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ORIGINAL PAPER

Happy citizens trust their rulers

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Abstract
Using Chinese panel data, we examine whether citizen well-being impacts the formation of political trust, which is key to regime stability. Through a quasi-experimental method, we demonstrate how an improvement in subjective well-being directly leads to increased political trust. In a supplementary analysis, we also demonstrate how low political trust is predictive of actions that undermine regime stability. These findings suggest that any government, even an authoritarian one, has an incentive to foster the happiness of its citizens.

Keywords Political trust · Life satisfaction · Social contract · Regime stability · Accountability

JEL Classification D72 · D78 · H11 · I31 · P35 · P48

1 Introduction

Elections are generally regarded as an effective mechanism for holding governments accountable to the public interest (Downs 1957; Nordhaus 1975; Persson et al. 1997). An extensive literature in the field of retrospective voting has, for instance, shown that voters tend to reward incumbents in times of economic prosperity and

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punish them when times are hard (e.g. see Kramer 1971; Fair 1978; Fiorina 1978; Lewis-Beck and Stegmaier 2000). This helps to incentivize governments to act in the collective interest and limits rent-seeking (Ferraz and Finan 2011). Some recent research has examined if there is an electoral incentive for governments to focus on citizen well-being beyond per capita GDP (Martínez Bravo 2016; Ng et al. 2017, 2022; Ward et al. 2021). This is because there can be a disconnect between economic prosperity and broader measures of subjective well-being (Layard 2011).

Raising the flag of "happy voters", recent research by both Liberini et al. (2017) and Ward (2020) suggests that governments in democracies have an electoral incentive to improve their citizens' happiness.[1] Liberini et al. (2017) demonstrated how individuals who are more satisfied with their lives were more likely to vote for the incumbent party in the UK. Ward (2020) reinforced this finding by showing that subjective well-being has been a significant predictor of real-stakes electoral outcomes in 15 European countries over four decades above and beyond objectively measurable indicators of economic prosperity.

While these results point to an electoral advantage for governments that manage to promote societal well-being, it is unclear whether a similar incentive exists in an authoritarian regime where elections are less a factor. Citizens in China still cannot directly decide the fate of government officials except for some limited elections at the village (community) level (Martinez Bravo et al. 2022).[2] In a pyramid-like bureaucratic system, officials at all levels in China are appointed and evaluated by higher levels of government (Francois et al. 2023). A good starting point in determining whether an authoritarian regime has an incentive to care about the happiness of its citizens is to consider which political objectives an authoritarian regime is likely to value. We put forward political trust, namely people's trust in government officials (Hetherington 1998; Levi and Stoker 2000) as a plausible candidate, as political trust is key to the survival of any regime in the long run, even an authoritarian one. In doing so, we draw inspiration from a large body of empirical work which has previously highlighted the crucial role of political trust in effective governance (Braithwaite and Levi 1998). For example, it significantly underpins citizens' advocacy of government policies (Fairbrother 2019; Macdonald and Cornacchione 2023) and compliance with laws or regulations (Tyler 2006; Marien and Hooghe 2011; Bargain and Aminjonov 2020). Crucially, in the Chinese context, political trust has previously been shown to matter for regime stability (Zhong and Hwang 2016; Chen et al. 2021).[3]

Recognizing the importance of political trust for any regime, including authoritarian systems, we estimate the causal effect of subjective well-being on political trust in China. In other words, we ask whether happier citizens are more likely to

[1] Note that we are using the terms happiness and (subjective) well-being interchangeably as umbrella terms for subjective indicators of quality of life.

[2] In fact, these village or community committees are not a branch of the government but self-management organizations of the residents. In other words, they have no real administrative power.

[3] In support of this, we show in a supplementary analysis how political trust is predictive of whether individuals intend to involve themselves in actions that may result in social unrest.

exhibit trust in the government. If true, this could be seen as an incentive, even for an authoritarian government, to enhance the happiness of the general public. We establish the theoretical foundation more formally in a conceptual framework derived from social contract theory (Hobbes 1651; Locke 1689; Rousseau 1762). It asserts that, in any stable governmental system, there is naturally an intangible agreement between the ruler and the ruled in which both commit to certain mutually beneficial rules and obligations. Citizens realize that coordinated rules serve their welfare better than a state of anarchy, which is why they give up freedoms and delegate decisions to a trusted institution that imposes universally accepted rules, that is, a government. Drawing from this framework, we posit that people's political trust in the ruling government will be conditional on their well-being. In effect, to retain trust, governments must serve the public interest by delivering policies to enhance societal well-being.

Our empirical analysis is carried out using the China Family Panel Studies (CFPS, 2012–2018) dataset, which is a nationally representative longitudinal survey. The dataset records various metrics of subjective well-being such as respondents' self-reported life satisfaction as well as their self-reported trust in local county-level government officials (hereafter referred to as political trust).[4] The difficulty in establishing a causal effect of life satisfaction on political trust is that an ordinary least squares (OLS) estimation will likely be biased due to various endogeneity issues, such as omitted variable bias and bi-directional causality. An example of the former could be personality traits that simultaneously affect subjective well-being and political trust. When it comes to bi-directional causality, a good deal of research suggests that political trust promotes happiness (Helliwell et al. 2020; Fu 2018; Carattini and Roesti 2023).

A further source of endogeneity bias relates to measurement error. While commonly overlooked in social science research, measurement error is unavoidable in surveys because of a variety of reporting biases and other issues. This is likely to be particularly important when dealing with survey questions aimed at ascertaining how people think or feel as opposed to more objective criteria. The consequence of measurement error is that it causes one to underestimate the impact of the affected explanatory variable on an outcome variable, commonly referred to as attenuation bias. As an illustration of the consequences of measurement error, a number of studies on the effect of individual income (as captured through surveys) on life satisfaction have found that after correcting for measurement error using an instrumental variables (IV) method, estimated effect sizes are two to five times larger than conventional OLS estimates (Luttmer 2005; Powdthavee 2010; Howley 2017). Similarly, Berger and Spieß (2011), in a study of the effect of maternal life satisfaction on child outcomes such as verbal skills, found that effect sizes were more than three times larger after adjusting for attenuation bias using an IV method.

We combine two strategies to overcome these potential problems. First, given the longitudinal nature of the CFPS, we use an individual fixed effects analysis, which means we can account for any time-invariant omitted variables such as personality

[4] We explain why this serves as a good measure of political trust in the Chinese context in Sect. 3.

traits, cultural factors, and family background. This approach is augmented by an IV approach to alleviate any remaining endogeneity issues. As with any analysis which relies on IVs, one might argue that the exclusion restriction is hard to prove. We address this concern by employing three separate IVs. We obtain remarkably similar estimates when employing these IVs independently or in combination with each other. The consistency of our estimates across these three IVs points to the reliability of our estimates. It is highly improbable that all instrumental variables would be biased in precisely the same manner, even more so here given that our IVs vary significantly in their nature. Although previous studies have established a causal link between trust (specifically general trust, as in Carattini and Roesti 2023) and life satisfaction, we are, to the best of our knowledge, the first to demonstrate the reverse: a causal effect of life satisfaction on political trust.

Our first IV is respondents' physical attractiveness (PA) evaluated by CFPS interviewers. The intuition behind the selection of this instrumental variable rests on the fact that being physically attractive can lead to more positive evaluations from others in everyday life (e.g. see Lorenzo et al. 2010), and this in turn benefits individual happiness (Hamermesh and Abrevaya 2013). While likely strongly correlated with life satisfaction, we argue that there is no a priori reason to expect that evaluations of physical attractiveness by a third party, namely the CFPS interviewers, will be directly related to respondents' level of political trust. It is worth noting here that, in this framework, any stable traits (personality, optimism) that might be simultaneously correlated with one's physical attractiveness and political trust will be absorbed by the individual fixed effects.

