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# Greener Pensions, Greener Choices: Linking Investments to Sustainable Behavior

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# Greener Pensions, Greener Choices: Linking Investments to Sustainable Behavior<sup>\*</sup>

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## Abstract

This paper examines how offering sustainable investment options influences sustainable consumption behavior. We combine a natural experiment in which individuals receive an option to switch to a pension plan with a strong sustainability profile with detailed household register data. This sustainable option improves sustainable consumption, as reflected in electric vehicle adoption and reduced vehicle emissions. The effect is primarily driven by individuals who do not choose the sustainable plan. We show that making sustainable investment available can create positive spillover effects on other sustainable behaviors, highlighting the potential of financial tools to support broader societal change.

**Keywords:** Household finance; sustainable investments; sustainable consumption; pension investments; sustainable pension plans; electric vehicles

**JEL codes:** G11; G51; D14

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# 1 Introduction

Does access to sustainable investments reinforce or undermine sustainable consumption? With assets exceeding USD 30.3 trillion in 2022 (GSIA, 2023), sustainable investing is now widely regarded a key instrument for addressing major societal challenges, including climate change (Bénabou and Tirole, 2010; Broccardo, Hart and Zingales, 2022). A rapidly growing body of research documents a strong demand for socially responsible investment (SRI) products (e.g., Barber, Morse and Yasuda (2021); Bauer, Ruof and Smeets (2021); Anderson and Robinson (2022); Ceccarelli, Ramelli and Wagner (2024)), often motivated by pro-social preferences (e.g., Hong and Kostovetsky (2012); Riedl and Smeets (2017)). Yet, the relationship between households’ sustainable investments and other pro-environmental behaviors, particularly consumption, remains underexplored. While recent studies have begun to examine how sustainable consumption influences investment decisions, findings are mixed: some suggest complementarity (Brunen and Laubach, 2022), whereas others point to offsetting behavior (Famulok, Kormanyos and Worring, 2024). However, how sustainable consumption responds to the introduction of new sustainable investment options remains an open question. This paper addresses that gap by exploiting a natural experiment involving the introduction of a sustainable pension plan to examine the broader ex-post effects of sustainable investment on households’ consumption behavior.

In this paper, we study a unique natural experiment in which a Danish pension fund, P+, in 2023 for the first time provided its members with an opportunity to switch from a standard variable-annuity product to four alternatives, including one with a strong sustainability focus. Exploring this offer, we provide the first causal evidence that offering a sustainable investment option has a positive effect on sustainable consumption. We show that access to a pension plan with a strong sustainability focus leads members to buy more electric vehicles and to reduce the emission profile of their vehicle fleet. The effect is primarily driven by individuals who ultimately choose to forego the sustainable pension option.

To frame our empirical analysis, we introduce a stylized conceptual framework for the sustainable investment and consumption. The model assumes that an agent draws utility from both consumption and sustainable behavior, hereby linking it to the literature connecting sustainable actions to warm glow, altruism, social norms, moral licensing, signaling, and emotions (Andreoni, 1995; Taufik, Bolderdijk and Steg, 2015; Riedl and Smeets, 2017; Bauer et al., 2021; Heeb, Kölbel, Paetzold and Zeisberger, 2023; Christiansen, Jansson, Kallestrup-Lamb and Noren, 2023). The agent can undertake two non-

exclusive and costly actions to reduce emissions: invest in a sustainably-labeled asset and purchase sustainable goods. The model generates an important prediction, namely that rejecting a sustainable investment does not necessarily imply anti-sustainable preferences. Instead, the choice depends on the sum of the expected risk-adjusted return differential between the sustainable and conventional assets and the perceived environmental gain from investment and consumption. When this combined payoff is negative, the agent rationally declines the sustainable investment yet compensates by increasing sustainable consumption. For example, an agent who values sustainability but doubts the financial or environmental efficacy of the sustainable portfolio may still achieve her goals through higher spending on eco-friendly goods — a mechanism our empirical results later confirm.

We begin our empirical analysis by documenting which individual background characteristics are associated with selecting a sustainable pension plan. We find that among P+ members, women and married individuals are more likely to select the sustainable plan, whereas higher income and financial sophistication are associated with a lower likelihood of choosing the sustainable option. Furthermore, individuals who previously engaged in sustainable consumption, such as owning an electric vehicle, are more likely to choose the sustainable plan, even after controlling for risk preferences. These patterns align with existing literature, reinforcing the link between demographic and occupational characteristics, sustainability preferences, and investment decisions (Riedl and Smeets, 2017; Bauer et al., 2021; Anderson and Robinson, 2022; Andersen, Chebotarev, Filali-Adib and Nielsen, 2024). The results also support our theoretical model’s prediction that a subset of individuals with strong sustainability preferences consistently opts for sustainable investments. In contrast, individuals with moderate sustainability preferences may forgo such options, particularly when their beliefs about the investment’s risk-return profile, shaped by their level of financial sophistication, differ (Anderson and Robinson, 2022).

Next, using the natural experiment, we show that offering a sustainable pension option increases sustainable consumption, proxied by propensity to buy an electric vehicle and by average car-fleet emissions. To establish a causal link, we focus on car buyers among P+ members who received the offer, *treatment group*, and compare them to a matched sample of car buyers from the general population, *control group*, over time. P+ members hold a university degree and tend to have higher incomes, making it essential to match on these characteristics to construct a comparable control group. We demonstrate that, during the pre-treatment period, 2019–2022, electric vehicle adoption and car-fleet emissions evolved similarly across the treatment and control groups. In 2023, however, following the offer, individuals who received the pension plan option became significantly more

likely to purchase electric vehicles and to reduce vehicle-related emissions relative to the matched control group. This suggests that the introduction of a sustainable investment option has positive spill-over effects on other sustainable behaviors. Notably, the increase in sustainable consumption is largely driven by those who forego the sustainable pension and choose a conventional pension plan instead, implying that the offer may operate through indirect mechanisms such as increased awareness, change in self-image, or social signaling. The results are consistent with the theory predictions.

Beyond the primary analysis, we explore and subsequently dismiss alternative explanations for the observed increase in sustainable consumption among offer recipients. First, we show that the increase in sustainable consumption only occurs in the months after the individual receives the offer. Second, we show that wealth effects are unlikely to explain our results. Specifically, while the offer may inform pension fund members of their pension wealth and lead to wealth effects, we show that members are not more likely to buy a car after receiving the offer. We also show that members are not more likely to buy an expensive car. In addition, we verify that the higher propensity to buy an electric car is not driven by commuters who can save on fuel costs, is not driven by owners of single-family houses who can charge at home, and that the effect is coming from individuals who either owned a vehicle for a shorter-than-average time or are new owners. The results confirm the robustness of our findings: the offer of a sustainable investment option indeed leads to increased sustainable consumption.

Focusing on pension savings rather than on individual stock holdings has several advantages. First, for most individuals, beyond Denmark, retirement accounts are a primary gateway to financial markets: in Denmark, roughly 60% of adults hold more wealth in pensions than in all other assets combined ([Forsikring & Pension, 2025](#)). Thus, shifting pension savings toward sustainable options represents a substantial and long-term commitment, both at the individual and societal levels ([Bauer et al., 2021](#)). Second, pension savings are not subject to high search costs and limited-participation frictions that characterize direct stock holdings, yielding more transparent identification of the effect of access to a sustainable option and expanding the validity of our findings beyond high-earning and highly-educated individuals, such as subjects in our natural experiment. By combining the individual importance of pension decisions with the institutional influence of pension funds, our setting allows us to examine how sustainable investment offers impact broader behavioral outcomes.

Our main contribution is showing that sustainable consumption and investments are linked. To our knowledge, this paper is the first study to assess how offering sustainable investment options influences non-survey-based measures of sustainable consump-

tion. Previous studies, such as [Barber et al. \(2021\)](#), document that investors are often willing to accept lower financial returns to achieve social or environmental objectives. Similarly, [Christiansen et al. \(2023\)](#) find that SRI investors prioritize social and environmental impact over financial performance. In an experimental setting, [Heeb, Kölbel, Ramelli and Vasileva \(2024\)](#) examine whether green investing crowds out political support for climate policy and find no evidence of reduced support. Our results suggest that such offers generate significant externalities, encouraging more sustainable behavior even among non-adopters. This underscores the policy relevance of broadening access to sustainable investment opportunities, particularly in the pension domain, which encompasses a substantial share of global assets and offers a strategic lever for promoting sustainability.

Our study contributes to the expanding literature on sustainable and socially responsible investing, particularly in terms of motivations, behavior, and economic consequences. Prior research, including [Riedl and Smeets \(2017\)](#), highlights intrinsic motivations—such as social preferences and signaling—as key drivers of SRI. Other work, such as [Christiansen et al. \(2023\)](#) and [Andersen et al. \(2024\)](#), emphasizes demographic and wealth-based determinants, showing that younger investors prefer SRI mutual funds, while older, wealthier individuals tend to favor charitable giving. We corroborate these patterns, demonstrating how demographic and labor market factors shape sustainable pension choices, conditional on risk preferences.

Finally, our analysis also intersects with the literature connecting consumption and investment, such as [Brunen and Laubach \(2022\)](#), who show that sustainable consumption habits, like purchasing eco-friendly products, are predictive of SRI preferences. We provide evidence of complementarity between consumption and investment behavior, in contrast to [Famulok et al. \(2024\)](#), who find that individuals with higher carbon footprints may use sustainable investments as a form of offsetting. Leveraging detailed register data, we reveal a strong correlation between electric vehicle ownership and the availability of sustainable pension plans, thereby confirming that for individuals with strong sustainability preferences, consumption and investment are complements.

The remainder of the paper is structured as follows: Section 2 describes the conceptual framework to help understand the households’ investment and consumption choices. Section 3 provides the institutional background for the pension offer, while Section 4 introduces the data. Section 5 analyzes households’ sustainable pension choices, and Section 6 examines the causal effect of sustainable investment on consumption decisions. Section 7 provides robustness checks, and Section 8 concludes. Additional details and results are included in the Appendix.



## 2 Conceptual Framework

Sustainable behavior has been linked to a range of factors, including altruism, warm glow, social norms, moral licensing, and sentiment (Andreoni, 1995; Kormos, Gifford and Brown, 2015; Taufik et al., 2015; Riedl and Smeets, 2017; Hartzmark and Solomon, 2019; Bauer et al., 2021; Heeb et al., 2023). The existing literature usually examines sustainable actions in isolation, typically focusing on either investment or consumption, with notable exceptions (e.g., Brunen and Laubach, 2022; Famulok et al., 2024; Heeb et al., 2024). We argue that sustainable behavior is multidimensional and that spillovers across domains may obscure true preferences for sustainability. To illustrate this idea, we develop a stylized conceptual framework that highlights the trade-offs and behavioral responses involved in sustainable investment and consumption. The model then serves as the theoretical foundation for our empirical analysis. Although deliberately stylized, the framework captures the essential trade-offs and behavioral responses relevant to our empirical setting.

We model an agent who, in addition to maximizing utility, also targets a specific level of environmental impact. At this stage, we do not take a position on whether the agent seeks a positive, negative, or neutral impact. For tractability, we focus on two channels through which the agent can influence her environmental footprint: sustainable investment and sustainable consumption. This framework parallels the model of prosocial behavior in Bénabou and Tirole (2006, 2010), which combines heterogeneity in altruism and greed with concerns for social reputation and self-respect in the context of sustainable behavior, and the work on moral licensing by Hong, Tirole and Zhang (2024). In our setting, agents derive utility from both consumption (*individual benefit*) and environmental impact (*prosocial behavior*).

Both sustainable actions impose costs: sustainable consumption often carries a price premium (Kearney, 2020), while sustainable investments may entail lower expected returns or higher risk (Riedl and Smeets, 2017; Barber et al., 2021). These trade-offs can compel agents to prioritize actions due to budget constraints. Given the importance of self-image and social signaling in sustainability-related decisions (Taufik et al., 2015), opting out of a sustainable choice may lead to cognitive dissonance. According to cognitive dissonance theory (Festinger, 1957), inconsistency between values and actions generates psychological discomfort, prompting individuals to reduce this tension through cognitive or behavioral adjustments (Harmon-Jones, 2019). In our context, an agent who declines a sustainable investment opportunity may compensate by increasing sustainable consumption to maintain her intended environmental impact.



Formally, we introduce a two-period, partial-equilibrium, discrete-time model in which a representative agent with CRRA utility chooses both her investment type and the composition of her period-one consumption bundle (Pennacchi, 2019). The agent enters the economy in period one with liquid wealth  $W_1 > 0$ . In this period, she must choose her total consumption  $C \geq 0$  and make a discrete portfolio choice  $s \in \{0, 1\}$ , where  $s = 1$  denotes the sustainable and  $s = 0$  the conventional assets. The invested amount is exogenous and identical across options,  $I = I_g = I_b = \bar{I}$ , while the investment outcome is endogenous to the agent's discrete choice. This assumption corresponds to the natural experiment set up with the total amount of pension saving being fixed, while the investment portfolio composition differs between sustainable and conventional plans. The agent selects the optimal sustainable consumption share  $\alpha \in [0, 1]$ , representing the share of her consumption allocated to environmentally-friendly goods. In period two, the agent consumes the proceeds from the investment. The agent's lifetime utility is given by:

$$U_s(C, \alpha) = \frac{C_1^{1-\sigma}}{1-\sigma} + \beta E \left[ \frac{C_2^{1-\sigma}}{1-\sigma} \right] + \lambda v(A), \quad (1)$$

$$\text{where} \quad v(A) = \frac{A^{1-\theta}}{1-\theta}, \quad \theta > 0, \lambda \geq 0.$$

In Equation (1), the first term,  $\frac{C_1^{1-\sigma}}{1-\sigma}$ , represents utility from period-one consumption with risk-aversion parameter equal to  $\sigma$ , the second component,  $\beta E \left[ \frac{C_2^{1-\sigma}}{1-\sigma} \right]$ , denotes the present value of expected utility from period-two consumption with discount factor  $\beta$ , and the final term,  $\lambda v(A)$  captures the utility derived from her environmentally beneficial choices, such as emission reduction,  $A$ .<sup>1</sup> The parameter  $\lambda$  denotes the *sustainability weight*, capturing the agent's valuation of sustainable behavior. If  $\lambda$  is negative, the agent has anti-sustainable preferences, and if  $\lambda > 0$ , the agent values the reduction in emissions. Our assumption of a trade-off between utility from consumption and environmental impact follows the work of John and Pecchenino (1994), who analyze the potential conflict between economic growth and the maintenance of environmental quality in an overlapping generations model.

The agent faces a budget constraint in period one,  $(1 + \alpha\tau)C + \bar{I} = W_1$ , where  $\alpha \in [0, 1]$  is the sustainable consumption share, and  $\tau > 0$  represents the price premium for sustainable (green) goods.<sup>2</sup> The term  $\bar{I}$  is a fixed investment amount allocated to either the sustainable or conventional asset.

<sup>1</sup> $v(A_1)$  is a concave, increasing function with diminishing returns.

<sup>2</sup>The price of conventional (brown) goods is normalized to one,  $p^o = 1$ , so the price of green goods is  $p^s = 1 + \tau$  (Kearney, 2020)

Emission reduction,  $A$ , is determined in period one and depends on both the agent's investment and consumption decisions:

$$A = \eta_s s \bar{I} + \gamma \alpha C, \quad (2)$$

where sustainable investment removes  $\eta_s > 0$  tonnes of emissions per euro saved, and sustainable consumption avoids  $\gamma > 0$  tonnes per euro spent.

Investment options also differ in risk-adjusted returns: let  $(1 + R_s)$  be the stochastic gross return of asset  $s$  realized in period two. Its risk-adjusted moment is defined as  $\tilde{m}_s := E[(1 + R_s)^{1-\sigma}]$ , where  $\sigma > 0$ ,  $\sigma \neq 1$ .

