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# Interrupting inertia: evidence from a mortgage refinancing field trial

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A widespread tendency for mortgage holders to forego opportunities to reduce their repayment burden through refinancing has been well documented. This puzzle has persisted in spite of considerable regulatory and public attention to the topic. In this *Letter*, we conduct a randomised controlled trial on a sample of circa 12,000 mortgage holders to test how targeted enhancements to an existing disclosure can prompt greater take-up of advantageous refinancing opportunities. The results show the best performing enhancement delivered a 76 per cent increase in the number of refinances completed, when compared against the pre-existing standard disclosure. Refinancers benefit materially, saving on average €1,209 just within the first 12 months after action. We observe that reminders substantially drive the increased uptake, and that the incorporation of personalised euro savings estimates as part of the menu of refinancing options presented to consumers can also help them to more easily weigh-up their opportunities and make the best informed choices. These results demonstrate the value of integrating behavioural economics into consumer protection policymaking.

## 1 Introduction

Across many countries, researchers have documented a widespread “failure to refinance”, where substantial savings available to mortgage holders through refinancing remain unclaimed (see, for example, Keys *et al.*, 2016; Bajo and Barbi, 2018; Andersen *et al.*, 2017; FCA, 2019; ACCC, 2018). This matters for a number of reasons: firstly, suboptimal refinancing implies that many households are overpaying mortgage interest and foregoing current or future consumption as a result (FCA, 2019); secondly, households with elevated debt burdens are more vulnerable to mortgage distress arising from income shocks (see for instance Giordana and Ziegelmeyer, 2020); thirdly, a failure of households to respond to interest rate changes could affect the transmission of monetary policy (DiMaggio *et al.*, 2020), and; fourthly, low refinancing activity could reduce competition in the mortgage market, acting as a disincentive for existing providers to compete on the basis of price or discouraging new entrants (Farrell and Klemperer, 2007). In broad terms, the “failure to refinance” can have macroeconomic and financial stability implications.

Over recent years, there have been several studies of refinancing activity in the Irish mortgage market. Byrne *et al.* (2020), for example, reported that “*mortgage customers in Ireland have not*

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<sup>1</sup> The authors are economists at the Central Bank of Ireland. All views expressed in this *Letter* are those of the authors alone and do not represent the views of the Central Bank of Ireland or the European System of Central Banks. We would like to thank Fergal McCann, Trevor Fitzpatrick, Mark Cassidy, and Vasileios Madouras for helpful comments, and Christopher Palmer (MIT) and Michael King (TCD) for their input to the design and evaluation of this project. Any remaining errors are our own.

engaged to any large extent with the option to switch their mortgage in recent years, despite downward movements in interest rates, and policy initiatives to improve the switching process". The authors found that 3 in 5 mortgaged households in Ireland could save at least €1,000 within the first year or €10,000 over the life of their loan by switching to a lower interest rate. Cumulatively, these estimates amounted to potential unclaimed savings of approximately €236 million over a one-year horizon. Devine (2022) provided further evidence of refinancing inertia, showing that two-thirds of borrowers at an Irish retail bank did not take up a cost free refinancing offer from their financial institution, foregoing average savings of €5,400 over the remaining term of their mortgage.

While there are several reasons why a failure to refinance could be a perfectly rational financial decision for mortgage holders<sup>2</sup>, behavioural factors have been shown to inhibit optimal financial engagement across a broad range of financial products, including mortgages (see Lunn *et al.* (2018) for overview). Indeed the sizable fraction of consumers with sufficient equity and good credit who stand to gain from refinancing in the Irish context, but who fail to act, suggests that such obstacles are at play.

We partnered with a large retail bank to carry out a randomised controlled trial (RCT), designed to test if mandatory financial disclosures could be enhanced to overcome behavioural obstacles and prompt better consumer engagement with mortgage refinancing opportunities in the Irish market.<sup>3</sup> RCTs have become an integral tool for effective policymaking, widely used across a range of policy domains, including in the consumer financial policy area (see Section 4). When designed with insights from behavioural economics, they provide an opportunity to pre-test policy interventions in a way that adjusts for the practical reality of how human decision processes work, within the scientific framework of the gold standard in evidence-based causal analysis (Byrne *et al.*, 2022).

