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**Priming or Learning? The Influence of Pension Policy Information on Individual
Preferences in Germany, Spain and the United States**

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A promising approach to pension policy preferences focuses on the influence of policy related information. We advance this research program by examining the impact of information about future pension benefits, including whether information effects occur through priming, learning or both. Drawing on a novel, split-sample survey experiment in the US, Germany and Spain, we specifically examine the impact of information on predicted pension replacement rates for 2040 on pension policy attitudes. Findings indicate that the information treatment increases support for the two outcomes considered: (i) increases in the pensionable age and (ii) greater spending on pensions relative to other social programs. Analyses of heterogeneous treatment effects accounting for prior beliefs of participants show that information effects occur both through priming and learning. The study concludes that hard, non-partisan information increases support for reforms that foster the financial sustainability of pension systems, although the scope of information effects depends on contextual conditions.

Decades after the end of the expansionary era of the welfare state, social policy reform remains at the top of the public agenda in most affluent democracies. Since contemporary reform proposals include complex recalibrations if not outright retrenchments (Fernández 2012; Häusermann et al. 2019), public debates regarding pension policy are particularly sensitive to interpretive frames (Goerres et al. 2018) and technical information regarding past and future performance of these programs (Hemerijck 2013). Such growing rationalization of social policy debates in affluent democracies has also motivated scholarly interest on the influence of systematic knowledge and specific information on individual policy preferences (Bachner and Hill 2014). Many works adopting this *information approach* have explored how objective knowledge (Althaus, 1998; Boeri et al., 2001; Parlevliet, 2017) or perceived prior knowledge (Bartels, 2018; Claassen and Highton, 2006) impacts social policy attitudes. Other studies, based on experimental evidence, assess whether providing information and/or frames to participants contributes to attitude revision (Gouveia, 2017; Naumann, 2017; Tinios and Poupakis, 2013).

While studies on the relationship between information and social policy attitudes have produced important insights, they usually neglect the critical distinction between *priming* and *learning* processes (Oskamp and Schultz, 2005). Without considering if respondents had prior awareness of a certain fact, we cannot determine if any observed effects on social policy attitudes are due to *learning* – ie. accruing new information – or *priming* – ie. being reminded of something already known. Seeking to incorporate this critical distinction to the literature on information and social policy attitudes, this study therefore addresses two important questions: Does information on the predicted generosity of public pension benefits influence individual attitudes regarding potential, parametric, pension reforms? In such case, does this information effect occur due to learning or priming?

In answer, we draw on a novel, online survey experiment conducted in the US, Germany and Spain. In a split sample design, participants in the randomly selected treatment group are asked to read a definition of the pension replacement rate and information about the current rate in their home country. They are then asked to guesstimate the rate in 2040 before being

shown the official forecast for the rate. By contrast, participants in the control group were not asked to guesstimate the future replacement rate and were not told the official forecast. This strategy allows us to identify the causal effect of initial exposure to reliable, non-partisan information on attitudes. We examine the role this information plays in support for raising the legal retirement age and transferring resources from other welfare programs to the old-age pension program. As we discuss below, the three countries considered were selected because they display substantial variation in pension policy trends and salience of the pension issue.

The results indicate that reading information on future pension generosity significantly alters pension policy preferences. Providing this information increases the average support for a higher pensionable age in the US and Germany, as well as for resource transfers from other social programs to pensions in the three countries. Once considering the relation between priors and hard information, results indicate that for attitudes on the pensionable age and for attitudes on pension-related social spending, the information effect occurs through a combination of learning and priming. Priming appears more likely to change attitudes toward policies that do not entail direct personal costs. Moreover, since cross-national variation in the size of the main information treatment is modest, the evidence does not suggest that the level of pension cuts or pension policy salience strongly shape the size of the information effects. We conclude that in explaining information effects on social policy attitudes, both priming and learning inform policy preferences and none of them clearly predominates over the other – posing questions about previous understandings of role of information in the policy cycle.

Public Attitudes toward Social Policies

Grounded on the intuition that hard information could affect political preferences independently from socio-economic and normative standings, social scientists have paid increasing heed to the role of information. This burgeoning *information approach* considers the influence of social or policy-related knowledge on policy attitudes (Bachner and Hill, 2014). Two issues have received particular attention by this approach: first, the link between

prior or elicited information and support for specific reform proposals; second, the link between information regarding individual income position and support for redistribution.

Regarding the first question, individual knowledge covaries with pension policy preferences. Interestingly, for European countries, a few studies show that prior and elicited knowledge of national Social Security Systems is in fact associated with neoliberal policy stances (Boeri et al. 2001; Boeri and Tabellini 2012). Higher awareness of the financial challenges posed by population aging to public pension systems reduces opposition to increasing retirement ages (Naumann 2017) and increases tolerance towards reforms that improve financial sustainability (Gouveia 2017; Boeri and Tabellini 2012). In addition, providing information on pension programs improves public familiarity about future benefits (Mastrobuoni and Taddei 2011) even though such gained knowledge fades quickly (Finseraas and Svensson 2017).

While this line of research hints at the potential explanatory power of information, it is often limited in terms of causal identification. First, several studies reporting knowledge-attitudes correlations fail to assuage concerns over reversed causality because they draw on non-experimental, cross-sectional survey data (Boeri et al. 2002, 2001; Tinios and Poupakis 2013). Second, existing, split-ballot survey experiments, which offer a more reliable basis for identifying causal effects of information provision, cannot pinpoint the impact of specific pieces of information because they combine demographic, financial and institutional information in their treatments or include ideologically-biased claims (Finseraas and Svensson 2017; Gouveia 2017; Naumann 2017). Third, to our knowledge no previous study on social policy information has disentangled the impact of policy-specific information recall from information learning – a distinction considered crucial in psychological scholarship on information processing (Oskamp and Schultz 2005).