We solve the model via backward induction, beginning with the optimal consumption choices  $C_s$  and  $\alpha_s$  conditional on the discrete investment choice  $s$ . The pair  $(C_s, \alpha_s)$  maximizes utility in Equation (1) subject to the budget constraint.<sup>3</sup> Optimization results in the following interior first-order conditions:

$$\tau C^{-\sigma} = \lambda \gamma A_1^{-\theta}, \quad (3)$$

$$C^{-\sigma} + \lambda \gamma \alpha A_1^{-\theta} = \Lambda(1 + \alpha \tau). \quad (4)$$

Let  $C_g$  and  $C_b$  denote the optimal consumption levels under sustainable ( $s = 1$ ) and conventional ( $s = 0$ ) investment, respectively. Solving Equation (3) yields the optimal green consumption shares:

$$\alpha_b = \left[ 1 - \frac{\tau C_b^{\sigma+\theta}}{\lambda \gamma^{1-\theta}} \right]_0^1, \quad \alpha_g = \left[ 1 - \frac{\tau C_g^{\sigma+\theta}}{\lambda \gamma^{1-\theta} (\eta_s \bar{I})^\theta} \right]_0^1, \quad (5)$$

where  $\alpha_b$  and  $\alpha_g$  are the optimal shares of sustainable consumption under conventional and sustainable investment, respectively.

To determine the optimal choice  $s$ , we substitute the optimal  $(C, \alpha)$  into Equation (1). Let the *financial gap*, difference in risk-adjusted returns, be defined as  $\Delta_u := \beta \frac{(\tilde{m}_g \bar{I})^{1-\sigma} - (\tilde{m}_b \bar{I})^{1-\sigma}}{1-\sigma}$ , and the *environmental gain* from sustainable investment as  $\Delta_a := \lambda[v(A_g) - v(A_b)]$ . The green asset is preferred if and only if the total gain is non-negative<sup>4</sup>:

$$\Delta_u + \Delta_a \geq 0. \quad (6)$$

Now we can use the model to understand what kind of investment and consumption de-

<sup>3</sup>The Lagrangian is  $\mathcal{L} = \frac{C_1^{1-\sigma}}{1-\sigma} + \beta \frac{(\tilde{m}_s \bar{I})^{1-\sigma}}{1-\sigma} + \lambda v(A) + \Lambda[W_1 - \bar{I} - (1 + \alpha \tau)C]$ , where  $v(A) = \frac{A^{1-\theta}}{1-\theta}$ ,  $\theta > 0$ .

<sup>4</sup>For linear  $v$  ( $\theta \rightarrow 0$ ), the gap sum simplifies to  $\ln(\tilde{m}_g/\tilde{m}_b) \geq \lambda \eta_s \bar{I}/\beta$ .

cisions to expect from agents with different environmental preferences. Parameter  $\lambda$  in Equation (1) represents the attitude towards environmental impact. Using  $\lambda$ , we can categorize three types of agents: anti-sustainable agents ( $\lambda < 0$ ), indifferent to sustainability ( $\lambda = 0$ ), and agents with pro-sustainable attitude ( $\lambda > 0$ ).

If  $\lambda < 0$ , the model predicts that the sustainable-consumption share must be equal to zero,  $\alpha_b = \alpha_g = 0$ .<sup>5</sup> The agent would still invest sustainably only if  $\Delta_u \geq |\lambda|\Delta_a$ , i.e., only if the sustainable investment has substantially larger risk-adjusted return compared to the conventional investment.

The agent indifferent to the emission reduction,  $\lambda = 0$ , makes the investment choice based solely on financial return, and sets  $\alpha_b = \alpha_g = 0$ . For a pro-sustainable agent,  $\lambda > 0$ , the sustainable consumption share will always be larger if she forgoes sustainable investment in favor of conventional:  $\alpha_b \geq \alpha_g$ , and the investment choice depends on condition (6). Finally, the model allows us to define a level of  $\lambda$  at which an agent always invests sustainably:

**Definition.** The *threshold green weight*  $\lambda^*$  is the smallest non-negative scalar satisfying:

$$\lambda^* := \frac{-\Delta_u}{\Delta_A} \quad (\Delta_A > 0). \quad (7)$$

Then:

$$\lambda \geq \lambda^* \implies V_g \geq V_b, \quad \text{and the agent always chooses } s = 1.^6$$

To sum up, the model delineates how agents with varying sustainability preferences navigate the trade-off between sustainable investment and consumption. A key insight from the theory is that it is not clear how sustainable investing maps into sustainable preferences. Even an investor with anti-sustainability preferences could choose sustainable funds if she believes that the return is sufficiently high. In contrast, an investor with a high preference for sustainability could forego the green investment option if she believes that the return or the impact is sufficiently low. In these two cases, the model suggests that we can examine consumption decisions to infer sustainability preferences: the anti-sustainability agent would not consume sustainably, whereas the sustainable agent would. However, observing consumption decisions is not sufficient if the agent achieves her sustainability target through investments. To correctly infer preferences for sustainability,

<sup>5</sup>Otherwise, interior condition in Equation (3) cannot hold, since the LHS is positive and the RHS is negative.

<sup>6</sup>When  $v(A) = A$  ( $\theta \rightarrow 0$ ), the abatement gap simplifies to  $\Delta_A \rightarrow \eta_s \bar{I}$ , and equation (7) becomes:  $\lambda_{\text{lin}}^* = \frac{\beta}{\eta_s \bar{I}} [\tilde{m}_b^{1-\sigma} - \tilde{m}_g^{1-\sigma}]$ .

we need to observe both consumption and investment decisions.

The model predictions map directly onto our pension-fund setting. If the offer of a sustainable pension plan triggers the compensation channel, we should observe (i) selective take-up by members with high inferred  $\lambda$  and (ii) larger subsequent electric-vehicle purchases precisely among those who decline the plan. Sections 3–6 put both implications to the data.

## 3 Institutional Background

This section presents an overview of the Danish pension system, outlining its key features and structure, followed by a detailed description of the specific pension fund offer.

### 3.1 The Danish Pension System

The Danish pension system is globally recognized for its robustness and is structured around three pillars, with the second pillar playing a pivotal role in ensuring retirement security (Ministry of Finance, 2020; Mercer, 2024). Comparative assessments place Denmark alongside leading systems such as those of the Netherlands, Sweden, Norway, Finland, and Iceland, with Australia often grouped in because its superannuation system mirrors Denmark’s large occupational direct-contribution funds, even though its base pension is means-tested rather than universal. The Danish system combines universal and occupational pensions to achieve high coverage and economic viability, supported by a strong regulatory framework and efficient management (OECD, 2019). The first pillar provides pension payments irrespective of the labor history. The second pillar consists of occupational pension schemes, which are typically mandatory and negotiated through collective agreements between employers and trade unions (Bovenberg, 2012; Balter, Kallestrup-Lamb and Rangvid, 2020). These schemes are funded and defined-contribution-based, providing a range of financial products tailored to individual needs. Pension funds under the second pillar primarily offer lifelong annuities (57%), ensuring a steady income throughout retirement, and lump-sum payments, which provide flexibility for retirees (Danish FSA, 2017). Around one-quarter of the pension plans are structured as fixed-period annuities, either offered as standalone products or combined with lifelong annuities.<sup>7</sup> Insurance products, such as disability and survivor benefits, are often integrated into these schemes, offering comprehensive coverage beyond retirement income (Andersen, Hougaard Jensen and Rangvid, 2022). Finally, the third pillar consists of

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<sup>7</sup>Payments for at least ten years up to 25-30 years depending on the contract. Pension payments will continue to the relatives if the insured person dies.

voluntary individual pension plans. Together, Denmark’s three-pillar approach combines universality, flexibility, and security, ensuring it remains one of the most effective systems globally (OECD, 2023).

### 3.2 The P+ Pension Fund and the Offer

In this paper, we analyze the administrative data of the pension fund P+ - a Danish pension fund serving approximately 110,000 members in 2024.<sup>8</sup> The fund provides occupational pension schemes for individuals eligible for membership in two trade unions, primarily targeting academics in fields such as law, economics, social sciences, communication, management, and engineering. Thus, these pension schemes belong to the second pillar of the Danish pension system. In 2023, P+ had DKK 150.1 billion in assets under management (around USD 20.9 billion). P+ embeds sustainability at the core of its investment strategy and applies exclusions across all portfolios.

In 2023, P+ introduced an initiative offering most of its non-retired members the opportunity to transition from the existing standard variable-annuity product to a newly designed pure variable-annuity product. The offer was presented exclusively to “standard” members, whereas “special” members—such as retirees, expatriates, and inactive members—were excluded. Table 1 presents our sample of non-retired members, representing approximately 85% of the total members, 93,156 out of 110,000 members. In addition, 18% of standard members did not receive an offer. Further details on the selection procedure are provided in the data section. The standard product featured a predetermined medium risk profile and incorporated basic sustainability elements, as set by the pension fund. In contrast, the new product enabled members to better align their investment choices with individual risk tolerance and sustainability preferences. Figure 1 illustrates the structure of the offer and the related decision-making context.

Members receiving the offer had the option to take no action and retain their current variable-annuity product (*no choice*). Alternatively, they could actively select one of four options: three plans featuring *conventional sustainability* levels, each differentiated by its risk profile (low, medium, or high), or a plan focused on *strong sustainability* with a fixed medium risk profile. As the first labor-market pension product in Denmark, P+ Sustainable promises a carbon-neutral portfolio as early as 2030, see Figure 4 in the Appendix. The strategy for the sustainability product tightens negative screens (outright bans on fossil-fuel extraction, weapons, tobacco, and alcohol) and accelerates disinvestment if companies lag on human or labor rights, biodiversity, or tax-governance

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<sup>8</sup>For more information about the pension fund, see <https://pplus.dk/en>

standards. To underpin those ambitions, P+ signed the UN-convened Net-Zero Asset Owner Alliance, setting five-year science-based decarbonization targets and disclosing its stance on thermal-coal, oil, and gas.<sup>9</sup> In 2024, the P+ went further, announcing it would exclude any new private-markets managers dedicated to fossil-fuel extraction.<sup>10</sup> The sustainability-focused medium-risk portfolio has delivered one-year returns equivalent to those of the conventional medium-risk benchmark, helped by the performance in renewable infrastructure and green equity.<sup>11</sup> It is important to note, that from 2024 and onward, members of P+ can also pick high, medium, or low-risk variants of P+ Sustainable plan, where each path channels a larger share of savings into climate-solution equities, green bonds, and renewable-infrastructure funds than the conventional plan.

Relevant P+ members received the offer in a secure digital letter that directed them to their personalized P+ webpage.<sup>12</sup> To explore and activate the offer, P+ members were required to log into their personalized P+ webpage, also included in the letter, which provided access to their individual pension information. The webpage communicated the differences between the four pension plans to members by presenting relevant outcomes, including best-case, expected, and worst-case future pension payouts. Neither explicit measures of volatility or similar risk metrics were provided, nor was it explicitly defined how the sustainable plan differed from the conventional plans.<sup>13</sup> Assuming that investors base their investment choices on names follows previous research, cf. [Cooper, Gulen and Rau \(2005\)](#) and [Christiansen et al. \(2023\)](#). Trust in P+ is high among its members, reflecting the broader trend of strong institutional trust within the Danish population ([Misiura and Rozkwitalska, 2019](#)). Consequently, greenwashing is not considered a significant concern in this context.

Before presenting the new pension options in P+'s personalized webpage, members were given a survey by P+ designed to assist them in making an informed decision.<sup>14</sup> The survey assessed the members' preferences regarding risk and return, attitudes toward financial losses, and the importance they placed on environmental sustainability. Based on the survey responses, each member was presented with a list of the four available options, with one option highlighted. For members who indicated that sustainability was important, the sustainable plan was highlighted. For the remaining members, the conventional plan that aligned with their risk preferences was highlighted.

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<sup>9</sup><http://www.unepfi.org>

<sup>10</sup>[www.newprivatemarkets.com](http://www.newprivatemarkets.com).

<sup>11</sup>See <https://pplus.dk/en/investments/return-on-investments/historical-returns>

<sup>12</sup>The content of the letter is reproduced in Appendix 2.1.

<sup>13</sup>The P+ site links members to the industry portal [faktaompension.dk/risiko](http://faktaompension.dk/risiko), which details the investment strategy and risk of all Danish pension plans, including P+.

<sup>14</sup>Appendix 2.2 reproduces the survey questions.

The survey data cannot be combined with the register-based dataset. Still, the survey enables us to analyze how the sustainability preferences expressed by members before making decisions with their ex-post investment choices. Figure 2 presents the survey results, where the Y-axis represents the highlighted option and colors denote the choice made by the member. The figure reveals a strong alignment between the members' stated sustainability preferences and their selected investment plans. Among individuals presented with the sustainable plan as the highlighted option, 93% opted for the sustainable pension plan. Similarly, 94% of the members who were guided toward the medium-risk conventional plan adhered to that choice. In contrast, notable deviations were observed for the high- and low-risk conventional plans. For the high-risk plan, 10% of the members, despite indicating that sustainability was not a priority, selected the sustainable plan, diverging from their stated risk and sustainability preferences. For the low-risk plan, a large proportion of members transitioned to the medium-risk conventional plan instead, reflecting a shift in their risk tolerance.

Survey responses show that members' stated sustainability preferences closely match their actual pension choices. The 2023 product menu also exposes a possible trade-off between a plan's risk profile and its sustainability focus, a question that merits deeper analysis in future work.

## 4 Data

This paper combines individual-level data from two sources: the P+ pension fund and Danish register data available through Statistics Denmark. Both datasets rely on an anonymized version of individuals' personal identification numbers, which allows Statistics Denmark to merge the two datasets. The use of the P+ pension dataset is novel in the empirical household literature, whereas the Danish register-based household data has been widely used in numerous studies, including Andersen et al. (2024); Epper, Fehr, Fehr-Duda, Kreiner, Lassen, Leth-Petersen and Rasmussen (2020); Jensen and Johannesen (2016).

The register data contains economic, financial, and personal information for the entire Danish population, including details such as gender, date of birth, number of children, marital status, and region of residence. This information enables the identification of individuals, households, and generations over time. Data from the Danish Tax and Customs Administration provides information on income, wealth, and portfolio holdings. Financial institutions supply details about customer deposits and security investments, while employers report wages paid to their employees. This ensures comprehensive and



accurate financial data. Educational records include all completed formal and informal education levels, registered annually. We use these records to measure education levels and fields of study. Individuals holding a Bachelor’s or Master’s degree in economics, business, or finance are classified as financially sophisticated and referred to as economists. The employer-employee dataset includes demographics, firm and plant IDs, addresses, and employment characteristics such as industry and managerial status.

We use vehicle consumption as a proxy for sustainable consumption. Cars are a common proxy for consumption and have been used in prior literature, such as [Berg, Nielsson and Streitz \(2024\)](#) and [Jensen and Johannesen \(2016\)](#). Car expenses represent a significant share of household consumption, and we have unique data on this aspect from the Motor Vehicle registry (DMRB), provided by Statistics Denmark. Vehicle data includes monthly and yearly records on vehicle ownership, with details such as vehicle type, use, model, fuel type, geographic location, and purchase price. It also contains emissions data, including CO<sub>2</sub>, CO, NO<sub>x</sub>, and HC levels.

