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Sadettin Haluk Çitçi [1], Halit Yanıkkaya[2] and Yunis Dede[3]

Abstract

Using the nationwide automatic enrollment (AE) policy implemented in Türkiye in 2017, this paper examines whether automatic enrollment into retirement plans generates new saving or mainly reshuffles existing saving. Using administrative data spanning universe of IPS and AES contracts, we track voluntary and automatic contributions at the individual level. A difference-in-differences design comparing individuals in a narrow ±2-year bandwidth around the age threshold isolates the impact of AES on voluntary IPS contributions and on total contributions (voluntary plus automatic), allowing us to quantify crowding out and net saving. Our findings reveal that AES reduces voluntary IPS contributions by about 85₺ per participant and roughly 30 percent of the new automatic saving is offset by lower voluntary contributions. Net of this partial crowding out, total retirement saving increases by about 195₺ per participant. Among persistent savers, the reduction in voluntary contributions is larger, about 178₺, and the implied crowding-out rate is close to 60 percent; even for this group, AES yields a net gain in retirement saving of roughly 140₺ per individual. These findings show that default-based enrollment policies change the level and composition of retirement saving and that their net impact depends on prior saving behavior.

Keywords: Automatic enrollment, Crowding-out, Retirement saving, Behavioral public policy

JEL Classification: H2, D14, H3.

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1. Introduction

The incorporation of automatic enrollment (AE) mechanisms into occupational pension schemes has emerged as one of the most influential and empirically successful applications of behavioral economics in the past three decades. By leveraging inertia and tendency to procrastinate, AE systems redefine participation as the default option, thereby shifting the decision not to participate into an active choice. This design feature has been shown to substantially increase both enrollment rates and contributions in retirement savings plans (Madrian & Shea, 2001; Thaler & Benartzi, 2004; Choi et al., 2002, 2004). Across nearly all institutional contexts where AE has been adopted, a consistent body of evidence indicates significant expansions in plan coverage and overall savings accumulation following implementation (Choi et al., 2004; Carroll et al., 2009).

Yet a central question remains unresolved: do these policies generate genuinely higher total retirement saving, or do they primarily reallocate existing saving across instruments? In particular, when defaults are set inside retirement accounts, do they expand individuals' net saving, or do they crowd out voluntary contributions to other vehicles such as individual retirement accounts (IRAs) or other financial assets? This distinction is crucial for assessing both the long-run financial security of households and the true effectiveness of retirement policy interventions. While a substantial literature documents large effects of AE on participation, contributions, and retention (Poterba et al., 1996; Madrian & Shea, 2001; Chetty et al., 2014), credible causal evidence on the extent of crowding out is still limited. The main obstacles are straightforward but severe. It is difficult to observe close financial substitutes in the data, and policy changes often coincide with time trends or unobserved shifts in preferences that complicate identification.

Despite the widespread adoption of AE, a fundamental question remains unresolved: do such policies induce a real increase in total retirement savings, or do they merely reallocate existing savings across different instruments? More specifically, do default-based retirement systems expand individuals' net savings, or do they crowd-out voluntary contributions to existing instruments such as individual retirement accounts (IRAs)? This distinction is critical for evaluating both the long-term financial security of individuals and the overall efficacy of retirement policy interventions. Although a substantial literature has documented the effects of automatic enrollment on participation and retention (Poterba et al., 1996; Chetty et al., 2014), credible causal evidence on the extent of crowding-out remains scarce. This limitation arises largely from the difficulty of observing true financial substitutes and the tendency for policy changes to be confounded by time trends or unobserved heterogeneity in individual preferences.

The literature has therefore emphasized the need for quasi-experimental variation and rich administrative data to isolate the causal impact of AE on total saving (Beshears et al., 2009; Madrian & Shea, 2001). A leading example is Chetty et al. (2014), who exploit a Danish pension reform to estimate how default contribution settings affect overall saving. They show that default-based policies can meaningfully raise total saving, especially among individuals with high inertia. Thaler and Benartzi's (2004) Save More Tomorrow program similarly demonstrates that behavioral interventions built around defaults and commitment can durably reshape saving behavior in environments characterized by present bias and procrastination.