Our second IV indicates whether a respondent experienced physical discomfort in the two weeks just before the next CFPS interview. While a minor health shock (e.g. a fever or cough) is likely to temporarily impact self-reported indicators of well-being, it is, we would argue, very unlikely to change one's political trust. The third IV captures the closeness of the relationship between parents and their children. Intuitively, these kinds of intra-family connections are unlikely to be directly related to political trust, all the more so in China since there is a long-standing custom in Chinese society where the government avoids involvement in family matters (Ocko 1991). On the other hand, the closeness of the parent–child relationship is significantly related to life satisfaction (Lowenstein et al 2007; Peng et al. 2019).

Our results show that life satisfaction has a significant and positive impact on the formation of political trust. Notably, our estimates remain remarkably similar to a battery of alternative specifications wherein we deploy these IVs individually or in various combinations. This strongly supports the suggestion that we are capturing the impact of life satisfaction on the formation of political trust, as opposed to the reverse, or that the relationship is due to another factor.

Our findings contribute to existing research in a number of ways. First, we add to the emerging "happy voters" literature which seeks to establish if governments have an electoral incentive to focus on measures of subjective well-being (Martínez Bravo 2016; Ng et al. 2017, 2022; Liberini et al. 2017; Ward 2020; Ward et al. 2021). To date, this research has focused on democracies. Our study can be seen as the first to consider this aspect in the context of an authoritarian regime where real elections are absent. Apart from the focus on democracies, one limitation with existing work

is that, while it has done much to enhance our understanding of the importance of subjective well-being in the political sphere, findings may be affected by endogeneity concerns. As an illustration, when looking at simple associations, it can be difficult to establish the degree to which subjective well-being influences support for incumbents from the fact that people are likely to be happier when their political party has won. To the best of our knowledge, Liberini et al. (2017) provide the only study addressing this problem. They employ a difference-in-differences model using the death of a spouse as an exogenous shock to happiness, assuming that this event does not influence voting behaviour via other channels. Here, we employ three novel instrumental variables in establishing a causal link between subjective well-being and political trust.

We also contribute to research concerned with factors affecting the formation of political trust (Blanco and Ruiz 2013; Sangnier and Zylberberg 2017; Acemoglu et al. 2020; Abramson et al. 2022; Yao et al. 2022; Chen 2025). Two approaches dominate the existing research in this area (Mishler and Rose 2001). The first one, an institutional approach, posits that government performance (particularly economic performance) is the determinant of political trust (e.g. see Hetherington and Rudolph 2008; Stevenson and Wolfers 2011; Van Erkel and Van Der Meer 2016). The second one, a cultural approach, argues that political trust originates from social norms and values rooted in the history of a society (e.g. see Chen et al. 2020; Nunn and Wantchekon 2011). We add to the institutional approach with a nascent measure of government performance, namely subjective well-being. A potential problem with the traditional institutional approach, particularly in authoritarian regimes, is that official statistics are susceptible to government manipulation (e.g. GDP; see Henderson et al. 2012). Using subjective well-being as a metric of government performance can alleviate this issue, as people's true feelings expressed in surveys are more difficult to manipulate than governments' own statistics.

Finally, there has been a wealth of existing research highlighting factors that go beyond income and wealth in making people happy (e.g. Akay et al. 2017; Ivlevs et al. 2019). Much less is known about the reverse. Apart from being merely a result of people's actions, happiness can be a factor in shaping their behaviours. The nascent literature that does exist in this area has shown that happiness can predict productivity (Böckerman and Ilmakunnas 2012; Oswald et al. 2015; Bellet et al. 2023), future divorce or separation (Clark et al. 2008; Guven et al. 2012), labour market choices (Krause 2013; Gielen and Van Ours 2014), and, as discussed earlier, voting behaviour (Liberini et al. 2017; Ward 2020). This paper adds to this body of work by examining the role that happiness plays in shaping political trust.

The remainder of this paper is organized as follows. In Section 2, we present social contract theory as a useful framework through which we develop our hypothesis in relation to the importance of subjective well-being for the formation of political trust. Section 3 outlines our data sources. Section 4 describes the empirical strategy. In Section 5, we document our main findings and heterogeneity analysis. This is followed by Section 6, which presents various robustness checks and further analyses. Lastly, we conclude with a discussion of our main findings in Section 7.

2 Conceptual framework

Beginning with the innate drive for individuals to maximize their own well-being, social contract theory posits that the relationship between citizens and the state is fundamentally defined by a reciprocal obligation (Hobbes 1651; Locke 1689; Rousseau 1762). Specifically, it posits that the ruling authority must commit to serving the interests of the citizens of the state, and in return citizens will consent to their authority for their own benefit. Although social contract theory has received considerable criticism over the last centuries (Loewe et al. 2020), the basic idea of mutual obligations and reciprocity remains influential in contemporary political economy (Besley 2020). For instance, it offers a useful framework for understanding contemporary state-citizen relations, such as the link between tax compliance and the quality of public services delivery (Feld and Frey 2007; Levi and Sacks 2009).

The phenomenon of retrospective voting in modern democracies also aligns with social contract theory: rewarding well-performing incumbents while punishing incompetent ones is an act of reciprocity. Retrospective voting demonstrates that people who constitute the state do actively seek to ensure that public power serves their interest. One can expect that citizens in authoritarian regimes will also aspire to make their governments accountable to the public interest. The question is, however, how can they incentivize those in power to promote their well-being in the absence of elections? We suggest that when the ruling elite does not serve the interests of their citizens, they are perceived to be in breach of the implicit social contract, and in turn, political trust is damaged. This could potentially threaten the survival of the nomenklatura, as political trust is essential to regime stability even in an autocracy where elections are absent. For instance, looking specifically at China, political trust has been shown to be important in predicting political protests (Zhong and Hwang 2016; Chen et al. 2021).

Beyond just mere survival, political trust is vital for the general efficacy of (authoritarian) governments. As an illustration, previous work has shown how low political trust makes tax evasion more likely and, more broadly, damages social trust and cooperation (Fukuyama 1996; Putnam 2000). Political trust has also been shown to be important in predicting the acceptability of government initiatives in China, such as long-term compensation as opposed to a one-cash deal for land expropriation (Cai et al. 2020) and the implementation of emission trading schemes (Gao et al 2022). Research by Zhang et al. (2022) illustrates how the public disclosure of anti-corruption investigations in China, which are aimed at convincing the public of the government's intention to crack down on corruption, negatively impacted the life satisfaction of those with low political trust but had the opposite effect for those with high trust. This suggests that political trust may moderate the effectiveness of governments' messaging efforts.

In summary, the importance of political trust renders it a plausible alternative to voting for Chinese citizens when it comes to incentivizing their government to work in their interests. Indeed, perhaps due to the recognition of the importance placed on political trust by the central government, the likelihood of a county

governor in China being promoted correlates positively with the level of political trust among local residents (Yao et al. 2022). We thus posit that, in lieu of voting, Chinese citizens offer their political trust in exchange for actions which enhance their individual well-being. In essence, in the absence of elections, political trust is what the Chinese people can offer in the social contract of reciprocity with their government.[5]

If one accepts the premise that political trust is important for the ruling party, the question becomes how individuals judge whether the government is committed to the contract and hence worthy of their trust. We argue that much like subjective well-being is important in predicting incumbent support, it will be key in shaping the degree to which citizens trust their rulers.

