Fee of pension pot (0.75%)	Government subsidy of fee (pays 1,5% of fee)	Fee paid by employer	Benefit to Employer
16-24	£ 2,700.00	£ 20.25	£ 0.30	£ 20.10	£ 0.15
25-34	£ 9,500.00	£ 71.25	£ 1.07	£ 70.72	£ 0.53
35-44	£ 30,600.00	£ 229.50	£ 3.44	£ 227.78	£ 1.72
45-54	£ 81,200.00	£ 609.00	£ 9.14	£ 604.43	£ 4.57
55-64	£ 189,700.00	£ 1,422.75	£ 21.34	£ 1,412.08	£ 10.67
65-74	£ 190,000.00	£ 1,425.00	£ 21.38	£ 1,414.31	£ 10.69

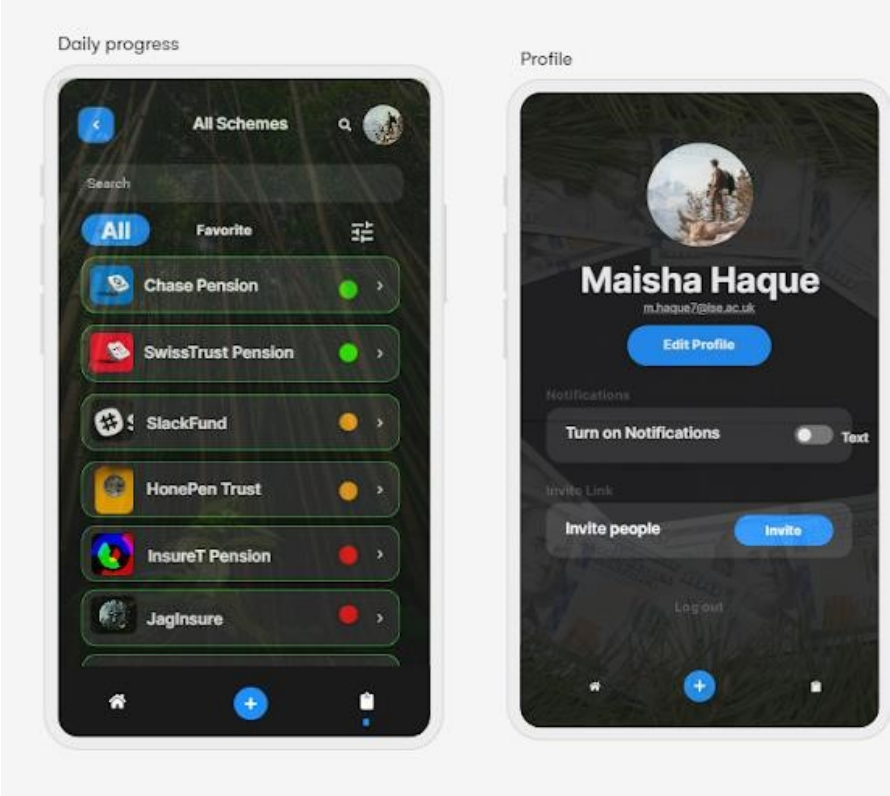
8.4.2 Calculation of Total Government Expense for Subsidy (Green Funds)

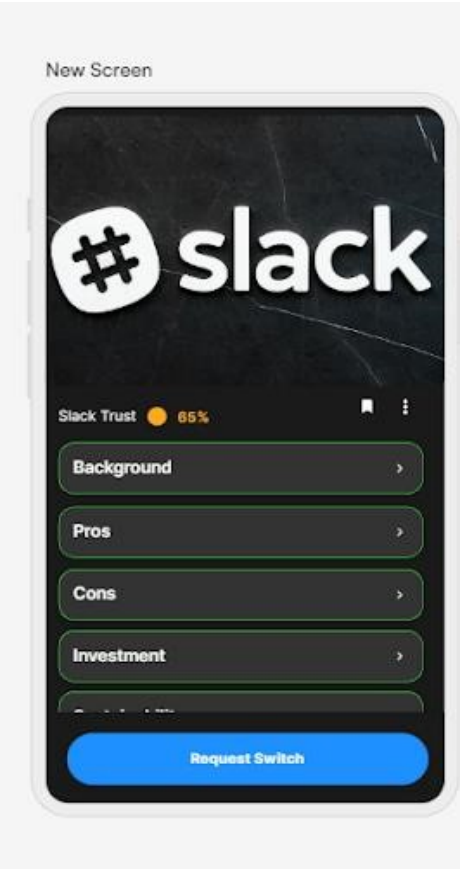
Age group	No. of people with pension pot (approx. 80% in each age group)	Subsidy paid by government (1% of total fee)	Government expense by age group
16-24 (excluded)	*not taken into account (only 20%)*		
25-34	4520000.00	£ 0.71	£ 3,209,200.00
35-44	4520000.00	£ 2.30	£ 10,396,000.00
45-54	4520000.00	£ 6.09	£ 27,526,800.00
55-64	4520000.00	£ 14.23	£ 64,319,600.00
65-74	4520000.00	£ 14.25	£ 64,410,000.00
Calculations/explanations	22.600.000 people participates in pension funds. given age group.	Number of people times fee for the This no. is divided equally between each age group.	

Sum of government expense (all age groups) £ 169,861,600.00

8.5 Proposed App to address Transparency limitation.






New Screen
slack
Slack Trust
65%
Background
Pros
Cons
Investment
Request Switch