Nonetheless, whether automatic enrollment systems induce real increases in net savings or primarily displace existing voluntary contributions (thereby reallocating savings through a crowding-out effect) remains an open and debated issue in the literature. This study exploits a unique natural experiment that provides a compelling setting to causally examine the extent to which AE policies affect retirement savings. In January 2017, Türkiye implemented a nation-wide reform requiring all employees under the age of 45 to be automatically enrolled in the Individual Pension System (IPS), unless they actively chose to opt-out. The enrolled was staged: the policy was first applied to private-sector firms with 1,000 or more employees and was subsequently extended in phases to include public sector institutions and smaller enterprises.

The Automatic Enrollment System (AES) introduced under this reform was designed as a close substitute for the pre-existing, fully voluntary IPS. By facilitating automatic enrollment through employers the AES removed key frictions associated with opt-in systems without requiring any individual action. Critically, eligibility for automatic enrollment was restricted by the law to employees under the age of 45, with the age threshold precisely defined in the regulation. This institutional feature allows us to examine whether automatic inclusion in the system induces additional retirement savings or simply displaces pre-existing voluntary contributions. Specifically, we assess the causal effect of AE on individuals' total contributions, thereby providing direct evidence on the magnitude of the crowding-out effect and the extent to which the AES generates net new saving.

The analysis is based on a comprehensive administrative dataset covering the entire population subject to the AES mandate. Exploiting the regulatory age cutoff at 45, the empirical strategy adopts a difference-in-differences framework centered on a narrow age bandwidth (±2 years) around the threshold to estimate whether (and to what extent) automatic enrollment displaces voluntary contributions to the IPS.

The empirical analysis shows that the AES induces a statistically and economically meaningful decline in voluntary IPS contributions of about 85₺ per participant. Combined with the estimated increase in total IPS contributions, this implies that automatic contributions rise by roughly 280₺, so that about 30 percent of the new

automatic saving is offset by lower voluntary contributions. Net of this partial crowding out, total retirement saving still increases by around 195 TL per participant. Among persistent savers who remain in the system through the end of 2020, the reduction in voluntary contributions is larger, about 178₺ per person, and the implied crowding-out rate is close to 60 percent. Even for this group, however, AES generates a positive net gain in retirement saving, on the order of 140₺ per individual.

This study adds to the literature in several related ways. It provides one of the few pieces of causal evidence that directly quantify both the level of net additional saving and the degree of crowding out generated by an automatic enrollment reform, using administrative data that track all voluntary and automatic contributions. Rather than inferring displacement indirectly from plan balances or participation, we observe how the same individuals reallocate between voluntary and default channels and recover explicit crowding-out rates for different saver types. The setting is also informative in its own right. Türkiye combines a large, established voluntary defined-contribution pillar with a nationwide AE mandate introduced in a middle-income, high-inflation environment where retirement saving is both salient and risky. This allows us to speak to the external validity of limited evidence from high-income countries, where mandatory pillars dominate and the voluntary margin has largely shrunk (Chetty et al., 2014). Finally, by contrasting the responses of persistent savers with those who enter or exit the system around the reform, we show that the same default intervention generates sharply heterogeneous adjustments.

The remainder of the paper is structured as follows. Section 2 provides institutional background on the IPS and the AES in Türkiye. Section 3 describes the dataset and outlines the empirical methodology employed. Section 4 presents the main findings of the analysis, while Section 5 concludes by summarizing the results and discussing their implications for the design of savings-related public policies.

2. Institutional Background

Türkiye’s retirement income system is organized around a three-pillar architecture. The first pillar is the mandatory public pension system, financed through payroll contributions and operated on a pay-as-you-go basis. The second pillar consists of occupational retirement arrangements, in which employers may provide retirement benefits or voluntary matching contributions. The third pillar is the Individual Pension System (IPS), a voluntary, defined-contribution scheme introduced in 2003 and substantially reformed in 2013 with the introduction of a 25% state matching contribution on individual payments (Çitçi & Yanıkkaya, 2024).

Türkiye has occupied a structurally weak position in the second and third pillar of the OECD three-pillar framework, with retirement income security continuing to rely predominantly on the public social security system (Brook & Whitehouse, 2006). In

order to change this landscape, the state started to implement the Automatic Enrollment System (AES), which came into force on 1 January 2017. Under the initial regulation, all employees below a statutory age threshold in covered workplaces were automatically enrolled into an IPS contract through their employer, with a minimum contribution rate of 3% of gross earnings deducted via payroll. AES contracts share the same basic legal and financial architecture as IPS contracts, including eligibility for the state match.