Traditionally, economic performance has been put forward as the most important criterion by which citizens assess government performance (e.g. see Kramer 1971; Markus 1988; Chappell 1990; Lewis-Beck and Stegmaier 2000; De Benedictis-Kessner and Warshaw 2020). However, voters oftentimes do not appear to vote in accordance with their country's (or indeed individual) economic interest. This suggests that income is only one of many aspects people take into account when evaluating government performance. Indeed, one reason why we observe the strong relationship between macro variables such as economic growth and the probability of incumbents being re-elected may simply be that voters' happiness is, by and large, enhanced by a strong economy. In support of this, the emerging literature on "happy voters" indicates that measures of subjective well-being are able to explain more of the variance in governing party vote share than standard macroeconomic indicators (Ward 2020). This aligns with the literature discussed in the introduction, which suggests that government performance is a key determinant of political trust. However, we propose that subjective well-being serves as a primary mediator in this relationship. In essence, government performance influences subjective well-being, which in turn drives changes in political trust. A crucial assumption is hence that if the government serves the interests of the public, this can be observed by means of a public whose happiness soars.

Note, however, that we do not argue that citizens clearly discern the sources of their well-being and in turn only link the variations caused by the government to their political trust. Previous studies in this field have shown that citizens' support of the government is affected by life events that are separate from politics, but influence their personal well-being. Examples include the death of a spouse and local college football wins (Healy et al. 2010; Liberini et al. 2017; Esaiasson et al. 2020). One possible reason for this is when people are feeling unhappy, unhappiness can be partly alleviated by searching for someone or something to blame (Schwarz and Clore 1983) and so individuals may incorrectly attribute their dissatisfaction and negative emotions to others, particularly salient others like the government.

[5] When we refer to the government, we do not make a distinction between the national level and the local level. This is because, as illustrated above, political trust is important for all levels of government and Chinese governments at all levels are centrally controlled.

This is not to dissuade governments from looking to improve the happiness of their citizens. It has been shown previously that there is a clear electoral dividend from doing so; rather, it highlights how we are not very good at correctly separating the sources of our happiness. If, as we suggest, happiness is a driver of political trust, governments aiming to maximize their own interests will have an incentive to enhance the happiness of its citizens.

3 Data

Our data come from the China Family Panel Studies (CFPS, Institute of Social Science Survey, Peking University 2018). This longitudinal nationally representative survey has been conducted every two years since 2010. The CFPS samples approximately 32,000 adults (age $\geq$ 16 in each wave) across 25 provinces which represent 95% of the total population in China.[6] We use four waves (2012, 2014, 2016, and 2018) of the CFPS in our analysis as our measure of political trust only became available with the 2012 wave. The measure is based on answers on an 11-point scale to the following question: "How much do you trust the cadres (officials in local county-level government)?"[7] 0 indicates least trust and 10 highest trust. This question has been used as a measure of political trust in various previous studies (e.g. Cai et al. 2020; Yao et al. 2022; Zhang et al. 2022; Sha 2023).

Two main reasons make this measure of political trust suitable for our study. First, although politically centralized, Chinese local governments are granted considerable autonomy in developing the local economy and providing public goods (Qian and Roland 1998; Jin et al. 2005). Second, local governments are also responsible for executing policies enacted by both local and central authorities.

Our main measure of subjective well-being is life satisfaction, which is based on a question consistently asked across all waves of the CFPS: "Are you satisfied with your life?" The scale ranges from 1, least satisfied, to 5, most satisfied. The CFPS also records a measure of self-reported happiness, which we employ as an alternative indicator of subjective well-being in a sensitivity check. This measure is available in two waves (2014 and 2018) and respondents are presented with a 10-point scale and asked: "Are you happy overall?", with 1 indicating least happy and 10 most happy.

The vast majority of respondents in the CFPS have not migrated across counties during our study period. Approximately 10% have migrated between counties across CFPS waves, and we exclude these respondents in our baseline analysis as our measure of political trust relates to trust in local county government officials. Migrating might be associated with changes in life satisfaction and lead to changes in the

[6] The 31 provinces in mainland China are covered by CFPS except Xinjiang, Tibet, Qinghai, Inner Mongolia, Ningxia, and Hainan.

[7] The Chinese political system includes six levels of bureaucracy: national level, provincial-ministerial level, prefectural-bureau level, county-division level, town-section level, and village-community level (informal government organization). There are 2843 county-level administrative districts in mainland China.

trust in local government officials simply because the county changes and with it the official respondents refer to when indicating their level of political trust. Hence, if migrants were included, this could artificially produce a correlation between changes in life satisfaction and changes in political trust. Note, however, that we conduct a robustness check by including migrants and get qualitatively the same results; see Online Appendix Table A7.

One may be concerned that there is a self-censorship issue when it comes to our measure of political trust given the political sensitivity of the question in the Chinese context. For example, respondents who do not trust the government may be particularly reluctant to answer this question or simply give a politically expedient answer (e.g. a score that is much higher than their actual level of trust). Yao et al. (2022), who use the same dataset as ours when looking at how air pollution affects people's political trust, have conducted a detailed examination of this issue. Their results suggest that self-censorship is highly unlikely. Rather than repeating their analysis, we summarize their findings as follows. First, the response rates are quite similar between trust in government officials and trust in other groups (e.g. parents and strangers) where political sensitivity is less of an issue. Second, political trust in the CFPS has high internal validity. For instance, those who had unhappy experiences with government officials (e.g. unreasonable charges and stalling) in the past 12 months before the CFPS interview report significantly lower political trust. Third, political trust in the CFPS is normally distributed, resembling the distribution of political trust as measured by the Asian Barometer Survey[8] which is conducted anonymously online.

Despite these findings, we conduct our own additional robustness checks to further alleviate any concerns surrounding self-censorship. A simple method to check this issue could be to include answers of "don't know" and "refused to respond" in the analysis (see, e.g. Otrachshenko et al. 2023). However, in our dataset, the share of such answers is very small ($<0.6\%$), which means that including them into any category of the normal answers (0 to 10 points) does not yield meaningful changes in our results. We thus turn to other approaches which are detailed in the supplementary analyses A, which is included in our Online Appendix. It shows that our results are very unlikely to suffer bias from self-censorship.

3.1 Instrumental variables

An advantage of using the CFPS is that we are able to obtain instrumental variables (IV) within the dataset to help alleviate endogeneity concerns. Reverse causality, measurement error, and, despite our use of individual fixed effects, time-variant omitted variables are potential sources of bias. This means a quasi-experimental

[8] The Asian Barometer Survey is a cross-national comparative survey focusing on socioeconomic modernization, regime transition, democratization, and changes in political values across the East-Asian region. It is conducted anonymously online by the National Taiwan University that is not controlled by the Chinese government so that the data is highly reliable when it comes to political attitudes.

approach is useful to reliably identify the effect of subjective well-being on political trust (see Section 4 for further details of the empirical strategy).

Our first instrumental variable for individual life satisfaction is the physical attractiveness (PA) score of the respondent. CFPS interviewers are asked to rate the physical attractiveness of respondents on a 7-point scale in each wave of the survey. The question comes at the end of the face-to-face interview, with 1 indicating least attractive and 7 most attractive. The rationale underpinning this instrumental variable is simply that attractiveness should be positively correlated with life satisfaction, but one's attractiveness is shaped by, among other things, personal behaviours such as fitness habits and clothing choices that are largely independent of government actions (see also our discussion of the validity of this instrument in Section 4).