Studies in a parallel literature on pro-redistribution attitudes more regularly distinguish between priming and learning effects. Accordingly, subjects learning that they are in a lower relative income bracket than they expected increase their support for redistribution in Argentina

(Cruces et al. 2013), but not on average in Germany (Engelhardt and Wagener 2018) or Spain (Fernández-Albertos and Kuo 2018). These studies moreover report null effects of priming on respondents' relative positions on attitudes. Yet these generally weak information effects may be specific to a generic support for redistribution and information effects may be stronger for concrete pension policy measures. Our study aims to overcome the limitations of these two strands in the *information approach*.

Information, Learning and Priming

To assess the effect of policy-related information on political attitude formation, we articulate a theoretical model concerning the influence of unframed, non-partisan information on pension policy attitudes. We consider the role of a general information effect and distinguish two mechanisms through which this effect can occur: learning – ie. discovering new information on pension policy – and priming – ie. being reminded of information previously internalized. For this purpose, we combine principles of political psychology and political economy.

Information gathering and processing is a time and energy-consuming process (Price and Tewksbury 1997; Zaller et al. 1992). As a result, information-based attitude revision requires overcoming mental laziness (Taber 2013). Prior work has considered several conditions that help overcome this laziness. Attaining information that is critical in a debate at hand (Kuklinski and Chong 2001) or being provided individualized information (Engelhardt and Wagener 2018) increase personal motivation to process new information and ultimately engage in the cognitive processing that undergirds attitude change.

Building on affective intelligence theory (Marcus et al. 2000), we argue that exposure to bad news regarding future personal losses is another potential, motivating force. Affective intelligence theory stipulates that certain emotional reactions to new information facilitate information processing and learning. In response to novelties that threaten a person's status quo – e.g. an “encounter of negative political news” (Marcus et al. 2000:112) – people usually feel emotions of fear and anxiety. These strong, uncontrolled emotions produce a chain reaction: the person stops ongoing activities, shifts attention to that political news and becomes

motivated to understand it, thereby opening the door for attitude revision (Groenendyk and Banks 2014).

One type of bad, political news that might cause especially intense fear and anxiety is information that public pension levels are falling. It is well documented that pension generosity will most likely decline in the three countries considered (Congressional Budget Office 2016; Zaidi 2012). With strong evidence that individuals react more swiftly and fiercely to losses than to gains (Jervis 1992; Kahneman and Tversky 1979), information on projected pension cuts should raise concern about the security of one's personal retirement income and prompt support for measures that could either increase future benefit levels or, at least, prevent further cuts. Two such potential measures are (a) direct resource transfers into pension programs from other social policy programs, or (b) parametric reforms that improve pension program sustainability by increasing the legal pensionable age rather than cutting pensions. We hypothesize, then, that providing information on future benefits leads to greater support for increases in the legal pensionable age (H1a) and for redirecting resources from other social policy programs into pension programs (H1b).

We have thus far theorized and formulated hypotheses about a crude, average *information effect*. By considering the relationship between prior and posterior beliefs, however, we can also improve our understanding on how socio-political information produces attitude revision (Balcells et al. 2015; Cruces et al. 2013; Fernández-Albertos and Kuo 2018). Since prior beliefs differ in accuracy, it follows that different patterns of the prior-information link must produce different cognitive and attitudinal responses. We focus on two particular situations: *overestimation* which occurs when the prior estimate of the *future* replacement rate was higher than its real predicted value - ie. excessive optimism; and *proper estimation* which occurs when the prior estimate of the future replacement rate is roughly accurate with its predicted real value. We pay particular attention to learning in the form of *overestimation*, because (as noted below) most respondents prove being overestimators and because affective intelligence theory (Marcus et al. 2000) does not predict strong information effects for *underestimation*.

Overestimators constitute the group that receives bad news and, based on prospect theory (Kahneman and Tversky 1979), the correct information should trigger feelings like anxiety or fear. The new, more accurate information makes them realize that they held overly optimistic beliefs and, according to affective intelligence theory, induces them to revise their attitudes on the matter. *Overestimators*, then, should become particularly prone to adopt policy preferences that improve their own welfare and minimize the risk of future pension cuts. They are thus more likely to support increases in the legal retirement age (H2a) or transfers from other programs to the old-age public pension system (H2b).

People might also have properly-estimated future pension levels. *Proper estimators* do not learn new information when provided the replacement rate, because they were previously informed about this. For proper estimators, information may only induce priming-based attitude change as opposed to learning-based attitude change (Kinder, 2013). A person is *primed* when a recent personal experience, e.g. a conversation or reading news, calls to mind - ie. primes a given construct that was already accessible in the person's memory. Priming processes can also occur regarding social policy preferences. Reliable projections indicate that future public pensions in the three countries considered will provide lower purchasing power than currently. Facing this information, respondents primed to recall declines in pension generosity will more likely be prone to support parametric reforms that enhance pension benefits or, at least, prevent pension cuts. We hypothesize that citizens primed to think about future pension levels (but not learning anything substantially new) are more likely to support increases in the legal retirement age (H3a) and support transfers from other social policy programs into old-age pension programs (H3b).

Cross-national Variations in Information Effects

Although most work on information effects draws on case-studies and shuns contextual factors shaping learning and priming processes, it stands to reason that country-level conditions affect the impact of providing non-partisan information. We therefore formulate competing predictions concerning two macro-level factors - forecasted declines in pension levels and

pension policy salience - that may shape information effects. First, the three countries considered have Bismarckian public pension systems – ie. pay-as-you go systems with earnings-related benefits and financed by payroll-tax contributions (OECD 2019); but they differ drastically in the projected changes of their public pension systems. As documented below, in coming decades, public pension cuts are projected to be most intense in Spain, followed by the US and Germany. Accordingly, if the size of the treatment effect is affected by the size of the projected pension cut, information on future pension provision should prompt the strongest reaction in in Spain, followed by the US and Germany. We therefore hypothesize that the main treatment effect should be largest in Spain, followed by the US and Germany for both outcomes: attitudes on the retirement age (H4a) and the preferred pension spending (H4b).

