8

Automation Risk, Social Policy Preferences, and Political Participation

Thomas Kurer and Silja Häusermann

Introduction

Automation of routine tasks has been picking up pace for several decades now. However, only in the past few years has it also become a subject of public and political debate, with—at times alarmist—predictions of mass unemployment encompassing an increasing number of occupational groups. With the politicization of automation risks, the technological change that has been underpinning deindustrialization for a very long time has acquired new political relevance by creating a new type of employment risk—one that is likely to inform political preferences. Beyond a general link between automation risk and support for a redistributive welfare state, we still know very little about *what kind* of social policy threatened workers are demanding. Moreover, we are interested in the *political significance* of such demands, which essentially depends on the size and level of political mobilization of the at-risk group.

Research on (perceived) risk as a determinant of social policy has become a standard component of micro-level research on welfare preferences over the past decade (Häusermann et al. 2019a; Marx and Picot 2013; Rehm 2009, 2016; Schwander and Häusermann 2013; Walter 2010). These studies have shown that unemployment risk, offshorability, or atypical employment drive support for social insurance, i.e., the demand for protection from these risks that are not in the individual's control. Hence, the first question we may need to ask is whether there is anything specific about the (perceived) risk of automation that would justify a theoretical distinction between this and other labor market risks. Indeed, it could be argued that knowing that the risk of being substituted by machines depends on whether they perform cognitive vs routine type of work tasks, individuals have somewhat more autonomy in shaping the risk they are exposed to. Delocalization or regulatory labor market liberalization are beyond the control of individuals, but the risk of one's job being automated can be reduced by training and opting for a less substitutable occupation.

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It could, therefore, be suggested that social policy demands linked to automation risks should differ from those linked to offshorability or outsiderness risks. More concretely, it could be assumed that beyond demands for more social insurance, i.e., passive income protection, individuals may ask for more opportunities, i.e., active training opportunities and activation. Hence, studying the implications of automation for the welfare state requires distinguishing between the passive, consumption-led policies of the welfare state and social investment (Busemeyer 2018; Garritzmann et al. 2018; Häusermann et al. 2019b).

The few existing studies that explicitly link automation risk to social policy preferences have neglected to factor in this distinction, instead mainly focusing on traditional redistributive policies and passive transfers. Thewissen and Rueda (2019) show that general demand for redistribution is stronger among individuals in occupations with higher levels of routineness, which translates into higher susceptibility to automation (Autor et al. 2003). In a similar vein, Sacchi et al. (2018) examine the relationship between automation risk and more specific passive social policies in Italy (see also Guarascio and Sacchi (Chapter 11) in this volume). In particular, they find consistently positive associations between objective automation risk and support for a generalized minimum income scheme. In a second step, they also look at unconditional (universal) basic income support. However, in line with other recent contributions (Chrisp and Martinelli 2018; Dermont and Weisstanner 2019), they only find scant evidence of an independent effect of automation risk on preferences for basic income (see Chrisp and Martinelli (Chapter 10) in this volume).

We contribute to this nascent literature by examining the prevalence of subjective automation risk in eight postindustrial societies and how it relates to a variety of potential policy responses. We build on original survey data that allows us to differentiate between support for more short-term solutions related to pensions and passive transfers and longer-term approaches related to human capital investment and (re)activation of labor supply. We find clear-cut evidence that, first and foremost, at-risk individuals demand traditional passive insurance against the risk of job loss. At the same time, they do not show any signs of supporting investment policies that might not be directly beneficial to them. Workers susceptible to automation thus demonstrate rational (short-term) preferences against the backdrop of the automation threat. At the same time, the absence of an intergenerational mindset indicates that the support base for human capital-oriented policies commonly recommended in response to technological change does not include those individuals who are most exposed to the current downsides of technological innovation.

The extent to which such divides in preferences impinge on a country's social policy agenda depends on whether workers susceptible to automation make their preferences heard. Several studies have suggested that the risk of automation is related to stronger support for right-wing populist electoral options, but have largely

neglected the question of participation and mobilization (Anelli et al. 2019; Frey et al. 2018; Im et al. 2019; Kurer and Palier 2019). However, the political relevance of the at-risk group depends on several factors, including their size and degree of political mobilization (Bürgisser and Kurer 2019) and the specificity of their preferences relative to both non-threatened groups and to particular social policies (active vs passive). We show that the group of people who feel imminently threatened by automation is relatively small and that they do not seem to be strongly politically mobilized by their grievances. On the contrary, a higher perceived risk of automation tends to slightly reduce political engagement. We conclude that at-risk workers' resistance to a more investment-oriented policy agenda is unlikely to carry sufficient political weight to prevent the transformation of the welfare state in precisely that direction.