Our second IV is based on a survey question which asks whether a respondent experienced physical discomfort (PD) in the two weeks before the interview. Specifically, between 2012 and 2018, respondents are consistently asked to answer "yes" or "no" to the following question: "During the past two weeks, have you felt any physical discomfort?" Approximately 30% of respondents report PD in each survey wave. While likely to impact how people will rate their subjective well-being, we argue that it is very unlikely that these short-term health shocks (e.g. a fever or a cough[9]) would be directly related to political trust. One may argue that there would be a stronger relationship between the first two IVs and hedonic well-being as opposed to life satisfaction. What is important for our purposes, however, is that the IVs are related to life satisfaction at least to some extent. This is clearly the case, as we show in Table 1 below (first-stage estimates).

Our third IV comes from a survey item capturing the closeness of familial relationships, reported by a subset of respondents. In 2012, 2016, and 2018, the CFPS asked respondents aged over 60 to report their relationship with each one of their children. Specifically, they are presented with five options (1. Not close at all; 2. Not very close; 3. Fair; 4. Close; 5. Very close) and asked: "In the past 6 months, how was the relationship between you and your child (child name)?"[10]For ease of description, we refer to this variable as parent–child relationships (PCR). Intuitively, within-family relationships should have a significant impact on people's life satisfaction while being very unlikely to be directly associated with their political trust. To maximize sample size, we assign this PCR score to each family member of the respondents who report PCR. When there is more than one person aged over 60 in a family, we use the mean value of the PCR reported by these family members. Note that although the PCR score is extrapolated to the whole family, this subsample (mean age, 59.578) is still substantially older than the full sample (mean age,

[9] Not all waves of the CFPS record the specific kind of the physical discomfort and so we do not take the details into account. The information is however collected in waves 2014 and 2016, where respondents specify physical discomfort as "fever, pain, diarrhea, cough, difficulty in breathing, cannot focus attention, difficulty in walking, palpitation, or other".

[10] We use the mean value of the relationship scores with each child to represent one's parent–child relationship.

49.138). The rationale behind this IV is that the closeness of an interpersonal relationship such as this would not only influence the reporters themselves, but also their children and other family members as it could affect general family harmony.

The CFPS captures rich demographic information, enabling us to control for individual characteristics in our empirical model.[11] Specifically, our main specification includes age, marital status (single, married, divorced, and widowed), level of education (six levels from being illiterate to having a university degree), residence (urban or rural area), *Hukou* (permanent urban residency permit),[12] political status (member of the Communist Party of China, CPC), occupation status (10 types of status, see details in Online Appendix Table A1), family per capita income, and household size.

Our final sample consists of an unbalanced panel of 77,891 observations. A concern with unbalanced panel datasets is that sample attrition may lead to selection bias. We examine this issue using the method proposed by Verbeek and Nijman (1992). In the first step, we generate an indicator of attrition (dummy variable, 0 if any one of the variables used in the baseline specification has missing values, otherwise 1), and then add this attrition indicator (lagged by one period) to the original empirical model as a control variable. An insignificant coefficient of the lagged attrition indicator would suggest that attrition does not cause selection bias in the estimation.[13] This is the case in our study, as we show in Online Appendix Table A8.

For an overview of summary statistics, we refer the reader to Online Appendix Table A1. The mean values of life satisfaction and political trust are 3.723 and 5.045, respectively. As a starting point in our analysis of the impact of life satisfaction on political trust, we plot the average political trust over different levels of life satisfaction. Figure 1 shows that the average political trust increases substantially with life satisfaction, which lends some initial support for our hypothesis that happier citizens are more likely to have trust in government officials.

4 Identification strategy

To identify the causal effect of life satisfaction on political trust, we employ a dynamic instrumental variables (IV) method. To this end, both stages of regressions are implemented via an individual fixed effects (FE) model. In the process, any time-invariant confounders between life satisfaction and political trust are removed as well as any stable linkages between the IV and political trust. Several instrumental variables sourced from different survey questions in the dataset are used. Consequently, the exclusion restriction can be more convincingly verified: if these distinct IVs produce comparable

[11] Employing a more parsimonious model by excluding these individual control variables does not change our results in any meaningful fashion.

[12] Note that simply working and living in an urban area does not mean a person has urban *Hukou*.

[13] For the details of the method, we refer readers to Verbeek and Nijman (1992) or Wooldridge (2010, p. 581).

Table 1 The impact of life satisfaction on political trust: results from IV estimation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. First stage							
	Dependent variable: life satisfaction						
Physical attractiveness	0.028***			0.028***	0.023**		0.023**
	(0.006)			(0.006)	(0.011)		(0.011)
Physical discomfort		−0.056***		−0.055***		−0.020	−0.019
		(0.012)		(0.012)		(0.024)	(0.024)
Parent–child relationship			0.104***		0.100***	0.099***	0.096***
			(0.018)		(0.018)	(0.018)	(0.018)
F-statistic	21.43	23.31	33.89	18.90	20.42	17.65	13.14
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	77,891	77,891	19,083	77,891	19,083	19,083	19,083
Number of persons	26,107	26,107	8,221	26,107	8,221	8,221	8,221
Panel B. Second stage							
	Dependent variable: political trust						
Life satisfaction	0.896**	0.939*	1.050***	0.875***	1.240***	0.921**	1.144***
	(0.457)	(0.515)	(0.396)	(0.347)	(0.360)	(0.395)	(0.364)
Anderson-Rubin Wald F-statistic	4.37	3.44	7.56	3.72	6.29	3.17	3.88
(*p*-value)	(0.038)	(0.065)	(0.007)	(0.026)	(0.002)	(0.045)	(0.010)
Hansen J statistic				0.020	0.685	1.242	2.432
(p-value)				(0.888)	(0.408)	(0.265)	(0.296)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	77,891	77,891	19,083	77,891	19,083	19,083	19,083
Number of persons	26,107	26,107	8,221	26,107	8,221	8,221	8,221

Individual control variables include age (log-linearized), marital status, education level, residence, Hukou, CPC membership, occupation status, family per capita income (log-linearized), and household size. In columns 2, 4, 6, and 7 where the IV of physical discomfort is used, we also control for individuals' evaluation of medical services. All control variables are described in Table A1. Robust standard errors clustered at county level in parentheses

*$p<0.1$; **$p<0.05$; ***$p<0.01$

results, it becomes highly improbable that any potential violations of the exclusion restriction would bias the results in the exact same way.

We start our analysis with a simple FE model as shown in the following equation:

$$PT_{it} = \alpha + \beta \cdot LS_{it} + \boldsymbol{Control}_{it} \cdot \lambda + \vartheta_t + \eta_i + \varepsilon_{it} \quad (1)$$

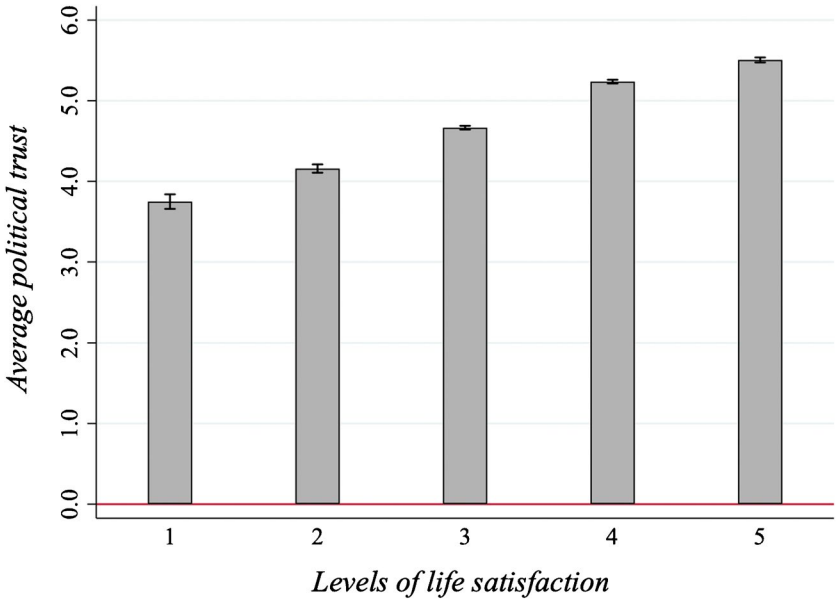

Fig. 1 Average political trust at different levels of life satisfaction. *Note.* The figure shows mean levels of political trust at given scale points of life satisfaction. Higher values indicate greater levels of life satisfaction and political trust. Whiskers denote 95% confidence intervals, which are calculated for the population mean. The calculations are based on the CFPS samples used in our analysis