The rollout of AES followed a phased "staging" schedule. In the first stage, the mandate applied to private sector firms with 1,000 or more employees. Subsequently, coverage was expanded to medium- and small-sized enterprises, public institutions, and, ultimately, firms with as few as 5–9 employees. Thus, over time, virtually the entire formal wage-earning workforce in Türkiye became subject to automatic enrollment, conditional on satisfying the age-eligibility criterion. Figure 1 presents the timeline of AES staging schedule.

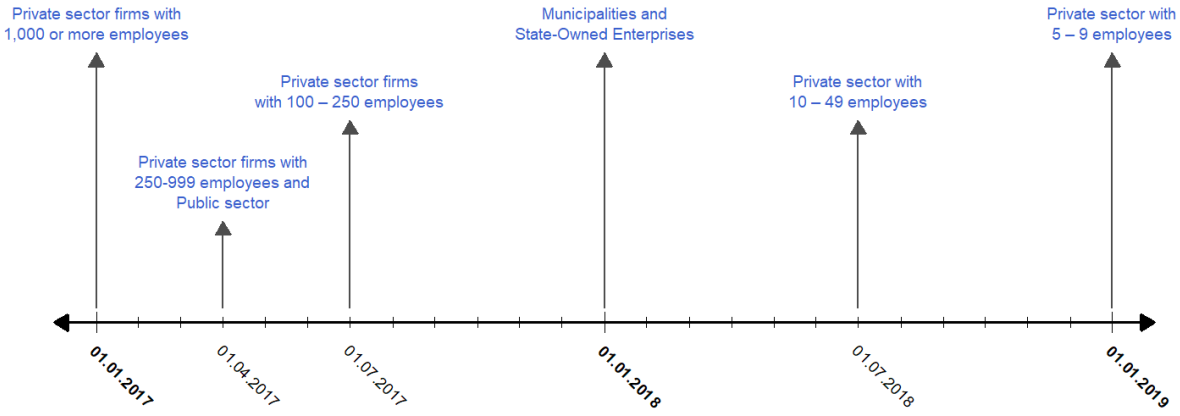

Figure 1. AES Staging Schedule by Employer Size and Type

A central institutional feature of AES is the statutory age limit of 45, which determines eligibility for automatic enrollment. The implementing regulation (Article 8/A) specifies two distinct reference rules for assessing whether an employee is under age 45. For employees whose inclusion date falls before 27 December 2018, the relevant benchmark is 1 January 2017: an employee is eligible for AES if they had not yet turned 45 as of 1 January 2017, and ineligible otherwise. For employees whose inclusion date falls on or after 27 December 2018, the benchmark shifts to the first day of the calendar year in which the employee is to be enrolled: the employee is eligible if they have not yet turned 45 on that date. In both cases the legal criterion is framed in terms of being under 45 years of age at the relevant reference date; those who have not turned 45 are automatically enrolled, while those who have are excluded from automatic enrollment and may only participate via voluntary channels.

The AES also embeds a default investment strategy. New participants are initially placed into low-risk “initial” and “standard” funds, which typically invest in conservative assets. Over time, participants may switch to funds with higher risk–return profiles, but the system deliberately exploits the empirically well-documented tendency for individuals to remain in default allocations. In practice, this default design shapes not only the extensive margin of participation and contribution decisions, but also the composition of retirement wealth accumulated within AES contracts.

3. Data and Methodology

3.1. Data

This study utilizes a data set spanning the universe of individual retirement accounts both in IPS and AES. The dataset is provided by the Pension Monitoring Center (PMC), the public authority charged with administering and regulating both systems. This high-quality, anonymized dataset includes annual contract-level and participant-level records detailing both IPS and AES contracts, and has a large unbalanced panel structure comprising over 17 million individuals and more than 39 million pension contracts.

The dataset captures, at the annual level, each participant’s ~~total~~ contributions, the accrued state matching contributions and the portfolio balances within the relevant calendar year. In addition, it includes detailed information on the asset allocation of individual portfolios, reflecting how contributions are distributed across available investment funds. All financial variables are recorded as year-end snapshots, enabling consistent cross-sectional analysis of savings accumulation over time.

