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Coming Together or Coming Apart? Crises, Uncertainty and Tolerance

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Abstract

Uncertainty affects people in various ways. It is frequently found to hinder investment and production in the economic sphere. In this study, we examine the empirical relationship between uncertainty and tolerance toward Muslims and Jews. Does uncertainty make people more or less tolerant? This question is particularly relevant given the prevalence of pandemics, wars, and financial crises. We investigate this relationship using the World Uncertainty Index, which measures the frequency of the word "uncertain" (and its variants) in The Economist Intelligence Unit country reports. By analyzing quarterly data from up to 56 countries between 1990 and 2020, we link country-level uncertainty to approximately 227,000 individual responses from the World Values Survey/European Values Study regarding whether respondents would like to have Jews or Muslims as neighbors. Leveraging the precise timing of survey interviews, we relate individual attitudes to prevailing uncertainty levels. Our results indicate a positive relationship between uncertainty and both tolerance indicators. Thus, for those concerned with attitudes toward minorities often subjected to prejudice, calm periods may pose greater risks to tolerance than volatile periods.

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1. Introduction

Uncertainty is a fundamental feature of reality, influencing numerous aspects of life. People often behave differently under uncertainty compared to certainty – for instance, by engaging in precautionary savings or altering their investment strategies. Changes in individual behavior, in turn, impact economic and social outcomes. An emerging literature using novel cross-country datasets explores the aggregate economic consequences of uncertainty. However, the cultural consequences of uncertainty remain largely understudied, representing a significant gap that this paper seeks to address.

We investigate how uncertainty affects individual-level tolerance towards two frequently stigmatized minorities: Muslims and Jews. Both groups often face prejudice, discrimination, and hate crimes (see, e.g., Birkholz and Gomtsyan, 2023; European Union Agency for Fundamental Rights, 2023; Enstad, 2025). In most countries, they are considered outgroups – a concept popularized by Sumner (1906) to describe the divisions people create between "us" (the ingroup) and "them" (the outgroup). Our focus on Muslims and Jews stems from their experiences of stigmatization and the ongoing global impact of Middle Eastern conflicts, which often evoke strong and polarized reactions.[1]

Does uncertainty lead to greater openness or hostility toward these groups? Intuitively, one might expect uncertainty to undermine social cohesion, fostering tension between groups, consistent with the "coming apart" hypothesis described by Delhey et al. (2021) in their study of pandemic-induced uncertainty and social trust. Conversely, other mechanisms suggest uncertainty could encourage tolerance. For example, during difficult times, individuals may recognize the value of cooperation and adopt more inclusive attitudes – a phenomenon we term "coming together."

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[1] Importantly, the events that transpired after October 7, 2024, have brought even sharper attention to these groups. Another motivation for including Muslims is the frequently heated immigration debates; and Jews remain one of the most consistently targeted religious minorities in numerous regions worldwide. By focusing on these two groups – each with a history of being scapegoated during times of political and economic crises – we can gain clearer insights into how uncertainty affects biases.

Our study utilizes the World Uncertainty Index (WUI), developed in 2018 with support from the International Monetary Fund (IMF). The WUI is based on the frequency of the word "uncertain" (and its variants) in the Economist Intelligence Unit's quarterly country reports. These reports provide standardized, credible assessments of economic and political conditions for 143 countries from 1952 to the present. The WUI offers strong cross-country comparability due to its consistent methodology. Additional details about the index are provided in the data section and Appendix A, which are based on Ahir et al. (2018, 2022).

Past research links rises in uncertainty, as measured by the WUI or similar indicators, to various economic outcomes, including lower employment and lower productivity growth (Bloom, 2009), lower investment and lower firm growth (Li et al., 2019; Kumar et al., 2023; Bloom et al., 2024), lower production (Bachmann et al., 2013), lower economic growth (Ahir et al., 2022; Baker et al., 2024), reduced trade (Matzner et al., 2023), tighter bank lending to businesses (Grimme and Henzel, 2024), and more gambling (Xu et al., 2023). Nguyen et al. (2021) find that uncertainty leads to fewer new business registered – but also to more early-stage entrepreneurial activities, entrepreneurial intentions and innovation, suggesting that innovative people are more alert to the opportunities that arise in times of uncertainty. Among political and social consequences, more uncertainty has, e.g., been linked to a rise in populism (Gozgor, 2022; Gavresi and Litina, 2023) and to a reduction in fertility (Gozgor et al., 2021). However, few studies explore cultural effects.

In this paper, we focus on tolerance – a preference for non-interference with others regardless of their beliefs, actions, or characteristics.[2] Tolerance is both intrinsically and instrumentally valuable. Simply put, tolerance reflects a non-exclusive social morality that recognizes that humans deserve respect – even if aspects of their lives differ from one's own and even if one dislikes some of those aspects. This kind of attitude brings a better quality of life for minorities in any society (Corneo and Jeanne, 2009; Inglehart et al., 2014), but there also indirect consequences, such as a more dynamic economy. As Mokyr (1990: 12) points out in his historical analysis of economic development: "innovation requires diversity and tolerance" (cf. Florida, 2003: 11). Indeed, studies confirm associations between tolerance and economic outcomes (McGranahan and Wojan, 2007; Florida et al., 2008; Chen, 2011; Berggren and Elinder, 2012; Audretsch et al., 2018; Badgett et al., 2019). One mechanism

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[2] This definition is "neoclassical" (Von Bergen and Bandow, 2009), in that allows for a preference for non-interference even though there is no disapproval of the actions, beliefs, or characteristics that the non-interference concerns. The "classical" definition requires such disapproval (see Forst, 2017).

through which tolerance can affect the economy is that it seems to entail a willingness to cooperate with others (Eriksson et al., 2021). More recent studies also document a negative link between tolerance and climate skepticism (Johansson et al., 2022), and a positive link between tolerance and welfare provision (Gründler and Köllner, 2020) and various types of integration (Berggren et al., 2023).

Both Locke (1689) and Mill (1859) argued for tolerance as a basis for peace amidst religious conflict and social harmony more generally. If people with different worldviews can adopt tolerant attitudes, they can cooperate on matters unrelated to the dogmas that are held passionately without having to give up their own convictions, which should be an arrangement that benefits all. This prospect is also of the highest importance in today's world, not only to secure cooperative arrangements between countries, but also within countries, as there has been substantial migration in recent decades, e.g., of Muslims into Europe.

Understanding what shapes tolerance is thus an essential matter. Previous research on country-level determinants of tolerance has looked at a large number of factors, such as economic, legal, and political institutions, globalization, religion, cultural factors, indicators of diversity, and economic conditions (Corneo and Jeanne, 2009; Berggren and Nilsson 2013, 2014, 2015, 2021; Berggren et al., 2019; Williamson Kramer, 2023) – but none have looked at uncertainty.

We use an individual-level tolerance indicator from the World Values Survey/European Values Study: whether a person has indicated that they accept a Muslim or a Jew as their neighbor. We relate it to country-level uncertainty of the quarter in which the persons answered the interview question or, if that information is lacking, uncertainty of the quarter in which survey interviews began in the country. This allows us to use relative temporal proximity in connecting the two variables. Adjusting for country and time fixed effects, our empirical strategy relies on variation in uncertainty within countries.

Our findings reveal a robust positive relationship between uncertainty and tolerance toward both Muslims and Jews. The results are consistent across alternative measures of uncertainty and specifications. This suggests that, contrary to fears that uncertainty exacerbates tensions, it may encourage greater acceptance of minority groups. These findings contribute to the literature on uncertainty's consequences and the determinants of tolerance, offering insights into the cultural implications of crises.

There are some studies that are somewhat similar to ours, although they do not use indicators of uncertainty and tolerance. Caïs et al. (2021) show that during the 2008 economic crisis, institutional trust declined but social trust increased. They speculate that the positive

effect of the crisis, arguably connected to more uncertainty, may have to do with an increase in civic participation and new political movements forming, offering people some hope that they together can work for a better future.[3] Similar findings of stable social trust and more sensitive institutional trust emerged when Delhey et al. (2021) examined trust during the COVID-19 pandemic. Aksoy et al. (2021) also use the COVID-19 pandemic to see how it affected the way people play Dictator and Trust games, and they document an increase in altruistic behavior as a result. Experimental evidence from von Dawans et al. (2012) shows that participants who were subjected to stress engaged in substantially more prosocial behavior (trust, trustworthiness, and sharing) than a control group. These findings all suggest that people may come together in a situation where they do not feel fully in control of a situation, as when there is general uncertainty in society.

Similar results have been obtained in studies of the aftermath of natural disasters. Rao et al. (2011) and De Juan et al. (2022) found that prosocial behavior increased and, in the case of Nepal, that routine violence went down after major earthquakes. Méon and Verwimp (2022) show that after a deadly storm during a music festival, people in the municipalities affected by the disaster gave more money to an ongoing collection of famine relief in Africa than people in non-affected municipalities. Buananno et al. (2023) report a positive effect of exposure to earthquake hazard on civic capital in Italian municipalities. However, Schilpzand (2023) relates natural-disaster data for 82 countries to individual-level trust and finds that ingroup trust increases after a disaster while outgroup trust decreases. This might indicate that uncertainty affects tolerance towards outgroups negatively, as trust and tolerance are related phenomena, but again, other studies point in the opposite direction.

To describe our contribution, we add to the literature on consequences of uncertainty by studying tolerance and bring insights to the literature on determinants of tolerance by studying uncertainty. We also relate to the literature on the cultural consequences of crises and disasters. We clarify our contribution by describing how our study fills a gap in each type of literature.

If we begin with studies on the consequences of uncertainty, they have almost exclusively looked at economic outcomes (as specified above). Thus, there is a gap in that literature with respect to other types of consequences – like tolerance, which we are the first to study. Take as a typical example Matzner et al. (2023), which relates the World

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[3] However, if an economic shock is personal and harsh, trust can decrease, as in the case of losing one's job in the former East Germany as Treuhand was privatized (Kellerman, 2024).

Uncertainty Index to trade and finds that an increase in uncertainty reduces cross-border trade flows. Yet, there is no examination of cultural effects here or in most other studies on the consequences of uncertainty. When it comes to studies on determinants of tolerance, none of them have investigated uncertainty as a possible cause. Quite the opposite: most cross-country studies (as specified above) seem to relate stable institutions to tolerance (e.g., the rule of law, as in Berggren and Nilsson, 2013). Thus, there is gap to fill also in that literature.

Lastly, there are some studies that look at the cultural effects of crises and disasters (as specified above). These are similar in character, in that such discrete events arguably bring with them a rise in uncertainty, and in that they also study cultural outcomes. For instance, both Rao et al. (2011) and De Juan et al. (2022) identify an increase in prosocial behavior after big earthquakes. However, a discrete event like an earthquake is not the same thing as having a continuous measure of uncertainty that incorporates all kinds of events and events of various importance. Furthermore, none of these studies have tolerance as an outcome variable. Hence, we also fill a gap in the literature.

Against this background, looking at three sets of literature, we thus think we offer a novel analysis in relation to them.
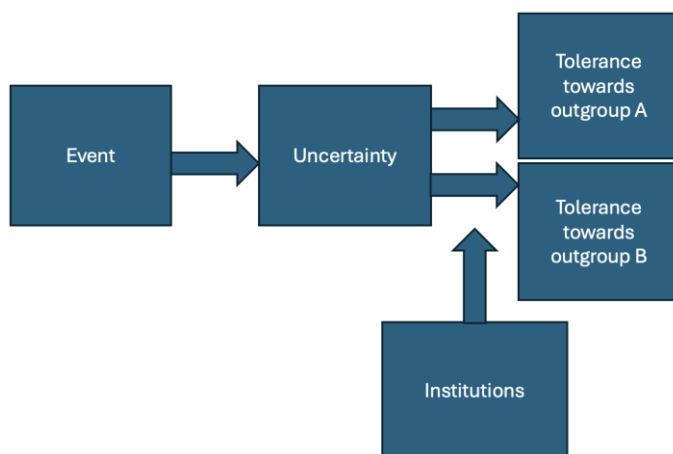

2. Theoretical framework

When analyzing attitudes toward minorities such as Muslims and Jews, a common starting point is the ingroup–outgroup framework**,** initially introduced by Sumner (1906). Sumner described how:

> a differentiation arises between ourselves, the we-group, or ingroup, and everybody else, or the others-group, outgroups. The insiders in a we-group are in a relation of peace, order, law, government, and industry, to each other. … Ethnocentrism is the technical name for this view of things in which one's own group is the center of everything, and all others are scaled and rated with reference to it … Each group nourishes its own pride and vanity, boasts itself superior, exalts its own divinities, and looks with contempt on outsiders.

This tendency to identify with similar individuals while viewing those perceived as different with skepticism or hostility is well-documented (see Brewer, 2019, for an

overview).[4] While we consider this approach a good starting point, we take particular interest in what explains *variation* in attitudes towards outgroups. Indeed, there is considerable variation both within and between countries, as well as temporal shifts. This indicates that outgroup attitudes are not uniform or static and can be influenced by various events and contextual features. They could also vary between outgroups.

Hence, our theoretical framework has four components: (i) the basic ingroup–outgroup dynamic: a foundational tension exists between ingroups and outgroups; (ii) the influence of societal changes: uncertainty, often triggered by natural disasters, financial crises, political turmoil, pandemics, and other disruptive events, can alter attitudes toward outgroups; (iii) the institutional context as a moderating factor: the effect of uncertainty on tolerance depends on the quality and openness of a society's institutions; and (iv) heterogeneity in outgroup effects: responses to uncertainty may vary depending on the specific outgroup in question (A, B, etc.). The key elements of this schema are illustrated in Fig. 1.

Fig. 1
Theoretical framework.

Let us first consider changes in the surrounding society, i.e., various events. More specifically, we take an interest in events that entail more uncertainty. Uncertainty can be caused by natural disasters, climate change, financial crises, political turmoil, pandemics, etc.

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[4] An early study, Tajfel et al. (1971), speculated that certain societies create a generic outgroup attitude that fosters a tendency to behave differently towards outgroups. Using experiments, they demonstrated that simply categorizing individuals into groups is enough to evoke favoritism and trigger discriminatory behavior against the outgroup.