Our first measure of sustainable consumption is the ownership of an electric vehicle (pure electric vehicles and plug-in hybrids) within the household, while ownership of a conventional combustion engine vehicle serves as a proxy for conventional consumption. We construct a dummy variable equal to one if an individual owned at least one EV in 2022, and zero otherwise. Another measure of sustainable consumption is the average CO<sub>2</sub> emission of household vehicles owned in 2022. Although households may not be fully aware of the exact emissions of their vehicles, the periodic vehicle tax is directly related to CO<sub>2</sub> emissions, providing households with a proxy for their vehicles’ sustainability. The average CO<sub>2</sub> emissions are calculated based on the technical passport emission characteristics of all vehicles owned by an individual in a given year.<sup>15</sup>

The P+ pension fund data set provides detailed information about its 93,156 non-retired members (85% of the total member population). We have access to information about the 2023 pension plan offer, certain demographic characteristics, and time-series data about members’ pension portfolios. Moreover, the data includes information about whether and when members received an offer to switch plans, whether and when they accepted the offer, and the plan they ultimately selected. For pension account details, we have information about the current plan, total savings, return rates, and the insurance features of the plan.

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<sup>15</sup>Average emissions are calculated as follows:  $\text{Emissions}_{it} = \frac{\sum_{j=1}^N \text{Emissions}_{jit}}{N_{it}}$ , where  $\text{Emissions}_{jit}$  represents the technical passport emission characteristics of vehicle  $j$  registered to individual  $i$  in year  $t$ , and  $N_{it}$  is the total number of vehicles.

The final dataset includes just under 80,000 members of the P+ pension fund.<sup>16</sup> Table 2 provides descriptive statistics for various groups of P+ members, showing means and standard deviations for variables related to demographics, education, workplace, financial characteristics, and car consumption. The table separates P+ members into categories such as those who did not receive an offer, those who received an offer, those who made a choice, and subgroups for each of the four pension choices. The descriptive statistics in Table 2 highlight the unconditional relationships between background variables and our sample of P+ members' pension choices. For instance, only 16% of economists chose the sustainable plan, compared to 30% of engineers. Additionally, members who selected the conventional high-risk plan were, on average, younger than those who chose the conventional medium- or low-risk plans.

Table 3 shows further information about the vehicle consumption including car acquisitions in 2023 of the general population and the P+ members for the different pension choices. Fewer P+ members buy a car (9%) than the general population (12%). For the P+ members, the car acquisition also varies across pension choices. The proportion of car buyers who buy an EV is higher for P+ members who choose the sustainable pension plan (48%) than for P+ members in general (33%). P+ members buy on average more expensive cars than the general population, which applies for all car types. Finally, P+ members' vehicles also have lower average CO2 emissions compared to those owned by the general population.

## 5 Sustainable Pension Choices

In this section, we examine the predictors of sustainable pension choices among P+ members. Our analysis focuses on the ex-ante demographic, educational, labor market, financial characteristics, and sustainable car consumption.

To identify the individual characteristics in 2022 that predict sustainable pension choices in 2023, we employ the following linear probability model:

$$p_i = P[y_i = \text{Sustainable}] = \alpha + \beta X_i + \epsilon_i, \quad (8)$$

where  $y_i$  denotes the pension choice of individual  $i$ ,  $X_i$  represents a vector of the explanatory variables of interest, and  $\epsilon_i$  is the error term.

We begin by comparing the choice of a sustainable pension plan to a conventional plan

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<sup>16</sup>The sample includes active P+ members present in all registers listed in the section above. The availability of the data is described in Table A1 in the Appendix.

across varying risk levels (low, medium, and high). Here, the dependent variable  $y_i$  is a binary variable that equals one if individual  $i$  selects a sustainable (medium-risk) plan and zero if she chooses any conventional alternative:

$$y_i = \begin{cases} 1 & \text{if } i \text{ chooses a } \textit{Sustainable (medium risk)} \\ 0 & \text{if } i \text{ chooses any Conventional } \textit{low, medium, or high risk.} \end{cases} \quad (9)$$

Column (1) of Table 4 presents the estimation results. The results illustrate the relationship between EV ownership in 2022 (a measure of sustainable consumption) and the selection of sustainable pension plans in 2023. The results reveal a strong positive association between EV ownership and the choice of a sustainable pension plan. This suggests that individuals who have already demonstrated a preferences for sustainability, reflected in consumption behaviors, are also more likely to make sustainable investment choices, which aligns with the previous literature and is established in the model.

As outlined in the theoretical framework, however, the observed relation between sustainable consumption and investment choices might not be sufficient to identify sustainability preferences when pension members perceive the financial return or environmental impact of sustainable investments to be low. This interpretation is supported by estimated associations between background characteristics and the likelihood of selecting the sustainable pension plan. For instance, financial background variables, such as financial sophistication, measured by education in economics, finance, or business, and higher income, are negatively correlated with the selection of the sustainable plan. Similarly, individuals who directly participate in the stock market (SMP) and those with a higher risky asset share are less likely to choose the sustainable option. By contrast, married individuals and women are more likely to opt for the sustainable plan. These findings suggest that some individuals who might otherwise engage in sustainable consumption (Table 2) nevertheless reject the sustainable pension option—potentially due to beliefs about its risk-return profile or real-world impact, which may be shaped by greater financial sophistication<sup>17</sup>.

However, directly comparing the sustainable medium-risk plan with all conventional alternatives is imperfect, as risk preferences might influence the decision. For instance, individuals may weigh the trade-off between a high-risk investment and a sustainable

<sup>17</sup>In the survey informing members about the sustainable option, the pension fund states that they, quote, *expect that both the risk level, costs, and returns can be compared to investments without an extra high focus on ... sustainability. However, you may experience greater return fluctuations along the way.* This may suggest to financially sophisticated members a different risk-return trade-off compared to the one presented in the plan description (Appendix A.2.3).

focus. Fortunately, the offer setup allows us to control for risk preferences by comparing individuals choosing sustainable medium-risk plans with those choosing conventional medium-risk plans. To address this, we redefine the dependent variable in Equation (8) as follows:

$$y_i = \begin{cases} 1 & \text{if } i \text{ chooses a } \textit{Sustainable (medium risk)} \\ 0 & \text{if } i \text{ chooses a } \textit{Conventional medium risk} \end{cases} \quad (10)$$

Column (2) of Table 4 presents the estimation results. Married individuals remain more likely to choose the sustainable plan; however, when controlling for risk preferences, women are less likely to switch to a sustainable plan. Economists are still less inclined to choose sustainability. Wealth indicators, such as income and pension wealth, are negatively associated with sustainable choice. Interestingly, individuals with a higher portfolio risk share are more likely to select the sustainable option. Lastly, the EV ownership indicator remains significantly and positively related to choosing a sustainable pension plan. Overall, the empirical results are not strongly dependent on how we define the alternative conventional investment option.

In the analysis above, we limit the choice set for an individual to two options: sustainable versus conventional plans, both conditional and unconditional on the risk profile. However, P+ members face a choice among four distinct profiles, with only one option possible. We also show that the results are robust to using a multinomial logit model where we do not assume a natural ordering of plans. Table 5 presents the effects of marital status, gender, economist, income, pension wealth, risky share, and EV ownership, respectively, on the likelihood of selecting one of the four plans.

Overall, our results indicate that ex-ante characteristics, such as gender and marital status, are positively associated with the selection of a sustainable pension profile. Conversely, financial sophistication, risky share, and wealth reduce the probability of choosing a sustainable option. Moreover, the analysis reveals a strong positive correlation between ex-ante sustainable consumption, measured by electric car ownership, and sustainable investment. Combined with the aggregate survey results described in Section 3, these findings highlight the complementarity between sustainable consumption and sustainable investment for individuals with high sustainability preferences .

## 6 Sustainable Pension and Consumption Choices

The previous analysis shows that individuals with sustainable preferences are more likely to invest accordingly when given the opportunity. We now examine how consumption behavior evolves ex post when individuals can allocate a considerable share of their wealth

to investment options aligned with sustainable values, shifting the focus from correlation to causation. The natural experiment also provides insights into the broader impact of offering such pension alternatives. The large financial stakes, combined with generally low engagement levels, may dampen engagement further. Thus, simply making value-aligned choices available to individuals may influence behavior in other areas. We proceed by examining whether offering sustainable pension options generates spillover effects on individual consumption, specifically focusing on individuals who choose conventional plans over sustainable ones.

To estimate the causal effect of receiving an offer to invest sustainably, we employ the difference-in-differences (DiD) approach, comparing changes in sustainable consumption between P+ members who received the offer and a control group consisting of a matched sample from the general population. We proxy sustainable consumption using car purchases, restricting the sample to individuals who bought cars between 2019 and 2023. Because car purchases are infrequent, the data constitute an unbalanced panel. The treatment group consists of P+ members who received the offer in 2023. We track these individuals' car purchases over the sample period and compare their likelihood of buying an electric vehicle, as well as the average emissions of their vehicle fleet, with those of the control group. We designate 2019–2022 as the pre-treatment period and 2023 as the treatment year.

Due to the nature of the natural experiment, all members who received an offer were assigned to the treatment group. P+ members differ from the general Danish population across several dimensions, most notably in educational attainment (see Table 2). To construct a suitable control group for each year, we match the sample of P+ members who purchased cars in year  $t$  and received an offer in 2023 with a sample of car buyers in year  $t$  from the general population. We use CEM (coarsened exact matching) (Iacus, King and Porro, 2012), which constructs a matched sample based on age, gender, income, education level, and municipality of residence. Table 6 provides descriptive statistics for the P+ sample and the matched sample in 2022. As the table shows, the matching ensures comparability across characteristics, including sustainable consumption prior to the treatment.<sup>18</sup>

First, we consider the probability of buying an electric vehicle, where the proxy variable equals one if individual  $i$  purchases at least one EV in year  $t$ . Second, we consider the average CO2 emissions in year  $t$  for individual  $i$ 's car fleet. To investigate the effect of receiving the offer to save in a sustainable pension plan on sustainable consumption, we

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<sup>18</sup>We run various combinations of the matching variables for robustness. Including education level and age provides a good match for the sample of P+ members receiving the offer.

estimate the following difference-in-difference regression model:

$$Y_{it} = \sum_{k=2019}^{2021} \gamma_k 1[Year_t = k] \times Offer_i + \beta_{offer} 1[Year_t = 2023] \times Offer_i + Offer_i + Year_t + X_{it}^\top \theta + \varepsilon_{it}, \quad (11)$$

where  $Y_{it}$  measures the level of sustainable consumption of individual  $i$  at time  $t$ .  $Offer_i$  is equal to one if individual  $i$  received an offer to change their pension plan and zero otherwise. The control group consists of the matched sample of all P+ members who bought cars in the corresponding year and received an offer in 2023.  $Year_t$  represents year dummy variables. Coefficients  $\gamma_k$  in  $\sum_{k=2019}^{2021} \gamma_k 1[Year_t = k] \times Offer_i$  measure the pre-trends in the propensity to buy an electric vehicle and car-emissions by comparing the behavior of treated and control groups.<sup>19</sup> The coefficient of interest  $\beta_{offer}$ , captures the spillover effect of the sustainable investment offer on sustainable consumption, with a positive value indicating a positive effect and a negative value indicating the opposite.

Tables 7 and 8 document the results of estimating Equation (11) for the propensity to buy an electric vehicle and for average car-emissions, respectively. The findings reveal that car-buying P+ members who received the offer to switch to a sustainable pension scheme are more likely to purchase an electric car and have lower CO2 emissions compared to a matched sample of car buyers. The results suggest that the information treatment, in the form of offering members the opportunity to save sustainably, has a positive spillover effect on their sustainable consumption behaviors.

Finally, we analyze whether the significant increase in sustainable consumption originates from individuals who chose a sustainable pension plan or from those who passed over the opportunity to invest sustainably. Therefore, we estimate the following DiD regression model:

$$Y_{it} = \sum_{k=2019}^{2021} \gamma_k 1[Year_t = k] \times Sustainable_i + \beta_{sust} 1[Year_t = 2023] \times Sustainable_i + \sum_{k=2019}^{2021} \mu_k 1[Year_t = k] \times Conventional_i + \beta_{conv} 1[Year_t = 2023] \times Conventional_i + Year_t + Sustainable_i + Conventional_i + X_{it}^\top \theta + \varepsilon_{it}, \quad (12)$$

where  $Sustainable_i$  is a dummy variable equal to one if individual  $i$  chose a sustainable pension plan in 2023 and zero otherwise.  $Conventional_i$  equals one if individual  $i$  chose a

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<sup>19</sup>Dummy  $Year_t == 2022$  is omitted, thus all the estimation results are presented as relative to 2022.

conventional plan (any risk profile) in 2023 and zero otherwise. The treatment group is the P+ members who made a choice of a pension plan and bought a car, and the control group is the matched sample of car buyers from the general population. The coefficients of interest are  $\beta_{sust}$  and  $\beta_{conv}$  representing the changes in sustainable consumption of individuals choosing sustainable or conventional plans, respectively.

The results in Tables 9 and 10 indicate that P+ members who chose the sustainable pension scheme are not significantly more likely to buy an electric car nor to reduce their car CO2 emissions compared to the control group. Conversely, individuals who chose conventional plans exhibit significantly higher likelihood of purchasing an electric vehicle and lowering their car fleet’s CO2 emissions in 2023 relative to the control group. These findings suggest that the observed effect of the offer is not primarily associated with pre-existing preferences for sustainability but rather with the informational aspect of the offer. Individuals who passed on the opportunity to invest sustainably in their pensions appear to adjust their behavior in other areas, such as car consumption, becoming more sustainable.

Because members choose their own pension plan, the result should be read as suggestive rather than causal. Still, it implies that giving people with only moderate green preferences clear information about sustainable investment options can shape their later decisions and raise their sustainable consumption.

The analysis above demonstrates that an offer to invest sustainably does not operate in isolation; it generates externalities for sustainable consumption. Receiving an offer significantly increases individual sustainable consumption, particularly among those who pass over the opportunity to invest sustainably in their pensions.

The empirical patterns align closely with the two key predictions of our conceptual framework in Section 2. First, we observe selective take-up of the sustainable pension plan. Members of P+ with revealed strong sustainability preferences, those we labeled high- $\lambda$  adopters, are likely to adopt the plan. For the high- $\lambda$  adopters, subsequent sustainable consumption does not change, exactly as the framework implies once both channels of emission reduction are already active. Second, and more striking, the spillover prediction shows up among individuals who decline the offer. The non-adopters increase their sustainable consumption, e.g. electric vehicle purchases, despite foregoing the sustainable pension plan. In terms of our framework, they occupy the intermediate range of  $\lambda$ : they value abatement but are deterred from sustainable consumption by its perceived cost or return uncertainty. Cognitive dissonance then leads them to raise the share of sustainable consumption instead, consistent with equation (5).



Taken together, the results show that receiving an offer of a sustainable investment can increase consumption-side sustainability through precisely the compensation channel that the theory predicts. Informational nudges that expand the menu of impactful choices, therefore, appear most effective for individuals with moderate, not extreme, sustainability preferences.

## 7 Discussion

The results presented above indicate that the offer to invest pension savings sustainably has a non-negative effect on sustainable consumption, primarily associated with the behavior of individuals who opted out of the sustainable pension plan. In this section, we explore alternative hypotheses that could account for the observed effects.

### 7.1 Wealth Effects of Offer

The offer received by P+ members, beyond providing information about a sustainable investment opportunity, may also serve as a reminder of their pension wealth. Such reminders, especially when the pension amount is unexpectedly large, can trigger a wealth effect, potentially leading to increased consumption. In the field of psychology, [Wang, Liu, Lin, Liu, Wu and Cui \(2022\)](#) demonstrate that even brief interventions that elevate perceived socioeconomic status (SES) can heighten the desire for status goods and visible spending. This suggests that feeling relatively wealthier can shift spending toward signaling items, without necessarily increasing total expenditure. Similarly, in economics and finance, wealth shocks, such as unexpected house price gains have been linked to higher marginal propensities to consume (MPC) ([Aladangady, 2017](#); [Bartzoka, 2023](#)).