Informed by behavioural economics, we designed and tested a series of enhancements to a letter that the retail bank issues to its variable rate mortgage customers to comply with Provision 6.5(g) of the Central Bank of Ireland's Consumer Protection Code. This provision requires regulated entities to inform their variable rate mortgage holders, at least annually, about other lower cost mortgage products available to the customer at that point in time. The enhancements were designed to tackle a series of behavioural biases which have been shown in other settings to deter optimal financial engagement, including, for example, inattention, present bias, and procrastination (see for instance Andersen *et al.*, 2015; Hastings and Mitchell, 2020; Brown and Previtro, 2014).

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<sup>2</sup> For example, if a mortgage holder intends to move house in the near-term, they might decide not to refinance because they will not be in the home long enough to recoup the associated costs.

<sup>3</sup> An RCT is a form of scientific testing which enables comparison of the impact of alternative interventions in the most reliable manner, with participants randomly assigned to different treatment groups, and their outcomes observed and compared using real data after a specified period of time.

We found that our enhanced communications were highly effective, bringing about an increase in the probability of mortgage refinancing of up to 76 per cent, with the addition of a reminder communication following an original notification substantially driving an increase in uptake. The project demonstrates the utility of applied behavioural science (small changes properly tested can make a big difference) and the potential for beneficial future application of insights from behavioural economics in other areas of consumer protection policy.

This *Letter* proceeds as follows: In Section 2 we describe our experimental design and data employed in the analysis. The results are explored in Section 3 and Section 4 concludes.

## 2 Overview of project

### 2.1 Background and sample

In early-2020, the Central Bank partnered with a large retail bank in the Irish market, in a voluntary capacity, to undertake an RCT in which a series of six behaviourally enhanced versions of the existing mandatory financial disclosure noted in Section 1 were tested.<sup>4,5</sup> The retail bank was planning on sending a letter to all of its variable rate mortgage holders in early-2020, to comply with the disclosure obligation. Prior to this, a sample of 12,050 customers was randomly selected from the variable rate customer population at the retail bank, for participation in the trial.<sup>6</sup> This sample was randomly allocated into seven different groups with approximately 1,700 customers in each. Six of these groups were ‘treated’ in the trial – in other words, they each received one of the enhanced disclosure notifications developed by the research team, while the seventh and final group received the standard disclosure notification that the bank was sending to its remaining variable rate customers (that were not part of the trial). The seventh group therefore acted as a baseline against which each of the six ‘treated’ groups could be compared at impact evaluation stage. The notification that was issued to trial participants occurred over the same timeframe as non-trial participants (January/February 2020), and in the case of treated groups, therefore replaced the standard notification that would otherwise have been issued to these customers. The enhanced disclosures are described in Section 2.2.

For the randomised control trial to be effective, it was essential that each of the seven groups was balanced in terms of key characteristics that might impact mortgage refinancing propensity. Table A1 in the Appendix reports summary statistics for the mortgage and borrower characteristics

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<sup>4</sup> The design phase of the project was informed by an internal Central Bank Steering Committee and by detailed engagement with internal stakeholders, while the overall project (design and analysis) was overseen by an external expert academic panel.

<sup>5</sup> The six alternative versions all represented improvements over the baseline. Each tested alternative retained the required information contained in the baseline standard, and added information or adjusted its presentation to more consumer-friendly formats.

<sup>6</sup> Power analysis was used to determine the sample size required to effectively test the impact of 6 different treatment arms.

across the sample. In broad terms, we find a high degree of statistical balance across the groups, lending support to our randomisation exercise.