At the same time, our findings suggest an interesting "attitudinal isomorphism" between people at risk of automation and right-wing populist voters (among whom automation losers might be a relatively small but nonetheless identifiable subgroup): both clearly support passive compensation much more strongly than activation and investment (on the social policy preferences of right-wing populist voters and parties, see e.g., Enggist and Pinggera 2020; Häusermann et al. 2020; Rathgeb 2021). This isomorphism would lead us to expect that if the subjective fear of automation were to spread, right-wing nationalist and populist parties are likely to be in a better position to mobilize them electorally than progressive liberal political actors.

Measuring Automation Risk

To assess our hypotheses, we use original data from a survey conducted in the context of the ERC project "WELFAREPRIORITIES" (Häusermann 2017). Data were collected in eight Western European countries with 1,500 respondents in each country. The countries were chosen to represent the main welfare regimes in Western Europe: Denmark and Sweden for the social democratic regime, Germany and the Netherlands for the conservative type, Ireland and the United Kingdom for the liberal welfare states, and Italy and Spain as representatives of the southern regime. The chosen cases also nicely encompass countries with very different profiles regarding their development toward a knowledge economy, with the Southern European countries notably contrasting with the Nordic ones. Our fieldwork was carried out in cooperation with a professional survey institute (Bilendi) using their online panels. The target population was a country's adult population (over the age of 18). The total sample comprises 12,501 completed interviews conducted between October and December 2018.

Different measures were taken in order to increase the survey's representativeness and to ensure high-quality answers. We based our sampling strategy on quotas

for age, gender, and educational attainment, drawn from national census figures. Age and gender were introduced as cross quotas, with six age groups (18–25, 26–35, 36–45, 46–55, 56–65, 66 or older) for both female and male respondents. We used a three-group split for educational attainment quotas. The survey includes a wide range of items capturing social policy positions as well as priorities. Survey respondents were therefore well aware that they were to think about their material demands, needs, and circumstances also when answering the question regarding automation risk.

The main independent variable was the *subjective* risk of automation, measured as follows: "What is the percent likelihood (0–100) that your job will be automated by a robot, new technology, smart software, or artificial intelligence in the next ten years?" While a precise estimate of automation risk is certainly a challenge, we have no indication of the cognitive burden of this specific item being overly high. The number of "don't know" answers was very low (< 1 percent) and comparable to similar but arguably simpler questions on, e.g., future labor market prospects more generally.[1] For obvious reasons, the question on automation risk was only put to respondents currently in paid employment (N = 6960). Our results thus apply to the active labor force but do not necessarily generalize to the general population. This caveat is particularly relevant when we describe average levels and distributions of automation risk across countries. It is possible that risk perceptions among the population as a whole deviate to some extent from those of the active labor force. Hence, we cannot completely rule out the possibility that our estimates of risk prevalence and especially the political impact of this automation anxiety, are somewhat underestimated.[2]

We complement our original survey data with two *objective* measures of automation risk. First, we add occupation-specific values of routine task intensity (RTI) from (Goos et al. 2014). Then, as a second, more future-oriented measure, we add the estimates of an occupation's susceptibility to automation produced by Frey and Osbourne (2017).

Who and How Many Feel Threatened by Automation?

In the following, we explore the distribution of automation risk across and within countries and compare our subjective measure with more established objective indicators of automation risk.

[1] "Don't know" answers were slightly more common among lower-educated as well as among younger respondents, which might reflect that employment prospects and automation risk are more difficult to gauge for younger labor market entrants who will remain in the labor force for many more years. There are no differences in the frequency of "don't know" answers between countries.

[2] Another item in our survey asks all respondents a more general question about "personal chances of a good, stable employment relationship until retirement." A comparison of groups shows that respondents who are not in paid employment have significantly more pessimistic perceptions of general labor market prospects than respondents who are currently in paid employment.

Cross-National Variation

As a first step, we explore the distribution of automation risk across countries and societal groups. The first plot shows country-specific densities of automation risk. The first noteworthy aspect of Figure 8.1 is the generally high number of people who seem relatively unconcerned by automation. In every country being studied, the densities peak at very low estimated probabilities of respondents' jobs being replaced by robots or smart software. Across the sample, the mean perceived risk is around 23 percent probability of replacement, the median value is ten percent. However, as noted previously, these values are based on respondents currently in paid employment. We can only speculate about risk perceptions in the population at large. While individuals of working age who are struggling to enter the labor market are likely to be more concerned, we would largely expect retired respondents to be free of worries about employment security.