We consider it theoretically ambiguous how people's attitudes towards outgroups change with uncertainty. Following Delhey et al. (2021), one can imagine uncertainty-inducing events leading to people "coming together" or "coming apart," i.e., attitudes toward outgroups can become more open or more separating. In the first case, when they are less sure of what is happening in their societies, people may become more cooperative and open to others in times of crisis, and thus more inclined to regard minorities as an accepted part of the overall community.[5] But it is, alternatively, conceivable that people take a more restrictive view of outgroups, if the need for cooperation in challenging times is directed inwards, towards the own group. "We" must work together to deal with the current events, while keeping "them" even more outside than before.

But what might determine whether more uncertainty leads to more or less tolerance towards outgroups? This, we suggest, depends on the context (as pointed out early on by Becker, 1963). We propose two relevant factors, discussed one by one in the following.

The first aspect to consider is the institutions in place. By this we mean, following North (1991), the formal and informal rules governing human interaction. We believe institutions have considerable power in shaping both behavior and attitudes, as suggested by a vast literature (see, e.g., Acemoglu et al., 2005; Ménard and Shirley, 2008; Voigt, 2019; Berggren, 2024). We propose that institutions can help explain how people deal with uncertainty. Institutions, whether in the political, legal, or economic realm, that enable and stimulate an open, dynamic, free, and transparent society will likely have citizens who can handle uncertainty. Such a society "trains" people to deal with change, and even negative change need not entail more negative attitudes towards others – rather, the opposite. Thus, we suggest that institutions that entail such features as democracy, media freedom, and economic freedom probably see people coming together when uncertainty goes up, which implies higher tolerance.[6]

The second aspect we want to highlight is that attitudes can differ towards different outgroups. *They need not* – indeed, our general expectation is that more uncertainty, in an open, dynamic institutional setting, will entail more tolerance towards most outgroups. However, it may be that a certain ingroup has a particularly strong and stable dislike of some

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[5] A related idea as to why a positive change in tolerance could come about is that outgroups are seen as less important or less threatening when there are bigger, uncertainty-generating factors to worry about. Social heterogeneity may even be valued in times of uncertainty because of the ability to learn from different behaviors, customs, and beliefs.

[6] Cf. Putnam's (2000) exploration of the dynamics of social capital and how social connectedness increases when people experience common uncertainty, enhancing tolerance across social lines.

outgroup, or that some cause of rising uncertainty is associated with a particular outgroup being responsible, in which case more uncertainty does not change the robust intolerance towards such a group. In this study, the main focus is on Jews and Muslims, which can be considered outgroups in most countries, with varying degrees of tolerance towards them.

In all, this leaves us with a simple theoretical structure insofar as we expect that there exists a basic tension between ingroups and outgroups; that events that create more uncertainty have ambiguous effects on tolerance towards outgroups; that open, dynamic institutions influence the effect of uncertainty in the direction of tolerance; and that the relationships can be expected to hold for most outgroups. Let us now turn to the empirical analysis to see if the theoretical pattern can be found in the data.

3. Data and empirical method

3.1. Data

Our dataset contains up to 227,549 individual observations from 56 countries, which are listed in Table B1 in Appendix B. These countries were included because they are the maximum number for which data were available. The data restriction primarily stems from the tolerance data, which are limited to these countries in the case of asking about tolerance towards Muslims and Jews (with respondents in some countries not being asked each of these two questions[7]).

Our dependent variable is an individual-level dummy variable indicating tolerance towards Muslims and Jews. It is measured using the World Values Survey/European Values Study (WVS) question "On this list are various groups of people. Could you please mention any that you would not like to have as neighbors?". Respondents who did *not* mark "Muslim" or "Jew" in their responses are defined as tolerant towards Muslims or Jews (and the tolerance variable thus takes the value 1). The WVS has been conducted in seven waves. We use data

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[7] We do not know why both questions were not asked in all countries; but as can be seen in Fig. 3, there is still a very big spread in the average tolerance levels of these countries. As clarified by the World Values Survey: "In some cases, certain problematic questions are omitted from the national questionnaire. … WVS requires implementation of the common questionnaire fully and faithfully, in all countries included into one wave. Any alteration to the original questionnaire has to be approved by the EC. Omission of no more than a maximum of 12 questions in any given country can be allowed."

from waves 2 to 7 over the period 1990–2020.[8] We have detailed information about the month the WVS wave started in a specific country, and for about half of all respondents (54%) we also know the exact date they were interviewed.[9]

Our main explanatory variable is the World Uncertainty Index (WUI) for the country in which a respondent resides. It is computed by counting the share of words that the word "uncertain" (or its variants) constitutes in the Economist Intelligence Unit country reports multiplied by 1,000,000. The index is reported for each country on a quarterly basis.[10] Using information on the exact interview date in the WVS individual-level data, or information on the first survey month in case the exact interview date is not reported, we can identify the level of uncertainty around the time a respondent was interviewed.[11] We describe and discuss the WUI further and present various analyses from others detailing its characteristics in Appendix A.[12]

In this study, we generate and make use of four alternative definitions of uncertainty: WUI interview (the World Uncertainty Index score during the quarter a WVS interview took place, using the exact interview date), WUI combined (the score during the quarter a WVS interview took place, using the exact interview date, and the score during the quarter the country-specific WVS wave of interviews started for the remaining observations), WUI interview lag (WUI interview lagged one year) and WUI combined lag (WUI combined lagged one year). The WUI interview variable more closely aligns the dependent and the main

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[8] The seventh wave of the WVS took place worldwide in 2017–2022, but a majority of surveys were completed in 2018–2020, with only about a dozen countries conducting their fieldwork after the pandemic outbreak. We use the version of the seventh wave published in December 2020.

[9] In a robustness test, we make use of the country average of these two variables, as well as of age, age squared and female. In another robustness test, we add three other groups from the neighbors list: gay people, Roma people and unmarried couples living together.

[10] In a robustness test, we use the Economic Policy Uncertainty Index (Baker et al., 2016; Economic Policy Uncertainty, 2024), which measures the prevalence of economic policy uncertainty in newspaper articles.

[11] Our data also include details about the last survey month within a country. Typically, WVS interviews within a country are concluded within four months, often even sooner.

[12] Ahir et al. (2022: 3–4) point out the following: "To address potential concerns regarding accuracy, reliability and consistency of our dataset, we evaluate the WUI in several ways. First, we examine the narrative associated with the largest global spikes. Second, we show that the index is associated with greater economic policy uncertainty (EPU), stock market volatility, and forecaster disagreement, and lower GDP growth, and tends to rise close to political elections. Finally, our index has a market use validation: commercial data providers that include Bloomberg, FRED, Haver, and Reuters carry our index to meet demands from banks, hedge funds, corporations, and policy makers."

explanatory variable than WUI combined, but we get more observations when applying the latter. The lagged variables are used to see whether the relationship of interest is only present close in time to when a respondent is interviewed or if it is also present after an additional year and to attenuate endogeneity concerns.

Our control variables in the baseline specifications are Female (taking the value 1 if the respondent is a woman and 0 otherwise), Age and Age squared, all taken from the WVS. We apply country- and year-fixed effects to control for stable characteristics of the countries and test for the role of time trends in a robustness analysis. In an extended analysis we add more individual-level controls from the WVS: Education (using the recoded variable for educational attainment in the WVS and reporting results for having attained a low or middle, as opposed to a high, level of education); Married (taking the value 1 if the respondent is married and 0 otherwise); Income (using the recoded variable for income levels in the WVS and reporting results for having a low or middle, as opposed to a high, income level); Muslim (taking the value 1 if the respondent is a Muslim and 0 otherwise); Jew (taking the value 1 if the respondent is a Jew and 0 otherwise); and Trust (taking the value 1 if the respondent is has replied that most people can be trusted and 0 otherwise).

In most cases our choice of control variables follows previous studies on determinants of tolerance, which typically control for gender, age and education. For example, there is an ongoing discussion on gender and tolerance, especially tolerance of Muslims (cf. Golebiowska, 1999, and Saharso, 2003), and a discussion on how tolerance develops with age. For example, Verkuyten and Slooter (2007) find evidence against the view that tolerance develops through a stage-like sequence where an intolerant attitude is followed by tolerance. A fairly robust pattern in previous research is that education is positively related to tolerance. It is debatable, however, if the correlation reflects a causal association (cf. Caplan, 2018), to what extent variation in tolerance is explained by education (Florida, 2004) or to what extent education matters through income (Paas and Halapuu, 2012). Being married has been shown to be associated with lower tolerance of gay people (Berggren et al., 2019). However, using a broader measure of social tolerance, Dima and Dima (2016) find a positive effect of being married. There is also a discussion on whether tolerance and social trust are similar traits (cf. Berggren and Nilsson, 2014), and the main finding is that they seem to be distinct but reinforcing. Moreover, we use two indicators of religiosity, as Muslims and Jews are associated with two world religions and as attitudes towards them may be influenced by religious considerations. Both are from the WVS. The first one is a dummy indicating

whether respondents consider themselves to be religious. The second one is a dummy indicating that respondents attend a service at least once per week.

Moreover, we make use of a set of country-level control variables: the log of GDP per capita, growth in GDP per capita, unemployment (percent of the total labor force), the share of the population residing in urban areas, and age dependency– all from the World Development Indicators. We also use economic freedom (from Gwartney et al., 2024), size of government (from Gwartney et al., 2024)[13], civil liberties (from Freedom House, 2024), and political rights (from Freedom House, 2024). We use the following country-level variables to split the sample: three indicators of (a lack of) media freedom (government censorship efforts of media, harassment of journalists and media bias; from Coppedge et al., 2024), institutional quality (legal system and property rights and sound money; from Gwartney et al., 2024), social trust (the share answering that "most people can be trusted"; from the WVS), log GDP per capita and political polarization (from Coppedge et al., 2020).

Descriptive statistics for all variables except those collapsed to the country level are presented in Table 1; the latter can be found in Table B2 in Appendix B.

Table 1

Descriptive statistics.

Variable	Observations	Mean	Standard deviation	Min	Max
Tolerance Muslims	227,549	0.795	0.404	0	1
Tolerance Jews	221,078	0.825	0.380	0	1
Tolerance homosexuals	225,093	0.624	0.485	0	1
Tolerance gypsies	135,439	0.597	0.491	0	1
Tolerance index 1	193,587	0.762	0.308	0	1
Tolerance index 2	193,587	0.732	0.304	0	1
Tolerance unmarried	215,106	0.754	0.431	0	1
WUI combined	227,549	0.142	0.143	0	0.928
WUI combined squared	227,549	0.041	0.078	0	0.861
WUI interview	121,671	0.168	0.162	0	0.928
WUI combined lag	227,549	0.172	0.174	0	0.929
WUI interview lag	121,671	0.163	0.166	0	0.929
EPU lag	64,363	0.102	0.060	0.020	0.396
Female	227,549	0.539	0.499	0	1
Age	227,549	45.356	17.493	15	108

[13] One can regard this as a proxy of welfare state size by taking 10–its value. This is because a larger value on the 0–10 scale corresponds to smaller government size based on information on government spending, marginal tax rates, government investment and state ownership of assets. Some authors have argued that the welfare state can, under some circumstances, promote tolerance (e.g., Rapp 2017).

Age squared	227,549	2363.137	1707.778	225	11664
Muslim	227,549	0.0545	0.227	0	1
Jew	227,549	0.002	0.045	0	1
Education (low)	160,256	0.261	0.439	0	1
Education (medium)	160,256	0.435	0.496	0	1
Income (low)	160,256	0.349	0.477	0	1
Income (medium)	160,256	0.390	0.488	0	1
Married	160,256	0.559	0.496	0	1
Trust	218,411	0.325	0.469	0	1
Religious	224,689	0.654	0.476	0	1
Attends service	163,435	0.099	0.298	0	1
>85% Muslims	221,078	0.070	0.255	0	1
Size of government	167,992	3.663	1.150	1.221	8.426
Economic freedom	167,992	7.261	1.041	3.653	8.569
Civil rights	197,075	2.124	1.449	1	7
Political freedom	197,075	1.883	1.588	1	7
Urban share	202,473	68.246	16.145	15.201	97.603
Age dependency	202,473	52.262	10.344	37.367	109.633
Growth in GDP per capita	200,494	2.379	3.252	-8.707	10.581
Unemployment	182,432	8.889	6.030	2.55	33.761
Censorship	211,808	1.815	1.374	-2.71	3.566
Harassment of journalists	211,808	1.893	1.325	-1.743	4.111
Media bias	211,808	1.712	1.049	-2.618	3.036
Political polarization	211,808	-0.964	1.256	-3.033	3.048
Log GDP per capita	201,074	9.876	0.865	6.974	11.076

Notes: The samples differ by variable; in each case, we report numbers from the largest available sample. For size of government, note that the variable is defined as 1-the original value on the 0–10 scale.

3.2. Empirical method

To study the relationship between uncertainty and tolerance, we run regressions with individual-level tolerance as the outcome and individual-level, right-hand-side controls, while our measures of uncertainty vary across countries and quarters of the year. The strategy is to exploit the fact that shocks to uncertainty occur in different countries at different points in time. This variation in uncertainty at the macro level within the same country can be used to contrast cultural attitudes between individuals who were affected by this variation depending on when they were interviewed.

While it is implausible that crisis-like events are caused by people being more or less tolerant, there is a risk that a noted relationship may be driven by unobserved factors. As for confounders, we apply both country- and year-fixed effects, as well as check whether

country-specific trends matter, along with including control variables. For the smaller subsample where we have information about the exact interview date, we can add a quarter-of-the-year fixed effect and thereby explore variation in uncertainty within the same country to contrast impacts between individuals that were differently affected depending on their interview date. Still, there are endogeneity concerns that we cannot deal with using the kind of data we have at our disposal. There may be an underlying determinant of both uncertainty and tolerance, and there may be confounders that we have not thought of that are relevant. Hence, we prefer to see our study as exploratory and do not make strong causal claims.

Throughout, we regress our models using OLS and cluster on the level of treatment, quarter of the year. Given the binary nature of the dependent variables, our estimates are coefficients from a linear probability model.