## 2.2 Treatment overview

**Table 1 | Principal enhancements mapped to behavioural factors**

Enhancement	Behavioural factor targeted	Explanation
Simplification	Inattention / information overload	To address consumer inattention and the possibility of information overload we summarised key salient information in bullet points at the top of the letter.
Personalised savings	Ambiguity aversion / present bias	To address consumer aversion to ambiguity and the difficulty one might face in computing the financial meaning of differences in interest rates across alternative products, we included, as part of the summary table of alternative product options, the euro amount of monthly and annual savings associated with each listed option relative to the borrower’s existing terms. We additionally listed the total current monthly repayment and that associated with the lowest cost available alternative in euro amounts.
More prominent subject line	Inattention	To increase the likelihood that customers would perceive the letter to be important, we trialled the use of colour, increased font size and emboldened the text in three of our interventions.
Framing	Loss aversion	We trialled presenting the refinancing opportunity with a gain frame and separately with a loss frame. We changed the language to read either “With a different rate, you could save up to €X a year on your mortgage” or “You could be missing out on savings of up to €X a year by not choosing a lower mortgage interest rate”.
Next steps clarified	Ambiguity aversion	We added a clarified process box which clearly delineated the steps required for a mortgage holder to take action and move onto a lower cost interest rate option.
Reminder	Procrastination / Forgetfulness	Each of the treated groups was randomly divided in half, with one half receiving an additional follow-up reminder notification by post 4-6 weeks after the original communication.

An illustration of the baseline notification that was to be issued to untreated variable rate customers is shown in the Appendix. Informed by behavioural economics, we designed six enhanced versions of this baseline to address biases and obstacles that relate specifically to the mortgage refinancing decision process.<sup>7</sup> For instance, we added monthly repayments and personalised savings estimates to each of the product options that were listed for a consumer, in an effort to make clear to customers the magnitude of the savings available, and to allow customers to

<sup>7</sup> The potential for our chosen enhancements to deliver beneficial impact upon consumer inertia and disengagement has been amply demonstrated in the literature in other settings.

immediately consider if it might be worth their while to refinance. Table 1 details the principal design enhancements that were applied across the six alternative versions, linking each to a specifically targeted behavioural factor. Table 2 describes how these features were integrated into the six alternative versions of the disclosure that were issued as part of the trial, while one of these versions (Version 2) is included in the Appendix for illustrative purposes. The reminder notification noted in Table 2 below is also included in the Appendix.

**Table 2 | Description of alternative disclosure versions / treatments**

Alternative disclosure version	Design format
Control	Existing standard (i.e. the standard letter that the retail bank was going to issue to all variable rate customers).
Version 1	Added personalised savings estimates with a simplified presentation.
Version 2	Added personalised savings estimates with a simplified presentation, and displayed key information in colour rather than black and white.
Version 3	Added personalised savings estimates with a simplified presentation, and a more prominent subject line.
Version 4	Added personalised savings estimates with a simplified presentation, and a gain frame.
Version 5	Added personalised savings estimates with a simplified presentation, and a loss frame.
Version 6	Added personalised savings estimates with a simplified presentation, a loss frame, and clarified next steps.
Reminder	A random selection of 50% of each treated groups (i.e. those receiving versions 1 to 6) additionally receive a reminder communication by post 4 to 6 weeks after the original communication.

## 3 Results

### 3.1 Impact on refinancing behaviour

To assess the impact of our interventions, trial participants were tracked in terms of their subsequent propensity to refinance. We gathered detailed loan-level data on each of the participants in the trial in the period prior to the intervention and again in the period following the intervention. We assessed the impact of the intervention using a data snapshot that was provided by the partnering institution at three months after the disclosure distribution.

The loan-level dataset recorded detailed loan characteristics such as the interest rate prevailing on the loan, the interest rate type, the initial and outstanding loan balance and loan-to-value ratio, the current monthly repayment, the pre-trial available savings on the mortgage (with respect to the

best available alternative product option). Additional indicators were also collected in the post-disclosure data drop, to allow easy identification of those loans that had reached maturity, switched externally, otherwise exited the book, and most importantly, refinanced internally with the mortgage provider. These data allow us to assess the differential impact of our treatments on borrowers' mortgage management.

In Figure 1 we compare the observed refinancing rate (3 months after the disclosure notification was sent) across the groups who received the baseline standard (control) or one of our enhanced versions, where the enhanced versions were not additionally followed up with a reminder notification. The baseline probability that a mortgage holder goes on to refinance in the control group is 8.9 per cent. This captures what we would expect to observe in normal circumstances in the absence of any experimental intervention (i.e. the benchmark). In the best performing alternative version (Version 4), this increases to 11.9 per cent (a 34 per cent improvement). This is a positive outcome, but a much stronger impact is observed when we introduce the reminder notification.