Second, the salience of the public pension policy in the domestic public agenda may also shape the impact of information effects. In countries where this policy issue was most salient during the survey fieldwork, individuals had ready access to more information on the topic, which could increase their pension policy knowledge and reduce the surprise caused by new information (Kuklinski et al. 2001). High public salience may have also prompted a strong preference that is then hard to sway with new information. In this regard, around the time of our survey (April 2018), a vibrant mobilization of pensioners took place in cities throughout Spanish to demand improvements in pension levels (Julio 2018). As a result, this topic became a salient issue in the Spanish public sphere, encouraging citizens to collect information and take firm positions on pension policy. This salience limits respondents' susceptibility to information provided in a survey. Hence if the size of the treatment effect is inversely affected by the salience of the pension policy issue, respondents in Germany and the US should be more likely to revise their policy preferences on the legal retirement age (H5a) and the preferred social spending allocated to old-age pensions (H5b) than respondents in Spain.

Methods and Data

To test the aforementioned hypotheses, we conducted an online, split ballot, survey experiment simultaneously in Germany, Spain and the United States. In April 2018, we

gathered original data using web-based surveys fielded simultaneously in the three countries. The survey was administered by IMOP, a Spanish survey company operating internationally. The design of the samples used quotas for age, education, gender and region so that the resulting samples in each country have demographic compositions reflective of each population (cf. Radl and Fernández 2022). To assess the influence information has on social policy preferences, we use two questions that tap into realistic alternatives faced by social policy makers in reaction to population aging. The first dependent variable is particularly salient in public debates within the three countries (Bonoli and Shinkawa, 2006; Immergut et al., 2007). It refers to the respondents' support for an increase in the reference age used to calculate initial retirement benefits (commonly dubbed 'legal retirement age'). US respondents were asked: "Please indicate your level of agreement with the following proposals for guaranteeing the sustainability of the US Social Security": "Keep the value of Social Security benefits and accept an increase in the legal age to receive Social Security benefits". Possible response options are "strongly agree", "agree", "disagree" and "strongly disagree".

Our second dependent variable captures the zero-sum dilemma faced by treasury budget policy makers: shifting the relative weight of different social policy programs. Using OECD (2018) estimates, we calculated the funds absorbed in 2018 by old-age pensions as well as education, family, healthcare, incapacity, survivors and unemployment programs in proportion to the total spending devoted to these six areas. We then provided these percentages to respondents and, through sliders, allowed them to change the proportional distribution while considering that the sum of the six categories cannot surpass 100 (Figure A1 displays the questionnaire page read by respondents). If respondents select a higher percentage for old-age pensions than initially provided, it means they are willing to detract funds from other programs and transfer them to old-age pensions. In the questionnaire, both outcome questions are included after the treatments.

To experimentally test the impact of information on people's policy preferences, respondents were randomly assigned to a *control group* and a *treatment group* of equivalent size. The *control group* was not asked for a guesstimate and was not provided any information

regarding the future social security benefits. The control group, therefore, was not primed in any way. By contrast, the *treatment group* received information regarding the future of social security benefits. In designing the information treatment, we followed four guidelines: (i) the treatment content reflects the actual situation in the country; (ii) given our interest in the role of knowledge, the content includes only descriptive information without explicit, value-based interpretations; (iii) the information provides quantitative and cross-nationally commensurable data; and (iv) the information - especially the replacement rates - come from reputable, well-known, nonpartisan organizations: the European Commission (2015) and the US Congressional Budget Office (2016).

The protocol is as follows: we first ask respondents for their guesstimate of the future replacement rate. In the case of the US respondents: “The average Social Security benefit of a recent retiree is \$18,000 and his or her average lifetime earnings are \$32,1. Therefore, the average Social Security benefit of a recent retiree is currently 56% of his or her lifetime earnings. What will this percentage be approximately in 2040?” After respondents provide an estimate, they are presented with the information: “The Congressional Budget Office estimates that the average Social Security benefit for a newly retired worker in 2040 will be 42% of the average worker’s income” [text in bold in the questionnaire]. Respondents in Germany (Spain) are instead given the following percentages concerning their home country: 43% in 2015 and 38% in 2040 (79% in 2015 and 56% in 2040). The treatment ends with a manipulation check: “Where you aware of this information?” with three possible answers: “Yes, I was aware that benefits are expected to decrease that much”, “No, I thought benefits would decrease much more” and “No, I didn’t think benefits would decrease that much”. Respondents were exposed to the treatment before they were asked their policy attitudes. Additional details on the treatments is provided in the Online Appendix.

The information regarding predicted replacement rates constitutes the *information treatment*. However, information on policy is not received unencumbered. Through exposure to the treatment, respondents may be acquiring new information – ie. learning – or may equally be reminded of information they knew previously – ie. primed. Since we collected the participant’s guesstimate before providing the treatment, we have sufficient information to

determine whether the person learned or was primed in the process. We classify respondents as primed if their guesstimate was within +/-10% of the actual value provided by the treatment (e.g. in the US: between 37.8 and 46.2). We classify respondents as *overestimators* if their guesstimated percentage was $\geq 10\%$ of the treatment value; and as *underestimators* if it was $\leq 10\%$ of the treatment value.

The randomization process conducted during the fieldwork stage was successful as respondents assigned to the *control* and *treatment groups* do not generally differ significantly in regards to key socio-economic factors (Table A1). Furthermore, an F-test of joint significance yields no significant differences between the control and the treatment groups. In addition, there is no significant association between treatment status and missing information in the dependent variable. In the multivariate analysis we first discuss the effect of having been treated with the information. In a second stage, we explore potential heterogeneous effects among treated respondents.