4. Empirical results

4.1. A first look

Before presenting regression results, we provide three graphs that illustrate aspects of the main variables. Fig. 2 shows a histogram of the main explanatory variable for which we have the most observations, WUI combined. Although more than 15% of the observations have almost no uncertainty, the remaining observations are spread out up to an uncertainty value of about 0.5 and show a declining pattern, with some distinct high-uncertainty cases appearing as well.
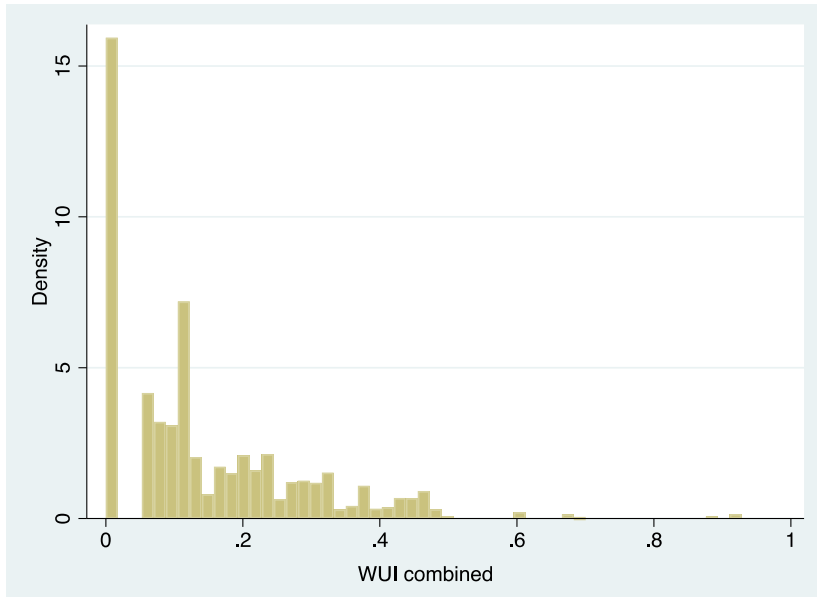
Fig. 2. The distribution of uncertainty (WUI combined) scores.

Fig. 3 shows the share of people who are tolerant towards Muslims and Jews in each country over the studied time period. There is variation across countries in the average level of tolerance, although the shares are generally quite high, with only a few countries having shares below 50%. Tolerance towards Jews is generally somewhat higher.

We proceed by relating, in regression analysis, uncertainty at the country level to individual-level tolerance towards Muslims and Jews, respectively.
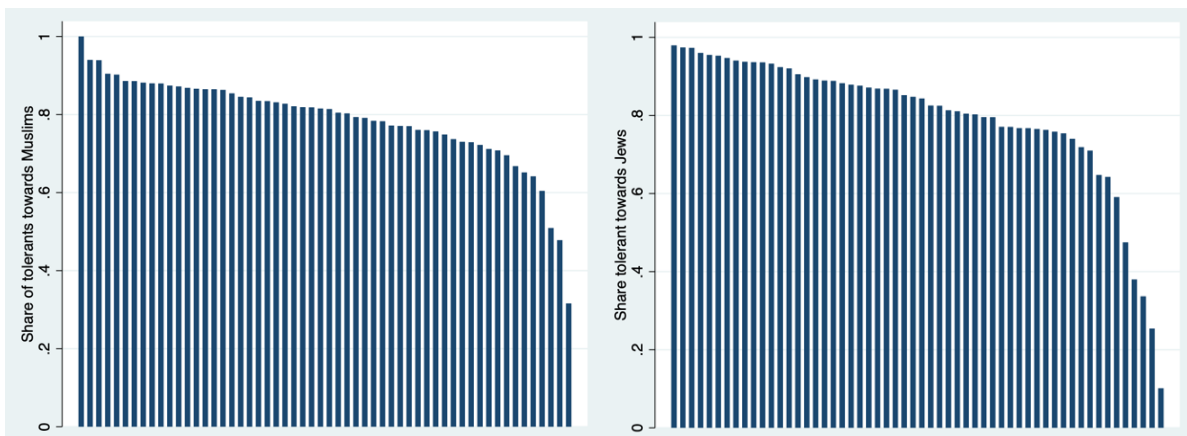
Fig. 3. Share of people per country that are tolerant towards Muslims and Jews.
Notes*:* The countries are ordered by tolerance level. The order of the countries is not identical in the two graphs: in each case, the countries are included by their respective tolerance levels. The scale denotes the share of respondents in each country that express tolerance towards Muslims (in the left-hand graph) and towards Jews (in the right-hand graph).

4.2. Baseline analysis

Baseline regression results are presented in Table 2 (tolerance toward Muslims) and Table 3 (tolerance toward Jews). Across all specifications, a positive relationship emerges between uncertainty and tolerance, providing empirical support for the "coming together" hypothesis.

Table 2

Uncertainty and tolerance towards Muslims: baseline regression results.

	(1)	(2)	(3)	(4)
		Tolerance towards Muslims		
WUI combined	0.147***			
	[0.031]			
Female	0.016***	0.018***	0.015***	0.018***
	[0.003]	[0.004]	[0.003]	[0.004]
Age	0.001*	0.000	0.001*	0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
WUI interview		0.195***		
		[0.040]		
WUI combined lag			0.132***	
			[0.033]	
WUI interview lag				0.262***
				[0.047]
Constant	0.783***	0.771***	0.781***	0.758***
	[0.007]	[0.008]	[0.009]	[0.010]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	227,549	121,671	227,549	121,671

Notes: Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table 3

Uncertainty and tolerance towards Jews: baseline regression results.

	(1)	(2)	(3)	(4)
		Tolerance towards Jews		
WUI combined	0.131***			
	[0.026]			
Female	0.008***	0.011***	0.008***	0.011***
	[0.002]	[0.003]	[0.002]	[0.003]
Age	0.001*	0.002***	0.001*	0.002***
	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]

WUI interview	0.108**		
	[0.039]		
WUI combined lag		0.099***	
		[0.028]	
WUI interview lag			0.097***
			[0.023]
Constant	0.801***	0.773***	0.804***	0.775***
	[0.011]	[0.013]	[0.011]	[0.009]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	221,078	129,422	221,078	129,422

Notes: Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

For tolerance towards Muslims, the point estimates are larger for WUI interview compared to WUI combined, and also larger, for both measures, when a lag is added. This indicates that the effect is larger when the relationship is estimated with higher precision, which is reassuring. The lagged effect suggests that a rise in uncertainty also has lasting effects on tolerance. For tolerance towards Jews, these differences do not really appear.

To interpret the point estimates, consider the coefficient for tolerance towards Muslims using the WUI interview lag: 0.262. It implies that if uncertainty increases by one standard deviation, the probability of an average respondent being tolerant increases by 4.3 percentage points (which is 5.4% of the average value). For a different specification of effect sizes, see footnote 16.

4.3. Extended analysis

To determine whether the findings are robust and to discern nuances, we have conducted extended analyses in several areas. First, we have used two other indicators of tolerance, as well as two tolerance indices based on the individual tolerance measures, to see whether uncertainty only relates to tolerance towards Muslims and Jews or whether the relationship generalizes. The two new groups are gay people (termed "homosexuals" in the WVS) and Roma people (termed "gypsies" in the WVS). These were chosen based on sufficient data coverage. In both cases, we use the same neighbor question as the one used to derive our data on tolerance towards Muslims and Jews. Then, Tolerance index 1 is the average tolerance towards Muslims, Jews and gay people (conditioned on there being data for all three groups), while Tolerance index 2 is the average tolerance towards Muslims, Jews, gay people and Roma people (where the measure must always have data on the first three

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groups; if data on the fourth group also exists, it is added to the calculation of the average, but if data on the fourth group does not exist, the average only covers the first three groups; this construction is to ensure a large data coverage, since there are much fewer data points on Roma people). Since each variable is a dummy variable, the averages of the indices are between 0 and 1. The results are presented in Table B3 in Appendix B. They show that, consistent with our findings for Muslims and Jews, higher levels of uncertainty are positively associated with tolerance towards gay people and Roma people.[14] However, the point estimates are more modest. The association between higher uncertainty and greater tolerance remains statistically significant and stable when using either of the indices. These findings lend additional support to the idea that there is a general pattern linking uncertainty to increased tolerance towards minorities, consistent with our theoretical framework.

Second, we have conducted a placebo test using attitudes towards unmarried people living together. This is a group much less likely to evoke strong biases, prejudice or discrimination. While cohabitation outside of marriage may still be considered controversial in some cultural contexts, this group is arguably the least controversial of those included in the WVS question about neighbor preferences. As shown in Table B4 in Appendix B, uncertainty is *not* associated with tolerance towards this group, and the estimated effect size is close to zero. This placebo test further reinforces the validity of our findings by showing that the observed relationship between uncertainty and tolerance is specific to minorities with a history of prejudice towards them. To some extent, it also alleviates concerns that the results for tolerance towards Muslims and Jews merely reflect general trends in society (cf. Janmaat and Keating, 2019), which would arguably apply to cohabitants as well.

Third, to see whether the results are robust to using another indicator of uncertainty, we have conducted a robustness test using the Economic Policy Uncertainty Index (EPU), as developed and described by Baker et al. (2016). It is the alternative that allows for a similar cross-country analysis, noting, however, that the sample is considerably smaller (22 countries) and available for a shorter time period (from 1997, whereas the WUI analysis starts in 1990). As reported by Ahir et al. (2022: 12), the WUI and the EPU are correlated at about 70%. Each national EPU index reflects the relative frequency of own-country newspaper articles that contain a trio of terms pertaining to the economy (E), policy (P) and uncertainty (U). In other words, each monthly national EPU index value is proportional to the share of own-country

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[14] This relationship holds across both the broader sample and the more limited sample for which we have precise interview dates (the latter results are available on request).

newspaper articles that discuss economic policy uncertainty in that month.[15] Results using the EPU, for all our tolerance measures, are reported in Table B5 in Appendix B. They indicate that the findings of the WUI are robust to using the EPU, which uses country-specific sources instead of relying on the standardized reports from the Economist Intelligence Unit, like the WUI. It is still the case that more uncertainty is related to higher tolerance towards Muslims, Jews, gays, and Roma people.

Fourth, we have added country-specific time trends in addition to applying country- and year-fixed effects (cf. Janmaat and Keating, 2019). The idea is to take care of potential differential drifts over time within countries regarding tolerance towards Muslims and Jews, respectively. We show the results, for linear and quadratic trends, in Table B6 in Appendix B (to be compared with columns (1) of Tables 2 and 3). The point estimates are smaller and the statistical significance is lower (at the 5% rather than the 1% level for Muslims) when applying the trends. The reduced size of the point estimates indicates that part of the relationship probably has to do with general unobserved changes in specific countries. The application of quadratic time trends instead of linear ones gives virtually identical results, suggesting that the linear trends capture the unobserved changes and that the quadratic specification does not add further explanatory value.

Fifth, we have added a number of additional individual-level control variables to see whether the WUI variables capture aspects of our respondents heretofore not controlled for. The results are shown in Tables B7 and B8 in Appendix B. When it comes to tolerance towards Muslims, the point estimates for WUI are virtually unchanged when adding the individual controls. Being a Muslim is a strong predictor of tolerance towards Muslims, which is hardly surprising, but it is an important variable to include since Berggren et al. (2019) found it to be the most robustly related to tolerance towards gay people (with a negative sign). Being a Jew is not associated with being tolerant towards Muslims, and when interacting being a Jew with uncertainty, we find no statistically significant result. As before,

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[15] Grounds for an article being counted include remarks about: uncertainty over who makes or will make policy decisions that have economic consequences, current and past uncertainty over what economic policy actions will be undertaken, uncertainty regarding the economic effects of policy actions – past, present and future, economic uncertainty induced by policy inaction, and economic uncertainty related to policy developments motivated by non-economic considerations – e.g., national security concerns. In the case of other countries than the United States, the scaling does not use the total number of monthly articles but the number of articles using (the equivalent of) the word "today". For more details, see Baker et al. (2016) and the web site https://www.policyuncertainty.com/.

women are more tolerant. Interestingly, education is not related to tolerance towards Muslims, but higher income comes with more tolerance. Lastly, social trust is also positively related to tolerance (in line with Berggren and Nilsson, 2014; cf. Johansson et al., 2022). When it comes to tolerance towards Jews, the uncertainty estimates remain unchanged when we include additional individual controls, indicating robustness. Looking at the individual controls, neither being a Jew nor being a Muslim is robustly related to tolerance towards Jews, nor is there any significant interaction effect between uncertainty and being a Muslim. Higher education is related to higher tolerance, and the same pattern is observed for income. Married respondents are slightly less likely to be tolerant of Jews, while the association with social trust is positive.[16]

Sixth, we have conducted an analysis where we control for the religiosity of the respondent, by using a dummy indicating of the person reports to be religious and by using a dummy indicator of whether the person attends a religious service at least once per week. We also interact these religiosity variables with the uncertainty variable. The findings, shown in Table B10 in Appendix B, reveal that religiosity, in neither of the two ways we measure it, relates to tolerance towards Muslims in a robust way; nor do the interaction terms. When it comes to tolerance towards Jews, the first indicator is robustly related to less tolerance towards Jews, even though the effect size is rather small. There is no statistically significant interaction effect. Importantly, the point estimates for uncertainty are not really affected and remain significant at the 1% level throughout.

Seventh, we examine if results are robust to the exclusion of outliers, by trimming the uncertainty variable at the 1st and the 99th percentiles (discarding very low and very high values) and rerunning our baseline regressions. Table B11 in Appendix B reassuringly shows that the results are robust to this exercise. Another exercise we have done is to exclude

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[16] As Jaanmat and Keating (2019) point to the importance of education for tolerance, the point estimates allow us to calculate how a standard-deviation change in uncertainty affects tolerance towards Muslims and in terms of standard deviations and also how being in the low- and middle-education categories compared to the high-education category affects the two tolerance outcomes in terms of standard deviations. See Table B9 in Appendix B. Having a high rather than a low education is related to an increase in tolerance towards Muslims of 14.6% of a standard deviation. That is more than three times larger than the effect size for uncertainty. On the other hand, having a higher rather than a middle education is related to an increase in tolerance towards Jews of 5.3% of a standard deviation, which is "only" 20% larger than for uncertainty. A possible conclusion is that uncertainty is not the most important factor for explaining variation in tolerance, but it still matters – and about equally so for both types of tolerance.

countries with more than 85% Muslims, to make sure the results are not driven by completely Muslim countries. This removes individual observations from Bangladesh, Egypt, Iran, Iraq, and Turkey. In this case as well, the results remain statistically significant at the 1% level, with similar point estimates. See Table B12 in Appendix B. Lastly, we have estimated the relationship for tolerance towards Jews only among respondents living in countries with at least 85% Muslims. The results are shown in Table B13 in Appendix B. As can be seen, the point estimate becomes much larger and is still significant at the 1% level, indicating that in the countries with most Muslims, more uncertainty is related to an especially large boost in tolerance towards Jews.