In our natural experiment, increased awareness of pension wealth could prompt a consumption response, particularly in the form of increased demand for luxury goods like cars. To test this hypothesis, we conduct several empirical analyses, starting with car demand. If a wealth effect were present, we would expect treated P+ members to exhibit a higher propensity to purchase vehicles. To investigate this, we expand the treated P+ sample beyond car buyers to include all P+ members who received the offer and construct a matched comparison group from the general Danish population. [Table 11](#) displays descriptive statistics on car buying and selling behavior for the matched and treated P+ samples. On average, individuals who received the offer did not exhibit a higher propensity to purchase a car in 2023 relative to 2019–2022. In fact, there is a slight increase in the likelihood of selling a car or making no changes to the fleet.

For a more rigorous test, we estimate equation (11), where the dependent variable is a binary indicator equal to one if individual  $i$  purchases a car in year  $t$ , and zero otherwise. Table 12, which pools data from the pre-treatment period (2019–2022), indicates that P+ members who received the offer are not more likely to purchase a car in 2023; in fact, they may be marginally less likely to do so. These findings are confirmed by Table 13, which treats each year in the pre-treatment period separately.

Wang et al. (2022) further suggest that the wealth effect may manifest itself not only in the quantity of goods purchased but in a preference for luxury goods, i.e., more expensive vehicles. Table 14 presents results from estimating equation (11), using as dependent variables the average price of the purchased car, only electric vehicles, and only combustion engine vehicles.<sup>20</sup> The results show that P+ members who received the offer tend to purchase more expensive vehicles, particularly electric ones. However, they do not tend to spend more on combustion engine vehicles. This suggests that the observed increase in car prices is not driven by general wealth effects, but rather reflects a stronger preference for sustainable vehicle choices.

Overall, the analysis of car demand and prices provides no evidence of broad wealth effects resulting from the offer. Thus, this alternative hypothesis does not undermine our interpretations presented above.

## 7.2 Robustness Analysis

In this subsection, we address potential confounding factors that could explain the observed increase in sustainable car consumption among the P+ members who received the offer of a sustainable pension plan.

P+ members received the offer at different points in 2023 (see Figure 3) and our primary analysis above includes all vehicles purchased in 2023, regardless of whether the transaction occurred before or after receiving the offer. To determine whether the offer itself, rather than unobserved characteristics, drives the effect, we consider the two subsamples of the treated group, namely those who purchased a car before and after receiving the offer, respectively. The Vehicle register contains exact car registration dates. We calculate the difference between the month of the car purchase and the month of the offer. Individuals with a non-negative difference are assigned to the post-offer group; those with a negative difference are placed in the pre-offer group. Tables 15 and 16 show that only those who purchased cars after receiving the offer demonstrate increased sus-

<sup>20</sup>Table 14 pools the years 2019–2022 to control for abnormal fluctuations in car prices during the COVID-19 pandemic.

tainable consumption. There is virtually no change among individuals who bought a car prior to receiving the offer. This supports the interpretation that the observed behavioral change is due to the offer’s informational content, not unobserved traits of the treated individuals.

Next, we examine whether cost-saving considerations may explain the results. For instance, individuals with higher education, such as P+ members, might be more attuned to the long-term savings of switching to an EV, especially if they are regular commuters or homeowners. Regular commuters can reduce fuel expenses and are, therefore, more likely to adopt EVs. In Denmark, taxpayers can claim a rebate if their daily commute exceeds 20 kilometers. We define commuters as those receiving such a rebate. Table 1 shows that nearly all P+ members are non-commuters and, therefore, less likely to benefit from commuting-related fuel savings. Another cost consideration is home charging. Individuals in single-family homes can charge EVs at lower electricity rates than at public charging stations. Among P+ members who received the offer, 60% live in single-family homes, compared to about 52% in the general population.<sup>21</sup> Tables 17 and 18 show the effect of housing type on the propensity to purchase EVs and on CO2 emissions. Table 17 indicates that P+ members in single-family homes are more likely to buy EVs than their matched counterparts. Apartment residents are also slightly more likely to do so. Table 18 shows that both groups tend to choose lower-emission vehicles after receiving the offer. These findings suggest that while cost-saving factors may partially contribute to the observed behavior, they account for only a modest portion of the effect.

Lastly, we consider whether vehicle ownership history might influence the decision to purchase an EV. In Tables 19 and 20, we categorize car buyers as long-term owners (those who owned their previous car longer than the average), short-term owners (those who owned their previous car shorter than the average), and new owners (no car ownership in the previous year). While sample sizes are small within each subgroup, the observed increases in EV purchases and reductions in emissions are mainly driven by short-term and new car owners, not long-term owners.

Taken together, the robustness checks consistently reinforce our main conclusion: the offer of a sustainable pension plan has a non-negative, and in many cases, positive effect on sustainable consumption behavior.

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<sup>21</sup>Statistics Denmark: <https://www.dst.dk/da/Statistik/emner/borgere/boligforhold/personer-i-boliger>.

## 8 Conclusion

This paper investigates how the introduction of a pension plan option with a strong sustainability focus affects subsequent consumption behavior. Leveraging a one-off product-menu change at a Danish pension fund, we provide the first causal evidence that the access itself to sustainable investment, even in the absence of take-up, can increase sustainable consumption. Pension fund members who received an offer become more likely to purchase electric vehicles and reduce the average emissions profile of their vehicle fleets when compared to a matched general population sample, indicating that financial product design can reverberate well beyond the portfolio itself.

Our stylized model helps reconcile this finding with seemingly contradictory ex-ante evidence. When the perceived monetary plus environmental payoff of the sustainable asset is negative, agents with moderate sustainability preferences optimally forego the investment yet compensate by shifting their consumption basket. The empirical patterns match these predictions: selective adoption of the sustainable pension plan is concentrated among households with stronger revealed sustainability preferences, whereas the spillover to consumption is driven by non-adopters.

The results carry several implications. First, the findings underscore the importance of analyzing investment and consumption decisions jointly; focusing on only one side of the household balance sheet risks misinterpreting the overall behavioral response to sustainability. Second, expanding sustainable options in retirement and investment appears to generate positive externalities for consumption, suggesting that the increasing availability of investment instruments can be a powerful lever for promoting economy-wide sustainability goals.

Naturally, there are limits to what we can learn from a single natural experiment. Our evidence comes from one Danish pension fund and uses vehicle choices as the primary indicator of sustainable consumption; future work should examine other consumption domains, longer time horizons, and other institutional contexts with weaker pension participation. Nonetheless, the central insight is robust: sustainable investment and sustainable consumption are complements once cognitive and financial trade-offs are fully accounted for. Designing financial products with sustainability in mind can therefore serve as an indirect, but effective, pathway toward more sustainable household behavior.

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# Tables

Table 1: Descriptive Statistics, Pension Fund Members

*Notes:* This table reports descriptive statistics (averages and standard deviations in parentheses) for the P+ pension fund members based on information from P+. Each column shows various subsamples as indicated by the headlines: All members, members in population register (BEF), members who did not receive an offer, and for members who received an offer separate for each of their choices of pension plan.

	All	In BEF	No Offer	Offer	No Choice	Choice	Sustainable	High Risk	Low Risk	Medium Risk
Pension Plan with Pplus:										
Member for more than 12 years	0.12 (0.32)	0.11 (0.31)	0.12 (0.32)	0.12 (0.32)	0.12 (0.33)	0.10 (0.31)	0.14 (0.35)	0.07 (0.26)	0.21 (0.41)	0.15 (0.36)
Depot in 1000 DKK	967.60 (1,280.11)	1,005.94 (1,301.87)	407.70 (893.01)	1,086.92 (1,317.92)	1,078.14 (1,319.72)	1,127.70 (1,308.80)	1,145.58 (1,300.01)	886.92 (1,030.97)	1,546.36 (1,900.60)	1,591.00 (1,623.83)
Ended	0.06 (0.23)	0.06 (0.23)	0.32 (0.47)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Currently contributing	0.62 (0.48)	0.66 (0.47)	0.20 (0.40)	0.72 (0.45)	0.70 (0.46)	0.81 (0.39)	0.83 (0.38)	0.82 (0.39)	0.68 (0.47)	0.79 (0.41)
Balance, no payments	0.30 (0.46)	0.27 (0.44)	0.46 (0.50)	0.27 (0.44)	0.28 (0.45)	0.18 (0.38)	0.15 (0.36)	0.17 (0.38)	0.30 (0.46)	0.20 (0.40)
Disability Pension	0.00 (0.01)	0.00 (0.01)	0.00 (0.03)	0.00 (0.01)	0.00 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Retired	0.00 (0.01)	0.00 (0.01)	0.00 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total premiums, 2022	56,358.24 (49,658.40)	59,434.89 (49,374.38)	20,389.42 (38,401.54)	64,023.59 (48,402.02)	61,993.47 (48,321.47)	73,452.10 (47,655.71)	71,865.45 (41,049.38)	72,225.18 (45,055.32)	60,153.22 (46,863.52)	76,852.29 (54,386.18)
Number of payments, 2022	7.98 (5.49)	8.37 (5.34)	3.14 (4.95)	9.01 (5.03)	8.80 (5.15)	10.01 (4.32)	10.35 (3.93)	10.06 (4.27)	8.46 (5.46)	9.82 (4.51)
Paid all year, 2022	0.63 (0.48)	0.66 (0.47)	0.20 (0.40)	0.72 (0.45)	0.70 (0.46)	0.81 (0.40)	0.82 (0.38)	0.81 (0.39)	0.70 (0.46)	0.79 (0.41)
Demographic Characteristics										
Female	0.52 (0.50)	0.51 (0.50)	0.57 (0.50)	0.51 (0.50)	0.50 (0.50)	0.59 (0.49)	0.51 (0.50)	0.63 (0.48)	0.72 (0.45)	0.54 (0.50)
Age	44.83 (10.81)	44.76 (10.79)	45.08 (11.68)	44.78 (10.61)	45.02 (10.66)	43.63 (10.31)	43.53 (10.43)	41.40 (9.40)	55.61 (10.38)	47.79 (10.48)
Married	0.57 (0.50)	0.58 (0.49)	0.53 (0.50)	0.58 (0.49)	0.57 (0.49)	0.60 (0.49)	0.63 (0.48)	0.57 (0.50)	0.67 (0.47)	0.64 (0.48)
Master's in Engineering	0.27 (0.44)	0.27 (0.44)	0.27 (0.44)	0.27 (0.44)	0.28 (0.45)	0.25 (0.43)	0.33 (0.47)	0.21 (0.41)	0.38 (0.49)	0.26 (0.44)
Master's in Economics and Business	0.24 (0.42)	0.24 (0.43)	0.23 (0.42)	0.24 (0.43)	0.23 (0.42)	0.29 (0.45)	0.18 (0.38)	0.31 (0.46)	0.23 (0.43)	0.29 (0.45)
Master's in Jurisprudence	0.17 (0.38)	0.18 (0.38)	0.17 (0.38)	0.17 (0.38)	0.18 (0.38)	0.16 (0.36)	0.09 (0.29)	0.15 (0.36)	0.12 (0.32)	0.18 (0.38)
Master's in Political Science	0.09 (0.29)	0.10 (0.30)	0.06 (0.25)	0.10 (0.30)	0.09 (0.29)	0.12 (0.33)	0.13 (0.33)	0.13 (0.34)	0.08 (0.28)	0.11 (0.32)
Master's in Sociology	0.05 (0.21)	0.05 (0.21)	0.04 (0.19)	0.05 (0.21)	0.05 (0.21)	0.05 (0.21)	0.09 (0.28)	0.05 (0.21)	0.02 (0.13)	0.04 (0.19)
Master's in Other Fields	0.18 (0.38)	0.17 (0.37)	0.22 (0.42)	0.17 (0.38)	0.18 (0.38)	0.14 (0.35)	0.18 (0.38)	0.15 (0.35)	0.17 (0.38)	0.12 (0.33)
Observations	93,156	86,843	16,365	76,791	63,186	13,605	1,509	7,990	107	3,998

Table 2: Descriptive Statistics, Sample

*Notes:* This table reports descriptive statistics (averages and standard deviations in parentheses) for our sample of P+ pension fund members based on information from P+ and Statistics Denmark. Each column shows various subsamples as indicated by the headlines: All members, members who did not receive an offer, and for members who received an offer separate for each of their choices of pension plan.