For this purpose we distinguish treated participants in three groups (specified above) by comparing their prior belief and the value in the treatment. *Overestimators* are treated respondents who provided a guesstimate 10 percent points higher than the forecasted level. *Underestimators* are treated respondents who provided a guesstimate 10 percent points lower than the forecasted level. *Properestimators* are treated respondents who provided a guesstimate within the bracket of +/- 10 percentage points of the forecasted level. Based on this classification, these additional models therefore include dummy variables for these three conditions while keeping the control group as the reference. This allows us assessing whether the average treatment effect is mainly driven by priming or learning. Including these three dummy variables also prevents loss of statistical power and facilitates interpretation.

Concerning the estimation strategy, one of the outcome is ordinal - *support for raising the legal retirement age* - and the other is continuous - *preferred public pension pension expenditure*. The ordinal outcome could be analyzed through ordinal logit models. Yet ordinal logit models draw on the parallel lines assumption, which is often violated and difficult to test for imputed data. For the main analyses, we hence decided to estimate linear regression models

for both outcomes.¹ The main models include the following control variables. Basic demographic conditions are captured through a *gender* dummy and four age groups (18-29 years; 30-45; 46-59; and 60-70). Socio-economic position is captured via *household income* (equivalized, using the modified OECD scale, and standardized) and three *educational attainment* groups (lower secondary education or less; post-obligatory secondary education; higher education). Normative perceptions are assessed through political ideology (measured on a 10-point scale and recoded into left/center/right) and support for the merit principle in terms of agreement (on a 4-point Likert scale). We also control for whether people correctly answered a question on the basic functioning of the public, pay-as-you-go pension system in their respective country. The wording of the latter two questions is included in the Online Appendix.

Missing values have been imputed for all independent variables using multiple imputation (ten sets of imputations). Although the chain process imputed missing values for the dependent variables, only cases with complete information on the dependent variables were included in the final analyses. Tables A8 and A9 replicate the main models without imputed information and yield substantially similar findings. Tables A2 and A12 in the appendix shows basic descriptive statistics of all independent variables used in the analysis.

Results

Descriptive Results

We conduct the empirical analysis in three steps. First, we examine descriptive statistics of the outcome variables to establish the basic support levels for the two types of policy options in the three countries considered. Second, we conduct multiple regression analyses to determine the average effect of the information treatment on the support for raising the statutory pension age and increased pension expenditures. Third, to discriminate between *priming* and *learning* processes, we replicate the multiple regression models distinguishing between *overestimators*,

¹ Replications the models using ordinal logic models produces equivalent results (Tables A11 and A13).

underestimators and *proper estimators* in order to account for the respondents' previous state of knowledge.

We begin the analysis by examining the familiarity of participants with future public pension levels. If most respondents were already well-informed regarding projected replacement rates, the treatment would not provide new considerations to them and the experiment could not assess the impact of new information. To this end, the pooled sample – including all three countries – indicates that most participants overestimated the future replacement rate (Figure A2). Yet the data also reflects considerable cross-national variation. Defining estimates within +/-10% of the projected replacement rate as correct, a slight majority of participants (54%) in Germany were correctly informed, but only one in five respondents in Spain (22%) and the US (20%) were correctly informed. In fact, contrary to what happens in Germany, most citizens in the US (56%) and Spain (50%) overestimate the future replacement rates. Put differently, in the latter two countries, inaccurate guesses occur mainly because respondents are overly optimistic regarding the expected purchasing power of pension entitlements.

The fact that, overall, two out of three respondents provide inaccurate guesstimates warrants an analysis of the impact of knowledge on pension policy attitudes. Specifically, we focus on individual positions regarding the legal retirement age and the preferred level of public pension expenditure as a percentage of all public social expenditure. The baseline distributions of our dependent variables are depicted on Figure A3. Support for increasing the legal retirement age (upper panel) is generally low. In the pooled sample, only four in ten (37%) participants in the control group support raising the legal retirement age. Yet this variable also displays substantial cross-national variation: support for raising the legal age is higher in the US than in Germany and Spain, and very similar in the latter two countries (Figure A3).