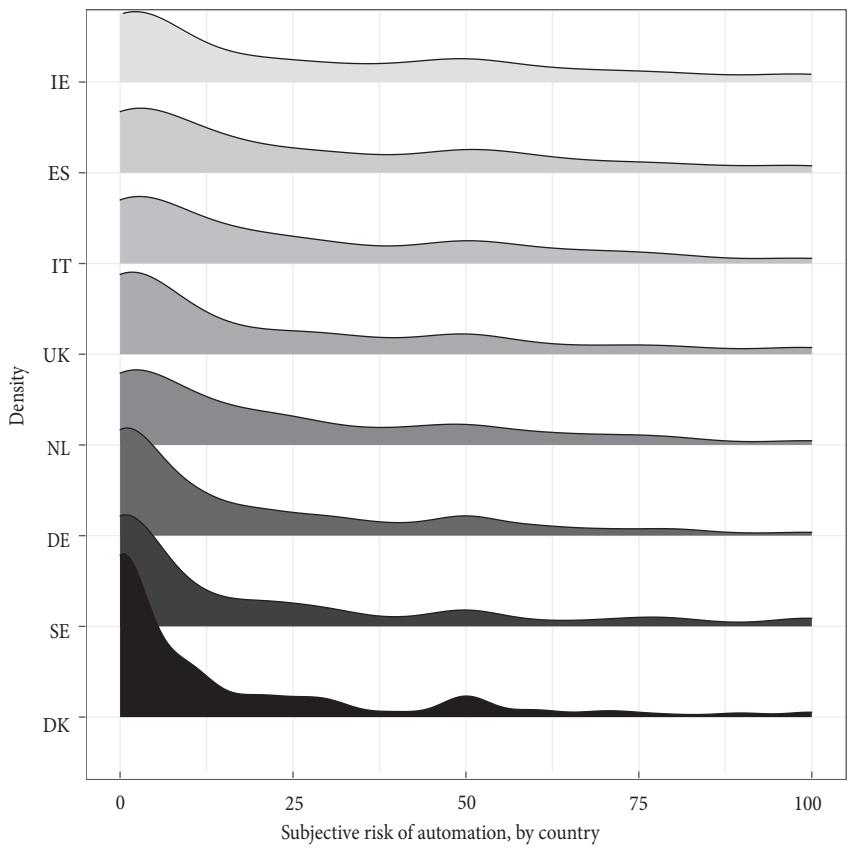

Fig. 8.1 Distribution of automation risk.

Taking a closer look at the differences between countries reveals some interesting variation. While fear of automation seems very rare in Nordic and Continental knowledge economy countries, especially in Denmark, Sweden, and Germany, the distributions are noticeably flatter in Southern Europe and Ireland. Here, a larger share of the respondents seems at least somewhat concerned about their job prospects in light of technological innovation.

Figure 8.2 provides a different illustration of the same distributions to give a more precise idea of the size of the at-risk group. We calculated the country-specific share of respondents who estimate their own risk of being replaced by robots or smart software in the next ten years to be above 30 percent, 50 percent, or 90 percent. Again, the number of respondents who are very seriously concerned about automation is relatively low. In every country studied, the share of respondents who believe that jobs like theirs will almost certainly disappear is below five percent. However, around 10–20 percent of respondents perceive a daunting fifty-fifty probability of being replaced and, on average, 28 percent of our respondents estimated this probability at 30 percent or higher. By implication, a sizable majority of the sample feels relatively secure and believes that their jobs are rather unlikely to be automated.

In terms of cross-sectional variation, Figure 8.2 demonstrates even more clearly that fear of automation is much more pronounced in Ireland and Southern Europe than in Nordic and Continental European countries. It is likely that these differences primarily reflect the distinct composition of the labor market and,

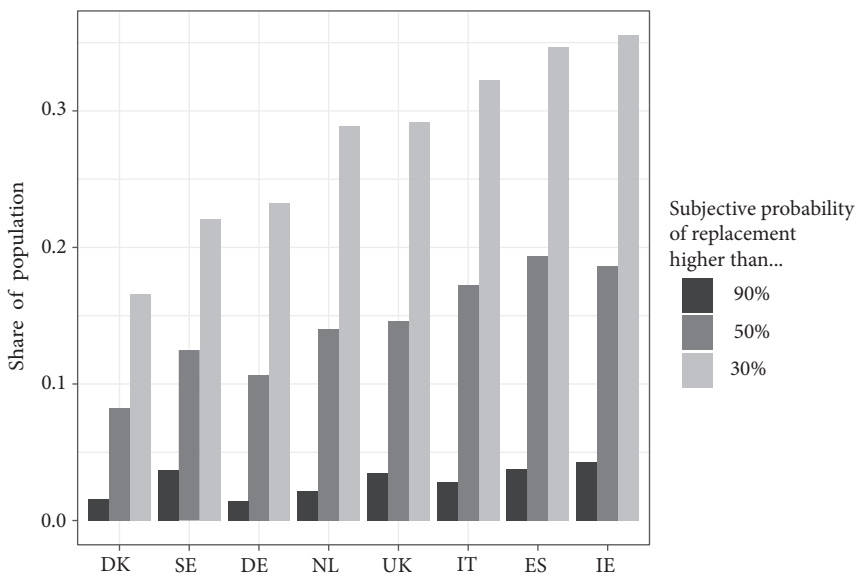

Fig. 8.2 Share of the population that feels threatened by automation.

thus, our samples, with more developed knowledge economies being dominated by highly skilled and specialized jobs that are—objectively—much less susceptible to automation.