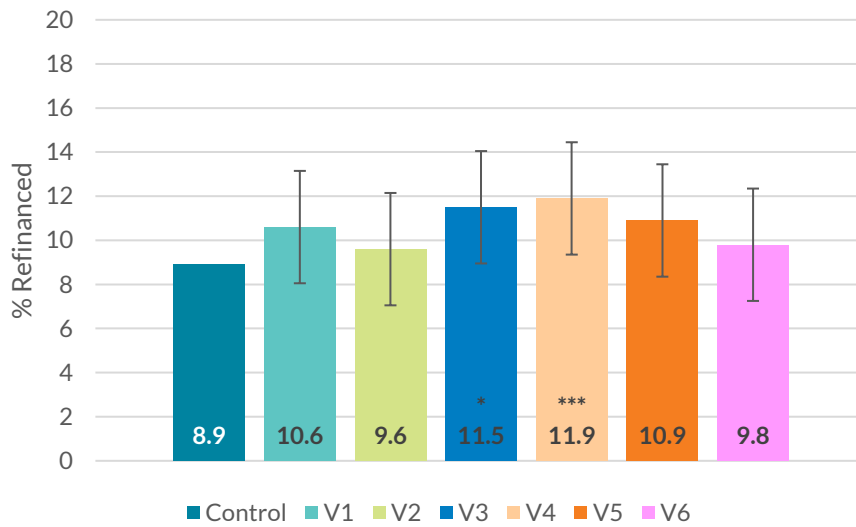
Figure 2 compares the refinancing probabilities of the control group against recipients of our enhanced versions who additionally received a reminder notification. Here, all 'treated' groups fare significantly better than the control group, and in the best performing version (Version 2), we achieve a 76 per cent improvement in the baseline probability of refinancing.<sup>8</sup>

As sketched out in Table 1, there is a range of precise cognitive and behavioural mechanisms through which the impacts observed may be operating on the consumer decision process. These mechanisms will be explored more deeply in a detailed technical paper (Byrne *et al.*, forthcoming).

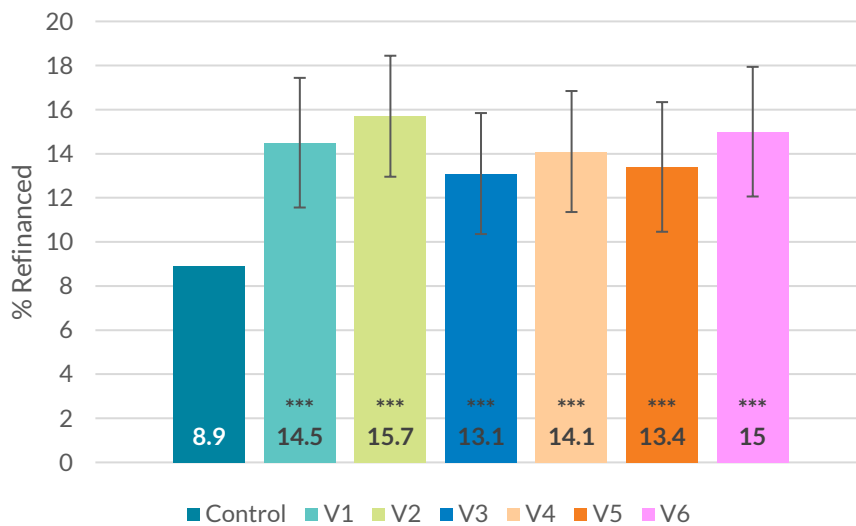
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<sup>8</sup> For the purpose of empirical transparency, we also model the probability that a refinancing opportunity was taken up (the outcome variable), as a function of the notification version received. The results are shown in Table A2 of the Appendix. The coefficients in columns 1 and 3 correspond to the positive impacts depicted in Figures 2 and 3. As an exercise in demonstrating the robustness of our treatment effect estimates, columns 2 and 4 repeat the estimation, but include in the model additional adjustment factors of interest relating to the characteristics of the underlying borrower and mortgage.

**Figure 1 | Treated (without reminder) versus Control**



**Figure 2 | Treated (plus reminder) versus Control**



Note: Stars denote statistically significant difference relative to control group at 10% (\*), 5% (\*\*), and 1% (\*\*\*) level. Error bars capture the standard error associated with the treatment effect estimates presented in Table A2.