In addition to financial information, the dataset contains key demographic attributes of participants, including age, gender, education level, and income bracket. However, education and income data are not systematically reported for all individuals, resulting in significant rates of missingness in these variables. The dataset also records precise opt-in and opt-out dates for both voluntary IPS and AES contracts. These time records enable detailed tracking of participants’ tenure within the system, as well as the analysis of opt-out behavior and re-enrollment dynamics over time.

The dataset spans the period from 2003 to the end of 2020. However, because the state matching contribution was introduced only in 2013, participation dynamics and contribution behavior in the pre-2013 regime differ markedly from those observed thereafter (Polat & Kekeç, 2017). To ensure analytical consistency and maintain comparability across individuals and over time, we restrict the sample to the post-reform period. Accordingly, all analyses are conducted on the subperiod from the beginning of 2014 through the end of 2020.

The analytical sample is restricted to individuals who, at some point after 2014, held at least one IPS contract with strictly positive contributions and maintained regular contribution activity for a minimum of one full year. We further limit the sample to individuals within a ±2 year bandwidth around the 45-year age threshold used to

determine eligibility for automatic enrollment. This narrow age window supports a quasi-experimental comparison between individuals just below and just above the cutoff, who are otherwise likely to be similar in both observable and unobservable dimensions. By sharply reducing systematic age-related heterogeneity, such as differences in earnings trajectories, employment stability, or baseline saving preferences, this design helps isolate the impact of the institutional rules from confounding demographic factors.

Note that some participants have multiple IPS contracts. For each individual, we thus combine his/her plans to sum their contributions up in all IPS contracts for each year. Finally, to mitigate the influence of extreme outliers in contribution behavior, individuals in the bottom and top 1% of the annual contribution distribution are excluded.

The dataset constructed through this sampling strategy constitutes an unbalanced panel, owing to variation in participants' entry and exit timings across both systems. The final sample comprises approximately 140,086 individuals and 699,500 observations. These individuals initially had an IPS contract between 2014 and 2017 and either opt-outed the system between 2018 and 2020 or remained continuously enrolled. Among them, those who were under the age of 45 were also enrolled in the AES in 2017 and either opted out between 2018 and 2020 or maintained their participation end of the 2020.

3.2. Methodology

This study employs a difference-in-differences (DiD) estimation strategy to identify the causal impact of the AES reform on both voluntary and total contributions. By comparing changes in contribution behavior over time between those exposed to the reform and those unaffected by it, the DiD approach enables credible identification of the effect of policy. The specification of the empirical model is defined as follows:

$$C_{i,t} = \alpha + \beta E_i + \gamma AES_t + \delta E_i * AES_t + \theta_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

In this specification, $C_{i,t}$ denotes the dependent variable, capturing either individual i's real voluntary IPS contributions in year t, or the combined total of real voluntary IPS and real AES contributions.[4] The treatment variable, E_i, is a binary equal to 1 if the participant i is under the age of 45 on 1 January 2017, thereby eligible for automatic enrollment, and 0 otherwise. This statutory age cutoff provides a clear distinction between treatment and control groups. AES_t, is a post-AES dummy that equals 1 for the years following the implementation of the AES in 2017, and 0 for all pre-AES years.

The interaction term $E_i * AES_t$ isolate the differential change in contributions attributable to the treatment group in the post-reform period. δ captures the causal effect of the AES on individual savings behavior. Within this framework, the coefficient on the interaction term (δ) is interpreted as the average treatment effect (ATE) of the

[4] Contributions are in Turkish Lira annual basis and deflated to year-end 2017 Türkiye's Consumer Price Index (CPI).

AES reform, representing the causal impact of AES on both voluntary IPS and total (IPS with AES) contributions according to the definition of dependent variable.

The credibility of the difference-in-differences (DiD) design employed in this study rests critically on the parallel trend assumption, which posits that, in the absence of the reform, treatment and control groups would have followed similar behaviours in their contributions. In this context, the groups are defined around the statutory age cutoff (participants just below and above the age of 45) and demonstrate comparable demographic characteristics, income distributions, participation motives and prior savings patterns.

To ensure the reliability of the estimated treatment effects, the analysis is confined to individuals within a ±2 year bandwidth around the statutory age cutoff. This restriction minimizes potential confounding due to age-related heterogeneity in savings behavior, thereby facilitating a more precise identification of the causal impact of the reform. Additionally, the inclusion of various individual fixed effects (μ_i) serves to control for unobserved, time-invariant individual characteristics.