Individual-Level Determinants

Next, we evaluate some of our priors regarding individual-level determinants of perceived risk of automation. In general, higher-skilled and specialized workers are expected to flourish in the knowledge economy, which should be reflected in lower perceived threat of automation. Figure 8.3 shows distributions of risk perceptions pooled across countries for different education and income groups. As expected, higher values on both variables go hand in hand with lower levels of subjective automation risk. However, an interesting observation is that income seems to be a somewhat stronger predictor. Although higher education does reduce perceived automation risk, a tertiary qualification alone does not seem to represent an effective insurance against the subjective risk of job loss due to technology.

Furthermore, the fear of being replaced by technology tends to decrease with age, which is likely to reflect the fact that labor market entrants face much more insecurity about long-term employment prospects than respondents closer to retirement age. We find no significant differences in automation risk perceptions between women and men. Lastly, looking at risk perceptions by occupation, customer service clerks[3] (mean risk: 38 percent) and, especially, machine assemblers[4] (mean risk: 47 percent) stand out as high-risk groups. These subjective perceptions square exceptionally well with the observation that routine occupations in both blue- and white-collar jobs are particularly threatened by automation (Autor et al. 2003). The type of tasks a job entails determines susceptibility to automation much more than formal skill requirements, with basic administrative work as well as repetitive assembly jobs in manufacturing both being key examples of routine work.

Correlation with Objective Indicators

As a next step, our aim is to systematize the comparison between our subjective measure of perceived vulnerability to automation and objective indicators

[3] ISCO 42: Customer services clerks deal with clients in connection with money-handling operations, travel arrangements, requests for information, making appointments, operating telephone switchboards, and interviewing for surveys or to complete applications for eligibility for services.

[4] ISCO 82: Assemblers assemble prefabricated parts or components to form subassemblies, products, and equipment, according to procedures strictly laid down. The products worked on may be moved from one worker to the next along assembly lines.

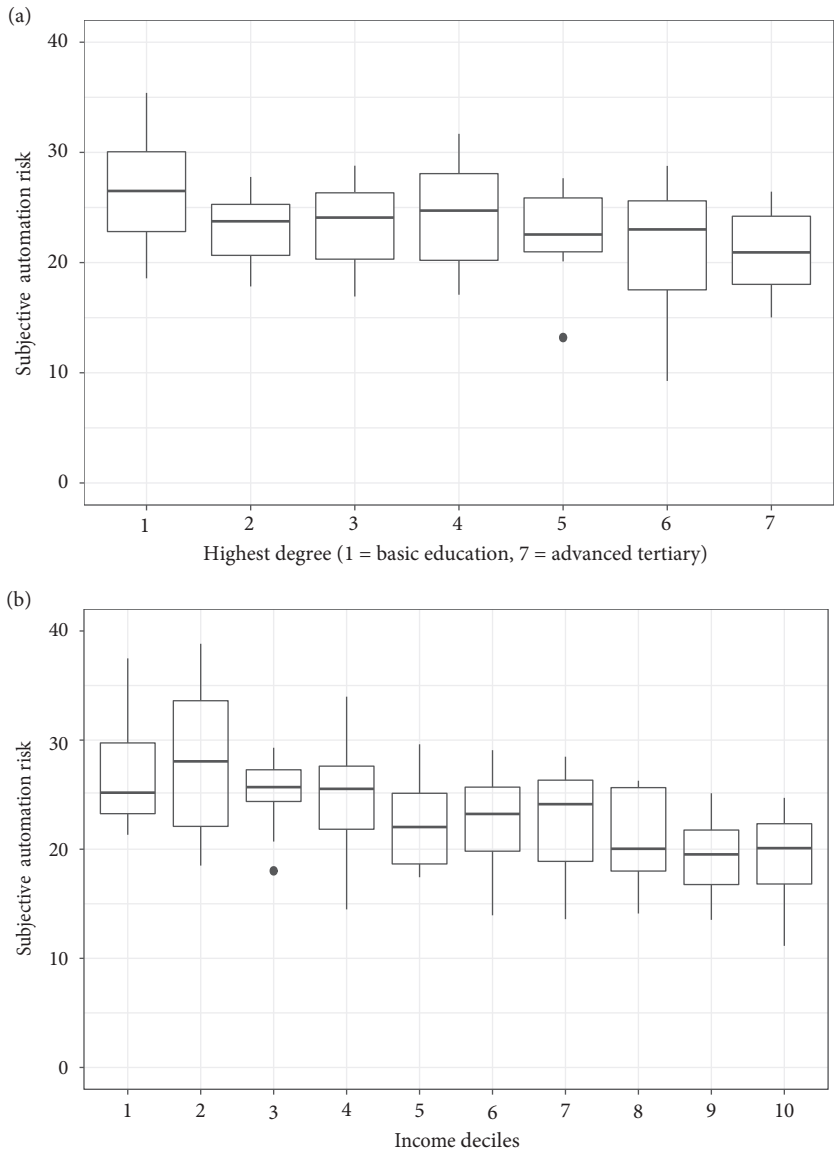

Fig. 8.3 Individual-level determinants of perceived automation risk.