### 3.2 Financial savings

We additionally observe that, among those borrowers who did refinance their mortgage, the average savings that would be achieved within the first 12 months was €1,209, equivalent to 2.8 per cent of median household disposable income in 2020 (CSO, 2020). Cumulatively in our final estimation sample of 11,200 mortgages,<sup>9</sup> refinancers realised €1,625,577 of savings within the first 12 months.<sup>10</sup> In a scenario where no randomised controlled trial was conducted, where we can

<sup>9</sup> Our starting sample comprised 12,050 mortgages. Our final estimation sample of 11,200 follows after the necessary exclusion of some loans from analysis (e.g. those loans that exited the loan book during the course of the trial or reached maturity).

<sup>10</sup> This figure is the sum of the savings achieved by refinancers in our estimation sample in the first year following the refinance. Actual savings achieved by a refinancer in the first 12 months is calculated by



safely assume the refinancing behaviour of the control group would have been observed in the entire sample, cumulative year-1 savings from refinancing would have amounted to €1,274,382, meaning that the trial itself delivered just over €350,000 in actual additional savings for mortgage holders. However, were such a level increase in the refinancing rate scaled up to the wider mortgage market, cumulative realised savings would be significantly greater.

### 3.3 Subgroup analysis

We investigate whether the impact of our enhanced communications differed for relevant borrower subgroups: namely, those with greater levels of outstanding debt, those with higher savings available, first-time versus second and subsequent borrowers, and those who previously availed of a COVID-19 repayment break (results are shown in Table A3 of the Appendix).

To make the assessment, we estimate a model of refinancing probability across treatment groups, including interaction terms between key borrower / loan characteristics and a variable indicating treatment status (i.e. which equals 1 for treated customers and 0 for those in the control group). The interaction terms examine whether the intensity of the impact is more pronounced within any of these specified subgroups. We do not find any strong evidence to suggest any of these subgroups respond to a greater or lesser degree than others to our enhanced communications, implying that the impact of our enhanced disclosures is consistent across these relevant subgroups.<sup>11</sup> This is a welcome finding, suggesting that the benefit of enhanced communications can be widely felt in the population.

## 4 Discussion and conclusion

This *Letter* outlines the results of a randomised controlled trial designed to test if mandatory financial disclosures could be enhanced to overcome behavioural obstacles and prompt better consumer engagement with mortgage refinancing opportunities in the Irish market. In partnership with the Central Bank, a large retail bank in the Irish market issued six treatment letters to a sample of its variable rate mortgage customers. Each letter contained an enhanced disclosure developed by the research team to target designated behavioural factors. Our results show that the enhanced disclosure measures were successful in prompting engagement among mortgage customers. The best treatment produced a 76 per cent increase in the probability that a borrower refinanced to a lower available interest rate, with a reminder notification accounting for a significant portion of this increased uptake. The average savings for those borrowers who did refinance was €1,209 within the first year. The results provided are intuitive, with less ambiguous personalised savings making

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multiplying the observed interest rate differential (old minus new interest rate applicable) by the outstanding balance on the mortgage.

<sup>11</sup> We do observe a significant interaction effect in Version 4 with respect to loan balance, but we do not read heavily into this result which we treat as incidental.

it clear to borrowers how much they can gain financially through action and the issuance of reminders reducing the likelihood of procrastination and forgetfulness.

The project illustrates the potential to significantly impact consumer engagement through small, complementary changes to an existing financial disclosure. Our selected enhancements of simplification, personalisation and reminders may be more valuable when disclosures are particularly difficult to understand and tedious to engage with. Communication with mortgage holders about refinancing is important at different points in the economic cycle. During periods of expansionary monetary policy, offer letters and reminders can improve interest rate pass-through in the form of reduced lending costs for households. When interest rates increase, households transitioning into fixed rate products would promote certainty and stability around repayment burdens in inflationary times.