	All mean/sd	No Offer mean/sd	Offer mean/sd	No Choice mean/sd	Choice mean/sd	Sustainable mean/sd	High Risk mean/sd	Low Risk mean/sd	Medium Risk mean/sd
Demographic Characteristics:									
Age	43.39 (10.59)	42.64 (10.77)	43.52 (10.56)	43.78 (10.62)	42.38 (10.21)	42.40 (10.34)	40.12 (9.27)	54.84 (10.31)	46.55 (10.39)
Married	0.57 (0.50)	0.54 (0.50)	0.57 (0.49)	0.57 (0.50)	0.58 (0.49)	0.62 (0.49)	0.55 (0.50)	0.68 (0.47)	0.63 (0.48)
Female	0.49 (0.50)	0.44 (0.50)	0.50 (0.50)	0.51 (0.50)	0.42 (0.49)	0.49 (0.50)	0.38 (0.49)	0.28 (0.45)	0.47 (0.50)
Kids at home	1.09 (1.06)	1.03 (1.06)	1.10 (1.07)	1.10 (1.07)	1.13 (1.06)	1.12 (1.05)	1.17 (1.08)	0.68 (0.87)	1.05 (1.03)
Single-family House	0.60 (0.49)	0.58 (0.49)	0.60 (0.49)	0.60 (0.49)	0.62 (0.49)	0.59 (0.49)	0.60 (0.49)	0.71 (0.46)	0.66 (0.47)
Commuter	0.00 (0.03)	0.00 (0.05)	0.00 (0.03)	0.00 (0.03)	0.00 (0.02)	0.00 (0.03)	0.00 (0.02)	0.00 (0.00)	0.00 (0.02)
Education:									
Master's and Higher	0.78 (0.42)	0.75 (0.43)	0.78 (0.41)	0.77 (0.42)	0.81 (0.40)	0.78 (0.41)	0.83 (0.38)	0.67 (0.47)	0.78 (0.41)
Social Sciences	0.45 (0.50)	0.37 (0.48)	0.47 (0.50)	0.46 (0.50)	0.50 (0.50)	0.46 (0.50)	0.51 (0.50)	0.33 (0.47)	0.49 (0.50)
Business	0.21 (0.41)	0.23 (0.42)	0.21 (0.41)	0.20 (0.40)	0.24 (0.42)	0.15 (0.36)	0.25 (0.43)	0.28 (0.45)	0.23 (0.42)
Math/Physics/Engineering	0.27 (0.44)	0.31 (0.46)	0.26 (0.44)	0.27 (0.44)	0.21 (0.41)	0.30 (0.46)	0.18 (0.39)	0.33 (0.47)	0.23 (0.42)
Economist	0.23 (0.42)	0.24 (0.42)	0.23 (0.42)	0.22 (0.41)	0.29 (0.45)	0.16 (0.37)	0.31 (0.46)	0.27 (0.45)	0.29 (0.45)
Other Degree	0.21 (0.41)	0.24 (0.43)	0.21 (0.40)	0.21 (0.41)	0.17 (0.37)	0.24 (0.42)	0.16 (0.36)	0.21 (0.41)	0.16 (0.37)
Manager	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)	0.10 (0.30)	0.08 (0.27)	0.09 (0.29)	0.08 (0.28)	0.13 (0.34)
Services	0.83 (0.37)	0.71 (0.45)	0.85 (0.36)	0.85 (0.36)	0.87 (0.34)	0.86 (0.34)	0.88 (0.33)	0.87 (0.34)	0.86 (0.35)
Workplace:									
Number of Employees	770.86 (1,467.78)	622.38 (1,188.96)	796.87 (1,509.85)	804.56 (1,530.75)	763.24 (1,414.40)	846.67 (1,631.09)	762.71 (1,389.41)	875.48 (1,674.08)	729.22 (1,366.54)
Firm Growth	0.75 (18.37)	0.61 (16.12)	0.77 (18.74)	0.78 (19.24)	0.76 (16.36)	0.82 (19.36)	0.71 (15.13)	0.06 (0.34)	0.87 (17.68)
Sector:									
State	0.44 (0.50)	0.30 (0.46)	0.46 (0.50)	0.47 (0.50)	0.44 (0.50)	0.45 (0.50)	0.46 (0.50)	0.39 (0.49)	0.41 (0.49)
Region	0.06 (0.23)	0.03 (0.18)	0.06 (0.24)	0.06 (0.24)	0.07 (0.25)	0.07 (0.25)	0.07 (0.25)	0.08 (0.28)	0.07 (0.25)
Municipality	0.15 (0.35)	0.08 (0.26)	0.16 (0.37)	0.16 (0.37)	0.16 (0.37)	0.17 (0.38)	0.15 (0.36)	0.09 (0.29)	0.18 (0.38)
Private Sector	0.35 (0.48)	0.59 (0.49)	0.31 (0.46)	0.31 (0.46)	0.33 (0.47)	0.31 (0.46)	0.32 (0.47)	0.43 (0.50)	0.35 (0.48)
Financial Characteristics									
LogValue of income	13.32 (0.38)	13.33 (0.48)	13.32 (0.37)	13.31 (0.36)	13.34 (0.37)	13.26 (0.35)	13.33 (0.37)	13.37 (0.38)	13.40 (0.35)
LogValue of stocks	5.17 (5.79)	5.25 (5.77)	5.15 (5.79)	4.83 (5.73)	6.56 (5.86)	5.79 (5.74)	7.06 (5.77)	5.24 (5.95)	5.88 (5.97)
LogValue of housingwealth	9.95 (6.45)	9.50 (6.64)	10.03 (6.41)	9.99 (6.43)	10.23 (6.32)	9.98 (6.36)	9.95 (6.45)	10.74 (6.05)	10.87 (6.01)
LogValue of bankdeposit	11.68 (1.51)	11.66 (1.49)	11.68 (1.52)	11.69 (1.53)	11.65 (1.43)	11.57 (1.44)	11.55 (1.39)	12.07 (1.40)	11.85 (1.50)
LogValue of mortgage	8.62 (6.74)	8.27 (6.85)	8.68 (6.72)	8.63 (6.72)	8.87 (6.68)	8.64 (6.67)	8.77 (6.76)	8.72 (6.61)	9.15 (6.54)
LogValue of bankloan	7.45 (5.62)	7.56 (5.62)	7.42 (5.61)	7.41 (5.62)	7.51 (5.60)	7.11 (5.66)	7.68 (5.59)	7.20 (5.56)	7.32 (5.57)
LogValue of fin.wealth	12.04 (1.61)	12.03 (1.59)	12.04 (1.62)	12.02 (1.63)	12.16 (1.56)	11.96 (1.55)	12.13 (1.53)	12.47 (1.52)	12.28 (1.62)
Log Pension Wealth	13.79 (1.20)	13.50 (1.32)	13.84 (1.17)	13.84 (1.17)	13.85 (1.16)	13.77 (1.16)	13.65 (1.13)	14.62 (0.96)	14.26 (1.13)
Leverage	1.27 (3.90)	1.25 (2.44)	1.27 (4.10)	1.27 (4.47)	1.27 (1.71)	1.16 (1.29)	1.33 (1.94)	1.05 (1.19)	1.18 (1.33)
LTV	0.58 (0.92)	0.60 (1.08)	0.58 (0.89)	0.57 (0.81)	0.60 (1.20)	0.57 (0.71)	0.64 (1.47)	0.46 (0.47)	0.54 (0.62)
SMP	0.37 (0.48)	0.38 (0.49)	0.36 (0.48)	0.34 (0.47)	0.46 (0.50)	0.38 (0.48)	0.50 (0.50)	0.38 (0.49)	0.40 (0.49)
Risk Share	0.21 (0.31)	0.22 (0.31)	0.21 (0.31)	0.19 (0.30)	0.27 (0.33)	0.22 (0.30)	0.30 (0.34)	0.21 (0.31)	0.23 (0.31)
Electric Car 2022	0.14 (0.34)	0.17 (0.37)	0.13 (0.34)	0.13 (0.33)	0.15 (0.36)	0.20 (0.40)	0.16 (0.37)	0.14 (0.35)	0.12 (0.33)
Emission, CO2	95.28 (40.34)	92.20 (42.78)	95.83 (39.87)	96.18 (39.59)	94.45 (40.95)	83.67 (47.50)	93.94 (41.47)	93.35 (46.38)	98.27 (37.22)
Emission, CO	263.48 (177.49)	259.65 (180.68)	264.15 (176.92)	265.95 (177.66)	256.87 (173.75)	240.92 (192.59)	256.13 (172.35)	249.61 (190.14)	262.56 (170.40)
Emission, HC	7.96 (29.56)	8.19 (30.36)	7.92 (29.43)	8.11 (29.76)	7.15 (28.00)	5.75 (24.20)	7.33 (28.54)	19.54 (47.22)	6.89 (27.22)
Emission, NOX	29.61 (31.67)	29.05 (32.33)	29.70 (31.56)	29.87 (31.82)	29.02 (30.46)	26.03 (28.53)	28.84 (30.43)	37.57 (44.50)	29.82 (30.27)
Car age	7.36 (6.03)	7.27 (6.15)	7.37 (6.00)	7.44 (6.00)	7.08 (6.01)	7.54 (6.28)	6.99 (6.04)	8.53 (5.97)	7.06 (5.87)
Year of car-ownership	3.59 (3.24)	3.21 (3.09)	3.66 (3.26)	30 3.69 (3.28)	3.52 (3.16)	3.61 (3.22)	3.26 (2.97)	4.61 (3.47)	3.95 (3.40)
Observations	79,502	1,1851	67,651	55,055	12,596	1386	7,399	97	3,713

Table 3: Descriptive Statistics, Vehicles

*Notes:* This table reports descriptive statistics (averages and standard deviations in parentheses) for vehicle consumption for the general population, all P+ members in our sample, and separate for each of their choices of pension plan. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Gen. Population mean/b/sd/t	Pplus Members mean/b/sd/t	No Choice mean/b/sd/t	Sustainable mean/b/sd/t	High Risk mean/b/sd/t	Low and Medium Risk mean/b/sd/t
Bought a Car	0.12 (0.33)	0.09 (0.29)	0.09 (0.29)	0.07 (0.26)	0.11 (0.32)	0.10 (0.30)
Type of Car: EV or PHEV	0.20 (0.40)	0.33 (0.47)	0.32 (0.47)	0.48 (0.50)	0.35 (0.48)	0.29 (0.45)
EV	0.13 (0.34)	0.24 (0.43)	0.24 (0.42)	0.42 (0.50)	0.24 (0.43)	0.20 (0.40)
PHEV	0.07 (0.26)	0.09 (0.29)	0.09 (0.28)	0.05 (0.23)	0.11 (0.32)	0.09 (0.28)
Price (Purchase Price + Profit + VAT):						
Average Price	123319.11 (83,402.09)	145570.64 (93,691.89)	145679.85 (95,415.09)	182264.08 (91,350.37)	143648.31 (88,177.79)	139347.75 (81,927.33)
Average Price, EV or PHEV	252972.29 (88,764.42)	261486.72 (83,244.80)	263989.04 (85,977.40)	254792.88 (71,861.64)	250300.75 (73,159.14)	255565.45 (68,568.48)
Average Price, EV	288098.15 (97,669.77)	289411.99 (85,398.19)	292872.42 (88,150.09)	262957.71 (72,497.54)	281485.98 (75,713.53)	272566.56 (65,433.68)
Average Price, PHEV	209193.43 (48,999.29)	207475.98 (42,508.79)	206661.23 (41,294.65)	197639.00 (32,888.49)	206274.54 (39,143.93)	223688.38 (63,904.86)
Average Price, Conventional	89,974.12 (36,973.74)	95,226.03 (35,829.76)	94,386.29 (35,136.55)	111933.12 (36,409.00)	95,617.06 (38,181.60)	100979.22 (37,971.82)
Car age (Age at Purchase):						
New car age	8.10 (8.50)	5.64 (6.38)	5.67 (6.29)	5.56 (7.23)	5.69 (6.64)	5.08 (6.76)
New car age, EV or PHEV	1.92 (1.40)	1.80 (1.30)	1.80 (1.32)	1.77 (1.03)	1.80 (1.25)	1.73 (1.36)
New car age, EV	1.85 (1.41)	1.76 (1.27)	1.77 (1.32)	1.79 (1.06)	1.73 (1.13)	1.61 (1.08)
New car age, PHEV	2.06 (1.38)	1.92 (1.38)	1.91 (1.33)	1.60 (0.89)	1.95 (1.46)	2.03 (1.87)
New car age, Conventional	9.67 (8.90)	7.48 (7.07)	7.49 (6.94)	9.03 (8.64)	7.76 (7.37)	6.45 (7.60)
Emissions of the Purchase:						
Average CO2 Emissions	80.69 (47.83)	70.64 (52.71)	70.90 (52.86)	49.96 (56.20)	68.25 (51.87)	77.44 (50.33)
Average CO2 Emissions, EV or PHEV	10.18 (14.24)	7.69 (13.07)	7.57 (13.01)	3.18 (9.32)	9.39 (14.25)	7.04 (11.63)
Average CO2 Emissions, EV	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Average CO2 Emissions, PHEV	28.34 (7.24)	28.22 (6.98)	28.20 (6.99)	28.00 (8.07)	29.45 (7.05)	24.90 (5.41)
Average CO2 Emissions, Conventional	108.48 (19.89)	110.14 (20.13)	110.12 (20.59)	112.33 (19.06)	109.72 (18.55)	110.79 (17.78)
Observations	1964343	60817	49610	1255	6539	3412

Table 4: Sustainable Choice, Model Estimation

*Notes:* This table reports the estimation results from estimating the linear probability model in Eq. (8). The individual chooses between the sustainable plan and the conventional alternative. In Column 1 the alternative includes any conventional risk profile as specified in Eq. (9) and in column 2 the alternative only includes the medium risk profile as specified in Eq. (10). Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Sustainable	Sustainable, fixed risk
Demographic Characteristics:		
Age	0.00342 (0.00342)	-0.00433 (0.00756)
AgeSq	-0.0000204 (0.0000356)	0.0000112 (0.0000767)
Married	0.0234*** (0.00695)	0.0426*** (0.0155)
Female	0.0175*** (0.00616)	-0.0224* (0.0135)
Kids at home	-0.00237 (0.00352)	0.00726 (0.00787)
Education:		
Masters degree	-0.00589 (0.00758)	-0.000614 (0.0162)
Economist	-0.0588*** (0.00627)	-0.123*** (0.0145)
Labor Market:		
Manager	0.00950 (0.0107)	0.0316 (0.0228)
Services	-0.0147 (0.00939)	-0.0387* (0.0205)
Private Sector	0.00577 (0.00698)	-0.00530 (0.0154)
Financial Characteristics		
Log Income	-0.0728*** (0.0114)	-0.135*** (0.0262)
Log Pension Wealth	-0.00790 (0.00719)	-0.0360** (0.0163)
LTV	-0.00179 (0.00236)	0.0189* (0.0106)
SMP	-0.0136** (0.00683)	-0.00171 (0.0153)
Risky Share	-0.0249** (0.0106)	0.0615** (0.0246)
Consumption: Cars		
Electric Car	0.0243** (0.0106)	0.0776*** (0.0242)
Rsqr	0.02	0.07
Observations	11,012	4,387

Table 5: Multinomial Logit Model

*Notes:* This table reports the estimation results from estimating the multinomial linear probability model. The individual chooses between the sustainable plan and the conventional alternatives with high, medium, and low risk levels - columns (1)-(4) respectively. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Sustainable	Conventional, high	Conventional, medium	Conventional, low
Age	-0.001 (0.003)	0.009 (0.005)	-0.008 (0.005)	-0.000 (0.001)
AgeSq	0.000 (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)
Married	0.024*** (0.007)	-0.035*** (0.011)	0.012 (0.010)	-0.001 (0.002)
Female	0.016** (0.006)	-0.093*** (0.009)	0.079*** (0.009)	-0.001 (0.002)
Kids at home	-0.002 (0.004)	0.015*** (0.005)	-0.013*** (0.005)	0.000 (0.001)
Masters degree	-0.007 (0.007)	0.020* (0.011)	-0.011 (0.010)	-0.002 (0.002)
Economist	-0.060*** (0.006)	0.051*** (0.009)	0.009 (0.009)	0.000 (0.002)
Manager	0.009 (0.012)	-0.004 (0.016)	-0.002 (0.014)	-0.003 (0.002)
Services	-0.016 (0.010)	-0.003 (0.014)	0.018 (0.013)	0.001 (0.002)
Log Income	-0.083*** (0.012)	0.098*** (0.018)	-0.015 (0.016)	0.001 (0.003)
Log Pension Wealth	-0.007 (0.007)	-0.031*** (0.011)	0.043*** (0.010)	-0.005*** (0.002)
LTV	-0.001 (0.004)	0.036*** (0.007)	-0.035*** (0.007)	-0.000 (0.002)
SMP	-0.013* (0.007)	0.039*** (0.010)	-0.026*** (0.010)	-0.000 (0.002)
Risky Share	-0.028** (0.011)	0.192*** (0.016)	-0.157*** (0.015)	-0.006* (0.003)
Electric Car	0.025** (0.012)	0.030* (0.016)	-0.055*** (0.014)	0.001 (0.003)
Observations	11012	11012	11012	11012

Table 6: Descriptive Statistics, Matched Sample

*Notes:* This table reports descriptive statistics (averages and standard deviations in parentheses) for the sample of P+ members who received an offer and the CEM matched (coarsened exact matching) sample from the general population, where matching is based on age, gender, income, education level, and municipality of residence. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Offer	CEM Matched Sample	T-test
Age	44.28 (10.42)	44.26 (10.43)	0.10 (0.00)
Gender	0.33 (0.47)	0.33 (0.47)	-0.00 (0.00)
LogValue of income	13.38 (0.37)	13.37 (0.53)	1.55 (0.00)
Master's Degree	0.75 (0.43)	0.75 (0.43)	0.00 (0.00)
New Electric Vehicle	0.33 (0.47)	0.33 (0.47)	-0.18 (0.00)
New car CO2 emissions	75.95 (52.33)	74.16 (52.10)	1.93 (0.00)
Observations	4737	48099	7404