PT_{it} is the political trust of individual i in wave t, LS_{it} denotes life satisfaction. $\boldsymbol{Control}_{it}$ is a vector of time-varying control variables at the individual level. The wave (time) fixed effects and individual fixed effects are captured by ϑ_t and η_i, respectively. As respondents who have migrated across counties are excluded from the sample, any province as well as county-fixed effects will be absorbed by the individual fixed effects. The standard errors are clustered at county level throughout the paper.[14] ε_{it} is the error term. β is our coefficient of interest and captures the effect of life satisfaction on political trust.

A causal identification of the relationship between life satisfaction (LS_{it}) and political trust by Eq. (1) relies on the assumption that LS_{it} is uncorrelated with the error term ε_{it}. Although the fixed-effects model removes the influence of all time-invariant confounders, the assumption of strict exogeneity is possibly violated. First, there could still be some time-varying confounders omitted from our model; for example, some government policies in certain periods may improve

[14] It is worth mentioning that this might make our estimation overly conservative when it comes to statistical inference (Abadie et al. 2022). We also show alternative approaches in Online Appendix Table A9, where we cluster standard errors (one way) at individual level, family level, and CFPS interviewer level, respectively, and cluster standard errors (two way) at both county and CFPS interviewer levels. We also report heteroscedasticity-robust standard errors. Our results are consistent across all of these approaches. To utilize a larger sample size, we use the combination of physical attractiveness (PA) and physical discomfort (PD) as the IV set in this check.

(or harm) people's life satisfaction and political trust simultaneously. Second, previous studies have found that political trust could be a source of individual happiness (Helliwell et al. 2020), and therefore reverse causality could also lead to a correlation between LS_{it} and ε_{it}. Third, when capturing a subjective construct such as one's own happiness through a questionnaire survey, measurement error is inevitable at least to some degree (Weimann et al. 2015) which often biases estimates towards zero (e.g. see Swaffield 2001).

To address these endogeneity concerns, we implement a two-stage least squares (TSLS) approach in which we use instrumental variables (IV) to capture exogenous variations in respondents' life satisfaction. The first-stage regression is given by Eq. (2), in which life satisfaction is regressed on the IV (Z_{it}) as well as all other covariates of Eq. (1). We then obtain a predicted indicator of life satisfaction ($\widehat{LS}_{it}$) which should be strictly exogenous (i.e. purged of any endogeneity bias) and can be used to estimate the causal effect of life satisfaction on political trust in the second-stage regression (Eq. 3).

$$LS_{it} = \epsilon + \varnothing \cdot Z_{it} + \boldsymbol{Control}_{it} \cdot \boldsymbol{\gamma} + \theta_t + \sigma_i + \mu_{it} \tag{2}$$

$$PT_{it} = \alpha + \beta \cdot \widehat{LS}_{it} + \boldsymbol{Control}_{it} \cdot \lambda + \vartheta_t + \eta_i + \varepsilon_{it} \tag{3}$$

Our first IV is respondents' physical attractiveness (PA) score as reported by the CFPS interviewers. The intuition behind the selection of this instrument is that PA is found to have a strong and direct impact on subjective well-being (Hamermesh and Abrevaya 2013), as attractiveness is positively correlated with the responses people get from others in everyday life (Lorenzo et al. 2010). Particularly, between-wave variations in PA could come from, for example, changes in body shape, dressing style, and make-up style of the same person, or from changing societal norms related to attractiveness ("beauty standards") and fashion trends with which the same person and their style are received. Interviewer ratings thus are a good proxy for PA as long as, on average, interviewer taste and the taste of the population interacting with the person are sufficiently correlated. It is apparent that these changes in one's attractiveness are caused by personal behaviours that are independent of the government. In addition, a person's attractiveness should not directly influence their trust in the county-level government officials, as citizens in China on average are unlikely to have frequent face-to-face interactions with government officials in their everyday life. Plus, an advantage of a third-party rating is that it removes any possible bias due to a correlation between reporting functions in self-assessments (life satisfaction, political trust). All this suggests that PA is a valid IV.

One might contend that, all things being equal, interviewers could rate the attractiveness of interviewees who report high political trust higher. In other words, these variables could be related with each other through a channel other than through life satisfaction. We find no evidence for this. Using a fixed-effects model, we regressed the PA rating on political trust, controlling for life satisfaction as well as our baseline

covariates, and political trust attracted a statistically insignificant coefficient and one close to zero in absolute terms (0.005). This suggests that there is no direct relationship between how interviewers rate the attractiveness of interviewees and how interviewees report their political trust.

One possible threat to the validity of using PA as an instrumental variable is the so-called beauty premium (Hamermesh and Biddle 1994). Specifically, previous literature has shown that PA correlates with educational achievement, attractiveness in the marriage market, and labour market outcomes (Hamermesh 2011). One may thus contend that our instrument could influence one's political trust through these indirect channels. This is unlikely to be a factor here for several reasons. First, we include a detailed set of covariates reflecting success in life such as education, income, occupation, and marital status. Second, our first-stage regression is also a fixed-effects model in which only within-person variation is considered. This means that any time-invariant characteristics which may be related to both PA and political trust, for example, personality traits,[15] will not produce bias.

It is worth noting here that most empirical studies which do support the existence of a beauty premium rest on between-person differences, in which PA usually correlates with other individual characteristics. Kanazawa and Still (2018) reveal that a beauty premium is not observed when individual differences, most of which are stable characteristics such as personality, intelligence, and family background, are controlled for. This is exactly what we achieve by employing the fixed-effects model, in addition to the use of detailed control variables.

Nevertheless, we look to further alleviate these concerns, following approaches commonly used for demonstrating instrument validity in the existing literature (e.g. Acemoglu et al. 2001). We first examine whether a beauty premium impacts our estimation by using additional control variables and excluding individuals from our analysis who are most likely to be impacted by a beauty premium if it exists. These findings suggest that our results are unlikely to be biased by a beauty premium. The details of these checks are included in the supplementary analyses B of our Online Appendix.