This *Letter* provides clear evidence on the importance of behavioural insights in policy design, building upon a strong and rapidly growing international precedent for the application of such insights to remediate stubborn and entrenched issues in the functioning of financial product markets. While the initiative was the first of its kind undertaken by the Central Bank, it reflects an important body of existing evidence demonstrating that small changes, carefully applied and pre-tested, can have impact. The application of a randomised controlled trial setting provides for a gold standard in causal evidence to establish what works, and what does not, before any proposed policy is rolled out to the wider population. Byrne *et al.* (2022) provide a more comprehensive outline of the value of behavioural economics in the public policymaking process. Examples are provided on the application of such insights across government and in the financial domain. Notably, the UK Financial Conduct Authority has demonstrated the benefit of integrating this approach within its regulatory toolkit, across a range of financial products, including credit cards, add-on insurance, redress schemes, product renewal, pensions, mortgages, and savings accounts.

In keeping with our strategic theme of being a future-focused organisation<sup>12</sup>, the Central Bank will continue to advance its capabilities in analysis and research on economic and financial issues through innovation in our ways of working. We will continue to identify additional areas of focus, and where appropriate, use the latest techniques available within the behavioural toolkit to help provide evidence for effective policy design.

## Appendix

**Table A1 | Descriptive balance across treatment arms (proportion of group, unless otherwise stated)**

	Control Group	Treatment Group					
		1	2	3	4	5	6
Dublin	0.20	0.21	0.20	0.19	0.21	0.19	0.19
	(0.40)	(0.40)	(0.40)	(0.39)	(0.41)	(0.39)	(0.39)
Borrower age (years)	49.74	50.29	49.80	50.08	50.13	50.10	49.87
	(9.26)	(9.37)	(9.22)	(9.26)	(9.61)	(9.30)	(9.40)
First time buyer	0.41	0.40	0.40	0.40	0.40	0.38	0.40
	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)
Outstanding mortgage balance (€)	83,503	81,425	80,098	81,530	81,020	81,351	82,548
	(84,125)	(89,826)	(80,088)	(90,834)	(91,867)	(98,831)	(87,424)
Interest rate	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Years to maturity	13.87	13.21	13.21	13.25	13.36	13.16	13.38
	(8.54)	(8.54)	(8.47)	(8.48)	(8.50)	(8.41)	(8.50)
1-Year savings (€)	1,044	1,037	1,007	1,021	1,022	1,018	1,037
	(1,010)	(1,155)	(980)	(1,137)	(1,101)	(1,178)	(1,065)
COVID-19 forbearance	0.09	0.07	0.08	0.07	0.09	0.09	0.08
	(0.28)	(0.25)	(0.28)	(0.25)	(0.28)	(0.29)	(0.28)
Observations	1,613	1,587	1,616	1,602	1,629	1,585	1,568

Note: The table reports means and standard deviations in parentheses of mortgage borrower / loan characteristics in each treatment and control group. The sample consists of 11,200 customers, since we focus on the group that forms part of the regression estimation discussed in Section 3. 'Dublin' is an indicator for whether the mortgaged property is located in Dublin or not. Borrower age is that of the oldest borrower on the mortgage. First-time buyer indicates whether the borrower is a first time-buyer or not. Mortgage balance is the amount outstanding on the loan at the time of trial, in euros. Interest rate is the interest rate that was applicable to the loan at the outset of the trial. 1-year savings is the amount (in euros) of savings that would be available to the borrower in the first year after refinancing to the lowest available rate. COVID forbearance indicates whether the borrower was using COVID-19 payment break (introduced in Ireland in March 2020 to alleviate short-term liquidity constraints faced by borrowers experiencing financial difficulties due to the impact of the pandemic).

**Table A2 | OLS regression estimation of refinancing activity**

Independent variables	(1)	(2)	(3)	(4)
	No reminder	No reminder	With reminder	With reminder
<i>Treatment status</i> <sup>^</sup> :				
Version 1	0.017 (0.013)	0.021* (0.013)	0.056*** (0.015)	0.059*** (0.014)
Version 2	0.007 (0.013)	0.012 (0.013)	0.068*** (0.014)	0.071*** (0.014)
Version 3	0.026* (0.013)	0.028** (0.013)	0.042*** (0.014)	0.047*** (0.014)
Version 4	0.030** (0.013)	0.032** (0.013)	0.052*** (0.014)	0.056*** (0.014)
Version 5	0.020 (0.013)	0.024* (0.013)	0.045*** (0.015)	0.048*** (0.014)
Version 6	0.009 (0.013)	0.013 (0.013)	0.061*** (0.015)	0.062*** (0.014)
Years to mortgage maturity		0.004*** (0.000)		0.005*** (0.001)
1-Year savings (€000s)		0.027*** (0.004)		0.021*** (0.004)
COVID-19 forbearance		0.032** (0.014)		0.033** (0.015)
Constant	0.089*** (0.008)	-0.001 (0.010)	0.089*** (0.008)	-0.004 (0.011)
Observations	6,409	6,409	6,404	6,404
R-squared	0.001	0.037	0.005	0.035