of the same risk. The left panel in Figure 8.4 shows country-specific correlations between our subjective measure and routine task intensity (RTI). RTI relies on detailed occupational dictionaries to quantify the occupation-specific importance of routine tasks vis-a-vis non-routine tasks. The more a job relies on such routine tasks, the more prone is it to be replaced by robots or smart software (see, e.g.,

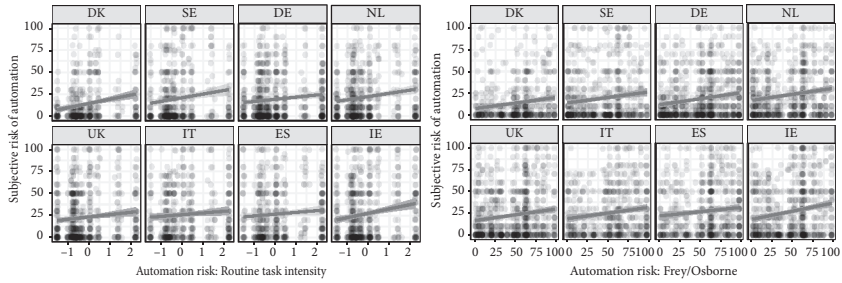

Fig. 8.4 Individual-level determinants of perceived automation risk.

Arntz et al. 2016; Autor et al. 2003; Autor and Dorn 2013). The two measures are consistently correlated in the expected direction, but this correlation is far from perfect. Our subjective indicator is a forward-looking measure that explicitly taps into prospective risk of automation (within the next ten years). While RTI does a good job of describing vulnerability in typical routine jobs, such as the two examples mentioned previously, it insufficiently captures the justified and widespread fear of automation among lower-skilled workers, for example in sales or transportation. These jobs are not particularly routine-heavy but still face a significant challenge from current advances in smart software and deep learning.

Hence, for a second comparison, we draw on a much more future-oriented indicator of automation risk developed by Frey and Osborne (2017). This indicator applies a revised task model of substitution that takes into account that recent advances in machine learning and pattern recognition are increasingly allowing the replacement of non-routine tasks. Apart from a few remaining "engineering bottlenecks," Frey and Osborne assume that it will soon be possible to automate almost any task provided there is sufficient amounts of data available. The right panel in Figure 8.4 shows correlations between subjective perceptions of risk and this more futuristic approach to automation. Again, there is a consistent yet only moderately positive relationship. Interestingly, this time the bias goes in the other direction. Most respondents are less concerned about automation than Frey and Osborne. This deviation is particularly pronounced in jobs that are doomed to imminent and complete extinction according to the Frey and Osborne model, e.g., white-collar office occupations of almost any skill level or elementary occupations like cleaning. The only groups that *over*estimate their risk compared to the Frey and Osborne assumption are respondents in highly analytical and thus hard-to-replace managerial and professional jobs.

Taken together, the consistently positive relationship between our subjective measure and two conceptually different objective indicators of automation risk lends credence to the general validity of subjective perceptions of vulnerability. Many respondents seem to be slightly more concerned than the routine-task intensity of their job would suggest they need to be but at the same time somewhat

less anxious about competition from algorithmic intelligence. In fact, the Frey and Osborne measure has been criticized for offering excessively gloomy estimates of labor substitution, because it is usually not entire occupations but only certain tasks within an occupation that are replaced by technology (Arntz et al. 2016). Hence, our respondents might be right to be slightly less pessimistic about their labor market prospects in times of automation.

Automation Risk and Social Policy Preferences

To test how the subjective risk of automation relates to social policy demands, we look at four variables that capture support for passive and active social policy in different ways. Passive social security is measured via pension policy and unemployment benefits; active social policy via support for tertiary education and labor market reintegration measures.

Specifically, we asked:

"To what extent do you agree with the following policy reform proposals? The government should …"

- … increase old-age pension benefits;
- … increase unemployment benefits;
- … expand services that help reintegrate the long-term unemployed into the labor market;
- … invest more in education.

All items were answered on a 1 (disagree strongly) to 4 (agree strongly) scale and were dichotomized into a support/oppose dummy variable for the sake of simplicity.