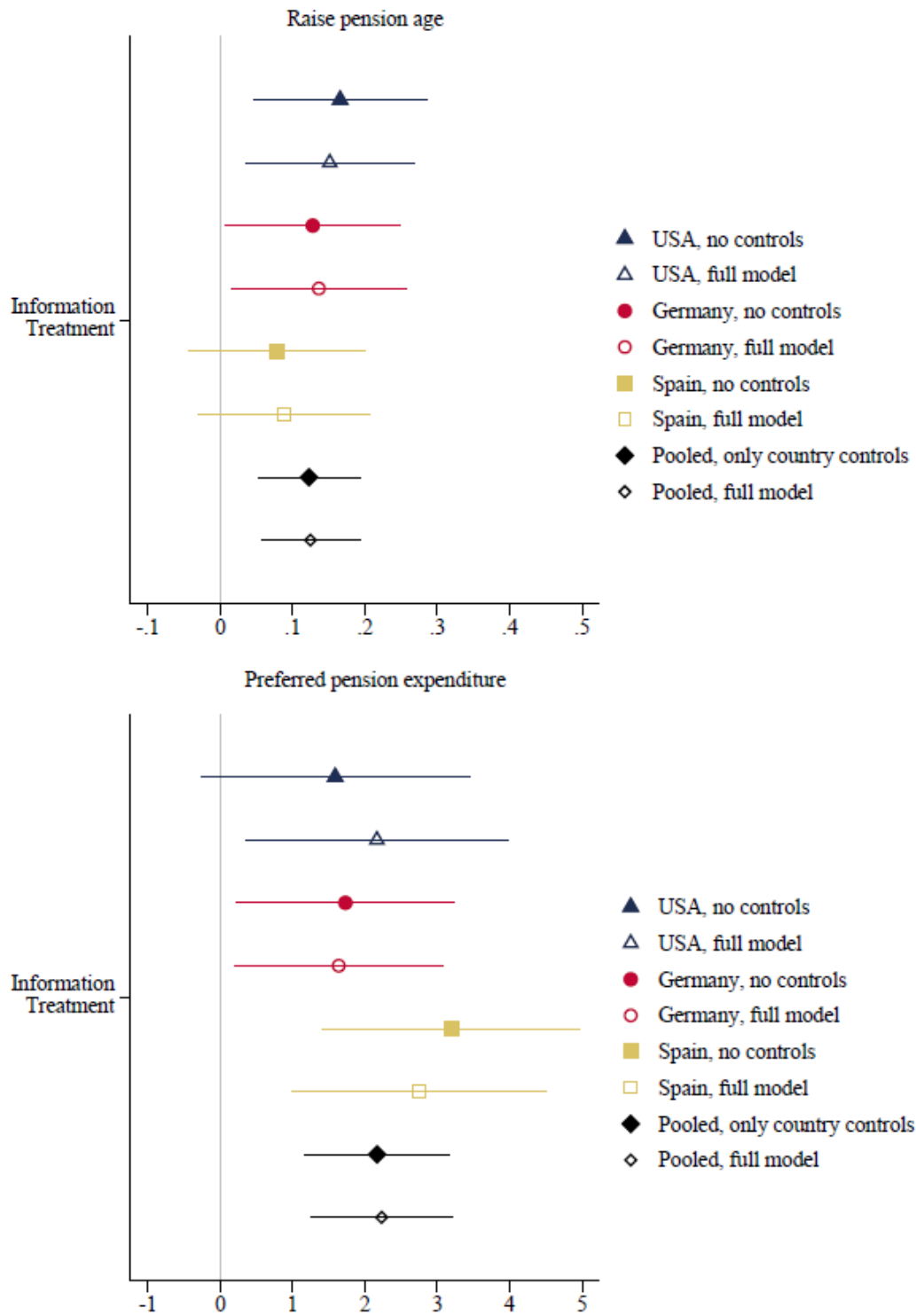
Participants' preferred level of pension expenditure is similar across the three countries – the averages being 25% in the US, 28% in Germany and 28% in Spain (Figure A3). Strikingly, these averages are lower throughout than the current baseline levels of public social expenditure committed to old-age pensions shown to respondents at the outset. On balance, (non-treated) respondents would prefer to allocate a somewhat lower percentage of social spending to

pensions – the largest expenditure in both European countries and second-largest in the US after health. The preferred level of pension expenditure also displays substantial dispersion, suggesting little domestic consensus on the preferred public expenditure devoted to that policy area.

Information effects

We now turn to the impact of assessments of the average treatment on the support for the two selected policy options. Given that our main interest lies on the role of elicited information effects, to facilitate the interpretation of the results we consider and depict in figures solely the impact of those treatment effects. Full models including all variables considered are, nevertheless, available in the Online Appendix (Tables A3 through A7). Figure 1 depicts effects of the *information treatment* - ie. a dichotomous variable indicating whether the respondent has read the predicted pension replacement rate in 2040 or was instead part of the control group - on both dependent variables (Tables A3 and A4 include the full models). The effects were obtained from 16 models corresponding to combinations of two dependent variables, four samples - USA, Germany, Spain and the pooled model - and models with and without control variables. Bivariate models - without control variables - indicate that the information treatment has a positive and significant effect on the support for increases in the legal retirement age in the US, Germany and the pooled sample – albeit not in Spain. Providing reliable information regarding the future pension replacement rate increases the support for this cost-cutting reform in two of the three countries (Table A3). Once we introduce the control variables, this pattern does not differ: the *information treatment* remains a positive and significant predictor of support for delayed pensionable ages in US and Germany. In Spain, the coefficient is also positive but not statistically significant. Figure 1 therefore suggests that providing information about future entitlements does affect individual position-takings regarding potential future increases in the legal retirement age.

Figure 1: Mean Treatment Effect on Policy Preferences



The effect of *information treatment* on the preferred, relative pension expenditure, displayed in lower plot of Figure 1 (Table A4 includes full models), differs from those

mentioned above. Regarding pension spending preferences, in bivariate models the *information treatment* is significant in Germany, Spain and the pooled sample, but not in the US. Yet, once we control for other variables, the treatment also becomes a positive and significant predictor in the US. Provided this information, participants would devote a larger proportion of all public social spending in the country to public pensions than participants not provided the information. This suggests that informed citizens would prefer to detract resources from other programs and redirect them to old-age pension programs.

In sum, Figure 1 indicates that participants exposed to the information treatment generally differ in their policy preferences from participants not exposed to it. Treated participants in the US, Germany and the pooled sample are significantly more likely to support increases in the retirement age than non-treated participants in those two countries and non-treated participants in the pooled sample. The magnitude of this effect is also substantial: it reaches 21% of a standard deviation in the US and 16% in Germany. Additionally, treated participants in the three countries would rather transfer more resources from other social policy programs into the old-age pension program than non-treated participants in the three countries. Again, effect sizes are medium-size, reaching between 15% of a standard deviation in Germany and 22% in Spain. This evidence is consistent with H1a and H1b. Cross-national variation in the average treatment effect is modest, which does not suggest that country-conditions would shape the size of this main effect. Contrary to H4b and H5b, the treatment has a positive and significant effect on the preferred pension expenditure in the three countries. But supporting H5a, the treatment has a positive and significant effect on the support for raising the pensionable in Germany and the US, but not in Spain.