Our second IV is the binary indicator physical discomfort (PD), which denotes whether a respondent experienced physical discomfort in the two weeks before the CFPS interview. On the one hand, changes in physical health are obviously correlated with one's subjective well-being, implying that the instrument should be strong. On the

[15] As kindly pointed out by one anonymous reviewer, an example of such a trait is positive emotionality (or affectivity; see, e.g. Watson and Naragon 2009). Positive emotionality is stable in adult life (Harker and Keltner 2001) and should thus be controlled for by the fixed-effects model. To further alleviate concerns about possible changes over time, we conduct a robustness check where we control for possible influences of positive emotionality. Drawing on studies suggesting that positive emotionality promotes engagement in social activities such as survey interviews and that patience is positively related to emotion regulation (Aghayousefi et al. 2017; Basharat et al. 2023), we use respondents' patience with the CFPS interview (a social activity) as a proxy of positive emotionality and control for this variable in the regressions. All our estimates remain very similar after adding this control variable (Online Appendix Table A4), suggesting that positive emotionality is not an issue in our analysis.

other hand, one would not expect a minor health shock to affect someone's political trust, so the instrument should also be valid. A possible exception is if the change in health alters people's evaluation of public medical services. Here, one could argue that respondents might adjust their political trust accordingly (Mattila and Rapeli 2018). We therefore control for respondents' evaluation of medical services (EMS) when using this instrumental variable.[16]

The third IV is a variable capturing the closeness of parent–child relationships (PCR) within the family, which is available in 2012, 2016, and 2018. This should be a strongly relevant IV as previous research has shown that such relationships are important for life satisfaction (Lowenstein et al. 2007; Peng et al. 2019). On the other hand, such within-family relationships are unlikely to be directly linked to political trust, particularly so in China, as there is a long-standing tradition that the government refrains from intervening in domestic affairs (Ocko 1991).

Considering that PCR is also a self-assessment using a Likert scale, one might be concerned that PCR could be correlated with political trust and life satisfaction due to similar reporting functions, i.e. a risk of common method bias. Our FE model can remove this bias to the extent that reporting styles are stable within the individual. Moreover, our first IV (PA, reported by the interviewers rather than the respondents) and second IV (PD, a dummy variable) are measured in different ways. A consistent estimate across these different IVs would also reduce the possibility of common method bias (CMB). As a sensitivity test to further alleviate this concern, we add an additional control variable to our analysis based on respondents' answer to the following question: "What is your social status in your local area?" Similar to the measure of life satisfaction, the response is also captured on a 5-point scale (1 for lowest and 5 highest). As this is another Likert-scale self-assessment, it will naturally account for the shared variance in social status, life satisfaction, and political trust originating from joint patterns in reporting behaviour (Siemsen et al. 2010). Controlling for such a variable will effectively reduce the CMB if it plays a role in our regression. We obtain very similar results after adding this control variable (Online Appendix Table A5), suggesting that there is no serious CMB in our study.

A prominent advantage of having three independent IVs is that we can provide credible evidence for supporting the exclusion condition, which is hard to achieve in the case of relying on a single IV. Our intuition is simply that if any one of these IVs violates the exclusion condition (which is unlikely as we argued above), the estimate based on that IV should be biased, and one should, in turn, expect to obtain different results if using different IVs. In contrast, a similar result across all IVs would suggest that all IVs are valid and our estimates are reliable, except for an extreme possibility that all IVs are invalid, yet they coincidentally cause similar bias. Moreover, if the estimates derived from using these IVs combined as well as individually remain similar, one can only expect these IVs to not only cause a similar size of bias, but also through very close channels. It is challenging to justify such a scenario considering that the three IVs originate from distinctly different questions.

[16] EMS averages are practically indistinguishable between individuals that report PD (3.535, $SD = 0.773$) and those that do not (3.548, $SD = 0.702$). Including this variable has little to no impact on the size of the effect of life satisfaction on political trust.

5 Empirical results

5.1 Main findings

Before presenting our main results, we first look at the correlation between life satisfaction and political trust using a pooled OLS estimation. The results are presented in Online Appendix Table A2. In columns 1 and 2, we can see that life satisfaction is significantly correlated with political trust, irrespective of whether we include or exclude individual-level control variables and wave-fixed effects. We then use an individual fixed effects model to re-estimate the relationship between life satisfaction and political trust. A strength of the model is that we do not have to worry about time-invariant omitted variables biasing our estimates, such as stable personality traits (see Allison 2009). As shown in columns 3 and 4, life satisfaction is still significantly correlated with political trust, but the coefficient size becomes smaller.

A limitation of the FE model is that by solely relying on within-person variation, it might be overly conservative. As a sensitivity check, we therefore also report estimates using a random-effects (RE) model. This takes between-person variation into account, increasing the statistical power at our disposal, but the downside is that omitted variable bias is more likely in this setting. The results in column 5 show that the life satisfaction coefficient is statistically significant and larger than that obtained when using the FE model.

Notwithstanding the fact that our FE analysis is based on within-person variation, it could still suffer from endogeneity bias, for example, due to bi-directional causality and measurement error. We therefore re-estimate the effect of life satisfaction on political trust using fixed effects coupled with an instrumental variable approach (FE-IV). We first use the three IVs, namely physical attractiveness (PA), physical discomfort (PD), and parent–child relationship (PCR), individually. The results are presented as part of our main results in columns 1 to 3 of Table 1 (for full results including control variable effects, see Online Appendix Table A3).

The first-stage regressions indicate that all three IVs are significantly correlated with life satisfaction as the F-statistics range from 21 to 33,[17] suggesting that all of them are strong instruments. The second-stage regressions show that life satisfaction has a significant and positive effect on political trust. All three estimates using separate IVs are remarkably similar, ranging from 0.896 to 1.050. This consistency supports the validity of our IVs. For our IVs to be invalid, one would have to assume that all of them are not only endogenous, but also coincidentally cause a similar bias in the estimation. Such a speculation can hardly be justified given that the three IVs are all quite different in nature, namely a PA score rated by the CFPS interviewers

[17] A rule of thumb is that instruments are not weak if the F-statistic of the first-stage regression exceeds 10. This empirical rule however is not sufficient and sometimes may cause over-rejection in the second-stage regression if the IV is not strong enough (Lee et al. 2022). We thus also report the results of an Anderson-Rubin Wald test which is more robust. The test result in column 5 of Table 1 rejects the null hypothesis that the coefficient of the endogenous regressor in the main equation (second stage) is equal to zero ($p=0.039$), suggesting that the inference on the coefficient of the endogenous variable is valid even in the presence of a weak instrument.

(as opposed to by the respondents), self-reported measures capturing a short-term health shock, and an assessment of the closeness of family relationships.

To further enhance the assumption on the exclusion condition, we use different combinations of these IVs as the set of instrumental variables. These combinations include (1) PA and PD, (2) PA and PCR, (3) PD and PCR,[18] and (4) PA, PD, and PCR. The results in columns 4 to 7 remain similar to previous estimates. In addition to being robust to different combinations of instrumental variables, our instruments pass the usual validity tests, that is, a test for over-identification restrictions (the *p*-value of Hansen J statistics are larger than 0.1 across all three specifications). This reaffirms that our IVs do not violate the exclusion condition.

The coefficients obtained from our various IV estimations are much larger than those in our baseline FE estimates. The larger magnitude of the FE-IV estimates relative to the FE estimates suggests that endogeneity indeed biases the latter. A possible explanation for the sizeable downward bias in the FE estimation is measurement error as political trust is self-reported and an underlying psychological construct that is hard to capture in surveys. Many studies have found that measurement error in an independent variable can lead to attenuation bias in the estimate, i.e. a significant downward bias (e.g. Lassen 2005; Aydemir and Borjas 2011).

According to the most conservative result (column 4) in our FE-IV estimation, an increase of one standard deviation of life satisfaction (SD, 1.056 points) would lead to an increase in political trust of 0.924 points, or 35% of a SD (2.638 points). To better gauge the significance of this finding, we compare the impact of life satisfaction on political trust to that of being a member of the Communist Party of China (CPC). As the ruling party in China, CPC members are unsurprisingly found to have significantly higher political trust. Considering the low within-person variation when it comes to CPC membership,[19] we use the results of our RE model to obtain this estimate ($\beta = 0.504$, $p = 0.000$). The effect on political trust of a one-SD increase in life satisfaction is almost twice as large as the estimated effect of being a CPC member.