In addition, to measure how much *relative* importance respondents attributed to these different policies, respondents were asked to allocate 100 points to six items, reflecting the relative importance they attribute to different welfare state expansion strategies. We asked interviewees to distribute 100 points across six social policy fields: old-age pensions, childcare, tertiary education, unemployment benefits, labor market reintegration services, and services for the social and labor market integration of immigrants. For the present analyses, we use the items that relate to pensions, unemployment benefits, labor market reintegration, and education.

Figure 8.5 visualizes the key coefficients of our simple multivariate linear regression analysis (all results are robust to logistic specifications). The result is clear cut and straightforward: workers who fear that they will be replaced by smart software or robots in the near future have a higher probability of supporting an extension

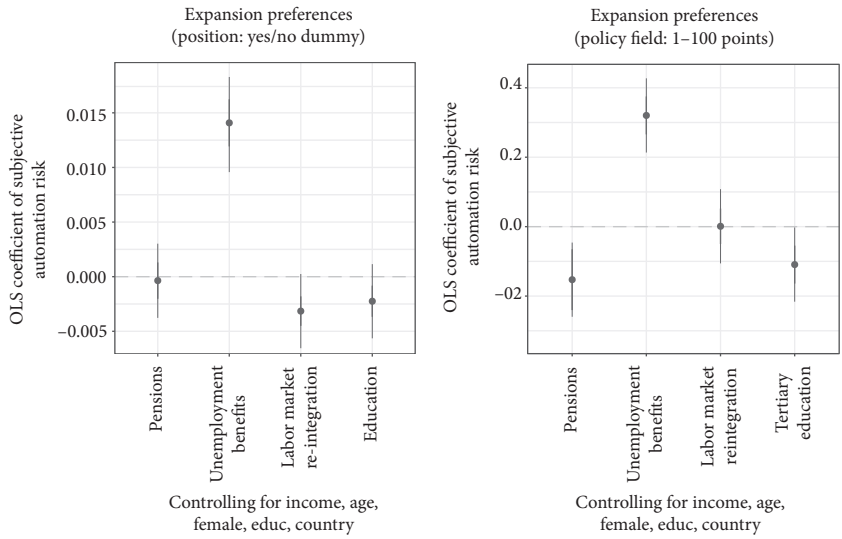

Fig. 8.5 Automation risk and social policy preferences.

of unemployment benefits. This is a rational (short-term) response to unemployment risk. At the same time, they do not show any sign of support for longer-term solutions, in particular policies related to the social investment state. This key result does not depend on whether we look at a respondent's policy position or their relative policy preferences. It is also robust to a direct trade-off question that asked respondents whether they supported higher unemployment benefits at the cost of lower pensions.

The positive association between automation risk and support for unemployment benefits is consistent across all countries, albeit not statistically significant in each and every case. This was to be expected given the reduced N in the split samples. The magnitude of the effect is relatively small—but so are the effects of other standard predictors. Standardized coefficients show that the effect is comparable in size to the coefficient of the respondent's age but somewhat smaller than the coefficient of their income. Education (treated as a continuous variable in the standardized analysis) seems practically irrelevant, perhaps indicating that ideological conflicts within education groups cancel out any overall effect.

Lastly, in supplementary analyses (available from the authors), we demonstrate that the general pattern of support for passive transfers as opposed to investment-oriented policies also holds when we look at objective rather than subjective indicators of automation risk. The results are even more clear cut in the sense that respondents with high RTI or high values of risk according to Frey and Osborne not only support unemployment benefits but also higher pensions, i.e., another form of passive transfer. Just as in the case of subjective automation risk, there

is no sign of support for investment-oriented policies among more risk-exposed respondents.

Preferences by Education

Previous research on this topic also drew our attention to differential incentive structures for higher and lower status individuals. Specifically, Thewissen and Rueda (2019) show that among higher-income individuals, the link between automation risk and demand for social compensation is even stronger than among lower-income individuals, an effect they ascribe to opportunity costs rising with income. Elsewhere, we (Häusermann et al. 2015) have shown that more highly educated labor market outsiders specifically prefer social investment, whereas less educated outsiders prefer redistribution. We read this effect as showing that the primary preference of more highly educated vulnerable employees is for work, i.e., for employment opportunities, over non-work compensation. A similar reasoning may apply to automation, as we might expect that more highly educated respondents who fear the risk of automation substitution would want to invest in upskilling and retraining, whereas low-skilled individuals would prefer income protection.

Figure 8.6 shows that this expectation is not borne out by the data, however. In general, the effect of automation risk varies only weakly with education. If anything, education seems to reinforce the pattern shown previously. High-skilled respondents who feel threatened by automation have an even stronger demand for unemployment benefits than lower-skilled respondents. With regard to investment-oriented policies, high-skilled respondents seem very slightly less skeptical toward spending on labor market reintegration measures but hardly differ from lower-skilled workers when it comes to supporting investment in education. The pattern is similar and even slightly weaker when we look at the relative importance of policy fields instead (see Appendix Figure A.4). To summarize, the strong support for passive transfers among the at-risk group largely holds across education groups. Contrary to what we might expect, higher-skilled respondents who feel susceptible to automation do not show significantly higher rates of support for longer-term strategies based on activation and investment.