Priming vs Learning

Thus far, we have only considered the total effect of information on pension policy preferences. Yet to infer a pure learning effect, we would have to assume, as previous studies usually do, that all – or almost all – participants were not already cognizant of this piece of information. In light of the above-mentioned evidence in Figure A2, however, this is clearly not the case. For those not already familiar with the information, the correction of prior beliefs

may occur because they were either *under-* or *overestimators*, with differing implications depending on whether it was mostly due to *priming* or *learning*.

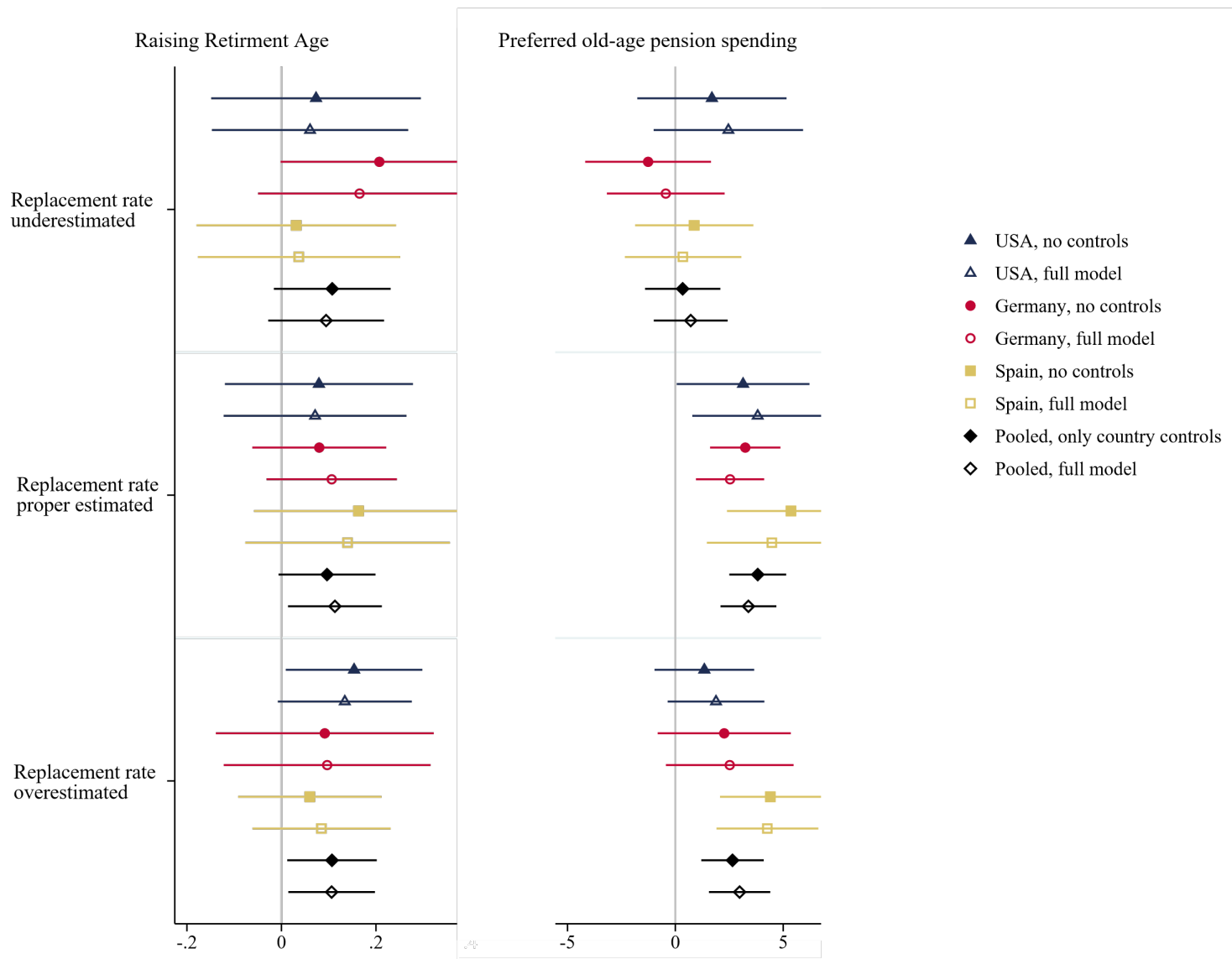
In the remainder of the analysis we therefore explore potential heterogeneous treatment effects by disaggregating treated respondents by their familiarity with the information provided in the treatment. Under the assumption that the distribution of over, under and proper estimation is similar among respondents in the control group, comparisons of preferences among the control and treatment groups provides indicators of whether information effects are heterogeneous depending on the prior beliefs of respondents. As noted above, having been primed is captured through the variable *proper estimator* and having learned new information is captured through the variables *underestimator* and *overestimator*. But first: is it safe to assume that treated respondents here classified as proper estimators were primed and treated respondents classified as under- and overestimators learned new information? Evidence from the manipulation check question asked after the treatment supports this expectation (Table A5). Most proper estimators declared that they were aware that the decrease would be of that magnitude. Most overestimators and underestimators, moreover, declared that they thought that benefits would decrease much less or more, respectively.

Hence, we added to the previous model the variables *proper estimator*, *underestimator* and *overestimator* – corresponding to three types of treated participants – instead of the generic dummy variable *information treatment*. To clarify, the reference category in these additional models is the control group: respondents that were not exposed to projected replacement rates. Tables A6 and A7 include the full models. Figure 2 depicts the main findings of this disaggregated analysis for the two outcomes and (similarly to Figure 1) 95% confidence intervals. The left-hand plot shows that the effects of proper estimation, underestimation and overestimation on support for raising the retirement age are all positive in the three countries, yet are statistically significant in only one case: overestimators of future replacement rates in the US are more likely to support increases in the pensionable age than non-treated US residents (in the model with control variables at the 10% significance level). By contrast, proper estimators in the US, Spain and Germany are not more likely to support increasing the

pensionable age. This suggests that the significant impact of *information treatment* in the US and Germany, reported in Figure 1, occurs due to different processes: mainly *learning* in the US and a combination of *learning* and *priming* in Germany.² H2a and H3a, therefore, are not generally supported by the data. Yet, the fact that many effects of *overestimator* and *properestimator* are not significant in the left-hand subplot of Figure 2 may be due to limited sample sizes. Support for this interpretation lies in models with the pooled dataset wherein standard errors shrink and the effects of *proper-estimator* and *overestimator* are – as expected – positive and significant in support for a higher pensionable age.