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Note: <sup>^</sup>Treatment effects are measured relative to a base category which is the Control group. Dependent variable is a binary refinance indicator (0 if no, 1 if yes). Column 1 reports impacts for the cohort that did not additionally receive a reminder notification. Column 2 reports impacts for the same cohort as Column 1, but additionally adjusts for certain borrower and mortgage characteristics. Column 3 reports impacts for the cohort that did additionally receive a reminder notification. Column 4 reports impacts for the same cohort as Column 2, but adjusts for certain borrower and mortgage characteristics, showing consistent results.

**Table A3 | Treatment effect heterogeneity – subgroup analysis (OLS regression)**

	(1) V1	(2) V2	(3) V3	(4) V4	(5) V5	(6) V6
Treatment indicator	-0.003 (0.018)	0.001 (0.018)	0.021 (0.018)	0.020 (0.018)	0.016 (0.018)	0.011 (0.018)
Treatment *	-0.008 (0.016)	-0.008 (0.016)	-0.008 (0.016)	-0.008 (0.016)	-0.008 (0.016)	-0.008 (0.016)
First Time Buyer						
Loan Balance (€50,000-100,000)	0.030 (0.023)	0.033 (0.023)	0.007 (0.023)	0.051** (0.023)	0.023 (0.023)	0.002 (0.023)
Loan Balance (>€100,000)	0.015 (0.027)	0.015 (0.027)	0.015 (0.027)	0.015 (0.027)	0.015 (0.026)	0.015 (0.027)
1-Year Savings (€500-1000)	0.046 (0.040)	0.032 (0.038)	0.038 (0.040)	0.025 (0.038)	-0.010 (0.037)	-0.006 (0.038)
1-Year Savings (>€1000)	-0.032 (0.032)	-0.032 (0.033)	-0.032 (0.033)	-0.032 (0.033)	-0.032 (0.032)	-0.032 (0.032)
COVID-19 Forbearance	-0.012 (0.039)	-0.012 (0.040)	-0.012 (0.040)	-0.012 (0.040)	-0.012 (0.039)	-0.012 (0.039)
First Time Buyer	0.057 (0.046)	0.070 (0.046)	0.068 (0.047)	0.052 (0.047)	0.058 (0.046)	-0.016 (0.047)
Loan Balance (€50,000-100,000)	0.011 (0.057)	0.092 (0.057)	0.069 (0.059)	0.021 (0.058)	0.069 (0.057)	-0.028 (0.057)
Loan Balance (>€100,000)	0.042 (0.029)	0.042 (0.030)	0.042 (0.029)	0.042 (0.030)	0.042 (0.029)	0.042 (0.029)
1-Year Savings (€500-1000)	0.117*** (0.040)	0.117*** (0.040)	0.117*** (0.040)	0.117*** (0.040)	0.117*** (0.040)	0.117*** (0.040)
1-Year savings (>€1000)	0.004 (0.042)	0.001 (0.042)	-0.007 (0.042)	-0.034 (0.042)	-0.039 (0.042)	0.032 (0.042)
COVID-19 Forbearance	0.021 (0.057)	-0.057 (0.057)	-0.063 (0.059)	-0.024 (0.059)	-0.034 (0.057)	0.081 (0.058)
Constant	0.046*** (0.013)	0.046*** (0.013)	0.046*** (0.013)	0.046*** (0.013)	0.046*** (0.013)	0.046*** (0.013)
Observations	3,200	3,229	3,215	3,242	3,198	3,181
R-squared	0.041	0.037	0.028	0.033	0.036	0.042

Note: Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. In each column we compare only one treatment group to the control group, hence the reduced sample size. Dependent variable is a binary refinance indicator (0 if no, 1 if yes). First Time Buyer interaction term is measured relative to a base category which is Second and Subsequent Buyers. Loan balance interaction terms are measures relative to a base category which is <€50,000. Savings interaction terms are measured relative to a base category which is <€500. Reminder and no-reminder samples are pooled in this regression estimation.