Automation and Democratic Engagement

In this final section, we want to come back to the question of whether (or to what extent) automation risk matters politically. In the introduction, we argued that the political relevance depends on the size of the affected group, on the specificity of their preferences, and on their political mobilization. Since we have already looked

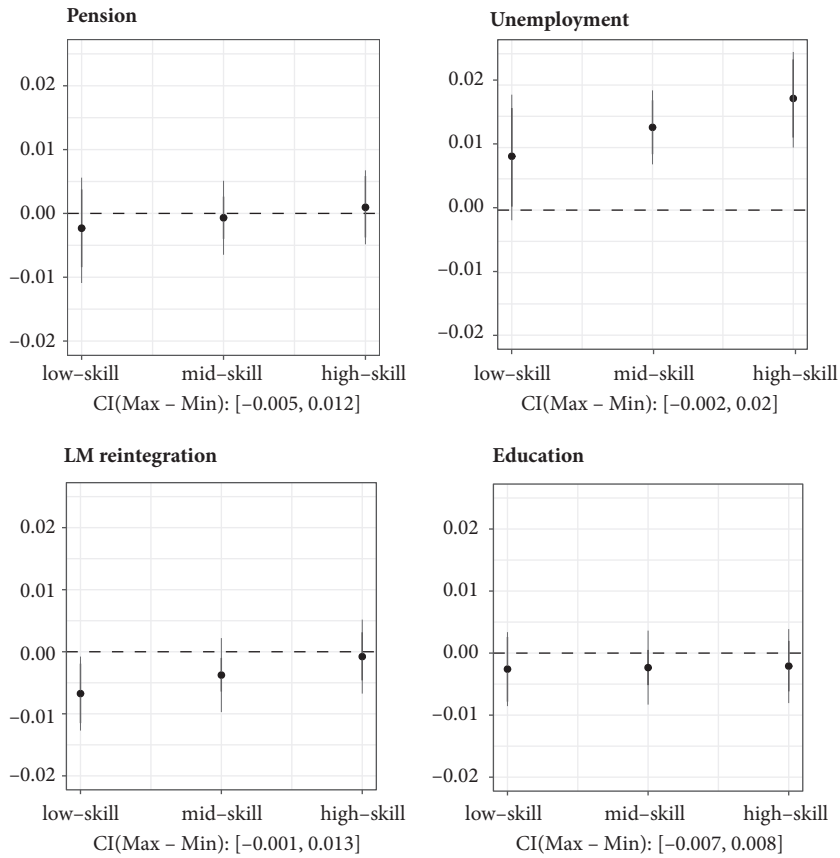

Fig. 8.6 Subjective automation risk and policy preferences (position), by education.

at the first two aspects, we will now turn to the relationship between automation risk and political participation. We might take a different view on political implications if the threat of technological unemployment creates political grievances that mobilize affected individuals, rather than risk being associated with political withdrawal.

Figure 8.7 shows standardized coefficients of a model regressing self-reported participation in the last general election on our measure of subjective automation risk as well as a few alternative standard predictors of voter turnout. In line with related work on more general forms of labor market vulnerability (Bürgisser and Kurer 2019; Häusermann and Schwander 2012; Rovny and Rovny 2017), we find that automation risk is negatively associated with political participation. Compared to other predictors, such as income, education, or age, however, the effect is substantively small. Furthermore, an additional analysis demonstrates that the

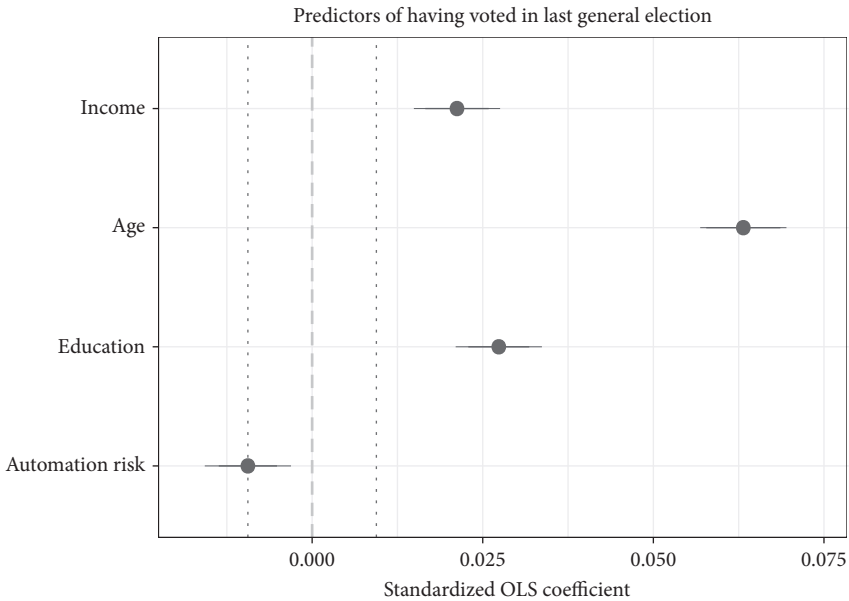

Fig. 8.7 Subjective automation risk and political participation.

demobilizing effect is concentrated among low- and semi-skilled respondents who feel threatened by automation (see Appendix Figure A.5).