² A Wald test indicates that the difference in the effect of *underestimator* and *overestimator* is significant in the model for pension expenditure in Spain and in the pooled model, but no significant differences were found for the other models.

Figure 2: Treatment Effects on Support for Increases in the Pensionable Age and for Higher Relative Pension Spending by Prior Estimate of the Future Pension Replacement Rate



The right-hand plot of Figure 2, presenting effects regarding preferred old-age spending, provides more forceful findings. Underestimation of future replacement rates does not produce a significant effect in any of the three countries. Overestimation produces a significant effect only in Spain. Yet proper estimation produces a positive and significant effect in the US, Germany and Spain. This indicates that among American and German participants only being reminded of information the participant already knew does affect individual preferences and boosts demands for more spending on pensions. For Spaniards, however, being reminded of information already known and having overly optimistic beliefs increases the preference for a more age-biased social policy system. In light of this evidence, we can then assert that the effect of the information treatment on the preferred pension expenditure reported in Figure 1 occurs mainly due to priming in the US and Germany and to both priming and learning in Spain. For the pooled model, *proper estimators* and *overestimators* support a significantly higher pension spending than do non-treated participants.

Considering the situation of overestimation across both outcomes, we cannot identify a clear pattern. Unlike German and Spaniard overestimators, American overestimators are more likely to support increases in the retirement age. Yet only Spanish overestimators are more likely to support transfers of funds from other programs into the pension programs. Hence the evidence is not generally consistent with H2b, but it is in line with H3b. In regards to underestimators, respondents in Germany, Spain or the US who provided a guesstimate lower than the future replacement rate and then received the correct information do not differ significantly in their policy preferences from respondents in the control group of their respective countries. Thus, the evidence does not point to any consistent learning effects for the group of underestimators, although sample size restrictions have to be taken into account for this small subgroup.³

³ As Models 3 and 7 in Table A6 show, in Germany and the pooled sample the estimated coefficient is at the margin of statistical significance in the specification without controls.

Can we identify cross-national patterns in these results? More specifically, is the effect of being *overestimator* consistently larger in one of the three countries? In the theoretical section, we hypothesized that the effect of being an overestimator may depend on country conditions. If the size of the main information effect depends on the size of the pension cut, it should be larger in Spain than the US and Germany (H4a and H4b). If it instead depends on the salience of pension policy in the public agenda, it should be larger in the US and Germany than Spain (H5a and H5b). The evidence is mixed in this regard and depends on the outcome. Regarding support for increasing the pensionable age, the average effect is actually larger in the US and Germany than Spain (in line with H5a). Yet regarding the preferred level of social spending devoted to old-age pensions, the average effect is similar across the three countries (contrary to H4b and H5b). Hence the evidence does not uniformly indicate that contexts of high salience or large pension cuts increase information effects among over-estimators.

Conclusions

Social scientists now concur that individuals are best described as ‘cognitive misers’ (Fiske and Taylor, 2013[1984]) who are prone to use mental shortcuts and commonly hold preferences inconsistent with their self-interests (Huddy, 2013). We thus need to better comprehend the cognitive processes linking policy-relevant information and policy preferences. This study contributes to this *information approach* through a cross-national, experimental analysis of the influence of exposure to reliable data concerning the generosity of public pensions. As outcomes, we consider the support for increases in the legal pension age and the resources garnered by old-age pension programs vis-à-vis other programs. Three main findings emerge from the analysis.

First, descriptively our study shows that large proportions of the population are ill informed regarding a central pension parameter like the future average replacement rate. In the US and Spain, most respondents provided an overly optimistic guesstimate of the pension replacement

rate. In Germany, most respondents gave a roughly accurate guesstimate, although nonnegligible percentages of German residents also over- or under-estimated future pension levels. In line with previous work (e.g. Boeri et al. 2001), people can therefore hardly be considered fully informed – or rational actors – regarding social policy. Our study contributes to this literature by showing important differences across the three countries considered. Akin to the what is known about financial literacy (Lusardi 2015), the US, Germany and Spain both lack and differ substantially in their level of pension literacy.

Our main goal, however, is to determine the causal impact of information effects, *learning* and *priming* on pension policy preferences. The second main finding of the study is that participants given information on the expected drops in replacement rates differ in their policy preferences from those who were not given such information. In fact, being exposed to that information significantly affects average preferences in almost all instances (Table A10 summarizes the main findings). Exposure to the treatment increased support for, one, a higher legal retirement age among residents in the US and Germany and, two, a higher preferred percentage of social policy resources assigned to old-age pension in the US, Germany and Spain. Effects sizes were also considerable in magnitude, reaching more than a fifth of a standard deviation in either outcome. Hence even if citizens are cognitive misers – ie. do not reflect on all relevant considerations in their long-term memory and have changing attitudes on even major policy issues (Zaller et al. 1992) –, this robust treatment effect indicates that citizens in the three countries considered are (a) able to process relatively complex social policy information and (b) adjust their preference accordingly.