5.2 Heterogeneity analysis

In this section, we study whether the effect of life satisfaction on political trust is heterogeneous between different socio-demographic subgroups. Note that this heterogeneity analysis is exploratory, as we had no strong a priori expectations as to what differences there would be across these subgroups. We split the sample into two roughly even subgroups based on gender, residence (urban v rural), age, family per capita income, and education level, respectively.[20] Here, the IV estimation is carried

[18] In this IV set, we find that PD does not attract a significant coefficient in the first-stage regression. The reason perhaps is that the sample here consists of comparatively older people who are more likely to experience physical discomfort and have become more adaptable to such conditions. This means that their life satisfaction may be less sensitive to physical discomfort.

[19] This is because only a small number of respondents in our sample joined the party during the sampling period and once joined quitting is usually not allowable.

[20] In terms of age and family per capita income, we split the sample at the median point. In terms of education level, those who achieved high school or higher education are defined as the educated, otherwise less educated. As some of those individual characteristics (e.g. income) will change across waves, some observations only appear once in the subgroups and will be automatically dropped in the FE-IV estimation.

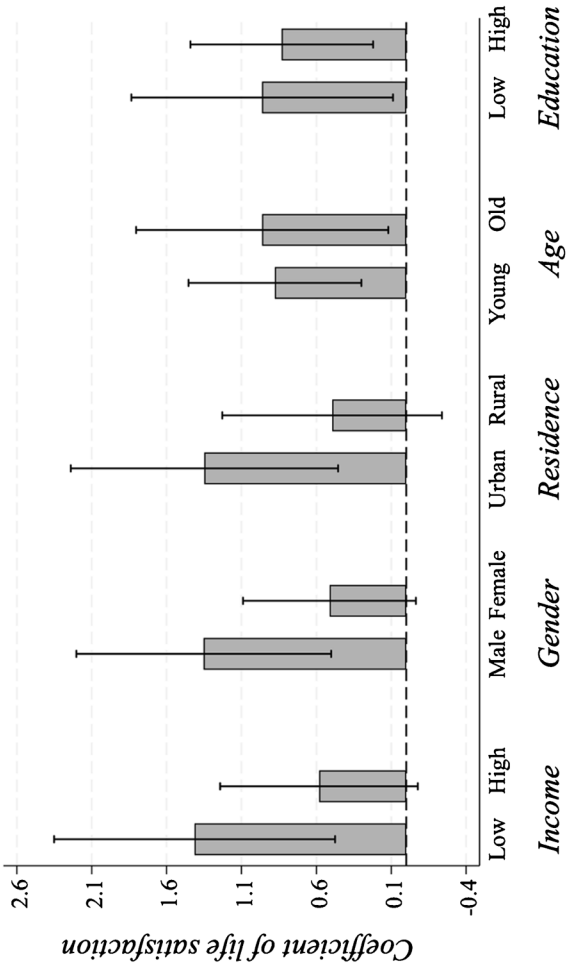

Fig. 2 Effect of life satisfaction on political trust across subgroups. *Note*. The results are estimated by FE-IV models with full controls, based on the IV set of physical attractiveness (PA) and physical discomfort (PD). Control variables include age (log-linearized), marital status, education level, residence, Hukou, CPC membership, occupation status, family per capita income (log-linearized), household size, and evaluation of medical services. All control variables are described in Online Appendix Table A1. Detailed results can be found in Online Appendix Table A3. Whiskers denote 90% confidence intervals, which are calculated based on standard errors clustered at county level

out based on the combination of physical attractiveness (PA) and physical discomfort (PD) as PCR is only available for relatively older participants in the survey. The results are presented graphically in Fig. 2, while the detailed results may be obtained from Online Appendix Table A6. The estimated differences across subgroups are often large, but they are mostly statistically insignificant due to large standard errors, except for the urban–rural gap. These findings should therefore be interpreted with caution.

Figure 2 reveals that the estimated effect of life satisfaction on political trust is comparatively large for the subgroup with below-average income. Individuals in this group are more likely to receive government aid, such as unemployment subsidies and targeted poverty alleviation measures. This may lead to a greater perception that their individual well-being is dependent on the government compared to their wealthier counterparts. We note here, however, that this explanation as well as the following interpretations is somewhat speculative and derived ex post.

The estimated impact of life satisfaction on political trust is also much more substantive for males than females. A possible explanation is that Chinese culture has a traditional feature of "men outside, women inside" so that men should take more responsibility when it comes to any actions involving local government (Du et al. 2021). Under such a social structure, men may have a stronger sense that government influences their well-being, which we suggest is a possible explanation for this gender difference. Another possible explanation is that, due to lower political representation, women may perceive governments as less responsive to their interests and therefore be less inclined to associate their well-being with government actions.

In addition, the effect of life satisfaction on political trust is significantly more substantial for the urban as opposed to the rural subgroup. Clan culture, which still prevails in rural China, could be one reason for this difference. Clan culture encourages individuals to rely more on genealogical networks rather than the government (Cao et al. 2022). It is thus possible that rural residents who are exposed more heavily to clan culture could be comparatively less likely to hold the government accountable for their own well-being.

Finally, there is no evidence to suggest that the relationship between life satisfaction and political trust is significantly different between the old and the young or the educated and the less educated.

6 Robustness checks and further analyses

6.1 Political trust or generalized trust?

One may be concerned that our estimates capture a pure trust effect of happiness rather than an effect specific to trust in the government. Fortunately, CFPS asks respondents about their general trust level, which enables us to control for general trust in our analysis. Specifically, respondents are asked to answer the following yes-or-no question: "In general, do you think that most people are trustworthy, or it is better to take greater caution when getting along with other people?", which

we translate into a binary variable. This or similar measures have been used widely to capture general trust in the political science literature (Sturgis and Smith 2010). The results in column 1 of Online Appendix Table A10 show that the coefficient of life satisfaction remains statistically significant and of a similar size as in our main results if general trust is controlled for.[21] This would suggest that our results reveal an impact of happiness on political trust that goes beyond any effect of happiness on other dimensions of trust.

6.2 Sensitivity to alternative well-being measure

As another sensitivity check, we also test if we can replicate our main findings in Table 1 using an alternative measure of subjective well-being, namely self-reported happiness, which is available in the 2014 and 2018 surveys of the CFPS. In Online Appendix Table A11, we can see that happiness attracts a positive and statistically significant coefficient in our FE model. Next, after employing PA and PD as instrumental variables,[22] we can see in columns 1 to 3 of Online Appendix Table A12 that happiness attracts a coefficient that is considerably larger than the FE estimate. This again suggests that subjective well-being is important in the formation of political trust, and looking at the direct association between these variables will significantly understate the importance of subjective well-being for the formation of political trust.

6.3 Beyond trust: political trust and regime stability

An important assumption for establishing the mechanism of political accountability in our theoretical framework is that political trust matters. That is, political trust is a mechanism through which citizens can express their dissatisfaction with government and ultimately incentivize their government officials to serve the public interest. There is already a large volume of literature underpinning this assumption (see Section 2). Here, we shed light on this issue within our own research setting. A challenge is the lack of data on Chinese people's political behaviours or activities affecting government effectiveness (e.g. tax evasion). Fortunately, a question in the 2014 wave of the CFPS gives us a chance to explore the role that political trust plays in predicting how people will respond to government actions that are detrimental

[21] For parsimony, we only report the results when using PA and PD as the IV set in the FE-IV estimation as this is the combination which maximises sample size. Our results are qualitatively the same if we use all our IV's individually or combined.