Eighth, for the smaller subsample with information on the exact interview date, we can add quarter-of-the-year fixed effects to our model. The strategy here is to exploit the fact that WVS interviews in a given country wave were often performed across two or more quarters, whereby we can explore variation in uncertainty within the same context and contrast tolerance attitudes between individuals that were affected by this variation depending on when they were interviewed. To illustrate the relevance of this exercise, let us give an example. In 2008, the WVS interviews in Ukraine took place both in the third and fourth quarters. In the beginning of September, there is a political crisis, which lasts until the end of the year. It is noteworthy that Ukrainians interviewed in the third quarter faced an uncertainty value of 0.098, while those interviewed in the fourth quarter experienced much higher uncertainty (0.176). Through the quarter-of-the-year fixed effects, we can study how uncertainty relates to tolerance by looking at changes in uncertainty by quarter in the same country while being able to control for other variables that vary. Table B14 in Appendix B shows that our baseline findings with more uncertainty being associated with higher tolerance (for both Muslims and Jews) also hold when using this stricter identification strategy.

Ninth, we investigate whether the size of government influences tolerance (cf. Rapp, 2017, and Ennser-Jedenastik and Köppl-Turyna, 2019), by itself or by interacting with uncertainty. One hypothesis is that larger governments create a sense of safety that promotes tolerant attitudes towards minorities. A competing hypothesis is that a large public sector will promote intolerance of outgroups, if they are seen as competing for transfers and benefits. Notably, the regression results show that neither government size nor the interaction effect attains statistical significance for either type of tolerance (see Appendix B, Table B15). As the regression estimates may hide some interaction effects along the full variation of government size, we also provide two marginal plots illustrating the interaction relations of interest (Fig. B1 in Appendix B). The marginal plot for tolerance towards Muslims reveals a positive

impact of uncertainty above a government size value of a bit less than 4, but results are imprecisely estimated. For tolerance towards Jews, the marginal plot indicates the opposite relationship across government size, but it is not statistically significant. Overall, the uncertainty-tolerance relationship seems to be independent of government size and thus of the welfare state.

Tenth, we have tested the sensitivity of our results by adding other time-varying country-level controls. However, it is important to be careful when selecting country-level variables and performing this kind of exercise as some controls may be so-called bad controls, which may lead to biased or misleading results. Keeping such caveats in mind, Tables B16 and B17 in Appendix B provides the results. The key observation is that the baseline findings for tolerance towards Muslims and Jews are robust to adding GPD per capita, the share of the population residing in urban areas, age dependency, economic freedom, political freedom, civil liberties, growth in GDP per capita and unemployment.[17] The point estimates hardly change at all, nor does the degree of statistical significance in the case of Muslims, while there is some weakening in the case of Jews. Few of the added variables are statistically significant themselves, and across the two tables, only one is statistically significant in both: the share of the population who live in an urban area (with a very small point estimate). In our view, this analysis demonstrates that uncertainty is a consistent predictor of both types of tolerance, with the inclusion of various country-level variables having no real impact on the key results. Thus, uncertainty does not seem to "capture" any of the other variables.

Eleventh, to try to pinpoint more potential "mechanisms" that help explain under what circumstances uncertainty affects tolerance, we have split the sample by the mean of five (groups of) country-level variables: media freedom (measured by government censorship effort, harassment of journalists and media bias), institutional quality (measured by legal system and property rights), social trust, log GDP per capita and political polarization. The results are presented in Table B18–B25 in Appendix B. A key finding is that the positive relationship between uncertainty and tolerance of Muslims only holds in countries with relatively high media freedom. This holds true for all three measures of media freedom. A possible interpretation is that when the media is free, the portrayal of Muslims is different and more positive, on average, which helps establish a stronger inclination towards cooperation with Muslims in uncertain times compared to countries with more government censorship effort, harassment of journalists and media bias. Another finding indicating some possible

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[17] On the role of institutions for tolerance, see, e.g., Weldon (2006) and Berggren and Nilsson (2013).

heterogeneity appears when comparing countries with high and low institutional quality in relation to the legal system and protection of property. While the estimates are not significantly different in magnitudes, the associations between uncertainty and tolerance (both towards Muslims and Jews) are positive and significant only in settings with better legal institutions. This may be explained by the assurance given by fair and effective legal institutions that opportunists will not exploit you in times of uncertainty, which in turn creates a stronger openness to cooperation across group boundaries. For the remaining split variables, the point estimates are positive and significant in both country groups, but with some variation in the size of the point estimates.

Twelfth, there might be ecological-fallacy concerns when relating a country level variable (uncertainty) to an individual-level variable (tolerance). We have therefore collapsed the baseline individual-level variables (tolerance, female, age and age squared) to create *country-level*, quarterly data and have re-run the baseline regressions with these aggregate variables, applying either country- and year-fixed effects or country- and quarter-of-the-year-fixed effects. As can be seen in Table B26 in Appendix B, we reassuringly find a positive and significant association between uncertainty and our measures of tolerance also in this setting with country-level tolerance.

Twelfth, we have examined non-linearities in the relationship between uncertainty and tolerance. We do not have a theoretical prior on whether the relationship could be quadratic but consider it worthwhile testing it. The results are presented in Table B27 in Appendix B. The findings suggest that the relationship is linear for tolerance towards Muslims, whereas it is slightly hump-shaped for tolerance towards Jews. However, if one takes these numbers seriously, the highest tolerance level towards Jews is achieved at an uncertainty level of 0.539, which is high, considering that the mean is 0.142 and the standard deviation 0.143. For practical purposes, we therefore think it makes sense to regard the relationship as roughly linear.

Thirteenth, we have estimated the baseline model separately for Europe, North America and Asia to see if the relationships between uncertainty and tolerance apply similarly. This is shown in Table B28 in Appendix B. Since most of the respondents are from Europe, this also puts a stamp on the results of the full sample. European respondents are associated with more tolerance towards both Muslims and Jews as uncertainty goes up. Interestingly, this also holds for tolerance towards Jews both in North America and Asia (but point estimates are much larger, especially in North America) – but not, in these two regions, for Muslims. Instead, North American and Asian respondents seem to "come apart" from

Muslims as uncertainty increases – tolerance towards them decreases, especially in Asia. This one of our theoretical points: that tolerance relates to tolerance contextually. We think there can be explanations for the observed pattern. For example, in the North American case, most of the large Middle Eastern conflicts during the time period of this study have involved US forces, and 9/11 occurred during it as well. The kind of uncertainty experienced from such traumatic and highly visible events may have made North Americans "blame" Muslims, with reduced tolerance as a consequence. There could be similar reasons for Asians, as many countries have either Muslim majorities or large Muslim minorities, with various conflicts over time. To mention three cases: India is in conflictual situations with Pakistan and Bangladesh, and China, Myanmar, and Thailand experience internal conflicts with Muslim minorities in a salient and (as portrayed) negative way. These findings put nuance on the issue of how uncertainty relates to tolerance, and we are grateful for the insightful comment that made us undertake this analysis

5. Concluding remarks

In recent years, social scientists have increasingly employed indicators of uncertainty to explore its impact on various outcomes. While uncertainty is often associated with adverse economic effects – such as reduced investment, employment, and productivity – its cultural consequences remain underexplored. This study contributes to the literature by examining the relationship between uncertainty and tolerance, using the World Uncertainty Index (WUI) and tolerance indicators derived from the World Values Survey/European Values Study.

Our findings reveal a robust and positive relationship between uncertainty and tolerance toward Muslims and Jews. When uncertainty increases, individuals are more likely to exhibit tolerant attitudes toward these historically marginalized groups. This result aligns with the "coming together" hypothesis, which posits that uncertainty fosters greater openness and cooperation. Interestingly, these effects extend to other minority groups, such as gay people and Roma people, but not to neutral groups like unmarried cohabitants. Thus, uncertainty appears to have a specific cultural benefit by promoting tolerance toward groups often subjected to prejudice.

That being said, there are nuances to our findings. For example, a heterogeneity analysis indicates that the results for tolerance towards Muslims primarily hold in Europe,

while more uncertainty is related to *less* tolerance towards Muslims in Asia and North America. This underlines that the relationship is contextual and that specific experiences and events can alter the general relationship. Furthermore, we find that the results hold for countries with higher-than-average media freedom and not for other countries, suggesting that openness and transparency are crucial for uncertainty to come with tolerance-inducing change.

It is also the case that the effect sizes are relatively modest. For instance, a one standard-deviation change in uncertainty is associated with a 4.4% of a standard deviation change in our two tolerance measures, which is smaller than the effect associated with an increase in education. Thus, uncertainty does play a role in explaining variation in tolerance, but it is not the most important explanatory factor.

Are there any policy implications from our findings? One might think that more uncertainty in policymaking is a good thing (if one prefers a more tolerant society), because uncertainty appears to bring people closer together. However, this would be a hasty conclusion because we only study cultural aspects and there are other consequences of increased uncertainty (such as poorer economic performance) that must be balanced against an increase in tolerance. Our findings nevertheless indicate that policy volatility may not be entirely bad and that short-term reforms and other policy changes that increase uncertainty may have positive effects on tolerance, in addition to improving long-term economic-policy outcomes.

As with any study, this analysis has limitations. First, the data span 1990–2020, which limits our ability to capture more recent developments, such as the COVID-19 pandemic and its aftermath. Future research could leverage the upcoming wave of the WVS/EVS to extend these findings into the 2020s. Second, while our empirical strategy mitigates some endogeneity concerns, causal inference remains challenging. For example, unobserved factors may simultaneously influence both uncertainty and tolerance. Experimental or quasi-experimental designs could further strengthen causal claims. Third, our focus on neighbor preferences as a measure of tolerance has limitations. While widely used in research, this measure captures only one aspect of tolerance, potentially missing broader attitudes toward minority groups. Future studies could explore additional dimensions of tolerance, such as support for anti-discrimination policies or willingness to engage in cross-cultural interactions. Finally, the relationship between uncertainty and tolerance is inherently contextual. Our heterogeneity analysis shows variation by region, institutional quality, and media freedom. For instance, while uncertainty fosters tolerance in Europe, the relationship is weaker or even

reversed in North America and Asia for Muslims. Future research should investigate these contextual dynamics further, exploring how historical, political, and cultural factors influence the uncertainty-tolerance link. Lastly, the World Uncertainty Index lacks a certain granularity when it comes to what kinds of uncertainty the data capture. Yet, we *do* know that the kinds of uncertainty it incorporates are economic-political in character, or at least that they have direct implications for the economy or politics, since this is what the Economist Intelligence Unit (EIU) reports cover. One could also argue that the imprecision is one of the *benefits* of this uncertainty measure, in the sense that it provides a continuous measure of large and small changes in perceived uncertainty, no matter what the reason for it is.

This is a novel topic, and for future research, we see the main contributions being about investigating how uncertainty relates to other types of cultural outcomes, and to try to find data that lends itself nicely to improved causal inference. In the meantime, we are pleased to have identified a relationship that enriches our understanding of the consequences of uncertainty, which can serve as a starting point for further studies.

Declarations

Declaration on competing interest: None.

Declaration on data availability: Only public data sources have been used, and data will be made available on request.

Declaration of use of AI and AI-assisted technologies in the writing process: Proofreader Pal has been used to check the language.

References

Acemoglu, Daron, Simon Johnson and James A. Robinson (2005). "Institutions as a Fundamental Cause of Long-Run Growth." In: Pierre Aghion and Steven N. Durlauf (Eds.), *Handbook of Economic Growth*, Vol. 1B (pp. 385472). Amsterdam: Elsevier.

Ahir, Hites, Nicholas Bloom and Davide Furceri (2018). "The World Uncertainty Index." Available at SSRN: https://dx.doi.org/10.2139/ssrn.3275033.

Ahir, Hites, Nicholas Bloom and Davide Furceri (2022). "The World Uncertainty Index." NBER Working Paper No. 29673. Available at NBER: https://www.nber.org/papers/w29763.

Aksoy, Cevat Giray, Antonio Cabrales, Mathias Dolls, Ruben Durante and Lisa Windsteiger (2021). "Calamities, Common Interests, Shared Identity: What Shapes Altruism and Reciprocity?" CESifo Working Paper No. 9112. Available at CESifo: https://www.cesifo.org/en/publications/2021/working-paper/calamities-common-interests-shared-identity-what-shapes-social.

Audretsch, David B., Nikolaus Seitz and Katherine Margaret Rouch (2018). "Tolerance and Innovation: The Role of Institutional and Social Trust." *Eurasian Business Review*, 8(7): 71–92.

Bachmann, Rüdiger, Steffen Elstner, and Eric R. Sims (2013). "Uncertainty and Economic Activity: Evidence from Business Survey Data." *American Economic Journal: Macroeconomics*, 5(2): 217–249.

Badgett, M.V. Lee, Kees Waaldijk and Yana van der Meulen Rodgers (2019). "The Relationship between LGBT Inclusion and Economic Development: Macro-Level Evidence." *World Development*, 120(August): 1–14.

Baker, Scott R., Nicholas Bloom and Steven J. Davis (2016). "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics*, 131(4): 1593–1636.

Baker, Scott R., Nicholas Bloom and Stephen J. Terry (2024). "Using Disasters to Estimate the Impact of Uncertainty." *Review of Economic Studies*, 91(2): 720–747.

Baker, Scott R., Nicholas Bloom, Steven J. Davis and Stephen J. Terry (2020b). "Covid-Induced Economic Uncertainty." NBER Working Paper No. 26983. Available at NBER: https://www.nber.org/papers/w26983.