4. Empirical Findings

This section presents the empirical findings in three parts. First, we report summary statistics for the treatment and control groups to assess baseline comparability in key demographic and financial characteristics. Second, we test the validity of the parallel trends assumption that is crucial for the credibility of the DiD approach by examining pre-reform contribution patterns around the eligibility threshold. Finally, we present baseline DiD estimates of the causal impact of automatic enrollment on both voluntary and total retirement contributions, followed by a heterogeneity analysis that explores variation in treatment effects across key subgroups.

4.1. Summary Statistics

Table 1. Summary Statistics

	(I)	(II)	(III)
	Age ≥ 45	Age < 45 (Voluntary Contributions)	Age < 45 (Total Contributions)
Number of Individual	83,282	56,804	
Percentage of Individual	59.45	40.55	
Average Annual Contributions (2013-2016) (₺)	3,299	3,164	3,164
Average Annual Contributions (2017-2020) (₺)	3,147	3,013	3,307
Pre- and Post-AES % change	**-4.62**	**-4.78**	**4.51**
Median Annual Contributions (2013-2016) (₺)	2,264	2,318	2,318
Median Annual Contributions (2017-2020) (₺)	2,085	2,130	2,436
Pre- and Post-AES % change	**-7.90**	**-8.12**	**5.07**
Standard Deviations	4,661	3,517	3,599

Gender(%)		
Male	46.51	55.40
Female	53.49	44.60

Note: Column (I) reports summary statistics for the control group, consisting of individuals aged 45 and above who hold only voluntary IPS contracts and are therefore not eligible for automatic enrollment under the AES reform. Columns (II) and (III) present statistics for the treatment group, defined as individuals under age 45 who, in addition to holding an IPS contract, were automatically enrolled into the AES. Column (II) displays contribution statistics based solely on participants' voluntary IPS contracts, whereas Column (III) provides total retirement contributions, calculated as the combined sum of IPS and AES contributions. Contributions are in Turkish Lira annual basis and deflated to year-end 2017 Türkiye's Consumer Price Index (CPI).

Table 1 reports the comparative summary statistics on demographic characteristics and contributions for both the treatment and control groups across the pre- and post-AES. Annual average and median contributions declined in both groups following the AES. This downward trend is likely attributable to the increase in inflation in Türkiye during the implementation of the AES, which eroded contribution values in real terms. Notably, the treatment group experienced a slightly larger (even if modest) reduction in voluntary contributions, which may be indicative of a partial crowding-out effect triggered by automatic enrollment.

On the other hand, when total retirement contributions are considered, the treatment group exhibits a clear increase in contribution levels during the post-reform period. This pattern suggests that the AES may serve as an effective policy tool for promoting retirement savings by actively enrolling individuals into the system. Finally, while modest structural differences exist between the treatment and control groups in terms of gender, the use of individual fixed effects and a narrowly defined age bandwidth (±2 years around the eligibility threshold) substantially mitigates the influence of such heterogeneity on the estimated treatment effects.

4.2. Validity of Parallel Trend Assumption

A core identifying assumption of the difference-in-differences (DiD) framework is that, in the absence of the reform, the treatment and control groups would have exhibited parallel trends in their contribution behavior. To evaluate the credibility of this assumption, we begin by visually inspecting pre-reform trends in average voluntary contributions. As illustrated in Figure 2, the contribution trajectories of individuals just below and just above the AES eligibility threshold closely mirror each other prior to 2017, indicating no evidence of systematic differences in savings behavior between the groups before the policy intervention.