## Illustrative Letter Examples

### Control (Pre-existing standard) Page 1

Mortgage Account Number 123456789

#### You may be able to save money on your mortgage

Dear Joe

This letter supplements the information we sent with your annual mortgage loan statement in the leaflet called **“Information about your mortgage (You may be able to save money on your mortgage)”**.

The standard variable interest rate we currently charge you on your mortgage loan is 4.5%.

However, we want to make sure you are getting the best deal and we may have a mortgage for you at a lower interest rate.

#### What rates are available?

The lowest interest rate currently available to you is a one-year fixed rate of 2.9%. We also offer fixed rates for periods of two, three, and five years. We explain Loan to Value at the end of this letter.

#### Explaining the table below

This table shows you the interest rates along with the Annual Percentage Rate of Charge (APRC). We explain APRC at the end of this letter.

#### Fixed interest rates

Fixed interest rate options	Loan to Value Up to 60%	Loan to Value 61-80%	Loan to Value over 80%
1-year	2.9% (3.9% APRC)	2.9% (4.2% APRC)	2.9% (4.4% APRC)
2-year	2.9% (3.8% APRC)	2.9% (4.0% APRC)	2.9% (4.3% APRC)
3-year	3% (3.7% APRC)	3% (3.9% APRC)	3% (4.1% APRC)
5-year	3% (3.6% APRC)	3% (3.7% APRC)	3% (3.9% APRC)
10-year	3.3% (3.5% APRC)	3.3% (3.6% APRC)	
10-year			3.5% (3.8% APRC)

Version 2 (Enhanced version used in trial) Page 1

Mortgage Account Number: 1234567

**You may be able to save money on your mortgage**

Dear John,

Your current mortgage interest rate is a standard variable rate of 4.5%. We want to make sure you are getting the best deal and we may have a lower interest rate for your mortgage.

Current monthly repayment at 4.25%:	€716	<ul style="list-style-type: none"> <li>We have a range of interest rates that could save you money.</li> <li>Our lowest rate is a fixed rate of 2.9%, which could result in an immediate monthly saving to you of about €126. Over the course of a full year, that's approximately €1,512 in savings.</li> <li>Below, we outline the full range of interest rate options currently available, along with the next steps to take if you wish to choose one of these alternative options.</li> </ul>
Potential monthly repayment at 2.9% fixed:	€590	
Estimated difference in monthly repayments	-€126	
Potential difference over the year:	-€1,512	

**Explaining the tables below**

These tables show you the interest rates along with the Annual Percentage Rate of Charge (APRC). We explain APRC at the end of this letter. The rates may vary by Loan to Value (LTV) ratio. We also explain LTV at the end of this letter.

**Fixed interest rates**

Fixed interest rate options	Loan to Value Up to 60%	Loan to Value 61-80%	Loan to Value over 80%	Difference in monthly repayments	Difference over the year
1-year	2.9% (3.9% APRC)	2.9% (4.2% APRC)	2.9% (4.4% APRC)	-€126	-€1,512
2-year	2.9% (3.8% APRC)	2.9% (4.0% APRC)	2.9% (4.3% APRC)	-€126	-€1,512
3-year	3% (3.7% APRC)	3% (3.9% APRC)	3% (4.1% APRC)	-€118	-€1,416
5-year	3% (3.6% APRC)	3% (3.7% APRC)	3% (3.9% APRC)	-€118	-€1,416
10-year	3.3% (3.5% APRC)	3.3% (3.6% APRC)		-€95	-€1,140
10-year			3.5% (3.8% APRC)	-€80	-€960

## Reminder

Mortgage Account Number: 1234567

### **REMINDER: You may be able to save money on your mortgage**

Dear X,

We recently wrote to you about the availability of lower mortgage interest rate options and the potential for savings on your monthly mortgage repayments.

This is a reminder to take action to avail of one of these options.

If you wish to take up a lower interest rate for which you are eligible, you can go online at [websiteaddress.com/mortgages](http://websiteaddress.com/mortgages), call us on 01 XXX XXXX, or visit a branch.

Yours sincerely,

Head of Mortgages



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