Becker, Howard S. (1963). *Outsiders: Studies in the Sociology of Deviance*. New York: Free Press.

Berggren, Niclas (Ed.) (2024). *Handbook of Research on Economic Freedom*. Cheltenham: Edwarf Elgar Publishing.

Berggren, Niclas and Mikael Elinder (2012). "Is Tolerance Good or Bad for Growth?" *Public Choice*, 150(1): 283–308.

Berggren, Niclas and Therese Nilsson (2013). "Does Economic Freedom Foster Tolerance?" *Kyklos*, 66(2): 177–207.

Berggren, Niclas and Therese Nilsson (2014). "Market Institutions Bring Tolerance, Especially Where There Is Social Trust." *Applied Economics Letters*, 21(17): 1234–1237.

Berggren, Niclas and Therese Nilsson (2015). "Globalization and the Transmission of Social Values: The Case of Tolerance." *Journal of Comparative Economics*, 43(2): 371–389.

Berggren, Niclas and Therese Nilsson (2021). "Economic Freedom and Antisemitism." *Journal of Institutional Economics*, 17(2): 289–304.

Berggren, Niclas, Martin Ljunge and Therese Nilsson (2019). "Roots of Tolerance among Second-Generation Immigrants." *Journal of Institutional Economics*, 15(6): 999–1016.

Berggren, Niclas, Martin Ljunge and Therese Nilsson (2023). "Immigrants from More Tolerant Cultures Integrate Deeper into Destination Countries." *Journal of Comparative Economics*, 51(4): 1095–1108.

Birkholz, Carlo and David Gomtsyan (2023). "Immigrant Religious Practices and Criminality: The Case of Ramadan." *Journal of Comparative Economics*, 51(1): 90–104.

Bloom, Nicholas (2009). "The Impact of Uncertainty Shocks." *Econometrica*, 77(3): 623–685.

Bloom, Nicholas, Steven J. Davis, Lucia S. Foster, Scott W. Ohlmacher and Itay Saporta-Eksten (2024). "Investment and Subjective Uncertainty." *International Economic Review*, 65(4): 1591–1606.

Brewer, Marilynn B. (2019). "Intergroup Relations." In: Eli J. Finkel and Roy F. Baumeister (Eds.), *Advanced Social Psychology: The State of the Science* (pp. 249–274). Oxford: Oxford University Press.

Buonanno, Paolo, Giacomo Plevani and Marcello Puca (2023). "Earthquake Hazard and Civic Capital." *European Journal of Political Economy*, 78(June): 102367.

Caïs, Jordi, Diego Torrente and Catalina Bolancé (2021). "The Effects of Economic Crisis on Trust: Paradoxes for Social Capital Theory." *Social Indicators Research* 153(1): 173–192.

Caplan, Bryan (2018). *The Case against Education: Why the Education System Is a Waste of Time and Money.* Princeton, NJ: Princeton University Press.

Chen, Xinxiang (2011). "Tolerance and Economic Performance in American Metropolitan Areas: An Empirical Investigation." *Sociological Forum*, 26(1): 71–97.

Coppedge, Michael, John Gerring, Carl Henrik Knutsen, Staffan I. Lindberg, Jan Teorell, David Altman, Fabio Angiolillo, Michael Bernhard, Cecilia Borella, Agnes Cornell, M. Steven Fish, Linnea Fox, Lisa Gastaldi, Haakon Gjerløw, Adam Glynn, Ana Good God, Sandra Grahn, Allen Hicken, Katrin Kinzelbach, Kyle L. Marquardt, Kelly McMann, Valeriya Mechkova, Anja Neundorf, Pamela Paxton, Daniel Pemstein, Oskar Rydén, Johannes von Römer, Brigitte Seim, Rachel Sigman, Svend-Erik Skaaning, Jeffrey Staton, Aksel Sundström, Eitan Tzelgov, Luca Uberti, Yi-ting Wang, Tore Wig, and Daniel Ziblatt (2024). *V-Dem Codebook v14*. Gothenburg: Varieties of Democracy (V-Dem) Project.

Corneo, Giacomo and Olivier Jeanne (2009). "A Theory of Tolerance." *Journal of Public Economics*, 93(5–6): 691–702.

De Juan, Alexander, Jan Pierskalla abd Elisa Schwarz. (2020). "Natural Disasters, Aid Distribution and Social Conflict – Micro-Level Evidence from the 2015 Earthquake in Nepal." *World Development* 126(February): 104715.

Delhey, Jan, Leonie C. Steckermeier, Klaus Boehnke, Franziska Deutsch, Jan Eichhorn, Ulrich Kühnen and Christian Welzel (2021). "A Virus of Distrust? Existential Insecurity and Trust During the Coronavirus Pandemic." DSS Working Paper No. 80. Available at DSS: https://www.soz.ovgu.de/isoz_media/downloads/arbeitsberichte/80_Delhey_et_al_2021_A_Virus_of_Distrust-download-1.pdf.

Douglas, M. (1966). Purity and Danger: An Analysis of Concepts of Pollution and Taboo. London: Routledge.

Economic Policy Uncertainty (2024). Dataset. Available at: https://www.policyuncertainty.com/

Ennser-Jedenastik, Laurenz and Monika Köppl-Turyna (2019). "Cushion or Catalyst? How Welfare State Generosity Moderates the Impact of Economic Vulnerability on

Populist Radical Right Support." Agenda Austria Working Paper No. 16. Available at EconPapers: https://econpapers.repec.org/paper/zbwagawps/16.htm.

Enstad, Johannes D. (2025). "Facing Antisemitism in Europe: Individual and Country-Level Predictors of Jews' Victimization and Fear across Twelve Countries." *Social Forces*, 103(3): 1186–1209.

Eriksson, Kimmo, Brent Simpson and Irina Vartanova (2021). "The Power of Tolerance vs. Unselfishness as a Cultural Determinant of Cooperation." *Frontiers in Psychology*, 12(September): 678237.

European Union Agency for Fundamental Rights (2023). "Antisemitism in 2022: Overview of Antisemitic Incidents Recorded in the EU." Report.

Florida, Richard (2003). "Cities and the Creative Class." *City & Community*, 2(1): 3–19.

Florida, Richard (2004). "Response to Edward Glaeser's Review of *The Rise of the Creative Class*." Mimeo. Available at:
https://creativeclass.com/articles/ResponsetoGlaeser.pdf.

Florida, Richard, Charlotta Mellander and Kevin Stolarick (2008). "Inside the Black Box of Regional Development: Human Capital, the Creative Class and Tolerance." *Journal of Economic Geography*, 8(5): 615–649.

Forst, Rainer (2017). "Toleration." In: Edward N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy.* Available at:
https://plato.stanford.edu/archives/fall2017/entries/toleration/.

Freedom House (2024). *Freedom in the World 2024*. Washington, DC: Freedom House.

Gavresi, Despina and Anastasia Litina (2023). "Past Exposure to Macroeconomic Shocks and Populist Attitudes in Europe." *Journal of Comparative Economics*, 51(3): 989–1010.

Golebiowska, Ewa A. (1999). "Gender Gap in Political Tolerance." *Political Behavior*, 21(1): 43–66.

Gozgor, Giray (2022). "The Role of Economic Uncertainty in the Rise of EU Populism." *Public Choice*, 190(1–2): 229–246.

Gozgor, Giray, Mehmet Huseyin Bilgin and Peter Rangazas (2021). "Economic Uncertainty and Fertility." *Journal of Human Capital*, 15(3): 373–399.

Grimme, Christian and Steffen Henzel (2024). "Uncertainty and Credit Conditions: Non-Linear Evidence from Firm-Level Data." *International Review of Economics & Finance*, 93(June): 1307–1323.

Gründler, Klaus and Sebastian Köllner (2020). "Culture, Diversity and the Welfare State." *Journal of Comparative Economics*, 48(4): 913–932.

Gwartney, James. D., Robert A. Lawson and Ryan A. Murphy (2024). *The Economic Freedom of the World: 2024 Annual Report*. Vancouver: The Frasier Institute.

Inglehart, Ronald, Svetlana Borinskaya, Anna Cotter, Jaanus Harro, Ronald C. Inglehart, Eduard Ponarin and Christian Welzel (2014). "Genetic Factors, Cultural Predispositions, Happiness and Gender Equality." *Journal of Research in Gender Studies*, 4(1): 32–100.

Janmaat, Jan G. and Avril Keating (2019). "Are Today's Youth More Tolerant? Trends in Tolerance among Young People in Britain." *Ethnicities*, 19(1): 44–65.

Johansson, Alva, Niclas Berggren and Therese Nilsson (2022). "Intolerance Predicts Climate Skepticism." *Energy Economics*, 105(January): 105719.

Kellermann, Kim L. (2024). "Trust We Lost: The Impact of the Treuhand Experience on Political Alienation in East Germany." *Journal of Comparative Economics*, 52(1): 54–75.

Kumar, Saten, Yuriy Gorodnichenko and Olivier Coibion (2023). "The Effect of Macroeconomic Uncertainty on Firm Decisions." *Econometrica*, 91(4): 1297–1332.

Li, Guangzhong, Jie Li and Yangru Wu (2019). "Exchange Rate Uncertainty and Firm-Level Investment: Finding the Hartman–Abel Effect." *Journal of Comparative Economics*, 47(2): 441–457.

Locke, John (1689). *A Letter Concerning Toleration*. London: Awnsham Churchill.

Matzner, Anna, Birgit Meyer and Harald Oberhofer (2023). "Trade in Times of Uncertainty." *The World Economy*, 46(9): 2564–2597.

McGranahan, David and Timothy Wojan (2007). "Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties." *Regional Studies*, 41(2): 197–216.

Ménard, Claude and Mary M. Shirely (2008). *Handbook of New Institutional Economics*. Cham: Springer.

Méon, Pierre-Guillaum and Philip Verwimp, P. (2022). "Pro-Social Behavior After a Disaster: Evidence from a Storm Hitting an Open-Air Festival." *Journal of Economic Behavior & Organization*, 198(June): 493–510.

Mill, John Stuart (1859). *On Liberty*. London: J.W. Parker.

Mokyr, Joel (1990). *The Lever of Riches: Technological Creativity and Economic Progress*. Oxford: Oxford University Press.

Nguyen, Bach, Christophe Schinckus, Nguyen P. Canh and Su D. Thanh (2021). "Economic Policy Uncertainty and Entrepreneurship: A Bad for a Good?" *Journal of Entrepreneurship*, 30(1): 81–133.

North, Douglass C. (1991). "Institutions." *Journal of Economic Perspectives*, 5(1): 97–112.

Paas, Tiiu and Vivika Halapuu (2012). "Attitudes towards Immigrants and the Integration of Ethnically Diverse Societies." *Eastern Journal of European Studies*, 3(2): 161–176.

Putnam, Robert D. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Rao, Li-Lin, Ru Han, Xiao-Peng Ren, Xin-Wen Bai, Rui Zheng, Huan Liu, Zuo-Jun Wang, Jin-Zhen Li, Kan Zhang and Shu Li (2011). "Disadvantage and Prosocial Behavior: The Effects of the Wenchuan Earthquake." *Evolution and Human Behavior*, 32(1): 63–69.

Rapp, Carolin (2017). "Shaping Tolerant Attitudes towards Immigrants: The Role of Welfare State Expenditures." *Journal of European Social Policy*, 27(1): 40–56.

Saharso, Sawitr (2003). "Culture, Tolerance and Gender". *European Journal of Women's Studies*, 10(1): 7–27.

Schilpzand, Annemiek (2023). "The Impact of Natural Disasters on Ingroup and Outgroup Trust: How Catastrophes Weave the Social Fabric of Trust." In: *The Fabric of Society: Unraveling the Socioeconomic Threads of Moral Values*. Doctoral Dissertation, Radboud University

Sumner, William G. (1906). *Folkways: A Study of the Sociological Importance of Usages, Manners, Customs, Mores, and Morals*. Boston: Ginn and Co.

Tajfel, Henri, Michael G. Billig, Robert P. Bundy and Claude Flament (1971). "Social Categorization and Intergroup Behavior." *European Journal of Social Psychology*, 1(2): 149–178.

Verkuyten, Maykel and Luke Slooter (2007). "Tolerance of Muslim Beliefs and Practices: Age Related Differences and Context Effects. *International Journal of Behavioral Development*, 31(5): 467–477.

Voigt, Stefan (2019). *Institutional Economics: An Introduction*. Cambridge: Cambridge University Press.

Von Bergen, C. W. and Diane Bandow (2009). "Supporting Genuine Tolerance in Organizations." In: Rodney A. Oglesby and Marjorie G. Adams (Eds.), *Business Research Yearbook: Global Business Perspectives* (pp. 586–593). Beltsville, MD: International Graphics.

von Dawans, Bernadette, Urs Fischbacher, Clemens Kirschbaum, Ernst Fehr and Markus Heinrichs (2012). "The Social Dimension of Stress Reactivity: Acute Stress Increases Prosocial Behavior in Humans." *Psychological Science*, 23(6): 651–660.

Weldon, Steven A. (2006). "The Institutional Context of Tolerance for Ethnic Minorities: A Comparative, Multilevel Analysis of Western Europe." *American Journal of Political Science*, 50(2): 331–349.

Williamson Kramer, C. (2023). "Individualism and Racial Tolerance." *Public Choice*, 197(3–4): 347–370.

World Uncertainty Index (various years). Database. Available at https://worlduncertaintyindex.com.

World Values Survey (various years). Database. Available at: https://www.worldvaluessurvey.org/ (accessed 28.10.2022).

Xu, Can, Andreas Steiner and Jakub de Haan (2023). "Does Economic Policy Uncertainty Encourage Gambling? Evidence from the Chinese Welfare Lottery Market." CESifo Working Paper No. 10241. Available at CESifo: https://www.cesifo.org/DocDL/cesifo1_wp10241.pdf.

Appendix A (*for online publication*)

The World Uncertainty Index (WUI) is described briefly in Sections 1 and 2.1. Here, we offer a complementary, richer description and discussion, along with a presentation of characteristics of the index documented by others. Much of the information derives from Ahir et al. (2022).