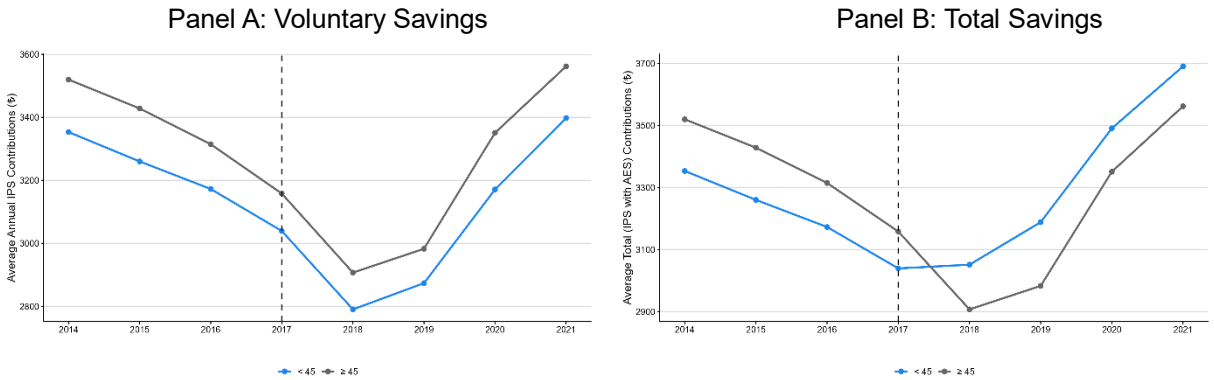

Figure 2. Parallel Trends

4.3. DiD Estimates

This section reports the baseline estimates of the causal impact of the Automatic Enrollment System (AES) on retirement saving behavior, employing the difference-in-differences (DiD) approach outlined in the methodology section. The analysis focuses on two outcome variables: (i) annual contributions made to the voluntary Individual Pension System and (ii) total contributions to the private pension system, which includes both voluntary IPS and mandatory AES contributions. Table 2 presents the estimation results based on the full sample, capturing average treatment effects.

Table 2. DiD Estimates for Full Sample (2013 - 2020)

	Voluntary Savings (only IPS)			Total Savings (IPS with AES)		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Treated x Time	-82.60***	-83.31***	-85.49***	198.9***	198.2***	195.8***
	(19.18)	(19.17)	(19.18)	(19.33)	(19.32)	(19.34)
Treated	-119.1***	-6.004	-31.75*	-109.3***	3.437	-24.78
	(13.72)	(18.69)	(18.75)	(13.73)	(18.80)	(18.87)
Time	-1,190***	-1,183***	-1,181***	-1,448***	-1,441***	-1,439***
	(37.96)	(37.96)	(37.92)	(38.97)	(38.98)	(38.92)
Age		63.27***	59.34***		63.07***	58.76***
		(6.946)	(6.959)		(7.038)	(7.050)
Gender (Male = 1)			220.2***			241.4***
			(10.35)			(10.42)
Constant	3,498***	578.5*	664.7**	3,494***	583.5*	677.9**
	(21.26)	(322.2)	(322.4)	(21.26)	(326.4)	(326.6)
Observations	699,500	699,500	699,500	699,500	699,500	699,500

Note: This table reports difference-in-differences (DiD) estimation results for voluntary IPS contributions (Columns I–III) and total contributions (Columns IV–VI), where total contributions are defined as the sum of IPS and AES. Sequential columns reflect model specifications with the inclusion of controls for age and gender. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 2 reports the difference-in-differences (DiD) estimates of the impact of AES on voluntary private pension contributions (Columns I–III) and total contributions (Columns IV–VI). The interaction term Treated × Time, which captures the causal effect of the reform, is negative and statistically significant for voluntary contributions, indicating that the AES reform leads to a relative decline in voluntary savings among individuals in the treatment group.

In contrast, the same coefficient is positive and significant for total contributions, suggesting that AES raises overall savings, despite a modest crowding-out effect on voluntary contributions. The results remain robust when controlling for individual fixed effects and year-specific shocks.

To quantify the extent to which AES crowds out voluntary IPS saving, we exploit the accounting identity that, in our data, total pension contributions equal the sum of voluntary IPS contributions and AES contributions in each individual–year observation, ${C_{i,t}}^{tot} = {C_{i,t}}^{vol} + {C_{i,t}}^{AES}$. Let $\hat{\delta}^{vol}$ denote the coefficient on Treated × Time in the voluntary IPS regression (Table 2, Column III), and $\hat{\delta}^{tot}$ the corresponding coefficient in the total-contributions regression (Column VI). The implied AES effect is then $\hat{\delta}^{AES} = \hat{\delta}^{tot} - \hat{\delta}^{vol}$, which implies $\hat{\delta}^{AES} = 281.29₺$. We define the crowding-out share of voluntary IPS by AES as, $\phi = \widehat{-\delta}^{vol}/\hat{\delta}^{AES}$.