Table 7: Purchasing an Electric Vehicle, Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the propensity to purchase an electric vehicle for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	All car buyers			Car Owners			New Car Owners		
	Electric Car	EV	PHEV	Electric <sub>car</sub>	EV	PHEV	Electric <sub>car</sub>	EV	PHEV
Offer	-0.000 (0.006)	-0.000 (0.005)	-0.000 (0.004)	0.000 (0.008)	0.003 (0.007)	-0.004 (0.005)	-0.002 (0.010)	-0.009 (0.009)	0.007 (0.006)
year=2019	-0.247*** (0.002)	-0.188*** (0.002)	-0.071*** (0.001)	-0.248*** (0.003)	-0.192*** (0.003)	-0.073*** (0.002)	-0.246*** (0.004)	-0.180*** (0.003)	-0.066*** (0.002)
year=2020	-0.177*** (0.002)	-0.147*** (0.002)	-0.041*** (0.001)	-0.160*** (0.003)	-0.142*** (0.003)	-0.034*** (0.002)	-0.198*** (0.004)	-0.150*** (0.003)	-0.049*** (0.002)
year=2021	-0.057*** (0.002)	-0.080*** (0.002)	0.019*** (0.001)	-0.033*** (0.003)	-0.073*** (0.003)	0.033*** (0.002)	-0.091*** (0.004)	-0.090*** (0.003)	-0.002 (0.002)
year=2023	0.073*** (0.002)	0.109*** (0.002)	-0.028*** (0.002)	0.062*** (0.003)	0.104*** (0.003)	-0.033*** (0.002)	0.095*** (0.004)	0.116*** (0.004)	-0.021*** (0.002)
Offer×year=2019	-0.003 (0.008)	-0.001 (0.007)	-0.002 (0.005)	-0.004 (0.011)	-0.006 (0.009)	0.002 (0.007)	0.000 (0.013)	0.008 (0.011)	-0.009 (0.007)
Offer×year=2020	0.005 (0.008)	0.001 (0.007)	0.005 (0.005)	0.009 (0.010)	0.001 (0.009)	0.011 (0.007)	-0.001 (0.013)	0.004 (0.011)	-0.004 (0.007)
Offer×year=2021	-0.003 (0.008)	0.001 (0.007)	-0.005 (0.005)	-0.004 (0.010)	-0.001 (0.009)	-0.004 (0.007)	-0.002 (0.013)	0.007 (0.011)	-0.009 (0.007)
Offer×year=2023	0.023*** (0.008)	0.027*** (0.007)	-0.005 (0.005)	0.026** (0.010)	0.026*** (0.009)	-0.001 (0.007)	0.019 (0.014)	0.031*** (0.012)	-0.013 (0.008)
Constant	0.297*** (0.002)	0.223*** (0.002)	0.086*** (0.001)	0.303*** (0.002)	0.230*** (0.002)	0.091*** (0.001)	0.288*** (0.003)	0.211*** (0.002)	0.077*** (0.002)
Observations	299593	299808	298831	185052	185266	184289	114541	114541	114541

Table 8: Levels of Emissions, Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the emissions for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	All car buyers				Car Owners				New Car Owners			
	CO2	CO	HC	NOX	CO2	CO	HC	NOX	CO2	CO	HC	NOX
Offer	1.791** (0.754)	-0.428 (3.139)	0.389 (0.552)	0.712 (0.534)	1.677* (0.918)	-3.137 (3.646)	0.686 (0.687)	0.615 (0.659)	2.047 (1.327)	6.048 (5.982)	-0.458 (0.918)	0.725 (0.906)
year=2019	30.736*** (0.326)	40.766*** (1.315)	2.230*** (0.224)	8.004*** (0.224)	31.573*** (0.404)	36.916*** (1.561)	2.516*** (0.286)	8.313*** (0.282)	29.158*** (0.549)	47.829*** (2.395)	1.854*** (0.356)	7.532*** (0.363)
year=2020	21.641*** (0.316)	24.431*** (1.279)	0.678*** (0.221)	4.861*** (0.217)	21.612*** (0.396)	16.915*** (1.533)	1.002*** (0.284)	5.185*** (0.277)	21.685*** (0.524)	36.375*** (2.291)	0.473 (0.345)	4.623*** (0.347)
year=2021	9.024*** (0.309)	16.322*** (1.278)	0.160 (0.223)	2.085*** (0.217)	8.327*** (0.387)	10.987*** (1.526)	0.371 (0.285)	2.129*** (0.276)	10.215*** (0.515)	25.149*** (2.302)	0.040 (0.351)	2.242*** (0.349)
year=2023	-13.661*** (0.316)	-36.503*** (1.317)	0.719*** (0.240)	-3.511*** (0.224)	12.988*** (0.386)	-35.703*** (1.539)	0.835*** (0.298)	-3.351*** (0.278)	15.195*** (0.551)	-37.873*** (2.482)	0.052 (0.403)	-4.149*** (0.376)
Offer×year=2019	-1.498 (1.068)	4.724 (4.311)	-1.020 (0.734)	-0.974 (0.733)	-1.309 (1.312)	10.742** (5.062)	-1.079 (0.925)	-1.251 (0.915)	-1.941 (1.842)	-7.868 (8.038)	-0.701 (1.191)	-0.322 (1.217)
Offer×year=2020	-1.192 (1.042)	3.026 (4.209)	-0.810 (0.724)	-0.252 (0.716)	-1.310 (1.295)	2.337 (4.997)	-1.039 (0.923)	-0.352 (0.904)	-1.057 (1.763)	2.450 (7.714)	-0.094 (1.155)	0.046 (1.168)
Offer×year=2021	0.059 (1.026)	5.421 (4.227)	-0.787 (0.734)	-1.295* (0.719)	0.022 (1.269)	7.914 (4.998)	-0.904 (0.931)	-0.491 (0.904)	0.103 (1.748)	-0.447 (7.791)	-0.282 (1.177)	-2.588** (1.180)
Offer×year=2023	-2.734*** (1.039)	-7.273* (4.321)	-0.920 (0.794)	-1.764** (0.735)	-2.553** (1.258)	-4.641 (4.993)	-1.265 (0.978)	-2.039** (0.903)	-3.157* (1.845)	-13.500 (8.335)	0.034 (1.353)	-0.962 (1.263)
Constant	74.162*** (0.229)	223.482*** (0.953)	7.235*** (0.168)	24.190*** (0.162)	74.147*** (0.283)	221.928*** (1.125)	7.959*** (0.212)	25.048*** (0.204)	74.191*** (0.388)	226.599*** (1.752)	5.702*** (0.271)	22.466*** (0.266)
Observations	231833	215759	187357	215504	151545	141257	123545	141139	80288	74501	63811	74364

Table 9: Purchasing an Electric Vehicle, Heterogeneity

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (12) for the propensity to purchase an electric vehicle for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	All car buyers			Car Owners			New Car Owners		
	Electric Car	EV	PHEV	Electric <sub>car</sub>	EV	PHEV	Electric <sub>car</sub>	EV	PHEV
Conventional	-0.001 (0.013)	-0.013 (0.012)	0.011 (0.008)	0.014 (0.017)	0.005 (0.015)	0.004 (0.010)	-0.031 (0.022)	-0.055*** (0.019)	0.023* (0.013)
Sustainable	0.119*** (0.045)	0.148*** (0.040)	-0.047* (0.027)	0.094 (0.061)	0.131** (0.054)	-0.066* (0.037)	0.159** (0.067)	0.175*** (0.059)	-0.017 (0.039)
year=2019	-0.247*** (0.003)	-0.190*** (0.003)	-0.070*** (0.002)	-0.247*** (0.004)	-0.196*** (0.004)	-0.071*** (0.003)	-0.246*** (0.005)	-0.177*** (0.005)	-0.070*** (0.003)
year=2020	-0.181*** (0.003)	-0.152*** (0.003)	-0.041*** (0.002)	-0.162*** (0.004)	-0.149*** (0.004)	-0.031*** (0.003)	-0.205*** (0.005)	-0.153*** (0.004)	-0.053*** (0.003)
year=2021	-0.065*** (0.003)	-0.087*** (0.003)	0.016*** (0.002)	-0.039*** (0.004)	-0.079*** (0.004)	0.032*** (0.003)	-0.101*** (0.005)	-0.095*** (0.004)	-0.006** (0.003)
year=2023	0.076*** (0.003)	0.113*** (0.003)	-0.029*** (0.002)	0.068*** (0.004)	0.110*** (0.004)	-0.031*** (0.003)	0.092*** (0.006)	0.117*** (0.005)	-0.025*** (0.003)
Conventional×year=2019	-0.013 (0.018)	0.007 (0.016)	-0.017 (0.011)	-0.034 (0.024)	-0.012 (0.021)	-0.018 (0.015)	0.029 (0.030)	0.047* (0.026)	-0.018 (0.017)
Conventional×year=2020	0.019 (0.018)	0.021 (0.016)	0.001 (0.011)	0.010 (0.024)	0.004 (0.021)	0.010 (0.015)	0.037 (0.029)	0.057** (0.025)	-0.017 (0.017)
Conventional×year=2021	0.037** (0.018)	0.024 (0.016)	0.014 (0.011)	0.017 (0.023)	-0.007 (0.021)	0.026* (0.015)	0.073** (0.029)	0.083*** (0.025)	-0.010 (0.017)
Conventional×year=2023	0.049*** (0.019)	0.071*** (0.017)	-0.018 (0.011)	0.030 (0.024)	0.049** (0.021)	-0.013 (0.015)	0.089*** (0.031)	0.120*** (0.028)	-0.027 (0.018)
Sustainable×year=2019	-0.044 (0.064)	-0.096* (0.057)	0.070* (0.039)	-0.010 (0.084)	-0.071 (0.075)	0.089* (0.052)	-0.098 (0.097)	-0.138 (0.086)	0.041 (0.056)
Sustainable×year=2020	0.014 (0.058)	-0.058 (0.052)	0.089** (0.035)	0.031 (0.078)	-0.071 (0.070)	0.129*** (0.048)	-0.013 (0.086)	-0.043 (0.076)	0.031 (0.050)
Sustainable×year=2021	-0.030 (0.061)	-0.094* (0.054)	0.075** (0.037)	-0.028 (0.082)	-0.123* (0.073)	0.113** (0.051)	-0.035 (0.090)	-0.056 (0.080)	0.021 (0.052)
Sustainable×year=2023	-0.047 (0.061)	-0.050 (0.055)	0.012 (0.037)	-0.030 (0.081)	-0.024 (0.072)	0.009 (0.050)	-0.073 (0.092)	-0.092 (0.082)	0.019 (0.054)
Constant	0.302*** (0.002)	0.229*** (0.002)	0.086*** (0.001)	0.306*** (0.003)	0.239*** (0.003)	0.089*** (0.002)	0.293*** (0.004)	0.212*** (0.003)	0.081*** (0.002)
Observations	148306	148422	147864	91819	91936	91378	56486	56486	56486

Table 10: Levels of Emissions, Heterogeneity

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (12) for the emissions for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	All car buyers				Car Owners				New Car Owners			
	CO2	CO	HC	NOX	CO2	CO	HC	NOX	CO2	CO	HC	NOX
Conventional	2.211 (1.656)	-0.304 (6.834)	-0.220 (1.216)	0.390 (1.166)	-0.534 (2.013)	-4.754 (7.947)	0.135 (1.544)	-1.181 (1.442)	8.216*** (2.917)	9.457 (12.962)	-0.919 (1.927)	3.695* (1.971)
Sustainable	-21.232*** (5.743)	-59.098** (24.005)	3.281 (5.039)	-8.791** (4.095)	-15.720** (7.169)	-54.274* (28.260)	7.019 (6.327)	-8.734* (5.128)	-31.479*** (9.584)	-68.896 (44.381)	-5.396 (8.184)	-8.809 (6.747)
year=2019	31.066*** (0.452)	40.312*** (1.811)	2.442*** (0.315)	8.024*** (0.309)	31.876*** (0.560)	36.668*** (2.135)	2.629*** (0.403)	8.162*** (0.388)	29.559*** (0.767)	46.849*** (3.341)	2.355*** (0.493)	7.984*** (0.508)
year=2020	22.497*** (0.434)	24.710*** (1.744)	0.918*** (0.307)	4.787*** (0.298)	22.150*** (0.542)	17.376*** (2.073)	1.150*** (0.395)	4.865*** (0.376)	23.139*** (0.727)	36.510*** (3.177)	0.974** (0.474)	5.092*** (0.483)
year=2021	10.259*** (0.428)	19.134*** (1.755)	0.443 (0.312)	2.464*** (0.300)	9.259*** (0.535)	13.481*** (2.091)	0.731* (0.402)	2.265*** (0.380)	11.968*** (0.713)	27.759*** (3.184)	0.409 (0.481)	3.280*** (0.485)
year=2023	-14.011*** (0.434)	-37.383*** (1.799)	1.425*** (0.336)	-3.504*** (0.307)	-13.866*** (0.528)	-38.578*** (2.082)	1.816*** (0.418)	-3.656*** (0.378)	-14.399*** (0.765)	-33.950*** (3.452)	-0.011 (0.557)	-3.505*** (0.526)
Conventional×year=2019	0.109 (2.373)	8.059 (9.493)	-2.837* (1.640)	-1.932 (1.619)	3.216 (2.900)	13.810 (11.090)	-3.359 (2.087)	-1.517 (2.012)	-6.798* (4.131)	-3.532 (17.838)	-1.971 (2.583)	-3.070 (2.712)
Conventional×year=2020	-2.658 (2.319)	2.334 (9.276)	-1.247 (1.621)	-0.012 (1.582)	0.017 (2.877)	5.966 (10.987)	-1.905 (2.094)	1.024 (1.994)	-8.540** (3.933)	-5.929 (17.020)	-0.031 (2.487)	-2.412 (2.588)
Conventional×year=2021	-4.331* (2.282)	0.840 (9.330)	-1.438 (1.646)	-2.377 (1.592)	-0.224 (2.826)	8.865 (11.016)	-1.613 (2.110)	-0.168 (1.999)	-12.630*** (3.882)	-14.375 (17.201)	-1.306 (2.558)	-6.949*** (2.617)
Conventional×year=2023	-5.490** (2.310)	-17.066* (9.540)	-1.671 (1.797)	-3.167* (1.629)	-2.016 (2.794)	-10.204 (10.999)	-2.425 (2.232)	-1.263 (1.998)	-13.192*** (4.115)	-32.578* (18.461)	-0.088 (3.018)	-7.310*** (2.810)
Sustainable×year=2019	12.237 (8.496)	6.017 (34.107)	-6.626 (6.547)	5.939 (5.818)	4.558 (10.409)	10.707 (39.695)	-11.960 (8.242)	1.615 (7.203)	27.083* (14.767)	-3.868 (64.685)	5.245 (10.566)	15.276 (9.834)
Sustainable×year=2020	8.340 (7.618)	36.092 (30.845)	-6.051 (6.128)	3.609 (5.261)	7.842 (9.673)	60.435 (37.068)	-12.778 (7.779)	4.312 (6.726)	10.952 (12.375)	-0.036 (55.182)	8.035 (9.742)	2.708 (8.389)
Sustainable×year=2021	13.478* (7.864)	74.936** (32.713)	-4.279 (6.468)	2.500 (5.580)	14.003 (9.717)	86.858** (38.109)	-6.865 (8.017)	4.916 (6.915)	11.269 (13.404)	50.853 (61.922)	-0.409 (10.885)	-3.830 (9.414)
Sustainable×year=2023	6.686 (7.701)	-11.224 (32.157)	-10.018 (7.024)	2.459 (5.485)	2.344 (9.510)	3.416 (37.918)	-14.097 (8.854)	2.726 (6.880)	14.463 (13.143)	-40.832 (59.267)	0.011 (11.310)	2.287 (9.010)
Constant	73.336*** (0.312)	221.362*** (1.292)	7.349*** (0.232)	24.485*** (0.221)	73.488*** (0.383)	219.517*** (1.511)	8.233*** (0.294)	25.643*** (0.275)	73.024*** (0.536)	225.201*** (2.421)	5.396*** (0.372)	22.075*** (0.369)
Observations	114570	106331	91982	106194	75136	69812	60811	69740	39434	36519	31170	36453