The WUI contains quarterly observations for the 143 countries in the world with a population above 2 million, which comes to 143 countries, with data from 1952 until today. This coverage is one of the main advantages of the WUI compared to other cross-country datasets on uncertainty. The latter a limited to advanced economies from the early 1990s onwards, i.e., the coverage is skewed and limited in comparison. The WUI also encompasses developing countries.

The index is constructed by recourse to the quarterly country reports of the Economist Intelligence Unit (EIU), which focus on economic and political events and where the measure of uncertainty is the share of words accounted for by the word "uncertain" (and its derivatives). While the word uncertainty as such is quite vague, the topics of the reports are such as to limit its meaning to matters relating to economic and political life (directly, to the extent that economic or political phenomena create uncertainty, or indirectly, to the extent that other phenomena create economic or political uncertainty).

The fact that the WUI is based on one single source of classification is another facet that distinguishes it from other text-based measures of uncertainty, such as the Economic Policy Uncertainty Index. Since the EIU reports follow a standardized process and structure, this makes the index comparable across time and countries.

In addition, the procedures used by the EIU have been put in place to ensure accuracy, unbiasedness and consistency. They are described as followed by Ahir et al. (2022: 7–8):

> The EIU – a leading company in the field of country intelligence—provides country reports on a regular basis for 189 countries. The country report typically covers politics, economic policy, the domestic economy, foreign and trade payments events, and on their overall impact on the country risk. In short, these reports examine and discuss the main economic, financial, and political trends in a country. To put together the country reports, the EIU relies on a comprehensive network of experts that are based in the field, and country experts that are based at the headquarter. Country experts based at the headquarter have at least 5–7 years of experience. Each of the analysts is in charge of two to three countries, and visits them regularly, ensuring up-to-date and focused expertise … When putting together the country reports, the EIU follows a five-step process: writing the report, editing, second

check, sub-editing, and production. In the writing the report step, field experts prepare a draft and send it to country experts based at headquarters. In the editing step, country experts at headquarters integrate the draft with their own inputs, and make sure the structure of the report is consistent and standardized. They also check that the report is consistent with the EIU's global and regional views. In the second check step, a senior staff at headquarters does a thorough check of the draft. In the sub-editing step, sub-editors do a check to make sure that the report is well drafted, consistent, accurate, and do fact checking. In the production step, the report is checked to make sure that the report is properly coded and styled adequately.

The fact the experts working within the countries being analyzed write up the material should reduce the risk for cultural bias; moreover, the EIU as such, with its headquarter-based country experts, are located across the world (in the UK, the US, India, Dubai and Hong Kong). A drawback is that there is only one EIU report per country per quarter, which could entail sampling noise. (For a subsample of 71 countries, there are monthly data from January 2008 onwards.)

Fig. A1 (from Ahir et al., 2022) shows the World Uncertainty Index for all countries between 1990–2021. It builds on the country-specific data that we apply in our econometric analysis.
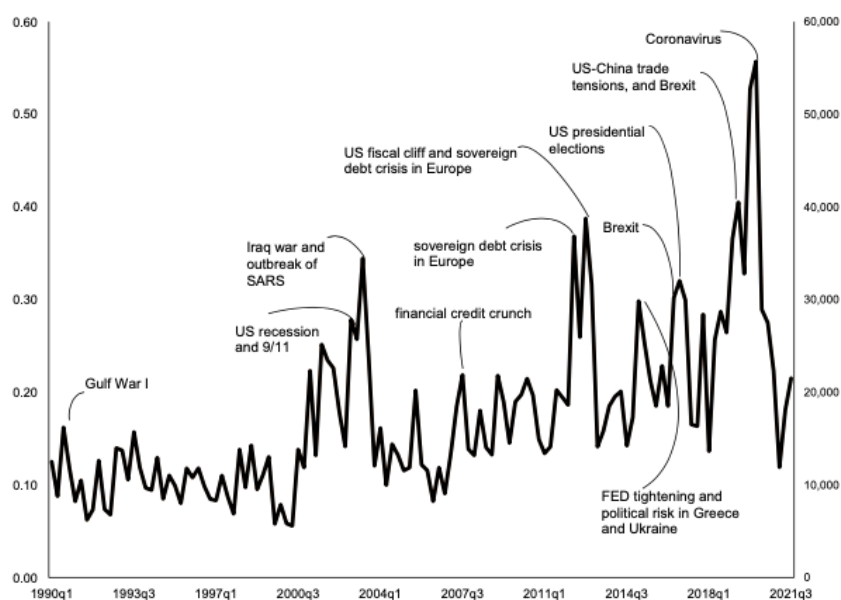
Fig. A1. The World Uncertainty Index 1990–2021.

Notes*:* This is Fig. 1 of Ahir et al. (2022: 39). It shows the GDP-weighted index. The left scale shows the number of times "uncertain" (or variants thereof) is mentioned in the Economist Intelligence Unit country reports per thousand words; the right scale are these numbers multiplied by 100,000.

Fig. A1 reveals an upward trend in uncertainty as measured by the World Uncertainty Index since around 2000, before which the world seemed rather stable. From 2000, both the level and variability increased (linked to many specific events by the authors). Political events, like Brexit and elections in a polarized political climate (Baker et al., 2020a), certainly play a part here, along with economic events. The latest numbers show the world having been at record heights of uncertainty in connection with the Covid pandemic (cf. Altig et al., 2020, Baker et al., 2020b, and Miescu and Rossi, 2021) but also a decrease after that, down to a value of a bit more than 0.20. Note that the war in Ukraine started after the period shown in the figure (cf. Anayi, 2022). There is clearly a lot of variation over time, but also across countries, e.g., with higher uncertainty in low-income countries.

Fig. A1 relates uncertainty to specific events, and Ahir et al. (2022: 20–21) have carried out a procedure for each country by examining "the narrative associated with the major spikes in the index to make sure that the word uncertain (or its variants) indeed refers to economic, economic policy and political developments, either domestic or foreign, that are relevant for the short- and/or medium-term outlook of the country discussed in the EIU report. … Reassuringly, this exercise confirms that all the spikes identified are indeed associated with 'uncertain' economic and political developments."

However, there might be further concerns about the WUI. One possible concern is that the word "uncertainty" is very particular. Ahir et al. (2022) carried out a robustness test using two alternative versions of the WUI with other keywords. The first used neutral keywords: ambiguous, ambivalent, dubious, erratic, hazy, hesitant, unclear, undecided, undetermined, unpredictable, unreliable, unsettled, unsure, vague, questionable, insecure and plus uncertain (and their variants). The second used negative keywords: risk, precarious, unresolved and plus uncertain (and their variants). It turns out that these two versions of the index are highly correlated with the baseline WUI, with a correlation of 0.91 for the neutral keywords and 0.81 for the negative ones. Hence, the choice of exact phrase seems of less importance.

Another concern is that the WUI differs greatly from other indicators of uncertainty, which would put its validity into question. As Cascaldi-Garcia et al. (2023) show, there are several available measures, each with its pros and cons. Among the other ways of measuring country-level uncertainty, we can mention the volatility of economic or institutional variables (Bloom 2009; Berggren et al., 2012), or using findings in newspaper archives, like the Economic Policy Uncertainty Index (Baker et al., 2016). However, these tend to be available for fewer years and countries. In any case, it turns out that the WUI is strongly correlated with

these other measures for the countries and years that are available across measures, implying reliability.

More specifically, Ahir et al. (2022) tested how the WUI related to other uncertainty measures based on text-searching approaches, such as the Economic Policy Uncertainty Index, and on the volatility of key economic and financial variables. Regarding the former, "the global WUI shows a remarkably high correlation (0.667) with the global EPU index. A strong statistically significant relationship is also found when regressing EPU on the WUI in a panel framework and purging for country and time fixed effects …" (p. 22). Regarding the latter, Ahir et al. (2022: 23–24) checked

> the correlation between the WUI and existing measures of volatility such as stock market price, exchange rate and cross-sectional volatility … [T]he cross-country correlation between the WUI and the measures of volatility is positive, statistically significant: 0.195 for stock market rate price volatility, 0.538 for exchange rate volatility and 0.320 for cross-sectional volatility. … Finally, we run panel regressions between the GDP growth forecast disagreement – a common measure of macroeconomic uncertainty – and the WUI, allowing also for country and time fixed effects. The results … suggest that the two series are statistically significantly correlated.

In all, this provides support for the validity of the WUI as an indicator of uncertainty.

Further support for this is provided by Baker et al. (2024), who use several alternative proxies of macroeconomic uncertainty to verify their baseline results (positive impacts of first-moment shocks and negative impacts of second-moment shocks). They look at how these measures relate to the WUI and the Economic Policy Uncertainty Index. Fig. A2 illustrates the strong correlations. When replacing their baseline uncertainty measure, stock market volatility, which proxies for second-moment shocks to business conditions, with the WUI, the negative impact on GDP growth is confirmed.
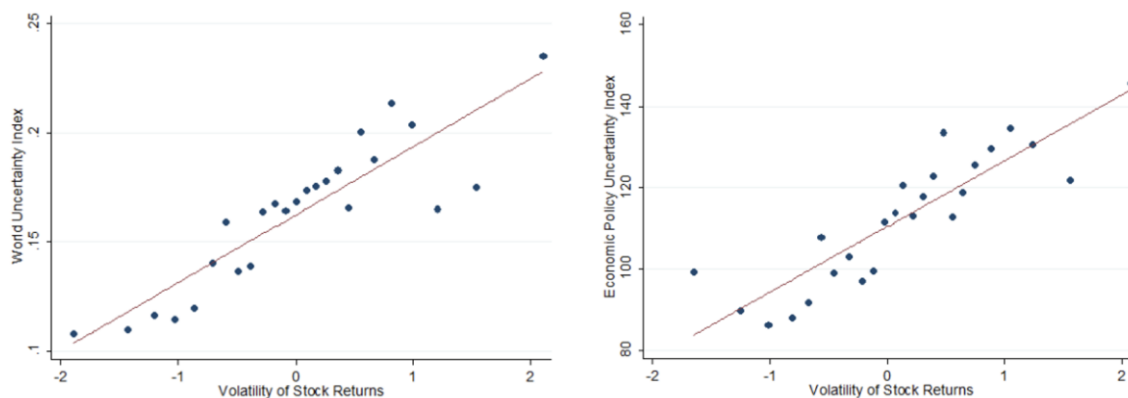
Notes: Left panel plots a bin-scatter (across 25 bins) of country-quarter values of the World Uncertainty Index (WUI) against a country-quarter measure of stock volatility. We are able to match this version of stock volatility and WUI values across 34 countries back to 1987. Right panel plots a bin-scatter (across 25 bins) of country-quarter values of Economic Policy Uncertainty against a country-quarter measure of stock volatility. We are able to match this version of stock volatility and EPU values across 20 countries back to 1987. WUI (Ahir, et al (2020)) measures uncertainty using frequency counts of "uncertainty" (and its variants) in the quarterly Economist Intelligence Unit country reports. EPU (Baker et al (2016)) measures uncertainty using the fraction of newspaper articles from major newspapers discussing topics regarding the economy, policy, and uncertainty.

Fig. A2. The Correlation Between the Volatility of Stock Returns and Two Uncertainty Indices

Notes*:* This is Fig. A1 of Baker et al. (2024).

Furthermore, the WUI has what might be called a "market use validation" since commercial data providers, such as Bloomberg, FRED, Haver, and Reuters, provide it to meet demands from banks, hedge funds, corporations and policymakers (Ahir et al., 2022: 4).

References

Ahir, Hites, Nicholas Bloom and Davide Furceri (2022). "The World Uncertainty Index." NBER Working Paper No. 29673. Available at NBER: https://www.nber.org/papers/w29763.

Altig, Dave, Scott Baker, Jose Maria Barrero, Nicholas Bloom, Philip Bunn, Scarlet Chen, Steven J. Davis, Julia Leather, Brent Meyer, Emil Mihaylov, Paul Mizen, Nicholas Parker, Thomas Renault, Pawel Smietanka and Gregory Thwaites (2020). "Economic Uncertainty Before and During the Covid-19 Pandemic." *Journal of Public Economics*, 191(November): 104274.

Anayi, Lena, Nicholas Bloom, Philip Bunn, Paul Mizen, Gregory Thwaites and Ivan Yotzov (2022). "The Impact of the War in Ukraine on Economic Uncertainty." VoxEU, 16.4.2022. Available at: https://cepr.org/voxeu/columns/impact-war-ukraine-economic-uncertainty.

Baker, Scott R., Aniket Baksy, Nicholas Bloom, Steven J. Davis and Jonathan A. Rodden (2020a). "Elections, Political Polarization and Economic Uncertainty." NBER Working Paper No. 27961. Available at NBER: https://www.nber.org/papers/w27961.

Baker, Scott R., Nicholas Bloom and Steven J. Davis (2016). "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics*, 131(4): 1593–1636.

Baker, Scott R., Nicholas Bloom and Stephen J. Terry (2024). "Using Disasters to Estimate the Impact of Uncertainty." *Review of Economic Studies*, 91(2): 720–747.

Baker, Scott R., Nicholas Bloom, Steven J. Davis and Stephen J. Terry (2020b). "Covid-Induced Economic Uncertainty." NBER Working Paper No. 26983. Available at NBER: https://www.nber.org/papers/w26983.

Berggren, Niclas, Andreas Bergh and Christian Bjørnskov (2012). "The Growth Effects of Institutional Instability." *Journal of Institutional Economics*, 8(2): 187–224.

Bloom, Nicholas (2009). "The Impact of Uncertainty Shocks." *Econometrica*, 77(3): 623–685.

Cascaldi-Garcia, Danilo, Cisil Sarisoy, Juan M. Londono, Bo Sun, Deepa D. Datta, Thiago Ferreira, Olesya Grishchenko, Mohammad R. Jahan-Parvar, Francesca Loria, Sai Ma, Marius Rodriguez, Ilknur Zer, and John Rogers (2023). "What Is Certain about Uncertainty?" *Journal of Economic Literature*, 61(2): 624–654.

Miescu, Mirela and Raffaele Rossi (2021). "Covid-19-Induced Shocks and Uncertainty." *European Economic Review*, 139(October): 103893.

Appendix B (*for online publication*)

Table B1

Included countries.