[22] Here we only consider physical attractiveness (PA) and physical discomfort (PD) because the data on parent–child relation is not available in the 2014 survey of the CFPS and happiness in contrast to life satisfaction is only available in 2 (2014 and 2018) as opposed to 4 waves. In Column 1 of Table A12, one may note that PD is not as strong an IV for happiness as life satisfaction from the first-stage regressions (F-statistic < 10). We thus also run regressions resting on PA and PD separately, from which we can obtain quite similar estimates (see column 2 and 3 of Table A12). The key point here is that we observe the same pattern as reported earlier when using life satisfaction (see Table 1). Specifically, happiness is significantly correlated with political trust but the FE analysis underestimates this effect.

to their own interest, essentially a measure of the readiness to protest against government actions. Building a causal link is difficult given the cross-sectional data, but the association between political trust and this measure will, we argue, still be informative.

The question (from CFPS 2014) that we take advantage of is: "If you are treated unfairly by the government, such as forced house demolition, land expropriation, compulsory taxation, and unjustified fine, what actions are you likely to take?" Respondents are asked to answer with the following options (multiple choices): "1. Appeal to upper-level officials, 2. Appeal to other government departments, 3. Appeal to courts, 4. Express your views through the internet, media, and social groups, 5. Sign a petition/march/sit-in/protest, 6. Bear it without doing anything, 7. Other actions (self-reported)".[23]

We split these options into two categories depending on the degree to which such actions will undermine regime stability. In general, options 1 to 3 will not hurt the regime as they are actions seeking solutions within the political system. Options 4 and 5, however, reflect people's discontent with the political system and can be seen as actions that could damage regime stability. In terms of option 6, although it largely reflects the fact that people do not believe that they can find a good solution within the political system, it is unlikely to harm the regime directly, at least in the short term. We thus put it alongside options 1 to 3, but confirm our results do not change substantively if we simply exclude respondents who choose this option.We label the resulting dummy variable as *Upheaval* (1 = actions that can damage regime stability and 0 otherwise). In Online Appendix Table A1, we can see that 19% of respondents would choose actions that might be perceived as having the potential to damage regime stability.

Given the binary nature of the dependent variable, we employ a probit model to explore the relationship between political trust and *Upheaval*.[24] The results are presented in Online Appendix Table A13, where we report coefficients and the marginal effects (calculated at means of political trust as well as all covariates). In column 1, we can see that political trust has a significant and negative marginal estimated effect ($\beta = -0.018$, $p = 0.000$). In column 2, a full set of control variables[25] is added to the model, and we can again see that political trust still shows a negative association with *Upheaval* at the 1% significance level, although one that is smaller in size ($\beta = -0.009$, $p = 0.000$). Numerically, these results suggest that a reduction of one SD in political trust (here 2.638 points) is associated with a 2.4 (2.638×0.9)

[23] Note that (i) option 6 is exclusive to other options; (ii) the damaging impact of action 4 is the same as option 5, if not greater. This is because social media can circulate such information quickly and widely, which is detrimental to government image. Although there is social media censorship in China, some news negative to the government can still circulate broadly; (iii) in terms of option 7, CFPS 2014 does not provide details of the other actions and it only constitutes around 1.5% of the total answers; we thus do not consider this option in this paper; i.e. samples with this option are removed.

[24] We also use a linear probability model (OLS) to estimate this effect; the results are also presented in Table A13 and closely resemble the estimates obtained when using the probit model.

[25] The model contains the same control variables as in column 2 of Table 1. Besides, gender, a province-fixed effect and a county fixed effect are added.

percentage point increase in the probability that a person chooses actions which would damage regime stability. This is equivalent to 12.6% of the average probability (19%) that individuals in our sample would choose actions that could damage regime stability (*Upheaval*). As a further comparison, we find in the same model that doubling one's family per capita income will reduce the estimated probability of *Upheaval* by 0.6 percentage points ($\beta = -0.006$, $p = 0.002$). This means that the effect of a one SD increase in political trust is equivalent to a 400% increase in family per capita income when it comes to predicting *Upheaval*. This supports our suggestion that political trust is indeed highly important for regime stability.

7 Conclusion

Recently, researchers have begun to assess whether there is an electoral incentive to consider subjective well-being as a policy goal (so called happy voters). While endogeneity concerns remain a challenge, this literature suggests that subjective well-being could be important for predicting electoral outcomes (Liberini et al. 2017; Ward 2020). Using the example of China, the question we asked is whether there is an incentive for authoritarian rulers to maximize the happiness of their citizens. We approached this question through the prism of social contract theory and political trust. Our idea here is that there is an intangible contract consisting of a set of mutual obligations between the ruling authority (e.g. governments) and its citizens. On the one hand, the ruling authority will commit to the welfare of the general public, and when this occurs, citizens will commit to supporting (trusting) the ruling authority by consenting to their authority.

In support of this premise, using an individual fixed-effects analysis, we first documented a positive association between individuals' self-reported life satisfaction and their political trust. We addressed endogeneity concerns through the use of an instrumental variables analysis, with three different instruments, namely physical attractiveness, recently experienced physical discomfort, and closeness of familial relationships. The consistency of estimates obtained using these instruments separately and in various combinations strongly suggests that our results are credible. Our findings indicate that life satisfaction directly impacts the formation of citizens' trust in the Chinese government. To the best of our knowledge, we present the first causal estimates of the impact of subjective well-being on the formation of political trust.

Our research also adds new insights to the extensive literature exploring the origins of political trust. Previous studies have highlighted the importance of history, culture, and economic development (Chen et al. 2020; Hetherington and Rudolph 2008; Nunn and Wantchekon 2011). Here we show that individuals' own perceived well-being is a significant driver. Our findings also add to a nascent literature that regards subjective measures of well-being as a factor explaining rather than resulting from certain phenomena. Prior studies have, for instance, demonstrated that life satisfaction is a predictor of various individual behaviours such as productivity in the workplace and the decision to get divorced (Clark et al. 2008; Oswald et al. 2015). Our study reveals that although trust might play a significant role in happiness, the

converse is equally valid. Moreover, overlooking the bi-directional nature of this connection may have biased previous evaluations of the link between political trust and life satisfaction, especially given how strong the relationship is between life satisfaction and political trust.

For a long time, the legitimacy of the Chinese government has been believed to rest on the remarkable economic performance of the country. The strong association we measure between political trust and individual's subjective well-being implies that this legitimacy is also built on aspects that go beyond individual income. We note how the Chinese government has started to officially recognize the importance of national happiness: The 20th National Congress of the Communist Party of China (CPC) conspicuously added a sentence to the party constitution stating that "the Communist Party of China has remained true to its original aspiration and founding mission of seeking happiness for the Chinese" (Huaxia 2022). While one might naively perceive this as an act of pure benevolence, our results imply that focusing on population happiness is important to maintaining political trust and thus regime stability. That said, we do not suggest that the government's decision will be completely determined by this incentive alone. There may, of course, also be cases where an authoritarian government adopts measures aimed at ensuring its survival which are detrimental to the happiness of the general public. If other incentives do not align with the wider happiness of the public at large (e.g. serving the interests of a small number of powerful "elites"), this creates a trade-off a government interested in long-term stability needs to navigate: such measures may secure immediate survival but at the same time reduce regime stability longer term, as they deteriorate people's happiness.

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Data availability Data and replication files are available from the corresponding author upon request.

Declarations

Competing interests The authors declare no competing interests.

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