Numerically, these estimates indicate that roughly 30% of the additional AES contributions induced by the reform are offset by lower voluntary IPS contributions ($\phi \approx 0.30$), while the remaining 70% represent net new retirement saving. Equivalently, each 1 TL of AES contributions generated by the reform is associated with an increase of about 0.70₺ in total retirement contributions and a reduction of about 0.30₺ in voluntary IPS contributions. The corresponding crowd-out ratios from alternative specifications in Table 2 (with different sets of controls but the same sample) cluster tightly around this value (0.29–0.30), confirming that the magnitude of partial crowding out is robust to model specification.

These magnitudes place our estimates in a natural position within the broader literature on retirement saving policies. First, the fact that roughly 70% of AES-induced contributions translate into higher total retirement saving aligns AES with the evidence on automatic and mandatory saving mechanisms, rather than with tax incentives that often generate little net new saving (e.g., Çitçi and Yanıkkaya, 2024). Chetty et al. (2014) find relatively low crowd-out (on the order of 15–20%) for Danish mandatory and employer pension contributions, while reforms to tax-favored voluntary accounts show much closer to full reallocation across assets. Our crowd-out estimate of about 30% is somewhat larger than their benchmark for mandatory schemes, but far below the near-complete offset one might expect if AES merely displaced existing voluntary IPS contributions. Second, the pattern is consistent with the 401(k) and auto-enrolment literature (Madrian and Shea, 2001; Choi et al., 2002, 2004; Cribb and Emmerson,

2020), which documents large mechanical increases in plan contributions when defaults are changed, but leaves open how much of this is net of other saving. By observing both the automatic AES channel and the pre-existing IPS channel in the same administrative system, our estimates make explicit that Türkiye's AES reform generates significant net additional retirement saving, alongside meaningful but clearly incomplete rebalancing away from voluntary IPS.

Persistent Savers

To examine heterogeneity in the policy's impact across participant types, we next focus on a distinct subgroup of individuals that we label persistent savers. This group consists of participants who have contributed regularly and without interruption to both the voluntary IPS and, once introduced, the AES. Their sustained engagement with both schemes suggests a deeper internalization of the institutional incentives and commitment mechanisms embedded in the retirement system. By isolating this group, we can assess whether AES primarily serves to bring new or marginal savers into the system, or whether it also strengthens and reinforces contribution behavior among individuals who were already strongly inclined to save.

The subsample is restricted to individuals who made regular contributions to the IPS throughout the 2013–2020 period and to the AES throughout the 2017–2020 period. The resulting persistent savers sample comprises approximately 20,725 individuals and 165,800 person-year observations. These participants exhibit long-term, uninterrupted contribution patterns and, by construction, are eligible for the full stream of matching contributions. They therefore represent a segment of the population with a consistently high propensity to save for retirement and stable exposure to the combined IPS–AES incentive structure.

We then replicate the DID analyses for this persistent savers subgroup. Table 3 reports the corresponding estimation results. Table 3 reports the DiD estimates for the subgroup of persistent savers, defined as individuals who contribute regularly to the IPS over 2013–2020 and to AES in every year after its introduction. For this group, the Treated × Time coefficient is negative and statistically significant in the voluntary IPS regressions (Columns I–III), indicating that AES is associated with a substantial reduction in voluntary IPS contributions even among long-term, highly engaged participants. In our preferred specification with age and gender controls (Column III), voluntary IPS contributions fall by about 178₺ per year, while total pension contributions (IPS + AES) rise by about 139₺ per year (Column VI).

Table 3. DiD Estimates for Persistent Savers (2013 - 2020)

	Voluntary Savings (only IPS)			Total Savings (IPS with AES)		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Treated x Time	-178.4***	-178.3***	-178.3***	139.1***	139.2***	139.2***
	(44.47)	(44.47)	(44.43)	(45.00)	(45.00)	(44.96)
Treated	-264.2***	-170.7***	-211.1***	-264.1***	-168.8***	-211.8***
	(27.78)	(39.67)	(39.77)	(27.78)	(40.03)	(40.12)
Time	-1,871***	-1,868***	-1,867***	-2,244***	-2,241***	-2,240***
	(122.6)	(122.6)	(122.4)	(126.6)	(126.6)	(126.3)
Age		52.05***	43.24***		53.06***	43.68***
		(16.04)	(16.05)		(16.32)	(16.32)
Gender (Male = 1)			406.3***			432.5***
			(22.69)			(22.90)
Constant	3,711***	1,308*	1,536**	3,710***	1,261*	1,504**
	(30.40)	(741.2)	(741.0)	(30.40)	(753.9)	(753.6)
Observations	165,800	165,800	165,800	165,800	165,800	165,800