Albania	Denmark	Kyrgyzstan	Slovakia
Argentina	Egypt*	Latvia	Slovenia
Armenia	Finland	Lithuania	South Africa
Austria	France	Mexico	South Korea
Azerbaijan*	Georgia	Moldova	Spain
Bangladesh*	Germany	Netherlands	Sweden
Belarus	Great Britain	Nigeria	Switzerland
Belgium	Greece	Northern Ireland	Tanzania**
Bosnia Herzegovina	Guatemala**	North Macedonia	Total
Brazil**	Hungary	Norway	Turkey
Bulgaria	India	Peru**	Uganda
Canada	Iran*	Philippines**	Ukraine
Chile	Iraq*	Poland	United States
China**	Ireland	Portugal	Uruguay*
Croatia	Italy	Romania	Venezuela*
Czech Republic	Japan	Russia	Vietnam**
			Zimbabwe

Notes*: *Country observations only included in the analysis of tolerance towards Muslims. **Country observations only included in the analysis of tolerance towards Jews.

Table B2

Descriptive statistics for variables collapsed at the country level.

Variable	Observations	Mean	Standard deviation	Min	Max
WUI combined (country level)	144	0.138	0.135	0	0.587
Tolerance Muslims (country level)	144	0.786	0.127	0.209	0.995
Tolerance Jews (country level)	128	0.864	0.109	0.311	0.990
Female (country level)	144	0.542	0.044	0.403	0.666
Age (country level)	144	45.797	4.513	31.509	55.409
Age squared (country level)	144	2403.5	437.58	1150.281	3410.505

Table B3

Uncertainty. tolerance towards gay people and Roma people and two tolerance indices.

	(1) Tolerance towards homosexuals	(2) Tolerance towards gypsies [*sic*]	(1) Tolerance index 1	(2) Tolerance index 2
WUI combined	0.071*	0.081**	0.103***	0.090***
	[0.036]	[0.037]	[0.026]	[0.024]
Female	0.041***	0.002	0.026***	0.022***
	[0.003]	[0.006]	[0.002]	[0.003]
Age	0.000	-0.000	0.000	0.000
	[0.000]	[0.001]	[0.000]	[0.000]
Age squared	-0.000***	-0.000	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.557***	0.594***	0.766***	0.741***
	[0.014]	[0.022]	[0.008]	[0.008]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	514,705	148,602	193,587	193,587

Notes: Tolerance index 1 is the average tolerance towards Muslims, Jews and gay people (conditioned on there being data for all three groups), while Tolerance index 2 is the average tolerance towards Muslims, Jews, gay people, and Roma people (where the measure must always have data on the first three groups; if data on the fourth group also exists, it is added to the calculation of the average, but if data on the fourth group does not exist, the average only covers the first three groups).
 *** p<0.01, ** p<0.05, * p<0.1

*** p<0.01, ** p<0.05, * p<0.1

Table B4

Uncertainty and tolerance towards two people who live together without being married.

	(1) Tolerance towards co-habitants
WUI combined	0.006
	[0.022]
Female	-0.009**
	[0.004]
Age	0.000
	[0.001]
Age squared	-0.000**
	[0.000]
Constant	0.783***
	[0.013]
Country- and year-fixed effects	Yes
Observations	215,106

*** p<0.01, ** p<0.05, * p<0.1

Table B5

Uncertainty and tolerance: using the Economic Policy Uncertainty Index.

	(1) Tolerance towards Muslims	(2) Tolerance towards Jews	(3) Tolerance towards homosexuals	(4) Tolerance towards gypsies	(5) Tolerance index 1	(6) Tolerance index 2
EPU	0.327***	0.096**	0.223*	0.590**	0.245***	0.265***
	[0.071]	[0.043]	[0.125]	[0.256]	[0.064]	[0.086]
Female	0.020***	0.008***	0.059***	0.000	0.030***	0.026***
	[0.004]	[0.003]	[0.004]	[0.009]	[0.003]	[0.003]
Age	0.001	0.001	0.002**	-0.004**	0.001	-0.000
	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]
Age squared	-0.000***	-0.000**	-0.000***	0.000	-0.000***	-0.000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.819***	0.913***	0.733***	0.700***	0.843***	0.825***
	[0.016]	[0.019]	[0.027]	[0.065]	[0.020]	[0.024]
Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	64,363	51,128	133,252	35,672	49,910	49,910

Notes: Tolerance index 1 is the average tolerance towards Muslims, Jews and gay people (conditioned on there being data for all three groups), while Tolerance index 2 is the average tolerance towards Muslims, Jews, gay people, and Roma people (where the measure must always have data on the first three groups; if data on the fourth group also exists, it is added to the calculation of the average, but if data on the fourth group does not exist, the average only covers the first three groups). The EPU is lagged one month to increase comparability with the WUI, which is measured quarterly. Russia was identified as an outlier and has been excluded.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table B6

Uncertainty and tolerance towards Muslims and Jews: applying country-specific time trends.

	(1)		(2)	
	Tolerance towards Muslims	Tolerance towards Muslims	Tolerance towards Jews	Tolerance towards Jews
WUI combined	0.056**	0.056**	0.053***	0.053***
	[0.025]	[0.025]	[0.009]	[0.009]
Female	0.016***	0.016***	0.008***	0.008***
	[0.003]	[0.003]	[0.001]	[0.001]
Age	0.001	0.001	0.001***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.799***	0.799***	0.814***	0.814***
	[0.008]	[0.008]	[0.005]	[0.005]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Linear time trends	Yes	No	Yes	No
Quadratic time trends	No	Yes	No	Yes
Observations	227,549	227,549	221,078	221,078

Notes: Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B7

Uncertainty and tolerance towards Muslims: adding individual control variables.

	(1)	(2)	(3)	(4)	(5)
	Tolerance towards Muslims				
WUI combined	0.150***	0.150***	0.150***	0.144***	0.125***
	[0.031]	[0.031]	[0.031]	[0.032]	[0.034]
Female	0.016***	0.016***	0.016***	0.016***	0.018***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]
Age	0.001*	0.001*	0.001*	0.001	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Education (low)					-0.059***
					[0.006]
Education (middle)					-0.047***
					[0.005]
Married					0.002
					[0.003]
Income (low)					-0.018***
					[0.006]
Income (middle)					-0.011**
					[0.005]
Muslim	0.138***	0.138***	0.138***		
	[0.027]	[0.027]	[0.027]		
Jew		0.003	0.018		
		[0.021]	[0.023]		
WUI x Jew			-0.142		
			[0.159]		
Trust				0.071***	
				[0.007]	
Constant	0.774***	0.774***	0.774***	0.762***	0.826***
	[0.007]	[0.007]	[0.007]	[0.008]	[0.012]
Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	227,549	227,549	227,549	218,411	160,256

Notes: Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B8

Uncertainty and tolerance towards Jews: adding individual control variables.

	(1)	(2)	(3)	(4)	(5)
	Tolerance towards Jews				
WUI combined	0.131***	0.131***	0.123***	0.131***	0.118***
	[0.026]	[0.026]	[0.025]	[0.026]	[0.025]
Female	0.008***	0.008***	0.008***	0.008***	0.011***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]
Age	0.001*	0.001*	0.001*	0.001	0.001
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Education (low)					-0.050***
					[0.010]
Education (middle)					-0.020***
					[0.005]
Married					-0.011***
					[0.004]
Income (low)					-0.036***
					[0.007]
Income (middle)					-0.015***
					[0.005]
Muslim	-0.016	-0.016	-0.026*		
	[0.012]	[0.012]	[0.014]		
Jew		0.014	0.014		
		[0.014]	[0.014]		
WUI x Jew			0.071		
			[0.062]		
Trust				0.038***	
				[0.003]	
Constant	0.803***	0.803***	0.804***	0.790***	0.814***
	[0.012]	[0.012]	[0.011]	[0.011]	[0.014]
Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	221,078	221,078	221,078	212,894	157,969

Notes: Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B9

How a standard-deviation change in three explanatory variables changes tolerance.

	(1) Tolerance towards Muslims	(2) Tolerance towards Jews
WUI combined	+4.4% of a standard deviation	+4.4% of a standard deviation
Education (low)	-14.6% of a standard deviation	-13.2% of a standard deviation
Education (middle)	-11.6% of a standard deviation	-5.3% of a standard deviation

Notes: The calculations are based on descriptive statistics in Table 1 and on point estimates in Tables B7 and B8, in both cases column (5). Education (low) and Education (middle) are individual-level dummy variables, expressing the difference compared to Education (high).

Table B10

Uncertainty and tolerance towards Muslims and Jews: adding individual religiosity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tolerance towards Muslims				Tolerance towards Jews			
WUI combined	0.141***	0.160***	0.135***	0.136***	0.133***	0.117***	0.129***	0.128***
	[0.032]	[0.032]	[0.029]	[0.029]	[0.026]	[0.031]	[0.026]	[0.026]
Female	0.016***	0.016***	0.012***	0.012***	0.009***	0.009***	0.007**	0.007**
	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]
Age	0.001	0.001	0.001***	0.001***	0.001*	0.001**	0.001	0.001
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Religious	-0.001	0.004			-0.012***	-0.016**		
	[0.003]	[0.006]			[0.004]	[0.006]		
WUI combined x religious		-0.034				0.027		
		[0.022]				[0.033]		
Attends service			0.009*	0.011			-0.009	-0.013*
			[0.005]	[0.008]			[0.006]	[0.007]
WUI combined x attends service				-0.017				0.024
				[0.039]				[0.046]
Constant	0.788***	0.785***	0.769***	0.769***	0.807***	0.809***	0.799***	0.799***
	[0.008]	[0.008]	[0.009]	[0.009]	[0.012]	[0.012]	[0.014]	[0.014]
Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	224,689	224,689	163,435	163,435	219,359	219,359	155,450	155,450

Notes: Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B11

Uncertainty and tolerance towards Muslims and Jews: outliers removed.

	(1) Tolerance towards Muslims	(2) Tolerance towards Jews
WUI combined	0.139***	0.144***
	[0.036]	[0.026]
Female	0.016***	0.008***
	[0.003]	[0.002]
Age	0.001*	0.001*
	[0.000]	[0.000]
Age squared	-0.000***	-0.000***
	[0.000]	[0.000]
Constant	0.784***	0.802***
	[0.007]	[0.011]
Country- and year-fixed effects	Yes	Yes
Observations	226,121	219,364

Notes: To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B12

Uncertainty and tolerance towards Muslims and Jews: removing countries with more than 85% Muslims.

	(1) Tolerance towards Muslims	(2) Tolerance towards Jews
WUI combined	0.162***	0.123***
	[0.033]	[0.027]
Female	0.016***	0.010***
	[0.003]	[0.002]
Age	0.001	0.001**
	[0.000]	[0.000]
Age squared	-0.000***	-0.000***
	[0.000]	[0.000]
Constant	0.782***	0.837***
	[0.008]	[0.011]
Country- and year-fixed effects	Yes	Yes
Observations	224,216	205,561

Notes: The countries with more than 85% Muslims are Bangladesh, Egypt, Iran, Iraq and Turkey.
*** p<0.01, ** p<0.05, * p<0.1

Table B13

Uncertainty and tolerance towards Jews: only including countries with more than 85% Muslims.

	(1) Tolerance towards Jews
WUI combined	0.538***
	[0.144]
Female	-0.022**
	[0.008]
Age	-0.000
	[0.003]
Age squared	-0.000
	[0.000]
Constant	0.261***
	[0.061]
Country- and year-fixed effects	Yes
Observations	15,517

Notes: The countries with more than 85% Muslims are Bangladesh, Egypt, Iran, Iraq and Turkey.
*** p<0.01, ** p<0.05, * p<0.1

Table B14

Uncertainty and tolerance towards Muslims and Jews: with quarter-of-the-year fixed effects.

	(1) Tolerance towards Muslims	(2) Tolerance towards Jews
WUI interview	0.229***	0.115**
	[0.050]	[0.041]
Female	0.018***	0.011***
	[0.004]	[0.003]
Age	0.000	0.002***
	[0.000]	[0.000]
Age squared	-0.000***	-0.000***
	[0.000]	[0.000]
Constant	0.765***	0.773***
	[0.008]	[0.012]
Country- and quarter-of-the-year-fixed effects	Yes	Yes
Observations	121,671	129,422

Notes*:* To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B15

Uncertainty and tolerance towards Muslims and Jews: interaction with size of government.

	(1)	(2)	(3)	(4)
	Tolerance towards Muslims		Tolerance towards Jews	
WUI combined	0.125**	-0.296	0.091*	0.187
	[0.046]	[0.304]	[0.050]	[0.167]
Female	0.016***	0.017***	0.008**	0.008**
	[0.004]	[0.004]	[0.003]	[0.003]
Age	0.001**	0.001**	0.001	0.001
	[0.000]	[0.000]	[0.001]	[0.001]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
Government size	-0.004	-0.019	0.000	0.003
	[0.009]	[0.014]	[0.005]	[0.006]
WUI combined x Government size		0.112		-0.025
		[0.082]		[0.034]
Constant	0.778***	0.833***	0.806***	0.795***
	[0.029]	[0.045]	[0.033]	[0.037]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	167,992	167,992	159,971	159,971

Notes*: Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B16

Uncertainty and tolerance towards Muslims: adding more country-level control variables.

	(1) Tolerance towards Muslims	(2) Tolerance towards Muslims	(3) Tolerance towards Muslims	(4) Tolerance towards Muslims	(5) Tolerance towards Muslims	(6) Tolerance towards Muslims	(7) Tolerance towards Muslims
WUI combined	0.132***	0.112***	0.135***	0.121***	0.150***	0.146***	0.142***
	[0.033]	[0.027]	[0.038]	[0.041]	[0.039]	[0.035]	[0.028]
Female	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***	0.017***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Age	0.001	0.001	0.001	0.001**	0.001	0.001	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	-0.052						
	[0.056]						
Urban share		0.013***					
		[0.005]					
Age dependency			-0.003				
			[0.003]				
Economic freedom				0.013			
				[0.020]			
Civil liberties					-0.049*		
					[0.029]		
Political rights					0.019		
					[0.024]		
Growth in GDP per capita						0.001	
						[0.003]	
Unemployment							0.002
							[0.004]
Constant	1.303**	-0.091	0.938***	0.670***	0.853***	0.783***	0.772***
	[0.555]	[0.310]	[0.167]	[0.150]	[0.030]	[0.013]	[0.036]

Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	201,074	202,473	202,473	167,992	197,075	200,494	182,432

Notes: Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B17

Uncertainty and tolerance towards Jews: adding more country-level control variables.