This key finding is consistent with our theoretical model that bad news on declining and low pension generosity produces concern and facilitates preference revision. Whether the participant was unaware of the value of the future replacement rate or simply reminded of it, once having that information she should give significant weight to this personally relevant consideration and use it to revise one's policy preferences. This consideration should raise personal concerns about one's old-age income security and prompt support for measures that

improve the financial sustainability of pension systems without inflicting further benefit cuts. In fact, the findings that citizens informed about the future replacement rate become more supportive of increases in the retirement age *and* of transfers of funds into the pension system are perfectly congruent. Joint increases in the retirement age and transfers of funds would strengthen the finances of these public schemes, reducing the need for pension cuts beyond those already scheduled or even potentially reversing scheduled cuts. Such finding of notable information effects is furthermore consistent with most work on this topic that shows an association between information and accommodating stances to reforms that improve financial sustainability (Boeri et al., 2001, 2002; Gouveia, 2017; Naumann, 2017). Reporting the impact of exogenous information regarding future replacement rates on pension attitudes in three countries, including two – the US and Spain – unconsidered by prior work, our study further strengthens the argument that informed citizens endorse measures that improve the financial health of public pension schemes.

Third, the results of our study indicate that information effects on policy preferences occur both through *priming* and *learning*. To distinguish between these two cognitive processes, we compare each respondent's guesstimate with the actual future value: learning can only occur among participants where prior and posterior beliefs differ; priming instead only occurs among participants who were already (largely) aware of that information and are merely reminded of it. Based on this logic, we document that for residents in the US and Germany information only affects pension spending preferences via priming. In contrast, for residents in Spain both priming and learning occurs apropos this outcome. Regarding support for raising the legal retirement age, the available evidence signals that learning-based attitude revision only occurs for residents in the US. In fact, we find no indication of priming in support for changes in the pensionable age in any of the three countries – although, as we acknowledge, the null results could be borne out by limited statistical power. Overall, the evidence does not provide clear indicators that *priming* predominates over *learning*, or vice versa. Indeed, our study reveals

that in the three countries pension policy preferences are similarly informed by *priming* and *learning* processes.

This study has limitations. First, to reflect real trade-offs faced by elected officials, the question concerning the first outcome actually asks for respondents' support to increases in the legal age to receive public pension benefits as means to prevent cuts in pension benefits. Although the question is phrased to emphasize support for increases in the legal age, this phrasing has some drawbacks. Despite controlling for political ideology, results may be partially influenced by reference to support for keeping the value of public pensions. Second, it is an inherent methodological challenge to test learning without inducing priming. Since the control group was not requested for a guesstimate of the future replacement rate, it is not possible to estimate interaction terms that would allow us to causally determine if treatment effects differ between over-, under- and proper-estimators. However, a promising research design would be to add a second control group that is primed but does not learn. This could be achieved by asking for this group's guesstimate, but not provide them with the real value that can induce learning. Even though this approach demands larger samples (if it should not come at the expense of statistical power), it could improve future research to delve deeper into the mental processes driving priming and learning effects on social policy preferences. Third, our comparative design was limited to only three countries, and remains limited in the inferences we can draw at the cross-national comparative level. To more fully understand cross-national differences and to systematically examine potential moderating effects of contextual conditions future research should aim to include a larger number of countries with varying macro-social conditions. Fourth, since the survey did not collect information about respondents' perceptions of future additional reforms, our study cannot determine if treatment effects are especially strong among participants who are more trusting than the future replacement rates will be as projected. Further research can address these limitations through analyses using alternative formulations of the outcome and collecting guesstimates of respondents in the control group and perceptions of the likelihood of future reforms.

Despite these limitations, the findings of this study have relevant theoretical implications for political sociology, political psychology and interdisciplinary scholarship on welfare reform and institutional change. Our study warns against sweeping (over-) generalizations about universal relationships between information and preferences common in political psychology studies. It instead shows substantial, cross-national heterogeneity in the size and robustness of information effects: for instance, overestimation of future pension generosity increases the support for raises in the pensionable age in the US but not in Germany and Spain. This suggests the need to take this local conditionality seriously. Since macro-level economic, cultural and political structures configure individual categories of understanding, they necessarily interact with the micro-level processes of information-based attitude revision. We need to overcome increasing compartmentalization in social scientific enterprise between separate macro- and micro-level accounts and strive for more integrative, cross-level theoretical models that provide conceptual categories to explain how and when information changes attitudes under real-world conditions. Concerning the literature on political information effects, our study indicates the risk of conflating learning and framing effects that occurs in many studies (Boeri and Tabellini, 2012; Naumann, 2017).

Not all information effects involve learning processes, as we all keep countless considerations in our long-term memories. Under particular circumstances, these considerations can become activated to trigger priming. For instance, personal economic interests may moderate priming effects depending on the policy. If the policy reform entails personal costs, primed individuals may avoid adjusting their preferences. In contrast, if policy reform entails diffuse costs, primed individuals may be more likely to adjust their preferences. That could help explain the disparity between the findings for our two outcomes, since increases in pensionable ages constitute a threat to individual retirement plans, while personal repercussions of redistributing budget resources are more difficult to ascertain. In conclusion, studies exploring information effects need to incorporate the distinction between learning and priming into their theoretical models if they wish to avoid conceptual overstretching.

Having documented priming and learning effects on pension policy attitudes, our study also has optimistic implications for the prospects of welfare reform. In the current era when most welfare reforms involve complex recalibrations and/or retrenchments (Natali 2018), reformist policy-makers face a major hurdle in garnering sufficient public support. Our study suggests that both being reminded and learning non-partisan information on forecasted developments have the capacity to shift individual policy preferences. These reasonable reactions should be good news for forward-looking, elected officials who can infer that evocative frames (Goerres et al., 2018) and political exchanges (Häusermann, 2010) are not the only possible means to achieve welfare recalibrations. Since individually-relevant, nonpartisan policy information can also change policy preferences, consistent deployment of those pieces of information by skilled politicians may persuade critical public opinion groups over the need of reform and ultimately make reform projects politically viable.

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