Table 11: Descriptive Statistics, Vehicle Demand

*Notes:* This table reports descriptive statistics (averages and standard deviations in parentheses) for buying and selling vehicles before and after the offer was given for the sample of P+ members who received an offer and the CEM matched sample. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Before offer		After offer	
	Offer	Matched Sample	Offer	Matched Sample
Bought a car	0.09 (0.29)	0.10 (0.30)	0.09 (0.28)	0.10 (0.30)
Sold a car	0.07 (0.25)	0.07 (0.26)	0.07 (0.26)	0.08 (0.28)
Car-owner, did nothing	0.38 (0.49)	0.34 (0.47)	0.41 (0.49)	0.38 (0.49)
New car-owner	0.07 (0.25)	0.07 (0.26)	0.06 (0.24)	0.07 (0.26)
Sold all cars	0.05 (0.22)	0.05 (0.22)	0.05 (0.22)	0.06 (0.23)
Not a car-owner	0.50 (0.50)	0.53 (0.50)	0.47 (0.50)	0.48 (0.50)
Observations	263554	592620	63853	155167

Table 12: Vehicle Demand, After Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the propensity to purchase an electric vehicle for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes all P+ members. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Bought any car	New car-owner	Second or more cars
Offer	-0.006*** (0.001)	-0.004*** (0.001)	-0.002*** (0.001)
year == 2023	-0.000 (0.001)	-0.005*** (0.001)	0.005*** (0.000)
Offer×2023	-0.004* (0.002)	-0.000 (0.002)	-0.004*** (0.001)
Constant	0.104*** (0.000)	0.075*** (0.000)	0.029*** (0.000)
Observations	870767	870767	870767

Table 13: Vehicle Demand, across Years

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the propensity to purchase an electric vehicle for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes all P+ members. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	Bought any car	New car-owner	Second or more car
Offer	-0.011*** (0.002)	-0.007*** (0.002)	-0.004*** (0.001)
year == 2019	0.005*** (0.001)	0.007*** (0.001)	-0.001** (0.001)
year == 2020	0.016*** (0.001)	0.015*** (0.001)	0.001** (0.001)
year == 2021	0.015*** (0.001)	0.013*** (0.001)	0.003*** (0.001)
year == 2023	0.009*** (0.001)	0.004*** (0.001)	0.005*** (0.001)
Offer×year ==2019	0.010*** (0.003)	0.006** (0.003)	0.004** (0.002)
Offer×year ==2020	0.006** (0.003)	0.001 (0.002)	0.005*** (0.002)
Offer×year ==2021	0.003 (0.003)	0.002 (0.002)	0.001 (0.002)
Offer×year ==2023	0.001 (0.003)	0.002 (0.002)	-0.002 (0.002)
Constant	0.094*** (0.001)	0.066*** (0.001)	0.028*** (0.000)
Observations	870767	870767	870767

Table 14: Vehicle Prices, After Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the average vehicle price for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	All cars	Electric Car	Combustion Engine
Offer	-4904.346*** (809.042)	-1.38e+04*** (1924.371)	-232.086 (358.552)
year ==2023	47501.554*** (566.967)	15887.128*** (987.472)	570.407** (290.936)
Offer×year ==2023	6063.162*** (1849.973)	8665.808*** (3229.730)	1206.577 (958.622)
Constant	1.27e+05*** (246.205)	2.68e+05*** (568.504)	92184.326*** (109.856)
Observations	202848	49808	153983



Table 15: Purchasing Electric Vehicle, After vs Before Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for propensity of buy an electric vehicle after and before the offer for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	After			Before		
	Electric Car	EV	PHEV	Electric car	EV	PHEV
Offer	-0.000 (0.006)	-0.000 (0.005)	-0.000 (0.004)	-0.000 (0.006)	-0.000 (0.005)	-0.000 (0.004)
year=2019	-0.247*** (0.002)	-0.188*** (0.002)	-0.071*** (0.001)	-0.247*** (0.002)	-0.188*** (0.002)	-0.071*** (0.001)
year=2020	-0.177*** (0.002)	-0.147*** (0.002)	-0.041*** (0.001)	-0.177*** (0.002)	-0.147*** (0.002)	-0.041*** (0.001)
year=2021	-0.057*** (0.002)	-0.080*** (0.002)	0.019*** (0.001)	-0.057*** (0.002)	-0.080*** (0.002)	0.019*** (0.001)
year=2023	0.073*** (0.002)	0.109*** (0.002)	-0.028*** (0.002)	0.073*** (0.002)	0.108*** (0.002)	-0.028*** (0.002)
Offer×year=2019	-0.003 (0.008)	-0.001 (0.007)	-0.002 (0.005)	-0.003 (0.008)	-0.001 (0.007)	-0.002 (0.005)
Offer×year=2020	0.005 (0.008)	0.001 (0.007)	0.005 (0.005)	0.005 (0.008)	0.001 (0.007)	0.005 (0.005)
Offer×year=2021	-0.003 (0.008)	0.001 (0.007)	-0.005 (0.005)	-0.003 (0.008)	0.001 (0.007)	-0.005 (0.005)
Offer×year=2023	0.031*** (0.009)	0.041*** (0.008)	-0.012** (0.006)	0.011 (0.010)	0.011 (0.009)	0.003 (0.006)
Constant	0.297*** (0.002)	0.223*** (0.002)	0.086*** (0.001)	0.297*** (0.002)	0.223*** (0.002)	0.086*** (0.001)
Observations	297791	298006	297052	296664	296870	295923

Table 16: CO2 Emissions, After vs Before Offer

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for CO2 emissions after and before the offer for all vehicle buyers, only for current vehicle owners, and only for new vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

	(1) After Offer, CO2	(2) Before Offer, CO2
Offer	1.791** (0.753)	1.791** (0.753)
year=2019	30.736*** (0.325)	30.736*** (0.325)
year=2020	21.641*** (0.316)	21.641*** (0.315)
year=2021	9.024*** (0.309)	9.024*** (0.309)
year=2023	-13.664*** (0.316)	-13.650*** (0.316)
Offer×year=2019	-1.498 (1.067)	-1.498 (1.066)
Offer×year=2020	-1.192 (1.041)	-1.192 (1.040)
Offer×year=2021	0.059 (1.025)	0.059 (1.024)
Offer×year=2023	-4.162*** (1.157)	0.080 (1.299)
Constant	74.162*** (0.228)	74.162*** (0.228)
Observations	230224	229277

Table 17: Heterogeneity by Housing Type, Electric Vehicle Purchase

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the propensity to buy an electric vehicle for individuals in single-family homes (Panel A) and in apartments (Panel B). The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

<b>Panel A: Single-family House</b>			
	Electric Car	EV	PHEV
Offer	-0.001 (0.007)	-0.002 (0.007)	0.002 (0.005)
year=2019	-0.277*** (0.003)	-0.215*** (0.003)	-0.076*** (0.002)
year=2020	-0.188*** (0.003)	-0.163*** (0.003)	-0.038*** (0.002)
year=2021	-0.053*** (0.003)	-0.085*** (0.003)	0.027*** (0.002)
year=2023	0.069*** (0.003)	0.111*** (0.003)	-0.034*** (0.002)
Offer × year=2019	-0.000 (0.010)	0.001 (0.009)	-0.001 (0.006)
Offer × year=2020	0.008 (0.010)	0.004 (0.009)	0.005 (0.006)
Offer × year=2021	0.003 (0.010)	0.005 (0.009)	-0.004 (0.006)
Offer × year=2023	0.026** (0.010)	0.029*** (0.009)	-0.007 (0.006)
Constant	0.335*** (0.002)	0.256*** (0.002)	0.094*** (0.001)
Observations	201766	201913	201077

<b>Panel B: Apartment</b>			
	Electric car	EV	PHEV
Offer	-0.009 (0.010)	-0.004 (0.008)	-0.006 (0.006)
year=2019	-0.176*** (0.004)	-0.123*** (0.003)	-0.057*** (0.002)
year=2020	-0.134*** (0.004)	-0.098*** (0.003)	-0.041*** (0.002)
year=2021	-0.047*** (0.004)	-0.057*** (0.003)	0.007*** (0.002)
year=2023	0.071*** (0.004)	0.090*** (0.003)	-0.016*** (0.002)
Offer × year=2019	0.000 (0.013)	0.002 (0.011)	-0.001 (0.008)
Offer × year=2020	0.008 (0.012)	0.001 (0.011)	0.009 (0.007)
Offer × year=2021	-0.007 (0.012)	0.000 (0.011)	-0.005 (0.008)
Offer × year=2023	0.016 (0.014)	0.022* (0.012)	-0.000 (0.008)
Constant	0.208*** (0.003)	0.146*** (0.002)	0.067*** (0.002)
Observations	97827	97895	97754

Table 18: Heterogeneity by Housing Type, Emissions

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the CO2 emissions for individuals in single-family homes (Panel A) and apartments (Panel B). The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

<b>Panel A: Single-family House</b>				
	CO2	CO	HC	NOX
Offer	1.766** (0.900)	-2.322 (3.587)	0.566 (0.666)	0.889 (0.632)
year=2019	34.204*** (0.397)	43.322*** (1.534)	2.576*** (0.275)	9.085*** (0.270)
year=2020	23.721*** (0.390)	23.083*** (1.509)	1.095*** (0.274)	5.491*** (0.266)
year=2021	9.147*** (0.379)	15.592*** (1.498)	0.480* (0.276)	2.267*** (0.264)
year=2023	-13.525*** (0.379)	-36.313*** (1.513)	0.665** (0.292)	-3.666*** (0.267)
Offer×year=2019	-1.435 (1.287)	11.160** (4.963)	-1.064 (0.888)	-1.048 (0.874)
Offer×year=2020	-0.812 (1.273)	6.036 (4.914)	-1.569* (0.890)	-0.446 (0.865)
Offer×year=2021	-0.327 (1.246)	9.080* (4.920)	-0.681 (0.900)	-1.179 (0.867)
Offer×year=2023	-2.125* (1.229)	-1.679 (4.891)	-0.621 (0.948)	-1.958** (0.862)
Constant	70.926*** (0.276)	214.161*** (1.103)	7.710*** (0.205)	24.111*** (0.194)
Observations	163431	151329	129094	151134
<b>Panel B: Apartment</b>				
	CO2	CO	HC	NOX
Offer	2.562** (1.293)	7.687 (6.332)	-0.316 (0.989)	0.185 (1.006)
year=2019	21.608*** (0.436)	32.372*** (2.103)	1.133*** (0.326)	5.495*** (0.334)
year=2020	15.019*** (0.484)	20.691*** (2.320)	0.008 (0.360)	3.428*** (0.369)
year=2021	7.015*** (0.480)	13.570*** (2.335)	-0.339 (0.364)	1.636*** (0.371)
year=2023	-13.339*** (0.517)	-33.559*** (2.534)	0.387 (0.411)	-3.191*** (0.403)
Offer×year=2019	-2.579 (1.766)	-13.171 (8.446)	-0.605 (1.295)	-0.953 (1.341)
Offer×year=2020	-2.481 (1.691)	-5.672 (8.100)	0.963 (1.251)	0.356 (1.286)
Offer×year=2021	0.301 (1.684)	-6.221 (8.173)	-0.782 (1.269)	-1.418 (1.298)
Offer×year=2023	-3.981** (1.832)	-23.934*** (8.989)	-1.684 (1.470)	-0.944 (1.428)
Constant	82.966*** (0.366)	247.617*** (1.793)	6.213*** (0.282)	24.439*** (0.285)
Observations	88140	83852	76781	83788

Table 19: Heterogeneity by Length of Vehicle-Ownership, Electric Vehicle Purchase

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the propensity to buy an electric vehicle for long-term (Panel A), short-term (Panel B), and new (Panel C) vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

<b>Panel A: Long-term owner</b>			
	Electric car	EV	PHEV
Offer	-0.012 (0.011)	-0.003 (0.010)	-0.009 (0.007)
Offer×year=2019	0.004 (0.016)	-0.002 (0.014)	0.005 (0.010)
Offer×year=2020	0.022 (0.016)	0.011 (0.014)	0.012 (0.010)
Offer×year=2021	0.006 (0.015)	-0.003 (0.014)	0.007 (0.010)
Offer×year=2023	0.022 (0.015)	0.024* (0.014)	-0.001 (0.010)
Constant	0.354*** (0.004)	0.258*** (0.003)	0.103*** (0.002)
Year FE	Yes	Yes	Yes
Observations	86525	86522	86432
<b>Panel B: Short-term owner</b>			
	Electric car	EV	PHEV
Offer	0.005 (0.010)	0.005 (0.009)	-0.001 (0.006)
Offer×year=2019	-0.005 (0.014)	-0.005 (0.013)	-0.000 (0.009)
Offer×year=2020	0.001 (0.014)	-0.006 (0.012)	0.009 (0.009)
Offer×year=2021	-0.012 (0.014)	0.002 (0.012)	-0.016* (0.009)
Offer×year=2023	0.026* (0.014)	0.023* (0.013)	0.000 (0.009)
Constant	0.259*** (0.003)	0.207*** (0.003)	0.081*** (0.002)
Year FE	Yes	Yes	Yes
Observations	98526	98744	97857
<b>Panel C: New owner</b>			
	Electric car	EV	PHEV
Offer	-0.002 (0.010)	-0.009 (0.009)	0.007 (0.006)
Offer×year=2019	0.000 (0.013)	0.008 (0.011)	-0.009 (0.007)
Offer×year=2020	-0.001 (0.013)	0.004 (0.011)	-0.004 (0.007)
Offer×year=2021	-0.002 (0.013)	0.007 (0.011)	-0.009 (0.007)
Offer×year=2023	0.019 (0.014)	0.031*** (0.012)	-0.013 (0.008)
Constant	0.288*** (0.003)	0.211*** (0.002)	0.077*** (0.002)
Year FE	Yes	Yes	Yes
Observations	114541	114541	114541

Table 20: Heterogeneity by Length of Vehicle-Ownership, Emissions

*Notes:* This table reports the estimation results from estimating the difference-in-difference (DiD) regression model in Eq. (11) for the emissions for long-term (Panel A), short-term (Panel B), and new (Panel C) vehicle owners. The treated sample includes P+ members who bought a vehicle. Standard deviations are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

<b>Panel A: Long-term owner</b>				
	CO2	CO	HC	NOX
Offer	1.269 (1.294)	-2.125 (5.151)	-0.048 (0.908)	-0.715 (0.891)
Offer×year=2019	-1.130 (1.853)	7.961 (7.174)	-0.083 (1.225)	0.568 (1.239)
Offer×year=2020	-1.080 (1.822)	-0.664 (7.056)	0.210 (1.221)	0.920 (1.219)
Offer×year=2021	0.032 (1.785)	4.027 (7.030)	-0.133 (1.226)	0.595 (1.215)
Offer×year=2023	-2.023 (1.740)	-6.423 (6.916)	0.077 (1.267)	-0.088 (1.195)
Constant	75.438*** (0.414)	224.532*** (1.643)	7.652*** (0.289)	24.682*** (0.284)
Year FE	Yes	Yes	Yes	Yes
Observations	73765	69161	59939	69094
<b>Panel B: Short-term owner</b>				
	CO2	CO	HC	NOX
Offer	1.899 (1.302)	-4.581 (5.165)	1.498 (1.029)	2.071** (0.972)
Offer×year=2019	-1.354 (1.860)	13.821* (7.149)	-2.024 (1.383)	-3.080** (1.345)
Offer×year=2020	-1.207 (1.842)	5.832 (7.086)	-2.143 (1.382)	-1.453 (1.333)
Offer×year=2021	0.246 (1.807)	12.337* (7.119)	-1.602 (1.400)	-1.436 (1.339)
Offer×year=2023	-2.933 (1.827)	-1.954 (7.244)	-2.639* (1.501)	-4.076*** (1.364)
Constant	73.002*** (0.387)	219.540*** (1.543)	8.241*** (0.308)	25.383*** (0.291)
Year FE	Yes	Yes	Yes	Yes
Observations	77779	72096	63606	72045
<b>Panel C: New owner</b>				
	CO2	CO	HC	NOX
Offer	2.047 (1.327)	6.048 (5.982)	-0.458 (0.918)	0.725 (0.906)
Offer×year=2019	-1.941 (1.842)	-7.868 (8.038)	-0.701 (1.191)	-0.322 (1.217)
Offer×year=2020	-1.057 (1.763)	2.450 (7.714)	-0.094 (1.155)	0.046 (1.168)
Offer×year=2021	0.103 (1.748)	-0.447 (7.791)	-0.282 (1.177)	-2.588** (1.180)
Offer×year=2023	-3.157* (1.845)	-13.500 (8.335)	0.034 (1.353)	-0.962 (1.263)
Constant	74.191*** (0.388)	226.599*** (1.752)	5.702*** (0.271)	22.466*** (0.266)
Year FE	Yes	Yes	Yes	Yes
Observations	80288	74501	63811	74364

# Figures

Figure 1: P+ Pension Offer Overview

*Notes:* This figure illustrates the offer's structure that the P+ members received and the related decision making context.