	(1) Tolerance towards Jews	(2) Tolerance towards Jews	(3) Tolerance towards Jews	(4) Tolerance towards Jews	(5) Tolerance towards Jews	(6) Tolerance towards Jews	(7) Tolerance towards Jews
WUI combined	0.099***	0.107***	0.113***	0.091*	0.111***	0.111***	0.105***
	[0.029]	[0.027]	[0.028]	[0.050]	[0.034]	[0.029]	[0.024]
Female	0.008***	0.008***	0.008***	0.008**	0.008***	0.008***	0.010***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]
Age	0.000	0.000	0.000	0.001	0.000	0.000	0.001*
	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	-0.052						
	[0.032]						
Urban share		0.002**					
		[0.001]					
Age dependency			0.003**				
			[0.001]				
Economic freedom				-0.000			
				[0.010]			
Civil liberties					-0.018		
					[0.018]		
Political rights					-0.011		
					[0.008]		
Growth in GDP per capita						0.000	
						[0.001]	
Unemployment							0.005**
							[0.002]
Constant	1.332***	0.644***	0.654***	0.809***	0.876***	0.809***	0.746***
	[0.315]	[0.078]	[0.061]	[0.077]	[0.034]	[0.010]	[0.027]

Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	194,323	194,323	194,323	159,971	188,925	192,344	180,625

Notes: Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B18

Uncertainty and tolerance towards Muslims and Jews: samples split by average media freedom (measured as the degree of absence of average government censorship effort).

	(1) Tolerance towards Muslims for countries with above-average media freedom	(2) Tolerance towards Muslims for countries with below-average media freedom	(3) Tolerance towards Jews for countries with above-average media freedom	(4) Tolerance towards Jews for countries with below-average media freedom
WUI combined	0.232***	-0.071	0.121***	0.101**
	[0.051]	[0.062]	[0.043]	[0.038]
Female	0.025***	-0.004	0.013***	0.000
	[0.003]	[0.004]	[0.002]	[0.005]
Age	0.000	0.001*	0.001**	0.001
	[0.000]	[0.001]	[0.000]	[0.001]
Age squared	-0.000***	-0.000**	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.804***	0.763***	0.871***	0.693***
	[0.008]	[0.015]	[0.011]	[0.023]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	154,310	73,239	139,263	81,815

Notes: The variable is decreasing in government censorship effort. To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B19

Uncertainty and tolerance towards Muslims and Jews: samples split by average media freedom (measured as the degree of absence of harassment of journalists).

	(1) Tolerance towards Muslims for countries with above-average media freedom	(2) Tolerance towards Muslims for countries with below-average media freedom	(3) Tolerance towards Jews for countries with above-average media freedom	(4) Tolerance towards Jews for countries with below-average media freedom
WUI combined	0.181***	-0.010	0.109***	0.088**
	[0.049]	[0.097]	[0.035]	[0.042]
Female	0.027***	-0.004	0.012***	0.002
	[0.003]	[0.005]	[0.002]	[0.005]
Age	0.000	0.001	0.001**	0.000
	[0.000]	[0.001]	[0.000]	[0.001]
Age squared	-0.000***	-0.000	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.818***	0.751***	0.879***	0.694***
	[0.009]	[0.017]	[0.011]	[0.020]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	145,673	81,876	135,213	85,865

Notes: The variable is decreasing in the harassment of journalists. To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B20

Uncertainty and tolerance towards Muslims and Jews: samples split by average media freedom (measured as the degree of absence of media bias).

	(1) Tolerance towards Muslims for countries with above-average media freedom	(2) Tolerance towards Muslims for countries with below-average media freedom	(3) Tolerance towards Jews for countries with above-average media freedom	(4) Tolerance towards Jews for countries with below-average media freedom
WUI combined	0.170***	0.073	0.089**	0.159***
	[0.044]	[0.072]	[0.037]	[0.041]
Female	0.025***	-0.005	0.010***	0.005
	[0.003]	[0.005]	[0.003]	[0.004]
Age	0.000	0.001	0.001	0.001
	[0.000]	[0.001]	[0.000]	[0.001]
Age squared	-0.000***	-0.000*	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.815***	0.733***	0.884***	0.674***
	[0.009]	[0.016]	[0.010]	[0.021]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	152,673	74,876	137,947	83,131

Notes*:* The variable is decreasing in media bias. To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B21

Uncertainty and tolerance towards Muslims and Jews: samples split by average institutional quality (measured as legal system and property rights).

	(1) Tolerance towards Muslims for countries with above-average institutional quality	(2) Tolerance towards Muslims for countries with below-average institutional quality	(3) Tolerance towards Jews for countries with above-average institutional quality	(4) Tolerance towards Jews for countries with below-average institutional quality
WUI combined	0.083**	0.131	0.105***	0.157
	[0.038]	[0.085]	[0.033]	[0.097]
Female	0.025***	0.004	0.012***	0.003
	[0.004]	[0.004]	[0.002]	[0.004]
Age	-0.000	0.001**	0.001***	0.001
	[0.000]	[0.001]	[0.000]	[0.001]
Age squared	-0.000***	-0.000***	-0.000***	-0.000**
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.848***	0.720***	0.845***	0.748***
	[0.009]	[0.017]	[0.009]	[0.026]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	128,421	99,128	121,121	99,957

Notes: To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table B22

Uncertainty and tolerance towards Muslims and Jews: samples split by average institutional quality (measured as sound money).

	(1) Tolerance towards Muslims for countries with above-average institutional quality	(2) Tolerance towards Muslims for countries with below-average institutional quality	(3) Tolerance towards Jews for countries with above-average institutional quality	(4) Tolerance towards Jews for countries with below-average institutional quality
WUI combined	0.175***	0.405***	0.137***	0.740**
	[0.034]	[0.077]	[0.037]	[0.276]
Female	0.020***	-0.006	0.011***	-0.006
	[0.003]	[0.007]	[0.002]	[0.007]
Age	0.000	0.002*	0.001*	0.000
	[0.000]	[0.001]	[0.000]	[0.001]
Age squared	-0.000***	-0.000**	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.795***	0.699***	0.804***	0.682***
	[0.009]	[0.020]	[0.014]	[0.051]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	188,399	39,150	181,819	39,259

Notes: To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B23

Uncertainty and tolerance towards Muslims and Jews: samples split by average social trust.

	(1)	(2)	(3)	(4)
	Tolerance towards Muslims for countries with above-average social trust	Tolerance towards Muslims for countries with below-average social trust	Tolerance towards Jews for countries with above-average social trust	Tolerance towards Jews for countries with below-average social trust
WUI combined	0.153***	0.116***	0.148***	0.093***
	[0.038]	[0.027]	[0.026]	[0.028]
Female	0.013***	0.022***	0.010***	0.005*
	[0.003]	[0.005]	[0.003]	[0.003]
Age	-0.000	0.002***	0.001	0.001
	[0.000]	[0.001]	[0.000]	[0.000]
Age squared	-0.000**	-0.000***	-0.000***	-0.000**
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.772***	0.815***	0.777***	0.854***
	[0.010]	[0.010]	[0.015]	[0.011]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	147,323	71,088	144,278	68,616

Notes: To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table B24

Uncertainty and tolerance towards Muslims and Jews: samples split by average log GDP per capita.

	(1) Tolerance towards Muslims for countries with above-average log GDP per capita	(2) Tolerance towards Muslims for countries with below-average log GDP per capita	(3) Tolerance towards Jews for countries with above-average log GDP per capita	(4) Tolerance towards Jews for countries with below-average log GDP per capita
WUI combined	0.194***	0.285**	0.086**	0.185***
	[0.046]	[0.104]	[0.033]	[0.031]
Female	0.023***	-0.002	0.012***	-0.000
	[0.004]	[0.005]	[0.002]	[0.005]
Age	0.000	0.001	0.001*	-0.000
	[0.000]	[0.001]	[0.001]	[0.001]
Age squared	-0.000***	-0.000*	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.801***	0.736***	0.864***	0.696***
	[0.010]	[0.018]	[0.014]	[0.017]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	155,319	72,230	143,411	77,667

Notes: To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B25

Uncertainty and tolerance towards Muslims and Jews: samples split by average political polarization.

	(1) Tolerance towards Muslims for countries with above-average political polarization	(2) Tolerance towards Muslims for countries with below-average political polarization	(3) Tolerance towards Jews for countries with above-average political polarization	(4) Tolerance towards Jews for countries with below-average political polarization
WUI combined	0.168***	0.125***	0.149***	0.107***
	[0.052]	[0.042]	[0.035]	[0.030]
Female	0.009**	0.024***	0.006	0.011***
	[0.004]	[0.004]	[0.004]	[0.002]
Age	0.001***	-0.000	0.001*	0.000
	[0.001]	[0.001]	[0.001]	[0.000]
Age squared	-0.000***	-0.000	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.753***	0.820***	0.757***	0.862***
	[0.012]	[0.012]	[0.015]	[0.012]
Country- and year-fixed effects	Yes	Yes	Yes	Yes
Observations	122,736	104,813	126,651	94,427

Notes*:* To be compared with column (1) of Tables 2 and 3, respectively. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B26

Uncertainty and country-level tolerance towards Muslims and Jews.

	(1) Country-level tolerance towards Muslims	(2) Country-level tolerance towards Muslims	(3) Country-level tolerance towards Jews	(4) Country-level tolerance towards Jews
WUI combined	0.190***	0.163*	0.176***	0.135***
(country level)	[0.054]	[0.081]	[0.030]	[0.034]
Female	-0.037	-0.217	0.098	0.093
(country level)	[0.438]	[0.462]	[0.298]	[0.368]
Age	0.049	0.004	0.002	0.013
(country level)	[0.057]	[0.056]	[0.022]	[0.031]
Age squared	-0.000	0.000	0.000	-0.000
(country level)	[0.001]	[0.001]	[0.000]	[0.000]
Constant	-0.446	0.487	0.595	0.399
	[1.347]	[1.345]	[0.621]	[0.819]
Country- and year-fixed effects	Yes	No	Yes	No
Country- and quarter-of-the-year fixed effects	No	Yes	No	Yes
Observations	144	124	131	116

Notes: Female, Age, and Age squared denote average values per country and quarter of the year. Robust standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table B27

Uncertainty and tolerance towards Muslims and Jews, quadratic specification.

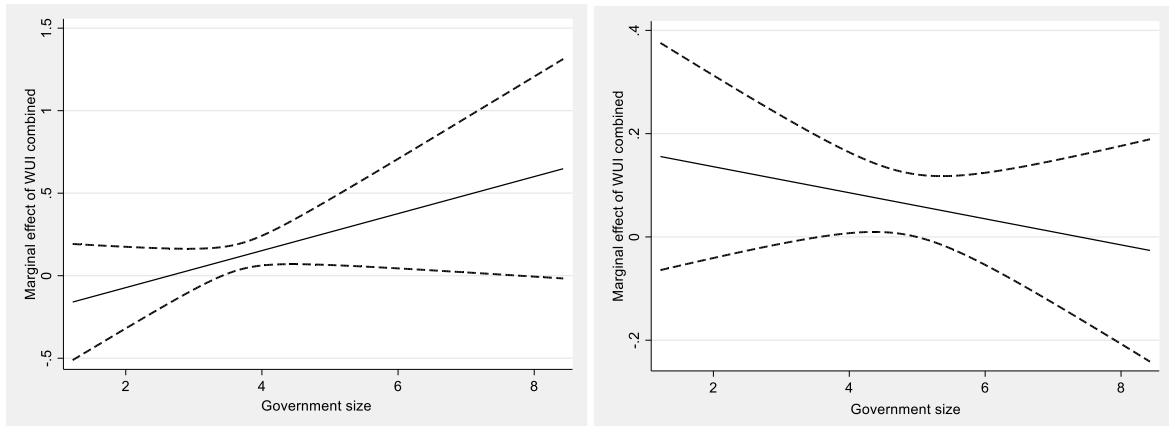|	(1) Tolerance towards Muslims	(2) Tolerance towards Jews
WUI combined	0.176**	0.276***
	[0.079]	[0.043]
WUI combined^2	-0.054	-0.256***
	[0.103]	[0.043]
Female	0.016***	0.008***
	[0.003]	[0.002]
Age	0.001*	0.001*
	[0.000]	[0.000]
Age squared	-0.000***	-0.000***
	[0.000]	[0.000]
Constant	0.781***	0.792***
	[0.008]	[0.011]
Country- and year-fixed effects	Yes	Yes
Observations	227,549	221,078

*** p<0.01, ** p<0.05, * p<0.1

Table B28

Uncertainty and tolerance towards Jews: continent-specific analysis.

	(1) Tolerance towards Muslims in Europe	(2) Tolerance towards Jews in Europe	(3) Tolerance towards Muslims in North America	(4) Tolerance towards Jews in North America	(5) Tolerance towards Muslims in Asia	(6) Tolerance towards Jews in Asia
WUI combined	0.134***	0.115***	-0.041***	0.523***	-0.958***	0.227***
	[0.034]	[0.028]	[0.002]	[0.017]	[0.008]	[0.027]
Female	0.022***	0.012***	0.004	-0.004	-0.010	-0.002
	[0.004]	[0.002]	[0.006]	[0.003]	[0.006]	[0.023]
Age	0.000	0.001***	0.002*	0.000	0.002	0.002
	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]	[0.003]
Age squared	-0.000***	-0.000***	-0.000**	-0.000	-0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.806***	0.847***	0.858***	0.871***	0.756***	0.613***
	[0.008]	[0.010]	[0.028]	[0.023]	[0.024]	[0.076]
Country- and year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	166,376	159,677	13,325	9,678	17,539	11,114

*** p<0.01, ** p<0.05, * p<0.1

Fig. B1. Uncertainty and tolerance towards Muslims and Jews: interaction with the size of government.
Notes: The graph to the left (right) shows how the point estimate, or marginal effect, of WUI combined varies for tolerance towards Muslims (Jews) as the size of government varies, with the hyphenated lines indicating the 95% confidence interval.