Note: This table reports difference-in-differences (DiD) estimation results for voluntary IPS contributions (Columns I–III) and total contributions (Columns IV–VI), where total contributions are defined as the sum of IPS and AES. Sequential columns reflect model specifications with the inclusion of controls for age and gender. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Economically, these estimates imply that AES operates quite differently for persistent savers than for the average participant. For this subgroup, the crowding out is 0.56. Each 1₺ of additional AES contributions generated by the reform is associated with only about 0.44₺ of extra total pension saving and about 0.56₺ of reduced voluntary IPS contributions. In other words, more than half of the automatic contributions are financed by cutting back on existing voluntary saving, and less than half represent net new retirement saving.

A comparison between the full sample and the persistent savers subgroup indicates broadly similar behavioral patterns in the effect of the AES reform on contribution behavior, though with differences in magnitude. In both groups, voluntary contributions declined following the reform; however, the estimated effect size is somewhat larger among persistent savers.

In both the full sample and the persistent savers subgroup, individuals appear to substitute AES contributions for their voluntary savings to some extent; however, the net effect on total retirement contributions remains positive. This substitution behavior is more pronounced among persistent savers, who demonstrate a stronger adjustment in their contribution patterns following the introduction of automatic enrollment. Compared with the full sample, where the crowd-out share is roughly 30% and 70% of AES contributions translate into higher total saving, persistent savers exhibit a much stronger tendency to reallocate within the pension system, shifting contributions from IPS to AES rather than expanding the overall level of retirement saving to the same extent.

Conclusion

This paper studies the causal impact of the 2017 Automatic Enrollment System (AES) reform in Türkiye on retirement saving within the Individual Pension System (IPS). Using the age-based eligibility rule as a quasi-experimental source of variation, we implement a difference-in-differences design that compares cohorts just above and below the cutoff. The design allows us to separate the reform's effect on pre-existing voluntary IPS contributions from its effect on overall contributions into retirement accounts.

We document two robust patterns. First, AES induces a statistically and economically meaningful decline in voluntary IPS contributions: part of the saving that would have been channeled voluntarily into the system is re-routed through the automatic channel. Second, despite this crowding out, total contributions to retirement accounts, combining voluntary IPS and AES flows, increase markedly after the reform. The automatic channel therefore does not simply re-label existing saving; it raises the level of retirement contributions on net. When we restrict attention to persistent savers, who are already consistently contributing before the reform, the reduction in voluntary contributions is larger, but the net increase in total saving is also stronger than in the full sample. Automatic enrollment reshapes the saving profile of those already engaged with the system at least as much as it brings new participants into it.

These results speak to a part of the retirement saving literature where hard evidence is still scarce. Only a small number of studies can jointly track retirement-account flows in order to measure net saving and crowd-out. Most work on automatic enrollment instead focuses on participation and balances in a single plan, in high-income settings where mandatory public or occupational schemes already cover most workers and where the scope for additional voluntary saving is relatively limited. By contrast, Türkiye entered the AES reform with a large, established voluntary defined-contribution pillar and with IPS already playing a meaningful role in household balance sheets, in a macro environment with elevated inflation and return volatility. In this context, our estimates provide rare evidence on how an automatic enrollment mandate layered on top of an active voluntary market redistributes saving across channels and changes the overall level of retirement saving.

From a policy perspective, the findings are encouraging but not mechanical. AES raises net retirement contributions even for workers who are already saving voluntarily, but it does so by changing both the level and the composition of their contributions. The magnitude of the net gain depends on prior saving behavior, and the intensity of engagement with the system. For countries considering similar reforms, whether emerging economies with expanding third pillars or advanced economies seeking to

revive underdeveloped voluntary markets, the message is that automatic enrollment can be an effective lever to boost retirement saving, but its impact is shaped by the legacy voluntary system into which it is introduced.

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