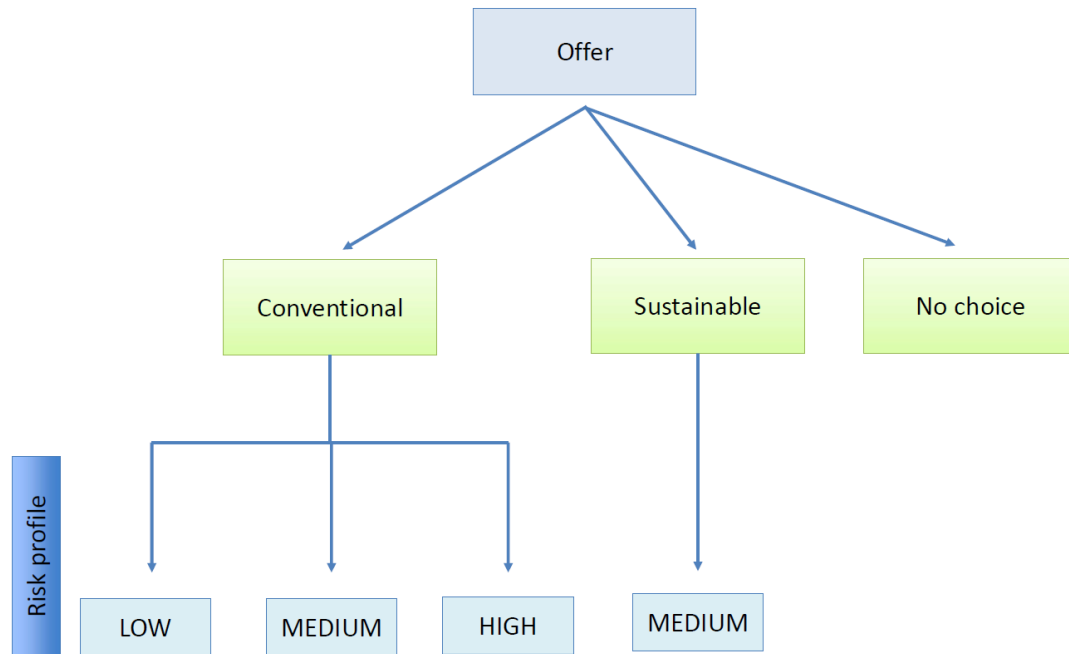


Figure 2: P+ Survey Results

*Notes:* This figure presents the survey results for the P+ members, where the Y-axis represents the highlighted option based on their answers, and colors denote the actual choice subsequently made by the member.

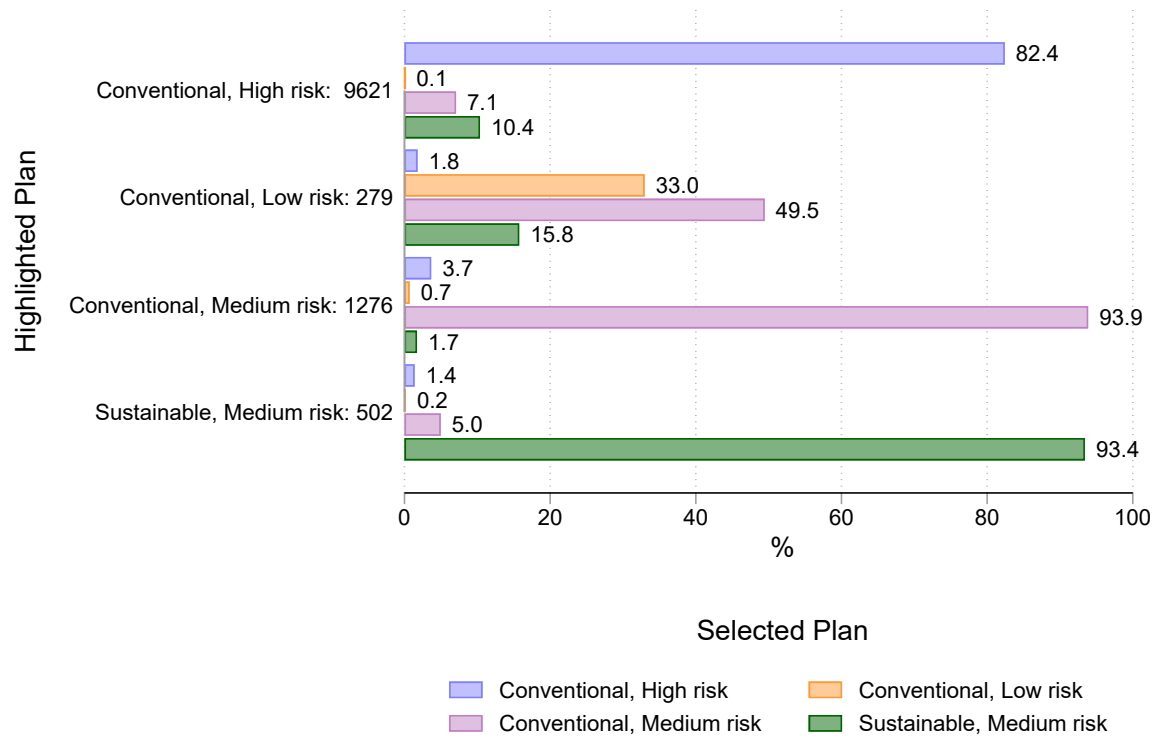
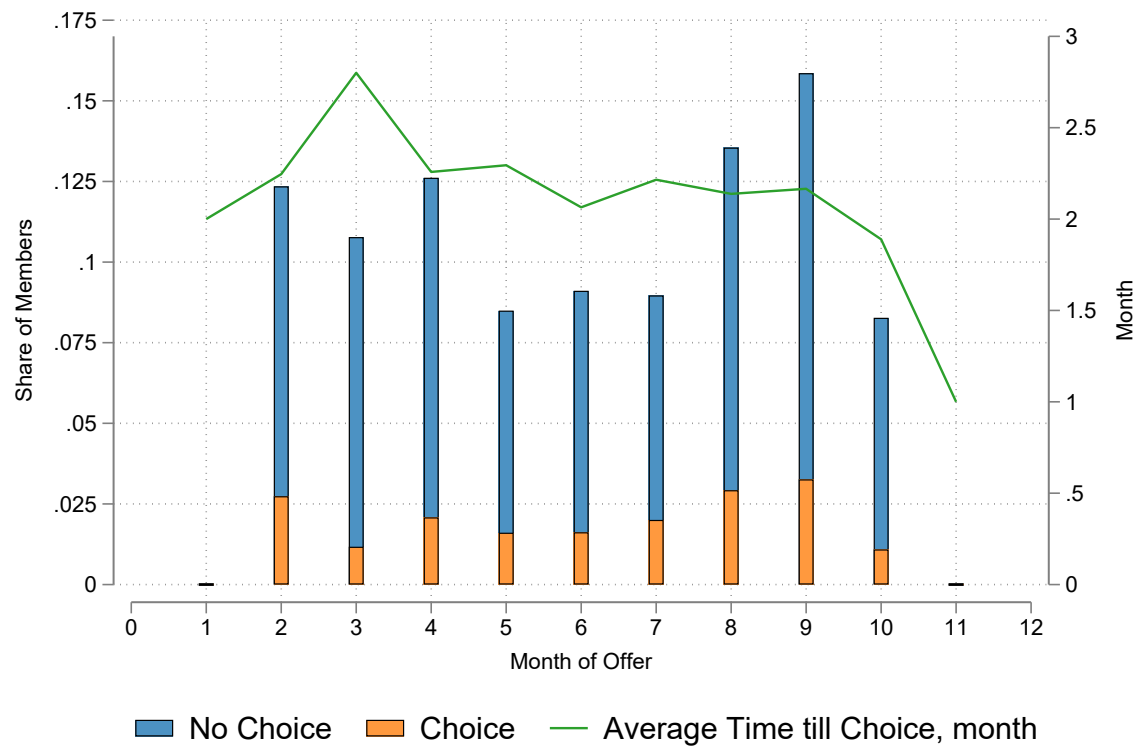




Figure 3: Timing of Offer across 2023

*Notes:* This figure visualizes the timing across the months of 2023 of the offer to the P+ members, the proportion that did and did not make a choice (left axis) and the average time till choice (right axis).



## A.1 Appendix: Additional Tables

Table A1: Sample Selection

*Notes:* The table describes data availability and sample selection restrictions imposed on the data.

	Sample size
All members	106,828
Active Members	93,264
In Population Register, BEF	86,929
In Labor register, IDAN	79,531
In Education Register, UDDA	79,513
Positive income	79,502
Observations	106828

## A.2 Appendix: P+ Material

### A.2.1 P+ Pension Products

Figure 4: P+ Pension Products

*Notes:* This figure shows a comparison of the conventional (P+ Life-cycle) and sustainable (P+ Sustainable) pension products.

Comparison of P+ Life cycle and P+ Sustainable		
Parameters	P+ Life cycle	P+ Sustainable
Market rate product	✓	✓
Gradual reduction of risk as you approach retirement	✓	✓
Number of listed shares in the portfolio	Approx. 2,500	Approx. 500
Target of carbon neutral pension	2050	2030
Target of percentage of climate friendly investments	15 percent in 2030	50 percent in 2030
Active ownership	✓	Enhanced
Percentage of sustainable investments	10 percent	39 percent
Possibility of different risk levels (low, middle and high)	✓	✓
Article 8 product according to EU's sustainability-related disclosure (the product promotes sustainability)	✓	✓
Increased exposure towards companies that are sustainability front runners	-	✓
Alternative investments in infrastructure and real estate amongst other things	✓	✓
Concentration risk as a result of a reduced investment universe	To some degree	To a greater extent than P+ Life cycle
Follows P+'s general policy for responsible investment and principle for restricted investment	✓	Enhanced
Comparable expectations to return, risk level, costs and annual costs	✓	✓

## **A.2.2 Letter from P+**

English translation of original Danish text in the letter sent to its members using their official secure digital mailbox service, e-Boks. The letter has direct links to P+ secure members' portal "Min Pension".

### **Do You Say YES or NO to the New Pension Scheme?**

Dear XXX,

You now have the opportunity to switch to our new pension scheme, P+ Livscyklus (P+ Life-cycle). If that sounds interesting, do not wait too long — we need your response within a month.

The new pension scheme was created because many of our members have requested a plan that offers:

- Market-based returns on the entire savings
- The ability to choose your own investment risk level
- Flexible insurance options that you can tailor to your needs

It might be the right choice for you too — but before you decide, you should know a bit more about the new scheme.

### **Your Savings Will Fluctuate More**

A pension scheme with market-based returns means that your savings will immediately reflect the full return — positive or negative — that we achieve when we invest your savings. As a result, your savings will fluctuate more than you may be used to.

### **You Can Influence the Investment**

With P+ Livscyklus, you have the option to choose whether your savings should be invested with a low, medium, or high risk profile. A high-risk profile gives you the potential for higher returns, but if the return is negative, you also risk a greater loss. So, you might feel more comfortable with a low and more secure investment risk — or you can take the middle ground with a medium risk.

You can also choose to place extra focus on sustainability when we invest your savings.

On "Min Pension", you can view projections of how your savings are expected to develop with the different risk profiles and compare them to your current plan.

## **Your Insurance Should Fit Your Needs**

Just like in your current plan, P+ Livscyklus also includes insurance coverage. We have focused on making the insurance options flexible and adaptable to your needs — so you can be sure that you and your loved ones are protected if something happens to you.

On "Min Pension", you can view the insurance options included in P+ Livscyklus and compare them with the coverage you currently have. There may be terms in your current insurance that you wouldn't want to give up — so it's worth taking a closer look.

### **Get an Overview on Min Pension**

Whether your current plan or P+ Livscyklus is the best fit for you is a decision only you can make. It depends on factors like your family situation, risk tolerance, and overall financial situation.

On "Min Pension", you can see the differences between P+ Livscyklus and your current plan based on your personal data. Here, you can also make your choice and say yes or no to switching plans. Please note that your decision is binding.

Log in to "Min Pension"

Best regards, Member Services

### **Would You Like to Prepare First?**

Then we recommend that you join a webinar on the topic. We will explain how P+ Life-cycle differs from your current plan, and you'll have the opportunity to ask questions along the way.

Link to "Sign up for the webinar via Min Pension"

## **A.2.3 P+ Guide to Choosing Risk Profile**

English translation of original Danish text that the members read on their personalized P+ webpage, "Min Pension".

### **Guide to choosing risk**

The return on your pension savings depends on how they are invested. The more risk you take, the more pension payout you will potentially receive. However, when it comes to risk attitudes, people's attitudes differ. Some people are happy to take a big risk to achieve a bigger gain, while others are more cautious, even if they forego the opportunity to achieve a bigger gain. In P+ you can choose how big the risk should be when we invest

your pension savings. We generally invest your savings with medium risk, but you can also choose low or high risk, and you can always change your choice. No matter which risk level you choose, we gradually phase out the risk until you turn 68. The phase-out is done to reduce the risk that your pension will be significantly affected if the financial markets develop very negatively in the years leading up to your retirement or while you are receiving your pension.

Take the guide and choose your risk level

## **Return and Risk**

The return on your retirement savings depends on how much investment risk you take. What is your attitude towards return and risk?

- My pension savings should be affected as little as possible when financial markets develop negatively.
- I would like my retirement savings to grow, but I am not willing to take big risks, even if it could secure me a larger pension in the long term.
- My retirement savings need to grow as much as possible, and since return and risk are related, I am willing to take greater risks because I believe it will pay off in the long term.

## **Your Attitude Towards Losses**

How would you react if your savings lose a large part of their value due to negative developments in the financial markets?

- I fear that the savings will not regain their value and be upset that my savings were not placed more securely.
- I do not think that it is good, but I believe that it will balance out again and that the investments will increase the value of my savings in the long term.
- It will not worry me. I know that stock and bond prices fluctuate, and I am convinced that investments will increase the value of my savings in the long term.

## **Sustainability**

Your savings are invested so that they can grow as much as possible until your retirement, within the framework of your risk profile. Do you want your savings to be invested with an *extra high* focus on responsibility and sustainability? We expect that both the risk level, costs, and returns can be compared to investments without an extra high focus on

responsibility and sustainability. However, you may experience greater fluctuations in returns along the way.

- No thanks, my savings are already invested with a sufficient focus on responsibility.
- Yes please, my savings should be invested with an extra high focus on responsibility and sustainability

### **Importance of Your Savings in P+**

When you retire, you will have to live on your pension savings, other assets, public benefits, etc. How large a share of your total wealth do you expect your P+ savings to make up when you retire?

- My savings in P+ will become my primary source of income
- My savings in P+ will only have a minor impact.

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