We interpret this finding as a limited sign of political demobilization and alienation among those threatened by automation. While we do not find evidence for politically mobilizing grievances, the negative association with voting is weak and restricted to lower-skilled at-risk workers. Certainly, the results are *not* strong enough to suggest that workers susceptible to automation are demobilized to such an extent that they lack any political influence.

Discussion and Conclusion

This chapter has examined the relationship between perceived risk of automation and support for specific social policy preferences. Importantly, our data allow us to differentiate between support for passive transfers and longer-term approaches based on human capital investment and (re)activation of labor supply. We find clear-cut evidence that at-risk individuals primarily demand traditional passive insurance against the risk of job loss but do not show any sign of support for investment policies generally recommended by policy advisers. Our results indicate that the support base for human capital-oriented policies does not include

those individuals who are most exposed to the current downsides of technological innovation.

The political implications of our findings are open to interpretation. Whether such preference differences matter politically depends on several factors, not least on the size of the at-risk group and on their level of political mobilization. For now, the group of people who feel imminently threatened seems relatively small. Roughly 10 to 15 percent of our sample are somewhat concerned and perceive a reasonably high probability that jobs like theirs will be automated within the next ten years. This share is considerably higher in countries that have not yet completed the transition to a modern knowledge economy that relies heavily on a highly skilled and specialized workforce.

This relatively small group of voters with a subjective perception of an imminent threat of automation certainly contrasts with the massive attention the spread and threat of automation attracts in the media and public debate. Part of this discrepancy may result from the question we put to our respondents, which asks not about fear in general, but about a concrete expectation of their job being automatized within a decade. There might be a difference between the egotropic fear and a more sociotropic worry about where economic development may be leading societies. This distinction might also explain a certain gap between the limited political relevance of the at-risk group in our study and the lines of argument in the literature that point to more substantial electoral fallout from automation. Contrary to the claim that automation is fueling right-wing nationalism, anti-elitism, and populism, our results suggest that actual subjective automation risk does not mobilize affected individuals, but, if anything, in fact demobilizes them. We therefore conclude that the at-risk group's preference for rather short-sighted policy responses will find only limited resonance within the political arena. On their own, the socio-structural group of automation losers—if we can even define them as a group in the sociological sense—will therefore most likely not be influential enough politically to challenge the transformation of the welfare state toward the social investment model.

Two caveats are in order, here, however. First, the preference for short-term social protection over long-term social investment demonstrated by automation losers in fact closely resembles the social policy preferences of right-wing populist voters more generally (Häusermann et al. 2020; Rathgeb 2021). The claims and priorities of these parties when it comes to welfare are not vague at all but are perfectly in line with the aforementioned preferences of individuals who feel susceptible to automation (Enggist and Pinggera 2020). Hence, it seems that right-wing populist parties are in a much better position to mobilize those threatened by automation than liberal progressive forces pushing for education, activation, and training.

Second, in the near future, subjective risk of automation may well grow beyond current levels, which would increase the political weight of this alliance of

national conservative and economically fearful voters. Our indicator can be interpreted as a conservative estimate because of the narrow time window of the next ten years. However, technological innovation is fast paced and has certainly not yet reached its peak. In particular, the domains of deep learning and artificial intelligence are evolving rapidly and are becoming increasingly helpful in (or threatening to) the performance of increasingly complex tasks. Indeed, our results show that higher education only weakly attenuates subjective risk perceptions. Although we believe that high-skilled voters might tend to overestimate their immediate risk of replacement, this aspect of our analysis is important when thinking about prospective welfare state reform. It suggests that the pool of voters that feel susceptible to automation might well go beyond the usual group of economically disappointed citizens. A weaker correlation between risk and income, that is, a situation in which economic disadvantage and economic risk tend to be crosscutting traits, creates broader and more influential coalitions in favor of a welfare state that *insures* citizens against economic threat (Rehm et al. 2012). If these developments generally lead to stronger support for passive transfers and hesitant support for social *investment*, policymakers might find it challenging to secure sufficient public support for a future-oriented policy agenda able to cope with the challenges and reap the benefits of the fourth Industrial Revolution.

Thus, the overall and most important contribution of our chapter to studies that seek to identify effective responses to economic modernization is that automation does not automatically produce the support in favor of the social investment welfare state envisioned by many experts.

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